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Factors associated with measles resurgence in the USA in the post-elimination era

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BIOGRAPHY Christian Akem Dimala is a medical doctor and public health consultant who trained first at the University of Buea in Cameroon and then at the London School of Hygiene & Tropical Medicine of the University of London. He went on to continue with his post-graduate medical education at the Unviersity Hospitals of Leicester and the University of Leicester where he also held honorary research fellow positions under the NIHR. His areas of interest include sustainable public health interventions to reduce cardiovascular and infectious disease burdens in Communities. He is currently an Internal Medicine Resident Physician at the Reading Hospital.

BACKGROUND There have been growing concerns of a potential re-establishment of measles transmission in the USA (US) in recent years. This study aito explore factors underlying the resurgence of measles in the US by assessing the associations between annual incidence rates (AIR), case importation, vaccination status and disease outbreaks.

METHODS Data on measles transmission between January 1st, 2001 and December 31st, 2019 were obtained from the national centres for disease control and prevention (CDC) surveillance databases and published reports.

RESULTS of the 3874 cases of measles in the US over the study period, 3506 (90.5%, 95%CI: 89.5–91.4) occurred in US residents. The AIR per million population in US residents over this period was 0.60 (95% CI: 0.59–0.61), with an overall significant increase over time ($P = 0.011$). The median percentage of imported and vaccinated cases were 36% [17.9–46.6] and 15% [12.1–23.2] respectively. There was a significant decrease in the percentage of imported cases ($P < 0.001$) but not of vaccinated cases ($P = 0.159$) over time. On multiple linear regression, there was a significant linear association between the AIR and the number of outbreaks ($P = 0.003$) but not with the

percentage of imported cases ($P = 0.436$) and vaccinated cases ($P = 0.692$), $R^2 = 0.73$. Strong negative and positive correlations were seen between the number of outbreaks and the percentage of imported cases ($r = -0.61$) and the of number states affected ($r=0.88$) respectively.

CONCLUSIONS Despite the overall reduction in the percentage of imported cases of measles over the past two decades, pockets of internal transmission of the disease following importation via increasing number of outbreaks in unvaccinated subpopulations, reinforced by vaccine hesitancy, account for the sustained increase in measles incidence rates in the US. Controlling indigenou transmission through efficient vaccination coverage in at-risk subpopulations and among international US travellers, improved disease surveillance and outbreak containment are essential in curbing measles resurgence.

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Information, trust and adherence to recommendations among migrants in Norway during the first wave of the COVID-19 pandemic

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BIOGRAPHY Pierina Benavente has a Master's degree in Global Health from the University of Bergen and is currently working as research assistant in the Inncovid.-Norge project. Her main focus is on migration and health research and on development of inclusive health policies for migrants and refugees. Pierina has also 14 years of experience in clinical trials.

Background And Objective Migrants in Norway bear a higher burden of COVID-19 infections and hospitalization than non-migrants. The Inncovid.Norge project was

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established to understand migrants': i) perception of health risks, ii) access to information, iii) degree of trust in and iv) adherence to recommendations from Norwegian health authorities during the first wave of the pandemic.

METHODS The project has two components. 1. An online survey was conducted between May and July 2020 among 529 Polish, Arabic, Somali, Tamil and Spanish-speaking migrants. Unweighted and weighted descriptive analysis and chi-squared tests were performed for all migrants together and for each language group. 2. A total of 55 structured phone interviews were performed in April-May 2020 with migrants from five different countries living in Norway: Poland (10), Syria (15), Somalia (10), Sri Lanka (10) and Chile (10). Interviews were conducted by bilingual researchers, audio-recorded, transcribed and analyzed with thematic analysis.

RESULTS Quantitative results there were statistically significant differences among groups in their perception of the risk of infection. Although the vast majority reported having received sufficient information (88%) and had high levels of trust in Norwegian authorities (76%), there were statistically significant differences among groups regarding the importance of sources of information and the level of trust, which was lowest for the Polish group. Overall, migrants reported very high adherence to non-pharmacological recommendations (88%). Qualitative results migrants used several combined and often transnational sources of information. Information was perceived as confusing and contradictory, but they also described strategies that worked. There was a wish for more translated information, especially regarding everyday challenges during the first wave of the pandemic.

CONCLUSION Understanding how migrants are dealing with this pandemic and the specific challenges is crucial to improve the dissemination of information and trust in the health authorities for the different groups.

234**How much health can a ton of carbon buy?**

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BIOGRAPHY Anand Bhopal is a PhD Research Fellow at the University of Bergen working at the interface of climate change and priority setting in health.

BACKGROUND Healthcare contributes around 4–5% of global carbon emissions, which is more than aviation and shipping combined and this figure is growing. The global

carbon budget is limited and finite and requires every sector to cut emissions and 'spend' wisely. Drawing on priority setting principles, we approach carbon emissions from the perspective of resource scarcity: where Dean Jamieson and colleagues writing in 'Investing in Health' once asked 'how much health can a million dollars buy?', we now ask 'how much health can a ton of carbon buy?'.

OBJECTIVE Our aim is to identify optimal emissions pathways which protect and improve health while decreasing emissions.

METHODS We conceptually analyse the relationship between healthcare and carbon emissions in three domains: (1) the absolute relationship between healthcare carbon emissions and health outcomes, including life expectancy, (2) carbon emissions and disability-adjusted life year (DALY) averted from individual interventions and (3) marginal carbon emission impacts of different approaches to clinical care, including potential tradeoffs between the quality and climate agenda.

RESULTS High-income countries account for the majority of global healthcare carbon emissions. At present, rapid improvements in health are not contingent on high carbon emissions, however, high-quality healthcare is. Hospital based healthcare is more carbon intensive than primary care based services. On the margins, major reductions in emissions from healthcare services can occur without reducing quality of care.

CONCLUSION The majority of healthcare carbon emissions derive from high-income countries. This is not only costly but carbon intense and inherently unsustainable at a global scale. Better conceptualising the relationship between healthcare carbon emissions and health will help prioritise interventions to reduce healthcare's growing carbon footprint and promote global health equity.

51**Disaster, displacement and disease: investigating zoonoses in forced migration in Pakistan**

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BIOGRAPHY Dorien Braam previously worked with the UN, Netherlands Government and NGO's across Asia and Eastern Africa focusing on forced migration, protection, human rights and shelter, before returning to academia with a in International Animal Health (Edin), writing a thesis on animal health in complex humanitarian emergencies. For her PhD in Veterinary Medicine she studies zoonoses–diseases transmitted between animals and

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humans—in displaced populations, with a focus on the Greater Horn of Africa, the Middle East and South Asia.

OBJECTIVES In the context of climate change, environmental degradation and more frequent disasters, human and animal displacement is projected to increase, with significant global health risks. Pathways to disease are complex and non-linear, in particular relevant when considering zoonoses, diseases transmitted between animals and humans. This study aims to highlight the complexities of endemic zoonotic disease risk and vulnerabilities of displaced populations in Sindh, Pakistan.

METHODS Using a qualitative case study approach, 30 semi-structured expert interviews and 17 semi-structured household interviews and observations were conducted, supported by a review of secondary qualitative and quantitative data. Findings were analysed using an ecosocial theoretical framework, to uncover the complex multilevel connections between risks and vulnerability factors.

RESULTS During displacement, livestock is an important consideration in determining movement and destination location, however rarely accommodated by relief agencies. Pre-existing connections, status within the community, role within the household and available resources played a significant role in determining displacement experience and related impact on immunity and health, both during displacement and the aftermath.

CONCLUSION People's vulnerability to zoonoses is largely grounded in structural inequalities and related vulnerabilities need to be addressed at individual, household, community and institutional level.

330**Do climatic hazards contribute to long-distance forced migration?**H. Buhaug*Peace Research Institute Oslo (PRIO), Oslo, Norway*

BIOGRAPHY Halvard Buhaug is Research at the Peace Research Institute Oslo (PRIO); of Political Science at the Norwegian University of Science and Technology (NTNU); and Associate Editor of Journal of Peace Research. His research portfolio includes multiple projects on security dimensions of climate change, funded by, e.g., the European Research Council, the World Bank and the Research Council of Norway. Recent publications include journal articles in *Global Environmental Change*, *Nature* and *PNAS*. He is chapter Lead Author in the forthcoming UN IPCC Sixth Assessment Report.

This study evaluates the importance of climatic conditions relative to economic, political and contextual

factors for predicting bilateral asylum migration to the European Union—a form of forced migration that has been causally linked to climate variability.

To account for complexities in drivers of migration related to endogeneity, multivariate interactions and unknown functional forms, the study develops a machine-learning prediction framework where variable importance is evaluated through out-of-sample prediction performance.

Results reveal that drought and temperature anomalies are weak predictors of asylum migration, challenging simplistic notions of climate-driven refugee flows. Instead, core contextual characteristics shape latent migration potential whereas political violence and repression are the most powerful predictors of time-varying migration flows.

Future asylum migration flows are likely to respond much more to political changes in vulnerable societies than to climate change.

328**Barriers and facilitators for tuberculosis case finding and retention in care among refugees in Kampala, Uganda: Using the COM-B model**E. Buregyeya*Makerere University School of Public Health, Kampala, Uganda*

BIOGRAPHY Esther Buregyeya, is an Associate and Head of Department for Disease Control and Environmental Health at Makerere University School of Public Health. She is a Ugandan physician with a master of philosophy in health sciences (with a bias in occupational health) from University of Bergen, Norway and a PhD in medical sciences from University of Antwerp, Belgium. Esther is a research expert in disease control with over 16 years of experience. She has a strong background in field research with vast experience in designing and implementing research mainly in HIV, tuberculosis, malaria antimicrobial resistance and mHealth.

BACKGROUND Globally, displaced populations face an increased burden of tuberculosis (TB). Uganda is currently hosting unprecedented big numbers of refugees from the East African region. There is need for urgent identification and management of TB cases among refugees. This study aimed at exploring the barriers to and facilitators for TB case finding and retention in care among urban slum refugees.

METHODS A cross-sectional study utilizing qualitative methods was conducted among refugees in an urban slum

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in Kampala City, Uganda. Key informant interviews with health care workers and community leaders and in-depths interviews with refugee TB patients and care takers of TB patients were conducted. Interview questions were based on constructs from the COMB-B model (Capability, Opportunity and Motivation Model of Behaviour change). Manual content analysis was performed and identified targeted intervention strategies guided by the related Behavior Change Wheel implementation framework.

RESULTS Key barriers included: physical capability (availability and easily accessible private facilities in the community with no capacity to diagnose and treat TB), psychological capability (lack of knowledge about TB among refugees), social opportunity (wide spread TB stigma and language barrier), physical opportunity (poor living conditions, mobility of refugees), reflective motivation (lack of facilitation for health workers), automatic motivation (discrimination and rejection of TB patients). Facilitators were; physical capability (availability of free TB services in the public health facilities), social opportunity (availability of translators).

We identified education, incentivization, training and enablement as relevant intervention functions with potential to address barriers to and enhance facilitators of TB case finding and retention among refugees in urban slums.

CONCLUSION The application of the COM-B model demonstrated the barriers and facilitators of TB case finding among refugees living urban Kampala, Uganda. The findings could serve as a guide for the design and implementation of interventions for improving the same.

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Prevalence of infectious diseases at primary care level in the migrant population residing in Catalonia, Spain

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BIOGRAPHY In Global Health under the Barcelona Institute for Global Health (ISGlobal) and BS in Integrative Biology at the University of Puerto Rico. Currently working as a data analyst under ISGlobal and previously performed the extensive data analysis of the CRIBMI research project as part of her Master's thesis. Also, she has fieldwork experience, working in the research project "Seroprevalence of antibodies against SARS-CoV-2 among health care workers in a large Spanish reference hospital". She has a keen interest in improving public health challenges to achieve access and equality for migrant populations.

INTRODUCTION Data are scarce on the prevalence of key infections in migrant populations at primary care, the first contact point of migrant groups with the health system, which is key for health policy planning.

OBJECTIVE To estimate the prevalence at primary care of infectious diseases, including HIV, active tuberculosis (TB), hepatitis B and C, Chagas disease, strongyloidiasis and schistosomiasis, in migrants residing in Catalonia, Spain in 2018.

METHODS The CRIBMI project implemented a systematic screening programme of seven infections at primary care for migrants residing in 4 areas of Catalonia (Barcelona, Lleida, Manresa and Tortosa). A cross-sectional study was carried out on migrants who attended primary care in 2018 for any reason and to whom testing was recommended under the CRIBMI programme. Serological tests were performed for the screening of all infectious diseases, except for active TB, where chest x-rays were carried out. All test results were extracted from the electronic patient record system of primary care in Catalonia which is linked to the laboratory system.

RESULTS Among 16,962 migrants who attended the participating centres, 2,535 (15.0%) were tested for at least one infection. The prevalence of infection among

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migrants for which a serological test was performed was 1.1% (13/1141) for HIV, 18.8% (286/1518) for Hepatitis B, 1.6% (23/1434) for Hepatitis C, 2.7% (5/186) for active TB, 6.9% (9/131) for Chagas disease, 14.0% (57/407) for strongyloidiasis and 3.9% (4/104) for schistosomiasis.

CONCLUSION A relatively high prevalence was reported in the selected infectious diseases within the screened migrant population. This serves as a reminder to the healthcare authorities to carry out extensive screening, monitoring and surveillance of key infectious diseases in migrant populations at primary care and community level to decrease the related morbidity and mortality of these infections.

41**The impact of COVID-19 on the psycho-social experiences of children left behind due to parental migration in Southern Wollo, Ethiopia**

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BIOGRAPHY Born and educated in Gondar, Ethiopia. lecturer at Wollo University and PhD fellow at Addis Ababa University. more than six years of experience in teaching and community service. Social psychology by training.

As parental migration increases worldwide a growing number of children are being left behind by migrant parents. Despite the positive effects of remittance have on poverty reductions, short term economic growth and the material well-being of children, a significant part of the story is omitted. This article explored the impact of parental migration during COVID -19 as perceived by children left behind in Southern Wollo, Ethiopia whose either one or both of their parents had migrated abroad. Accordingly, data were gathered qualitatively from 15 children whose parents migrated abroad in Southern Wollo, Ethiopia. Consent from caregivers and left-behind children was obtained. Parental migration coupled with COVID-19 affected the psychosocial well being of children. The results also found due to COVID-19 children worried about a reunion with migrant parents since they are listening to people who died abroad. Children left behind responded that they lack parental love and care and experienced isolation, longing, sadness and fear due to COVID- 19. Home stay restrictions for left-behind children exposed them to their peers in school and other activities that served as coping mechanisms for parental absence. Thus, organizations and those that have a stake shall work and design policies to ensure the best interest

of these children left behind that are overlooked during COVID -19. Activities shall be designed for caregivers and families left behind at home to communicate and support children who became vulnerable to various psychological and social problems as a result of parental absence during the pandemic.

323**Exposure and public health effects of polycyclic aromatic hydrocarbon compounds in Sub-Saharan Africa: A Systematic review**

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BIOGRAPHY Benson is a practising dental physician, public health specialist and academic researcher with research interests in environmental health, epidemiology and public health. He's presently a doctoral student at the University of Port Harcourt where he also bagged his Masters' degree in Public Health. He's a member of the Royal Society of Tropical Medicine and Hygiene and has collaboratively published more than 25 original and review manuscripts in Nigerian and International journals. He possesses certifications in research ethics and also serves as a research associate with research consulting firm in Nigeria.

OBJECTIVE In order to achieve improved global health, environmental health risks that could affect this goal have to be reduced as much as possible. This review thus aimed at determining the exposure levels, health risk assessments and public health effects of Polycyclic Aromatic Hydrocarbons (PAHs) in Sub-Saharan Africa (SSA).

METHODS This review was developed using guidelines provided for Preferred Reporting Item for Systematic Review and Meta-Analysis (PRISMA). Search was done on Google Scholar, Scopus and Pubmed databases. A study was included if it was carried out in SSA from 2000 to 2020 and written in English language. Fifty-two studies were finally retained and used for the review. Extracted data included the concentrations of 8 selected priority PAHs (including the PAHs prioritized for their carcinogenic potentials), their sources and reported outcomes.

RESULTS In SSA, PAHs exposure has been linked to the use of unprocessed biomass fuels for cooking, release of poorly treated petrochemical effluents into water bodies,

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etc. Related public health effects included the occurrence of respiratory, cardiovascular abnormalities etc. Others included destruction of natural biodiversity in soil, water and atmospheric environmental media. Health risk assessments also buttressed the occurrence of these public health effects of PAHs.

CONCLUSION The Sub-Saharan Africa region is exposed to a substantial amount of PAHs pollution which is associated with deleterious environmental and epidemiological effects. The adoption of healthier forof energy, a change of attitude to one that favours environmental sustainability and proper enforcement of environmental regulations; are thus necessary for attaining environmental sanity in this region.

KEYWORDS: PAHs pollution, exposures, public health effects, Sub-Saharan-Africa, health risk assessment, environmental effects.

290**Future aspirations: Koranic education in West Africa**

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BIOGRAPHY Jónína Einarsdóttir has a Ph.D. in Anthropology from Stockholm University. She is a of Anthropology and Head of Faculty at the University of Iceland. She has conducted extensive fieldwork in Guinea-Bissau and Iceland. Her main fields of research are anthropology of children and youth, medical anthropology, development and humanitarian aid, fragile states and health care system. In Iceland, her research includes the study of the Icelandic custom to send urban children to stay and work on farduring the summertime.

OBJECTIVE The parents of allegedly trafficked children are mostly ignored or represented as cruel, naïve, or desperately poor in mass media and reports published by global and local institutions and NGOs. The aim of the study was to give voice to Bissau-Guinean Fula Diabe parents who are descendants of former slaves who aim to raise their social status by sending their sons to the neighboring country Senegal to study the Koran.

METHODS Data is based on series of fieldwork, including participant observation and interviews, in 2009–17 and focuses on the marabouts, parents, villagers, NGO staff and Bissau-Guinean Koran schoolboys in Senegal.

RESULTS While no parent argues they are forced to send away boys to have fewer mouths to feed, they lament few educational opportunities in their villages. The

parents, more concerned with their discrimination than poverty, send their favorite son abroad hoping he will return to the village to teach children the Koran and become a respected citizen. To the outrage of the parents, global institutions and NGOs classify the practice to send the boys to Senegal, including the crossing of borders and begging, as child trafficking.

CONCLUSION To the dismay of the local population, anti-trafficking activities are ongoing, including repatriation of boys from Senegal, something seen as degrading and patronizing. Repatriation of their chosen son is seen as the worst outcome and proof of their discrimination. Yet, the parents are resistant and continue to send their sons to Senegal to seek knowledge and fight “ignorance” through religious education.

28**Humanitarian Emergency at sea: Health of migrants recovered from the Mediterranean during the 2015–2017 surge in irregular migration to Europe**

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OBJECTIVE In the spring of 2015, an unprecedented 60 million individuals had been forcibly displaced from their native homes worldwide. Assisted by people smugglers and criminal networks, more than one million men and women, children and elderly embarked on hazardous voyages across the Mediterranean Sea. In small inflatable dinghies, wooden boats and fragile vessels the migrants entrusted their fat in the forces of nature and the goodwill of their smugglers. The extraordinary rise in migrants seeking to Europe led to a sharp increase in migrants landing on the beaches in Greece, Italy and Spain. This study assess the health of migrants that survived.

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METHODS Health of migrants rescued as a part of the Norwegian-lead Operation Triton (2015–2017) in the Mediterranean ($n = 30\,000$) was evaluated in terms of triage category, diagnoses recorded at the time of rescue and the treatment provided and then analysed with reference to key variables on the migration, including time of year, route of travel, days at sea, means of transportation, number of co-travellers and weather conditions, as well as the demographic variables recorded (gender, age category; adult/child/elderly and country of origin).

RESULTS We found that a majority of migrants presented no physical injuries or diseases in need of immediate follow up. Nonetheless, a substantial proportion did. Conditions included infections, injuries, dehydration, fatigue, as well as exacerbation of a variety of pre-existing health conditions.

CONCLUSION Migration put logistical constraints on limited resources, including capacity for medical support. This project provides new insight into health and health care needs of migrants entering Europe by sea, in support of better planning of both immediate and long-term healthcare services to this particularly vulnerable group of individuals in the future.

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Climate change and child health: a scoping review and an expanded conceptual framework

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BIOGRAPHY Daniel Helldén is a medical doctor and PhD student at the Department for Global Public Health at Karolinska Institutet, primarily interested in the intersection between child health and broader sustainable development.

OBJECTIVE Climate change can have detrimental effects on child health and wellbeing. Despite the imperative for a fuller understanding of how climate change affects child health and wellbeing, a systematic approach and focus solely on children (aged <18 years) has been lacking. In response to this challenge, our aim was to broadly assess how climate change affects child health and wellbeing.

METHODS Following the objective, a scoping review method was applied with a literature search on the impacts of climate change on child health from January, 2000, to June, 2019 conducted on PubMed, Web of Science, Cochrane Library, Global Health and WHO regional databases. The included studies explicitly linked an alteration of an exposure to a risk factor for child health to climate change or climate variability. Through open coding based on previous frameworks, an expanded framework was developed.

RESULTS In total, 2970 original articles, reviews and other documents were identified, of which 371 were analysed. Direct effects of climate change include temperature changes (heat waves and more rapidly changing temperatures), changing precipitation patterns with increased risk of floods, droughts and wildfires. More indirect effects include ecosystem disruption, changing vector patterns and air pollution. Child health risks due to these effects can be categorised as (I) a cause of direct harm to children from a range of diseases and (II) an increase in the risk of overall disease. However, the effects of climate change on child health vary significantly across geographical locations and are heavily influenced by broader socioeconomic contexts.

CONCLUSIONS Present and future generations of children bear and will continue to bear an unacceptably high disease burden from climate change. The understanding of climate change impacts on child health could be further enhanced by studying overlooked populations, socioeconomic contexts and geographical regions.

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Unveiling the double hidden faces of migration impacts in Cambodia: mental health of aging caregivers and left behind children

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BIOGRAPHY Thida Kim holds a master degree in family and developmental psychology and master degree in Gender and Development Studies. She is currently a Ph.D student at the University of Hong Kong, major in social psychology.

OBJECTIVE According to a national-level survey on migration impacts conducted in 2018, aging caregivers in migrant households reported poorer health status and a higher prevalence of anxiety and depression symptoms,

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45 and 53 percent respectively. Drawing on the qualitative data, this paper investigates key explanatory factors of mental health impacts and well-being of left behinds, specifically grandparents and children. Coping strategies and household resources are also explored.

METHODS The study adopts a qualitative method applying thematic analysis. Twenty-six households identified by the absence of parent(s) due to migration, internally or internationally, were purposively selected from 1456 surveyed households. In-depth interviews were separately conducted with grandparent and child, aged 12–17.

RESULTS Three themes on coping strategies emerged involving caregiver's financial independence, household structure and other social resources. Aging grandparents, aged 55 to 75, reported multiple health problems comprising aging-related physical illness and psychosocial distress linked to childcare and household burden. Left behind children described various emotional distresses including sadness, anger, self-pity and jealousy over parent's migration. A perceived lack of warmth and care from the middle generation significantly contributes to psychological disadvantage among left behinds, especially in skipped generation households where instrumental support from the middle generation is absent. Yet, remittances, regular communications and visiting of migrants improved the livelihoods and minimised distress of left behinds. Also, economic independence and/or other sources of household income contribute to better living conditions of left behinds regardless of remittance.

CONCLUSION A compounding health disadvantage is observed among left behinds, especially in skipped generation households. Though remittance somewhat improves livelihoods and facilitates debt repayment, left behinds engage in coping strategies including narratives of financial independence and the importance of multigenerational family structure of households. This study paves the way for recommendations and further interventions to support left behinds.

285**Psychological resilience among refugees in Greece: Implications of being a peer refugee helper**

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BIOGRAPHY Michalis Lavdas is a researcher at the Society and Workplace Diversity Research Group (Bergen University) involved in the research project “Clinical

encounters with refugees suffering from mental health problems”. The main focus of the research he is involved in relates to facilitators of resilience with an emphasis to peer refugee helpers in the Greek context. He has graduated from the Department of Psychology in Panteion University of Athens (Greece) and has a MSc. Diploma in Mental Health Policy and Planning from the New University of Lisbon. He has more than 10 year experience in public mental health settings.

The research, conducted in a Greek context, aims to gain more knowledge on the facilitators that foster resilience in refugees and asylum seekers emphasizing “peer help” experience. Understanding how people originating from different cultural backgrounds understand mental health as well as focusing on helpers with a lived experience in forced migration and how it affects them is of crucial importance in scaling up mental health care for internationally displaced populations. Helpers are identified as people that sharing a common experience with the beneficiaries provide a range of services from interpretation, cultural mediation to psychosocial care provision and caregiving. Specific focus of the research is placed in the implementation of the World Health Organization scalable intervention Problem Management Plus (PM+).

A multi-method research design will be implemented through qualitative methodology in combination with the use of well validated psychological instruments under separate sub-studies. Such activities will involve (a) vignette based focus group interviews, (b) semi-structured group interviews and (c) quantitative measures for resilience, sense of coherence and demographics. Additionally, an evaluation will be conducted of the peer-refugee delivered intervention of PM+. This intervention is being delivered in refugee settings in Greece through Terre des hommes Hellas.

Data gathered will be analysed to provide evidence on PM+ effectiveness in refugee camp settings. Additional collaboration in the previous research activities will be sought through established collaboration with Drop in the Ocean as well as with other organizations that represent refugee communities in Greece.

Initial results that will be produced through the above-mentioned sub-studies will be included at the presentation hoping to inform policies and practices in the field of refugee mental health, promoting the principles of inclusion and emphasis in lived experience even in high-income context. Understanding the role of peer refugee helpers might also provide important data on proper support of such initiatives.

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"An act of God" Climate change awareness and perceived health effects in rural communities of southwest, NigeriaC. Onuegbu¹ and F. Omololu²¹University of Warwick, Coventry, UK; ²University of Ibadan, Ibadan, Nigeria

BIOGRAPHY Chinwe Onuegbu is a doctoral student at Warwick Medical School, University of Warwick, UK. Her research focuses on informal health discussions in low-resources settings of Low-and-Middle-Income Countries (LMICs).

OBJECTIVE This study aimed to explore the local understanding and perceived health-related consequences of climate change among rural dwellers in southwest Nigeria.

METHODS A mixed-methods research design was adopted. A household survey was initially carried out among 572 respondents to understand the level of awareness about climate change in the community. A semi-structured questionnaire containing questions adapted from previously validated questionnaires was used. Following the survey, in-depth interviews were conducted among 12 community members from different age and sex categories to further explore the perceptions and experiences of climate change. Frequencies and Chi-square tests were used to conduct univariate and bivariate analysis of the survey data, respectively, while a thematic analysis technique was used to generate relevant themes from the interviews.

RESULTS A large majority (95%) perceived that climate change exists (through their personal observations), but only 25% knew "climate change" as a concept and a global phenomenon. Education ($P = 0.000$), occupation (0.000) and income level (0.047) were associated with knowledge of the concept of climate change. However, about half of the population (45.6%) understood climate change as a phenomenon caused by supernatural forces, while 32.8% had no ideas of its causes. Findings from the interviews corroborated this result, as expressions such as "an act of God", "end of the world" and "sign of God's vengeance" were used to describe climate change. Furthermore, 90% of the participants believed that climate change was affecting their health. Health effects recounted during interviews were mostly increased heat which caused dehydration, fever, measles and dysentery.

CONCLUSION Poor knowledge and misinformation about climate change exists in local rural communities in Nigeria. As part of efforts to increase potentials for adaptation and mitigation of climate change, it is important to

prioritise orientation campaigns to increase knowledge and best practices in rural communities of Nigeria.

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Cross-border movement threatening malaria elimination effort in the Guiana Shield: assessment of mobile migrant population characteristicsP. Pratley¹, M. Heemskerk², E. Jacobs¹ and H. Hiwat³¹KIT Royal Tropical Institute, Amsterdam, Netherlands; ²Social Solutions, Paramaribo, Suriname; ³Ministry of Health of Suriname Malaria Program, Paramaribo, Suriname

BIOGRAPHY Pratley is a senior Health Systems and Services advisor specialized in research, evaluation and program implementation at the intersection of Health Systems Strengthening and vulnerable populations. He holds a DrPH from The George Washington University in Washington, DC and previously served as a specialist in health policies and systems strengthening at the WHO regional office for the Americas in the Suriname country office.

JUSTIFICATION Migration along the porous borders of Suriname with French Guiana, a European Territory and Brazil, represents a continuous threat to the national elimination goal in Suriname. A key population that engages in this migration are Artisanal Small-Scale Gold miners (ASM) that work throughout the Guiana Shield.

OBJECTIVE The study was focused on understanding the size, characteristics, migration patterns and health-related perceptions on risk of disease, health needs and access to care among mobile migrant ASM communities in Suriname.

METHODS Mobile Migrants' population characteristics were examined using a mixed methods approach combining document review, a quantitative survey and qualitative in-depth interviews with the target population and experts.

RESULTS The total ASM population was estimated at around 31,000 individuals, of which 20,000 active in Suriname and 11,000 in French Guiana. Turnover was estimated to be 10.5% of which 95%, or some 2,000 persons annually are newcomers to the sector. International migration patterns were mapped from Brazil, but also from Venezuela, Dominican Republic, Cuba and China. In terms of perceived health risks, we find that most ASM workers are somewhat concerned with malaria, leishmaniasis and COVID-19.

CONCLUSION The improved understanding of the size, characteristics, migration patterns and health needs of

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ASM communities carries important implications for targeting the health needs of these vulnerable and hard-to-reach mobile communities in the Guiana shield. Recommendations include

- 1 Using data to target most vulnerable subgroups
- 2 Increasing efforts to communicate risks, preventive measures and treatment options
- 3 Scale up support by increasing service delivery, specifically for most at-risk subgroups to implement prevention and treatment options for malaria elimination.

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Factors influencing immigrant women's satisfaction with care during childbirth: A cross-sectional study in central Norway

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BIOGRAPHY My name is Kristin Reppen and I am 24 years old. I live in Trondheim where I study medicine at the Norwegian University of Science and Technology. This is my fourth year of medical school and I follow The Medical Student's Research Program. My research interests revolve around women in global health and I am part of a research group investigating immigrant women's experience of maternity care during childbirth at St. Olavs hospital in Trondheim.

Besides my studies I have a passion for cooking and I play the French horn in the medical student's orchestra.

OBJECTIVE Immigrant women in Norway and other countries are more likely than the general population to experience interventions during childbirth, poorer birth outcomes like preterm delivery and unsatisfactory birth experience. The underlying causes behind these associations are complex and unclear. Few studies from Norway focus specifically on immigrant women's childbirth experiences and outcomes. The objective of this study is to measure and investigate potential differences in Norwegian born and non-Norwegian born women's childbirth experiences and satisfaction with health care during labor and birth at St. Olavs Hospital in Trondheim, Norway.

METHODS A cross-sectional study is currently being carried out on the hospital maternity wards. All eligible women are being invited to complete a questionnaire within the first week postpartum. The questionnaire incorporates validated and self-developed items to measure birth experience, satisfaction with care, prior birth experiences, sociodemographic characteristics and the woman's general health. To increase response rates and

allow a more diverse population to participate in the study, the questionnaire is translated into six languages in addition to English and Norwegian: Polish, Arabic, Tigrinya, Dari, Farsi and Somali. The recruitment period started in September 2020 and will continue until September 2021. The questionnaire data will be supplemented with pregnancy and birth information from consenting participant's birth records.

RESULTS We will compare birth experiences between and within groups of women: immigrant and non-immigrant and then further assess differences within the groups based on different variables such as region of origin, total time lived in Norway, age and socioeconomic status.

CONCLUSION This study has the potential to increase knowledge relevant for the provision of high-quality health care in childbirth in Norway's increasingly diverse population.

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Family physician perceptions of climate change, migration, health, and health care in sub-Saharan Africa: an exploratory study

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BIOGRAPHY Speciality Environmental health, health equity, lung diseases. Current main role: Operational manager of CliMigHealth, Post-doc at Ghent University, Harvard Medical School and BIDMC, where I assess the impact of temperature differences on lung health of people with chronic obstructive pulmonary disease.

OBJECTIVE While family physicians (FPs) are community-oriented generalists and should be the entry point for the population's interaction with the health system, they are underrepresented in research on the climate change, migration and health(care) nexus. Similarly, FP insights into building capacity through integrating health-determining sectors (recommended WHO-strategy) for climate-resilient and migration-inclusive health systems needed, especially in regions such as Sub-Saharan Africa (SSA). Therefore, we explored FPs perceptions on climate change, migration and health(care) in SSA and on intersectoral capacity building opportunities.

METHODS Three focus groups of each 10 FPs conducted during the 2019 WONCA conference in Kampala,

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Uganda were transcribed verbatim and inductively analysed.

RESULTS FPs' perceived interactions related to 1) migration and climate change, 2) migration for better health and health care, 3) health impacts of climate change and the role of health care and 4) health impacts of migration and the role of health care. We coined these complex and reinforcing interactions as continuous feedback loops intertwined with socio-economic, institutional and demographic context. Furthermore, FPs identified intersectoral capacity building opportunities on micro, meso, macro and supra level: multi-dimensional and multi-layered governance structures; improving FP training and primary health care working conditions; primary health care providers as community and policy educators; collaboration between health sector and civil society; and more responsibilities for high-income countries.

CONCLUSION This study points towards future interdisciplinary research questions and complexity theory to analyse the nexus and identifies responsibilities for FPs and primary health care in intersectoral capacity building strategies.

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415**The global prevalence and correlates of skin bleaching: a meta-analysis and meta-regression analysis**

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BIOGRAPHY Dominic Sagoe is an associate at the Department of Psychosocial Science and leader of the Human Enhancement and Body Image Lab (HEBI Lab) at the University of Bergen. He obtained a PhD in psychology from the University of Bergen in 2015. Dominic's research specialization is in epidemiological and psychosocial aspects of human enhancement drug (HED) use particularly anabolic-androgenic steroid use and body image. He has published several articles in his speciality and has collaborated with many academics, researchers, policymakers and health professionals around the world.

OBJECTIVE To estimate and investigate the global lifetime prevalence and correlates of skin bleaching.

METHODS A meta-analysis and meta-regression analysis was performed based on a systematic and comprehensive literature search conducted in Google Scholar, ISI Web of Science, ProQuest, PsycNET, PubMed, other relevant websites and reference lists. A total of 68 studies (67,665

participants) providing original data on the lifetime prevalence of skin bleaching were included. Publication bias was corrected using the trim and fill procedure.

RESULTS The pooled (imputed) lifetime prevalence of skin bleaching was 27.7% (95% CI: 19.6–37.5, $I^2 = 99.6$, $P < 0.01$). The highest significant prevalences were associated with: males (28.0%), topical corticosteroid use (51.8%), Africa (27.1%), persons aged ≤ 30 years (55.9%), individuals with only primary school education (31.6%), urban or semi-urban residents (74.9%), patients (21.3%), data from 2010–2017 (26.8%), dermatological evaluation and testing-based assessment (24.9%), random sampling methods (29.2%) and moderate quality studies (32.3%). The proportion of females in study samples was significantly related to skin bleaching prevalence.

CONCLUSION Despite some limitations, our results indicate that the practice of skin bleaching is a serious global public health issue that should be addressed through appropriate public health interventions.

KEYWORDS: skin bleaching, skin lightening, cosmetic dermatology, epidemiology, public health

26**Interruption of health care for the residents of Moria refugee camp in Lesbos, Greece, after the fire in 09/2020**

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BIOGRAPHY Schaller is a Internal Medicine and Tropical Medicine specialist. She has been working in many places around the world, most recently among refugees on the island of Lesbos, Greece.

OBJECTIVE As a volunteer doctor from Switzerland working in Moria–Europe's biggest refugee camp–on the Greek island of Lesbos during the time of the fire that destroyed the entire camp in September 2020, I witnessed the health problem that arose after the population was left in the street. As we were able to access the refugee population again, I decided to document the impact on the health of chronic patients.

METHODS About 300 patients were on chronic medication at that time for conditions such as diabetes, chronic heart disease, epilepsy, rheumatic inflammatory diseases on long-term immunomodulators or severe psychiatric disorders. I recorded information about the health effects of the emergency situation and recorded vital parameters during the days following the reopening of a clinic.

RESULTS During the first five days of operation of the temporary clinic (12–16/09), 85 of the registered chronic patients presented and received their medication. We

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measured the vital parameters of most of the patients. The blood pressure readings were overall acceptable. The lack of food possibly contributed to avoiding the development of hyperglycaemia in most diabetic patients; however, 11 patients had a blood glucose above 200 mg/dl (11 mmol/l) and two of them above 500 mg/dl (27.8 mmol/l). Among the patients who consulted in those days following the destruction of the camp, some were at risk of severe complications following treatment interruption (myocardial infarct during the week preceding the fire, artificial mitral valve on long-term anticoagulation, severe epilepsy, Graves disease).

CONCLUSION Crisis such as a fire might cause disruption in the treatment of the chronic patients. In most cases, an interruption of a few days has no repercussions. However, with some chronic diseases, consequences can be dramatic. The authorities in charge of the emergency response must be made aware of the needs of this specific population.

128**Socioeconomic impact of COVID-19 among immigrants in Lisbon Region**

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BIOGRAPHY A researcher with 14 years of global experience in health econometrics, epidemiology and data analysis. Teaching assistant in the courses of biostatistics, data analysis and econometrics for public health. I have concentrated most of all on global health with a profound interest in studying quantitative research methods and risk factors that can affect vulnerable populations in general and migrants in specific.

OBJECTIVE Pre-existing inequalities among immigrants may threaten their economic well-being during the pandemic. This study compares the economic impact of COVID-19 between immigrants and natives.

METHODS Cross-sectional analytical study conducted in Lisbon region through phone interviews and using a structured questionnaire. Data collected in July 2020 included information on 420 households, of which 51% were of immigrants. Socioeconomic characteristics were compared using the Pearson chi-squared statistic. Logistic regression was used to compute adjusted odds ratio (OR) and corresponding 95% confidence intervals (95% CI) to compare the socioeconomic position and economic well-being, using Portuguese natives as the reference group.

RESULTS About 27% of immigrants included in our study became unemployed due to the COVID-19 pandemic compared to only 9.9% of natives ($P < 0.001$). More than 50% of immigrants were subject to temporary or partial lay-off because of COVID-19 in comparison to 32.2% lay-off among native Portuguese ($P < 0.01$). Immigrants were more likely to be unemployed due to the COVID-19 pandemic (AOR 3.54, 95% CI 1.72–7.30). In addition, immigrants were more likely to be subject to temporary or partial lay-offs because of COVID-19 (AOR 2.10, 95% CI 1.17–3.76) and to have their household income decreased due to COVID-19 (AOR 3.21, 95% CI 1.80–5.75). Regarding the financial difficulties during the COVID-19 pandemic, immigrants were more likely to fall behind with bills (AOR 1.95, 95% CI 1.09–3.50), to have financial difficulties in buying hygiene products (AOR 1.95, 95% CI 1.10–3.48), to have financial difficulties in paying phone and internet (AOR 3.02, 95% CI 1.65–5.53). Immigrants were also more likely to send their kids to school to have meals (AOR 2.02, 95% CI 0.57–7.19).

CONCLUSION Immigrants in Lisbon, Portugal, face inequalities represented by several forof economic vulnerabilities during the pandemic. Urgent policies needed to be implemented to mitigate the economic burden of COVID-19 among immigrants in Portugal.

369**Risks from heat extremes under climate change affecting most vulnerable regions of the world**

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BIOGRAPHY Jana Sillmann is Research Director at CICERO and leads the Climate Impacts group. She is an internationally well-recognized expert in the field of climate extremes and associated socioeconomic impacts and risks with highly cited journal articles. She is a lead author of the 6th Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) and is co-chair of the Development Team of the Knowledge Action Network on Emergent Risks and Extreme Events (Risk KAN).

OBJECTIVE Global surface temperatures are rising due to human-induced climate change. With increasing global warming, heatwaves are becoming more frequent, more intense and will last longer. While every region can be affected by heatwaves, some people will suffer from more health impacts than others due to underlying vulnerabilities and differing ability to adapt to the increasing heat.

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METHODS We use different indicators to show increases in heatwaves across the world under different global warming scenarios. We further show changes in risk associated with future heatwaves for two future pathways of societal development representing low and high vulnerability conditions. Specific heat stress indicators, for instance for issuing heat warnings, are used to illustrate how regions will be differently impacted by heat extremes.

RESULTS Extreme heatwaves are expected to occur throughout the year across Africa, a continent most vulnerable to climate change, already in the near future (10–20 years) due to global warming. Exceedances of health-relevant thresholds are strongly increasing globally and particularly in densely populated areas. In some of the most densely populated regions, such as India, the eastern USA, or Southeast Asia, heatwaves can be further intensified by high levels of relative humidity, with severe consequences for human health. Risks associated with heatwaves could be significantly reduced if global warming is stabilized below 1.5 °C for both low and very high development countries and in the presence of rapid socioeconomic development, which can reduce vulnerabilities and increase adaptive capacities in the respective countries.

CONCLUSION The occurrence of longer, hotter and more frequent heatwaves will have strong impacts on human health if anthropogenic climate change continues at the current rate and could force people to migrate due to long-lasting exceedance of critical health thresholds (e.g., resulting in heat exhaustion and heat strokes).

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Motherhood and mental disorder among migrant and non-migrant women

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BIOGRAPHY Is a senior researcher with a PhD in psychology. She has many publications in the field of migrant health and her main interests are in women's and migrant's mental health and use of health care services.

OBJECTIVE While some studies suggest that motherhood can be protective of mental disorders, others suggest there is little difference in the mental health of mothers and non-mothers. Findings may differ based on the groups studied and definition of mental health. Yet, few studies have considered if the association between motherhood and mental disorder varies among different groups of migrant women.

METHODS We use longitudinal national Norwegian register data (2008–2013) to determine the association between becoming a mother and mental disorder (measured by use of mental health services (MHS)) among women age 25–40 years who were married and childless at baseline ($n = 83,338$). With 306,097 observation years, we conducted discrete-time logistic regression with interaction analyses to determine if the association varied by region of origin.

RESULTS Around 55% of women became mothers in the follow-up period. Overall, becoming a mother was associated with slightly reduced odds of MHS use, even after controlling for education, workforce attachment, age and marital break-up (OR = 0.92). Interaction analyses indicated that this relationship was significantly different for women from non-EU Eastern Europe and East/South East Asia. Becoming a mother was associated with greater odds of MHS use among these groups.

CONCLUSION Entering motherhood may be associated with a slight decrease in risk of mental disorder among women in general but some groups of migrant women may experience an increase. The reason for this needs to be investigated. It is possible that in the absence of support from extended family, these women need additional support in order to adjust to their new roles as mothers. It is important to identify and support migrant mothers with mental disorder at an early stage.

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Ultrasonography for the follow-up of vesical lesions in migrants with urinary schistosomiasis: a prospective study

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BIOGRAPHY Francesca Tamarozzi is a research physician, whose main interest is the diagnosis of parasitic diseases, in both epidemiological and clinical settings and integrating lab-based and imaging techniques. her main focuses are cystic echinococcosis, filariasis and schistosomiasis.

OBJECTIVE Chronic infection with *Schistosoma haematobium* may lead to serious complications, including bladder carcinoma. Although it is recommended that only bladder masses not regressing within 6 months after praziquantel intake should be investigated invasively, outside endemic areas invasive procedures are often performed at diagnosis. At present, no study evaluated the evolution (regression and re-appearance) of the lesions after

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treatment in case of no risk of reinfection which could inform optimal case management.

METHODS Adult migrants with *S. haematobium* infection (eggs in urine) were enrolled in the study. Exclusion criteria were advanced pregnancy and known chronic urinary pathologies. Vesical ultrasound was performed at enrollment (T0) and at 1, 3, 6, 12 and 24 months after praziquantel treatment.

RESULTS Twenty-two African patients participated in the study, 10 (45.5%) of whom had bladder masses on ultrasound. Seventeen (77.3%) patients, including all those with masses, completed a 6-month follow-up; of these, 2 stopped at T6, 3 at T12 and 12 (54.5% of the cohort) completed the 2-year follow-up. Eight patients, 6 of whom with endoluminal masses, underwent urinary cytology, which was negative for neoplastic cells. All lesions decreased in volume over time; in 4/10 cases the lesions regressed by T3, in all cases by T6. No case of new development/re-appearance of masses was observed.

CONCLUSION This is the first study applying ultrasound for the long-term follow-up of urinary lesions due to *S. haematobium* infection outside endemic areas. Results suggest that mucosal masses detected on ultrasound without obvious signs of wall invasiveness regress over time without apparent risk of recurrence, supporting the recommendation that invasive procedures should be avoided if regression over time is observed. Furthermore, it may be suggested that a follow-up shorter than 6 months could be envisaged, in case of difficulty of attendance, if lesions visibly reduce at 1–3 months after therapy.

492**Facilitators and barriers to adopting sustainable practices in global health institutions**

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The climate crisis threatens human health and well-being and disproportionately affects populations in low and middle-income countries. Given that the purpose of global health institutions is to improve the health of populations, they have a critical role to play in mitigating the health effects of climate change as well as rapidly reducing greenhouse gas emissions from the global health enterprise. This study examines how global health institutions are reducing the greenhouse gas emissions from their own operations and analyzes the facilitators and barriers to achieving decarbonization goals.

We reviewed the sustainability goals and implementation plans of 10 global health universities from the

‘TropEd’ network and the top 10 international non-governmental organizations (NGO) ranked by ‘NGO Advisor’ working in a health-related field. We systematically collected information from institutional websites and annual reports. Through online interviews, key informants validated the information and shared their opinions regarding what factors are helping their institutions decarbonize and what factors are hindering progress. Initial findings show that 9/10 universities sampled have a sustainability policy, 6/10 have specific decarbonization goals and 8/10 have implementation plans. However, the systematic online search shows that only 3/10 non-governmental organizations sampled have a sustainability policy, 1/10 have specific decarbonization goals and 1/10 have implementation plans.

Findings from the interviews with the key informants of the 10 global health universities are summarized. Institutions across all sectors need to rapidly decarbonize to mitigate the worst effects of climate change, but results suggest institutional responses are lagging amongst global health NGOs. This study identifies lessons and best practices that global health institutions are utilizing to successfully decarbonize their operations as well as highlighting critical gaps that still need to be tackled.

96**Orofacial lesions associated with long-term highly active antiretroviral therapy among HIV-seropositive adults in Ibadan, Nigeria**

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BIOGRAPHY Consultant Oral Physician, a holder of Masters degree in Dental Surgery and presently a PhD student In Oral Medicine, University of Ibadan, Nigeria. She has four publications on HIV-based research. She is happily married with three children.

OBJECTIVE This study was aimed at assessing the self-reported oro-facial manifestations due to long term use of HAART, as well as the pattern of oral lesions on examination.

METHODS This was a cross-sectional study conducted in Ibadan, Nigeria, among HIV sero-positive adult patients who had been on HAART for at least two years. Data were collected using an interviewer-administered questionnaire. Clinical diagnosis of HIV-related oral lesions

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was made according to the EC-Clearinghouse criteria. Data analysis was done using SPSS version 25.

RESULTS The study participants comprised of 227 HIV sero-positive patients who were HAART experienced, with 54 (24%) males and 173 (76%) females. Their mean age (\pm SD) was 44.7 (\pm 9.4) years. The participants CD4 count ranged from 13 to 1338 cells/mm³, with a median count of 341 cells/mm³. Almost half (45%) of the participants noted one or more oro-facial changes since they commenced HAART. These oral changes included dryness of mouth, burning sensation, abnormal taste, melanotic hyperpigmentation, oral thrush, ulcers and parotid swelling. Most of those who noted oral changes had been on HAART over 10 years ($P = 0.03$) and the changes were more reported among those on the first-line regimen.

CONCLUSION Melanotic hyperpigmentation was the most common oral lesion found and burning mouth syndrome was the most commonly reported complain among HIV-seropositive adults who are on long-term HAART.

373**Host inflammatory biomarkers for monitoring response to treatment in extrapulmonary Tuberculosis (EPTB)**

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BIOGRAPHY Working as a of microbiology at Gulab Devi Hospital Lahore. Special interests TB diagnosis and immune pathology.

AIMS Monitoring treatment response in extrapulmonary tuberculosis (EPTB) is important to ensure proper disease management. Evaluation of response early during anti-tuberculosis (TB) treatment is critical to reducing overtreatment, development of drug resistance, morbidity and mortality. This study aimed to explore the utility of inflammatory biomarkers in the peripheral blood to predict response to treatment in EPTB patients.

METHODS The study was conducted at a tertiary care hospital in Lahore, Pakistan. Presumptive EPTB patients attending outpatient clinics were enrolled from April 2016 to August 2017. Blood samples (5ml) were collected from the registered patients after taking informed consent before initiation of TB treatment and at 2 and 6

months after treatment. Biorad 40 plex Bio-PlexPro™-Human Chemokine Panel was used on Luminex® xMAP™ to detect cytokines/chemokines (inflammatory biomarkers) from the unstimulated plasma of the patients.

RESULTS A total of 364 EPTB patients were registered for anti-TB treatment. Plasma samples were available for 91 patients (48 lymphadenitis and 43 pleuritis). Overall a significant change was observed in 25 inflammatory biomarkers with treatment. However, levels of MIG ($P < 0.001$), IP-10 ($P < 0.001$), CCL23 ($P < 0.001$) and CXCL11 ($P = 0.001$) decreased significantly in most of the patients at both 2 and 6 months of treatment. At 2 months, 29/64 (45%) patients responded partially while 35/64 (55%) showed complete regress. More good responders had a significant reduction of biomarkers (16/40) than partial responders (1/40) indicating that a significant decrease in inflammatory biomarkers correlates with early clinical response during anti-TB treatment.

CONCLUSION The present study identified candidate inflammatory biomarkers that can be used to monitor disease progress and treatment response in EPTB, with a potential for early identification of fast and slow responders to anti-TB treatment.

36**Neurocognitive impairment in treated HIV-infected adults: A perspective from a tertiary care center in Ethiopia**

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BIOGRAPHY Biniyam A. Ayele, MD Assistant of Neurology College of Health Sciences, Addis Ababa University

OBJECTIVES Given the improvement in life expectancy of people living with HIV (PLWH) in sub-Saharan Africa, the risk of asymptomatic HIV-associated neurocognitive disorder (HAND) has increased. The study objectives were to investigate the prevalence of HAND and associated risk factors.

METHODS A single-center observational cross-sectional study was conducted between December 2019 and June 2020 to investigate HAND. International HIV dementia scale (IHDS) was used to screen for the disorder. Both descriptive and analytical statistics were used to analyze the data.

RESULTS Total of 324 PLWH (63% females), on combination antiretroviral therapy (cART) for median of 144 months (IQR: 108–168) were investigated. The mean age of the study participants was 42.5 years (1SD = 12.2).

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The prevalence of HAND was 75.3% and the difference was significantly more in those above 40 years of age (65.8% vs. 80.7%, $P = 0.003$). Age is the only risk factor identified with multivariable logistic regression analysis. A linear decrement in the total score of cognitive ability (IHDS score) was observed as the patient's age increase; age was responsible for 9.4% variation observed in IHDS score ($r = -0.31$, $R^2 = 0.094$, $P < 0.0001$). Although statistically not-significant, the trend for cardio-metabolic risk factors (hypertension, diabetes mellitus, dyslipidemia, smoking, alcohol and khat use) was higher in the group diagnosed with HAND.

CONCLUSION The prevalence of neurocognitive impairment was higher among HIV-infected people older than 40 years than in younger individuals. Age was found to be an independent predictor of HAND. Cardiovascular and behavioral risk factors are more common among patients with HAND than those without HAND.

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Incidence of tuberculosis among persistent coughers after negative smear in Dale woreda, southern Ethiopia: a population-based follow-up study

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BIOGRAPHY Mr. Abiot Bezabeh holds BSc degree in public health in 2010, in public health in 2015 from Hawassa University and currently he is PhD candidate at the University of Bergen Norway. Abiot has experience as a public health specialist with expertise in public health, community TB care and capacity development in Ethiopia.

OBJECTIVE this study aims to estimate the incidence and risk factors of tuberculosis among initially smear negative persistent coughers in Dale district, southern Ethiopia.

METHODS in this population-based prospective cohort study, local health extension workers visited every household in the district three times with four months interval in 2016–17. Symptom screening questionnaires were used to identify individuals with symptom-compatible with TB. People aged ≥ 15 years with presumptive TB who were

smear negative at first visit were followed-up. Outcomes were bacteriologically confirmed (PTB b+) and clinically based TB diagnosis (PTB c+). We used penalized (LASSO) and non-penalized proportional cox regression models to explore associations between exposure and outcome.

RESULTS 3484 individuals with initially smear negative presumptive TB were followed up for 2155 person-years, median 0.8 year; 90 persons had PTB b+ and 90 had PTB c+. The incidence (per/100,000 person years) for both PTB b+ and PTB c+ were 4,176 (95 % CI 3,378–5,109). PTB b+ and PTB c+ were significantly associated with age, sex, length of education and mid-upper arm circumference. In penalized LASSO regression, the risk of PTB b+ was 63% (LASSO HR, 0.37) lower for age group 35–64 and 77% (LASSO HR, 0.23) lower for ≥ 65 compared to 15–34. Men had 62% (LASSO HR, 1.62) higher risk of PTB b+ compared to women. The risk of PTB c+ was 39% (LASSO HR, 0.61) lower for the age group 35–54 compared to 15–34. Men had 56% (LASSO HR, 1.56) higher risk of PTB c+ than women.

CONCLUSION This study identified a high IR of pulmonary TB; the rate was higher in young-adults signifying sustained transmission and also higher among men. There is potential for improving TB prevention efforts by closer monitoring and follow-up of persistent coughers by primary health care.

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Community-wide pulmonary tuberculosis screening in Dale woreda southern Ethiopia: a prospective follow up study

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BIOGRAPHY Abiot holds Bsc degree in public health in 2010, in public health in 2015 from Hawassa University and currently he is PhD candidate at the University Bergen in Norway. Abiot has experience as a public health specialist with expertise in community tuberculosis prevention & care in Ethiopia. He has engaged in the capacity development of government and stakeholders which

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intends to improve case detection among at most risk groups through TB survivors group empowerment.

OBJECTIVE To measure the prevalence and incidence of pulmonary TB in the total adult population in Dale woreda in southern Ethiopia, through systematic and repeated active case finding.

METHOD Health extension workers (HEWs) visited every household in Dale woreda in three consecutive rounds over a 12 months period from Oct 2016 to Jan 2017. A structured symptom-screening questionnaire was used to identify individuals with presumptive TB, i.e. individuals with chronic cough, with or without related TB symptoms, for referral to local health services for diagnosis and follow-up. Bacteriologically confirmed pulmonary TB included any positive test for pulmonary TB (smear microscopy, GeneXpert and/or culture). Clinically diagnosed pulmonary TB included radiological findings and clinical decision to start TB treatment. TB prevalence was calculated for cases identified in the first round of household visits (n/100,000 population); whereas TB incidence was calculated for cases identified in the consecutive rounds (n/100,000 person years).

RESULT: of the 136,181 individuals older than 15 years screened in the first round of household visits, 2052 (1.5%) were identified as having presumptive TB, of whom 98 (4.5%) had bacteriologically confirmed pulmonary TB and 24 (1.2%) had clinically diagnosed pulmonary TB, giving a prevalence of 72/100,000 and 17/100,000 population respectively. During the consecutive rounds of household visits, another 1694 (1.3%) were identified as having presumptive TB, of whom 220 (13%) had bacteriologically confirmed pulmonary TB and 36 (2.1%) had clinically diagnosed pulmonary TB, giving an incidence of 206/100,000 and 33/100,000 person years respectively.

CONCLUSION This study found a higher incidence of bacteriologically confirmed pulmonary TB than the World Health Organization TB estimate for the same year for Ethiopia, but lower prevalence shown compared to recent studies. The higher incidence of bacteriologically confirmed pulmonary TB indicates amplified risk of disease transmission in the community demanding targeted intervention.

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Effects of maximal strength training on bone mineral density in people living with HIV and receiving ART: A pilot study

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BIOGRAPHY Enock Chisati is a qualified Exercise Physiologist and Sports Scientist. He completed his PhD in Exercise Physiology in 2020 with support from the Consortium for Advanced Research Training in Africa (CARTA). He received his Master training in Exercise Physiology and Sports Sciences from the Norwegian University of Science and Technology (NTNU) in Norway. Enock is an upcoming researcher and academic with a robust portfolio of academic publications. His research focuses on understanding the beneficial effects of exercise on the underlying mechanics of human physiology to guide treatment and prevention of life style diseases and chronic conditions.

OBJECTIVE Although physical activity is recommended for improving bone health in patients with reduced BMD, data on effects of strength exercises on low BMD among PLWHIV is scarce. This study therefore aimed to determine the effects of a 12 weeks maximal strength training (MST) on BMD among PLWHIV in Blantyre, Malawi.

METHODS Twenty-six PLWHIV with reduced BMD were randomised into a training group (TG, $n = 15$) and control group (CG, $n = 11$). The TG underwent 12 weeks of MST consisting of 4 sets of 3 to 5 repetitions at 85%–90% of one repetition maximum (1RM) 3 times per week. The CG was advised to maintain their usual lifestyle. Measurements of BMD using dual-energy X-ray absorptiometry, 1 RM using a squat machine, heart rate using a heart rate monitor, weight, height and body mass index were obtained before and after the intervention in the TG and CG. Descriptive statistics and student's t -tests were used to analyse data.

RESULTS The study was conducted for 12 weeks. Data of 24 participants [14 (TG) and 10 (CG)] were analysed. At base line, there were no significant differences in age ($P = 0.34$), height ($P = 0.91$), weight ($P = 0.43$) and body mass index ($P = 0.34$) between participants in the TG and the CG. After the intervention, there were significant

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improvements in lumbar BMD ($P < 0.001$) and resting heart rate ($P = 0.03$) in the TG compared to the CG. There were significant improvements in muscle strength (1 RM) in both the TG ($P < 0.001$) and the CG ($P = 0.01$).

CONCLUSIONS MST improves lumbar BMD and strength in PLWHIV receiving ART in Blantyre, Malawi. MST with a shorter exercise duration of 12 weeks seems to have the potential in treating reduced BMD in PLWHIV.

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Prevalence of hepatitis B infection in pregnant women delivering at Kawempe National Referral Hospital, Uganda: A nested observational cohort study

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BIOGRAPHY Hannah G Davies is a PhD candidate based in Kampala, Uganda. Her research is focused towards improving the safety of maternal vaccines in resource-limited settings by strengthening the infrastructure for identifying, reporting and investigating potential adverse events after immunisation.

Melanie Etti is a clinical research fellow in Infectious Diseases and Microbiology currently working at the Institute for Infection and Immunity, St. George's University of London, previously based in Kampala, Uganda. Her research and clinical interests include global public health, particularly the development and evaluation of strategies for the reduction of communicable disease spread in resource-limited settings.

BACKGROUND Chronic Hepatitis B virus (HBV) infection is the leading risk factor for liver cirrhosis and hepatocellular carcinoma globally. Vertical transmission is the commonest route of HBV transmission worldwide. Universal antenatal screening for HBV is recommended by the World Health Organization to enable the provision of prophylactic measures that reduce the risk of viral transmission, however, this is not routine practice in Uganda. We determined the prevalence of HBV infection among a cohort of women recruited to the ProGreSs study who attended Kawempe National Referral

Hospital, a busy government-funded hospital in Kampala, Uganda, to deliver their infants.

METHODS 5 ml venous blood was collected from all study participants and serological testing for hepatitis B surface antigen (HBsAg) and hepatitis B anti-core antibody (HBcAb) was performed. Consent was sought to obtain the results of syphilis and HIV point-of-care testing performed during routine antenatal care. Baseline demographic, medical and obstetric data were also collected from all women at recruitment.

RESULTS 6062 women were recruited with mean age of 25.7 years. The overall HBsAg seroprevalence was 2.2% (95% CI 1.8–2.6%). 129 participants were both HBsAg- and HBcAb-positive, suggestive of either acute or chronic HBV infection. Two participants were HBsAg-positive and HBcAb-negative, indicative of early acute HBV infection. HIV infection was more common among HBsAg-seropositive women than HBsAg-seronegative women (15.3% v 9.7%, $P = 0.04$). No other demographic, obstetric or medical factors were found to be associated with HBsAg seropositivity within our study cohort.

CONCLUSION The HBsAg seroprevalence of 2.2% is suggestive of intermediate endemicity of HBV infection among our study population. The results of this study strongly support the introduction of universal antenatal screening for HBV in this setting. This will facilitate the provision of targeted prophylactic interventions including neonatal HBV vaccination and maternal antiviral therapy in order to reduce the rate of vertical HBV transmission.

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Childhood tuberculosis and treatment outcome in tertiary child referral hospital: a retrospective analysis

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BIOGRAPHY I am Mohamad Azlan Hamdan, a paediatrician and currently doing my clinical Fellowship in Paediatric Infectious Diseases. I am particularly interested in TB and HIV medicine. I am also like to depth my knowledge and clinical experience in pediatric transplant and oncologic infectious diseases.

OBJECTIVES The study objective was to describe the characteristics and treatment outcomes of children with TB in Women and Children Hospital Kuala Lumpur (WCHKL).

METHOD A retrospective analysis was conducted using data from the hospital TB registry from July 2019 to

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February 2021. The children are being followed in outpatient pediatric infectious diseases clinic after discharged from ward and less than 17 years old.

RESULTS A total of 45 children were enrolled in this registry and 11(24.4%) of them were excluded with the diagnosis of latent TB infection (LTBI). The diagnosis of TB disease was made based on either microbiologically proven or non-microbiologically proven in the presence of a clinical diagnosis of TB or suggestive radiographic findings. Nineteen children (55.9%) were female with a ratio of 1.1: 1 to male. Children less than 5 years old were predominant with 44.1%. Malay ethnicity constitutes the majority of the cases with 84.8%. The distribution of TB types was as follows: pulmonary TB 23.5%, extrapulmonary TB 17.6% and disseminated TB 55.9%. Four children (11.9%) were immunocompromised and one of them had primary immunodeficiency, a Wiskot-Aldrich syndrome with a successful marrow transplant. Two children (5.8%) complicated with a drug-induced liver injury during the intensive phase. One child with the disseminated disease had treatment interruption during the initial phase. The mean duration of each clinic follows up follow-up was 3 months and none was lost to follow up. Twelve children (35.8%) had completed the treatment. No mortality from TB was recorded

CONCLUSION TB in children is a direct consequence of adult TB and is a good marker of current transmission in the community. Diagnosis of TB can be challenging because clinical sign and symptoms are not as specific as in adults and bacteriologic confirmation is the exception.

439**Pre-diagnostic cost of extrapulmonary tuberculosis from the patient perspective in Zanzibar, Tanzania**

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BIOGRAPHY Shoaib Hassan is a medical doctor by training and specializes in Epidemiology. In the past, has been working in field settings to respond infectious disease outbreaks. Moreover, Hassan's work in setting up and evaluating surveillance system has been appreciated. Currently, he follows ambitions to utilize modern epidemiology and economic methods to understand the socioeconomic implications of infectious diseases like tuberculosis.

OBJECTIVE The latest WHO TB report in 2018 concludes 10 million new cases, 15% EPTB. The diagnostic challenges in EPTB lead to a long delay, morbidity and economic burden. Considering the significantly limited research about the financial burden of EPTB patients, this

study aims at estimating the pre-diagnostic cost of EPTB from the patient perspective.

METHODS This study is nested in larger project and utilizes patients' interview data collected from August 1st 2014 to August 31st 2015 at Mnazi Mmoja Hospital (MMH), Zanzibar. Patients of all age-groups presenting with signs and symptoms of EPTB were interviewed. This study analyses demographic, socioeconomic and household assets' variables. Firstly, all types of pre-diagnostic EPTB costs and annual income from patients' perspective were estimated. Secondly, regression analysis was used to identify factors responsible for high total cost for EPTB patients.

RESULTS The EPTB patients were predominantly children and young adults; 35% and 50% respectively, 55% were male and the majority lived in urban areas (69%). The average monthly income per person was US\$ 136 with no significant difference by sex. The median total cost for all patients was US\$ 98. The average indirect costs mainly contributed to mean total patient costs (65%). About 58% of the patients suffered from catastrophic costs (10% of annual income). On average patients faced 67 days of reduced productivity due to EPTB illness. High expenses towards diagnostics were associated with total income for male and decreasing work capacity for females.

CONCLUSION The pre-diagnostic, out-of-pocket and opportunity cost estimated in this study are significantly high from patient perspective. The findings are consistent with the known health seeking behaviors, but alarmingly EPTB diagnostic confirmation is linked with patients' paying capacity. These challenges are barriers to the end-TB goal. The higher catastrophic costs are pushing the already worse-off patients further towards poverty.

66**Neuropsychiatric outcomes in children and adolescents with perinatally acquired HIV: a systematic review and meta analysis**

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BIOGRAPHY Rebecca is a junior doctor in Oxford and has undertaken this work as part of the Academic Foundation Programme. She aspires to be a paediatrician and is especially enthusiastic about both child neurology and community child health. In particular, she wants to know

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more about how these issues present themselves in low and middle income countries. She is also working on a project improving the safety profiles of adeno-associated virus gene replacement therapy for children with neuromuscular disorders. Outside of work she loves swimming, cycling and generally time in the outdoors.

OBJECTIVE The story of HIV has been almost entirely rewritten over the last ten years. What was once a disease leading to death in early infancy is now a chronic condition to be managed throughout the life course. In short, children with perinatally acquired HIV are growing up! However, managing this chronic condition is not without its challenges and there has been concern about both the direct effects of the virus on the developing brain, as well as the sequelae from growing up in a family affected by HIV. The objective of this study is to define the neuropsychiatric challenges faced by this population, in the hope of determining effective ways of supporting these young people as they grow up.

METHODS Registered on PROSPERO, index CRD42020159159. We conducted a literature search spanning key databases and the grey literature. Forward and backward reference checking was employed. Entries were reviewed by two independent reviewers. Data extraction and risk of bias assessments were conducted by the same group of reviewers.

RESULTS Broadly, the neuropsychiatric effects of perinatally acquired HIV fall into three main categories: cognitive impairment, developmental delay and psychiatric illness. The papers overwhelmingly report disturbance in these areas in the paediatric HIV population, but the degree and nature of these difficulties is a matter for discussion. The data are complex, as the fall out of paediatric HIV spans the entire biopsychosocial realm of illness, but clear patterns emerge on careful examination of the data.

CONCLUSIONS What is clear is that there are several needs which are specific to this population. Furthermore, there are key ways in which these currently unmet needs can be tackled, both in modifying the course of the disease with earlier initiation of ART and designing services which support the needs of these young people as they grow up.

485**Community-based ART service delivery for key populations in sub-Saharan Africa: scoping review of outcomes along the continuum of HIV care**

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BIOGRAPHY A medical doctor with more than 10 years of post qualification experience in clinical medicine and public health. Currently a PhD student at the Institute of Tropical Medicine Antwerp in Belgium

OBJECTIVE This scoping review summarized the evidence on the effect of community-based ART service delivery (CBART) along the continuum of HIV care among key populations (KP) in sub-Saharan Africa. KP include sex workers, men who have sex with men, persons who inject drugs and transgender people.

METHODS We searched Pubmed (Medline), Google scholar and NGO websites for articles published between 2010 and April 2020. Studies from sub-Saharan Africa were included if KP were involved in care and if the service delivery included ART. We synthesized the involvement of KP community members or lay providers in medical task provision and any of the continuum of HIV care outcomes (HIV testing uptake, diagnosed with HIV, linkage to care, ART uptake, retention and viral suppression).

RESULTS of the 3,033 records identified, 29 records were eligible for full-text screening, of which 6 papers met the inclusion criteria. CBART for KP (KP-CBART) was provided through: (a) community drop-in-centres, (b) community drop-in-centres plus mobile team, or (c) community-based health centres. KP were engaged as peer educators and they provided services such as community mobilisation activities for HIV testing and ART, ART adherence counselling and referral for ART initiation. Across the KP-CBART studies, outcomes in terms of ART uptake, adherence to ART, retention in care and viral suppression were at least as good as those obtained for KP attending facility-based care. Findings were also comparable to those of CBART in the general population, although CBART models for the general population usually provide a less comprehensive care package.

CONCLUSIONS KP-CBART was at least as effective as facility-based care and should be scaled up to complement facility-based care. Lessons learnt from KP-CBART could inform CBART for the general population. How

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engaging KP and their level of engagement affects CBART outcomes should be explored.

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Adolescent-friendly antiretroviral treatment centres in Ogun State, Nigeria: disclosure of HIV status and clinical outcomes

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BIOGRAPHY A medical doctor and public health practitioner with about 10 years of post qualification experience. Currently a PhD student at the Institute of Tropical Medicine Antwerp

BACKGROUND APIN Public Health Initiatives implemented adolescent-friendly health services (AFHS) to improve access to care and HIV disclosure among ALHIV in Ogun State Nigeria. AFHS include peer mentoring, treatment literacy, support group meetings, flexible clinics, multi-month ART dispensing and client tracking. The aim of this study is to determine HIV disclosure rates, factors associated with disclosure and clinical outcomes among adolescents receiving HIV care in adolescent friendly clinics.

METHOD A retrospective cohort study of HIV infected adolescents receiving HIV care in 12 adolescent friendly HIV clinics. Data of adolescents who commenced ART without knowing their HIV status before January 2020 were extracted for analysis. We summarised the characteristics, HIV disclosure, retention in care and viral suppression rates at 12 months of intervention using descriptive analysis. We used the chi-squared test and logistic regression to test for associations.

RESULTS The mean age of study participants was 12.5 years (SD+/-2). 46% of them were male. of 139 adolescents, 83% knew their HIV status (full disclosure), 14% were partially disclosed to and 3% were not aware of their HIV status at 12 months of AFHS intervention. Overall retention rate was 94% (132/139). The odds for retention in care were two times higher among clients with full HIV status disclosure compared to those with partial or no disclosure. Factors associated with full disclosure included ART regimen, HIV status of caregivers and duration on ART. Viral suppression rate was 92% (128/139).

CONCLUSION Provision of AFHS to HIV positive adolescents improved HIV status disclosure and treatment

outcomes among them. Therefore, to improve HIV status disclosure among adolescents, national HIV programmes should implement AFHS in all adolescent HIV clinics with similar settings.

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Keys factors influencing multidrug-resistant tuberculosis: A Mixed Effects Modelling Study in Burundi

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BIOGRAPHY Arnaud holds a BSc and International certificate on principles of bioethics in research (Haifa University). He is a MD©, and ambassador of the International Journal of Medical Student (Pittsburg, USA) and Royal Society of Tropical Medicine and Hygiene student ambassador (UK). On Head of ARNECH Research and Consulting office. Mr. Arnaud is highly resourceful and goal-driven statistician with key interests in Designing of effective M&E system and developing tools for routine data collection, data analysis, data visualization and projection using varied regressions to calculate incremental effect of projects interventions on targeted population in Infectious diseases, Chronic and NCDs and Maternal Health areas.

OBJECTIVE In this study, using data from two referral anti tuberculosis in Burundi, we model the determinants associated with MDR-TB in Burundi.

METHODS Prospective data of a sample of 180 tuberculosis randomly selected from a population of patients admitted in 2019 in two referral anti tuberculosis centres in Burundi. The associated factors were carried out by fixed and random effect logistic regression. Model performance was assessed by AUC Model was internally validated via bootstrapping with 1000 replications. All analyses were conducted in R 3.5.0.

RESULTS of 180 participants of the study, 60 were MDR-TB and 120 were Drug Susceptible. High MDR-TB is observed in patients who live in rural zones (51.3%), in collective residences (69.2%), in houses with more than six people (59.5%), if many people share one room (70.0%), in patients with TB treatment history (86.4%) and in diabetics (66.6%). HIV tests were 32.3% and 67.7% positive respectively in MDR-TB patients and drug susceptible patients. More than half of cases (75%) and controls (73.3%) belonged to the age group ≤ 45 years. After modelling using fixed and random effects, residence, people per house, MDR-TB close contact, history of TB treatment, tobacco consumption and diabetes were statistically associated with MDR-TBs. With 2000

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stratified bootstrap replicates, the model had an excellent predictive performance (AUC), accurately predicting 88.15 % (95% CI: 82.06%–92.8%) of all observations. Drug susceptible patients with no close contact had a low probability around 10 % to develop MDR-TB.

CONCLUSION The high prevalence of tuberculosis and associated factors of MDR-TB in Burundi raises concern especially in this context, where there exists an equally high burden of chronic diseases, chronic malnutrition, HIV/SIDA and other infectious diseases. Targeting interventions based on these identified factors will allow judicious channelling of resources and effective public health planning.

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Policy considerations for the early detection of tuberculosis infection: an application of the Shiffman & Smith Framework

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BIOGRAPHY Rosie is a Canadian-British medical graduate of NUI Galway, Ireland. She holds an in Global Health from Maastricht University in the Netherlands, where she completed a semester away with Manipal University in India. She is a board member of the Irish Global Health Network, a consultant for the Geneva Centre for Humanitarian Studies and a research fellow for Lancet Migration. She is currently working as an academic junior doctor in England.

OBJECTIVE Incipient *Mycobacterium tuberculosis* (TB) refers to latent infection that is likely to progress to active disease within 1–2 years but does not yet show clinical, radiographic nor microbiological evidence of active disease. Biomarker-based tests to diagnose ITB are being developed and evaluated and hold promise for better prediction and, through TB preventive therapy, prevention of TB disease. Being a recent concept, incipient TB and its treatment has yet to be included in global and national policies. We describe and analyze challenges and opportunities surrounding its prioritization.

METHODS 22 semi-structured interviews were conducted with TB experts in 8 countries. A modified Shiffman & Smith framework, which contains four categories; Ideas, Issue Characteristics, Actor Power and Political Contexts, was used to analyse the current landscape and potential for policy prioritization of diagnosis and treatment of incipient TB.

RESULTS Framing incipient TB testing as “early detection” rather than “prediction” and its management as “treatment” rather than “preventive therapy”, may help raise its importance in TB control and elimination policies and its acceptance by healthcare providers and the public. Respondents cautioned that there are many policy considerations for the future implementation of ITB diagnostics, including addressing barriers that LTBI programmes face, such as the high cost of tests and treatments, lack of designated human resources and low treatment adherence rates.

CONCLUSION Tests for incipient TB that predict the progression of TB infection could be a major breakthrough in the early detection of disease, if framed appropriately. Consensus surrounding the framing of early infection within the TB community, but also to the public, will be crucial for the successful adoption of incipient TB diagnostics and treatment. When designing incipient TB policies, it will be important to address challenges that pertain to current latent TB policy implementation, by drawing on contextual experiences through field research.

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Uptake of antiretroviral therapy in prograingtegrating HIV and tuberculosis treatment in sub-Saharan Africa: a systematic review and meta-analysis

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BIOGRAPHY I am a clinician with four years of experience in organizing and delivering HIV services at community and health facility levels in rural Cameroon. I have authored 35 peer-reviewed publications with diverse world leading journals. I currently serve as Clinical Research Physician at the Liverpool School of Tropical Medicine. I hold an M.D. Degree from the University of Buea (Cameroon) and an in Public Health for

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Development (London School of Hygiene and Tropical Medicine).

OBJECTIVES Compelling reports suggest suboptimal ART uptake in prograintegrating treatment of HIV and tuberculosis (TB) in sub-Saharan Africa (SSA). This study estimated ART uptake and investigated the barriers to and enablers of ART uptake in these programs.

METHOD A systematic review of studies published in seven databases from March 2004 through July 2019 was performed. Random-effects meta-analysis was used to pool estimates of ART uptake. Thematic analysis was used to synthesize data on barriers to and enablers of ART uptake.

RESULTS of 5149 studies identified, 27 were included: 23/27 estimated ART uptake and 10/27 assessed barriers and/or enablers of ART uptake. The pooled ART uptake was 53% (95%CI: 42%-63%), with high variability across studies. Sub-group meta-analysis revealed considerably higher uptakes for: studies published from 2012 onwards (compared to those before 2012), studies from Southern and Central Africa (compared to other regions), retrospective studies (compared to other study designs) and studies with ≥ 1000 participants (versus those with < 1000 participants). The principal socioeconomic and individual level barriers to ART uptake were stigma, low income and younger age. The main health system related barriers were limited staff capacity, shortages in medical supplies, lack of infrastructure and poor adherence to or lack of treatment guidelines. Clinical barriers included intolerance to anti-TB drugs, fear of drug toxicity and contraindications to antiretroviral drugs. Health system related enablers included well-managed procurement, supply and dispensation chain; convenience and accessibility of treatment services; and strong staff capacity. Availability of psychosocial support was the main enabler of uptake at the community level.

CONCLUSION In SSA, integrated HIV/TB treatment progrado not, in general, achieve high ART uptake. But net improvements were observed in publications from 2012 (when revised guidelines on HIV/TB collaborative activities were issued) onwards and in large-scale studies. The recurrence of specific modifiable system-level and patient-level factors in the literature reveals key intervention points to improve ART uptake in these programs.

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Building community networks to address stigma and discrimination against people living with HIV (PLHIV) in Ratodero, District Larkana, Sindh, Pakistan

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BIOGRAPHY Mehek Ali is a Program Manager for the Community Engagement Centre—a joint venture of IRD and IHHN. She has worked in education, mental health and community-based innovations in Pakistan since 2012. She has led the design and implementation of several community projects focusing on adolescent wellbeing, womxn empowerment, community engagement and learning paradigm IRD, IHHN and beyond; these have included approaches for people with lived experiences of TB, HIV and violence. She completed her undergraduate studies in Psychology from Queen's University, Canada and earned her in Psychology from the University of Birmingham, UK.

OBJECTIVE In April 2019, Pakistan faced its fifth HIV epidemic, this time in the town of Ratodero, District Larkana, Sindh. This outbreak largely affected children under the age of five. Though attributed mainly to medical malpractice, the outbreak also highlighted multifarious marginalization of people with lived experiences. A self-sustaining community engagement initiative was implemented to create enabling and inclusive environments for People Living with HIV (PLHIV).

METHODS Utilizing a socio-ecological model, 10 trained Community Health Workers (CHWs), recruited locally, formed Community Support Groups (CSGs) comprising PLHIV, their caregivers and general population. CHWs employed the Community Life Competence Process (CLCP). The CLCP took CSGs through a rigorous learning cycle to identify shared goals and develop action plans embedded in collective resources.

RESULTS In four months, 23 CSGs were formed across 12 union councils consisting of 280 (58% women and 42% men) representatives. A review of CSGs' collective goals revealed aspirations to create an inclusive social system for PLHIV. To realize these collective goals, 15 of the CSGs formulated action plans. These included: advocacy efforts with union councils (drafting letters for improved health and education provisions), empowering women (setting-up a vocational center), environmental upgrading (organizing clean-up drives) and mobilizing communities for HIV screening to know their status. In a

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short time, apart from creating a support mechanism for PLHIV, CSGs were able to recognize and address multiple communal concerns.

CONCLUSIONS Developing self-sustaining local support systems, with a potential to evolve, helps to effectively address stigma and discrimination faced by PLHIV. Collective goals established and actions taken by CSGs reveal community agency to garner support for PLHIV and also shows their efficacy in strengthening the surrounding ecosystem (education, health and financial systems). In resource-limited settings, as an implementation model, CSGs thus provide equitable opportunities for communities to address HIV in their own contexts.

283**The peer educator is the game changer of my life: Involving HIV infected adolescents in the disclosure in Congo**

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BIOGRAPHY Faustin KITETELE is a Congolese medical professional with over 22 years of experience working in the Democratic Republic of Congo (DRC). He holds the position of Chief of infectious diseases at Kalembelembe Pediatric Hospital in Kinshasa, DRC. He has been involved in the management of HIV/Aids, tuberculosis, hepatitis, sickle cell anemia and sexual violence in children and adolescents for more than 15 years.

He had been involved in the development of national and international guidelines including the World Health Organization guidelines on HIV disclosure. He is currently a PhD candidate at the University of Bergen.

OBJECTIVES Several approaches to the disclosure of HIV status have been described, each of which places particular emphasis on the role of parents, provider or psychosocial to mitigate the impact of this disclosure on the adolescent, but often underestimate the participation of "peers". We therefore undertook to assess the perceptions of adolescents living with HIV about disclosure done by parents, guardians, health care workers, peer educators, accidentally or by self-discovery and the effects induced.

METHODS Qualitative descriptive study with semi-structured interviews of 73 adolescents living with HIV disclosed by parents, guardians, health care workers and/or peer educators, accidentally or through self-discovery at Kalembelembe Paediatric Hospital, Democratic Republic of the Congo. Microsoft Excel analysis matrix was used to organize the qualitative data.

RESULTS The vast majority of adolescents living with HIV whose disclosure involved the peer immediately, short, medium- and long-term, had unanimously acknowledged the peer role in accepting their HIV status, antiretroviral treatment adherence and development of self-esteem. However, most adolescents living with HIV who disclosed their status without involving peer educators declared that they had accepted their situation after a relatively long period followed by contact with the peer and integration with the self-support group. Most adolescents living with HIV whose disclosure involved peer educators had a suppressed viral load at their last health check-up prior to the study.

CONCLUSIONS We found that the HIV status disclosure process is one of the most important factors that allows adolescents living with HIV to accept their HIV status with minimum distress. Adherence, retention to care and treatment, self-esteem and risk of depressive symptoms result from the dynamics of the relationship between peer educators and adolescents living with HIV and psychosocial support.

432**Barriers to and enablers of adherence to the treatment of active tuberculosis in HIV patients: a mixed-methods systematic review**

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BIOGRAPHY Abdulazeez Lawal is a Research Assistant currently working on the Living Systematic Review of COVID-19 registered trials at the Infectious Diseases Data Observatory (IDDO). His duties include manual data extraction from clinical trial registries, ensuring validated double extraction and contributing to the overall quality control of the data collection and analysis processes and writing of the manuscript.

He is a Nigerian-trained medical doctor and has experience working in various infectious diseases settings. He recently just completed an in Global Health and he is interested in infectious diseases science and epidemiology and their intersection with Global Health.

OBJECTIVE We aimed to identify barriers to and enablers of Tuberculosis (TB) treatment adherence among HIV patients.

METHODS A systematic search of the literature was carried out using MEDLINE, EMBASE, CINAHL and the Cochrane Database of Systematic Reviews in late June 2020. Studies were included if published in the last 10

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years, in English and have a focus on adult patients with TB/HIV coinfection. An integrative approach was used to synthesise the data obtained from selected studies.

RESULTS of 2,235 studies yielded by the search, 13 articles which satisfied the inclusion criteria were included in the review. The WHO's framework for adherence was adapted to classify the various factors identified.

Being male, having co-morbid health conditions, alcohol use, smoking, being of a low socioeconomic status, having poor knowledge of TB, experiencing stigma, advanced HIV/TB disease and poor healthcare service delivery/having a negative experience of health service were identified as barriers to adherence. Being married, having some education, being employed, good social support, adequate disease knowledge and a good patient-healthcare provider relationship were enablers of adherence. The effects of age, family size and the use of ART on adherence to ATT were equivocal.

The factors affecting adherence in patients with HIV were found to be similar to that of the general population without HIV, but HIV patients seem to be doubly negatively affected by the barriers and derive only half benefit from the enablers.

CONCLUSION Social determinants of health and the way healthcare services are delivered have a great influence on adherence to treatment. It is imperative that policymakers address these determinants and structure healthcare service better to serve patients. More research should be conducted to get a more nuanced view of the factors affecting adherence and how they affect HIV patients differently.

140**Factors associated with delay in tuberculosis diagnosis in Nampula, Mozambique, 2020**

A. Marega

Universidade Lurio, Nampula, Mozambique

BIOGRAPHY Abdoulaye Marega, General practitioner, Master in tropical medicine and international health at Universidade Lúrio, Assistant at the Faculty of Health Sciences. President of the Institutional Committee on Bioethics at Universidade Lúrio

OBJECTIVES the study estimated the patient's average delay time and identified the associated factors.

METHODS The study was descriptive, cross-sectional with a quantitative approach, involving 366 patients affected by tuberculosis diagnosed and treated in health centers (HC) in the municipality of Nampula, socio-demographic and clinical information were collected and a

descriptive analysis was performed by Chi-square test and the multinomial logistic regression model.

RESULTS The majority of patients interviewed were male, 54.9%, with an average age of 34.6 years and a median age of 33 years. The mean delay in diagnosis was 16.8 days, 95% CI (16.1–17.5), Median, 14 days, IQR (7.0–30.0). Factors that contributed to the delay of more than 4 weeks were consultation at the HC of 25 September (OR, 35.5; 95% CI, 1.9–649.7) and at the attached center the psychiatric clinic (OR, 99; 95% CI, 3.5–282.4), taking more than an hour from home for HC (OR, 2.5; 95% CI, 1.5–4.3), being a smoker (OR, 7.8; 95% CI, 12–29.8) and needing monetary help (OR, 4.2; 95% CI, 1.8–9.8). Clinical factors such as tiredness (OR, 3.5; 95% CI, 1.0–11.9), being co-infected with HIV/AIDS (OR, 2.7; 95% CI, 1.1–6.8) and the habit of consulting a healer (OR, 4.6; 95% CI, 1.1–18.5) increased the likelihood of a delay in TB diagnosis.

CONCLUSION To reduce patient delay, it is imperative to strengthen the diagnostic capacity of health professionals, improve information on diagnosis, support patients, involve practitioners of traditional medicine, combat the consumption of psychotropic substances and take into account the co-infection of TB and HIV in the control of TB in the municipality of Nampula.

192**'Real world' assessment of the PMTCT cascade performance at 8 weeks post-partum Burkina Faso—Component 1 of PREVENIR-PEV study**

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BIOGRAPHY Doctor in medicine, at the Centre MURAZ, Member of the Policy and Management of Health System Program. I have a master's degree in Public Health option Health and Development from the Université Libre de Bruxelles and DIU on HIV infected people care, from the University of Ouagadougou. I was in charge of the HIV Day Care hospital of Bobo-Dioulasso Urban Health District (2012 to 2014). I submitted two abstracts accepted as oral and poster to different AFRAVIH conferences. I am now involved in a series of research projects on elimination of mother-to-child transmission of HIV.

OBJECTIVE We took advantage of the quasi universal attendance of mother-infant pairs to the second

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immunization visit (EPI-2), to assess the Prevention of Mother To Child Transmission of HIV (PMTCT) cascade performance up to 2 months post-partum.

METHODS Component 1 of PREVENIR-PEV study is a cross sectional study consisting of the administration of a short questionnaire offered to mothers aged 15 and over who attend the EPI-2 visit. The study was conducted in 2020 during one year in 20 Health and Social Promotion Centers (CSPS) in the Bobo-Dioulasso urban area, Burkina Faso.

RESULTS of the 14254 mothers included in this study, 14217/14242 (99,8%; 95%CI: 99,8–99,9) have attended at least one antenatal care visit during their last pregnancy. 12892/13353 (96,5%; 95%CI: 96,2–96,9) of mothers self-reporting as non HIV-positive have been tested for HIV during or after their last pregnancy. 235/13353 (1,8%; 95%CI: 1,5–2,0) mothers were never tested. Only one of the 116 HIV-infected mother/exposed infant pairs followed all steps of the PMTCT cascade up to two months after delivery. 112/113 (99%) HIV-infected mothers were on ARV; 84/102 (82%) HIV exposed infants received 6 weeks of ARV prophylaxis at birth. The worst indicator was related to early diagnosis of infant HIV infection by PCR, with samples collected in 59/111 (52,7%; 95%CI: 43,4–61,9) cases but results received by only 2 children at the time of EPI-2 visit.

CONCLUSION The main challenge detected by this study, with respect to the indicators of the PMTCT cascade as defined by the WHO, is the percentage of HIV exposed infants receiving a virological test for HIV within 2 months of birth. The innovative approach used here accurately estimate the performance of the PMTCT cascade could be routinely applied especially when mothers are difficult to reach, such as in low income countries with intermediate or low HIV prevalence.

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An innovative strategy integrated into the expanded program of immunization (EPI) to improve PMTCT in Burkina Faso, the PREVENIR-PEV study

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BIOGRAPHY Anaïs Mennecier, PharmD, has 8 years of experience in clinical research and pharmacovigilance, including 3 in the field of HIV. She is currently an

international project manager in charge of 2 studies in the field of PMTCT taking place in Africa.

OBJECTIVE We evaluated a rescue intervention for Prevention of Mother To Child Transmission of HIV (PMTCT) based on an almost never missed visit by mothers and their children, the second immunization visit (EPI-2). PREVENIR-PEV study AIMS to identify and engage in care & prevention mothers and/or infants with HIV infection unaware of their status and HIV exposed uninfected (HEU) infants at high risk of HIV-1 acquisition by breastfeeding.

METHODS Component 1 of PREVENIR-PEV study was conducted in 2020 in 20 Health and Social Promotion Centers of Bobo-Dioulasso urban area. Participating HIV-uninfected mothers aged 15 or more received an HIV rapid test at EPI-2 visit if not performed in the last 3 months. Previously and newly diagnosed HIV-1 mothers were referred to a referral health centers (CMA) for maternal plasma viral load and HIV PCR of HIV exposed infants using Point of Care tests with immediate results. Breastfed HIV-exposed infants born to women with a viral load higher than 1000 cp/ml were considered at high risk of HIV-1 acquisition by breastfeeding.

RESULTS Among the 5731 women tested by HIV rapid tests, four mothers tested positive (2 of whom being tested for the first time). 103 mothers including 2 newly diagnosed, attended the CMA visit. 6 (6%) HIV exposed infants were diagnosed with HIV, including infants of the 2 newly diagnosed mothers. ART was initiated immediately for 5 of them and one infant died before treatment initiation. 13% of the 97 HEU children were at high risk of HIV-1 acquisition by breastfeeding and were offered lamivudine prophylaxis.

CONCLUSION In the context of low-performing routine infants' HIV diagnosis, the rescue strategy proposed in PREVENIR-PEV study is particularly useful to ensure that all HIV-infected infants and mothers are initiated on ART and that HEU infants at high risk of HIV-1 acquisition are protected.

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Alarming tuberculosis rate among people who inject drugs in Vietnam despite full HIV control

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BIOGRAPHY VU HAI Vinh is a senior physician, deputy head of Infectious and Tropical Diseases Department, Viet Tiep Hospital, Haiphong, Vietnam. He is in charge of International Relations office, member of scientific committee of this university hospital and member of expert committee on HIV in Hai Phong. His work mainly focuses on the control of viral infections (HIV, HCV but also tuberculosis) among vulnerable populations. He is also visiting lecturer of Haiphong University of Medicine and Pharmacy.

OBJECTIVE The tuberculosis (TB) epidemic is not homogeneous in the general population but presents in high-risk groups, including people who inject drugs (PWID). However, the TB epidemic remains largely undocumented among PWID, mainly because they are marginalised with poor attendance to the healthcare system.

METHOD We performed a cross-sectional survey of TB prevalence among two cohorts of HIV-positive ($n = 484$) and HIV-negative ($n = 457$) PWID in Hai Phong, Vietnam. Members of community-based organisations (CBO) followed the cohorts at the CBO offices. These cohorts were taken from a large research program aiming at ending the HIV epidemic among PWID. Participants were screened for TB using questions on TB symptom administered by CBO workers, followed by a chest X-Ray and then by an Xpert® MTB/RIF test at the TB hospital. TB was defined by a positive Xpert® MTB/RIF.

RESULTS For both cohorts, most PWID were male (92%), living alone (63%) and employed (78%), with a median age of 42 years. Only a few (4%) were homeless. Among HIV-positive PWID, 90% were on ART and 82% had a viral load $<1,000$ copies/mL. Using this CBO-based screening, we were able to diagnose 15 active TB cases. The TB prevalence ranged between 5.9% (95%CI: 3.8–8.4) among all subjects with complete data and 1.6% (95%CI: 0.6–3.3), assuming no subjects with missing data had TB. Living couple, arrestation over the past 6 months, homelessness and smoking methamphetamine were independently associated with TB, but not HIV.

CONCLUSION The TB prevalence among PWID was 30 to 90 times the prevalence in the general population; Vietnam is already in the top 30 TB burden countries. These data rely significantly on CBO workers who can reach and counsel marginalised PWID. While the HIV

epidemic has ended in this group, the very high TB rate requires consideration and urgent action.

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Large community-based intervention and mass screening for HIV control among people who inject drugs in Vietnam: a quasi-experimental study

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BIOGRAPHY Nicolas Nagot, MD PhD, trained as a medical epidemiologist at the London School of Hygiene & Tropical Medicine. He is now in Clinical Epidemiology at the University of Montpellier (France) and Head of the Department of Medical information and clinical research at the Montpellier University Hospital. He has worked overseas during 10 years to develop his field of research which encompasses the control of HIV and associated infections among key populations (mainly female sex workers and people who use drugs) and the prevention of mother-to-child transmission.

OBJECTIVE In most low-middle income countries, HIV remains difficult to control among people who inject drugs (PWID). Our goal was to assess the efficacy, at a city level, of an innovative community-based intervention on viremia prevalence (best reflecting the transmission potential among all PWID).

METHODS We implemented a quasi-experimental study in Haiphong, Vietnam, a city of two million inhabitants. The intervention consisted of four annual respondent-driven sampling (RDS) surveys implemented in community-based organisation (CBO) sites, coupled with HIV screening and peer supports to access antiretroviral treatment, medication assisted treatment (MAT) and to provide harm reduction activities. At each RDS survey, adults who inject drugs were enrolled (self-declaration followed by urine test and injection-mark check). A final RDS survey (RDS4) was done for evaluation purposes. Viremia prevalence and the HIV cascade of care were compared among those who were part of the first RDS (RDS1) and those who were part of the final RDS (RDS4).

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RESULTS At RDS1, of 1,383 participants, 29.9% were HIV-seropositive and 75.6% were virally suppressed. Less than 5% reported sharing needles/syringes. Over the 3 RDS surveys, 3,150 distinct PWID were eligible; representing 60% of the estimated PWID population in Hai-phong. Among the 95 PWID identified as HIV-seropositive and not on treatment, 66 (69.5%) were initiated on antiretroviral treatment. In addition, the proportion of PWID on MAT increased from 11.8% at RDS1 to 48.9% at RDS4 ($P < 0.001$). HIV viremia was reduced by almost 2.5 times, from 7.2% at RDS1 to 2.9% ($P < 0.001$). The intervention contributed to 46% of this reduction. Meanwhile, the HIV cascade of care improved from 90.6/92.2/91.0 to 96.6/92.7/98.6.

CONCLUSIONS Mass community-based screening using sequential RDS proved very efficient to identify untreated HIV-infected PWID and link them to care in low-middle income countries and therefore to control the HIV epidemic.

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Estimating population-level HIV incidence using the synthetic cohort method in Zambia: data from demographic and health Surveys 2002–2018

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BIOGRAPHY Chola Nakazwe is a PHD student at the University of Bergen. She is also a researcher in Zambia based at the National Statistics office, with extensive applied research experience gained from coordinating and implementing various health-related surveys such as demographic health surveys. Her PHD research focus is assessing the changing HIV epidemiology in Zambia: evidence from population-based surveys. The research is of high national policy importance as HIV and AIDS contributes to the high burden of morbidity and mortality in Zambia.

OBJECTIVE The objective of our study is to examine changes in HIV incidence using the cohort synthetic method based on HIV prevalence data from 2002 to 2018.

METHODS We used the synthetic cohort principle method to estimate HIV incidence using HIV prevalence data from four nationally representative surveys

conducted in 2001–2, 2007, 2013–14 and 2018. This method is based on the assumption that differences in HIV prevalence among individuals aged α years in the first survey and $\alpha + \tau$ years in the second survey conducted τ years later can be attributed to incident infections and AIDS deaths. By taking into account AIDS deaths and adjusting for the effect of antiretroviral treatment on survival, HIV incidence is estimated for that age group.

RESULTS Estimated HIV incidence in the inter-survey period 2002–2007 for adults aged 15–49 years was 1.09 (95% CI: 0.71–1.47) per 100 person-years at risk (pyar). Estimated HIV incidence was higher among men than women in 2002–2007 (1.15 compared with 1.04 per 100 pyar). However, incidence declined among men in subsequent survey periods to 0.48/100 pyar in 2013–2018, whereas HIV incidence increased among women to 1.29/100, resulting in women having a higher HIV incidence than men. Estimated HIV incidence declined by 40% and 87% among young women and men (15–24 years) between 2002 and 2018 from 1.5/100 pyar and 1.1/100 pyar to 0.9/100 pyar and 0.1/100 pyar, respectively.

CONCLUSION Our results indicate that new HIV infections are declining among young people but remain high among young and older women. Based on our data, the HIV epidemic trajectory shows a positive pattern among young people and a contrary negative pattern among adult women, indicating a need for Zambia to intensify treatment and combination prevention strategies with a strong focus on reducing HIV infection among women.

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Barriers and enablers of adherence to nevirapine prophylaxis against HIV 1 transmission among 6-week-old HIV exposed infants in Northern Uganda

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BIOGRAPHY I am a Public Health specialist. I have worked and published work on maternal and infant health especially in the area of infectious disease epidemiology. I have worked on virologic monitoring, breastfeeding, adherence, home deliveries and unintended pregnancy among HIV infected and exposed mother-

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infant pairs in post-conflict Northern Uganda. I have worked under the supervision of: 1. Thorkild Tylleskar (pediatrics and international health), UiB 2. James K. Tumwine (pediatrics and child health), Makerere University 3: Grace Ndeezi (pediatrics and child health), Makerere University 4. Paul Waako (Pharmacology), Busitema University

OBJECTIVE Sub-optimal adherence to infant prophylaxis has been associated with mother-to-child transmission of HIV. The factors associated have not been well characterized in different settings. This study describes barriers and enablers of adherence to infant prophylaxis among 6-week-old HIV-exposed infants in Lira, Northern Uganda.

METHODS This prospective cohort study was conducted from 2018–2020 at the HIV clinic in Lira Regional Referral Hospital and included 472 mother-infant pairs. HIV-infected pregnant women were recruited, followed up at delivery and 6 weeks postpartum. We used a structured questionnaire to obtain data on socio-demographic, reproductive-related, HIV-related characteristics and adherence. Data were analyzed using Stata to estimate adjusted risk ratios using Poisson regression models to ascertain barriers and enablers of adherence to infant nevirapine prophylaxis.

RESULTS Barriers to infant adherence are maternal characteristics including: younger age (≤ 20 years adjusted risk ratio (ARR) = 1.55; 95% CI: 1.1–2.2), missing a viral load test during pregnancy (ARR: 1.4; 95% CI: 1.1–1.7), not receiving nevirapine syrup for the baby after childbirth (ARR = 6.2; 95% CI: 5.1–7.6). Enablers were: having attained ≥ 14 years of schooling (ARR = 0.7; 95% CI: 0.5–0.9), taking a nevirapine-based regimen (ARR = 0.6; 95% CI: 0.4–0.9), long-term ART (≥ 60 months ARR = 0.75; 95% CI: 0.6–0.9), accompanied by a husband to hospital during labour and childbirth (ARR = 0.5; 95% CI: 0.4–0.7), labour starting at night (ARR = 0.7; 95% CI: 0.6–0.8)

CONCLUSION Despite mothers receiving nevirapine syrup from the health workers for the infant, non-adherence rates still prevail at 14.8%. The health system needs to consider giving the nevirapine syrup to HIV-infected pregnant women before birth to avoid delays and non-adherence. Attention should be put on younger women and those who recently started ART.

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Serosurvey, awareness and sensitization on HIV, HBV, HCV and Mycobacterium tuberculosis among community-based population in Mbano, Imo State, Nigeria

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BIOGRAPHY Prince Chinonso Nnadozie is a final year Master student of University of Bergen, Bergen, Norway. He is studying Global Health at Centre for International Health, University of Bergen. He has a Bachelor degree in Microbiology, from the University of Port Harcourt, Port Harcourt, Nigeria; and a Master of Science degree in Environmental Toxicology and Chemistry, from the Norwegian University of Science and Technology, Trondheim, Norway. He had attended and passed courses on Systematic Review and Meta-Analysis. He has interest in Epidemiology and general public health. He would be glad if he is offered any opportunity to study at the PhD level.

OBJECTIVES We investigated the prevalence of HIV, hepatitis (HBV and HCV) and *Mycobacterium tuberculosis* (Mtb) among 57 communities in Mbano, Imo State, Nigeria. We also conducted health advocacy to educate people about these infectious diseases, their modes of transmission, prevention and treatment during the medical outreach.

METHODS We conducted Mtb, HIV, HBV and HCV tests using TB Rapid Card Insta, Alere Determine HIV-1/2, Determine HBsAg2 and HCV-Ab rapid test strips respectively and counselled participants. Interviews with a modifiable guide were carried out to gain insight into experiences of health and illness of participants from communities in Mbano, Imo State, Nigeria. Convenience sampling method was adopted for the study. They were counselled and those that showed positive results including presumptive cases were referred to hospitals for treatment and/or further tests.

RESULTS of 204 participants, 88 (43.1%) were males and 116 (56.9%) were females. Age ranged from 0 to ≥ 55 years (mean age = 34). Results showed that 9 (4.4%) participants were seropositive to HIV. of these HIV seropositive participants 2(22.2%) were males and 7

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(77.8%) were females. Forty (19.6%) participants were seropositive for Mtb. Nine (4.4%) and 4 (2.0%) participants were seropositive for HBV and HCV, respectively. Symptoms were reported by 15 (7.4%) Mtb patients, 6 (2.9%) HBV patients, 3 (1.5%) HCV patients and by one (0.5%) PLHIV.

CONCLUSION The study has shown high seropositivity of Mtb and HBV among the community population of Mbano in Imo State, Nigeria. It also revealed a relatively low seropositivity of HCV. Also, this outreach affords us the opportunity to reach rural communities in Mbano, Imo State, Nigeria who are facing challenges in seeking and accessing quality healthcare at fixed health center sites. There should be concerted efforts by the government to join force with activities of Society Against Infectious Diseases (SAID) program.

34**The Epidemiology of Delayed HIV Diagnosis in Ibadan, Nigeria**

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BIOGRAPHY As a curious medical Doctor, I am passionate about research with innate ability to care for people and to find the root cause of their diseases. Hence, this has led me to Canada and currently completing a master degree in Clinical Epidemiology to know more about the diseases that are of great challenges to my country. My interest in HIV research was inspired by my experience as a general practitioner. Having seen many patients who were diagnosed very late in the course of their HIV infection and imagined how many other people they would have infected before they were diagnosed.

BACKGROUND Human immunodeficiency virus infection (HIV) is one of the major health burdens in Nigeria. Delayed HIV diagnosis remains a significant driver of HIV transmission. The causes of delayed diagnosis are unknown. This observational study investigated demographic risk factors for delayed HIV diagnosis, time from HIV infection to diagnosis and trends in the rate of positive HIV tests and delayed diagnosis in Ibadan, Nigeria.

METHODS The AIDS Prevention Initiative database provided data on people living with HIV who enrolled for care between October 2013 and December 2018 at the Antiretroviral Therapy (ART) clinic in the University College Hospital, Ibadan, Nigeria. 3,458 patients aged 15 years or older, diagnosed with HIV for the first time,

with available CD4 counts, were included in this study. Delayed HIV diagnosis was defined as CD4 counts less than 350 cells/mm³ at the time of first diagnosis. Logistic regression analysis was performed to assess the risk factors for delayed HIV diagnosis and the time interval between HIV infection and diagnosis was calculated based on the average CD4 decline rate.

RESULTS 3,458 patients were included. The prevalence of delayed HIV diagnosis was 1,993/3,458 (57.6%). Risk factors significantly associated with delayed HIV diagnosis in the multivariate analysis were older age, retiree, marriage separation, never married and widowed females. Risk factors significantly associated with an early HIV diagnosis were student and tertiary education. The mean time from infection to diagnosis was 6.3 years. A progressive decline in the rate of positive HIV tests and delayed HIV diagnosis were observed from 2014 to 2018.

CONCLUSION Rate of delayed diagnosis was high but is declining with time. HIV testing implementation should focus on groups at risk of delayed diagnosis.

242**A prospective study on treatment outcome of tuberculosis in diabetes patients in a tertiary care centre in Tamilnadu, India**

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BIOGRAPHY Dr. Parameshwari associate in CHENGALPATTU MEDICAL COLLEGE, Tamilnadu, India Has published more than 10 articles in national and international journals served as guide for ICprojects and Post graduate dissertations jas 10years of teaching experience as professor.

OBJECTIVES of the study: To assess the treatment outcome of Tuberculosis (TB) in diabetes and to compare the treatment outcome among diabetic and non-diabetic patients on Category I tuberculosis (TB) treatment.

METHOD A prospective observational study was conducted in Chest Medicine Department, Chengalpattu Medical College Hospital, Chengalpattu between February and April 2018 among patients who were registered under RNTCP. 50 patients who were registered under RNTCP for Category I tuberculosis treatment were followed for a period of 6 months to assess the treatment outcome of tuberculosis with relation to their diabetes status. The data was summarized into frequencies and treatment outcomes was compared using the Chi square

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test, with relative risks (RRs) and 95% CIs calculated as appropriate.

RESULTS The mean age of the study population was 49.9 (SD 10.5) with predominantly males 74%. Most were of low socio economic status with Illiteracy 48%) and unemployed 38%. The mean weight of the participants was 53.5 kg (SD 9.44). The signs and symptomlike cough with expectoration (78%), weight loss (54%) and evening rise in temperature (56%) were common. Pulmonary tuberculosis was found in 82%; extra pulmonary TB in 9 (18%). 56% had diabetes of whom 78% are undergoing treatment within 5 years. 58% of TB patients were cured; 20% completed treatment and 14% were lost to follow up. Four patients (8%) died during the treatment period. Sputum smear positive TB (68.8%) is more among diabetics; sputum smear negative (66.7%) TB is more common more among nondiabetics. Diabetic patients reported were more likely to have pulmonary TB (65.9%) than extra pulmonary TB (11.1%) (*P*-value 0.002).

CONCLUSION The study highlights DM does not adversely affect TB outcomes.

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Novel insights into pathogenesis of human post-primary tuberculosis from archival material of pre-antibiotic era, 1931–47

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BIOGRAPHY Syeda Mariam Riaz is a PhD candidate at the University of Bergen and doing research at Haukeland University Hospital. She has a degree in Bachelor of Medicine, Bachelor of Surgery from Pakistan and an M.Phil in International Community Health from Norway. The interest in research started in her masters and her work focuses mainly on understanding the immune pathogenesis of post-primary tuberculosis and factors involved in tissue destruction and cavitation.

Primary tuberculosis (TB) and post-primary TB are two distinct disease entities caused by same organism,

Mycobacterium tuberculosis (MTB). Primary TB occurs when an individual is infected with MTB for first time without prior immunity to infection. Post-primary TB begins only after primary MTB infection has established systemic immunity. There is a lack of knowledge that how MTB can establish disease in an immune host and cause cavitory disease. This knowledge is an essential prerequisite for development of new vaccines and therapies. A major hurdle is the non-availability of untreated human material with post-primary TB. All the animal models produce primary TB only and this has diverted focus from true pathogenesis of post-primary TB.

OBJECTIVES We aimed to understand the pathology of post-primary TB in the human lungs from 1931 to 1947 before the antibiotic's era.

METHODS Formalin-fixed paraffin-embedded blocks from 1931 to 1947 were collected from the archives stored at Department of Pathology, the Gades Institute, Norway. Blocks were re-embedded, sectioned and stained for haematoxylin and eosin, acid-fast bacilli and connective tissue.

RESULTS Granuloma was not the only characteristic lesion of TB; rather, TB histology showed great diversity and involved granulomas and various stages of pneumonia including necrosis, caseation, cavitation and fibrosis. Lesions in different stages of development were found compartmentalized within the same lung making it feasible to understand the temporal relationship. The early lesions of post-primary TB begin as alveolar accumulation of foamy macrophages. These lesions may regress or progress to necrosis and cavitation. Cases with pneumonic infiltrates significantly had more cavities, died because of pulmonary TB and less frequently had disseminated TB than cases that only had granulomas.

CONCLUSION TB has not one, but two characteristic lesions, tuberculous pneumonia in post-primary TB and granulomas in primary TB. Regressive early lesions hold the key to vaccine development.

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Safety of Yellow Fever vaccination in HIV infected patients—the experience of a travel clinic in Portugal

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dedicated to tropical and travel medicine and part of his work involves travel medicine consultation in the travel clinic of the Infectious Diseases department. He also works with diagnosis and management of inward patients with tropical diseases. He completed the Diploma in Tropical Medicine and Hygiene in 2019 and is currently enrolled in a PhD programme in Tropical Medicine.

OBJECTIVE The safety and immunogenicity of attenuated vaccines like yellow fever (YFV) in people living with HIV (PLWH) is still a matter of debate, especially in those with advanced HIV infection. Our work aims to describe immune status at time of YFV administration and outcomes following administration in a population of PLWH travelers of a tertiary care hospital in Northern Portugal.

METHODS We reviewed the epidemiological and clinical information of all 36 adult PLWH followed at our centre who were vaccinated against YF between 2008 and 2018 as part of a pre-travel consultation.

RESULTS Thirty-four PLWH received a dose of YFV after HIV diagnosis. In three, this dose represented a revaccination. Most were male (88%) with median age at vaccination date of 45 (range 28–76) years old. Most common destinations were Angola (52%) and Brazil (42%). The three main reasons for travel were work (36%), visiting friends and relatives (30%) and tourism (24%). Average TCD4 cell count at vaccination time was 642/uL (range 258–2160/uL) and HIV viral load was non-detectable in 79%. The range of viremia in the remaining 7 patients was 21–155000 copies/mL. Median time from HIV diagnosis to YFV was 5 years (range: 4 months–20 years). Two patients delayed YFV to allow TCD4 cells counts >200/ μ L. of note, two HIV infected patients were vaccinated before HIV diagnosis was known—only one had TCD4 cell counts <200/uL. None of the vaccinated PLWH developed moderate/severe side effects following vaccination and none developed YF during travel.

CONCLUSION In this population (all but one having TCD4 cell counts >200/ μ L and 79% with non-detectable HIV viral load), YFV administration was safe. YFV is fundamental in travel health of HIV patients and more data on safety and immunogenicity should be obtained to review current recommendations that preclude vaccination in advanced HIV infection.

366**Differences in VMMC-related adverse events between military and civilian health facilities in Uganda**

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BIOGRAPHY Lucky Obangaber works with University Research Co., LLC—Department of Defense HIV/AIDS Prevention Program (DHAPP).

OBJECTIVE Occurrence of Adverse Events (AEs) in Voluntary Medical Male Circumcision (VMMC) is a critical measure of service quality. While much has been reported about national VMMC programs, there is a paucity of data on AEs in military health facilities (HFs). URC-DHAPP supports military health facilities to implement VMMC, promptly identify and manage AEs. We compared the occurrence of AEs in Ugandan civilian and military-managed health facilities.

METHODS The capacity of the military Directorate of HIV/AIDS care was strengthened to independently implement mobile VMMC within military settings. Using the military and local government reporting systems, AEs are identified and locally managed at military health facilities even after the circumcision camps close. The military leadership applies a robust follow up mechanism at all administrative levels. National VMMC data (DHIS2) from 14 military health facilities were compared with similar data from civilian health facilities over the period October 2018 to Sept 2019. Linear Regression Modelling was applied to contrast trends in VMMC AEs over time in the two groups.

RESULTS The rates of AEs in VMMC increased over time in civilian facilities but remained constantly low in military facilities. The civilian health facility AE rate in VMMC was 1.1% compared to 0.34% in military health facilities. The VMMC AEs rates varied remarkably over time between civilian and military health facilities ($f(2,13) = 4.57$; $P < 0.05$), with civilian health facilities reporting incremental rates over time ($R^2 = 0.228$), while rates for military facilities remained constant ($R^2 =$

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0.002). This may be an indication of better quality of VMMC services in military managed health services.

CONCLUSION Engagement of military leadership and health system strengthening is critical for early identification and proper management of AEs. Further investigation of the mode of care provided is required to inform best practice for VMMC.

363**Tracking VMMC-related Adverse Events in Ugandan military health facilities**

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BIOGRAPHY Lucky Obangaber works with University Research Co., LLC–Department of Defense HIV/AIDS Prevention Program (DHAPP).

OBJECTIVE Rapid scale up of Voluntary Medical Male Circumcision (VMMC) has topped the global agenda of HIV management in the past decade. Nonetheless, evidence on the extent and management of VMMC Adverse Events (AEs) is limited, particularly for military settings. URC-DHAPP supported 28 military health facilities to rapidly scale up VMMC services. We assessed the extent of AEs related to VMMC and describe their management.

METHODS We implemented the military modified “MOVE” model through mobile outreaches to reach the underserved populations with VMMC services. Follow up of circumcised clients was supported through scheduled telephone call reminders, commander-led reminders within the barracks and assigning each health worker a lot of clients to follow up within 7 days as an outreach service. Data from AE medical records in District Health Information System (DHIS2) was statistically analysed over a period of one year, comparing pre and post rapid scale up of VMMC.

RESULTS Integrating client follow up during the outreach period is an effective strategy to improve client follow up and prevention of AEs. Strengthening the capacity

of the military VMMC mobile on-site team AE management provides an opportunity for timely identification of AEs and their management. 17,000 circumcisions were conducted through military VMMC services between October 2017–September 2018 with 0.16% minor AEs reported. The following year, 24,038 circumcisions were conducted with minor AEs increase of up to 0.34%. Healthcare providers attributed this increase to patient's poor wound care, increased proportion of circumcised men, late reporting and lack of a streamlined follow up system.

CONCLUSION Accelerated VMMC in the military setting contributed to an increase in the proportion of clients experiencing minor adverse events. The observed increase in AEs rates requires further investigation to determine whether it is an indication of better detection or compromise to the quality of VMMC services.

357**Implementation of early infant diagnosis for HIV: Experiences from the Ugandan military PMTCT program**

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BIOGRAPHY Paul Lubega works with the University Research Co., LLC–Department of Defense HIV/AIDS Prevention Program (DHAPP).

OBJECTIVE Early Infant Diagnosis (EID) for HIV exposed infants (HEI) is a priority intervention in the global HIV epidemic control effort. While there is a large body of evidence on EID in the general population, little is documented about it in military setting a high-risk population. The URC-Department of Defense HIV/AIDS Prevention Program strengthens EID implementation within the Ugandan military health facilities.

METHODS The program provides routine technical assistance to strengthen mother-baby care points within the Maternal and Child health services to increase uptake, coverage and quality of EID services. We conducted a retrospective evaluation of EID services in 10 military health facilities. Data extracted from EID records on first

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Polymerase chain reaction (PCR) at 6 weeks and rapid test at 18 months in the last 24 months was analyzed. Descriptive statistics were applied to determine the extent of EID implementation.

RESULTS A total of 890 HEI from 10 military health facilities were included in this assessment. of these 70.4% had a documented 1st PCR results and only 42.4% a final rapid test results, 7 infants tested positive. 64.3% of the infants did not complete the EID cascade largely due to homestead migration associated with soldier husbands' mobility.

CONCLUSION Although strengthening mother-baby care points within the military improves uptake and quality EID services, it does not guarantee completion of the EID cascade. Interventions that factor in high migration of soldiers' homesteads ought to be sought to ensure completion of the EID cascade in military PMTCT programs.

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Using the “granular” approach in programming to improve linkage to care among newly diagnosed PLHIV in Ugandan military health facilities

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BIOGRAPHY Michael Ssemanda works with University Research Co., LLC–Department of Defense HIV/AIDS Prevention Program (DHAPP).

OBJECTIVE The second 90 in the 90: 90: 90 UNAIDS strategy aim to have 90% of all people with diagnosed HIV infection receiving sustained antiretroviral therapy (ART). Little is documented about linkage to care for military populations. The URC-Department of Defence HIV/AIDS Prevention Program implemented a targeted approach to improve linkage among newly identified PLHIV in Ugandan military health facilities.

METHODS We implemented the granular approach articulated in PEPFAR 3.0. This entailed daily collection of detailed patient level data/information from all 28 supported health facilities. The information was routinely reviewed, analysed and used to guide timely program

implementation, including informing linkage interventions.

RESULTS Granular programming enhanced in-depth understanding of site-specific implementation gaps that directed targeted support. Linkage to care improved from 65% in Q1 to 94% in Q4. Linkage among men improved from 56% to 77% during the same period and overall the project achieved 103% the project target for new HIV positive clients initiating ART by the end of quarter 4. ART starter packs are critical in improving early initiation of treatment at non-ART accredited sites that provide HIV testing service.

CONCLUSION Use of daily patient level data for real-time programming improves understanding of site-specific processes and dynamics that affect performance. This is critical for improving linkage to care at military health facilities.

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“Command-Driven”: Improving HIV service delivery using a military leadership approach

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OBJECTIVE Military personnel are 2–5 times at a higher risk of acquiring sexually transmitted infections (STIs), including HIV. Existing interventions within civilian populations have not been effective in the military given their mobility and priority population nature. The Ugandan military adopted a novel “Command Driven” approach (CDA), to improve HIV prevention, care and treatment (PCT) outcomes. We describe a URC-Department of Defense HIV/AIDS Prevention Program (URC-DHAPP) CDA and demonstrate its effect on HIV PCT outcomes.

METHODS A hybrid authoritarian-participatory leadership model was applied through the HIV/AIDS prevention, care and treatment cascade at 28 military-supported health facilities. The CDA closely mirrored information flow and action driven by the military's hierarchy. The approach was evaluated through mixed methods. Narratives were used to describe the CDA, while focus group discussions and key informant interviews explored client

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and service providers experience and perceptions. Program data from District Health Information System (DHIS-2) was analyzed quantitatively.

RESULTS Military leadership can effectively and efficiently enhance PCT outcomes within priority populations. Military leaders were not only engaged but also led by example motivating all troops under their command. Mass sensitization, use of media; bespoke training, combined with CDA tremendously improved linkage to care and treatment outcomes. The CDA can leverage other military command-driven requirements like mandatory screening during deployment for missions and strict adherence to monitoring for even better outcomes. Linkage in care improved from 60.2% to 80.5% and suppression rates from 87% to 90% within one year.

CONCLUSION The CDA is a promising intervention warranting formal incorporation within military health policies and practice. Some aspects of this hybrid leadership model could yield positive results in HIV PCT within civilian settings.

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Data strengthening to track retention of mobile populations in HIV care: Experiences from military health facilities in Uganda

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BIOGRAPHY Twaha Rwegyema works with University Research Co., LLC–Department of Defense HIV/AIDS Prevention Program (DHAPP).

OBJECTIVE Few studies document how HIV infected military individuals engage with care, or how they can be successfully retained on ART. MOH Uganda recommends various strategies; however, these are not specific to military populations. To HIV/AIDS and contribute to epidemic control, retaining key populations like military PLHIV in care remained critical. Retention in care was about 76% in 2018 for Uganda. Low retention has been attributed to poor data quality and reporting. URC-DHAPP implemented interventions geared towards retaining PLHIV in military health facilities from January 2019.

METHODS We conducted a data quality assessment, reviewed 24,574 client files at 28 military health facilities

to account for every patient. A patient record review was used to extract information on status of patients in care—whether they were active and retained in care, lost to follow up, transferred out or died. Active in care was ascertained using a 4-weeks consecutive visit constancy method based on their last visit to the health facility.

RESULTS Quality of data is critical in accurately determining retention rates in military health facilities. Military PLHIV reported as lost to follow up mainly resulted from gaps in data processing. Targeted validation of retention data resulted in improved data quality with only 2% variation of reported and verified after a period of 6 months. 80% (19,651) were found to be active and retained in care, relatively higher than the national average of 76%, while 12% were lost-to-follow up and 7% had transferred out. Common cause of poor data quality was un-updated routine medical records, presence of duplicate files, use of wrong data sources to report retention and undocumented self-transfers.

CONCLUSION Gaps in good data quality contribute to low retention rates reported in military health facilities. Targeted interventions to address data quality are critical for accurate determination of retention rates.

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Strengthening Laboratory Management Towards Accreditation (SLMTA): Implementation experience from Uganda military laboratories

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OBJECTIVE While the Ministry of Health and Central Public Health Laboratories (MOH/CPHL) adopted the Strengthening Laboratory Management toward Accreditation (SLMTA) program in 2010 with the goal of attaining ISO 15189 accreditation, none of the 28 military health facilities have been supported. The SLMTA process enables laboratories to develop and document their ability to detect, identify and promptly report all diseases of public health

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significance that may be present in clinical specimens. The URC-Department of Defense HIV/AIDS Prevention Program is supporting five (5) military health facilities to implement the SLMTA and improve the quality of services.

METHODS An initial audit using the WHO-recommended SLMTA checklist was deployed to collected data from 5 military health facilities. Laboratory staff at these health facilities were trained to strengthen their technical capacity, followed by mentorship, coaching and feedback sessions. Data collected was analyzed and compared against standard WHO site accreditation scores. Health facility specific action plans were developed to address identified gaps.

RESULTS The military health facilities have never been supported to implement the SLMA program. The highest score was 49.4%, lowest score was 15.1% averaging 28.4% at the baseline audit. Appropriate commodity inventory forecasting, purchase and management recorded the highest score of 47% while the least score was 3% for management reviews. Laboratory staff and military leadership engagement has enabled health facility laboratories to setup SLMTA appropriate structures, processes, specifically ensuring that all Standard Operating Procedures are developed, improve data management and internal audits routinely conducted.

CONCLUSION Continued on-site support involving all relevant stakeholders and organizing internal audits are planned to ensure military health facility laboratories meet minimum accreditation requirements by the next assessment phase.

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Where are the TB patients? Reflections from low yield of tuberculosis contact tracing and investigation in Ugandan military health facilities

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BIOGRAPHY Rogers Besigye works with the University Research Co., LLC–Department of Defense HIV/AIDS Prevention Program (DHAPP).

OBJECTIVE Tuberculosis (TB) affects up to 8.8 million people each year, most of whom live in low-and middle-income countries. One of ‘WHO 2035 End TB strategies’ is TB contact tracing and investigation used to increase TB cases. Little has been reported on the success of this strategy, especially in military health facilities. We describe the process, outcomes and implications of a TB contact tracing program in Uganda military health facilities supported by the URC–Department of Defense HIV/AIDS prevention program (DHAPP).

METHODS TB contact tracing was implemented within 28 military health facilities for a period of 4 months. TB patients’ charts were reviewed for locator information and contacts traced by community linkage teaFamily members were screened for TB with those suspected to have TB fully investigated according to standard procedures. Data from the TB contact tracing exercise was analysed and used to improve program performance.

RESULTS A total of 199 (103 males, 96 females) TB patients were enlisted, of these 87 (F: 62, 71%; M: 25, 29%) were identified for contact tracing. From them 221 contacts were traced, 33 (15%) of whom were children less than 5years, 124 (56%) were females. Only 17 of those evaluated were bacteriologically diagnosed with TB, a prevalence of 7.7% among contacts. The extent of resources invested in this mobile military population resulted in a less than optimal yield of infected contacts. Low yields have also been reported in civilian health facilities.

CONCLUSION The prevalence of TB as identified by investigations among contacts remains low. Explanatory factors and effectiveness of contact tracing warrant further investigation.

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Differentiated care to reach the last troop: The Ugandan military experience

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BIOGRAPHY Cassette Wamundu headed the Directorate of HIV/AIDS (DHIV) in Uganda Peoples Defence Forces (UPDF) until 2020.

OBJECTIVE Uganda adopted the ‘Test and Treat’ policy for HIV treatment in 2016. However, mobile populations like the military present challenges in its implementation. While Differentiated Service Delivery Models (DSDM) have been shown to reduce losses to follow up (LFTU) and improve adherence, little is documented about differentiating care for the military population. URC-Department of Defense HIV/AIDS Prevention Program (DHAPP) supported the Ugandan military to implement a DSDM tailored to the military.

METHODS We designed and implemented a DSDM model tailored to the military deployed in hard-to-reach areas. This involved engaging the military leadership to foster buy-in, obtain permission and guide mobile service delivery to deployed troops. Troops on ART were mapped in 60 hard to reach locations. This ensured timely 3-months drug re-fills and delivery of other drugs incorporated into the delivery cycle of other military supplies to these locations. Mobile clinics were conducted to ensure patients were clinically monitored at least once every 6 months. We assessed this model’s contribution to coverage and quality of antiretroviral treatment (ART) services.

RESULTS Implementation of DSDM tailored to the military was highly appreciated by both the commanders and soldiers on ART because it improved access to timely care. A total of 2,229 soldiers were reached within nine months. Viral load coverage improved from 10% to 62%, with a suppression rate of 85%. TLD transition coverage increased to 55% while IPT uptake increased from 10% to 38% with improved retention. Challenges experienced included difficult terrain and weather conditions that hampered movement to these locations.

CONCLUSION Differentiating care is critical towards improving coverage and quality of HIV services for the military. A tailored DSDM for the military results in improved retention and viral load coverage.

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Implementing a “Low Dose High Frequency” capacity-building approach and its effect on HIV service delivery in Uganda’s military health facilities

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BIOGRAPHY Denis Bwayo is the Program Director, University Research Co., LLC–Department of Defense HIV/AIDS Prevention Program (DHAPP).

OBJECTIVE Capacity building (CB) is critical in improving healthworkers’ practice in the face of rapidly evolving evidence and guidelines in HIV care. A major challenge for low resource settings is the dearth of evidence on how to effectively build the capacity of primary health-care workers to deliver quality health services. This paper describes local adaptation of the Low Dose, High Frequency (LDHF) approach and its effect on HIV service delivery within 28 military ART clinics in Uganda. We aimed to determine the a) LDHF acceptance by health workers; b) effect on adherence to HIV management guidelines; c) trends in viral load suppression and; d) barriers in adherence to guidelines.

METHODS We implemented an LDHF approach that entailed initial start-up training of healthworkers followed by bi-monthly on-site mentorship, coaching and feedback sessions at 28 military health facilities over 6 months. Using mixed-methods, we surveyed 541 client records and conducted 12 key informant interviews with healthworkers. Overall, healthworkers were positive about the LDHF approach which improved the quality of care.

RESULTS Overall, health workers were positive to the LDHF approach which resulted into improvement in quality of care. Prescriptions for recommended first-line ART regimen improved from 58% to 93%; timely due viral load test ordering increased from 45% to 79%; timely initiation of adherence counselling for non-suppressed clients increased from 32% to 66%; and appropriate switching of patients on failing regimes improved from 26% to 51%. Most commonly cited barriers to adherence to guidelines were heavy workload, complex guidelines, lack of job aides and patient-related factors.

CONCLUSION The LDHF CB model was acceptable to health workers and results in adherence to HIV guidelines. However, comprehensive adherence to the guidelines requires addressing other health system and patient-related factors that cannot be resolved by the LDHF approach alone.

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Dynamics of medicine stock management in highly mobile populations: Lessons from 28 military health facilities in Uganda

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BIOGRAPHY Paul Kibenge works with the University Research Co., LLC–Department of Defense HIV/AIDS Prevention Program (DHAPP).

OBJECTIVE Effective management of medicines to meet needs of highly mobile populations remains a challenge, particularly for specialized medicines like ARVs and anti TB. While evidence exists on medicines management in the general population, little is known about high-risk mobile populations, including the military which is a priority population. Medicine stockouts remain a major challenge across Uganda, mostly in civilian health facilities. The URC-Department of Defense HIV/AIDS Prevention Program (DHAPP) in Uganda appraised the medicines management cycle in 28 Ugandan military health facilities.

METHODS DHAPP technical assistance focused on improving HIV commodities' storage, prescription, dispensing and logistics records management. We conducted a mixed methods cross-sectional assessment of this process. We reviewed stock data and key documents, conducted; in-depth interviews (IDI = 112), key informant interviews (KII = 5) and focus group discussions (FGDs = 28).

RESULTS There was a relatively high availability of ARVs and TB drugs, also confirmed by the users. This achievement was directly ascribed to the modified medicines management cycle (mMMC) used in the Ugandan military—reinforced by an appropriate management support, a legal and policy framework. The mMMC factored in the uniqueness rooted within military processes and actors at the commodity distribution and utilization stages.

CONCLUSION Innovative modification of MMC addresses stock management bottlenecks, ensuring high availability of HIV commodities for the military population. This modified MMC would be potentially beneficial in other high-risk mobile populations.

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Adapting “MOVE” to accelerate VMMC coverage for HIV prevention in priority populations: Implementation experiences from Uganda’s military

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BIOGRAPHY Abdul Nyanzi works with the Directorate of HIV/AIDS in the Uganda People’s Defence Forces (UPDF) under URC-DHAPP. He is the Thematic Lead for Voluntary Medical Male Circumcision (VMMC).

OBJECTIVE Voluntary male medical circumcision (VMMC) is a proven biomedical preventive measure to prevent transmission of HIV. However, there is a paucity of data regarding conventional VMMC service delivery models among mobile priority populations such as the military. URC-Department of Defense HIV/AIDS Prevention Program (DHAPP) adapted the WHO’s MOVE model to rapidly scale up VMMC coverage in a Ugandan military setting.

METHODS The MOVE model was implemented within the context of VMMC mobile services. The adaptation aimed at rapidly scaling up VMMC uptake within priority populations and civilian communities served by Uganda’s 28 military health facilities. Program Impact Pathways (PIP) were used to provide a visual chain of events and outcomes linking program outputs to VMMC coverage.

RESULTS It is cost-effective and impactful to deploy a military-driven MOVE model geared towards demand creation, including invoking and leveraging the military leadership and adopting a lean model characterised by task-shifting to gain efficiency. The flexibility adopted through utilisation of mobile theatres to address the military mobility combined with robust documentation, reflection and learning; and prompt management of adverse events resulted in increased VMMC coverage and uptake. This approach led to an exponential increase in VMMC coverage and uptake from 3% (against 25% Q1 target) to 137% within 9 months by end of Q4.

CONCLUSION Adaptation of the MOVE model within military settings, cognizant of contextual specificities, is highly effective. This military-driven modified MOVE model in mobile VMMC potentially provides an

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opportunity to scale up national VMMC coverage to achieve global and national VMMC targets.

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Emergence of multi-drug resistant bacterial infection of lower respiratory tract among people living with HIV

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BIOGRAPHY Upendra Thapa Shrestha, Lecturer, Central Department of Microbiology, Tribhuvan University, Kathmandu Nepal (Intitutional Email: upendra.thapa-shrestha@cdmi.tu.edu.np). Currently; PhD Scholar; Faculty of Tropical Medicine, Mahidol University, Bangkok, Thailand (Email: upendrathapa.shr@student.mahidol.edu).

Goal: Applied Molecular Microbiology research and its application in human beings

Publications: More than 24 articles in national and international journals

Current status: working on diagnosis of acute undifferentiated febrile illness with focus on arboviral infections using multiplex real-time RT-PCR based on three tertiary care hospitals in Nepal

Research Grants Awarded from: University Grants Commission, Nepal, Ministry of Science and Technology, Nepal, USAID, USA

Other interested research area: Malaria, antimicrobial resistance

OBJECTIVES This study aimed to determine the prevalence of lower respiratory tract infection among HIV due to multidrug-resistant pathogens and to detect plasmid-mediated blaTEM and bla CTX-M genes among Extended-Spectrum Beta-Lactamase (ESBL) producing isolates from sputum samples in Sukraraj Tropical and Infectious Disease Hospital, Kathmandu, Nepal.

METHODS A total of 263 sputum samples from confirmed HIV-positive cases were processed with standard microbiological methods to isolate and identify the possible pathogens. The identified bacterial isolates were subjected to antibiotic susceptibility testing using modified Kirby Bauer disk diffusion following Clinical Laboratory Standard Institute (CLSI) guidelines. Multidrug-resistant and ESBL producers were screened and confirmed. Plasmids from those ESBL producers and Mstrains were extracted and screened for ESBL genes; blaCTX and

blaTEM by conventional PCR method using specific primers.

RESULTS of 263 sputum samples, 67 (25.5%) were culture positive showing *Klebsiella pneumoniae* (17, 25.4%) as the most predominant one. A higher rate of infection (4/8, 50%) was seen among older people of 61–70 years, whereas no infection was seen below age 20. About 30.0% ($n = 15$) of smokers, 32.9% ($n = 23$) cases with previous pulmonary tuberculosis and 39.8% ($n = 7$) of people with CD4 counts <200 cells/μl were found to be more susceptible towards LRTIs. Among 53 bacterial isolates in Enterobacteriaceae family, 52.8% ($n = 28$) were multidrug-resistant and 43.3% ($n = 23$) were ESBL producers. All ESBL producers were sensitive to Colistin and Polymyxin B. of 23 ESBL producers, 95.6% ($n = 22$) and 52.1% ($n = 12$) possessed blaCTX-M and blaTEM genes respectively in their plasmid, which may transfer both vertically and horizontally resulting higher rate of ESBL producers.

CONCLUSION The increasing rate of Mbacterial infections mainly ESBL producers of LRTIs among people with HIV causes difficulty in the management of diseases leading to high morbidity and mortality among HIV patients.

KEYWORDS: HIV, Lower respiratory tract infection, ELBL, blaCTX, blaTEM

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Interferon-γ-inducible protein 10 (IP-10) kinetics after antiretroviral treatment initiation in Ethiopian adults living with HIV

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BACKGROUND Interferon-γ-inducible protein 10 (IP-10) has been suggested as a marker for targeted viral load (VL) monitoring during antiretroviral treatment (ART). We aimed to determine the kinetics of IP-10 during the

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initial year of ART, with particular regard to the impact of tuberculosis (TB) co-infection on IP-10 secretion.

METHODS Longitudinal plasma IP-10 levels were quantified through enzyme-linked immunosorbent assay (ELISA) in treatment-naïve Ethiopian adults using samples obtained before and during the initial 12 months of ART. All participants underwent bacteriological TB investigation before starting ART. In virological responders (VRs; defined as VL <150 copies/ml with no subsequent VL ≥1000 copies/ml), IP-10 kinetics were analyzed using pairwise comparisons and linear regression models.

RESULTS Among 91/112 (81.3%) participants classified as VRs, 17 (18.7%) had concomitant TB. Median baseline IP-10 was 650 pg/ml [interquartile range (IQR), 428–1002] in VRs. IP-10 decline was more rapid during the first month of ART (median 306 pg/ml/month) compared with later time intervals (median 7–48 pg/ml/month, $P < 0.001$ in each comparison). Although VRs with TB had higher IP-10 levels at baseline, median 1102 pg/ml (IQR, 627–1704), compared with TB-negative, median 628 pg/ml (IQR, 391–885), the rate of IP-10 decline during ART was similar, regardless of TB-status.

CONCLUSION During the initial year of ART, IP-10 kinetics followed a biphasic pattern in VRs, with a more rapid decline in the first month of ART compared with later time intervals. Baseline IP-10 was higher in TB-positive versus TB-negative, but the kinetics during ART were similar.

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The influence of marital status on HIV infection in an HIV hyperendemic area of rural South Africa, 2000–2017

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BIOGRAPHY Boikhutso is a researcher and bio-statistician at the University of KwaZulu Natal (South Africa). His research interests are on Generalized linear models and Public health issues.

OBJECTIVE Marital status is one of the factors whose impact on HIV infection has always been studied but contradictory findings have been reported. The drastic changes in marriage patterns in South Africa influence the role of marital status on HIV infection. This study aims to give evidence-based information on the association

between marital status and HIV infection in a hyperendemic HIV area in rural South Africa.

METHODS This study was conducted on longitudinal data collected from the African Health Research Institute (AHRI) based in northern rural KwaZulu-Natal from 2000 to 2017 using multivariable Cox regression.

RESULTS The multivariable Cox regression results found marital status to be a significant factor of HIV infection. Compared to those who were married, the risk of HIV infection was approximately two times in those who were never married while those who were widowed presented as much as twice the risk of HIV infection. In addition, less educated participants were at higher risk of HIV infection than those with tertiary education. Furthermore, as expected, the risk of HIV infection increased with age (20–24 HR: 3.05 (2.32–4.02); 25–34 HR: 3.98 (3.12–5.07) and 35–49 HR: 4.36 (3.36–5.67). Women were more susceptible to HIV infection than men.

CONCLUSION This study found marital status to be an influential factor of HIV infection together with other socio-economic and demographic factors. This finding will help guide policy makers on empowerment programmes and policies targeting HIV and other health related issues in rural South Africa.

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Prevalence of tuberculosis, HIV/AIDS, and hepatitis in a prison of Balochistan: a cross-sectional survey

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BIOGRAPHY Public Health Specialist with 19+ years' experience in TB Control Program Technical lead, M&E, supervision and management. Post-graduations in Diploma in Tuberculosis and Chest Disease (DTCD), from the University of Punjab Lahore. Master of Science in Public Health (MSPH), from the Quid-i-Azam University Islamabad. Done SORT-IT UNION's operational research course. Currently as a Ph.D. A scholar working

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on an Extra Pulmonary Tuberculosis based project in Pakistan. In credit 15 publications in peer reviewed (2 as author) journals with another submitted under review in the BMC Infectious Diseases journal. Contributed enormously to the COVID-19 pandemic in the province.

OBJECTIVES Human Immunodeficiency Virus, Hepatitis and Tuberculosis are three primary infections that have the potential to cause severe morbidity in prison settings. The prison has the most favorable environment for the transmission of infections. We conducted this survey to determine the prevalence and feasibility of rapid diagnostic tests in an active screening of these diseases in prisons.

METHODS This cross-sectional survey conducted in central Jail Gaddani, one of the largest prisons in the Balochistan province of Pakistan. All prisoners, jail staff and staff's families participated. Informed consent obtained from participants. Van equipped with X-ray linked with Computer-Aided Detection for TB software used for screening. Sputum tested on Xpert for MTB/RIF assay and blood specimens collected for HIV and hepatitis serology. Diagnosed TB patients enrolled for treatment at Basic Management Units, reactive on Hepatitis Rapid Diagnostic Tools were referred for further management and HIV reactive referred to Anti Retro Viral center for further management.

RESULTS A total of 567 participants screened, (63% (356) prisoners, 23% (129) staff's family and 14% (82) jail staff). Among tested 10.3% (58/562) were hepatitis seropositive (Hepatitis-C, 41 [7.29%] Hepatitis-B, 16 [2.84%] Hepatitis-B&C, 01 [0.17%]). of these 49 were prisoners, 8 were jail staff and 1 was staff's family. HIV seropositive were 4% (24/566) and all were prisoners. Almost 99% (565/567) screened by X-ray, 172 (30%) were CAD4TB score > 50, out of 26% (148) tested on Xpert and 2% (03) tested positive for *Mycobacterium tuberculosis*. Five TB patients were diagnosed. Co-morbidities observed in 15 patients, (01 TB/HIV, 12 HIV/HCV, 01 HIV/HBV and 01 HBV/HCV).

CONCLUSION The frequency of infectious diseases in prison is alarming. For limiting the transmission of infections, immediate steps are required to be taken for improvement of prisons condition by application of screening protocols at the time of the first entry of prisoners in prisons.

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Healthcare seeking pathways and diagnostic delays among extra-pulmonary tuberculosis patients: a study from Lahore, Pakistan

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OBJECTIVE Extra-pulmonary tuberculosis (EPTB) most often remains undiagnosed or even untreated due to the complicated healthcare-seeking pathways. The management challenges lead to either over or under treatment, which causes diagnostic delay, development of drug-resistance, an increase in morbidity and mortality. Ultimately further impact on poverty, equity and financial status of the patients and families. This study aimed to assess the healthcare-seeking pathways, behavior and delays in the management of EPTB patients and factors associated with a longer delay.

METHODS The study was conducted at Gulab-Devi private tertiary-care hospital in Lahore, Pakistan. Data were obtained prospectively by a pre-designed questionnaire from EPTB patients. The period from inception of the symptom and registration at outpatient department (patients' delay) and enrollment for anti-tuberculosis treatment (health system delay) and from the onset of symptom to enrollment (total delay) were analyzed according to sociodemographic and clinical characteristics, healthcare-seeking pathways and risk factors associated with delays.

RESULTS Out of 339 patients with a median age of 22 years (IQR 17±30), 190 were categorized as confirmed, 91 as probable and 58 possible EPTB cases. The median

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patient, health system and total delays were 44, 12 and 66 days respectively. The majority of patients accessed private healthcare facilities (69.5%) and visited the same facility more than once (65.6%). Longer patient delay was experienced in TB lymphadenitis and age group 15–44 years compared to TB pleura-effusion. Private healthcare facility contacts, lower socioeconomic-class, residence out of the city and travel time >60 minutes were factors associated with prolonged delay (all $P < 0.05$).

CONCLUSION There is a considerable delay in EPTB patients' management. Patient delay is the major contributor to the total delay. Multiple sociodemographic and clinical factors are associated with prolonged delay. Decentralizing diagnosis, community awareness and collaborating with private healthcare providers may decrease delays in the management of EPTB.

95**Soil-Transmitted Helminths (STH) Prevalence Survey in Pakistan**A. Ali*Interactive Research and Development (ird), Lahore, Pakistan*

BIOGRAPHY My name is Waleed Rabbani, a postgraduate researcher and program management expert. I am currently serving as a Senior National Program Manager in Pakistan Deworming Initiative and providing technical support focused on strategic planning, high-level implementation and monitoring & evaluation of the school-based deworming program. I have been associated with conducting the spot checks of the payment system of Benazir Income Support Program, the largest social safety net program in South Asia. During my career, I have worked with the MSI, GIZ and Mott MacDonald. Waleed has been invited to various consultations of WHO in regards to Neglected Tropical Diseases.

OBJECTIVE WHO estimates, 21.7 million School Age Children in Pakistan are infected with STH, along with 9.3 million preschool-age children. However, prior to implementing large-scale deworming program, it was necessary to determine the geographical distribution of STH in the country. The objective of the survey was to report the prevalence and intensity of STH across Pakistan and provide information to the government for evidence-based interventions.

METHODS WHO's sentinel site approach was used to estimate baseline prevalence of STH infections. Schools were considered sentinel sites whereby one school was selected for every 300,000 children aged 5–10 years in

each of the nine ecological zones of Pakistan. Mobile lab team with technical and non-technical members were deployed in four provinces (Punjab, Sindh, Baluchistan, Khyber Pakhtunkhwa (KPK)) as well as the territory of Azad Jammu & Kashmir (AJK). A total of 77 schools across the country were approached, 5,188 parents consented to their child's stool to be analyzed for STH using the Kato-Katz methodology.

RESULTS The weighted prevalence of STH in the different ecological zones ranged from 0% to 37.5%. There are regions where prevalence is significantly higher. Rawalpindi and Gujrat have prevalences of 56% and 36%, respectively, representing the highest in the Northern Regions of Punjab. STH is endemic across Northern regions of KPK, with the highest prevalence around the district of Swat (37%). Much of the Southern Region of Pakistan has low levels of infection, with notable exception of the Karachi area where prevalence reaches 20%. The survey also revealed that hygiene and sanitation infrastructure and basic hygiene practices at schools and households across all areas were poor.

CONCLUSION There are regions with a sufficiently high prevalence of STH to justify mass deworming programs, which have a multi-dimensional impact on health, education and livelihood.

37**Sero-prevalence of Yellow fever, Chikungunya and Zika virus at community level in the Gambella Region, South West Ethiopia**

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BIOGRAPHY Getahun Asebe is an Assistant at Gambella University, College of Agriculture and Natural Resource,

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OBJECTIVE A community based sero-prevalence survey was conducted for YF virus (YFV) CHIK virus (CHIKV) and ZIKV infections in two selected districts of the Gambella Region in South West Ethiopia.

METHODS Blood samples were collected from study participants from two selected districts and screened for IgG antibodies to YFV and CHIKV infections using enzyme-linked immunosorbent assays (ELISA). For the detection of ZIKV-specific IgG antibody a recently developed Blockade-of-binding ELISA was used. 135 sera for YFV and 90 for CHIKV were randomly selected for screening while all serum samples were checked for ZIKV. Data were coded using EpiData Software v.3.1 and analyzed using STATA version 13.1 program.

RESULTS 150 volunteers (96 males and 54 females, age ranging from 18 to 65 years, mean age \pm SD = 35.92 \pm 10.99 years) participated and provided blood samples. The results show that 4(2.9%), 14 (15.6%) and 41 (27.3%) samples were tested positive for IgG antibodies to YFV, CHIKV and ZIKV infections, respectively. Agro pastoral occupation was a factor significantly associated with a high sero-prevalence of IgG against CHIKV infection vs. being a pastoralist (AOR = 14.17; 95% CI: 2.30, 87.30). Residency in the Lare district (AOR = 11; 95% CI: 3.31, 39.81), being female (AOR = 4.7; 95% CI: 1.62, 14.64) and pastoralist by occupation (AOR = 5.1; 95% CI: 1.44–17.80) were significantly associated with a high sero-prevalence of IgG antibody to ZIKV infection.

CONCLUSION The findings of this study revealed the occurrence of YF, CHIK and ZIKV in the area. However, conducting further studies to determine active cases of arboviral infections and strengthening the surveillance system would be important to design appropriate public health interventions to reduce the risk of future outbreaks in the present study area.

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Seroprevalence of Rift Valley Fever and West Nile Fever in Cattle in Gambella Region, South West Ethiopia

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BIOGRAPHY Getahun Asebe is an Assisiatnt at Gambella University, College of Agriculture and Natural Resource, Currently a PhD candidate at Department of Veterinary Microbiology, Immunology and Public Health, College of Veterinary Medicine, Addis Ababa University, Bishoftu, Ethiopia. He has obtained his Doctor of veterinary medicine from Addis Ababa University, Faculty of Veterinary Medicine and MSc, from the same university at Aklilu Lema, Institute of Pathobiology in Tropical and Infectious Diseases. He has published many research and review works in different scientific journal. Besides, he presented his findings in different seminars in the country.

INTRODUCTION/OBJECTIVE Rift Valley fever (RVF) and West Nile fever (WNF) are re-emerging mosquito-borne zoonotic diseases that cause public health and economic crises. Ethiopia shares borders with South Sudan and Kenya, where these diseases are often documented. The free movement of animals and humans across these borders is expected to increase the spread of these diseases. The current study was conducted to assess the occurrence of RVF and WNF in the Gambella region of Ethiopia.

METHODS We collected a total of 368 cattle serum samples from the Lare district on the border of South Sudan and measured the presence of IgG antibody against RVF and WNF virus infections using enzyme-linked immunosorbent assays (ELISA).

RESULTS The prevalence of anti-RVF virus IgG antibody was 7.6% (95% CI: 5.3–10.82%), while that of anti-WNF virus IgG antibody was 5.4% (95% CI: 3.52–

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8.29%). In this study higher seroprevalence of IgG antibodies to RVF virus infection was observed compared to WNF virus in cattle. There was no significant association between the prevalence and the cattle age, sex or sampled locations.

CONCLUSION The detection of IgG antibody to RVF and WNF virus infections in the Gambella region warrants active case finding and further study of the dynamics of transmission.

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Effectiveness Analysis of Single Dose Rifampicin-Post Exposure Prophylaxis (SDR-PEP) as a preventive intervention for Leprosy: A systematic review of RCTs

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BIOGRAPHY Muhammad Mikail Athif Zhafir Asyura (Mikail) currently is an undergraduate studying medicine in the faculty of medicine, University of Indonesia. Mikail has a wide variety of interests in healthcare, ranging from tropical infectious diseases to global health. Having an expertise in review research, Mikail has authored and co-authored multiple review articles in various fields of medicine. Ilma Ranjani Wijaya (Ilma) currently is an undergraduate studying medicine in the faculty of medicine, University of Indonesia.

OBJECTIVE Leprosy is a skin disease caused by *Mycobacterium leprae* with an incidence of 200,000 cases annually. Current multidrug treatment has been shown to be effective in curing leprosy but ineffective in pressing the transmission rate shown by the unchanging number of new cases for the past 8 years. Recently, the implementation of large-scale single dose rifampicin-post exposure prophylaxis (SDR-PEP) was shown to be promising in intercepting and halting further leprosy transmission. Hence, this systematic review was done to analyze the effectiveness and applicability of the treatment and to determine the feasibility in low resource settings.

METHODS Record searching was carried out according to PRISMA guidelines in MEDLINE, Science Direct, CENTRAL, Wiley Online Library and Directory of Open Access Journals (DOAJ) until February 2021. A total of 646 studies were found, with randomized controlled trials conducted on populations endemic of leprosy were included. Studies in the form of protocols and outcome not in incidence reduction were excluded. 4 studies were included based on the criterias and assessed using the Cochrane Risk of Bias tool 2.0.

RESULTS 86,502 subjects were divided into control and interventional groups and are followed-up in 2–6 years. Most studies showed a significant incidence reduction of leprosy cases by 50–60% with one study achieving an incidence reduction of 56.5% [32.9,71.9] ($P = 0.0002$). Furthermore, a complementary effect between single dose rifampicin-post exposure prophylaxis and Bacillus Calmette–Guérin vaccine was identified. Moreover, cost-effectiveness of the intervention was analysed which resulted in US \$ 5,673 being averted in its 25th year of implementation implying its sustainability and feasibility.

CONCLUSION The review established promising results of implementing single dose rifampicin-post exposure prophylaxis to prevent leprosy transmission. Further national scale intervention while implementing a multilayered approach is advised to ensure full support and continuity of the preventive intervention.

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Coverage and effect of malaria interventions in northern Uganda: Results from 3 annual household surveys 2018–2020

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BIOGRAPHY Phyllis Awor is a Public Health Physician and health system researcher working at Makerere University, College of Health Sciences, School of Public Health.

INTRODUCTION Uganda has one of the highest number of annual malaria cases, accounting for 4% of the global burden. We determined the coverage of malaria control interventions; treatment seeking patterns; and the prevalence of malaria and anaemia in children in northern Uganda over 3 years.

METHODS Three annual cross-sectional household surveys were conducted in Kole, Kwanja and Oyam districts in Nov-Dec 2018, Nov-Dec 2019 and Nov-Dec 2020. A stratified 3-stage cluster sampling strategy was used and 1020 households were interviewed during each survey round.

RESULTS Ownership of a mosquito net fluctuated between 66% and 90% and universal coverage of bed nets (1 net for every 2 people in a household) was low, ranging from 31% – 57% over the 3 years. Actual use of bed nets (the night prior to the survey) also fluctuated

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from 58% to 43% and then 88% during the last survey. The majority (about 60%) of children had been sick two weeks prior to the survey with fever, diarrhoea and cough or fast breathing. Only half of all the sick children sought health care outside the home. Care seeking in the public and private health sector was similar, being about 50%. Finally, prevalence of malaria and anaemia in children was high. Of all the children found at home 50–80% were positive for malaria during the 3 survey rounds and 50–60% had anaemia (Hb < 11g/dl). About 2% had severe anaemia (Hb < 7 g/dl).

CONCLUSION Prevalence of malaria and anaemia in children was found to be very high. This is very likely related to the fluctuating coverage and use of malaria control interventions such as bed nets in the study area. Without addressing such coverage fluctuations and adding new effective interventions, achieving malaria reduction goals will be impossible.

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A cross-sectional study of the prevalence, parasite density and risk factors associated with falciparum malaria infection in Akure, Nigeria

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BIOGRAPHY Awosolu Oluwaseun is a PhD student of Applied Parasitology, School of Biological Sciences, Universiti Sains Malaysia. He is a student ambassador to the Royal Society of Tropical Medicine and Hygiene and also a lecturer at the Federal University of Technology, Akure, Nigeria. His research is focused on the study of factors associated with falciparum malaria infection transmission and the molecular surveillance for anti-malarial drug-resistant gene markers in Akure Ondo State, Nigeria. Other areas of interest include the epidemiology of Schistosomiasis and geohelminths and drug efficacy. He currently has over 20 publications in both international and local journals including Pathogens.

OBJECTIVE Malaria is a major public health problem worldwide, particularly in Nigeria. This study was designed to determine the current prevalence, density and risk factors associated with malaria infection in Akure South Local Government Area (LGA) of Ondo State, Nigeria.

METHODS A cross-sectional hospital-based study was conducted in which blood samples were collected and examined for the prevalence of Plasmodium species through the technique of Giemsa-stained thick and thin blood smear. Also, demographic, socioeconomic and

environmental information were collected using a well-structured questionnaire.

RESULTS Out of the total 601 participants examined, 390 (64.89%) participants were found positive for Plasmodium falciparum with a mean (S.D) parasite density of 2149.98 (2506.7). The prevalence of malaria infection differs significantly ($P < 0.05$) by age, gender, occupation, education and location. Multivariate analysis revealed that malaria infection is associated with being age group ≤ 12 years, being male, being farmer, absence of mosquito net, having income \leq ₦30,000 (78.94 USD) per month, having bush around home and using river as household water source.

CONCLUSION Malaria is prevalent in the study area, thus appropriate control measures such as insecticide treated net (ITN), seasonal chemoprevention, fumigation and health education should be provided to alleviate the menace of malaria infection.

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Exploration of family quality of life in persons with leprosy, lymphatic filariasis and podoconiosis related disabilities in Ethiopia

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BIOGRAPHY Moges Wubie Aycheh, I have MSc in Tropical and Infectious Diseases, Assistant at Debre Markos University, Debre Markos, Ethiopia. I served more than 10 years in teaching different courses for medicine, public health, Nursing and Midwifery students, conducting research, advising students' research work and giving community services. Along with, I served as vice dean of Medicine and Health Sciences college around four years.

OBJECTIVE The objectives of this study were to assess and compare family quality of life of persons affected by leprosy, podoconiosis or lymphatic filariasis (LF) and their family members, explore the relationship between

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family quality of life and perceived stigma and activity limitations and explore what factors influence family quality of life.

METHODS A cross-sectional quantitative study was conducted in the Awi zone, Ethiopia. Persons affected and their family members were selected using purposive sampling. Three questionnaires were used: the Beach Center Family Quality of Life (FQoL) scale (range 25–125, with higher scores denoting higher family quality of life), the SARI Stigma Scale (range 0–63, with higher scores denoting higher levels of stigma) and the Screening of Activity Limitation and Safety Awareness (SALSA) scale (range 0–80, with higher scores denoting more activity limitations). Data analysis consisted of simple descriptive analysis and regression analysis.

RESULTS A total of 95 persons affected and 117 family members were included. The overall mean of the FQoL score was 71.7. Persons affected had significantly higher mean FQoL scores than family members on all domains. Female gender, a smaller family size and occupation were associated with lower FQoL. We found a mean SARI Stigma score of 22.3 and a mean SALSA score of 37.6. There was no association between the FQoL and SARI scores or between the FQoL and SALSA scores.

CONCLUSIONS Family quality of life is an important area to address because neglected tropical diseases often affect the whole family. It is therefore important in order to provide appropriate support for persons affected and their family members. Efforts to improve the FQoL of families in which a family member is affected by leprosy, podoconiosis or LF should give priority to women and families with a smaller family size.

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The impact of leprosy, podoconiosis and lymphatic filariasis on family quality of life: A qualitative study in Northwest Ethiopia

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University, Debre Markos, Ethiopia. I served more than 10 years in teaching different courses for medicine, public health, Nursing and Midwifery students, conducting research, advising students' research work and giving community services. Along with, I served as vice dean of Medicine and Health Sciences college around four years.

OBJECTIVE The objective of this study was to explore the quality of life of families with a family member affected by leprosy, podoconiosis and lymphatic filariasis. Based on this exploration, the study aimed to develop a family-based approach to support prevention and self-management of leprosy, podoconiosis and lymphatic filariasis-related disabilities in the Ethiopian context.

METHODOLOGY: The study used a cross-sectional design with a qualitative approach. Both semi-structured interviews and focus group discussions were conducted. Participants, persons affected and their family members, were selected by purposive sampling. Data were collected between August and November 2017 in Awi zone, Northwest Ethiopia and analyzed by three independent researchers using open, inductive coding and content analysis.

RESULTS A total of 86 participants were included in this study: 56 participants in the in-depth interviews and 30 participants in the focus group discussions. We found that participation restrictions, reduced productivity and marginalization were common. In addition, discrimination in the communities occurred often, often extending to family members of persons affected. Divorce and difficulties in finding a spouse were common for persons affected and their family members. Many persons affected reported mental health problems. While most people got social and physical support from their families, there were a few exceptions. In particular, persons with younger children seemed to lack social support. Having to provide for their affected family member sometimes caused stress, school dropouts and an additional workload. Financial problems and loss of livelihood were reported by almost all participants.

CONCLUSION This study revealed that leprosy, lymphatic filariasis and podoconiosis have an effect on several dimensions of family quality of life. Many problems reported related to stigma and poverty.

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Temporal evolution of *Plasmodium falciparum* drug resistance markers from Equatorial Guinea: 1999 to 2016

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BIOGRAPHY I am the Head of the Malaria and NTDs Laboratory at the National Centre for Tropical Medicine. The research aimed at cooperation projects in developing countries as Equatorial Guinea, Ethiopia and South Sudan.

I did my doctoral thesis at the National Centre of Microbiology in Madrid, with postdoctoral stays at the University of Glasgow (Scotland) and at the Centre for Malaria and other Tropical Diseases in Lisbon. My lines are antimalarial resistance and genetic variability of *P. falciparum*, I have experience in field work in African countries in cooperation projects. I am a lecturer in three Masters in tropical medicine.

Equatorial Guinea, located in west central Africa, has malaria among the leading causes of disease. From 2008, the official malaria treatment are the ACTs (ASAQ and AL) and IPT for pregnant women and children under five is SP.

The objectives of the present study were to characterise the prevalence of drug resistance markers from 1999 until 2016 and to evaluate temporal trends in resistance haplotypes over 18 years. Moreover, to observe the effects and possible influence, of different public health interventions for malaria control in the country.

The *pfdhfr*, *pfdhps*, *pfcr* and *pfmdr1* genes were studied by Nested PCR-RFLPs and *pfk13* by sequencing. Changes in the prevalence of haplotypes over time were compared using X2 statics and Odds Ratio were used to represent and evaluated change between two years. Trend estimation of haplotypes was assed by linear regression analysis.

Considering the results of the resistant haplotypes for SP, a gradually increasing trend is observed until 2013, where it has the maximum and in 2016, it decreases. A fully resistant haplotype was present in 1999, but reached

its maximum in 2013 and decreased in 2016. A super resistant haplotype appeared in 2013 and is more prevalent in 2016. In the case of mutations in the *pfmdr1* and *pfcr* genes, there is a clear downward trend until 2016. No mutations have been detected in the *pfk13* gene.

The emergence of the super-resistant haplotype indicates a need for increased vigilance in the use of SP, as it is used for malaria prevention in pregnant women and children under five. Withdrawal of CQ may be one of the reasons of decrease in resistance-related markers over time. One of the most important results is the absence of mutations in *pfk13*, which shows that ACTs maintain their efficacy, with no detection of possible resistant parasites.

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***Plasmodium knowlesi* as a threat to Malaria elimination by 2030 in Indonesia**

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BIOGRAPHY Ibrahim Bin Sa'id is currently a Ph.D. student at Malaria Research Unit, ICBMS, University of Lyon, France. His research interest is around non-falciparum malaria parasites in Indonesia. His current research is about the zoonotic perspective of *Plasmodium knowlesi* as a threat to the target of Malaria Elimination in Indonesia by 2030, which is also a target of SDGs in the health sector.

OBJECTIVE Known as the 5th parasite that can cause malaria in humans, *Plasmodium knowlesi* reportedly infected humans for the first time in Indonesia, in 2010. One of the natural hosts is *Macaca fascicularis* with *An. Leucosphyrus* as a vector. This host and vectors can be found in various regions in Indonesia, especially in non-urban areas. Given the target of malaria elimination by 2030, the Ministry of Health (MoH) is taking serious steps regarding this zoonosis by taking surveillance sentinel trial this year. Based on the above background, this study aito provide comprehensive information concerning *P. knowlesi* as a malaria parasite in Indonesia with an explanation of several aspects, including history,

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characteristics, distribution of hosts and vectors, diagnosis, treatment & drug and potential vaccine.

METHODS We identified articles in PubMed using the keyword «*Plasmodium knowlesi* Indonesia» and Indonesian articles published locally. Information and case data are also obtained from annual health reports from 2008 to 2020 from the MoH and cross-check with data from the National Statistics Agency.

RESULTS In 2019 there were 111 reported cases of knowlesi malaria in Aceh Province, in the same province there were also 16 cases of *P. knowlesi* confirmation reported in 2021. Meanwhile, according to WHO, there were 465 cases of knowlesi malaria in Indonesia from 2004 to 2016. The results of this study showed that the difficulty in identifying and centralizing data are the main factors in overcoming this zoonosis.

CONCLUSION Seeing the extraordinary success of the Ministry of Health in the last 10 years, it can be concluded that the 2030 target can be achieved if the synergy of all parties can be optimized in the next 9 years.

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Clinical diagnostic score and psychological support for efficient management of Buruli Ulcer in resources limited settings.

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BIOGRAPHY Yap Boum II is the regional representative for Africa for Epicentre, the research arm of Médecins sans Frontières (MSF). He is currently based in Yaoundé, Cameroon. From 2009 to 2014 Boum headed the Epicentre research base in Mbarara, Uganda, leading research projects on tuberculosis and malaria among others. Most recently, in Guinea, he was in charge of Laboratory Coordination for the MSF/Epicentre.

Boum taught at Mbarara University of Sciences where he has a professorship in Microbiology. In addition, he teaches Public Health and Microbiology at the Universities of Yaoundé I, Douala and Virginia.

OBJECTIVES We sought to evaluate the performance of a treatment algorithm that include a clinical diagnostic score (CDS) for management of Buruli Ulcer (BU) in Cameroun. We also assessed the mental health situation of patients. Lastly, we evaluated the perception of patients, Health care workers (HCWs) and traditional healers towards BU.

METHODS We conducted a mixed methods study in three BU-endemic health districts in Cameroon. HCWs administered a clinical diagnostic score (CDS) that was compared to Polymerase Chain Reaction (PCR) for detection of BU. A treatment algorithm was developed and its performance evaluated. Participants completed psychological scales and Focus Group Discussions (FGDs) were used to evaluate their perceptions alongside those of traditional healers and HCWs.

RESULTS We evaluated 340 patients. There were 139 (38.2%) and 225 (61.8%) PCR-positive and -negative lesions respectively. The participants were aged 1–85 years with median age of 26.5 (IQR 12–50). Women made up 35.9% of the participants. The CDS was performant when compared to PCR (AOC = 0.72) and the score from doctors and nurses strongly correlated positively ($r = 0.90$). The treatment algorithm has a sensitivity of 69.3% (95%CI: 60.5 – 77.2) and a specificity of 94.1% (95%CI: 89.7% – 97.0). Its positive predictive value of 88.9% (95%CI: 81.0 – 94.3) was beyond the WHO target of 70%.

We found 36% (26/73) of patients suffering from depression and 25% (18/73) of them were suicidal with 75% (55/73) of participants feeling stigmatized and discriminated. Four patients out of five (58/73) showed general belief in the mystical origin of the disease and had recourse to both traditional and biomedical treatment. Traditional healers were more open to collaboration than physicians.

CONCLUSION Given these results, it is crucial to implement culturally inclusive patient-centered prograthat integrate accessible and effective diagnostic tools, patients' cultural beliefs and psychological effects of BU.

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Microscopy, serology, circulating anodic antigen, and eosinophil count for the follow-up of migrants with chronic schistosomiasis: a prospective cohort study

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BIOGRAPHY Research physician at the Department of Infectious Tropical Diseases of Negrar hospital, Verona, Italy. Head of the WHO collaborating centre on strongyloidiasis and other Neglected Tropical Diseases. Main research interests: NTDs, schistosomiasis and strongyloidiasis in particular.

OBJECTIVE Chronic infection with *Schistosoma spp.* may lead to severe complications. Furthermore, incompletely effective treatment may pose a public health risk of (re) introduction of infection in regions with suitable ecological conditions. An accurate test for the diagnosis and timely evaluation of parasitological cure after treatment is needed, especially outside endemic areas.

METHODS We assessed the performance of urine/faeces microscopy, two commercial serology tests (ELISA and ICT), eosinophil counts and the up-converting phosphor technology lateral flow assay to detect circulating anodic antigen (UCP-LF CAA) for the post-treatment follow-up of schistosomiasis in migrants. Patients attending the outpatient clinic for migrants at Sacro Cuore-Don Calabria Hospital, Verona, Italy with positive urine/stool microscopy and/or PCR (confirmed cases) or only positive serology (possible cases) and at least one follow-up visit at 6 (T6) or 12 (T12) months after praziquantel treatment, were included. Sera were blindly tested with UCP-LF CAA at Leiden University Medical Centre, the Netherlands.

RESULTS Forty-eight patients were included, 23 confirmed ($n = 11$ *S. haematobium*; $n = 10$ *S. mansoni*; $n = 1$ both) and 25 possible cases. When compared to microscopy, ICT showed 100% sensitivity while ELISA had an overall sensitivity of 82.6%. Percentage seropositivity and median antibody titers did not change significantly during follow-up. Eosinophilia occurred in 43.5% of confirmed and 8.7% of possible cases and decreased significantly post-treatment in both groups. UCP-LF CAA was positive in 86.9% of confirmed and 20% of possible cases. Percentage positivity and median CAA levels decreased significantly post-treatment, with only two patients having positive CAA levels at T12.

CONCLUSION Contrary to serology, the UCP-LF CAA test showed high accuracy for the diagnosis of active infections, with significant and rapid decrease over time after treatment. This would be particularly useful in migrants, who have generally poor compliance to follow-

up and encourages the development of a commercial, user-friendly format of this test.

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Molecular analysis of *Strongyloides stercoralis* beta-tubulin gene and the possible effects on albendazole efficacy

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BIOGRAPHY Predoctoral researcher currently working on Neglected Tropical Diseases (NTDs), specifically on *Strongyloides stercoralis* infection, within the 'Towards the interruption of transmission of soil-transmitted helminths' (STOP) Project.

Strongyloides stercoralis infection is a neglected helminthiasis treated with ivermectin or albendazole. The presence of Single Nucleotide Polymorphisms (SNPs) in the isotype 1 beta-tubulin gene is related with the absence of albendazole efficacy in nematodes (F167Y, E198A/L and F200Y). In this study we have sequenced the *Strongyloides stercoralis* beta-tubulin gene to clarify if these SNPs could be related with the low efficacy of albendazole. For that, a pool of 150 larvae obtained from an individual from Mozambique was analysed. After pooled larvae DNA extraction, a 1829 base pair fragment of the beta-tubulin gene was amplified and analysed by Sanger sequencing. The PCR product was cloned and transformed in *Escherichia coli* competent cells to obtain genetic variants within the pool. A total of 40 clones were sequenced and compared with those deposited in GenBank and WormBase ParaSite databases using DNASTAR software. In none of the clones we found the presence of the above SNPs related to anthelmintic resistance, but we found 5 nucleotide changes with respect to the reference sequences that resulted in amino acid changes. The new SNPs found were C130R (5/40 clones), R214K (4/40 clones), A249T (2/40 clones), E289G (2/40 clones) and S365F (5/40 clones). Among them, 3 SNPs involved a change in the nature of the added amino acid: C130R from a polar (C) to a basic amino acid (R), A249T from a non-polar (A) to a polar one (T) and S365F from a polar (S) to a non-polar (F) one. Since it is

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known that these changes could have an impact in the three-dimensional structure of a protein, molecular docking studies will be carried out to analyse the effect of these SNPs on conformational changes in the beta-tubulin protein and the interaction with benzimidazole drugs. Docking results will be shown during the ECTMIH conference.

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Ivermectin for *Strongyloides stercoralis* infection in immunocompromised patients: a single dose or a 2+2 regimen?

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BIOGRAPHY Chiesa is a trainee at the Department of Infectious and Tropical Diseases of the University of Brescia. She has an interest in tropical medicine. She had two short experiences on the field, one at the Indian Institute for Mother and Child (Calcutta, India) and at the St Mary's Hospital (Gulu, Uganda).

Ivermectin is the drug of choice for preventive treatment of *S.stercoralis* hyperinfection though few data are available about the optimal therapeutic regimen for immunocompromised patients.

A retrospective observational monocentric study collected all patients with a diagnosis of strongyloidiasis and a clinical criteria for immunosuppression followed by our Outpatient's in 2013–2019. Patients were treated with ivermectin 200µg/Kg administered a single day or at day 0–1–14–15.

Primary endpoint was cure, defined as a negative serology or a significant reduction in serological title at 6 and/or 12 months after therapy. The trend of eosinophils and adverse reaction to the drug was evaluated of 225 patients evaluated in the outpatient's clinic, 130 had clinical criteria for immunosuppression of those, 85 were male, 105 Italian with a median age of 68.8 years. Diagnosis was made with copro-parasitological test in 7 cases and with serology for the others: 65 used EIA (media 43.5, IQR 7–64MONA), 57 an IFAT test (media 182, IQR 40–320 dilutions). Forty-three patients were considered cured after 6 and/or 12 months using the serologic criteria, 24 failed; 63 had no data available and were excluded from the analysis. Eosinophils were a mean of 1280 cell/mm³ (IQR 500–1680) at diagnosis and normalized after therapy (327 cell/mm³ -IQR 137–442- at 6

months; 264 cell/mm³ -IQR 165–310- at 12 months). Forty patients received a single dose of ivermectin 200 µg/kg while 86 were treated with four doses: no difference in serologic or eosinophilic response was observed. In 5 cases mild cardiac adverse reaction were reported.

No correlation between a four-dose regimen of ivermectin and a higher rate of cure in immunocompromised patients could be demonstrated. Prospective studies are needed to verify our finding. Retrospective nature of this study, limitations in the identification of immunocompromise and in tracing the follow-up limit the quality of the data collected.

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Feasibility of large-scale mass drug administration for malaria in Angumu health zone, Ituri, DRC

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BIOGRAPHY Esther Sterk is a medical doctor with masters in international health. She is currently working as tropical medicine advisor for MSF in Geneva.

BACKGROUND WHO recommends mass drug administration (MDA) for malaria in extreme complex emergencies. Angumu health zone in Ituri, DRC, a highly malaria-endemic area, has been hosting around 50'000 displaced from lower-endemicity zones; with health system overburdened and risk of further COVID-19-related deterioration of access to health care. Ministry of public health and Médecins sans Frontières (MSF) implemented MDA to rapidly reduce malaria morbidity and mortality. We describe feasibility of MDA, pharmacovigilance results and short-term impact on reported malaria morbidity.

METHODS We planned 3 MDA rounds, 28 days apart (2 amodiaquine-artesunate (ASAQ) and 1 artesunate-pyronaridine (Pyramax)), for >2-months-old living in 4 health areas (population 56,353, including displaced). MDA was distributed door-to-door to reduce risk of COVID-19 transmission. The first dose was directly observed. Notification of adverse events (AE) was implemented. Number of weekly confirmed malaria cases reported in MSF-supported health facilities was compared before (weeks 1-40/2020) and after (weeks 41-53/2020) MDA

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in targeted (6 facilities) and non-targeted health areas (14 facilities).

RESULTS 227 teams of 2 community-health workers conducted MDA. First MDA round (24/9-13/10/2020) reached 74'847 people (133% administrative coverage), second (9/11-27/11/2020) 75'487 (134%) and third (17/12/2020-8/1/2021) 78'227 (139%) people. During first, second and third round there were 679 mild (0,9%)/3 severe AE, 425 mild (0,57%)/3 severe AE and 220 mild (9,3%)/0 severe AE reported respectively. None of severe AE could be linked to MDA after investigation. The average weekly number of malaria cases/facility decreased by 81% (151 vs. 29) in MDA-targeted areas compared to 33% (139 vs 93) in non-targeted areas.

CONCLUSIONS We successfully implemented 3-round MDA with two different antimalarials (including new antimalarial Pyramax) in complex emergency setting during COVID-19 times, reaching high coverage with immediate reduction of reported malaria cases in MDA-targeted areas. MDA has the potential to become an important malaria-control tool in emergency settings.

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Leprosy-specific serology as tool to identify contacts exposed to *M. leprae* infection in a highly endemic area in Northeast Brazil

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BIOGRAPHY Graduated in Biochemical Pharmacy from Universidade Estadual Paulista Júlio de Mesquita Filho UNESP-Araraquara (1991) and master's degree in Biological Sciences area of concentration – Immunology from Universidade Estadual de Campinas- UNICAMP (1995). PhD in progress in Tropical Medicine and Public Health at the Institute of Tropical Pathology and Public Health at the Federal University of Goiás UFG.

Federal University of Goiás, UFG, Brazil. Title: Use of serological tests to detect subclinical infection by *M. leprae*. Adjunct at the Federal University of Goiás since 1997, in discipline: basic immunology and medical immunology. Research: Development, Production and Evaluation of rapid test prototypes.

The aim of this study was to evaluate the performance of ML Flow and ORT in the field aiming to identify contacts of leprosy patients presenting subclinical infection therefore with an increased risk of developing leprosy. Persons affected by leprosy were randomly selected in Sobral, Ceará, Brazil and contacts of patients that had agreed to participate were visited. Whenever signed consent was obtained, the contact's blood samples were collected by digital puncture. ML Flow and ORT (whole blood) were performed immediately after collection and reactions by ELISA (serum) at laboratory. The ML Flow test detects IgM antibodies to NTP-BSA and the ORT test detects IgM/IgG antibodies to NDO-LID1. The results of the ML Flow and ORT tests were compared with the results of the ELISA PGL-I serology. Among the 342 contacts evaluated 74 (21.6%) were household contacts, 116 (33.9%) were neighbour contacts and 152 (44.4%) were social contacts. Anti PGL-I ELISA positivity among the 342 contacts was 38% while the overall positivity was 28,4% for the ML Flow test and 8.7% for the ORT test. When considering ELISA-PGL-I serology as the gold standard for positivity, the ML Flow test showed 50% sensitivity, 84% specificity, 65% positive predicted value (PPV) and 73% negative predicted value (NPV), while the ORT test showed 16% sensitivity, 96% specificity, 73% PPV and 65% NVP. The agreement of visual colour intensity scores between the two raters was 95% and 98% for the ML Flow and ORT tests respectively. Comparing the performance of ML Flow and ORT with PGL-I ELISA the results showed that ML-Flow can select a larger group of people with a possible presence of subclinical infection, therefore a greater number of contacts would be considered to receive chemoprophylaxis for leprosy if such a policy was applied.

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Stigma and empowerment in leprosy: perspectives of the people affected in a hyperendemic territory in the northeast region of Brazil

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BIOGRAPHY Graduated in Nursing from the University of Fortaleza (1981). Specialist in Maternal and Child Nursing from the University of Fortaleza (1981), Specialist in Pediatrics and Childcare from the Paulista School of Medicine (1986), Master's degree in Public Health from the National School of Public Health (ENSP- FIO-CRUZ, 2009). Doctor's degree in Public Health (Federal University of Ceará, 2020)

OBJECTIVE To evaluate stigma and empowerment related to leprosy in people affected by the disease, living in endemic areas in the Northeast region of Brazil.

METHODS Cross-sectional study in the cities of Fortaleza and Sobral, state of Ceará, comprising an international multicentre project (including India and Indonesia): Post-Exposure Chemoprophylaxis Project (PEP ++). In Brazil involved people affected by leprosy notified in the National System of Notification Diseases in 2017–2018. Sociodemographic and clinical questionnaires, Empowerment Scale (ES) and EMIC-AP Stigma Scale, validated for Brazil were used. Approved by the National Research Ethics Commission (CAAE: 86480218.9.0000.5054) and financed by Nationale Postcode Loterij.

RESULTS 203 people affected by leprosy were approached, predominantly men (54.2%, $n = 110$), age of 51.4 years, race/brown color (64.5%, $n = 131$), in their first treatment (85.2%, $n = 173$), multibacillary operational classification (66.5%, $n = 135$), with history of leprosy reactions (47.2%, $n = 96$) and physical disability degree (24, 6%, $n = 50$). A considerable percentage preferred to prevent other people from knowing about their diagnosis (45.3%, $n = 92$) and considered the disease contagious even after treatment (80.3%, $n = 163$). The mean score for SSc was 48.41 (95% CI = 47.46–49.37) – on a scale of 1 to 100, the higher the score, the greater manifestations of empowerment are suggested. For the EMIC-AP, an average score of 8.72 (7.72–9.72) was found – higher scores correspond to greater expressions of stigma.

CONCLUSION Manifestations of empowerment suggestive of intervention to face leprosy but also evidence of ignorance about the disease and stigma were seen. Internationally, it has been shown that the development of empowerment and elimination of stigma are a key strategy for controlling and coping with leprosy and its possible physical and psychosocial repercussions.

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Stigma and social distancing related to leprosy in hyperendemic territory in the northeast region of Brazil

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BIOGRAPHY Graduated in Psychology from the Federal University of Bahia (UFBA), Multidisciplinary Institute in Health, Campus Anísio Teixeira (2015). Master's degree in Public Health from the Federal University of Ceará – UFC, working in the area of tropical diseases, focusing on the following topics: leprosy, stigma, empowerment, application of scales and validation studies. She is currently as project coordinator of the social organization NHR Brasil.

OBJECTIVE To evaluate the stigma and social distance related to leprosy in an endemic territory in the Northeast region of Brazil.

METHODS Descriptive cross-sectional study in the cities of Fortaleza and Sobral, state of Ceará, part of an international multicenter (Brazil, India and Indonesia) linked to the Post-Exposure Chemoprophylaxis Project (PEP ++). Including contacts of people affected by leprosy, notified by National System of Notification Diseases 2017–2018, community health workers (CHW) and a random sample of community members. A sociodemographic questionnaire, Social Distancing Scale (SDS) and Community Stigma Scale (EMIC-CSS) were used. For analysis. Approved by the National Research Ethics Commission, CAAE: 86480218.9.0000.5054 and financed by Nationale Postcode Loterij.

RESULTS 302 CHW, women (83.7%, $n = 253$), mean of 41.4 years and complete high school (60.3%, $n = 182$) were evaluated of the 350 community members, women predominated (72.9%, $n = 255$), with a mean of 45.44 ± 17.36 years and race/brown color (68.5%, $n = 239$). of the 251 contacts, women prevailed (70.9%, $n = 178$), mean of 40.63 ± 16.75 ± 17.0 years and race/brown color (66.9%, $n = 168$). The EMIC-CSS reached averages above 50.0% considering the maximum score of the scale (30 points): 16.03 (95% CI: 15.36–16.7) for Contacts, 14.72 (95% CI: 13.99–15.45) Community and 16.03 (95% CI): 15.36–16.7) for CHW. Lower averages were observed for the SDS score 1.44 (95% CI: 1.11–1.76),

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Community 2.61 (95% CI: 2.22–3.01) and CHW, 0.98 (95% CI: 0.74–1.21).

CONCLUSION The stigma averages perceived in the territory, by all study populations, reinforce the challenges for leprosy control in these areas. However, the SD of those affected by the disease was considered low, particularly among CHW. Evaluating different perspectives helps understanding stigma, helping in the integrated composition strategies to face its repercussions.

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Modelling of Buruli ulcer to guide efforts towards 2021–2030 Neglected Tropical Diseases Roadmap Goals

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OBJECTIVE Buruli ulcer is caused by *Mycobacterium ulcerans*, which causes an infection damaging the skin, soft tissue and sometimes bones. Delayed diagnosis and treatment leaves life-long deformities and disabilities. In order to avoid this burden the Road Map for Neglected Tropical Diseases sets as a key target that by 2030 more than 90% of the cases are diagnosed before the disease is advanced. In this study we set out to develop a dynamic model based on the natural history of Buruli ulcer to aid assessing strategies to address the target set in the Road Map.

METHODS We developed a compartmental model with three transitory states accounting for disease severity categories (I to III, from less to more severe), three transitory states consequence of diagnosis and treatment in each category and three terminal states (natural evolution and healing with and without disability). The model was

parameterized in order to simulate realistic endemic scenarios of Buruli ulcer.

RESULTS Focusing in scenarios with different diagnosis and treatment efforts for each category of the disease and evaluating the impact on 2030 target indicators, we observed that if the current efforts are not increased the target will not be achieved. While increasing efforts to diagnose most cases before evolving to Category II or III provides a higher impact, the lack of a reliable diagnostic test for confirmation of BU at community level precludes stressing this strategy.

CONCLUSION The most interesting approach during the first years of the Road Map would be to increase efforts in targeting cases with Category II lesions. We believe the model can contribute to define strategies for controlling Buruli ulcer.

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Haemoglobin at inclusion in visceral leishmaniasis clinical studies: A systematic review and proposal for an individual patient data meta-analysis

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BIOGRAPHY Prabin Dahal is a post-doctoral researcher based at Infectious Diseases Data Observatory (IDDO), University of Oxford. He has a broad interest in epidemiology of infectious diseases (Malaria and Visceral Leishmaniasis in particular) and his research has primarily focused on delineation of dose-response relationships for commonly used antimalarial drugs through individual participant data meta-analysis and assessment of safety of antileishmanial drugs.

OBJECTIVE Anaemia is a common haematological sign in patients with visceral leishmaniasis (VL). A systematic review (SR) of all published efficacy studies for antileishmanial drugs was carried out to characterise variations in haemoglobin levels and other haematological parameters used for patient enrolment.

METHODS All the articles indexed in Infectious Diseases Data Observatory (IDDO) VL clinical study library were eligible for inclusion. The IDDO VL library is a living SR updated bi-annually and searches the following

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databases: PubMed, Embase, Scopus, Web of Science, Cochrane, clinicaltrials.gov, WHO ICTRP, Global Index Medicus, IMEMR, IMSEAR and LILACS.

RESULTS A total of 158 publications (35,578 patients; 1980–2019) describing antileishmanial therapies were included. The minimum haemoglobin required for inclusion was ≥ 3 g/dL in 7 (4.4%) trials, ≥ 3.5 g/dL in 5 (3.2%), ≥ 4 g/dL in 8 (5.1%) trials, ≥ 5 g/dL in 24 (15.2%) trials, ≥ 6 g/dL in 20 (12.7%) trials, ≥ 7 g/dL in 2 (1.3%) trials and the level was unclear in 91 (57.6%). Prothrombin time >4 s over the control values were required in 9 (5.7%) trials, >5 s in 12 (7.6%) trials, >15 s in 3 (1.9%) trials and was unclear in 134 (84/8%). Patients with bleeding diathesis/coagulation disorders/glucose-6-phosphate dehydrogenase deficiency were excluded in 13 (8.3%) trials. Description of blood transfusion among patients were presented in 16 (10.1%) trials; these trials enrolled 3,459 patients with at least 213 (6.2%) patients requiring transfusion for severe anaemia either before enrolment or during active treatment/follow-up.

CONCLUSIONS Over a quarter of VL trials allowed inclusion of severely anaemic (≤ 5 g/dL) patients with at least 213 patients requiring blood transfusions before enrolment/during treatment/follow-up; this suggests haematological safety in VL warrants closer scrutiny. An individual participant data meta-analysis using the IDDO VL platform is proposed to study the haematological consequences of the disease and the treatment by appropriately accounting for heterogeneity.

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Visceral Leishmaniasis in pregnancy and vertical transmission: A systematic literature review on the therapeutic options

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epidemiology of infectious diseases (Malaria and Visceral Leishmaniasis in particular) and his research has primarily focused on delineation of dose-response relationships for commonly used antimalarial drugs through individual participant data meta-analysis and assessment of safety of antileishmanial drugs.

OBJECTIVE The occurrence and outcome of Visceral Leishmaniasis (VL) in pregnant women is rarely reported in published literature. A systematic review was undertaken to identify cases of VL infection during pregnancy and summarise the consequences of infection and treatment on the mother and foetus.

METHODS The following databases were searched: Ovid MEDLINE®/Embase; Cochrane Databases of Systematic Reviews; World Health Organization Global Index Medicus: LILACS; IMSEAR; IMEMR; WPRIM; ClinicalTrials.gov; WHO International Clinical Trials Registry Platform. Selection criteria included any reports describing VL in pregnancy or vertical transmission of the disease in humans.

RESULTS We screened 272 publications and identified 70 records (1926–2020) describing 447 VL cases in pregnancy. The disease was detected during pregnancy in 394 (88.1%), retrospectively confirmed after delivery in 52 (11.6%) and the time of identification was unclear in 1 (0.2%). of the 394 mothers whose infection was identified during pregnancy, 344 (89.1%) received a treatment, 3 (0.8%) were untreated and treatment status was unclear in 47 (12.2%). of 344 mothers, Liposomal Amphotericin B (L-AmB) was administered in 202 (58.7%) and pentavalent antimony (PA) in 92 (26.7%). Outcomes were reported in 176 mothers treated with L-AmB, including 4 (2.3%) reports of maternal deaths, 5 (2.8%) miscarriages and 2 (1.1%) foetal death or stillbirth. For PA, outcomes were reported in 87 mothers of whom 4 (4.6%) died, 24 (27.6%) had spontaneous abortion and 2 (2.3%) had miscarriages. A total of 26 cases of confirmed, probable, or suspected vertical transmission were identified and the median time to detection after birth was 6 months (range: 0–18 months).

CONCLUSIONS Outcomes of VL treatment during pregnancy are under-researched. When reported, information is often incomplete, making it difficult to derive generalisable information on outcomes for mothers and babies. Reported data favour the usage of L-AmB during pregnancy.

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Methodological variations in design and conduct of visceral leishmaniasis clinical trials: A systematic review

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BIOGRAPHY Prabin Dahal is a post-doctoral researcher based at Infectious Diseases Data Observatory (IDDO), University of Oxford. He has a broad interest in epidemiology of infectious diseases (Malaria and Visceral Leishmaniasis in particular) and his research has primarily focused on delineation of dose-response relationships for commonly used antimalarial drugs through individual participant data meta-analysis and assessment of safety of antileishmanial drugs.

OBJECTIVE A systematic review (SR) of published treatment efficacy trials in visceral leishmaniasis (VL) was carried out to characterise analytical variations in design and conduct.

METHODS All studies (158 trials; 1980–2019) indexed in Infectious Diseases Data Observatory (IDDO) VL clinical study library were eligible for inclusion. The IDDO VL library is a living SR updated bi-annually and searches the following databases: PubMed, Embase, Scopus, Web of Science, Cochrane, clinicaltrials.gov, WHO ICTRP, Global Index Medicus, IMEMR, IMSEAR and LILACS.

RESULTS Case definition (CD) for patient screening was defined solely based on compatible clinical diagnosis in 27 (17.1%) trials, based only on parasitological/serological confirmation in 38 (24.1%), using a combination of compatible clinical diagnosis and/or parasitological/serological method in 76 (48.1%) and was unclear in 17 (10.8%). After screening, patient enrolment required VL confirmation based on demonstration of parasites in spleen in 54 (34.2%) trials, bone marrow in 22 (13.9%), either bone marrow and/or spleen in 49 (31.0%), lymph node in 1 (0.6%), a combination of one or more of the above in 19 (12.0%), blood in 4 (2.5%) and was unclear in 9 (5.7%). Test of cure was carried out after <15 days of post-treatment in 7 (4.4%) trials, between 16–70 days in 131 (82.9%) and was unclear in 20 (12.7%). Post-treatment follow-up was <6 months in 7 (4.4%) trials, 6 months in 110 (69.6%), >6 months in 35 (22.2%) and was unclear in 6 (3.8%). Relapse was defined solely based on clinical suspicion in 3 (1.9%) trials, based on

confirmed presence of parasites in 22 (13.9%), a combination of clinical suspicion and/or parasitological/serological method in 33 (20.9%) and was unclear in 100 (63.3%).

CONCLUSIONS This study highlights substantial methodological variations in definitions adopted for patient screening, disease diagnosis and therapeutic outcomes suggesting a need for a harmonised protocol for VL clinical studies.

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Spatio-temporal trend of *Aedes koreicus* spread in northwest Italy

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She has been working in the Neuropathology Laboratory of the Italian Reference Centre for TSEs (CEA).

She has gained a remarkable experience in the surveillance of animal diseases, mainly on vector borne diseases and TSEs. She collaborated in implementing monitoring plan on mosquitoes and ticks in Piedmont and Liguria Regions, management of field work and data collection, species identification.

OBJECTIVE Mosquitoes belonging to the genera *Aedes* are rising concern in Europe, as they are competent vectors of diverse human viral diseases. *Aedes koreicus*, an invasive alien species, was first detected in Italy in 2011.

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It was identified in North-western Italy (Liguria Region) in September 2015. The most probable route of introduction was deemed to be the commercial port of the Genoa. Recently, *Aedes koreicus* has successfully colonized a wider area. The aim of this study is to describe the spread of *Aedes koreicus* in Liguria Region.

METHODS In the period 2013–2020 mosquito surveillance has been carried out fortnightly at 20 different sites located throughout the region from May to November. Prevalence data were used to describe expanding area of *Aedes koreicus* and temporal trends. A statistical test for trend (Cuzick, J. 1985) was used to evaluate an increase in prevalence over the period.

RESULTS A total of 45,621 adult mosquitoes, including 20,168 *Aedes* spp., were trapped. Prevalence data demonstrated that *Aedes koreicus* specimens increased in Genoa from 2015 ($n = 1$; prevalence=0%) to 2019 ($n = 29$; prevalence = 1%) when the invasive species was detected also in Savona province ($n = 6$; prevalence = 0.5%). Afterwards, *Aedes koreicus* was identified in 2020 in two new sites at the eastern and western part of Genoa and in both Genoa and Savona provinces (respectively $n = 27$, prevalence=0.5%; $n = 43$, prevalence=1.5%). A prevalence trend in increasing number of *Aedes koreicus* was detected ($p = 0.017$) in the entire region, but not at single province level, as the prevalence in Genoa is slightly decreasing, whereas diffusion area is increasing.

CONCLUSION: Based on these findings, the species appears to be well-established in some areas in Genoa and Savona provinces. Even though the area of first introduction is still unknown, there is a clear evidence of further spread of *Aedes koreicus* in the area and beyond.

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Diagnostic tests using loop mediated isothermal amplification (LAMP) protocols for diagnosis of visceral and cutaneous leishmaniasis: A meta-analysis

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BIOGRAPHY Astrid has a research interest in clinical trials and diagnostics for Neglected Tropical Diseases (NTDs) of the skin. She is a postdoctoral fellow at the Institute of Epidemiology, Medical University of Vienna.

Sensitive, reliable and fast diagnostic tools that are applicable in low-resource settings, ideally at the point-of-care, are seen as crucial in the fight against visceral leishmaniasis (VL) and cutaneous leishmaniasis (CL).

One promising molecular method, already implemented for diagnosis of other diseases, is the loop-mediated isothermal amplification (LAMP) protocol.

Using a comprehensive search strategy and unpublished data, we focus in this systematic review and meta-analysis on studies evaluating the performance of LAMP for the diagnosis of VL and CL in humans and animals such as dogs, compared with microscopy and/or other molecular diagnostic methods.

A meta-analysis, pooling sensitivity and specificity rates and calculating areas under the curve (AUCs) in summary receiver operating characteristic (SROC) plots, was conducted on datasets extracted from studies, grouped by condition (VL and CL) and sample type.

We report high sensitivity and specificity for LAMP when compared with microscopy and PCR using blood samples, with pooled estimate values for sensitivity and specificity of > 90% and calculated AUC values >0.96 for all subgroups. This is with the exception of LAMP compared to microscopy for diagnosis of CL, where we report a pooled estimate of 89.7% (95% CI: 83.1%–93.8%) for sensitivity and a pooled estimate of 59.2% (95% CI: 34.8%–79.8%) for specificity. This may demonstrate not a failure but a superior performance of LAMP, capable of identifying true cases, which are erroneously counted as false positives due to the low sensitivity of the direct microscopic test. Overall, however, only a limited number of studies was truly comparable.

Due to its high sensitivity and specificity, in combination with simple readout methods and low laboratory equipment requirements for sample preparation compared to other molecular methods, LAMP could be a promising candidate for a reliable molecular diagnostic test for VL and CL in low-resource settings.

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The role of social cohesion in the implementation and coverage of an MDA trial for malaria elimination in The Gambia

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Amsterdam. Her dissertation research focuses on the socio-cultural and ethical elements of an MDA trial for malaria elimination in The Gambia, particularly participation, coverage/adherence and informed consent. She holds an MPH (Global Health) from Emory University and a BA (Anthropology) from the University of Florida.

OBJECTIVE Mass drug administration (MDA) involves administering medication to an entire target population irrespective of individual-level disease status and requires high coverage to be successful. Literature regarding individual or structural effects on coverage exist, but there is a need to better understand the influence of community social dynamics, such as social cohesion. The objective of this paper is to understand how social cohesion, as defined by the trial communities, affected an MDA trial for malaria elimination in The Gambia.

METHODS We conducted a mixed-methods, ethnographic study focused on understanding the trial's acceptability, coverage and compliance. In total, 210 in-depth interviews and 29 focus group discussions were completed among trial participants, decliners, village leaders and field staff. Based on initial results, we conducted an in-depth comparison of two theoretically-chosen villages with unique social dynamics and different coverage levels to explore this topic.

RESULTS Social cohesion was analysed around three elements: (1) the locally-defined version within the two villages, (2) variations in the definitions reflected through community participation and (3) the role of social pressure on expressions of dissent. Two distinct forms of social cohesion were identified. The low-coverage village expressed a top-down form where community members accepted the medication following the logics of a hierarchical system but did not actively engage in more complex forms of participation. Conversely, the high-coverage village demonstrated a social cohesion in which participation and compliance was a continuous process in which community members were involved in the implementation from the initial decision-making through medicine intake. The individuals took the directive to participate but contextualized the implementation to their needs.

CONCLUSION This study demonstrates that participation in an MDA is more nuanced than an individual taking medication. Social dynamics, particularly how the communities defined and expressed social cohesion, greatly affected the implementation and coverage of this trial.

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Chagas disease and Strongyloidiasis: detection of asymptomatic and chronic infection in Bolivian population living in Madrid, Spain

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INTRODUCTION: Chagas disease (CD) is one of the main imported parasitic illnesses that affects the immigrant population residing in Spain. Among the infected individuals, there are people that aware of their condition, due to many barriers they did not receive or seek adequate treatment. Others are unaware and only a few received timely treatment. But while CD is unknown, strongyloidiasis is even more. Therefore, we reactivated detection of both parasitic infections through non-massive community-based screening campaigns at the Bolivian Consulate in Madrid.

METHODS Once a week, a screening point was installed at the Bolivian Consulate in Madrid. An immunochromatographic test (ICT) for CD detection was offered to people who came to their appointment for consular procedures. A blood sample was taken by venipuncture, the ICT was immediately performed and later in a reference laboratory, confirmation was carried out. With the same sample, IgG against *Strongyloides* was determined. Positive participants were referred to medical appointment in referral hospitals.

RESULTS 152 people participated in the screening activities, 31 were positive for CD, out of them nine individuals had already been treated, 18 people were unaware of their infection, four had a positive diagnosis but had not received treatment. For *Strongyloides*, 11 individuals tested positive, two of whom had also been positive for

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CD. Currently, all positive cases are being referred according to the need of each case.

CONCLUSIONS CD is a silent infection with a high prevalence in the Bolivian population living in Madrid (20%). Only 26% out of positive cases had received treatment. Although the prevalence for strongyloidiasis is lower than CD (7%), its lack of knowledge is greater. The treatment of asymptomatic infections is not urgent, but it is important to maintain control measures to reduce the burden of these diseases and prevent further complications.

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Atypical localization of *Leishmania infantum*: a case of laryngeal leishmaniasis in an Italian immunocompromised Patient

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INTRODUCTION: Mucocutaneous leishmaniasis are caused primarily by *Viannia* subgenus species. Here, we report a case of autochthonous mucosal leishmaniasis in an Italian resident by *Leishmania infantum*.

CASE DESCRIPTION: An 83-year-old Italian male with chronic lymphocytic leukemia (CLL), paroxysmal atrial fibrillation and mild renal failure presented with dysphonia in March 2018; a right supraglottic swelling was detected by fibroscopy, confirmed as a contrast-enhancing lesion expanding on the right vestibular fold by magnetic resonance and by PET scan showing FDG-uptake at laryngeal site only with histology reporting a granulomatous process. In February 2019, the lesion was excised; the biopsy revealed a localization of CLL or

small lymphocytic lymphoma with epithelioid granulomas. One year later, due to lesion enlargement leading to moderate airway obstruction and dysphagia, Ibrutinib was introduced and tracheostomy placed; the biopsies reported chronic granulomatous inflammation and the presence of *Leishmania* amastigotes, with high parasitaemia assessed by quantitative PCR (>2.500.000 copies/mL), despite negative serum parasitaemia. Ibrutinib was discontinued and the induction treatment with liposomal amphotericin B (L-AmB) for five days introduced (May 2020), followed by the maintenance phase with weekly administrations. The patient was closely monitored and re-evaluated after 6 months with CT scan, stable and a biopsy which displayed inflammation and a reaction for CD1a; parasitaemia was still elevated (68.520.000 copies/mL) and identified as *L. infantum* by sequencing of hsp20 gene. Miltefosine was then administered, leading to lesion reduction, relief of symptoms and tracheostomy removal, but was suspended after 45 days because of gastric intolerance. L-AmB was then withdrawn as the mucosal lesion regressed.

CONCLUSIONS This case describes a laryngeal localization of *L. infantum*, as previously anecdotally reported and highlights the difficulties in the diagnostic work-up, the need of close monitoring and the optimal response to the combined treatment.

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Evaluation of the impact of *Strongyloides stercoralis* infection in diabetes mellitus

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BIOGRAPHY Specialized in Internal Medicine and Infectious Diseases. Infectious Diseases Service practitioner since 2011. He completed the Diploma of Tropical Medicine at the Liverpool School of Tropical Medicine. Experiences in the field (Angola, Ivory Coast) and obtained the degree of Doctor of Medicine. Research areas: soil-transmitted helminth infections, strongyloidiasis, intestinal parasites and Chagas disease (also tuberculosis, arbovirosis and malaria). More than 50 international

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publications. He participates (both as coordinator and collaborator) in different national and international research projects, as well as in different collaborative networks (REDIVI, RICET, TropNet, GeoSentinel). He participates as a teacher in masters and courses of Tropical Medicine.

OBJECTIVE Strongyloidiasis is asymptomatic most of the times, although can cause gastrointestinal, respiratory and cutaneous symptoms and even severe clinical manifestations. Previous studies have addressed the possibility of the parasite to establish a complex relationship with the host that could affect the risk of developing diabetes mellitus or modify its presentation. This study aims to evaluate the potential impact of strongyloidiasis in diabetes mellitus and other metabolic diseases.

METHODS This is a case-control observational retrospective study which includes 96 *S. stercoralis* infected patients and 96 non-infected, visited during 2019 in a Tropical Medicine Unit in Barcelona (Spain). Epidemiological and clinical variables were retrieved from medical records and afterwards a statistical analysis was carried out with SPSS to determine any association between strongyloidiasis and diabetes mellitus and other metabolic diseases.

RESULTS Most of the patients were men (103, 53.60%) with a mean age of $42.86 \pm SD 14.16$ years. Geographical area of origin of the patients were: Latin America (98, 51.04%), Africa (39, 20.31%), Asia (36, 18.75%), Europe (17, 8.85%) and unknown origin (2, 1.04%). Of those who were immigrants, the average time elapsed since their departure was 10–11 years and 88 of them (45.80%) returned to their country of origin at some point. Twelve (6.30%) patients were diabetic; 31 (16.10%) presented arterial hypertension; 29 (15.10%) had dyslipidemia; 10 (5.20%), had thyroid pathology. Some patients had a co-infection: 24 (12.50%) were affected by Chagas disease; 15 (7.80%) with schistosomiasis; 6 (3.10%) with tuberculosis; and 11 (5.70%) with HIV infection. Furthermore, 34 (17.70%) patients were smokers and 22 (11.50%) drank alcohol regularly. When comparing patients with strongyloidiasis and un-infected patients, no differences were found regarding diabetes mellitus and other metabolic diseases.

CONCLUSIONS The results obtained in the present study do not confirm any type of association between strongyloidiasis and diabetes mellitus.

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Prospective observational study on the pharmacokinetic properties of the Irrua-ribavirin-regimen used for routine care of Lassa fever patients in Nigeria

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BACKGROUND AND OBJECTIVES Lassa fever is an acute infection with variable severity caused by the Lassa virus. The virus reservoir is the commensal rodent *Mastomys natalensis* but Lassa virus can also be transmitted from human to human. Lassa virus causes annual outbreaks in many regions of West Africa with a marked surge in case numbers since 2018. The recommended antiviral therapy for Lassa fever is ribavirin. There are currently two accepted regimens: the so-called “McCormick regimen” and the “Irrua-ribavirin-regimen”, the latter of which is based on once daily dosing. The Irrua-ribavirin-regimen became the standard of care in adult Lassa fever patients in Nigeria, however, evidence for ribavirin efficacy in Lassa fever patients is poor and pharmacokinetic data for the used regimens are not available. The main objective of this study was therefore to characterize the pharmacokinetic properties of the Irrua-ribavirin-regimen.

METHODS This prospective, observational study is conducted at the Irrua Specialist Teaching Hospital in Edo State, Nigeria. Eligible were PCR confirmed Lassa fever

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patients hospitalized and treated with ribavirin according to the local standard of care. Blood samples for pharmacokinetic analyses were obtained at 0.5, 1, 3, 5, 8, 12 and 24 hours after the first, fourth and tenth dose. As secondary objectives safety and tolerability, viral kinetics and Lassa virus genome changes under treatment were evaluated.

RESULT Participants have been successfully included in this pharmacokinetic study during the 2020 and 2021 transmission season. Blood concentration time profiles have been analysed and will be presented in detail.

CONCLUSION This is the first clinical study describing the pharmacokinetics of intravenous ribavirin therapy of Lassa fever providing important insights for future dose optimization.

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Temporal trends of drug resistance markers, fever- and parasite clearance in uncomplicated *Plasmodium falciparum* malaria infections, Bagamoyo district, Tanzania 2004–18

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BIOGRAPHY My name is Lucas Grzechnik Mörk and I am a 26 year old medical student, currently studying my last year at Uppsala University. I want to become a paediatrician and I am highly interested in the field of global health – especially tropical diseases and child health. Apart from my medical studies I am an inspirational speaker for SIDA (Swedish International Development Agency). Currently I am giving lectures about global health, malaria and the global goals primarily to schools and associations.

OBJECTIVE Longitudinal anti-malarial drug resistance surveillance is a cornerstone in modern malaria control. The aim of this study was to investigate temporal trends of fever and parasite clearance and selection of molecular markers associated with anti-malarial drug resistance in

Bagamoyo district, Tanzania in anti-malarial drug trials conducted between 2004–18.

METHODS Data was compiled and compared from six clinical trials of uncomplicated *Plasmodium falciparum* malaria. Single nucleotide polymorphisms *P. falciparum* multidrug resistance gene 1 (pfmdr1) N86Y, chloroquine transporter gene (pfcr1) K76T and kelch 13 propeller gene (pfk13) were analysed. Parasite clearance half-life and slope half-life were estimated using the Worldwide Anti-Malarial Resistance Network Parasite Clearance Estimator.

RESULTS A slower trend of fever clearance was observed for trials in 2004, 2006 and 2007–08 compared to trials of 2012–13, 2014 and 2018. Overall, parasite clearance was faster on day 1 for the trials in 2012–13, 2014 and 2017–2018. Median parasite clearance time was 36.99 and 20.37 hours and slope half-life was 5.65 and 2.52 hours in 2012 and 2017–18, respectively. A statistically significant increase was observed for Pfm1 N86 (yearly odds ratio 1.33 [95% CI 1.26–1.39]) between 2004–18 and for pfcr1 K76 between 2004–14 (yearly odds ratio 1.52 [95% CI 1.39–1.65]). No non-synonymous mutation for pfk13 were found.

CONCLUSIONS Parasite and fever clearance remained high and efficacious in Bagamoyo district, Tanzania, between 2004 and 2018. However, a trend of increased selection for pfmdr1 N86 and pfcr1 K76 associated with artemisinin combination treatment partner drug resistance was observed. These findings highlight the importance of continued surveillance of anti-malarial drug resistance development.

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Mycobacterium leprae transmission characteristics during the declining stages of leprosy incidence: a systematic review

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BIOGRAPHY I am currently completing a PhD at Erasmus University Medical Center (Erasmus MC) in the Netherlands, focused on leprosy control and case detection delay. During my professional career, I have conducted and managed several studies in hospitals and research institutes across various therapeutic areas. My scientific

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background in immunology and a passion for global health.

OBJECTIVE Leprosy is an infectious disease caused by *Mycobacterium leprae* that persists mainly in Brazil, India, Indonesia and parts of sub-Saharan Africa. As leprosy incidence begins to decline, characteristics of new cases shifts away from those observed in highly endemic areas, revealing potentially important insights into possible ongoing sources of transmission.

METHODS A literature search of major electronic databases was conducted in January, 2020, with 134 articles retained out of a total 4318 records identified in the search strategy. We present quantitative data from 3950 leprosy case records in 22 low endemic countries and supporting evidence describing the decline in several global contexts.

RESULTS The main strategies shared by countries who achieved a substantial reduction in incidence include BCG vaccination, active case finding, adherence to multidrug therapy and continued surveillance following treatment. From leprosy case records collected across 22 low endemic countries, 48.3% were suspected to be imported, originating from transmission outside of the country. A majority of cases were multibacillary (64.4%) and regularly confirmed through skin biopsy, with 122 cases of suspected relapse from previous leprosy treatment. There were 18.7% of cases with a reported family history, while other suspected sources included travel to high endemic areas and direct contact with armadillos. None of the countries included in the analysis reported a distinct increase in leprosy incidence in recent years.

CONCLUSION Together with socioeconomic improvement over time, there have been several examples of successful leprosy control programmes implemented in recent decades, which led to a substantial decline in incidence. Most cases described in these contexts were multibacillary and numerous cases of suspected relapse were reported. Despite these observations, there was no indication that these cases led to a rise in new secondary cases, suggesting that they do not represent a large ongoing source of human-to-human transmission.

404**Catalyzing equitable engagement of scientists in low- and middle-income countries in neglected disease research and development**

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BIOGRAPHY Joseph Hargan-Calvopiña is an Associate Director at BIO Ventures for Global Health, where he works to bring scientists from academia and industry together to accelerate malaria, tuberculosis and neglected tropical disease research and product development through WIPO Re:Search. He obtained his B.S in Microbiology, Immunology and Molecular Genetics, as well as his Ph.D. in Molecular Biology, from UCLA.

United Nations Sustainable Development Goal 3 aims to end neglected disease epidemics by 2030. To do so, public-private collaborations are essential to strengthen surveillance systems, improve access to current interventions and expand research and development (R&D) of new interventions for unmet needs. Scientists in low- and middle-income countries (LMICs) must be equal partners in such collaborations. LMIC partners contribute deep understanding of neglected diseases and ensure that R&D prograaddress regional priorities, while gaining access to cutting-edge resources and know-how to create and lead initiatives in their countries.

In 2013, BIO Ventures for Global Health (BVGH) and the World Intellectual Property Organization (WIPO) established a fellowship program for LMIC researchers, funded by the Government of Australia. Fellowships are managed through WIPO Re:Search, a BVGH/WIPO-led international consortium that catalyzes cross-sector neglected disease R&D and capacity building. The program has placed 20 researchers from 11 LMICs in academic and industry laboratories to hone their R&D skillsets and nucleate mutually beneficial collaborations. Nearly 95% of fellows from the latest round agreed the program addressed common bottlenecks in LMICs, such as access to equipment, partnership development with scientists in high-income countries and new idea generation. Nearly three-fourths of hosts from the latest round agreed the program helped advance their own research, exemplifying the shared benefits of partnerships with LMIC scientists. The program also helped fellows attract over US\$ 8 million in competitive grants. In addition to empowering fellows to advance their own R&D programs, fellowships nurture the research enterprises at the fellows' institutions through knowledge exchange and collaborations.

Full engagement of LMIC researchers in R&D programs and the resultant capacity building, are critical to achieving equity in global health. The WIPO Re:Search Fellowship Program serves as a model to other organizations seeking to build capacity and increase participation of LMIC scientists in international partnerships.

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Kinetics of *Schistosoma mansoni* -specific DNA after treatment with Praziquantel

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BIOGRAPHY Studied medicine in the German city of Würzburg. Medical Doctor since May 2020.

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OBJECTIVE Detection of circulating parasite specific DNA is a sensitive tool to proof *Schistosoma* infection. However, it is not fully understood how long DNA fragments remain in the human body after treatment with praziquantel and when check-ups are indicated. To answer this question, we examined the amount of *Schistosoma mansoni* -specific DNA over time after treatment with praziquantel.

METHODS 6 Participants living in a non-endemic country with qPCR proven *S. mansoni* infection received a three-day, weight adjusted dose of praziquantel. A particular feature was the lack of possibility of reinfection. A threshold cycle value of Ct < 36 (Ct max = 40) was considered as proof of active infection requiring treatment. For the follow-up, the sera of treated patients were examined for the presence of free-circulating *Schistosoma mansoni*-specific DNA over a period of 56 days using qPCR. The reciprocal Ct values Ct⁽⁻¹⁾ of a total of 15 serum samples were used to describe DNA Kinetics.

RESULTS On average there was a significant increase ($p < 0,05$) in the Ct⁽⁻¹⁾ values on day 3 after administration of praziquantel, followed by a continuous decline of the Ct⁻¹ value over the course of 56 days. After 48 days on average the Ct-value was > 36 indicating successful treatment. The degradation of *Schistosoma* DNA can be captured by the formula $f(t) = A_0 \times e^{(-kt)} + y_0$ with the rate constant $k = 0,0289 \text{ d}^{(-1)}$.

CONCLUSION Knowledge of the *Schistosoma*-specific DNA kinetics could help to optimize further treatment and control strategies for schistosomiasis. The results indicate a rapid degradation of parasitic DNA 3 to 7 days after administration of praziquantel. In this study the amount of circulating parasite DNA dropped to Ct > 36 (considered as unspecific) approximately after 50 days. In the event of discontinuous DNA degradation, reinfection or treatment failure should be considered.

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Prevalence of Schistosomiasis among migrants from sub-Saharan Africa and evaluation of diagnostic screening methods

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BIOGRAPHY Studied medicine in the German city of Würzburg. Medical Doctor since May 2020. Doctoral thesis at the Department of Tropical Medicine, Klinikum Würzburg Mitte, Germany.

OBJECTIVE Schistosomes can persist several years in the human body and may cause continuous damage and progressive disease. This study focused on the screening of a high-risk population living in a non-endemic area with determination of prevalence and evaluation of suitable screening strategies.

METHODS 105 African participants, accommodated in community homes for refugees in Würzburg, Germany were screened for schistosomiasis by using POC-CCA (with additional implementation of G-Score determination and urine dipstick), stool and urine microscopy, a serum antibody rapid assay (ICT) and qPCR from blood samples. The qPCR was used as the standard reference for the evaluation of all other diagnostic methods. A threshold cycle value of Ct < 36 (Ct,max = 40) was considered as positive.

RESULTS Schistosomiasis prevalence based on the results of qPCR, was 3.9% with only proof for *S. mansoni* infection. None of the participants provided evidence for *S. haematobium* infection. The prevalence, based on POC-CCA alone, was 27.6%. When POC-CCA and ICT were combined, the prevalence was 3.8% with a positive predictive value of 80%. The POC-CCA result was unaffected by leukocyturia ($P > 0.05$) and by the length of stay in a non-endemic area ($P > 0.05$). Both stool and urine microscopy did not reveal any eggs. There was a very significant ($P < 0.01$) correlation of a higher-grade G-Score with a positive ICT and DNA detection.

CONCLUSION Combining POC-CCA and ICT provides an effective way to screen a high-risk population with an unknown prevalence of schistosomiasis living in a non-endemic area. In this context, microscopy can be omitted if serum qPCR testing is available. With 3.9% schistosomiasis prevalence was lower than expected and it has previously been described by other authors in similar settings. By using POC-CCA alone, the prevalence can be significantly overestimated, which could result in unnecessary treatments.

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Promoting the integration of Female Genital Schistosomiasis diagnostics into primary health care services in rural Madagascar

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BIOGRAPHY Yannick Höppner: Post-graduate position at the Bernhard-Nocht-Institute for Tropical Medicine (BNITM) at the department of Infectious Disease Epidemiology (Madagascar). Master of Science in “Biomedical Sciences” at the Vrije Universiteit Amsterdam (The Netherlands). Daniela Fusco: Senior researcher. Scientific coordinator of freeBILy clinical trial, PI of the operational research project FIRM-UP and of the capacity building projects EduMad and IBBM at BNITM (Germany-Madagascar). Senior post-doc and laboratory working group coordinator of PREVAC clinical trial at INSERM (France-Guinea) Master of Science in “International Health” Charité (Germany). PhD in “Functional Biology of Molecular and Cellular Systems” University of Bologna (Italy)

OBJECTIVE Non-acute infections and chronic disorders are often neglected in humanitarian settings, mostly because they have a complex management structure and do not require an immediate response. Madagascar has one of the highest prevalence of schistosomiasis, with around 50% individuals infected with *Schistosoma haematobium*. Continuous infection can result in chronic for of schistosomiasis, such as Female Genital Schistosomiasis (FGS). Our study aim to assess the impact of an awareness campaign on the uptake of FGS services and the potential of their integration into primary health care (PHC) services.

METHODS The study is conducted in the Boeny region in Madagascar within the catchment area of three PHC centres (PHCC) which includes approximately 60000 women. A baseline assessment followed by a 7-months awareness campaign on FGS started in September 2020.

Colposcopy examinations are offered at PHCC to a maximum of 500 women in reproductive age. Women enrol through an attendance list. Midwives screen for FGS, investigating its typical vaginal lesions or ‘sandy patches’. Colposcopy results are validated via digital imaging and molecular investigations. Focus group discussions (FGDs) are used to assess perceptions of the awareness campaign. Follow-up assessments will be performed at the end of the screening.

RESULTS More than 500 women, our indicator for success, registered on the attendance list within the first 5 months of the campaign showing high willingness to get diagnosed and treated for FGS. Extant data demonstrate the success of the awareness campaign. Additionally, preliminary qualitative data suggest increased FGS awareness.

CONCLUSION First results of the study indicate the feasibility of our strategy in addressing FGS management. A strategy involving colposcopy examinations has the added benefit of providing the opportunity to identify additional medical conditions such as cervical cancer. This would enable a more comprehensive integrated package of care for women’s health at PHC level.

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Assessment of sensitivity and specificity of a rapid immunochromatographic test (*Schistosoma* ICT IgG-IgM) for Schistosomiasis in endemic and non-endemic populations

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BIOGRAPHY Julie Hörmann has obtained a masters degree in human medicine at the University of Basel in Switzerland. After graduation in 2019, she started working as an assistant physician at the emergency department at the University Hospital Basel. Now she is working on her medical thesis at the Swiss Tropical and Public Health Institute Basel, investigating diagnostic methods for Schistosomiasis.

OBJECTIVE Schistosomiasis, an infectious disease caused by human pathogenic *Schistosoma* species, is a neglected tropical disease affecting more than 200 million people worldwide.

For diagnosis of schistosomiasis stool and urine microscopy for detection of eggs is still regarded as gold

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standard, however with limited sensitivity. In previous years, serological tests have gained more attention. This study examines the sensitivity and specificity of a rapid diagnostic test based on immunochromatography (Schistosoma ICT IgG-IgM, LD Bio, Lyon, France) for detection of specific antibodies in endemic and non-endemic populations.

METHODS We used frozen banked serum samples of patients with proven schistosomiasis, patients with other helminth infections, patients with rheumatoid factor positive rheumatoid arthritis and healthy blood donors to assess the sensitivity and the specificity of the test.

RESULTS We found a sensitivity of 100% in patients with parasitologically confirmed schistosomiasis, irrespective of the species (*S. mansoni*, *S. haematobicum*, *S. japonicum*, *S. mekongi*). In healthy blood donors and patients with rheumatoid factor positive rheumatoid arthritis from Europe, specificity of the test was 100%. However, with 75%, specificity was considerably lower in people with other helminth infections.

CONCLUSION With its high sensitivity, the Schistosoma ICT IgG-IgM appears to be a good screening test for detection of antibodies. However, in populations with a high risk for co-infection with other tissue helminths, positive results should be confirmed with other tests due to lower specificity of the rapid diagnostic test.

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Febrile illness epidemiology in rural South and Southeast Asia to inform the expansion of village health worker program beyond malaria

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BIOGRAPHY Nan SN Htun is a medical epidemiologist who are interested in neglected tropical diseases and the strengthening of health care system.

OBJECTIVE In rural South and Southeast Asia, non-malaria febrile illnesses are under-diagnosed and represent an increasing proportion of fevers. There is limited information about the etiology of non-malarial pathogens causing fever and appropriate diagnostics and treatments are not yet deployed widely. To address these public health challenges, the study aims to determine the epidemiology of febrile illnesses and evaluate new diagnostic tests and management algorithm for febrile illnesses that could be deployed by village health workers (VHWs) across the region.

METHODS This multi-country, prospective observational study will be conducted in over 500 villages in Bangladesh, Cambodia, Laos, Myanmar and Thailand. Within communities, peripheral health centre staff and VHWs will collect clinical data and blood samples for etiological investigations in patients presenting with fever. These will be supplemented by community-based surveys exploring health status, health seeking behaviors and verbal autopsies to determine the causes of deaths associated with febrile illnesses. In parallel, samples and data from febrile patients attending clinics or hospitals will be examined for more comprehensive pathogen identification and biomarkers assessment and disease severity.

RESULTS The findings will fill knowledge gaps of pathogens distribution in the region and inform prediction models for patients at risk of severe outcomes. The verbal autopsies, health status and health seeking behavior survey data will assist in planning health service provision for febrile illness and other common causes of ill health conditions. All these data will be used in economic and epidemiological models to explore the potential impact of new affordable point-of-care tests and decision-support tools that community healthcare providers could use to triage and treat febrile patients in the 2020s.

CONCLUSION This integrated approach to febrile illnesses in resource limited areas will facilitate pathogen discovery, improve clinical management algorithm for febrile patients and highlight priority areas for disease control efforts in the region.

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Nodding syndrome in northern Uganda: treatment possibilities**R. Idro***Makerere University College of Health Sciences, Kampala, Uganda*

BIOGRAPHY Idro leads a paediatric neuroscience research group in Uganda. His group is studying the pathogenesis and outcomes of children exposed to central nervous system infections, interventions to prevent re-admissions and mortality in transfused children and malaria prophylaxis and prevention of stroke in sickle cell anaemia. He is a Medical Research Council (UK) 2015 African Research Leadership Awardee (through which he is studying the pathogenesis and treatment of nodding syndrome) and the 2019 Inaugural Greenwood Africa Awardee. He sits on Boards of the International League against Epilepsy and the International Child Neurology Association.

OBJECTIVES Nodding syndrome (NS) is a devastating neurological disorder affecting thousands of children in Africa. The aetiology is incompletely understood and so, the current standard of care is a cocktail of symptomatic treatments. We aimed to study if NS is a neuro-inflammatory disorder, with antibodies to *Onchocerca volvulus* or its symbiotic bacteria *Wolbachia*, cross-reacting with neuron proteins and whether doxycycline may be used as treatment.

METHODS First, in a case control study, we recruited 154 cases with NS and 154 age-matched community controls to examine if any, specific antibodies to neuronal proteins in sera and CSF. *O. volvulus* seroreactivity was assessed by anti-Ov16 IgG at baseline. We performed an initial screen for the presence of any neuronal or glial antibodies in control sera and NS sera/paired CSFs at baseline. Secondly, we recruited 240 patients with NS and randomized them to either six weeks oral doxycycline 100 mg daily or placebo and are performing follow-up studies to determine after 24 months if any, reduction in the concentrations of the antibodies detected in the case control study above and in neurological functioning, seizure control and nutritional status.

RESULTS All study follow-up clinical testing is complete. Ov-16 IgG were detected in 95% NS vs 55% CC. Preliminary evidence for neuronal-reactive antibodies was found 18/50(36%) NS sera bound to brain sections, principally to the Purkinje cells and molecular layer of the cerebellum, compared with 3/50(6%) control sera. The remaining laboratory testing and data analysis is ongoing. We hope to have all results available by December 2021.

CONCLUSIONS The preliminary study suggests that antibodies to *O. volvulus*-specific antigens are common in NS. The presence of increased IgG reactivity of NS sera with brain tissue, particularly the cerebellum, which show atrophy on MRI in NS, is consistent with our hypothesis of *O. volvulus*-induced neuroreactive antibodies in NS.

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Geospatial and temporal analysis of incidence rate of malaria in Burundi**A. Iradukunda***University of Burundi, Burundi, Burundi*

BIOGRAPHY Arnaud. I holds a BSc and International certificate on principles of bioethics in research (Haifa University). He is a MD, and ambassador of the International Journal of Medical Student (Pittsburg, USA) and Royal Society of Tropical Medicine and Hygiene student ambassador (UK). On Head of ARNECH Research and Consulting office. Arnaud is highly resourceful and goal-driven statistician with key interests in Designing of effective M&E system and developing tools for routine data collection, data analysis, data visualization and projection using varied regressions to calculate incremental effect of projects interventions on targeted population in Infectious diseases, Chronic and NCDs and Maternal Health areas.

The problem is related to the Identification of the most epidemic zones and periods. The analysis concerns 46-health districts. Data was collected through the DHIS-2 (District Health Information System) software of the Department of Public Health. These data are structured by the monthly incidence of malaria by year and by district over the 5-year period. The analysis tool was R Software version 3.4.3. The classification was carried out with the FactoMineR package. The Analysis is that in Principal Components and the classification is ascending hierarchical (CAH).

During the 2013–2017 period, the incidence rate varied both downward and upward. Only the dry season period experienced the maximum rate of less than 100 %. Unlike the rainy season with the rate higher than 100 %. These are the periods to be feared and intervened in the fight against mosquitoes by insecticides and use of mosquito nets. Our classification method shows three groups: The first group characterized by a very high incidence of malaria GASHOHO, DS MUREORE and others (North East of Burundi). The second group is characterized by an average incidence rate. (Center and south East). The last group knows a low incidence rate: DS

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MATANA, BUJUMBURA MAIRIE, RYANSORO and others (South West). These results confirm what said in the OCHA report of 2017 on the incidence rate in North and North East of Burundi and the declaration of malaria's epidemic by WHO.

This study shows a geographical mutation of malaria from the plains regions towards the highlands regions, a signal to the decision-makers to prevent malaria in these new epidemic regions but also not to relieve primary prevention in the formerly epidemic regions. The extension of the rice farming and mosquito resistance to insecticides are the biggest reasons. This study could serve as a model for research and reference for public health decision makers.

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Ivermectin distribution and non-formal health workers role in control and elimination of Onchocerciasis in Burundi: Treatment under WHO Community Guidelines

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BIOGRAPHY Arnaud holds a BSc and International certificate on principles of bioethics in research (Haifa University). He is a MD© and ambassador of the International Journal of Medical Student (Pittsburg, USA) and Royal Society of Tropical Medicine and Hygiene student ambassador (UK). On Head of ARNECH Research and Consulting office. Arnaud is highly resourceful and goal-driven statistician with key interests in Designing of effective M&E system and developing tools for routine data collection, data analysis, data visualization and projection using varied regressions to calculate incremental effect of projects interventions on targeted population in Infectious diseases, Chronic and NCDs and Maternal Health areas.

INTRODUCTION Onchocerciasis is an infection caused by *Onchocerca volvulus*. This neglected tropical disease affects around 40 million of whom 99% are in Africa. From 2005, many control programs have been implemented to tackle Onchocerciasis in Burundi and great successes have been achieved. Integrated national NTDs control program is to a paradigm shift from control of morbidity to interruption of transmission and ultimately elimination.

METHODS Data used in this study were collected from 2005 till 2019 in four endemic regions of Burundi, namely Rutana, Bururi, Cibitoke and Bubanza, where

Ivermectin Treatment under Community Guidelines was applied.

RESULTS A population of 1,536,392 [1114870–1932403] participants was targeted by Ivermectin treatment in all the four provinces. The over all ivermectin coverage rate was 77.78% [67.80%–81.60%]. Specifically, it was 76.42% in Rutana, 76.56% in Bururi and 78.74% in Cibitoke – Bubanza respectively. More than 80% of coverage is observed after six years of massive drug administration under WHO Community Guidelines from 2011 except the 2016 year where this coverage was 79.98%. The statistics projections on 2030 horizon show that the coverage rate could decrease in parallel of the Onchocerciasis prevalence decreasing.

CONCLUSION This study showed the Ivermectin coverage rate in high endemic regions by the Treatment Under community Guidelines approach and the increasing efforts of the integrated national NTDs control program of Ministry of Health.

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Prevalence of onchocerciasis-associated epilepsy in Mvolo County, South Sudan: a door to door survey

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BIOGRAPHY I am a physician with over 7 years experience in clinical medicine and field research experience in rural onchocerciasis-endemic villages in South Sudan, where I worked as a physician and field research assistant. I am currently coordinating research project aimed at Evaluating the effect of community directed interventions in reducing incidence of onchocerciasis associated epilepsy and nodding syndrome and improving quality of lives of people living with epilepsy and their families. Graduated from faculty of Medicine, AL Neelain University, Khartoum, Sudan.

BACKGROUND A high prevalence of epilepsy has been observed in onchocerciasis-endemic areas with high ongoing onchocerciasis transmission.

OBJECTIVE To determine the prevalence and incidence of epilepsy in Mvolo an onchocerciasis endemic area in South Sudan.

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METHODS In June 2020, a door-to-door household survey was conducted in 34 villages in Mvolo. In the first phase, households were visited by a trained research team to identify persons suspected to have epilepsy. In the second phase, persons suspected to have epilepsy were interviewed and examined by a clinician.

RESULTS A total of 2,357 households containing 15,699 individuals agreed to participate in the study of these, 5,046 (32.1%, 95%CI: 31.4–32.9%) individuals had skin itching and 445 (2.8%, 95% CI: 2.6–3.1%) had blindness or blurred vision. An epilepsy screening questionnaire identified 813 (5.1%) persons suspected to have epilepsy. of the suspected cases, 804 (98.9%) were seen by a clinician and in 798 (98.1%) the diagnosis of epilepsy was confirmed. The overall epilepsy prevalence was 50.8/1000, (95% CI: 47.6–54.4/1000) and prevalence of nodding syndrome 22.4/1000, (95% CI: 20.1–24.9/1000). Younger age, male gender, family income from an activity other than farming, skin itching and blindness or blurred vision were risk factors for epilepsy. Thirteen PWE developed their first seizures in the 12 months preceding the household survey (annual incidence= 82.8/100,000, 95% CI: 44.1–141.6/100,000).

CONCLUSION A very high prevalence and incidence of epilepsy was observed in Mvolo, South Sudan. Urgent action is needed to prevent children from developing OAE by strengthening the local onchocerciasis elimination programme.

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The epilepsy disease burden in onchocerciasis-endemic regions in South Sudan, the effect of a community-based vector control program

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BIOGRAPHY I am a physician with over 7 years experience in clinical medicine and field research experience in rural onchocerciasis-endemic villages in South Sudan, where I worked as a physician and field research assistant. I am currently coordinating research project aiat Evaluating the effect of community directed interventions in reducing incidence of onchocerciasis associated epilepsy and nodding syndrome and improving quality of

lives of people living with epilepsy and their families. Graduated from Faculty of medicine and Health Sciences, Alneelain University, Khartoum, Sudan

BACKGROUND A high prevalence of epilepsy including nodding syndrome (NS) has been observed in onchocerciasis-endemic areas in South Sudan, a prevalence of 4.4% and 5.1% were documented in recent surveys conducted in Maridi and Mvolo Counties respectively, higher prevalence was observed in villages closest to the high flowing rivers with active foci of blackfly breeding.

OBJECTIVE To study the feasibility and cost of community based vector control method (slash and clear) as a complementary method to the community directed distribution of ivermectin in reducing onchocerciasis transmission.

METHOD The study was conducted in 2019 in Maridi County South Sudan. River Maridi was entomologically mapped for the potential sides of blackfly breeding and Maridi Dam was found to be the only side which favor breeding of Blackfly, community volunteers were trained on the basics of human landing catching and slash and clear techniques, *Simulium damnosum* biting rates were collected before and during the 12 months following the “slash and clear” intervention using the human landing method. Blackflies were dissected to measure infectivity rates before and 12 months after the intervention.

RESULTS Biting rates of *S. damnosum* s.l. close to the Maridi dam spillway decreased by >90% post-slash and clear for more than 6 months. Twelve months after the “slash and clear” intervention, the reduction in biting rates was still at >50%. Parity rates reduced from 13% pre- “slash and clear” (November 2019) to 5.6% post- “slash and clear” (November 2020)

CONCLUSION The “slash and clear” method was found to be an effective, simple and cheap community-based method to reduce blackfly biting rates. When repeated at least annually together with a high CDTI coverage, it has the potential to considerably accelerate onchocerciasis elimination.

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Ascaris exposure as associated with lung function and asthma

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BIOGRAPHY Nils Oskar Jøgi is a MD and PhD student at the Department of Clinical Science (K2), University of Bergen. He studied medicine at the University of Tartu (Estonia) in 2020–2017 and started his PhD in 2018. His field of interests are the interactions between helminths (parasitic worms) and host allergic diseases and lung health.

BACKGROUND The round worm *Ascaris* is believed to be the most prevalent helminth infection worldwide with a prevalence of around 1 billion. *Ascaris* infection raises an extensive immunological response which could possibly impact lung health. Further, *Ascaris* travels through the lungs of humans during its life cycle and the infection has been related to increased risk of asthma among children. Long-term effects on lung function in humans are largely unknown.

OBJECTIVE To investigate the potential associations of *Ascaris* exposure with lung function and asthma in a Northern-European cohort.

METHODS Serum *Ascaris* IgG antibodies (ImmunoCAP, ThermoFisher Scientific) as well as lung function were measured in 671 adults aged 18–47 years (46% women) from RHINESSA study centres in Aarhus, Denmark; Bergen, Norway and Tartu, Estonia. Seropositivity was defined as IgG > 90th percentile. Linear and logistic regressions were used to analyze *Ascaris* seropositivity as associated with lung function and asthma, adjusted for age, height and smoking and clustered by centre.

RESULTS Women were more likely to be *Ascaris* IgG seropositive than men (15% vs 5% above 90th percentile, respectively). *Ascaris* seropositivity was associated with lower FEV1 (-247ml; 95% CI: -460, -34) and higher risk of asthma (aOR=5.84; 95%CI = 1.67–20.37) among men but not among women. These results were not altered when adjusting for house dust mite sensitivity and were consistent across study centres.

CONCLUSION *Ascaris* exposure was associated with substantially lower lung function and increased asthma risk among men. *Ascaris* exposure may be an important and potentially overlooked public health challenge with regard to respiratory health. Our results highlight a need for further research on long-term effects of helminth exposure on host lung health; in particular, this needs to be addressed in settings in which *Ascaris* infections are highly prevalent.

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Paediatric cryptosporidiosis: a case-case-control study of a hierarchy of socioeconomic, environmental, hygiene, perinatal, and individual level risk factors

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BIOGRAPHY Øystein is an MD clinical microbiologist whose main research interests are: (1) diarrhoeal infections (2) prolonged and persistent diarrhoea (3) strengthening of on-the-ground diagnostic capacity for infections in low-resource settings.

BACKGROUND We found puzzling contradictions between literature on risk factors for cryptosporidiosis and knowledge on risk factors for paediatric diarrhoea, related to, e.g., water, sanitation, nutritional factors and their overall relationships with socioeconomic factors. We were concerned that these differences reflected different methodologies, rather than genuine epidemiological differences. We aimed to distinguish between risk factors unique to cryptosporidiosis and those in common with non-cryptosporidiosis diarrhoea.

METHODS We used epidemiological tools that, to our knowledge, have not been previously combined in a risk-factor analysis for cryptosporidiosis: (1) a conceptual framework with hierarchical organisation of risk factors, thereby making explicit underlying assumptions about confounding and mediation, (2) improved case ascertainment, using a clinical reference standard that includes quantitative cutoffs and (3) a case-case-control design.

We analysed data from a case-control study embedded in a large diagnostic accuracy study in southwestern Ethiopia (CRYPTO-POC). Strengths of association and relative contributions of various risk factors were estimated by odds ratios (ORs) obtained from mixed logistic regression models, according to the conceptual framework (figure) and by population attributable fractions (PAFs), respectively. We also quantified the extent to

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which distal-level risk factors were mediated through intermediate risk factors.

RESULTS The strongest risk factors (OR) for cryptosporidiosis were acute malnutrition, having a non-mother primary caretaker, drinking public tap water, previous healthcare attendance and having a mother with no education. Most cases (PAF) were contributed by level-5 risk factors; level-2 and -3 factors were more important for non-cryptosporidiosis diarrhoea.

CONCLUSION Based on both previous studies and our findings, we suggest exploring clinical interventions for cryptosporidiosis for any child presenting for healthcare, particularly children with severe or moderate acute malnutrition. Such interventions should not distract from currently recommended measures against all-cause diarrhoea, whether in public health (e.g., poverty alleviation, comprehensive WASH, breastfeeding) or in the clinical setting (e.g., ORS, zinc).

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Protocol: a randomised, open label, multicentre, non-inferiority clinical trial in new treatment modalities for cutaneous leishmaniasis caused by *Leishmania tropica*

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BIOGRAPHY I started 25 years ago with Cultural Anthropology, but finally became a nurse and to work with Médecins Sans Frontières. I got very interested in the tropical infectious diseases and specifically leishmaniasis, during a Kala Azar outbreak. Then I decided to do a masters in this. I was and am very privileged that I got to work with The very well-known Leishmaniasis specialist and research coordinator and to continue with Médecins Sans Frontières. But now as a researcher in cutaneous leishmaniasis.

BACKGROUND Cutaneous leishmaniasis (CL) is a neglected tropical disease, caused by the protozoan *Leishmania*. Although not fatal, skin lesions often develop into

ulcerating, disfiguring wounds and scars causing loss of function, psychosocial suffering and stigmatisation. Since decades, mainstay treatment for CL are pentavalent antimonial drugs, which are given in long courses (3–6 weeks) of painful injections and has important financial and gender barriers to access the treatment. The antimonial treatment is contra-indicated for various vulnerable groups (pregnant women and patients with underlying morbidities), due to the potential toxic side effects. There is limited evidence on effectiveness in *L. tropica* of alternative treatment modalities: thermotherapy and oral miltefosine.

OBJECTIVE We aim to evaluate the effectiveness and safety of thermotherapy and miltefosine and the combination of the two treatments to find an effective, safer and shorter treatment for CL caused by *L. tropica*.

METHOD Randomised, open label, multicentre, non-inferiority clinical trial, evaluating efficacy and safety of new treatment options in four study arms: (1) topical thermotherapy (ThermoMed®, radiofrequency generated heat of 50°C, 30 seconds application, one session); (2) miltefosine (2.5 mg/kg, 28 days); (3) combination of thermotherapy (one session) and miltefosine (21 days); and (4) compared to intralesional injections of meglumine antimoniate (the standard of care). Sample size: 832 parasitologically confirmed CL patients (208 per study arm), ≥10 years of age in CL clinics in Quetta and Peshawar, Pakistan. Primary endpoints are initial cure rate (re-epithelisation and flattening of lesions) at day 91 and frequency and severity of adverse events.

RESULTS We hope to identify an affordable, safe and effective treatment without injectables for CL caused by *L. tropica*, which can be implemented in lower level healthcare facilities, in order to increase treatment accessibility for CL patients.

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Cutaneous leishmaniasis patient characteristics and treatment outcomes in Pakistan, 2014–2020

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BIOGRAPHY Started 25 years ago with a study in Cultural Anthropology, however, became a nurse instead and started working with Médecins Sans Frontières. During my missions and specifically during kala Azar outbreaks, I realised that my interest was still research, esp. neglected tropical diseases, so got a masters in this! I am privileged: able to continue my work with MSF as cutaneous leishmaniasis researcher and work with The great well-known Leishmaniasis specialist, research coordinator Koert Ritmeijer! My goal: to find alternative treatment modalities for CL! (am so lucky with this position, as well as do a PhD).

BACKGROUND Cutaneous leishmaniasis (CL) is highly endemic in Pakistan, with an estimated incidence of 50–100,000 annually. This parasitic skin disease, transmitted by sand-flies, causes disfiguring wounds, which often lead to stigmatization and psycho-social suffering. The mainstay treatment is with pentavalent antimonial injections. Médecins Sans Frontières (MSF) supports the Ministry of Health with free CL diagnosis and treatment services in Balochistan and Khyber Pakhtunkhwa. The patient line list, maintained since 2014, contains almost 20,000 CL patients.

OBJECTIVE To describe patient characteristics, analyse trends over the years and to identify risk factors of negative treatment outcomes, i.e. treatment failure or relapse.

METHODS Retrospective analyses were performed of the CL patients cohort treated between 2014 and 2020, by logistic regressions with Wald statistics using chi square and Fisher's exact test for statistical significance difference. For the analysis of treatment outcomes, variables were dichotomised in 'initial response' and 'no response' to the antileishmanial treatment and 'final cure' and 'treatment failure' (no response /relapse) at follow-up.

RESULTS of the 17,404 patients with complete records, 47.2% were female, the median age 10 years, 51.1% had facial lesions and male patients presented with larger lesions. The proportion of patients receiving intramuscular injections vs. local intralesional injections gradually increased from 17.6% in 2014 to 49.0% in 2020. Poor/no initial response rate was 4.2%. Children <16years had almost 3-fold higher odds of poor initial response (OR 2.77 (95% CI 1.96–3.92)). Treatment failure rate was 5.8% and relapse rate 0.9%. The analyses showed that female, age <16 years, lesion duration ≤ 2 months, lesion size <5cm, facial lesions and high parasitaemia, were associated with treatment failure.

CONCLUSION The insights gained from this large cohort of CL patients can be used to improve treatment algorithms, patients follow up and contribute to the Pakistan national CL guidelines.

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The epidemiology of Brucellosis and Q fever in occupationally exposed groups in peri-urban Togo

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BIOGRAPHY Charlotte Kerr is a PhD student in the Infectious Disease Epidemiology at LSHTM. She has a background in veterinary medicine and a Master's degree jointly from RVC/LSHTM in One Health (Infectious Disease). Her research focusses on the epidemiology of zoonotic disease transmitted through dairy products in Togo with a focus on whether demographic shifts such as urbanisation, changes in income and diet affect these.

The objective of this project is to estimate risk factors for Brucellosis and Q fever in those at higher occupational risk in the surrounding region of Lomé to understand the epidemiology and inform control strategies.

We targeted two main populations: abattoir workers and workers on farwith dairy cattle. Workers from the main abattoir in Lomé were invited to partake in the study, selected using simple random sampling. Dairy farms, mostly traditional, were identified along the three main axes of dairy supply into Lomé with the support of government animal health workers. Up to three workers were selected randomly per farm. A structured questionnaire was administered to study participants including questions on occupational exposure through animal husbandry and professional activities, animal product (including dairy) consumption and health. Blood samples were collected and serum tested using the Rose Bengal plate agglutination test, *Brucella* IgG ELISA and the *Coxiella burnetii* Phase 1 and 2 IgG ELISAs. Workers were classified as positive for each organism if they were seropositive to at least one test. Logistic regression will be used to investigate risk factors.

Overall 189 livestock workers were recruited, 108 from the abattoir and 81 from 52 dairy farWe found an overall seroprevalence in this group of 9.5% (6.1–14.7) for *Brucella* species and 28% (22.1–34.9) for *C. burnetii*. This varied with site of work, with a seroprevalence for *Brucella* of 13.6% and 6.5% for farm and abattoir workers respectively and 23.5% of farm workers and 31.5% of abattoir workers seropositive to *C. burnetii*. Participants' characteristics and analysis of risk factors will be presented.

Preliminary data suggests a high level of exposure to *Brucella* and *C. burnetii* in this occupationally-exposed

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group. Establishing factors which contribute to this risk may allow us to provide practical advice to workers on how to protect themselves.

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The nasal mucosa as an alternative route of artesunate administration for malaria treatment: An In vivo and ex vivo approach

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BIOGRAPHY Yobouet Inès Kouakou is a PhD student at the University of Lyon 1 (France). She simultaneously pursues her pharmaceutical studies as an intern at Hospices Civils de Lyon. The theme of her thesis revolves around malaria and finding new ways to facilitate treatment access and administration to people living in endemic developing countries. Her current work focuses on evaluating the potential of the nasal mucosa as an administration route for the pre-referral treatment of malaria in young children at high risk of developing severe malaria.

OBJECTIVE Malaria is the most common parasitic disease. Severe malaria management is complex as it requires intravenous administration of artesunate and symptomatic drugs in resuscitation units. Such health resources are often unavailable in developing countries. As severe cases frequently result from delayed or inadequate treatment, mild cases should readily be treated with orally available sensitive drugs to prevent severe malaria. In instances where oral treatment is impossible, an alternative easy-of-use administration route that permits fast absorption, diffusion and action of the drug should be available. The aim of this study was to explore the nasal mucosa as a safe and more accessible alternative route for artesunate administration.

METHODS For that purpose, the permeability of artesunate in solution and solid form was studied in vitro on RPMI 2650 nasal mucosa model using a Transwell permeability-based assay. Drug toxicity was evaluated using an MTT-based cytotoxicity assay on RPMI 2650 cells and by measuring the Transepithelial Electrical

Resistance (TEER) of the model immediately before and after the permeation assay.

Artesunate permeability was also assessed on excised animal nasal mucosa using Franz vertical diffusion cells.

Drug quantification was done by Liquid Chromatography coupled to tandem Mass Spectrometry.

RESULTS Regarding the in vitro permeation assay, 12.06 ± 2.20 % of the initial dose of artesunate in solution permeated through the cell layers after a 4-h assay ($n = 6$). Mean TEER values were 86 ± 7 , 89 ± 12 and 83 ± 13 $\Omega \cdot \text{cm}^2$ immediately before, after and the day after the permeation assay, respectively. Statistical analysis showed no significant difference (ANOVA, $n = 6$, P -value = 0.6527).

CONCLUSION Artesunate was well tolerated by the in vitro nasal mucosa model but permeation was limited. Better permeation efficiency could be achievable by drug formulation optimization: using reversible permeation enhancers, for example, could improve drug permeation without causing cell damage.

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Operational aspects and practices related to orally administered drugs for preschool-aged children relevant for the novel pediatric praziquantel formulation

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BIOGRAPHY Johanna Kurscheid is a public health consultant based at the Swiss Centre for International Health, Swiss Tropical and Public Health Institute in Basel. Prior to this she was a Research Fellow at the Department of Global Health, Research School of Population Health at the Australian National University. Her work over the last 5 years has primarily focused on the epidemiology of NTDs, RCTs, WASH and health education and promotion. She also has a background in biomedical science and molecular parasitology.

Schistosomiasis is a serious public health problem in many countries, particularly in sub-Saharan Africa. Preventative chemotherapy is the current control strategy of choice but treatment of pre-school aged children (PSAC) is hampered due to the lack of a child-friendly drug formulation. The standard 600 mg praziquantel (PZQ) tablet is large and difficult to swallow, thus requires cutting and crushing. To mask the bitter taste and improve absorption, it should be administered with

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food, milk or juice. A novel, child-friendly orodispersible Levo-Priziquantel 150 mg tablet (L-PZQ-ODT) is currently in late stage development to overcome these challenges. In view of its upcoming registration and launch, practical challenges in the context of MDA program must be considered. For example, the accuracy and feasibility of determining child weight class and corresponding tablet counting required for correct drug dosing, as well as the administration of multiple tablets. The aim of this landscape analysis was to gain a better understanding of these operational factors and other practical issues related to pediatric drug dosing and oral administration in other indications to derive recommendations for product information or the need for supplementary materials to facilitate the introduction of the new formulation into public health programs. This study used a mixed-method approach involving qualitative and semi-quantitative research methods. Firstly, a literature review was conducted to generate evidence-based data on technical implications and reliability of direct and indirect weight determination and weight-dependent dosing as well as administration of oral health products to PSAC in resource-constrained settings. A questionnaire-based survey and key informant interviews explored experiences and opinions on operational aspects and needs on the practicality of calculating drug dosage and safe administration in different health care settings and country contexts. Information derived from this study will support dosing, handling and administration of the novel pediatric formulation.

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Factors predicting adequate and timely response to paediatric febrile and diarrhoeal illnesses – Treatment pathways in rural Tanzania

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BIOGRAPHY Maike Lamshöft obtained her MSc in Public Health at Charité Berlin and has worked as an infectious disease epidemiologist and counselor in the field of reproductive health before joining the Bernhard Nocht Institute as project manager in several multi-country research

projects in sub-Saharan Africa. Current research interests are the epidemiology, diagnoses and treatment of febrile and diarrhoeal illnesses in children in Ghana and Tanzania, antimicrobial resistance and intervention trials.

OBJECTIVE Many children in sub-Saharan Africa die from malaria, pneumonia, or diarrhoea – deaths that could be prevented by early diagnosis and targeted treatment. This study aimed at gaining insights into case management by mothers before they present their child to hospital.

METHODS We conducted a cross-sectional study among 332 parents attending Korogwe District Hospital with their under-fives between November 2019 and July 2020. Adequate and timely treatment was defined as seeking health care within 24 hours after onset of fever and continued fluid intake for diarrhoea.

RESULTS Admission diagnoses included respiratory infections (62%), malaria (25%), diarrhoea (18%) and suspected sepsis (8%). Of all recruited children, 91% received treatment prior to admission, mostly antipyretics (76%), 'mvumbasha', a local herbal remedy (28%) and antibiotics (18%) – half of them without prescription. For diarrhoea, ORS use was rare (8%), although perceived as easily accessible and affordable. 54% of mothers restricted fluids, but 74% continued breastfeeding. 49% of the parents presented their child directly to hospital, whereas 24% went to a pharmacy and 15% to a primary health facility first. Malaria symptoms began 3–4 days before the hospital visit; and only 25% of febrile children visited any health facility within 24 hours of disease onset. Regression analysis revealed several risk factors for delayed treatment of fever: Visiting the pharmacy (AOR 5.2; 95% CI 1.6–15.4), the dispensary being the nearest accessible health facility (AOR 4.4; 95% CI 2.2–8.7) and 'mvumbasha' (OR 2.8; 95% CI 1.4–5.9). Higher socioeconomic status was protective (OR 0.5; 95% CI 0.2–0.9).

CONCLUSION This study suggests that antipyretics and antibiotics dispensed at pharmacies, but also local herbal medicines delays the 'test and treat' for malaria, which can be life-threatening. Community pharmacies could be harnessed as key contact points for sensitizing community members on detection of febrile illnesses and preparation of ORS.

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Understanding and improving the case management of severe febrile illness in malaria-endemic areas: evidence from the CARAMAL Project

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BIOGRAPHY Nina Brunner is a PhD candidate at the Swiss Tropical and Public Health Institute (Swiss TPH). In her doctoral research, she focuses on treatment seeking patterns of children under five with suspected severe malaria in remote areas of Uganda, Nigeria and the Democratic Republic of Congo. She is interested in the influence of healthcare use and access to healthcare on intervention effectiveness and the different perspectives of patients, caregivers, healthcare workers and regulators on disease and health-related behavior.

OBJECTIVE Every year, over 400,000 children die from malaria and other preventable illnesses in sub-Saharan Africa. Few details are available on where these children die, from which causes and under which circumstances. A better understanding of these factors is crucial to address effectively the remaining burden of preventable childhood deaths.

METHODS We report the results from the Community Access to Rectal Artesunate for Malaria (CARAMAL) field studies in the Democratic Republic of the Congo (DRC), Nigeria and Uganda, in which over 14,000 episodes of severe febrile illnesses were identified and followed-up for 28 days, using multiple survey methods.

RESULTS We found multiple deficiencies in the continuum of care, leading to low effectiveness of case management and negative health outcomes. The health status of the children in our study could be determined through Day-28 home visits in 93% of the episodes (13,805/14,847). Case fatality rates (CFR) varied largely by country and place of initial presentation (range: 0.3% to 15%). A number of risk factors for death could be identified and will be presented. The administration of pre-referral Rectal Artesunate (RAS) seemed to reduce the CFR only in Uganda (RR=0.3, $P < 0.05$).

We found evidence that a lower proportion of children receiving RAS completed referral compared to those not receiving RAS. Treatment with parenteral artesunate was high in referral health facilities (above 80%), but the administration of a full course of an ACT to complete the treatment was inconsistent (from virtually nil in Nigeria to 65% in DRC). Hence, many children were effectively treated with an artemisinin monotherapy. Most children were considered healthy on Day 28, but over 60% had detectable malaria antigenaemia.

CONCLUSIONS Results from the CARAMAL Project provide a comprehensive body of evidence to support the improvement severe febrile illnesses management at community level.

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Effectiveness of automated phone calls and Scampaings to improve perception and knowledge of leprosy in Uttar Pradesh, India

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BIOGRAPHY Suchitra Lisam is a public health practitioner having a MBBS degree from Delhi University, Master of Public Health (MPH) from Chulalongkorn University with specialization in health system development and a Post-Doctoral Course in Epidemiology (PDCE) on HIV/AIDS from California University (UCLA, USA). She has about eighteen years of experience in public health program planning and management particularly in HIV/AIDS; TB, Poliomyelitis etc. and health system strengthening. She led and coordinated several health system related research projects in collaboration with several bilateral partners and agencies etc. and had designed and evaluated large scale health program under National Health Mission (NHM).

OBJECTIVES The aim of this study is to describe the evaluation of an automated phone calls and short text messaging (SMS) campaigns to improve perceptions on leprosy including knowledge about preventive chemotherapy for leprosy in Fatehpur and Chandauli districts of Uttar Pradesh, India.

METHODS The mobile-phone based intervention consisting of short messaging service (SMS) messages was designed based on six steps of quality intervention

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development (6SQuID). For automated calls, a customized story script was developed and voice recorded in form of a dialogue between two to three persons conveying a specific message of leprosy in line with Smessages. We used five different automated calls and five types of Smessages covering symptoms, cause, mode of transmission, treatment and prevention of leprosy. The Sand automated calls were sent to 28,855 mobile subscribers i.e. 12,499 from Chandauli and 16,356 from Fatehpur. All five types of Smessage were sent and automated call were blasted to each subscriber once a week on different days that got repeated at end of every cycle. Effectiveness of intervention was evaluated through real time caller-based telephone interviews comprising questions about knowledge of leprosy including Social Distance Scale (SDS). We evaluated the intervention among 1440 people from database of both districts.

RESULTS The mobile phone-based intervention was implemented from May to September 2020 and its evaluation is carried out from February to May 2021. Total seven Swere delivered to each subscriber while total 10 automated calls were received by each subscriber. On average, 7213 subscribers i.e. 25% of total subscribers picked up automated calls, whereas 5193 i.e. 72% of 7213 listened to call content. of the 1440 subscribers who were called, 243 i.e. 17% remembered receiving Sor automated call about leprosy.

CONCLUSIONS Analysis of evaluation is underway since March till May 2021.

238**Co-infection among pregnant women in Battor and Adidome districts of the Volta region of Ghana**

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BIOGRAPHY I am an Assistant in the Department of Medical Laboratory Science at Marquette University, Milwaukee, WI, USA. I teach different courses including Clinical Chemistry and Concepts, Medical Microbiology, Public Health to name a few. My research focus is on Neglected Tropical Diseases (NTDs) and other parasitic diseases for over 10 years. My current research interest is in developing sensitive and specific molecular diagnostic tests for Schistosomiasis and other Soil Transmitted Helminths (STHs).

OBJECTIVE In sub-Saharan Africa helminth diseases such as schistosomiasis and strongyloidiasis are endemic and can lead to co-infections. 40 million pregnant women are infected with soil-transmitted helminths (STHs) or

schistosomes. The first-time pregnant women in malaria-endemic areas are more susceptible to helminth infection. Studies have assessed the frequency of schistosomiasis and other helminth diseases, such as soil-transmitted helminth (STH) co-infection during pregnancy, but none have been done on the Ghanaian population. This global health project involves Noguchi Memorial Institute for Medical Research, University of Ghana and Marquette University.

METHODS We determined the nature and extent of co-infection (*Schistosoma mansoni*, *S. haematobium* and *Strongyloides stercoralis*) from filtered urine samples collected from Battor and Adidome districts of Ghana. The overall distribution and frequency of such infection in pregnant women (age range 14–45 yrs) was also assessed. Species-specific cell-free repeat DNA for all these species were amplified from 163 urine samples. The positive infection rate for all three species was highest for women in 20 – 30 yrs of the age range.

RESULTS In Adidome district (87 samples), *S. haematobium* had the highest prevalence (60.9%) compared to *S. mansoni* (34.5%) and *S. stercoralis* (3.4%). In the Battor district, however, the infection prevalence was higher for *S. mansoni* (52.6%) and *S. stercoralis* prevalence (15.8%). Mixed infection of *S. haematobium* and *S. mansoni* were high in both Adidome (18 out of 76) and Battor (22 of 87) districts.

CONCLUSION The study outcome highlights the extent of single and multiple helminth infections among this vulnerable population. The results will directly inform programmatic structure and help in decisions to deliver control program interventions to this group.

241**Prevalence of duo-schistosome infection among school children after MDA in Zambia: Comparison of six different diagnostics**

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BIOGRAPHY I am an Assistant in the Department of Medical Laboratory Science at Marquette University, Milwaukee, WI, USA. I teach different courses including Clinical Chemistry and Concepts, Medical Microbiology, Public Health to name a few. My research focus is on Neglected Tropical Diseases (NTDs) and other parasitic diseases for over 10 years. My current research interest is in developing sensitive and specific molecular diagnostic tests for Schistosomiasis and other Soil Transmitted Helminths (STHs).

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OBJECTIVE Schistosomiasis in Africa is an ongoing public health problem, with an estimated 200,000 people dying each year from the infection. Diagnosing this infectious disease is difficult and is exacerbated by the fact that in Africa two of the three main species of schistosomes infecting humans, *Schistosoma mansoni* and *S. haematobium*, are often sympatric. Detecting *S. mansoni* and *S. haematobium* infection by current parasitological and immunological methods has low sensitivity, sometimes providing false positive results particularly after drug treatment. To address these shortcomings, we have detected both species by six different diagnostics tests (including WHO recommended) among school children in Zambia after drug treatment.

METHODS This cross-sectional study was conducted among 130 school children aged 8–16 years in Chongwe and Siavonga Districts in Zambia. Species-specific cell-free repeat DNA fragment were amplified for both species from filtered urine samples by polymerase chain reaction (PCR) and loop-mediated isothermal amplification (LAMP). Also, KK and CCA (for *S. mansoni*) and urine filtration and haematuria (for *S. haematobium*) were conducted.

RESULTS Our approach detected five times more positive cases by PCR (94) and LAMP (110) than by KK (0) and CCA (11) for *S. mansoni*. For *S. haematobium*, the outcome was similar against haematuria (PCR:78, LAMP: 80 and haematuria: 3) and even better against urine filtration (0). There were no false positives produced by LAMP. For *S. mansoni*, LAMP was the best indicator of disease prevalence (87.69%) with better sensitivity (96.49%) and specificity (100%). This was followed by PCR, CCA and KK. Similarly, for *S. haematobium*, LAMP was the best method with 89.89% sensitivity, 100% specificity and 68.46% disease prevalence. This was followed by PCR, haematuria and urine filtration.

CONCLUSION The results of this study emphasize the need for a more accurate way of testing and identifying patients who have schistosomiasis especially during control intervention.

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Use of the ND-O-BSA based ELISA to screen for leprosy in a nonendemic country

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BIOGRAPHY Chiara Piubelli is a molecular biologist with a PhD in biotechnology. Currently she is working as a biologist and research scientist at the molecular biology lab of the Department of Infectious – Tropical Diseases and Microbiology, IRCCS Sacro Cuore Don Calabria Hospital. She is the coordinator of the biomedical research group and the main scientific interests are focused on the study of biomarkers for the detection of the pathogens involved in infectious and tropical diseases as well as on the study of the pathogen pathophysiology and on the host-pathogen interaction. She is author of 43 scientific articles.

OBJECTIVE Leprosy is a neglected tropical disease caused by *Mycobacterium leprae*. If untreated, the infection results in progressive damage of the skin, peripheral nerves and eyes, leading to disabilities. World Health Organization (WHO) considers leprosy endemic in 22 countries, with over 200,000/year new cases, with 80% occurring in India, Brazil and Indonesia.

Due to passive diagnosis, the estimation of hidden cases is ~8-times higher than the reported numbers. In Europe, where annually are recorded on average 20 cases, leprosy was endemic until the end of the last century; nowadays the few reported cases are mostly from endemic countries. The ELISA based on phenolic glycolipid I (PGL-I) or its synthetic version ND-O-BSA is extensively used in endemic countries to screen the household contacts of confirmed patients. The anti-PGL-I titer is almost universally positive in multibacillary lepromatous leprosy patients (BB, BL and LL forms) but is generally low or negative in paucibacillary tuberculoid for (TT, BT). It has also a prognostic value; household contacts with a positive titer have ~3-fold higher probability to develop the disease within 3 years than those with a negative titer.

METHODS & RESULTS We tested sera from patients with suspected or confirmed diagnosis of leprosy, those under treatment or those who had finished at least 1 cycle of treatment (SLALT) and from a control group of tuberculosis (TB) patients. We tested 50 well-characterized sera from leprosy patients with known clinical forms ND-O-BSA and 50 sera from patients never exposed to *M. leprae* to calculate the cut-off using optimized OD

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thresholds, generated by receiver operating characteristics (ROC) curve analysis. We obtained, 54% of SLALT and 22.5% of TB positive sera, consistent with the literature.

CONCLUSION ELISA based on ND-O-BSA can be an important tool to facilitate the diagnosis of leprosy, even in a nonendemic country.

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Modelling haemoglobin decrease as a biomarker for hookworm-related morbidity

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BIOGRAPHY With a background of Mathematical for Life Sciences (MSc), Veronica focused her interests on infectious disease modelling. She worked on modelling the spread of antibiotic resistance in an hospital environment, as a project for her Master thesis at the university of Trento, Italy. She moved to Rotterdam, the Netherlands to work as a Junior Researcher at the Department of Public Health, Erasmus MC, on Neglected Tropical Disease control. Among others, the research involved developing mathematical and statistical models for the analysis of epidemiological data or the impact of control measures. She has experience with individual-based modelling, Bayesian inference, public health.

OBJECTIVE Hookworm infection is ranked among the top 7 causes of worldwide anaemia. Although anaemia is generally associated to moderate-to-heavy intensity (MHI) hookworm infections, low haemoglobin (hb) levels in adults have been observed for all levels of infection intensity. We aimed to estimate the excess prevalence of anaemia due to hookworm and assess the appropriateness of current WHO morbidity targets (prevalence of MHI infections <2%).

METHODS We defined a statistical hierarchical model to study the association between hb concentrations and egg counts at individual level, through means of a latent variable simulating unobserved worm burdens. Hb is assumed to follow a logistic decrease with increasing worm burdens. The model was fitted to data from Uganda using a Bayesian framework via Stan. For different endemicity scenarios (prevalence of any and MHI infection), we investigated the excess prevalence of anaemia with respect to an underlying population burden of anaemia.

RESULTS The model fitted well to the data, simulating a prevalence of hookworm infection of 58% (95%CI: 55%–60%) and MHI prevalence of 5% (95%CI: 4%–

6%). The model reproduced a baseline hb setting in the population, i.e. in absence of hookworm infection, with a mean hb of 126.5 g/L (95%CI: 115–128) and a prevalence of anaemia of 38% (95%CI: 35%–41%). The estimated excess of anaemia ranges from zero to 10% by varying endemicity scenarios and is almost proportional to MHI prevalence. Achieving a 2% prevalence of MHI infections corresponds to a remaining 1% excess prevalence of anaemia.

CONCLUSION This modelling study is a first step towards a better understanding of the relationship between prevalence of anaemia and hookworm prevalence (and intensity). Our simulations indicate that the current WHO target for the control of hookworm morbidity see appropriate. This model will be extended to a dynamic framework to include the effect of anthelmintic treatment.

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Epidemiological trends of leprosy and case detection delay in East Hararghe Zone, Ethiopia: APEP4LEP baseline survey

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OBJECTIVE Leprosy is a chronic infectious disease caused by *Mycobacterium leprae* and one of the world's neglected tropical diseases (NTDs), which can cause permanent physical impairments if left untreated. The PEP4LEP study compares two integrated skin screening interventions combined with single dose rifampicin as post-exposure prophylaxis (SDR-PEP) distribution to contacts of leprosy patients. The aim of this baseline survey was to describe the epidemiological trends of leprosy and determine the average case detection delay in the Ethiopian study districts.

METHODS The study was conducted in three districts of East Hararghe zone, Oromia Region, Ethiopia. We applied a retrospective ecological study design to describe epidemiological trends of leprosy control surveillance data collected between 2010 and 2019. In a prospective cross-sectional study, 50 patients who were diagnosed in

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the past six months were interviewed using PEP4LEP designed questionnaire to establish the baseline case detection delay.

RESULTS Trends showed that there is no statistically significant decrease in new cases detected annually over the past 10 years ($p > 0.05$); the number of new child cases increased in the three districts included. The method of case detection in the districts was mainly passive, with a few periodic outreach activities. The average case detection delay was 22.4 months. The average patient and health system delay was 11.6 months and 9.0 months, respectively. The highest average delay was seen in multi-bacillary (MB) patients, with 23.7 months. MB cases, patients with grade-2 disabilities (G2D).

CONCLUSION The 10-year trend of leprosy incidence in the PEP4LEP study districts in Ethiopia is not decreasing. A considerable leprosy case detection delay is reported in these areas. Efforts to reduce delay and interrupt the transmission should focus on integrating active case finding, contact tracing and providing post-exposure prophylaxis to contacts of leprosy patients.

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Temporal and spatial trends of leprosy new cases detection in a highly endemic area in the Northeast region of Brazil

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BIOGRAPHY Bachelor degree in Dentistry at Universidad Nacional Autónoma de México (2013). Master in Dental Sciences by the Postgraduate Program of the Federal University of Ceará, Brazil (2018) with expertise in Stomatology, Oral Pathology and Special Patients. Currently, PhD student in the Postgraduate Program in Public Health at the Federal University of Ceará with an area of expertise in clinical-epidemiological and operational perspectives for the control of neglected diseases, with an emphasis on Chagas disease and Hansen's disease.

OBJECTIVE To describe epidemiological indicators related to leprosy in the state of Bahia, Northeastern Brazil, 2001–2019.

METHODS Mixed population-based ecological study, with temporal trend based on secondary data from the

National System of Notification Diseases (SINAN), adopting the state of Bahia as the unit of analysis and its 417 municipalities. Analysis of three indicators epidemiological monitoring of leprosy in Bahia were performed, registered in the period: 2001–2019: Leprosy detection coefficients in general population, detection coefficient in children under 15 and coefficient of grade II detection of physical disability (GIF2) at the time of diagnosis.

RESULTS 51,468 new cases of leprosy were registered, 12.2% ($n = 6,298$) reported in Salvador (capital of the state). 50.7% were male ($n = 26,084$) and 7.8% ($n = 4,008$) occurred in children <15 years with an average of 210.9 new cases (NC) in children/year. GIF2 was present in 5.1% ($n = 2,608$) of the NC. The average general detection rate for the period was 18.53 LU/100 thousand inhabitants (high endemicity) and, for children <15 years, 5.27 LU/100 thousand (very high endemicity). The average detection rate of NC with GIF2 was 9.32/million. High rates of general detection in 2019 were seen in the far north, east region close to the capital and in the far south of the state. A similar distribution has been identified for children <15 years. The detection rates of NC with GIF2 were higher in the extreme north of the state.

CONCLUSION Leprosy persists with highly endemic parameters, despite the reduction observed in the general detection of NC. The focal distribution in areas of greater social vulnerability requires integrated intersectoral strategies to achieve control, including approaches centered on the people affected and their networks of family and social contacts to reduce transmission.

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Patterns of spatial and temporal hospitalizations occurrence for Chagas disease in an endemic area in the Northeast region of Brazil

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of expertise in clinical-epidemiological and operational perspectives for the control of neglected diseases, with an emphasis on Chagas disease and Hansen's disease.

OBJECTIVE To characterize patterns of spatial and temporal occurrence of hospitalizations for Chagas disease in the state of Bahia, Northeastern Brazil, 2000–2019.

METHODS Mixed population-based ecological study, with temporal and spatial tendency. official and free national databases access on hospitalizations were used, focusing on Chagas disease as a primary or secondary cause. The analysis was based on the municipalities of residence, including sociodemographic data and standardized hospitalization rates calculation with joinpoint regression.

RESULTS A total of 1,047 hospitalizations were identified, 78.6% (823) had the disease as primary cause, with 55.6% (582) in men and 65.1% (681) in > 50 years of age. In 12.5% (131) of the hospitalizations there was an evolution to death. Higher hospitalization rate in men (0.41/100000 inhabitants [95% CI 0.26 to 0.56]) and > 60 years (60–69 years: 1.40/100000 inhabitants [0.57 to 2.22] and > = 70 years: 1.76/100000 inhabitants [0.76 to 2.75]). There was no significant temporal trend of hospitalizations due to the disease in the total period, women (Annual Percentage Change [APC] -0.7; 95% CI -2.4 to 1.0) and 60–69 years of age (APC -1.5; 95% CI -4.5 to 1.6). The highest rates of hospitalizations in the state were found in areas in the center, far east and in municipalities close to the state capital.

CONCLUSION Despite the reduction in the temporal trend in the state of Bahia, hospitalizations due to Chagas disease persist as elevated levels with a significant association with death, with emphasis on elderly males. The importance of expanding access to timely diagnosis and treatment of Trypanosoma cruzi infection and integrating health care and surveillance actions for Chagas disease in the chronic phase in the Unified Health System of Brazil are emphasized.

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Leprosy indicators and diagnosis delay in the Mogovolas, Meconta and Murrupula districts of Nampula Province, Mozambique: A PEP4LEP baseline survey

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BIOGRAPHY Abdoulaye Marega, general practitioner, Master in Tropical Medicine and International Health, Assistant at the Faculty of Health Sciences at Lúrio University. Chairman of the institutional bioethics for

health committee at Universidade Lúrio, Nampula, Mozambique.

OBJECTIVES Leprosy is a chronic infectious disease caused by Mycobacterium leprae, mainly affecting the skin, peripheral nerves and eyes. The PEP4LEP project will compare two integrated skin screening interventions combined with the distribution of single-dose rifampicin as post-exposure prophylaxis (SDR-PEP) for leprosy patients' contacts in Ethiopia, Mozambique and Tanzania. For study implementation in Mozambique, baseline information is needed on (1) the National Leprosy Control Program in Mozambique; (2) the epidemiological trend of leprosy in Murrupula, Meconta and Mogovolas district between 2015 and 2019; and (3) the case detection delay in these areas.

METHODS This descriptive retrospective and cross-sectional study are based on data from the Provincial Nampula Leprosy Control Programme between 2015 and 2019 and on interviews with 50 leprosy patients using a PEP4LEP designed questionnaire.

RESULTS Programa Nacional de Control da Lepra (PNCL) cooperates with (inter)national organizations to implement leprosy control activities. The new leprosy case detection rate in the three included districts increased from 328.7 to 607.2 cases per 1,000,000 population from 2015 to 2019. The proportion of children ranged from 5.5% to 16.7% in the three districts; 38.1–43.8% were female patients; 75.3–87.1% were MB leprosy patients and 10.4–20.7% of the newly detected patients suffered from grade-2 disabilities (G2D). Data on the mean detection delay is expected in Spring 2021, but the first information gathered indicates long-existing delays in diagnosis in Nampula province.

CONCLUSION The increasing new leprosy case detection rate and high G2D proportion indicate that there is a need for active case finding and chemoprophylaxis with SDR-PEP to help interrupt the chain of Mycobacterium leprae transmission in Nampula province Mozambique.

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Closing the loop: Using community feedback to improve programme efficiency in mass drug administration campaigns for neglected tropical diseases

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BIOGRAPHY Jake Mathewson is an infectious disease epidemiologist at KIT Royal Tropical Institute in the Centre for Applied Spatial Epidemiology. Jake's current work focuses on the use of spatial analysis and Bayesian modeling for enhanced active case finding for tuberculosis in Pakistan, as well as working towards the elimination of neglected tropical diseases through the FCDO supported Ascend Lot 1 programme as a global monitoring and evaluation officer since October, 2020. Jake is passionate about improving control methods of communicable and vector-borne diseases in low resource settings.

INTRODUCTION: People centered approaches are needed to ensure that health interventions, such as preventive treatment of NTDs, are appropriate and accessible to all in need. Beneficiary Feedback mechanisms (BFMs) provide a means to collect, analyse and act upon perspectives from the communities reached to improve delivery of health programmes, while also seeking to reach more members of the community including marginalized groups. We will present feasible BF incorporated in existing tools for mass drug administration (MDA) campaigns piloted within the multi-country Ascend Lot 1 program since November 2020.

METHODS Feedback was collected using existing monitoring tools like the Supervisors Coverage Tool (SCT) and Independent Coverage Survey (ICS) in three countries: Mozambique, Uganda and Sudan. Topics addressed included timing and venue of the MDA, information provision, COVID-19 precautions and reasons for low satisfaction. Suggestions on how to improve the MDA were further collected. Alternatively feedback was solicited through community meetings and daily community drug distributor reports. Recommended changes to programmatic activities were documented and communicated back to communities.

RESULTS Preliminary findings were positive and demonstrated opportunities for adding value through use of BF. Initial results from the SCT in Mozambique offered key operational considerations, like timing of MDAs being more optimal for men than women. Data from the ICS in Uganda are currently being analyzed and will be presented.

CONCLUSIONS Using existing tools is a feasible and cost effective way to collect community feedback within MDAs and can help to make NTD programmes more effective. Use of the SCT has limitations such as small sample size that reduces statistical confidence of results, restriction to purposeful selected areas and is likely more effective for guiding program activity when supplemented by community meetings following MDAs. Community expectations should be managed and demonstration of

added value to health ministries is essential for systemic uptake.

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Extended 6-day treatment of artemether-lumefantrine+single low-dose primaquine for uncomplicated *Falciparum* malaria in Bagamoyo, Tanzania: Efficacy and safety- randomized controlled trial

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BIOGRAPHY Lwidiko Edward is a medical doctor and a malaria researcher with experience in malaria drug efficacy clinical trials, implementation research, molecular analysis of malaria drug resistance markers and malaria diagnostic tools both molecular and microscopy. He is also a member of academic staff at the department of parasitology and medical entomology. He is also affiliated with Uppsala University department of Women and Children's Health.

OBJECTIVE To compare PCR-determined parasite clearance, cure rate, post-treatment prophylaxis and safety, of standard treatment (3 days) versus an extended treatment (6 days) of artemether-lumefantrine (AL) with single low-dose primaquine for treatment uncomplicated *P. falciparum* malaria in Bagamoyo district, Tanzania.

METHODS Randomized controlled, parallel group, superiority clinical trial compared standard 3-day artemether-lumefantrine treatment (control) with extended 6-day treatment+single low-dose primaquine (intervention). Enrollment criteria: 1–65 years old with microscopy confirmed uncomplicated *P. falciparum* malaria. Primary endpoint: proportion of PCR detectable *P. falciparum* on days 5 and 7 blood samples. Secondary endpoints: cure rate, post-treatment prophylaxis, safety.

RESULTS A total of 280 patients were enrolled, in the control arm (141) and intervention arm (139). In both

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arms, 121 completed 42 days follow-up. Proportion of PCR positivity (control vs intervention) at day 5 (80/130 (61.5%) vs 89/134 (66.4%), $P = 0.44$) and day 7 (71/129 (55.0%) vs 70/134 (52.2%), $P = 0.71$). Day 42 microscopy determined cure rates (PCR adjusted) were 97.4% (100/103) and 98.3% (110/112), $P = 0.65$, in the control and intervention arm, respectively. Microscopy determined crude recurrent parasitaemia during follow-up was 21/121 (17.4%) in the control and 14/121 (11.6%) in the intervention arm, $P = 0.20$ and it took 34 days and 42 days in the respective arm for 90% of the patients to remain without recurrent parasitaemia. Lumefantrine exposure was significantly higher in intervention arm from day 3 to day 42, but cardiac, biochemical and haematological safety was high and similar in both arms.

CONCLUSION Extended 6-day AL treatment and a single low-dose of primaquine was not superior to standard 3-day treatment for AL sensitive *P. falciparum* infections but was equally efficacious and safe. Thus, extended AL treatment may be considered as future treatment regimen for AL resistant *P. falciparum*, to prolong the therapeutic lifespan of AL in Africa.

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Predictive performance of rapid diagnostic tests for malaria and its impact on integrated community case management of malaria in Africa

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BIOGRAPHY Johannes Mischlinger holds an M.D. degree by the Medical University of Graz, a Ph.D. degree by the Medical University of Vienna and two post-graduate M.Sc. degrees by the London School of Hygiene and Tropical Medicine. Initially he worked at the Centre de Recherches Médicales de Lambaréné in Gabon as a research physician in clinical trials on antimalarial chemotherapy. Since 2018 he has been working at the Bernhard Nocht Institute for Tropical Medicine in Hamburg, Germany in the Department of Clinical Research. His research interests comprise research methodology, epidemiology and statistical analysis in the broad field of clinical tropical medicine.

BACKGROUND Integrated community case management (iCCM) of malaria complements and extends the reach of public health services to improve access to timely diagnosis and treatment of malaria. Such community-based programmes rely on standardised test-and-treat algorithm implemented by community health workers using

malaria rapid diagnostic tests (RDTs). However, due to a changing epidemiology of fever causes, positive RDT results might not correctly reflect malaria-disease in all malaria-endemic settings in Africa. This study modelled diagnostic predictive values for all malaria-endemic African regions as an indicator of the programmatic usefulness of RDTs in iCCM campaigns on malaria.

METHODS Positive predictive values (PPV) and negative predictive values (NPV) of RDTs for clinical malaria were modelled. Assay-specific performance characteristics stem from the Cochrane Library and publicly available data on the proportion of malaria-attributable fevers among African febrile children under five years of age were used as prevalence matrix.

RESULTS Average country-level PPVs vary considerably: Ethiopia had lowest PPVs (HRP2-assay: 17.35%; pLDH-assay: 39.73%) and Guinea the highest PPVs (HRP2-assay: 95.32%; pLDH-assay: 98.46%). On the contrary, NPVs were above 90% in all countries (HRP2-assay: $\geq 94.87\%$; pLDH-assay $\geq 93.36\%$).

CONCLUSIONS PPVs differed considerably within Africa when used for screening of febrile children indicating unfavourable performance of RDT-based test-and-treat algorithm in low-PPV settings. This suggests that the administration of antimalarials alone may not constitute causal treatment in the presence of a positive RDT result for a substantial proportion of patients particularly in low-PPV settings. Therefore, current iCCM algorithm should be complemented by information on other setting-specific major causes of fever.

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Deletion patterns, genetic variability and protein structure of pfhrp2 & pfhrp3 and its implication for malaria rapid diagnostic test

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BIOGRAPHY PhD Student in tropical medicine focused on malaria molecular and genomic epidemiology with an approach of global health and cooperation research. The conducted research was co-directed by Biomedicine and Biotechnology department of Alcalá University, with a fellowship for University professors' Formation and National Centre of Tropical Medicine (Spain). We have collaborations with endemic countries as Equatorial

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Guinea, South Sudan and Ethiopia. I participate in the Public Health and Epidemiology Research Group, School of Medicine, University of Alcalá, ensuring a Public Health approach.

My research interests include malaria molecular and genomic epidemiology, focus on diagnosis techniques and antimalarial resistances.

Malaria rapid diagnostic tests (mRDT) play a key role in malaria control strategies, ensuring prompt and accurate diagnosis. However, their efficacy has been threatened by deletion and genetic variability of *pfhrp2/3* genes. This study aims to characterise the deletion and genetic patterns of *pfhrp2* and *pfhrp3* genes and its implication for mRDT effectiveness.

The study included 354 isolates from symptomatic patients in Ethiopia, example of seasonal malaria context, during 2014. *Pfhrp2/3* genes were amplified and sequenced. DNA and protein sequence and statistical analysis were performed using bioinformatics tools.

Deletion prevalence in exon 1–2 (signal peptide) and exon 2 (coding sequence) were 22% and 4.6% for *pfhrp2* and 68% and 18% for *pfhrp3*, therefore signal peptide tends more to be deleted. Significantly, complete gene deletion was more frequent in *pfhrp3* (19%) than in *pfhrp2* (2.9%), which could be related with its genetic instability or fitness-cost. Haplotype taking *pfhrp2* & *pfhrp3* showed complete deletion in 1.4% and presence in 31%.

Genetic and nucleotide diversity of 99 *pfhrp2* and 81 *pfhrp3* sequences were evaluated, reporting higher diversity in *pfhrp2* ($\pi = 0.065$, $\Theta = 0.125$). Lack of geo-clustering was observed by phylogenetic analysis including homologous sequences, exposing lack of selection pressure. Amino-acidic sequences, classified in different haplotypes, varies widely in frequency, number of repeats and organisation of motif repeats, with novel amino-acid changes. Prediction of RDT sensitivity based on type 2 x type 7 repeats showed that 66% of isolates were non-sensitive. Protein structures were predicted *in silico*, placing, for the first time, the location and availability of known epitopes whose frequency were previously analysed.

Deletions and high genetic diversity in *pfhrp2* and *pfhrp3* evidence their possible impact in mRDT use. Molecular surveillance of these genes is essential to ensure the effectiveness of public health interventions and national guidelines in malaria endemic countries.

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Prevalence of *Plasmodium falciparum* isolates lacking Histidine Rich Protein 2 among symptomatic patients in Kwilu Province (Congo)

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BIOGRAPHY Yannick Munyeku is a Congolese medical doctor with years of experience as general practitioner, public health officer and researcher. He has worked both for private-owned institutions and international organizations where he played a critical role in shaping and coordinating an entire health program. He holds a Bachelor of Medicine from the University of Kinshasa, a DTM&H and MSc in Tropical Medicine from Nagasaki University. He is actually working as a researcher for the National Institute of Biomedical Research (INRB-Kinshasa) and as a public health officer for the MoH division of health laboratory.

Malaria rapid diagnostic tests have become a primary and critical tool for malaria diagnosis in malaria-endemic countries where PfHRP2-based RDTs are widely used. Since about a decade, PfHRP2-based RDTs' accuracy is challenged by isolates harbouring *pfhrp2* gene deletion, causing false-negative results. In Congo, few is known about the prevalence of *pfhrp2* gene deletion among symptomatic patients. This study aimed to determine the local prevalence of the *pfhrp2* gene deletion among malaria symptomatic patients and associated factors in the Kwilu province.

We used secondary data from a prospective cross-sectional study conducted on 684 individuals of all ages, seeking healthcare from October to December 2018 in 34 randomly selected health facilities in the Kwilu province, for symptoms suggestive of malaria. Data were collected using a structured questionnaire.

Blood was collected for microscopy, applied on PfHRP2-RDT and spotted onto Whatman filter paper to prepare DBS. Genomic DNA was extracted from

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membranes of spent PfHRP2-RDT cassettes and DBS. For the *pfhrp2* gene detection, we performed a nested PCR assay targeting a 228 bp fragment spanning from exon 1 to a portion of exon 2 of *pfhrp2* gene.

To confirm *Plasmodium falciparum* infection and *pfhrp2* gene deletion, we performed a real-time PCR assay targeting a 226 bp region of the *P. falciparum* lactate dehydrogenase. Data were analyzed using STATA15. Fischer's exact test and the Kruskal-Wallis test were applied with a level of statistical significance set at 0.05. The overall prevalence of *pfhrp2* gene deletion was 9.2%. Deletion of *pfhrp2* gene was associated with health zone of origin ($P = 0.012$) and age ($P = 0.019$). Among false-negative PfHRP2-RDT results, only 9.9% were due to *pfhrp2* gene deletion.

P. falciparum isolates with *pfhrp2* gene deletion are common among symptomatic patients in Kwilu province. The use of RDTs targeting PfHRP2 and pLDH antigens could limit the spread of deleted isolates.

162**Leprosy epidemiological trends and diagnosis delay in three districts in Tanzania: A PEP4LEP baseline study**

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BIOGRAPHY Nelly Mwangeni, MD, MMED Catholic University of Health and Allied Sciences, Mwanza Tanzania.

OBJECTIVE Leprosy is an infectious Neglected Tropical Disease (NTD) which is still a public health problem in various countries, including Tanzania. The **OBJECTIVES** of this study are: (1) assessing the recent epidemiological leprosy trend in three Tanzanian districts and (2) determining the case detection delay. This study will function as baseline for the PEP4LEP project, an implementation study on integrated skin screening and single dose rifampicin as post-exposure prophylaxis (SDR-PEP) administration to leprosy patients' contacts in Mozambique, Ethiopia and Tanzania.

METHODS For the retrospective descriptive epidemiological study section, leprosy data from 2015–2019 were collected using the Tanzanian National Tuberculosis and Leprosy Program registry. For the cross-sectional study section, the case detection delay was assessed using a questionnaire which was designed for PEP4LEP and administered to 50 leprosy patients. Statistical significances were calculated using the Chi-square test.

RESULTS Between 2015 and 2019, 595 new leprosy cases were detected in Morogoro, Mvomero and Lindi district in Tanzania, of which: 233 (39.2%) females, 23 (3.9%) people with grade-1 or grade-2 disabilities and 460 (77.3%) multibacillary leprosy (MB) patients. Significantly more MB leprosy was observed in males (97.0%, $P < 0.001$); disabilities were significantly more common in females (96.1%, $P < 0.001$). Of the 50 leprosy patients interviewed to assess the detection delay, 35 (70.0%) experienced a delayed diagnosis of over a year; 24 (48.0%) patients had disabilities at time of diagnosis. The mean detection delay was 28.6 (95%CI 22.2–34.9) months.

CONCLUSION There is a considerable leprosy case detection delay in the Tanzanian PEP4LEP study districts. Capacity building, awareness raising, active case finding and chemoprophylaxis administration to patients' contacts are necessary to attain zero transmission and zero disability.

475**High-resolution estimates and the burden of undetected and untreated Chagas disease cases in Spain**

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BIOGRAPHY MD, PhD. Family doctor with expertise in Tropical Medicine and International Health. Co-founder of 'Health between Cultures' (www.saludentreculturas.es) in Spain. I've been designing and coordinating community-based interventions to tackle NTDs among migrants for the last 15 years. Currently working in Public Health as epidemiologist.

OBJECTIVE To generate high-resolution estimates of the burden of undetected and untreated *T. cruzi* infection cases in Spain, the non-endemic country with the highest burden of Chagas disease outside the Americas and compare them with the actual number of cases reported by official sources.

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METHODS A study of aggregate data collected from the literature and official sources (Spanish National Statistics Institute; Spanish Agency of Medicines and Medical Devices) was undertaken, from 2010 to 2018, to estimate the number of Chagas disease cases and the underdiagnosis and undertreatment rates.

RESULTS A total of 2,602,285 individuals originally from the 21 *T. cruzi* endemic countries in America were living in Spain in 2018 and 55,367 migrants were estimated to have Chagas disease, out of them 613 (1.1%) were children under 15 years of age and 23,382 (42.3%) were women of childbearing age (15–44 years). Bolivian migrants represented 54% of the total estimated cases. The number of expected adults with Chagas disease was higher in Catalonia, Madrid and andalusia. Underdiagnosis and undertreatment rates were heterogeneous among the different Spanish autonomous regions, being the estimated global underdiagnosis rate of 71% and among children under 15 years of age it was estimated to be 60%. The autonomous regions with the lowest rates of underdiagnosis were Murcia, Catalonia and Balearic Islands. The global rate of undertreatment in Spain was estimated to be 82.5% among patients older than 14 years and around 81% among women of childbearing age.

CONCLUSION The burden of Chagas disease in Spain remains high, as well as the underdiagnosis and undertreatment rates. Nevertheless, these rates have improved over time, especially among children, suggesting the efficacy of the antenatal screening programmes. Accurate estimates like this should help policymakers to design and implement cost-effective health interventions and they could be replicated in other non-endemic countries.

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Translation of liver stage activity of M5717, a *P. falciparum* Elongation Factor 2 Inhibitor, from bench to bedside

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BIOGRAPHY With Merck since 2015, Thomas is responsible for global health drug discovery focusing on Malaria and Schistosomiasis. He also leads open innovation initiatives to catalyze research in infectious diseases. Prior to his current role, Thomas worked with Medicines for Malaria Venture on the early stages of the pipeline from compound screening to candidate selection. Thomas holds a PhD in organic chemistry from the Universities of Strasbourg (France) and Freiburg im Breisgau (Germany). In 2009, he was appointed as a Post-doctoral fellow at Harvard University (USA). He authored and co-authored over 30-peer-reviewed articles and is a co-inventor on several patents

OBJECTIVE M5717, a *Plasmodium falciparum* Elongation Factor 2 Inhibitor, has been shown to be equipotently active against all stages of the malaria parasite. The molecule recently completed a Phase 1 Single Ascending Dose (SAD) study (50–2100 mg) and its antiparasitic activity was confirmed in a Blood Stage Volunteer Infection Study (VIS) (NCT03261401).

The objective was to support M5717 dose selection using in vitro and in vivo liver stage models and modelling and simulation, to support the dose selection of M5717, a *Plasmodium falciparum* Elongation Factor 2 Inhibitor, for a liver stage VIS.

METHODS The in vitro liver stage inhibitory concentrations of M5717 were studied in *Plasmodium berghei*-infected spheroids of human hepatic cell lines generated in stirred-tank culture system, the resulting IC99 values were correlated with in vivo plasma average concentrations obtained from the liver stage *Plasmodium berghei* infection mouse model. The curative single oral dose (1.5 mg/kg) corresponded to 3x the IC99.

An initial draft population pharmacokinetic (popPK) model based on data from the SAD1 was used to predict the dose giving an area under the curve (AUC_{blood}) that was maintained for greater than 24 hours above the IC99 and exceed 3x the IC99.

RESULTS We obtained an IC99 of 10 nM against infected *Plasmodium berghei* HepG2 spheroids. The simulations based on the popPK Model suggested that a dose of 60 mg would provide exposure exceeding IC99 and 200 mg would exceed 3x IC99 in 33% and 100% of the

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simulated population. Due to uncertainties in the dose prediction, the first dose evaluated was 200 mg followed by de-escalation.

CONCLUSION By integrating preclinical models with popPK simulations we were able to rationally define M5717 starting dose for the liver stage VIS as well as the subsequent lower doses to be tested.

¹Arez et al. *ACS Inf. Dis.* 2019;11:1831–1842.

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Granular Mapping of Schistosomiasis and Soil-transmitted Helminthiasis in the Coastal Region of Kenya: Challenges and Opportunities

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BIOGRAPHY Martin is a Research and evaluation specialist supporting countries and organisation to build capacity and strengthen strategic information system to allow for collaborative learning and adaptation in low and middle-income countries.

Currently, Martin is the Regional Monitoring Evaluation Research and Learning Manager supporting an FCDO NTD program in Africa dubbed Accelerating the Sustainable Control and Elimination of Neglected Tropical Diseases (ASCEND) working with various Countries MOH to build robust MEL systems

OBJECTIVE Schistosomiasis Precision mapping (PM) has been identified by the world health organisation (WHO) as an innovative tool to shrink the map to ensure a more targeted treatment and interrupt transmission accurately. In Kenya, PM was conducted between October to November 2020. We, therefore, highlight the lessons learned that other countries can adapt and adopt into PM's planning and implementation.

METHOD PM was conducted in six counties in Kenya's coastal region targeting school-Age Children sampled in their household. The selection of the villages to be surveyed was based on spatial data of distance to water sources/points, historical data (ESPEN & CIFF/SBDP & peer-review publication) and local knowledge and information from sub-national health departments. An evaluation unit is defined as the ward level. Data for lessons learned were gathered from the minutes that were

recorded during the debriefing meetings and post mapping review meeting with various personnel and stakeholders who took part in the planning and implementation of the mapping exercise.

RESULTS From the findings, PM requires a rigorous site selection strategy and a robust coordination team that covers the various program areas (laboratory work, advocacy communication and social mobilisation, data management and logistics) from the village to the County level is a key component. Further community based surveys are logistically intense, hence, a solid micro plan covering all activities and necessary resources at the lowest level of implementation needs to be in place before the program rolls out, while mapping out various population typologies (pastoralists/nomads) and determine strategies to reach them. Sufficient engagement of community members and the gatekeepers is critical for the success of the PM.

CONCLUSION A rigorous site selection and a robust micro plan together with a meaningful engagement with the community is key for the success of PM.

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Effective in vitro gametocytes production and cryopreservation conditions of *Plasmodium falciparum* toward the discovery of malaria transmission blocking drugs

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BIOGRAPHY Roukayatou OMOROU is a PhD student at the university of Lyon1 (France) in the ICBmixed research unit. Her study focuses on the resistance mechanism of malaria parasite especially *Plasmodium falciparum* and their impact on gametocytes (sexual form of the parasite). She believes that blocking the parasite's chain of transmission and reducing resistance to antimalarial drugs are two major challenges in eradicating malaria. Her study outcome is to get knowledge that can promote the development of drugs that meet these two criteria. She lives in Vaulx-en-velin and is a natural landscape enthusiast.

ABSTRACT: Malaria remains one of the deadliest diseases. The surge in resistance to already available molecules, such as artemisinin derivatives, makes the promise

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of malaria eradication more complicated. One of the cornerstones of this fight remains the blocking of the transmission chain which will be possible thanks to research and development of antimalarials effective on parasites' sexual for(gametocytes) and on the resistant for. However, the in vitro or ex vivo study of transmission blocking activity by candidate molecules requires the availability of gametocytes. The first objective is to set-up a convenient and effective protocol for high quality gametocytes production in vitro. The second objective is to find an optimal cryopreservation method.

METHOD In vitro gametocyte production in *Plasmodium falciparum* NF54 (PfNF54) strain cultures was based on the effect of natural stress to induce gametocytogenesis. A known stress factor is a high density of asexual blood stages in culture. When high parasitemia was achieved, N-acetylglucosamine was added to cultures to prevent further re-invasion thus promoting the optimal development of gametocytes. Giemsa-stained slides were examined daily to monitor parasitemia and gametocytemia. A protocol to store gametocytes was also developed. Several freezing/thawing conditions such as temperature, cryoprotectants (intracellular type cryoprotectants such as glycerol or DMSO and extracellular cryoprotectants such as Hydroxyethyl starch) and thawing solution were tested.

RESULT: In vitro gametocytes production with PfNF54 cultures was achieved. About 7593/μL of gametocyte was counted. Parasites are well cryopreserved at -20°C with cryoprotectant based on glycerol. Parasite recovery rate was 17% after thawing and recultivation in 7ml of fresh RBCs at 5% hematocrit. The daily growth factor of these parasites is 2X on average. Compared to the growth factor in continuous culture (~2.5X), the development of these parasites was not different ($P = 0.6530$).

CONCLUSION This study will be completed with further experiments.

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EDCTP: A model partnership for aligning European investments in poverty-related and neglected tropical diseases

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BIOGRAPHY Lara Pandya is a Senior Strategic Partnerships officer at the European & Developing Countries Clinical Trials Partnership (EDCTP), having formerly

been an EDCTP Project officer from 2007 to 2010. She is responsible for building and managing partnerships with key public and private stakeholders, particularly in the areas of HIV and neglected infectious diseases and for facilitating the coordination of European national research programmes on infectious diseases. Lara graduated from the University of Bristol with a bachelors and Master of Science in Geography and subsequently obtained a Master's in Public Health at the London School of Hygiene & Tropical Medicine (LSHTM).

OBJECTIVE The European & Developing Countries Clinical Trials Partnership (EDCTP) is a public-public partnership between the governments of 14 European and 16 African countries, supported by the European Union. EDCTP supports collaborative research and capacity development that accelerates the clinical development of new or improved interventions to prevent or treat HIV, TB, malaria and other poverty-related and neglected tropical diseases (PRDs) in sub-Saharan Africa (SSA). In 2014, the partnership established a new instrument to improve the coordination and alignment of European national research programmes ('Participating States Initiated Activities' (PSIAs)), which has contributed to shaping the European funding and policy landscape for PRDs.

METHODS PSIAs are research and capacity development activities on PRDs that are funded and implemented by EDCTP's member governments. Here we present the analysis of the European countries' PSIAs, the results of these investments and overall impact.

RESULTS From 2014–2020, European governments coordinated €1.157bn worth of PSIA investments through EDCTP, supporting a portfolio of highly collaborative PRD research and capacity development activities that are well-balanced across disease areas and intervention types. The PSIA topics closely correspond to EDCTP's strategic priorities and are complementary to activities funded through EDCTP's calls for proposals, often filling gaps in unaddressed research priorities. An integrated overview of the activities supported by EDCTP and its members offers greater insight into areas where there are neglected priorities and evidence gaps and thus more research is needed. Consequently, PSIAs play an important role in informing future national research funding priorities.

CONCLUSION The PSIAs instrument is an integral component of the EDCTP programme and demonstrates EDCTP's value as a platform for clinical research cooperation and coordinated investments. It has successfully stimulated research coordination across European countries, avoiding duplication of efforts and promoting a focus on joint global priorities, serving as a model for other research funding partnerships.

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The EDCTP Knowledge Hub: Developing an open platform for facilitating high quality clinical research

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BIOGRAPHY Sam Driver is Digital Resources Manager at The Global Health Network. He joined The Global Health Network team in early 2019 after an almost 20-year career in Scientific and Medical publishing with the Royal Pharmaceutical Society, The Biochemical Society, Oxford University Press and as an Editorial Consultant. Throughout his career his roles have included writing and editing health-related evidence-based content for print and digital publications and creating digital resources for healthcare workers around the world.

OBJECTIVE Despite significant efforts made, too few studies are led from Africa and there is a need to address this inequity. Limited skills, knowledge and tools prevent local teams from conceptualising and implementing their own studies. The European & Developing Countries Clinical Trials Partnership (EDCTP) and The Global Health Network (TGHN) have partnered to develop the 'EDCTP Knowledge Hub' (<https://edctpknowledgehub.tghn.org/>), aimed at providing researchers in low-resource settings with resources and tools they cannot otherwise access freely. This enables them to design and lead their own high-quality studies addressing local priorities with global alignment, generating new data that can change community health outcomes.

METHODS To establish the true gaps and assess existing tools, a validated mixed-method study was undertaken. Specialist software was utilised to conduct an internet-based meta-search, followed by an exploration of perceived gaps in content. Feedback was invited on these findings at a Ninth EDCTP Forum workshop. Subsequently, 9 online surveys and 2 workshops were undertaken by TGHN and the Special Programme for Research & Training in Tropical Diseases (WHO-TDR), to determine knowledge gaps within research reutilising the Delphi survey technique.

RESULTS Feedback from the EDCTP Forum workshop supported the presented data and validated these findings. Data management and comprehensive data sharing

training that "starts from scratch" featured in the surveys and workshops as missing skills and knowledge gaps. Moreover, a web-search based scoping exercise highlighted that few resources provided guidance on generating information required for populating protocol templates or were specific to low-resource settings.

CONCLUSION The Protocol Development, Data Management and Data Sharing toolkits recently launched on the EDCTP Knowledge Hub contain open-access interactive resources identified as key to addressing unmet research community gaps. We have also pooled existing resources, enhancing discoverability and access for researchers lacking support and guidance in designing and running their own studies.

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The added value of PCR for detection of *Leishmania donovani* on microscopy negative smears and decision to treat

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BIOGRAPHY Myrthe is a postdoctoral researcher in the Unit of Neglected Tropical Diseases at the Institute of Tropical Medicine in Antwerp. She did her PhD on the transmission dynamics, ecology and diagnostics of cutaneous leishmaniasis in southern Ethiopia. Her current work focuses on clinical and diagnostic research of visceral and cutaneous leishmaniasis at different study sites in Ethiopia. With her background in molecular biology, an important focus of her work is on capacity building in resource-constrained settings, including establishing and supporting molecular laboratories and providing laboratory trainings.

OBJECTIVE Visceral leishmaniasis (VL) caused by *Leishmania donovani* is a major public health problem in Ethiopia. As untreated VL is fatal, reliable laboratory methods are pivotal for accurate diagnosis and treatment of VL patients. The gold standard, microscopic examination of Giemsa stained splenic or bone marrow aspirates, lacks sensitivity. In this study, we evaluated the added value of PCR for the detection of *L. donovani* on microscopically negative slides and for the decision to treat VL

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patients at the Leishmaniasis Research and Treatment Center in Gondar, Ethiopia.

METHODS An ongoing retrospective study is performed on microscopy negative ($N = 99$) and positive ($N = 14$) stored splenic ($N = 82$) and bone marrow ($N = 31$) aspirate slides from primary VL cases ($N = 75$), relapse cases ($N = 23$) and test-of-cure ($N = 15$) samples. Sociodemographic, clinical and treatment data are collected and samples are tested by PCR.

RESULTS Preliminary results show that for primary VL, test of cure and relapse, respectively 55.0% (CI 40.9%–66.7%), 66.7% (CI 38.7%–87.0%) and 57.1% (34.4%–77.4%) of the microscopy negative slides were PCR positive, indicating that PCR had a significant added value to microscopy ($p < 0.001$). The added value was most pronounced in bone marrow aspirates, for which 80.8% (CI 60.0%–92.7%) of the negative slides was PCR positive. Importantly, 52.1% (CI 37.4%–66.5%) of the primary VL patients and 46.7% (22.3%–72.6%) of the relapse cases that were PCR positive did not receive VL treatment. Additionally, we will make a model to predict which socio-demographic and clinical parameters are associated with a positive PCR result and the decision to treat.

CONCLUSION PCR on microscopy negative slides can have a large added value if implemented in routine clinical practice for correct diagnosis and treatment allocation of primary VL. Its added value for relapse diagnosis and as test of cure is promising but requires determination of the PCR target's half-life.

266**Performance and cost benefit improvement of multiplex real-time PCR platform for the routine diagnosis of intestinal protozoosis**

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BIOGRAPHY Ramón Pérez Tanoira is a clinical microbiologist in Hospital Universitario Príncipe de Asturias and coordinates the master's degree in Tropical Medicine and International Health at the Autonomous University of Madrid. He has been participating in research projects at

national and international centers [Helsinki University Hospital, University of Helsinki and VTT Technical Research Center of Finland (Helsinki, Finland); Gambo Rural General Hospital (Kore, West-Arsi, Gambo, Ethiopia), Notre Dame de la Sante Hospital (Dschang, Cameroon), Saint Joseph Hospital (Kitgum, Uganda), Loreto Regional Hospital "Felipe Santiago Arriola Iglesias" (Iquitos, Peru) and National University of the Peruvian Amazon (Iquitos, Peru)]

OBJECTIVE Infections caused by intestinal protists are widespread, constituting a worldwide public health problem. The introduction of molecular diagnostic platforms have added an unquestionable advantage over microscopic diagnosis. The objective of our study was to evaluate the diagnostic performance of multiplex real-time PCR, as well as their economic impact for routine use in microbiological laboratories.

METHODS Descriptive analysis of patients with a positive result for the molecular panel Allplex™ GI-Parasite Assay (Seegene, Seoul, South Korea) was carried out at the Hospital Universitario Príncipe de Asturias (HUPA), Madrid, Spain. Sample collection was longitudinal and prospective from September 2020 to February 2021. Sensitivity data and costs associated to the replacement of microscopy by PCR as first line diagnostic method in the laboratory were compared with those obtained in the same period of 2018–2019. Multiplex real-time PCR detects *Blastocystis* sp, *Cryptosporidium* spp, *Cyclospora cayentanensis*, *Dientamoeba fragilis*, *Entamoeba histolytica* and *Giardia lamblia*.

RESULTS A total of 828 stool samples were analysed, of which 181 ($n = 21.9\%$) were positive for at least one protist species. Three microorganisms were responsible for all diagnosed infections: *Blastocystis* sp. (106; 58.5%), *D. fragilis* (100; 55.2%) and *G. lamblia* (15; 8.3%). Up to 20 patients (11.05%) had some type of immunosuppression, of which 13 (76.4%) were infected by *Blastocystis* sp, ($P = 0.482$). The most common referred symptoms were diarrhoea (64; 35.4%) and abdominal pain (58, 32.0%). Compared to microscopy, the use of the molecular panel increased the diagnostic sensitivity from 10.4% with a processing cost per sample of 4.6€ to 21.9% in 2020–21 and a cost of 13.8€ per samples.

CONCLUSIONS The use of molecular techniques increases the diagnostic sensitivity of gastrointestinal parasitosis, compared to microscopy. A high proportion of infections were caused by *Blastocystis* sp. and *D. fragilis*. Future work will focus on detecting the relation of certain genotypes of *Blastocystis* sp. and a worse outcome.

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Mass drug administration for endemic scabies: A systematic review

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BIOGRAPHY Giulia Rinaldi (BSc MSc MBBS) is an academic doctor with interests in dermatology and infectious diseases. She is currently practicing training in clinical medicine at Guy's and St Thomas' NHS Trust in London, UK.

OBJECTIVES Scabies is an extremely fastidious infestation caused by the *Sarcoptes scabiei* mite. It causes a persistent itch that can disrupt a person's mental health, sleep and overall quality of life. In endemic areas, treatment by targeting symptomatic individuals and their contacts is often unsuccessful due to high rates of re-infection. To overcome this, Mass Drug Administration (MDA) can be used to treat the whole community, irrespective of whether individuals presently have scabies. This systematic review is the first that summarises the evidence for the effectiveness of MDA in treating scabies. It also identifies drivers of success for scabies MDA program.

METHODS An exhaustive literature review was conducted on MEDLINE, EMBASE, Web of Science and Scopus. All peer-reviewed articles published in English January 2000 to March 2020 were eligible and only if the studies were primary and interventional. Furthermore, the intervention had to be a pharmacological MDA method involving human subjects.

RESULTS Ten articles that qualified for inclusion were identified. MDA for scabies significantly reduced prevalence in communities at follow up. Some of the drivers of success were communities with low levels of migration, an uptake of MDA of >85%, the use of oral Ivermectin therapy, the treatment of children and pregnant women within the population and repeated treatment for participants diagnosed with scabies at baseline.

CONCLUSIONS Our results suggest MDA is an effective method to treat scabies in the endemic community. The identified drivers of success suggest MDA program may not be as successful in urban areas with increased levels of migration. Further evidence is needed about the cost-effectiveness of these interventions and their sustainability. Importantly, MDA should not substitute the tackling of socioeconomic factors which contribute to endemic disease such as good sanitation and hygiene.

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Susceptibility status of visceral leishmaniasis vector *Phlebotomus argentipes* sand flies to insecticides of public health importance in NepalL. Roy^{1,6}, S. Uranw¹, K. Cloots², U. Kiran³, U. R. Pyakurel⁴, P. Shah⁴, L. Wangchuk⁵ and W. Van Bortel⁶

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OBJECTIVE We aim to provide an update on the susceptibility status of wild caught *Phlebotomus argentipes* to insecticides currently used for Indoor Residual Spraying (IRS) i.e. pyrethroids and to alternative insecticides of other classes with different modes of action.

METHODOLOGY: Standard WHO susceptibility test procedures for malaria were adapted for *P. argentipes*. Sand flies were collected from villages with and without vector control interventions (IRS) in five Visceral Leishmaniasis (VL) endemic districts in Nepal. Resistance status was determined by using discriminating concentrations of insecticides of different classes; pyrethroids, organochlorines, organophosphates and carbamates. Additional synergist-insecticide bioassays were performed for pyrethroids to understand mechanistically likely to be involved in resistance phenotypes.

RESULTS We observed pyrethroid resistance and tolerance in the vector sand fly populations of areas receiving pyrethroid based IRS for many years, with corrected mortality rates of 82.66% for alpha-cypermethrin 0.05%, 97.5% for deltamethrin 0.05% and 94.61% for lambda-cyhalothrin 0.05%. Pyrethroid tolerance was observed in

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areas without any IRS in recent years, with mortality ranging from 90–97%. Cross resistance was clearly seen with DDT 4% in pyrethroid resistant populations with mortality rate less than 90%. This possible suggest knockdown resistance mutations involvement as well. Partial involvement of a monooxygenase-based resistance mechanism was evident in piperonyl butoxide synergist bioassay. Malathion and bendiocarb were found to be promising alternative insecticides for IRS, as observed mortality rates were more than 98%.

CONCLUSIONS This study shows explicit spread of pyrethroid resistant phenotypes in areas having IRS as vector control intervention in Nepal. Tolerance is evident in non-IRS areas as well. Malathion and bendiocarb can be used as alternative insecticides for IRS if needed. We recommend systematic monitoring of resistance in the vector population to mitigate the development of insecticide resistance and guide more rational insecticide use in the fight against VL.

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Factors influencing clinical trial participation in Madagascar: A cross-sectional trial experience survey

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BIOGRAPHY Kirsten Schmidt-Hellerau, MD MMSc, is a medical doctor specialized in internal medicine, infectious diseases and emergency medicine, holding a Master's degree in Global Health from Karolinska Institutet. Currently she is working in the division of infectious diseases of Cologne University Hospital, Germany. Previous clinical and research experiences in different low-, middle- and high income settings include, among others, working with Doctors Without Borders in an Ethiopian refugee camp, conducting a qualitative study in Sierra Leone and recently working in a clinical trial in Madagascar.

OBJECTIVE Sufficient participant recruitment and retention are crucial for the success of clinical trials. While a number of studies have investigated factors influencing trial participation, there are virtually no data on these factors in Madagascar, a country still comparatively new to conducting clinical trials. This study identifies factors influencing trial participation in a cluster-randomised clinical trial, which evaluates the effects of test-based treatment of schistosomiasis in pregnant women in Madagascar (freeBILy).

METHODS A cross-sectional survey using a structured trial experience questionnaire was conducted among pregnant women ($n = 220$) presenting at primary health care centres and in the communities. Standardised data were analysed using descriptive statistics and segregated by control and intervention groups for comparison. Responses to open questions were analysed using a thematic approach.

RESULTS Overall, reported trial satisfaction was high. Main satisfying factors include increased health awareness and perceived health improvement, which is also a factor encouraging future trial participation (28% in intervention group, 17% in control group). Factors discouraging future trial participation include fear of side effects (5% in intervention group, 1% in control group) and time constraints (6% in intervention group, 7% in control group). Barriers to trial participation also include advice from family against participation (13% of women declining or withdrawing participation).

CONCLUSION Alongside practical concerns, such as time constraints, the decision to join and remain in a trial is influenced by perceived benefits in terms of health awareness and overall health, as well as family support. Going forward, these factors need to be addressed in on-going and future clinical trials in limited resource settings with little experience in conducting trials, such as Madagascar.

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Rapid urine antigen testing (POC-CCA) for *Schistosoma mansoni* in pregnant women attending antenatal care in the Madagascan highlands

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OBJECTIVE Praziquantel treatment of pregnant women for schistosomiasis has long been recommended by the World Health Organization (WHO). Nevertheless, they still are frequently excluded from mass drug administration as well as from individual treatment. At the same time, mothers and their children are vulnerable to the negative effects of schistosomiasis. Prevalence of schistosomiasis among pregnant women is widely unknown. We aimed to integrate rapid urine antigen testing into existing antenatal care services (ANC) in a high prevalence area in the Madagascan highlands.

METHODS During regular ANC at a primary health care centre in the rural village of andina, pregnant women were offered a point-of-care circulating cathodic antigen test (POC-CCA). The provided urine was immediately tested by the study midwife who had received short technical training. Women were recruited in the context of the freeBILy clinical trial (www.freebily.eu), a cluster randomised controlled trial focusing on pregnant women and their children to evaluate test-based schistosomiasis treatment with Praziquantel.

RESULTS Rapid urine antigen testing for *Schistosoma* was readily taken on by women attending ANC, the collection of urine proved acceptable and staff were comfortable performing the test. The majority of women (62%) reported to have never been treated for schistosomiasis before. of 178 participating women, 160 (90%) tested positive.

CONCLUSION A test positivity of 90% in this known high prevalence setting emphasizes the need to include pregnant women in schistosomiasis control prograPOC-CCA testing of urine for schistosomiasis during ANC proved to be feasible and acceptable in this setting, but even though the test is recommended by the WHO, test

accuracy in pregnant women remains to be formally evaluated. Apart from allowing test-based treatment of pregnant women in low resource settings, it is also a potential strategy to monitor local prevalence.

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The state of affairs in post-exposure leprosy prevention: a descriptive meta-analysis on immuno- and chemoprophylaxis

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BIOGRAPHY Anne Schoenmakers is an MD from the Netherlands. She works for NLR (an NGO focussing on leprosy) as medical technical advisor and is the project manager of the PEP4LEP project, an implementation study on leprosy prevention and integrated skin screening in Ethiopia, Mozambique and Tanzania which is funded by EDCTP/EU & LRI. Before joining NLR, she worked as primary health physician and performed ethnographic research on communication and logistics in acute care.

OBJECTIVE Annually, over 200,000 people are diagnosed with leprosy. Progress has been made in the field of post-exposure prophylaxis (PEP) for patient contacts. In this descriptive meta-analysis, we summarize the current evidence and identify knowledge gaps.

METHODS A systematic literature search according to the Preferred Reporting Item for Systematic Reviews and Meta-Analyses (PRISMA) methodology was conducted searching Cochrane, Embase, Pubmed/MEDLINE, Research Gate, Scopus and Web of Science on Jan. 22, 2020. Subsequently, Infolp.org, Google Scholar and the "snowball method" were used. The found articles were screened for eligibility using predetermined criteria.

RESULTS After deduplication, 1,515 articles were screened and 125 articles included. Immunoprophylaxis by bacillus Calmette-Guérin (BCG) vaccination is known to provide protection against leprosy. The World Health Organization (WHO) included BCG in its Guidelines for the Diagnosis, Treatment and Prevention of Leprosy by stating that BCG at birth should be maintained in at least leprosy high-burden regions. Evidence for re-vaccination is conflicting. Contact follow-up screening is important in the first period after BCG administration, as case numbers may temporarily increase. Most leprosy vaccine studies do not focus on post-exposure prophylaxis, but two potential vaccines seem promising: *Mycobacterium*

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indicus pranii (MiP) and LepVax. For post-exposure chemoprophylaxis, dapsone/acedapson, rifampicin and ROM (rifampicin, ofloxacin, minocycline) were studied. Single-dose rifampicin is favored as PEP (SDR-PEP). It demonstrated a protective effect of 57% in the first two years post-administration to contacts of leprosy patients. It is safe, inexpensive and implementation is feasible and well accepted. Since 2018, SDR-PEP is included in WHO's leprosy guidelines.

CONCLUSION Progress is made regarding chemoprophylaxis and immunoprophylaxis to prevent leprosy in patient contacts. Investing in vaccine studies, like LepVax and MiP and harmonization with tuberculosis research is important. SDR-PEP is promising as chemoprophylaxis and WHO endorses upscaling. More research, surveillance and PEP medication availability should be promoted.

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The cost of sleeping sickness vector control in the Democratic Republic of the Congo

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OBJECTIVE Before the revival of global efforts to control Gambiense HAT (g-HAT) in 2000, the disease was a major public health problem in Africa. By 2012, the elimination of g-HAT as a global public health problem by 2020 was declared and it was accomplished two years

early, in 2018. Currently, the goal is the elimination of transmission by 2030, which will require the adoption of innovative disease control approaches with special attention to foci where transmission persists, particularly in the Democratic Republic of the Congo (DRC). Case detection and treatment remains the main control strategy and vector control was rarely used due to costs although the disease is transmitted solely through the bites of tsetse flies. In 2015, the use of Tiny Targets, small insecticide treated screens, was introduced in the DRC. Tiny Targets are an innovative control tool against tsetse that has proven to be effective and less costly in other countries (i.e. Uganda, Ivory Coast, Chad and Guinea). This study aimed to estimate the annual cost of vector control using Tiny Targets in one health zone in the DRC and to identify the main cost drivers.

METHODS The economic and financial costs of vector control activities were collected from the payer's perspective to estimate the average cost per target deployed, linear km and km² covered by vector control. To examine the robustness of the results, sensitivity analyses were conducted on key parameters.

RESULTS The annual economic cost was estimated at around 130,000\$ to cover an area of 2,100 km² which meant a cost between 5\$ and 6\$ per target deployed or around 60\$ per km² covered.

CONCLUSION Vector control using Tiny Targets could be a valuable disease control strategy and these results can contribute to rational decision making in g-HAT elimination programs, supporting context-based adaptations of the approach.

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Out-of-pocket expenses and their impact on sleeping sickness disease control activities in the Democratic Republic of the Congo

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OBJECTIVE The decrease in human African trypanosomiasis (HAT) cases indicates we are on track for the elimination of HAT as a public health problem and sustainable disease elimination by 2030. This will require a maintained commitment towards disease control activities. Easier to use screening tests and improved treatments were developed. This allows a shift from mass screening towards disease control and surveillance integrated into the primary health care system. However, past studies have shown that financial barriers are one of the reasons people do not get tested. There is limited information on the out of pocket expenses related to case detection. This study aims to fill this gap by estimating the medical and non-medical costs incurred during different stages of HAT case detection and management—namely, serological testing, parasitological testing, disease staging and treatment—and how these expenses influence perception and participation in those activities.

METHODS This study uses qualitative and quantitative methods. First, group discussions and semi-structured interviews with people that came in contact with HAT screening activities are conducted to identify which expenses people have and how this may influence their behaviour. Afterwards, a survey is conducted on a random sample of 400 people that in the previous 6 months came in contact with HAT screening activities to estimate the medical and non-medical expenses related to HAT and to assess how these costs influenced the behaviour towards HAT control.

RESULTS The study estimates expenses related to HAT control, indicates the importance of these expenses even when HAT screening tests and treatment are provided for free and how this influences behaviour and participation.

CONCLUSION HAT surveillance integrated into the health care system will be essential to achieve a sustainable disease elimination and this study informs policy makers and supports context-based adaptations to improve coverage of innovative disease control approaches.

130**Seroprevalence and risk factor analysis of human leptospirosis in distinct climatic regions of Pakistan**

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BIOGRAPHY Muhammad Luqman Sohail is currently working as Assistant in Cholistan University of Veterinary and Animal Sciences, Bahawalpur, Pakistan. Areas of interest are one health and tropical neglected infections. He has worked in Infectious Disease Laboratory, College of Veterinary Medicine, Cornell University, USA. Leptospirosis is a worldwide tropical emerging infectious disease of zoonotic importance and large epidemics and epizootics have been reported all over the globe.

OBJECTIVE A cross survey study was conducted to estimate seroprevalence of human leptospirosis in climatically distinct regions of Pakistan and to identify the risk factors associated with the disease.

METHODS Blood samples from 360 humans were collected through convenient sampling, 120 from each of three study areas. Serological testing was performed using ELISA kit as per manufacturer's recommendations.

RESULTS The results showed an overall prevalence of 40.83% (95% CI; 35.71–46.11). Statistical analysis showed significant ($P < .05$) differences in leptospiral seroprevalence in three different geographic locations, with highest in humid sub-tropical climatic region (50.83%; 95% CI; 41.55–60.07), followed by semi-arid region (44.16%; 95% CI; 35.11–53.52) and lowest in hot and dry region (27.50%; 95% CI; 19.75–36.40). After multivariate analysis age, gender, exposure to flooding water, source of water usage, disinfection schedule of surroundings and history of cut and wound were found significantly associated with the seropositivity of *Leptospira*. **CONCLUSION** The present study, first to uncover seroprevalence of human *Leptospira* in different climatic regions of Pakistan, about effect of climate on prevalence of *Leptospira* in the region.

132**Seroprevalence of *Leptospira* spp. in Horses of Distinct Climatic Regions of Punjab, Pakistan**

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Leptospirosis is zoonotic disease which is globally distributed among many domestic and wild animals. In equines, it causes uveitis, jaundice and reproductive disorders.

OBJECTIVE A cross-sectional epidemiological study was conducted for the first time in Pakistan to determine the seroprevalence and to identify associated risk factors of leptospirosis in distinct climatic regions.

METHODS A total of 384 horse sera ($n = 128$ from each of three study areas) and data on biologically plausible risk factors along with spatial locations were collected from horses reared in Bahawalpur, Lahore and Rawalpindi districts of Punjab, Pakistan. Sera were subjected to double-antigen sandwich enzyme-linked immunosorbent assay to analyze the existence or not of Horse LS-IgG in horses. Chi-square, univariate analysis and multivariate logistic regression were used to analyze the data.

RESULTS Overall, seroprevalence in Punjab was found to be 33.85% (confidence interval [CI]: 29.13–38.83). Significant statistical difference ($P < .05$) was observed among prevalence in study areas with highest prevalence in Rawalpindi (40.62%; CI: 32.04–49.66), followed by Lahore (38.28%; CI: 29.83–47.28) and lowest in Bahawalpur (22.65%; CI: 15.73–30.89). Age, gender, living area, herd size, water source, rodents, flooding, feeding management and practices and usage of animals were the significant risk factors associated with the occurrence.

CONCLUSION This study is first serological evidence of equine *Leptospira* and its associated risk factors in climatically distinct regions of Punjab, Pakistan.

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Fighting malaria means fighting anaemia: The effect of malaria on children's haemoglobin levels among 7,384 twins in sub-Saharan Africa.

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BIOGRAPHY Tim Starck is a medical student at the medical faculty of the University Heidelberg and doctoral student at the Heidelberg Institute of Global Health.

OBJECTIVE Malaria and anaemia are highly interconnected public health challenges of tropical resource-limited settings that particularly affect young children in sub-Saharan Africa (SSA). Anaemia, however, is highly multifactorial with many complex and frequently overlapping risk factors other than malaria. Due to this complex aetiology, it remains hard to identify the exact population-wide effect of malaria on anaemia. Therefore, we set out to estimate the impact of malaria on population haemoglobin in a quasi-experimental twin study.

METHOD To quantify the malaria-induced effect on haemoglobin in children under 5 years of age, we leveraged data from 7,384 6-to-59-month-old twins and other multiples from 57 nationally representative demographic household surveys (DHSs) from 23 SSA countries conducted between 2006 and 2019. We used a quasi-experimental twin fixed-effect design to control for confounders that do not vary between twins, such as socio-economic status, nutrition, or mother dependent variables. We further added subset analyses based on sex-concordance of twin pairs to reduce the weight of genetic confounding. Finally, we provide a descriptive analysis of the trends in malaria prevalence and haemoglobin changes across the pooled dataset of 270,961 children of all surveys.

RESULTS The overall pooled prevalence for malaria (18.6%) and anaemia (62.9%) remained largely constant across the included studies. The prevalence of anaemia was higher in malaria-positive children (82.4%) than in negative children (56.2%). The twin-analysis revealed a malaria-induced haemoglobin decrease in infected twins of -0.9 g/dl (CI 95% -1.0 ; -0.7). This effect remained consistent over the subset analyses.

CONCLUSION After rigorous control for confounding through a twin fixed-effect design, our study shows that malaria substantially decreased haemoglobin levels among SSA twins. This effect reflects the population-level effect of malaria on anaemia. Fighting malaria therefore means fighting anaemia in young children, which could substantially benefit the development of countries, regions and individuals.

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Treatment outcomes and antivenom effectiveness in snakebite patients in north-west Ethiopia – A retrospective analysis

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BIOGRAPHY Inge Steegemans is a nurse with an interest in international health. After obtaining her bachelor's degree in nursing she wanted more and started with a master's in health sciences, specializing in international public health. She created the opportunity to conduct her master thesis in collaboration with Médecins Sans Frontières on snakebites in Ethiopia. This led to fieldwork in Ethiopia and experiences and memories for a lifetime.

Millions of people are bitten by venomous snakes annually, causing high mortality and disability, but the true burden of this neglected health issue remains unknown. Since 2015 Médecins Sans Frontières is treating snakebite patients in a field hospital in northwest Ethiopia. Due to the poor market situation for effective and safe antivenom for Sub-Saharan Africa, preferred antivenom was not always available, forcing changes in choice of antivenom used. This study describes treatment outcomes and the effectiveness and safety of different antivenoms used.

A retrospective observational study included 792 snakebite patients presenting at the field hospital between 2015 and 2019. ANOVA-analyses were used to compare the treatment outcome of patients treated with Fav-Afrique ($n = 149$), VacSera ($n = 164$) and EchiTabPlus ($n = 156$) antivenoms and to determine the risk of adverse reactions or complications for each antivenom. Pearson correlations were used to determine factors influencing treatment outcome.

Whereas only incidental snakebite cases presented before 2015, after treatment was made available, cases rapidly increased to 1,431 in 2019. Envenomation was mainly caused by Northeast African carpet viper (*Echis pyramidum*) and puff adder (*Bitis arietans*). Patients treated with VacSera antivenom showed lower chance of positive treatment outcome (89.6%) compared to Fav-

Afrique (94.0%) and EchiTabPlus (97.4%). More adverse reactions to antivenom were observed in patients treated with VacSera (18.3%) compared to Fav-Afrique (1.3%) and EchiTabPlus (7.1%). Factors correlating with poor outcome were time between bite and hospital admission, number of vials of antivenom administered, time between hospital admission and antivenom administration and occurrence of complications.

Snakebite incidence is grossly underreported unless treatment options are available. Although EchiTabPlus showed the most favorable outcomes in this retrospective analysis, prospective randomized trials are needed to evaluate the effectiveness and safety of the most promising antivenom for Sub-Saharan Africa. Structural investment in sustained production and supply of antivenom is urgently needed.

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Optimization of single-dose primaquine used with artemisinin combination therapy for reduction of *Plasmodium falciparum* transmission: WWARN Individual Patient Data Meta-Analyses

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BIOGRAPHY Kasia Stepniewska is a Head of Statistics, at WorldWide Resistance Antimalarial Network and Infectious Diseases Data Observatory, at University of Oxford. Stepniewska has 25 years experience working in biostatistics research positions and in the last decade has led and collaborated on many large individual patient meta-analyses in malaria.

BACKGROUND Since WHO recommended single low-dose (SLD) primaquine (0.25mg base/kg) in combination with artemisinin-based combination therapies (ACTs) in areas of low transmission or artemisinin-resistant *Plasmodium falciparum*, several clinical studies have been assessed its efficacy and safety.

METHODS Systematic reviews and individual participant data meta-analyses of SLD primaquine studies were performed to assess (i) gametocyte clearance based on detection using molecular methods and transmission-blocking and (ii) changes in haemoglobin concentration between days 0 and 7 associated with the addition of SLD primaquine to ACTs. Eligible studies were identified through search of MEDLINE, Web-of-Science and Embase.

RESULTS Fourteen efficacy (2,574 participants) and 20 safety (6,406 participants) studies using primaquine over a dose range 0.0625–0.75 mg/kg were analysed. Addition

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of 0.25 mg/kg primaquine to ACTs was associated with near complete prevention of transmission to mosquitoes. Rate of decline of gametocyte carriage on day7 and day14 was dose dependent. Primaquine dose 0.25 mg/kg combined with artemether-lumefantrine was efficacious, a 0.4 mg/kg dose was needed to achieve similar efficacy in combination with dihydroartemisinin-piperaquine. Primaquine was safe and not associated with changes in haemoglobin on day7 in participants with normal glucose-6-phosphate dehydrogenase (G6PD) status. However, in those G6PD deficient, it was associated with additional drop in haemoglobin on day7, 0.42 g/dL (95%CI 0.45–0.83) for 0.25 mg/kg dose and 1.03 g/dL (95%CI 0.72–1.34) for 0.4 mg/kg dose. Severe anaemia (haemoglobin <7 g/dL) on day7 was rare (1/1,000–1/10,000) for both 0.25 and 0.40mg/kg doses among participants \geq 12 years old with at least 11 g/dL haemoglobin; its risk increased with the low baseline haemoglobin concentration, high parasitaemia and young age.

CONCLUSIONS Adding 0.25mg/kg primaquine to ACTs was associated with near complete prevention of transmission to mosquitoes. Even among G6PD deficient patients, severe anaemia remained a rare event after primaquine doses 0.25–0.40 mg/kg among participants \geq 12 years old with a baseline haemoglobin at least 11g/dL.

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Efficacy and safety of artemether-lumefantrine and artesunate-amodiaquine in treating children with uncomplicated *Plasmodium falciparum* malaria in mainland Tanzania

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BIOGRAPHY Born in 1994 in Stockholm, Sweden. Medical student at Uppsala University in Sweden since January 2016 with a great interest in Global Health. Participated in a IFMSA exchange programme to Bejaia, Algeria in 2018. President of the Swedish Society of Medicine's Student and Junior doctor's section in Uppsala since 2019. The plan for 2020 was a malaria field study in Bagamoyo, Tanzania which was cancelled due to the pandemic. The study was instead converted to the analysis of malaria therapeutic efficacy data instead.

OBJECTIVE The World Health Organization recommends frequent therapeutic efficacy studies to monitor and maintain effective antimalarials. The aim of this study was to be a part of the ongoing surveillance of artemether-lumefantrine (AL) and artesunate-amodiaquine (ASAQ), the currently recommended ACTs for the treatment of uncomplicated *Plasmodium falciparum* malaria in Tanzania.

METHODS This study was conducted at 6 sentinel sites located in 6 different regions in mainland Tanzania (Mwanza, Kigoma, Mbeya, Mtwara, Tanga and Morogoro) between December 2018 and March 2020. Artemether-lumefantrine was studied at 4 sites and artesunate-amodiaquine at 3 sites. Children between 6 months and 10 years with uncomplicated *P. falciparum* malaria were treated with standard doses of respective treatment and monitored for 28 days. The main outcomes were polymerase chain reaction (PCR) uncorrected and corrected cure rates, day 3 parasitemia and safety.

RESULTS A total of 612 patients were enrolled. 4 patients were lost to follow-up and 4 patients withdrawn during the study. The PCR-uncorrected adequate clinical and parasitological response (ACPR) for AL was 84.2% and PCR-corrected ACPR was 99.0%, with 3 recrudescence infections observed. 49 (14.3%) patients in the AL group had new infections during the follow-up. 1 patient had parasitemia on day 3. For ASAQ, the PCR-uncorrected ACPR was 98.9% and with 1 early treatment failure and 2 late clinical or parasitological failures. No deaths or severe adverse events were observed during the study. A total of 146 patients (23.9%) reported adverse events, the most common being cough, fever and abdominal pain.

CONCLUSION This study showed that both AL and ASAQ were highly efficacious drugs with adequate safety profiles. However, AL treatment was associated with high rates of new infections.

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Determining the target populations to treat with leprosy prophylactic interventions: a hotspot analysis in two districts in Indonesia

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BIOGRAPHY Anneke Taal graduated as a biomedical researcher with specialisations in Infectious Diseases and International Public Health. She is currently working at NLR the Netherlands on a multi-country clinical trial testing an enhanced prophylactic regimen for contacts of leprosy patients. Moreover, she is a PhD candidate at Erasmus Medical Centre Rotterdam focusing on transmission patterns of leprosy using GIS technology.

OBJECTIVE Leprosy incidence remains stable around 200,000 new cases globally for the last two decades. Current elimination strategies are focused on reducing the number of new patients substantially by early detection and providing prophylactic treatment to at-risk populations, including contacts of leprosy patients. Since leprosy is unevenly distributed between countries and within a country, identifying high-risk clusters of leprosy cases for targeting prophylactic interventions is crucial. This study aims to establish a methodology for policymakers to identify clustering of leprosy cases and to determine target populations for prophylactic interventions using Geographic Information Systems.

METHODS We used the Heatmap tool of QGIS to identify clusters of leprosy cases in two districts in Indonesia. Fifteen scenarios were compared, varying the heatmap radius (i.e., 500, 1000, 1500, 2000 or 2500 m) and cut-off value (i.e., ≥ 2 , ≥ 5 and ≥ 10). For each scenario, we calculated the number of cases in clusters, the cluster area in km square and the total population to be targeted with prophylactic treatment.

RESULTS The positive Moran's I values imply clustering of leprosy cases in both districts. Widespread distribution of clusters in Pamekasan and focused distribution of clusters in Pasuruan district was identified with the Heatmap tool. The proportion of cases in clusters increased with heatmap radius and ranged from 3% to almost 100%. While the proportion of population in clusters to be targeted with PEP decreased with heatmap radius from 227% to 3%. A decision tree was developed that shows the cluster scenarios most fit to PEP strategy, distribution of cases, resources available and proportion of population to be targeted.

CONCLUSION Clustering of leprosy cases was identified by the heatmap tool in both districts. The decision tree provides cluster scenarios that support policymakers in the usage of the heatmap tool to determine targeted populations with prophylactic interventions.

174**Number of people requiring post-exposure prophylaxis to end leprosy: A modeling study**

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BIOGRAPHY Anneke Taal graduated as a biomedical researcher with specialisations in Infectious Diseases and International Public Health. She is currently working at NLR the Netherlands on a multi-country clinical trial testing an enhanced prophylactic regimen for contacts of leprosy patients. Moreover, she is a PhD candidate at Erasmus Medical Centre Rotterdam focusing on transmission patterns of leprosy using GIS technology.

OBJECTIVE Worldwide, around 210,000 new cases of leprosy are detected annually. To end leprosy, i.e. zero new leprosy cases, preventive interventions such as contact tracing and post-exposure prophylaxis (PEP) are required. This study aims to estimate the number of people requiring PEP to reduce leprosy new case detection (NCD) at national and global level by 50% and 90%.

METHODS The individual-based model SIMCOLEP was fitted to seven leprosy settings defined by NCD and proportion of Multibacillary (MB) leprosy patients. Using data of all 110 countries with known leprosy patients in 2016, we assigned each country to one of these settings. We predicted the impact of administering PEP to about 25 contacts of leprosy patients on the annual NCD for 25 years and estimated the number of contacts requiring PEP per country for each year.

RESULTS The NCD trends show an increase in NCD in the first year (i.e. backlog cases) followed by a significant decrease thereafter. A reduction of 50% and 90% of new cases would be achieved in most countries in 5 and 22 years if 20.6 and 40.2 million people are treated with PEP over that period, respectively. For India, Brazil and Indonesia together, a total of 32.9 million people requiring PEP to achieve a 90% reduction in 22 years.

Conclusion/Significance: The leprosy problem is far greater than the 210,000 new cases reported annually. Our model estimates the number of people requiring PEP to achieve a significant reduction of new leprosy cases can be used by policymakers and program managers to develop longterm strategies to end leprosy.

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Diagnostic accuracy of nine commercial seroassays for the differential diagnosis of human hepatic cystic echinococcosis and other focal liver lesions

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BIOGRAPHY Francesca Tamarozzi is a research physician, whose main interest is the diagnosis of parasitic diseases, in both epidemiological and clinical settings and integrating lab-based and imaging techniques. her main focuses are cystic echinococcosis, filariasis and schistosomiasis.

OBJECTIVE The differential diagnosis of hepatic cystic echinococcosis (CE) may be challenging. When imaging is insufficient to define the etiology of the lesion, serology can be applied, but no consensus diagnostic algorithm exists. We evaluated the performances of nine serological tests commercialized in Europe for the diagnosis of “echinococcosis”, for the differential diagnosis of hepatic CE and non-CE focal liver lesions potentially in differential diagnosis with CE.

METHODS We performed a diagnostic accuracy study using a panel of well-characterized sera from patients with hepatic CE ($n = 65$; $n = 45$ in “liquid” content stages and $n = 25$ in “solid” content stages) and non-CE focal liver lesions ($n = 70$; $n = 54$ with “liquid” content and $n = 11$ with “solid” content). Unfortunately, no sera from patients with alveolar echinococcosis (AE) were available. The diagnosis and staging of CE were based on ultrasound (gold standard). Nine commercial seroassays (5 ELISA, 2 WB, 1 CLIA and 1 ICT) were the index tests.

RESULTS Sensitivity (Se) ranged from 43%-94% and 31%-87% and specificity (Sp) from 68%-100% and 94%-100%, when borderline results were considered positive or negative, respectively. Three seroassays (2 ELISA and 1 WB) were excluded from further analyses due to poor performances. When tests were combined, Sp reached 98–100%. The best results were obtained using the WB with best performance alone (Se 83%) or as a third test in case two non-WB tests gave discordant (Se 67–73%) or discordant and concordant negative results (Se 73–86%).

CONCLUSION Verification of the performances of commercial tests for the serodiagnosis of CE is imperative. The commercial WB with the best performance appears a

valid one-test approach. The performance of two non-WB tests, read with stringent criteria (borderline=negative and considered positive only if concordant positive), possibly confirmed by a validated WB, appears similarly sensible. Similar studies should be implemented in CE-endemic and CE/AE co-endemic areas.

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Clinical performance evaluation of VIDAS® dengue NS1 Ag, VIDAS® Anti-DENGUE IgM and VIDAS® Anti-DENGUE IgG assays in endemic population

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BIOGRAPHY Pharm D, I specialize in in vitro diagnostic medical devices with a focus on ImmunoAssays since 4 years. As Clinical Scientist at bioMérieux, I am responsible for conducting clinical trials for new immunoassays under development. I have participated in several launches of new assays. Arbovirus diseases is my major topic.

The aim of the study was to evaluate the clinical performances of the automated VIDAS® DENGUE assays on samples from patients in endemic areas, with symptom-consistent with dengue infection.

Study was performed on manufacturing lots for VIDAS® DENGUE NS1 Ag, VIDAS® Anti-DENGUE IgM and VIDAS® Anti-DENGUE IgG.

1296 samples from Asia, Latin America and Africa were tested with RT-PCR and ELISA competitor methods (FOCUS/InBIOS NS1, InBIOS and PANBIO IgM, PANBIO IgG). Among those, 312 samples were tested as well with rapid test assays (Standard Diagnostics). Clinical agreements of the VIDAS® Dengue assays were performed with ELISA and rapid test assays. Sensitivities of NS1 Ag assays have been established by comparison with RT-PCR considered as reference method.

VIDAS® DENGUE NS1 Ag had a sensitivity of 76.42% equivalent of the NS1 ELISA assays. Negative Percent Agreement with ELISA methods was 99.25%. Positive Percent Agreement was 92.75% for samples between 0 and 5 days post-onset of symptom

VIDAS® Anti-DENGUE IgM and VIDAS® Anti-DENGUE IgG NPA were 78.65% and 86.29% respectively. Combined PPA for these two VIDAS® assays was 91,91%.

PPA and NPA versus rapid tests were respectively 88.06% and 88.38% for NS1, 71.76% and 69.16% for IgM and 80.00% and 49.66% for IgG. For discrepant

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results, most were concordant with ELISA assays suggesting a higher performance of VIDAS® Dengue assays over rapid tests.

With an automated single test concept, VIDAS® Dengue solution shows as good a performance as ELISA for a reliable diagnosis of dengue.

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Can malaria mimic acute appendicitis? A case report

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BIOGRAPHY I'm MD and Infectious Diseases Specialist. I worked in 2016 for two months as a Volunteer Doctor according with UNHCR in Chios, in camps of Refugees. Then I worked as physician for 1 year at Centre for Tropical Diseases in Don Calabria-Sacro Cuore Hospital in Negrar (Verona) in order to manage an hospital clinic for the Asylum-seekers and Refugees. Now I'm working in Italy near Milan, especially in clinical care and treatment of marginal people: HIV patients, homeless, drug addicted, refugees, asylum seekers and migrants. I have achieved PhD in 2021 in Clinical Ethics with a research about Transcultural Medicine.

OBJECTIVE In Europe malaria is mainly an imported disease, mostly detected in people returning from visiting friends and relatives in sub-Saharan Africa.

METHODS We report an unusual case of falciparum malaria mistaken for acute appendicitis.

RESULTS A 32-year-old black woman was admitted to a nearby Hospital with fever and abdominal pain. She reported having returned from Paris a few days earlier. Blood tests showed elevated CRP, LDH, Liver Function Tests (LFTs) and thrombocytopenia (44,000 platelet/uL). An abdominal CT-scan revealed an inflamed appendix with pelvic effusions. Blood and urine cultures were inconclusive. Suspecting an acute appendicitis, the consulting general surgeon suggested an appendectomy, that was performed on the same day. Despite prompt surgery, patient remained febrile, so she was transferred to our Infectious Diseases Unit. After a more extensive anamnestic investigation, it was discovered that patient had been staying in Ivory Coast for 6 months before arriving in Paris, where she had remained for a few days only. Therefore, a peripheral smear for *Plasmodium falciparum* was immediately performed and tested positive, with a

percentage parasitaemia of 18%. Hence, intravenous artesunate was introduced and continued for 3 days, followed by oral piperazine tetraphosphate/artenimol for another 3 days. Treatment was well tolerated. On the 9th day since admission, peripheral smears became negative. Two blood transfusions were needed due to severe thrombocytopenia. The histopathology report from the appendix was negative for acute inflammation and only showed follicular lymphoid hyperplasia. Patient was discharged after twelve days. One-month follow-up was negative and platelet levels and LFTs had gone back to normal.

CONCLUSION Falciparum malaria clinical presentation is highly heterogeneous and can include abdominal symptoms. In view of such variability, accurate history-taking is fundamental. Malaria is still a clinical emergency, for which late diagnoses can lead to severe and life-threatening forms of the disease.

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Using malaria risk maps to support evidence-based decentralized malaria control planning in mainland Tanzania

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BIOGRAPHY Sumaiyya Thawer is a PhD student of the Analytics and Intervention Modelling Group at the Swiss Tropical and Public Health Institute (Swiss TPH). Her project aims to explore the utility of routine malaria data for malaria risk stratification and surveillance. Sumaiyya has over 4 years' experience working in Monitoring & Evaluation in Tanzania. She currently provides technical support to the National Malaria Control Program of

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mainland Tanzania for various malaria surveillance activities under the Towards Elimination of Malaria in Tanzania (TEMT) Project of Swiss TPH.

Control efforts in mainland Tanzania have led to a decline in the prevalence of malaria infection (PfPR_{6-59mo}) from 18.1% (DHS/MIS-2008) to 7.5% (MIS-2017). As transmission decreases, the heterogeneity of transmission increases and sub-national stratification becomes crucial for targeting interventions cost-effectively. In line with the World Health Organization High Burden to High Impact initiative, mainland Tanzania has employed a country-led data-driven approach to develop a sub-national malaria risk stratification. This approach was originally developed during the revision of the previous malaria strategic plan. The current plan (2021–2025) makes use of this evidence and advocates for tailored interventions through emphasizing (1) burden reduction strategies in moderate-high transmission areas and (2) elimination strategies in low-very low transmission areas. As the country moves towards implementation of targeted interventions, a more granular micro-stratification of malaria risk becomes valuable for further targeting of community-based interventions.

Combinations of routine data for the period 2017–2019 obtained from district health information system, along with modelled prevalence estimates (PfPR_{2to10}) at ward level were used. The council PfPR_{5to16} served as a guide to set appropriate cut-offs for the routine indicators through a misclassification sensitivity analysis. This allowed for allocating the 3,311 wards to one of four risk groups: very low, low, moderate and high.

Out of 3,311 wards, 405 were in very low strata (11% population), 794 in low strata (31% population), 640 in moderate strata (18% population) and 1,472 in high strata (40% population). The resulting micro-stratification revealed further heterogeneity within councils and identified wards that require focal interventions such as community-case management, indoor residual spraying and larviciding.

Micro-stratification can inform council health managers about the malaria situation in their respective wards, hence supporting an evidence-based decentralized malaria control planning. Such a framework will provide improvements in the allocation efficiency of malaria funding to maximize future impacts on disease burden.

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Filicidal activities, toxicity and phytochemical screening of two multipurpose plants: *Scoparia dulcis* and *Cylicodiscus gabunensis* used as local herbal medicines.

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BIOGRAPHY Samje Moses and Fidelis Cho-Ngwa are senior researchers in the ANDI center, while Edward Tiku is a PhD student and a research assistant in the same institution. This research team is involved in searching for drugs against Onchocerciasis. The team had partake in many drugs screening with international pharmaceutical companies and has an onchocerca drug lead, Auranofin that was screened and is undergoing clinical trials.

OBJECTIVES This study aimed at: searching for new and more efficient therapies against filariasis, by screening extracts of *Scoparia dulcis* and *Cylicodiscus gabunensis* for their antifilarial effects against adult and juvenile filariae and identify new sources for the isolation of macrofilaricidal compounds that could serve as drug leads against filariasis.

METHODS The hexane, methylene chloride and methanol extracts of *Scoparia dulcis* and *Cylicodiscus gabunensis* were prepared and tested in vitro on the bovine parasite, *Onchocerca ochengi* as well as *Brugia malayi* microfilariae (mfs). Adult female worm viability was determined biochemically by MTT/formazan colorimetry, while the adult male and microfilariae viability were determined by microscopy base on % inhibition of worm motility score. Cytotoxicity and acute toxicity of active extracts were tested on monkey kidney epithelial cells (LLC-MK2) and in Balb/C mice respectively.

RESULTS For *Scoparia*, the hexane extract recorded IC₅₀ of 50.78 µg/ml for the adult *Onchocerca* male and female parasites and 3.91 and 6.95 µg/ml for *Onchocerca* and *Brugia* microfilariae(mfs) respectively. While Methylene chloride extracts recorded IC₅₀ of 62.5 µg/ml and 60.57µg/ml for *Onchocerca* adult male and female respectively and 3.91 µg/ml and 3.0 µg/ml for *Onchocerca* and *Brugia* mfs respectively. The 50% cytotoxic concentration (CC₅₀) on the LLC-MK2 cells was 31.25 µg/ml for both extracts.

For *Cylicodiscus*, the hexane extract recorded IC₅₀ 21.44 µg/ml and 9.01µg/ml for *Onchocerca* and *Brugia* mfs respectively, while methylene chloride extract recorded 50.78 and 62.50 µg/ml for *Onchocerca* adult male and female respectively, 16.31 and 9.47 µg/ml for

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Onchocerca and *Brugia* mfs respectively. The CC50 was 3.0 and 6.5 µg/ml for hexane and methylene chloride respectively.

None of the plants extracts recorded acute toxicity, their phytochemical screening reveals the presence of alkaloids, flavonoids, sterols and, saponins, phenols.

CONCLUSION These results unfold potential sources for the isolation of novel anti-*Onchocerca* lead compounds and validate the traditional uses of the plants in Onchocerciasis treatment.

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Ultrasound overview of intracranial hypertension in childhood cerebral malaria in Kinshasa

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BIOGRAPHY Tshimanga Mutatshi Taty, Pédiatre

Né à Kinshasa, le 17/06/1973 Marié, père de 4 enfants. Etude universitaire fait à l'université de Kinshasa, département de Pédiatrie. Pédiatre depuis 2018. Domaine de recherche: maladie infectieuse.

Plusieurs formations suivie:

- Formation de diplôme de formation médicale spécialisée en pédiatrie au centre hospitalier Universitaire de Caen en France
- Formation en ligne sur le traitement antiretroviral "eSCART" à IMT ANVERS
- Plusieurs publications et conférences assistées.

Actuellement encours de formation sur la cardiologie pédiatrique et congénitale à l'université de Bordeaux. J'assume la fonction de médecin des urgences et soins intensifs à l'Hôpital pédiatrique de Kalembelembe.

INTRODUCTION: Intracranial hypertension (ICH) is present in the course of children being treated for cerebral malaria. IT is a contributor to neurologic morbidity and mortality in children less than 5 years of age. No study has evaluated ICH in a non-invasive way or determined

definitive mechaniscontributing to neurologic injury in our setting.

OBJECTIVE The study aim was to evaluate the pathologic neurovascular changes occuring in children with cerebral malaria.

METHODS The study was an observational study taking place from June 2015 until June 2017. The study was performed at KalembeLembe Pediatrics Hospital. A total of 160 children with retinopathy positive cerebral malaria were included and underwent serial transcranial doppler ultrasounds through hospital day 7 or until death, whichever occurred first. The results were compared to 155 control patients with severe malaria without neurologic symptoms.

RESULTS In the cohort of children with retinopathy positive cerebral malaria 40 (25%) had evidence of ICH on transcranial doppler ultrasound. Fifteen (37.5%, $P = .007$) and 14 (35%, $P = 0.014$) children children meeting the diagnostic criteria for microvascular obstruction and low flow, respectively, presented ICH . Overall mortality was 23.8%. Age ≤ 24 months, deep coma, hypoglycemia, impaired autoregulation and ICH on transcranial doppler ultrasound were predictors of mortality.

CONCLUSIONS Transcranial doppler ultrasound is a non-invasive tool we can use in resource limited settings to identify ICH during treatment for cerebral malaria. It also can be used to determine mechanisof neurologic injury during pediatric cerebral malaria and adapt treatments to specific neurovascular changes.

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Genotyping of the *Echinococcus granulosus* strain in endemic areas of Chile

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BIOGRAPHY Nicole Urriola – Urriola, has been working at the UCN School of Medicine since 2006. She has developed two lines of research studying some prevalent parasites in the region such as Echinococcosis in endemic rural areas, prevalence of intestinal parasites in dogs, among others. Another line of work that she has developed is the study of autochthonous strains of *Lactobacillus* spp., Isolated from goat cheeses.

Cystic echinococcosis (CE) or hydatidosis is caused by the parasite *Echinococcus granulosus* which is endemic to north-central and southern Chile, principally in farming areas. The genus *Echinococcus* has a complex genetic variability demonstrating ten genotypes (G1-G10) that

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have been isolated from different hosts. The present study was undertaken to determine the genotype of *Echinococcus granulosus* present in Chile. We analyzed 48 hydatid cysts using the PCR technique to amplify the Cytochrome C oxidase-1 (CO1) gene located in the mitochondrial genome of the parasite obtained from the following intermediate hosts: 23 sheep from the region of Magallanes; 3 goats, 5 cattle and 1 human cyst from the region of Coquimbo; and 16 cattle from the region of Araucania. Sequencing of the amplified products revealed two sequences that belonged to another species identified as *Taenia hydatigena* (QC1 and QC2). Phylogenetic analysis demonstrated the presence of *Echinococcus granulosus* sensu stricto, genotype G1, with G1A and G1D haplotype variants. Additionally, we found a G1 variant that was not identified in the GenBank database and it was denominated as G1CHI. The samples belonging to the region of Coquimbo were grouped with those from the regions of Araucania and Magallanes indicating movement of livestock between regions which correlates to a Sudden-Expansion Model. Analysis of the human cyst showed that it had a G1 genotype, therefore, public health policies should be implemented to prevent transmission to humans and if possible, to also control and/or eradicate the parasite from livestock and the definitive host.

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Evaluation of the CL Detect Rapid test and novel sampling methods for Cutaneous Leishmaniasis in Ethiopia

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BIOGRAPHY Saskia van Henten is a medical doctor from the Netherlands who is currently doing her PhD on diagnosis and treatment of cutaneous leishmaniasis in Ethiopia.

OBJECTIVE Cutaneous Leishmaniasis (CL) is common in Ethiopia and mainly affects people in rural areas. Diagnosis of CL routinely relies on invasive skin slits examined with microscopy, requiring trained staff and an equipped lab. A new rapid diagnostic test (RDT) for CL which may be used in the field has been validated for

other Leishmania species. Less invasive sampling methods such as an adhesive plastic tape disc that is placed onto the intact lesion have also become available. The performance of this CL detect Rapid Test and alternative sampling methods should be evaluated for Ethiopia.

METHODS In this diagnostic accuracy study, three sample types (tape disc, dental broach and skin slit) are taken from each patient with clinical suspicion of CL. Microscopy, PCR and RDT is done on skin slit samples, the dental broach sample is tested with the RDT and PCR and the tape is tested with PCR only. The sensitivity and specificity of different tests are calculated against a combined reference of microscopy and PCR on the skin slit.

RESULTS Interim results from 165 patients show that 94 patients had localized CL, 58 Mucocutaneous CL and 11 diffuse CL. Median lesion duration was 11 months and 66 (40.0%) had ulceration. Although specificity of the skin slit RDT was high (96.2, 95% confidence interval (CI) 81.1–99.3), sensitivity was low, at 31.3% (95% CI 23.9 – 39.7). The dental broach RDT had even lower sensitivity (22.7%, 95% CI 16.3 – 30.6). The tape discs, which were much less painful than skin slit (median pain score 1.0 and 6.0 respectively), showed 100% sensitivity but limited specificity (11.8%).

CONCLUSION The CL detect rapid test has very poor sensitivity, making it unsuitable for routine use in CL diagnosis. Tape disc samples seem promising as they are highly sensitive in combination with molecular tools.

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Towards a cross-NTD perception study toolkit: a prototype toolkit and implementation protocol developed in the field of leprosy

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BIOGRAPHY Anna van 't Noordende is a program support and PhD research officer for NLR. Her PhD study focuses on the perception of leprosy (assessment, impact and interventions at individual, family and community level).

OBJECTIVES A negative perception of leprosy and other neglected tropical diseases (NTDs) is a problem that is seen globally. It results in discrimination, social exclusion and widespread mental health problems. There is a need for a standardised toolkit to assess the different aspects of perception of leprosy or other NTDs, including essential knowledge of these conditions.

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METHODS AND RESULTS We developed the Perception Study Toolkit (PST) and a protocol for conducting such a study. This toolkit consists of four measures, a Communication Needs Assessment questionnaire, Knowledge Attitudes and Practices measures, the EMIC community stigma scale and the Social Distance Scale. It also comprises qualitative methods to investigate perception: the way people see leprosy, what they know about leprosy and their attitudes, beliefs and reported behaviour towards persons affected by leprosy.

CONCLUSIONS The PST can help identify specific beliefs, knowledge gaps, misconceptions and fears to inform community education and behaviour change interventions and can be used to monitor and evaluate such interventions. Using a standard toolkit like the PST would enable assessment of the perception of leprosy or other NTDs that would allow comparison across projects and countries including monitoring of changes over time.

III**A family-based intervention for prevention and self-management of disabilities due to leprosy, podoconiosis and lymphatic filariasis in Ethiopia**

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BIOGRAPHY Anna van 't Noordende is a program support and PhD research officer for NLR. Her PhD study focuses on the perception of leprosy (assessment, impact and interventions at individual, family and community level).

OBJECTIVE This proof-of-concept study aimed to develop and pilot a family-based intervention to support prevention and self-management of leprosy, lymphatic filariasis and podoconiosis-related disabilities in Ethiopia.

METHODS We used a pre/post intervention study design with a mixed methods approach. The study population included persons affected by leprosy, lymphatic filariasis and podoconiosis and their family members. All persons affected had visible impairments due to their condition. We collected physical impairment outcomes, data on activity limitations, stigma and family quality of life using the SALSA scale (range 0–80), the SARI stigma scale (range 0–63) and the Beach Centre Family Quality of Life

scale (range 0–125) and conducted in-depth interviews and focus group discussions. Quantitative data were analysed using paired t-tests, unequal variances t-tests, linear regression and binary logistic regression. Qualitative data were coded using open, inductive coding and content analysis.

RESULTS The family-based intervention consisted of self-management of disabilities, awareness raising and socio-economic empowerment. The intervention was delivered over several monthly group meetings over the course of several months. A total of 275 (100%) persons affected attended at least one session with a family member and 215 (78%) attended at least three sessions. There was no significant improvement in eye and hand problems after the intervention. However, foot and leg impairments, number of acute attacks, lymphedema and shoe wearing all significantly improved at follow-up. In addition, family quality of life significantly improved from 67.4 at baseline to 89.9 at follow-up for family members and from 76.9 to 84.1 for persons affected ($P < 0.001$). Stigma levels significantly decreased from 24.0 at baseline to 16.7 at follow-up ($P < 0.001$). Activity levels improved, but not significantly.

CONCLUSION This proof-of-concept study showed that the family-based intervention had a positive effect on impairments and self-management of disabilities, family quality of life and stigma.

III2**Changing perception and improving knowledge of leprosy in Uttar Pradesh, India: an intervention study**

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BIOGRAPHY Anna van 't Noordende is a program support and PhD research officer for NLR. Her PhD study focuses on the perception of leprosy (assessment, impact and interventions at individual, family and community level).

OBJECTIVES The aim of the present study is to describe the development and evaluation of interventions to increase the community acceptance of a study about a new preventive chemotherapy regimen for leprosy and improve the perception of leprosy in Fatehpur and Chandauli district, Uttar Pradesh, India.

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METHODS We conducted a pre-post intervention study. Two interventions were designed based on the six steps of quality intervention development (6SQuID): (1) posters for persons affected by leprosy and community members and (2) meetings with persons affected by leprosy, community members and influential people in the community. The effect of the interventions was evaluated by conducting a perception study before and after the interventions were implemented. The perception study consisted of in-depth interviews, focus group discussion the KAP measure, EMIC-CSS, SDS and an intervention evaluation tool.

RESULTS In total 1067 participants were included in the first survey and 843 participants in the second survey. In addition, post-intervention eight focus group discussions and 48 in-depth interviews were conducted. The effect size of the interventions was large for the KAP and EMIC-CSS and medium for the SDS. Effect sizes were larger in Chandauli district than in Fatehpur district. The largest effect was found on the KAP for persons affected by leprosy in Chandauli ($r=0.8$) and the smallest effect for the participants from Fatehpur on the EMIC-CSS ($r=0.1$). In the in-depth interviews and focus group discussions, many participants indicated that there had been a change in perception in the community. There was an association between the number of posters seen and the KAP ($n = 738$, $\rho=0.389$, $P < 0.001$), EMIC-CSS ($n = 539$, $\rho=-0.208$, $P < 0.001$), SDS ($n = 539$, $\rho=-0.203$, $P < 0.001$) scores in survey 2.

CONCLUSIONS Contextualized posters and community meetings were effective in changing the perception of leprosy and in increasing leprosy-related knowledge.

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Acceptability of Tiny targets for *Tsetse* Control in the rural communities of Yassa Bonga, Democratic Republic of Congo

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BIOGRAPHY Catiane Vander Kelen Is an Anthropologist research assistant working at the Institute of Tropical Medicine (Belgium) in the sleeping sickness team. She is

also undertaking a PhD on community participation in NTDs with the Liverpool school of tropical Medicine. Previous she had a significant experience working with different NGOs in humanitarian settings. She worked 5 years with Médecins Sans Frontières as Health Promotor in various countries for numerous projects of which Cholera in Haiti and Zambia, Ebola in West Africa and sleeping sickness in oriental province in DRC.

The National Programme for Human African Trypanosomiasis (HAT) or sleeping sickness elimination in DRC includes a large-scale vector control operation. For this operation newly designed Tiny Targets, small panels of cloth impregnated with insecticide deployed along water bodies, are used for controlling tsetse flies, which transmit the trypanosome parasites causing the disease. However, the effectiveness of the Tiny Targets is partly dependant on the acceptance of the local surrounding communities. In 2018, we conducted a qualitative research to explore Tiny Targets perception and acceptability

Research was conducted in two different village clusters: villages that were previously actively involved in the Tiny Targets deployment through a community-based project and villages where Tiny Targets were deployed by an external team. We conducted fourteen focus group discussions and seven semi-structured interviews in two clusters of three villages each in the Yasa Bonga health zone.

Our findings showed acceptability was better when communities were involved in the Tiny Targets deployment. In actively involved communities, awareness about Tiny Targets was satisfactory and all village chiefs endorsed the project, which promoted a positive perception of the Tiny Targets and their benefits. On the other hand, in communities that were uninvolved the communication was poor and community custom not respected, Tiny Targets were seen negatively as a potential danger linked to witchcraft which created a climate of anxiety.

This study clearly demonstrates acceptability factors are numerous and vary according to culture and context and have more chance to happen when community are involved. For this reason enough attention has to be given on how to involve people concerned when implementing activities to create the best condition for acceptability. This study particularly suggests that good awareness rising, involvement of local authorities and respect of social norms were key factors in the success of Tiny Targets deployment in DRC.

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Clinical manifestations and laboratory changes due to loiasis in an endemic cohort

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BIOGRAPHY Luzia Veletzky is an MD doing her PhD in clinical loiasis and her residency in tropical medicine. She has worked in Gabon on malaria, loiasis and other parasitic infections.

INTRODUCTION: The filarial disease loiasis is increasingly shown to be of public and individual health concern. Recently, evidence of associated mortality and morbidity has been published. Differences in clinical and immunological manifestations of infections between non-endemic and endemic populations as well as between microfilaremic and amicrofilaremic individuals have previously been described. However clinical data and understanding of the disease in the most affected, highly endemic populations is limited. This analysis explored the association between different states of loiasis infection, occurrence of symptom and laboratory changes in a large endemic cohort.

METHODS Data were gathered during a cross sectional survey in central Gabon. Volunteers were queried an extensive questionnaire on symptoms, concluding with history of eye worm. Concomitantly, midday blood sampling was performed and direct microfilariae diagnostics, as well as for co-infection including malaria and M. perstans, hemoglobin and white blood cell counts were done. For analysis, participants were grouped into distinctive infection states, including individuals with “no

sign for loiasis infection”, “microfilaremic” and “occult loiasis”.

RESULTS Analysis of symptom frequency revealed that microfilaremic loiasis was not associated with any of the queried unspecific symptoms, in contrary to occult loiasis which was associated with a range of symptom. Loiasis positive individuals had higher absolute and relative eosinophilia compared to loiasis negatives. Further, the extent of eosinophilia correlated with extent of microfilaremia.

CONCLUSION These data underline that Loiasis is not an asymptomatic infection in endemic populations. It rather manifests as different infection states presenting with distinctive outcomes and alterations of the cellular immune system. This diversity of outcomes may have contributed to the previous underestimation of the impact of loiasis. More clinical and immunological data are needed to understand the disease and in order to provide adequate public health interventions and treatment in endemic populations.

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Can we find tropical pathology in a Spanish ICU?

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BIOGRAPHY

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OBJECTIVE To increase awareness of tropical diseases in patients admitted to an ICU that might be fatal without an early diagnosis.

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METHODS A descriptive study of the tropical diseases found in patients admitted to a third level ICU was performed from January 1st 2010 until February 15th.

RESULTS Five cases of three different conditions were found:

Cerebral malaria: a 51 year-old male was brought to the ER because of fever and confusion after a migration tour through Equatorial Guinea. He had severe anemia, renal failure and lactic acidosis. Immunochromatography was positive for *Plasmodium falciparum* and thick smear confirmed the diagnosis. Initiating early treatment with intravenous artesunate led to a complete recovery.

Leptospirosis: Case 1: A 52 year-old female developed fever and shortness of breath 12 days after returning from a tourism trip to Thailand. Dyspnea rapidly progressed and pulmonary infiltrates were visible in chest X-ray. Echocardiography showed severe left ventricular systolic dysfunction. Case 2: a 40 year-old male from Bangladesh, sought medical advice because of fever and dyspnea. In both cases, serology for *Leptospira* spp. was positive. Antibiotic treatment with ceftriaxone and doxycycline plus i.v. corticosteroids was administered with good clinical response.

***Strongyloides stercoralis* hyperinfestation syndrome:** two immunocompromised patients were admitted, the first receiving methotrexate for rheumatoid arthritis while the second had AIDS. They both developed septic shock secondary to pneumonia and bacterial meningitis due to *E.coli* and *Klebsiella pneumoniae* respectively. Bronchioalveolar lavage showed filariform larvi of *S. stercoralis*. Treatment with ivermectin plus guided antimicrobial therapy was started. The first patient fully recovered; however, the second died in spite of intensive support care.

CONCLUSION Tropical diseases might appear as severe conditions that may pose a problem when not suspected. Raising awareness of physicians becomes a fact of key importance, in order to initiate early treatment.

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Leiomodin-1 antibodies in the serum and cerebrospinal fluid of persons with onchocerciasis-associated epilepsy

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BIOGRAPHY Melissa is a PhD student in medical sciences at the Global Health Institute, University of Antwerp, Belgium (The NSETHIO research group). The focus of her research is to decrease/stop the burden of the river epilepsy now called onchocerciasis associated epilepsy (OAE) by identifying the underlying mechanism of OAE.

OBJECTIVE Neurotoxic leiomodin-1 auto-antibodies cross-reacting with *Onchocerca volvulus* was suggested to trigger Nodding syndrome. Our study aimed to determine whether leiomodin-1 auto-antibodies play a causative role in onchocerciasis-associated epilepsy (OAE).

METHODS Serum and cerebrospinal fluid (CSF) samples of persons with nodding syndrome and other forof OAE were screened for leiomodin-1 antibodies by a cell-based assay (CBA) and western blot (WB). Furthermore, these samples were investigated for the presence of auto-antibodies cross-reacting with rat brain tissue by immunohistochemistry. Additionally, immunohistochemistry was used to detect leiomodin-1 protein in post mortem brain samples of persons who died with OAE.

RESULTS By CBA, leiomodin-1 antibodies were detected in 6 (9%) of 68 persons with OAE compared to 14 (23%) of 60 controls without epilepsy ($p = 0.024$). By WB, these antibodies were detected in 19 (45%) of 42 persons with OAE (including 4 (9.5%) with nodding seizures) and 23 (61%) of 38 controls without epilepsy ($P = 0.17$). Leiomodin-1 antibodies were not detected in 12 CSF samples from persons with OAE. Moreover, leiomodin-1 was only detected in capillary walls in post-mortem brain tissue and not in brain cells. Finally, no specific pattern was identified on rat brain slides with serum samples from persons with OAE or controls from persons with or without *O. volvulus* infection.

CONCLUSION Our data does not support OAE to be an auto-immune disorder caused by leiomodin-1 antibodies.

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Risk of transmission of arboviruses, and *Aedes aegypti* breeding eco-bio-social factors and susceptibility to insecticides in disease foci, Côte d'Ivoire

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BIOGRAPHY Julien Zahouli is currently the Good Laboratory Practices (GLP) study director of vector control programme at Centre Suisse de Recherches Scientifiques (CSRS) in Côte d'Ivoire. He is also a postdoctoral fellow at Swiss Tropical and Public Health Institute (Swiss TPH) in Switzerland. Julien completed a PhD in Epidemiology at University of Basel and Swiss TPH in 2017. Then, he returned back home (Côte d'Ivoire) where he conducts and supports several projects. His research interests include anthropogenic impacts (deforestation, agriculture, urbanization and insecticide) on *Aedes* mosquito ecology and insecticide-resistance and (re-)emergence of arboviruses (dengue, yellow fever and Zika) in Africa.

OBJECTIVE *Aedes aegypti* mosquito is a main arbovirus vector in Africa. In Côte d'Ivoire, *Ae. aegypti* arbovirus vector control is limited and multiple dengue and yellow fever occurred. We thus assessed arbovirus transmission risk, *Aedes aegypti* breeding eco-bio-social determinants and susceptibility to insecticides in disease foci in Côte d'Ivoire.

METHODS We sampled *Ae. aegypti* larvae and breeding containers and household socio-ecological data in two rubber tree areas (Koffikro and Samo), two oil palm areas (Ehania and Agbaou) and two urban neighbourhoods (Bingerville and Cocody) in Abidjan, Côte d'Ivoire from June to December 2020. *Stegomyia* indices (container index: CI, household index: HI and Breteau index: BI) were determined. Additionally, we tested *Ae. aegypti* larvae and adults against biolarvicide (*Bacillus thuringiensis*: Bti) and insecticides (DDT, malathion, lambda-cyhalothrin, permethrin and deltamethrin). Mortality was recorded.

RESULTS The most productive *Ae. aegypti* breeding sites were tyres, discarded cans, water storage containers and rubber latex collection cups. *Stegomyia* indices were highest in urban areas, followed by rubber areas and oil palm areas, with HI of 98.3, 81.2 and 67.82 CI of 69.7, 57.3 and 29.5 and BI of 99.7, 65.9 and 13.8, respectively. *Ae. aegypti* larval infestation was correlated with complex community behaviours, including water storage practices and solid waste management. *Ae. aegypti* breeding sites' positivity was associated with unmanaged solid waste, water supply interruptions, water storage duration and insecticide-susceptibility status. *Ae. aegypti* was susceptible to Bti, lambda-cyhalothrin and malathion (mortality rate: ~100%) in all areas, but showed possible resistance to deltamethrin (mortality: 87.3–90.8%) rubber and oil palm areas and resistance to DDT (mortality: 57.3–

60.1%) in Abidjan and permethrin (mortality: 79.5–85.4%) in rubber and oil palm areas.

CONCLUSION In Côte d'Ivoire, *Ae. aegypti* larval indices and dengue and yellow fever transmission risk were correlated with socio-ecological factors and insecticide-resistance level. Integrated community-based vector control is recommended.

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***Strongyloides stercoralis* seroprevalence in a migrant population with autoimmune diseases (AID)**

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BIOGRAPHY Internal Medicine Consultant. Infectious Diseases Screening and Vaccination in Immunosuppressed patients Unit.

OBJECTIVES Following migration from endemic to non-endemic regions, people remain at high risk for adverse sequelae from *Strongyloides* infection; these complications are more frequent in immunocompromised persons. We describe the characteristics of a migrant population with AID visited in a infectious diseases screening unit, seroprevalence of *Strongyloides*, correlation of serology with stool sample results and we analyse factors associated to positive results.

METHODS From May 2019 to January 2021 41 patients were screened. Patients were tested for *Strongyloides* with IgG indirect enzyme-linked immunosorbent assay (ELISA) and 3 stool samples. Serology results reported as negative (<0.1), intermediate (non-negative but not reaching the laboratory defined cut-off for a clearly positive result) or positive (>=1.01). Factors related to positive, negative or intermediate serology were analyzed by bivariate analysis.

RESULTS 28 women, 13 men were screened. Median age was 43.5 years. 9 from Asia, 4 from Africa and 28 from Central and South America. Time from immigration to screening was 14 years and from AID diagnosis 6.69 years. 32 (78%) were receiving immunosuppressive treatment or had previously received. Only 18 patients handed in all 3 stool samples. Serology results were: 3 (7.3%) positive, 10 (24.3%) intermediate and 28 negative (68.2). 1 patient with intermediate result (0.19) had positive stool test. Positive results were associated with eosinophilia; intermediate results were not. However, our patient with intermediate serology and positive stool test presented with 1417/mm³ eosinophil count. No

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significant associations were observed between different serology status and age, sex, place of origin, immunosuppressive treatment at first consultation, latent TBC, occult hepatitis B.

CONCLUSION 8.5% of our patients had a definite diagnosis of *Strongyloides* infection. Intermediate serology can be associated with *Strongyloides* infection thus undelining the difficulty of its interpretation and should be assessed individually. Larger studies are needed to properly define the role of serological screening in immunosuppressed patients.

390**The relationships between rural and urban environments on arsenic consumption in Bangladesh drinking water**

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BIOGRAPHY Ramota Adelakun in a 2nd year ESRC-BBSRC Soc-B PhD student at UCL.

Her current research is interdisciplinary, focusing on arsenic contaminated drinking water and evidence based policy in Bangladesh. She is interested in conducting research that bridges the gap between biological and social sciences.

Prior to joining UCL, Ramota received her Bsc in Biological Sciences from Kingston University and Msc in Tropical Disease Biology from the Liverpool School of Tropical Medicine.

Safe drinking water is a human right and long-established goal of various national and international policies. Bangladesh has traditionally relied on surface water as their main source of drinking water, however bacterial and parasitic contamination resulted in a majority switch to the use of tube-wells. At the time of installation, tube-wells were determined to be the safest access to clean water. By the 1990s it became clear that tube-wells were contaminated with arsenic. Arsenic is a naturally occurring element which causes detrimental health effects when consumed in high amounts (>10 parts per billion). Policy measures have been introduced over time to decrease arsenic consumption.

This study seeks to understand how drinking water sources have fluctuated between 1999–2019 in rural and urban areas of Bangladesh. Available data from the Demographic Health Survey (1999–2017) will be used to establish drinking water source patterns in rural and urban areas. Data from three waves of MICS data sets (2006, 2012, 2019) will be used to determine changes in

consumption of arsenic based on region and districts over time. These are the largest available data sets.

The results will show the distribution of tube-well water consumption in rural vs urban areas and the prominence of alternative drinking water sources over time using DHS data. The MICS data will be used to determine the changes in arsenic consumptions regionally and by district. These will be presented comparatively against completed notable national policy measures to reduce arsenic consumption.

Arsenic policy measures are implemented nationally, with varying degrees of efficacy across regions. These results will provide a preliminary analysis into the quantitative impact of policy measures on consumption over time. The data from this study can be used to identify failures of policy measures and inform future policy plans.

335**Determinants of reported antibiotic usage trends among sick children across low-and-middle-income countries in 2005–17: an analysis of user characteristics**

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BIOGRAPHY Gbemisola Allwell-Brown (GA-B) is a doctoral student at the Department of Women's and Children's Health, Uppsala University, Sweden. In her research, she examines global trends in antibiotic use among children from low- and middle-income countries (LMICs), including socio-demographic differentials in antibiotic usage patterns over time in these settings. She is also involved in research aimed at promoting antimicrobial stewardship in Uganda.

GA is a physician with clinical experience in Nigeria. Her broader research interests are in health systems and global child health, particularly childhood fever management.

OBJECTIVE This study aimed to analyse reported antibiotic use for children under five years of age with fever, diarrhoea or cough with fast or difficult breathing (outcome) from low- and middle-income countries (LMICs) in 2005–17 by the following user characteristics: rural/urban residence, maternal education, household wealth and healthcare source visited.

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METHODS Based on 132 Demographic and Health Surveys and Multiple Indicator Cluster Surveys from 73 LMICs, we estimated the outcome by user characteristics for all country-years using a hierarchical Bayesian linear regression model.

RESULTS Across LMICs in 2005–17, the greatest relative increases in the outcome occurred in rural areas, poorest quintiles and least educated populations, particularly in low-income countries and South-East Asia. In low-income countries, rural areas had a 72% relative increase from 17.8% (Uncertainty Interval (UI): 5.2–44.9) in 2005 to 30.6% (11.7–62.1) in 2017, compared to a 29% relative increase in urban areas from 27.1% (8.7–58.2) in 2005 to 34.9% (13.3–67.3) in 2017. Despite these increases, the outcome remained consistently highest in urban areas, wealthiest quintiles and populations with the highest maternal education.

CONCLUSION Our estimates suggest that the increasing reported antibiotic use for sick children under five years of age in LMICs in 2005–17 was driven by gains among groups often underserved by formal health services.

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Control of antimicrobial resistance in Cameroon: Analyzing the feasibility of implementing the National action plan

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BIOGRAPHY I am a Medical doctor by profession and a Public health specialist who has worked both at the primary level of the Cameroon health system. I currently work as a laboratory-clinic interface officer for Global Health Systemsolutions, Cameroon, an international NGO involved in health system strengthening, where I have acquired demonstrated experienced leading diverse team of healthcare professionals to design, implement and evaluate evidence-based public health initiatives with clinical components. I am also passionate about research with special interest in antimicrobial resistance, which is currently among top threats to global health.

OBJECTIVE WHO has developed a Global Action Plan (GAP) and has urged all countries to develop and implement a National Action Plan (NAP). We analyzed the implementation of the Cameroon NAP by identifying the

prioritized activities and assessing possible implementation challenges.

METHODS We conducted a review of national documents on the control of AMR, including regulations, policies, guidelines and assessed the health system structure. Publications and other supporting documents were obtained by a systematic literature search. We applied the policy analysis triangle framework and the Theory of Change to analyze the NAP, actors involved and the process of implementation.

RESULTS The NAP consisted of 6 strategic OBJECTIVES, with the first five a direct translation of the five pillars of the GAP. Several gaps were identified. There was no timeline of activities set per year; the chronology of activities was not consistent, there were no activities or OBJECTIVES to ensure the sustainability of the NAP like creating awareness on AMR and there were no indicators for impact evaluation included. Among the actors involved, the Ministry of Public Health had the highest interest in the implementation as the lead stakeholder to oversee the overall implementation. However, there was no clear source of funding and stakeholders at the primary level of the various sectors responsible for implementation were not clearly defined.

CONCLUSION Despite adequate multisectoral collaboration within the prioritized activities relevant to Cameroon, more is needed for effective implementation of the NAP. The timeline of the different activities, as well as the involvement of key stakeholders at the primary level, needs to be improved. The government's overall commitment to healthcare should be increased and implementation of an action plan should commence at the district or regional level while challenges in mobilizing the necessary funds need to be overcome.

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Antibiotic sensitivity and biofilm formation in enterococcal urinary infections, a comparison between strains from Spain and Uganda

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BIOGRAPHY Graduated in Pharmacy (Universidad Complutense de Madrid)

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OBJECTIVE *Enterococcus faecalis* and *Enterococcus faecium* are ubiquitous members of the human gut microbiota and have become the second most common agents of nosocomial diseases due to their constantly growing resistance. Enterococcal infections are associated with biofilms, which are intrinsically tolerant to antimicrobials and thus are a serious impediment for treating infections. Our objective was to compare and relate the capacity to form biofilm and the antimicrobial sensitivity of strains isolated from patients with urinary tract infection in a rural hospital in Uganda and a secondary hospital in Spain.

METHODS Prospective study conducted at the Saint Joseph Kitgum hospital (Uganda), Hospital Principe de Asturias (Spain) and Hospital Universitario Fundación Jiménez Díaz (Spain), which includes *Enterococcus faecalis* and *Enterococcus faecium* isolated from patients with suspected UTI and who presented leukocyturia. All microorganisms were identified in Spain by MALDI-TOF. Antimicrobial susceptibility studies were carried out using the Vitek® 2 system (Biomérieux, France). The biofilm formation capacity was studied following the protocol of Stepanovic et al. (APMIS. 2007 Aug; 115 (8): 891–9), by photospectrometry using 2% crystal violet.

RESULTS: A total of 49 *Enterococci* strains in Uganda (32 *E. faecium* and 17 *E. faecalis*) and 55 strains in Spain (51 *E. faecalis* and 4 *E. faecium*) were isolated. The results of the sensitivities were very close between the strains obtained in both countries. The antibiotics with lower resistance were nitrofurantoin and Imipienem (5–10%). We have found a significant association between a higher biofilm formation and higher levels of resistance to gentamycin (*P*-value 0.014 *E. faecalis*, 0.034 *E. faecium*).

CONCLUSIONS: A high incidence of urinary tract infection caused by *Enterococcus faecium* has been found in Uganda. A higher biofilm formation was associated with resistance to gentamycin. It is recommended to start using antibiotics such as nitrofurantoin because the high susceptibility founded in the studied strains.

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High antibiotics prescription among febrile patients in Forécariah rural health district in Guinea: a four-year retrospective study, 2014–2017

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BIOGRAPHY Delamou (MD, MPH, PhD) is Associate of Public Health (Preventive Medicine), Head of the Public Health Chair and Director of the Africa Centre of Excellence for the Prevention and Control of Communicable Diseases (CEA-PCMT) of the University Gamal Abdel Nasser of Conakry. He carries more than 15 years of experience in managing and coordinating research projects and programmes in Guinea and Africa. Delamou is a member of the National Scientific Committee on COVID-19 and the National Ethics Committee in Guinea. He has co-authored several peer-reviewed scientific papers, including 73 indexed to date in PubMed: <https://www.ncbi.nlm.nih.gov/pubmed/?term=delamou+a>

OBJECTIVE Resistance to antibiotics constitutes a significant global public health threat, fuelled by overconsumption of antibiotics. This study aimed to describe the frequency of antibiotic prescription among febrile patients in the rural health district of Forécariah in Guinea.

METHODS This was a cross-sectional study using routinely collected data in health facilities from 2014 to 2017. We used the WHO model list of essential medicines to assess antibiotics prescription. Their prescription trend was compared between years using the chi-square test and a level of significance set at 5%.

RESULTS Overall, 18,719 patients presented with a reported or documented fever, accounting for 55.0% of the total number of consultations for any cause. The median age was ten years (IQR: 3–26). About 45% had 15 years or more. Under-five years old (35.7%) were the most represented. Respiratory (38.5%) and gastrointestinal (37.0%) syndromes were the most common presenting syndromes. Overall, malaria was diagnosed in 58.6% of patients. Regarding antibiotic prescription, overall prevalence was 51.1%, with an increasing trend among under five years old (60.7%), patients with respiratory (80.9%), urogenital (79.0%) and cutaneous (72.4%) syndromes. Moreover, the most prescribed classes of antibiotics were beta-lactams (42.0%), metronidazole or sulfamethoxazole-trimethoprim (41.7%) and fluoroquinolones (13.9%). Meanwhile, the Access group

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accounted for the highest prescription (82.2%), followed by the Watch group (19.7%). Use of Watch group antibiotics and the prescription of two or more antibiotics doubled over time.

CONCLUSION The antibiotic prescription was high among under five years and patients with respiratory symptoms. Besides, the prescription of two or more antibiotics and antibiotics from the Watch group doubled over the study period. This calls for a prospective assessment of the causes of fever and high antibiotic consumption in Guinea.

131**The relationship between health and infra structure among vulnerable groups in LMICs**

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BIOGRAPHY Arne H Eide is Chief Scientist at SINTEF Digital and at NTNU. He has 25 years of experience in research on disability and poverty, community-based rehabilitation and studies on living conditions in low-income countries. Eide has had different international expert roles on Disability statistics, Disability and Development and on Provision of assistive technology to low-income contexts. Eide is currently engaged in the GATE initiative led by WHO, global data collection on assistive technology and member of the Editorial Committee for the Global Report on Assistive Technology.

Water, sanitation and energy (electricity) are at the very core of sustainable development, critical to the survival and well-being of people and reflected in Sustainable Development Goal (SDG) number 6 (access to clean water and sanitation) and 7 (access to renewable energy), with direct relevance for SDG no 3 on health and well-being. Access to clean water, good sanitation and electricity for cooking and lighting is a key element in creating healthy environments. The vulnerable poor population in LMICs often do not have access to these basic necessities, or access may be limited and of poor quality. While health is not evenly distributed in any population, lack of infrastructure may aggravate the situation for vulnerable sub-populations further and be a key determinant for ill health and functional difficulties in contexts with limited health services and endemic poverty. We will present analyses of the relationship between health, functional difficulties and access to basic infrastructure. The overall hypothesis is that both health and functional difficulties are associated with access to water, sanitation and

electricity. The data is drawn from a series of ten national, representative household surveys in sub-Saharan Africa and Nepal, including both individuals with and without functional problems and different measures of physical and mental health. A regression model including functioning, physical and mental health, access to infrastructure, socio-demographic and socio-economic variables will be developed and tested statistically. It is expected that the results will provide new knowledge on the importance of infrastructure on health and well-being and to what extent vulnerability adds to the expected negative effects of poor infrastructure. This will contribute to the discussion on how to include vulnerable groups into broad poverty alleviation program

216**Skin diseases among building construction workers in Dar es Salaam, Tanzania**

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Serving community, setting intervention and policy making for better workplace environment

OBJECTIVES The study aimed at assessing prevalence of occupational skin diseases, associated factors and preventive measures among building construction workers in Dar es Salaam, Tanzania.

METHODS Construction sites and participants were selected using Simple random sampling. Nordic Occupational Skin Questionnaire (NOSQ) was adapted and used for assessing development of skin diseases among construction workers. Analysis of categorical variables, associated factors and skin preventive measures was done using Chi-square tests. Bivariate and Multivariate logistic regression analyses were performed to determine odds ratio and adjusted odds ratio for factors that indicated to influence the occurrence of skin diseases.

RESULTS The study population consisted of 420 building construction workers from different sites with the mean age of 32.7 years. The participants were masons, assistant masons and carpenters. The mean work duration was 6 years. Prevalence of skin diseases was 228(54%) among the workers. Carpenters had higher prevalence of skin diseases 12(67%) followed by assistant masons 43 (64%). Timely provision of safety trainings to workers,

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PPE utility, training and guidance lowered the occurrence of skin diseases.

CONCLUSION High number of construction workers experienced skin diseases, especially those who have worked for more than 4 years. Workers who received safety training before the work shift had lesser prevalence of skin diseases compared to those who did not.

483**A review of Epidemiological trends of antimicrobial resistant Enteric fever in Pakistan**

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BIOGRAPHY Shoaib Hassan is a medical doctor by training and specializes in Epidemiology. In the past, has been working in field settings to respond infectious disease outbreaks. Moreover, Hassan's work in setting up and evaluating surveillance system has been appreciated. Currently, he follows ambitions to utilize modern epidemiology and economic methods to understand the socioeconomic implications of infectious diseases.

OBJECTIVE Multi and extensive drug-resistance enteric fever cases reported globally are often linked to global-travels. Therefore, a literature review was conducted to estimate prevalence, epidemiological-trends and geo-mapping such reported-cases in highly-endemic Pakistan.

METHODS To overcome limited publications, we expanded literature search to PubMed central, grey-literature and reports from MOH in Pakistan. Resulting data was extracted and compiled in excel. For additional analyses and geo-mapping STATA and QGIS were used, respectively.

RESULTS Literature-search short-listed 59 articles however, 37 contained required quantitative information for the pre-set variables. Majority articles (82%) reported Aenteric fever were published within Pakistan. While publications from other countries also reported Acases associated with Pakistan; mainly from USA (6%). The Aenteric fever were spread across Pakistan mainly children and males. The drug resistant Enteric fever cases were also linked with travels to Pakistan. The health-facility based studies were from the major tertiary-care hospitals in urban areas. The literature did not highlight prevalent risk factors, endemicity or outbreak-related dynamics. About 44% of the *S. typhi* isolates were Mto the first-line therapy (Ampicillin, Chloramphenicol and Sulfamethoxazole/Trimethoprim). In comparison, the identified multi-drug resistance to first-line therapy for *S. paratyphi* isolates was relatively low (25%). In addition

to the *typhi* and *S. paratyphi*, we came across an unprecedented event of extensively drug resistant (XDR) *S. typhi* outbreak in Pakistan. Only 10% literature suggested any control and prevention efforts.

CONCLUSION This literature review, the first of its kind addresses this gap and has brought forward the descriptive epidemiological trends of Aenteric fever associated with Pakistan. Lack of a structured surveillance system for enteric fever cases especially drug-resistant has also been found. Unless population-level research and control strategies are introduced, prevention of MDR-enteric fever may not be achieved in near future.

134**Utilisation of diagnostics in India: A rapid ethnographic study exploring context and behaviour**

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BIOGRAPHY Bronwen is a global health professional specialized in the field of antibiotic resistance. Currently she is a PhD candidate interested in implementation of evidence-based practices to improve the use of antibiotics. Her research investigates the use and utility of existing diagnostics to determine bacterial from non-bacterial cause of illness and target antibiotic use. Focusing on context, she has employed rapid ethnography to broaden the understanding of the complexity in diagnostic utilization in Ujjain, India. She is also investigating the utility of C-reactive protein to identify bacterial cause of infection in febrile children and adults, in the same setting.

OBJECTIVES To explore factors that influence behaviour in the utilisation of diagnostics by caregivers of sick children. Utilisation is defined as a caregiver assisting a child to get diagnostic tests done and return for follow-up of results. Understanding these experiences may help inform the development of interventions and implementation strategies to improve the use of diagnostics, thereby target treatment and optimise antibiotic use.

METHODS A rapid ethnographic qualitative study using three months of unstructured observations, one-month of structured observations of diagnostic utilisation and 43 semi-structured interviews, at the paediatric outpatient department of a teaching hospital in rural, central India. Interviews were conducted with caregivers of sick

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children attending the paediatric outpatient department who were sent for one or more diagnostic test. Transcripts were coded and analysed using inductive thematic analysis. Findings were explored from a behavioural perspective through the lens of the COM-B model for understanding behaviour. The multiple methods of investigation applied allowed for triangulation and cross-validation of the findings.

RESULTS Three key themes were identified that influenced caregivers' behaviour. Caregivers trusted and understood the importance of diagnostics but their acceptance wavered depending on the severity of illness and preference to treat their child directly with medicines. Caregivers struggled to access diagnostics, describing delays in testing, receiving results and follow-up, further complicated by travel time, distance and competing priorities such as work. Diagnostics were relatively cheap compared to other healthcare facilities however, the cost of the test, travel expenses and wages lost for missing work, were barriers to getting the tests done and returning for follow-up.

CONCLUSIONS Diagnostics are generally accepted and their purpose understood however, the organization of diagnostic services, direct and indirect costs hinder caregivers from utilizing diagnostics. Improvements in accessibility and affordability may increase caregiver motivation to utilise diagnostics and return for follow-up.

235**Strengthening Diagnostic Laboratories in Rural Ghanaian Hospitals – An Integrated Approach to Tackle Antimicrobial Resistance**

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BIOGRAPHY Maike Lamshöft obtained her MSc in Public Health at Charité Berlin and has worked as an infectious disease epidemiologist and counselor in the field of reproductive health before joining the Bernhard Nocht

Institute as project manager in several multi-country research projects in sub-Saharan Africa. Current research interests are the epidemiology, diagnoses and treatment of febrile and diarrhoeal illnesses in children in Ghana and Tanzania, antimicrobial resistance and intervention trials.

OBJECTIVE Antimicrobial resistance (AMR) is a growing concern worldwide and compromising the treatment of common infections. Sub-Saharan Africa (SSA) faces a high infectious disease burden and shortfall of diagnostic facilities; Asurveillance data exist from only 43% of SSA countries.

METHODS We designed a 77m² model microbiology laboratory for low-resource settings, staffed with two technicians and equipped with generator, autoclave, incubators, laminar flow cabinet, automated blood culture systems, microscopes and freezers; and established the buildings on the premises of Agogo and Assin Fosu district referral hospitals, serving a population of 378k. Data are captured following the Global Antimicrobial Resistance Surveillance System (GLASS) guidelines.

RESULTS The laboratories are fully operating since 2019 and 2020, with an increasing number of routine patient samples (blood, urine, stool) to confirm the clinical diagnosis including pathogen identification and antibiotic susceptibility testing. From an average of 113 samples each month, *E.coli*, *Salmonella enterica* and *S.aureus* are the most frequent isolates; highest rates of positive blood cultures are found in neonates. Resistances to first and second line antibiotics are common; of particular concern are high frequencies of extended-spectrum beta lactamase (ESBL) positive *K. pneumoniae* and *E.coli* conferring resistance to third-generation cephalosporins. The system is continuously evaluated in regards of quality and timeliness and flanked by Point Prevalence Surveys of antimicrobial use in the hospital (GPPS) and surveys among nurses, clinicians and pharmacists to tailor antimicrobial stewardship programs.

CONCLUSION A microbiology laboratory embedded into the routine hospital environment provides important information for action: the early diagnosis and treatment of patients and close monitoring of emerging drug resistances in rural Africa. In the long run, the system will have to prove its full potential for the detection of (nosocomial) outbreaks and emerging pathogens requiring prompt control measures. Molecular typing methods will help identifying reservoirs and transmission routes.

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Imported purulent skin infections in Berlin, 2011–2020: the need for regionally targeted antimicrobial stewardship

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BIOGRAPHY andreas Lindner works at the Institute of Tropical Medicine and International Health, Charité – Universitätsmedizin Berlin. andreas is a specialist in Infectious Diseases and Tropical Medicine. He completed a Master in Tropical Medicine and International Health as well as a further Diploma at the London School of Hygiene and Tropical Medicine. He has worked for Médecins Sans Frontières in Central African Republic, Chad, Republic of Congo, South Sudan and Myanmar. His research focuses on neglected tropical diseases and vulnerable populations.

OBJECTIVE Antimicrobial resistance (AMR) may complicate the treatment of imported skin and soft tissue infections (SSTIs). StaphTrav (www.staphtrav.eu) is the European surveillance network for *Staphylococcus aureus*, including the virulence factor Panton-Valentine leucocidin (PVL), imported by purulent SSTI in intercontinental travellers.

METHODS Data of all patients contributed to StaphTrav by Charité Institute of Tropical Medicine and International Health in Berlin was analysed over a 10-year period (2011–2020) and complemented with information on antimicrobial treatment and *Streptococcus pyogenes* from retrospectively reviewed charts.

RESULTS/CONCLUSIONS 254 *S. aureus* (54% PVL-positive) and 139 *S. pyogenes* isolates were identified. Amoxicillin/clavulanate (25%), amoxicillin (13%), ciprofloxacin (12%), cefuroxime (10%) and doxycycline (8%) were most frequently prescribed among 154 empirical antimicrobial prescriptions of pre-treating physicians. For amoxicillin/clavulanate treatment, oxacillin resistance (MRSA) ranging from 13–31% (highest in Latin America) has to be encountered. About 80% of *S. aureus* isolates were resistant to penicillin. Ciprofloxacin (last line antibiotic, serious side effects) and cefuroxime (poor oral bioavailability) are not recommended for SSTI; both are drivers of MRSA and *Clostridioides (C.) difficile*. Tetracycline resistance in *S. pyogenes* was abundant, particularly after

exposure in South-East Asia (83%), South Asia (62%) and Africa (68%), but also remarkably for *S. aureus* in Africa (26%) and in Latin America (19%).

We adopted regionally targeted antimicrobial therapy of our patients with purulent SSTI. If antimicrobial treatment is required, we favor trimethoprim-sulfamethoxazole after exposure in Latin America (*S. aureus* R=6%) and South-East Asia (*S. aureus* R=13%), but not in Africa (*S. aureus* R=42%) and South Asia (*S. aureus* R=36%). We favor clindamycin after exposure in Africa (*S. aureus* R=5%), despite an increased risk of *C. difficile* infection. We favor amoxicillin/clavulanate after exposure in South Asia (*S. aureus* R=15%), as we observed for clindamycin also considerable *S. pyogenes* resistance in this region. Future recommendations should take different Apatterns in tropical regions into account.

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Panton-Valentine leucocidin (PVL)-positive *Staphylococcus aureus* skin infections: patients' perspective on quality of life and quality of medical care

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Chad, Republic of Congo, South Sudan and Myanmar. His research focuses on neglected tropical diseases and vulnerable populations.

OBJECTIVE The virulence factor Panton-Valentine leucocidin (PVL) is associated with severe and recurrent *Staphylococcus aureus* skin infections. PVL pathogenicity is poorly understood, the exotoxin is still unknown to many physicians and the psychosocial burden for infected patients has not yet been evaluated.

METHODS As part of a prospective observational study, investigating the risk of transmission from infected returning travellers to close contacts, the quality of life (QoL) of diseased individuals and their previous medical care were assessed. The study took place at the Charité Institute of Tropical Medicine and International Health in Berlin (02/2019–12/2020). At the end of the observational period, 3–12 months after successful decolonisation, patients were interviewed with an adapted version (without limited recall period) of the Dermatology Life Quality Index (DLQI) scale and additional questions.

RESULTS The 34 patients interviewed had a median number of 3 [1–20] clinical episodes, with a median disease duration of 3.5 [1–84] months. The mean DLQI score was 17.2 (SD 7.4), indicating a very large effect on patients' QoL. For comparison, psoriasis is considered severe at a DLQI score >10. Among our patients, 79% were very much or concerned a lot about infecting private contact persons; 56% felt that their mood was very much or depressed a lot; 24% had a significant impairment of QoL for ≥6 months. Despite an average of 2.1 (SD 1.9) pre-treating physicians, wound swabs were taken in only 45% and the PVL-diagnosis was established only in 16% of patients. Most patients (86%) had the impression that their pre-treating physicians were poorly/very poorly informed about the disease.

CONCLUSION PVL-positive *Staphylococcus aureus* skin infections can have a major impact on QoL, often for months and beyond the period of infection. Increased awareness for early diagnosis and treatment is required to reduce morbidity and psychosocial burden of this neglected disease.

156**The rise of bottled water as the primary drinking water source in the Dominican Republic**

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Sciences and Psychiatry at the University of Calgary in Canada. He is a public health specialist and child psychiatrist. He has worked on child and public health projects in the Dominican Republic with non-governmental agencies for over 25 years with a special focus on patterns of use of drinking water.

OBJECTIVE Reliance on bottled water as a primary drinking water source is increasing in low-and middle-income countries (LMICs) despite the associated costs and alternative possibilities. The Dominican Republic (DR) has one of the highest bottled water use rates among LMICs. This study aimed to describe the growth of relying on bottled water in the over time and its relationship to contextual variables.

METHODS Data on primary drinking water sources were extracted from Demographic and Health Surveys and Multiple Indicator Cluster Surveys from the from 1991–2014 (awaiting 2019 data). Trajectories by potentially influential variables were determined (e.g., rural/urban residence, source of water for non-drinking purposes, wealth).

RESULTS In 1991, 9.0% of households reported relying on bottled water as their primary drinking water source. There was then a steep rise over the next 11 years (4.2% of households/year) followed by a plateau for the next five years, followed by another steep increase (3.7% of households/year) resulting in a prevalence of 83.0% of households in 2014. This expansion has occurred despite increased availability of tapped water in households (now over one-half of households). Although reliance in urban areas is consistently higher than rural areas at all data points, the urban:rural ratio has fallen from 20.3 (1991) to 1.4 (2014). There is a clear relationship with wealth, however, over half of the poorest quintile reported bottled water as their primary drinking water source in 2014, with almost all of the richest quintile relying on bottled water (97.5%) at that time point.

CONCLUSIONS The patterns identified in the may reflect future trends in other countries where availability of acceptable and safe drinking water from public sources becomes increasingly limited. Further study is needed to determine the health and financial costs of this trend both in the and in other LMICs.

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Assessing the technical and economic performance of the integrated disease surveillance and response system in Post-Ebola Sierra Leone

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BIOGRAPHY Christina Mergenthaler is an epidemiologist at KIT Royal Tropical Institute, where she focuses on developing methodologies to monitor and evaluate active TB case finding interventions using real-time geospatial data collection and analysis. Recently she has supported analysis and electronic collection of household and health facility data with the aim to strengthen outbreak-prone disease surveillance in Sierra Leone and to generate evidence around maternal and child health in Afghanistan. As a member of KIT's Center for Applied Spatial Epidemiology (KIT-CASE), Christina analyzes subnational TB spatial trends, hotspots and anomalies to better inform strategic decision making, planning and prioritization of TB programs.

OBJECTIVE We performed an evaluation of Sierra Leone Ministry of Health and Sanitation's Integrated Disease Surveillance and Response (IDSR) technical and economic performance by measuring sensitivity of selected conditions notified by the IDSR system and evaluating its economic impact.

METHODS We conducted a mixed methods assessment consisting of a household incidence survey, health facility survey, household case verification survey, costing analysis, interviews and focus group discussions with IDSR stakeholders. Sensitivity estimates were derived from disease incidence and health seeking behaviors measured in the household incidence survey, positive predictive values from the household case verification survey and DHIS2 disease notifications. To conduct the costing analysis, key stakeholders were interviewed and budgets and program records were reviewed using a micro-costing, bottom-up survey.

RESULTS All age diarrhea cases were notified by IDSR with an estimated sensitivity between 4.3% and 15.7%. Sensitivity for all age suspected measles cases was estimated between 0.09% and 3.2%, translating to a suspected measles notification rate of 4.56 per 100,000 population. The annual budget impact for IDSR was 2.9

million USD in 2018, which was 1.3% of the total health budget. 78% of costs were made at primary health unit level. Training, travel and equipment were the largest cost drivers, respectively covering 26%, 23% and 20% of total costs.

CONCLUSION The sensitivity estimates showed the health and surveillance systems' ability to detect and report notifiable conditions; however, interpretation is difficult as guidance on relevant surveillance sensitivity norms lacking. Underreporting, which was found to be substantial when comparing facility paper records with their respective digital records in DHIS2 may help to explain the apparent low sensitivity of diarrhea and suspected measles. As IDSR's budget impact is a relatively low percentage of the total health budget, sustainability of the IDSR system may be possible with continued international donor support.

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Feasibility and challenges in sustaining a community based surveillance system in Post-Ebola Sierra Leone

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OBJECTIVE We assessed opportunities and barriers to sustain Community Based Surveillance (CBS) in low resource settings as part of a World Bank evaluation of Sierra Leone's Ministry of Health and Sanitation's CBS and Integrated Disease Surveillance & Response (IDSR) systems.

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METHODS We conducted a mixed methods assessment consisting of a household incidence survey, health facility survey, costing analysis, in-depth interviews and focus group discussions with key CBS system stakeholders.

RESULTS In districts where CBS was ‘fully functional’, the number and type of CBS alerts corresponded to the number and type of diseases reported through the facility based IDSR system in the same period. However under-reporting of diarrhea and measles suspects from the community is still apparent and reporting deteriorated when primary facility staff including CHWs reported stoppage of stipends. The annual budget impact for CBS was estimated at 4.4 million USD in 2018. The majority of costs were made at community level (73%) compared to regional (0.3%), primary health unit (21%), district (4%) and national (2%) level. Key costs drivers were CHW trainings (59% of total costs) and salaries of human resources (15%). Barriers included sustainable financing of human resources, internet connectivity, limited trainings and supportive supervision and unsupported transportation costs.

CONCLUSION Agreement between CBS and IDSR reports support the possibility that CBS increases sensitivity of disease surveillance to hard-to-reach communities, which enables local authorities to take early prevention measures when and where impact will be the greatest. Qualitative interviews suggest that CBS has improved the interface between the community and primary level of the health system, with CHWs and community members reporting that communities are more willing to share information about health issues compared to the pre-CBS implementation period. However if the barriers to sustainability are left unaddressed, opportunities for CBS to prevent disease outbreaks will go unrealized.

74**Penicillin allergy labelling and de-labelling: a national survey of the knowledge and practices of hospital doctors in Ireland**

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BIOGRAPHY Siobhán O'Regan is a doctor on the Irish Basic Specialist Training Programme currently working on the Infectious Diseases Service in St. James's Hospital in Dublin, Ireland. She has a strong interest in Tropical Medicine and International Health and is currently undertaking a Diploma in Tropical Medicine and Hygiene at the University of Glasgow with a view to

work as a Clinical Lecturer in Tropical Medicine next year.

INTRODUCTION Irish patients significantly over-report Penicillin allergies. This is associated with increased use of broad-spectrum antibiotics, antimicrobial resistance, prolonged admissions and increased treatment costs. We aimed to identify targets for improving antimicrobial stewardship.

METHODS An anonymous nationwide survey of hospital doctors in Ireland assessed penicillin allergy knowledge, prescribing practices and clinical management.

RESULTS 192 responses were received from 40 hospitals. 56% felt confident in their knowledge, 42% felt they had received good formal teaching on this. Registrars/Senior House officers were more confident than interns ($P < 0.002$). Self-reported penicillin allergy was overestimated by 13% and true prevalence by 5%. Although 76% recognised poorer patient outcomes are associated with documented ‘penicillin allergy’, many were unaware that this label could lead to prolonged admission (48%), poor treatment compliance (63%) and higher rates of MRSA/VRE/CRE/C. difficile (35%). 56% frequently challenged documented allergies (67% of Registrars, 32% of interns, $P < 0.002$). 73% frequently transcribed allergies from notes/Kardex without patient verification (69% of Registrars, 82% of interns, $P < 0.004$), while 50% had incorrectly documented ‘No known drug allergy’ for patients who transpired to have allergies. In a history of severe anaphylaxis, 8 incorrectly chose to give flucloxacillin or piperacillin/tazobactam. 44% correctly identified all safe options. Interns incorrectly avoided 1.7 times as many safe antibiotics compared to registrars (non-significant). This correlated weakly with self-reported confidence ($r = 0.16$, $P < 0.04$). In difficult situations of penicillin allergy labelling, people were most reassured by microbiology (68%), senior team member (60%) and pharmacy advice (56%), as opposed to local guidelines (36%) or formal training (28%). Many inaccurately considered allergy impossible where the patient had previously tolerated penicillin (55%) or did not develop symptoms after first exposure (44%).

CONCLUSION While many NCHDs are confident on the topic of antibiotics and allergies, knowledge deficits and unsafe practices were identified with definite opportunities for education and improvement.

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Motivational drivers of sustained WASH practices among parents and children: an exploratory study on a WASH intervention in Lagos, NigeriaO. Orighoye^{1,2}, M. Maynard¹, T. Apekey¹, H. O. Olanase³, O. Ojo³ and F. Adekoya³¹Leeds Beckett University, Leeds, UK; ²Royal Society of Tropical Medicine and Hygiene, London, UK; ³The Neo Child Initiative, Lagos, Nigeria

BIOGRAPHY Oritseweyinmi Orighoye is a Paediatrician par excellence with interests in environmental and public health. As an early career researcher in public health, she focused on a few sustainable development goals: zero hunger, good health and wellbeing, quality education, clean water, sanitation and hygiene, reduced inequalities, sustainable cities and communities, climate action and partnerships for goals. She is a final year PhD student at Leeds Beckett University and an NIHR grant awardee by the Royal Society of Tropical Hygiene and Medicine. Her research focuses on nutrition, physical activity, NCDs and NTDs among parents and family in Nigeria.

OBJECTIVE The aim of this study was to understand the motivational drivers of sustained WASH practices through the direct observation and views of children, parents and school heads/teachers in an urban slum setting in Lagos, Nigeria.

METHODS A qualitative cross-sectional study was conducted in a culturally diverse urban slum settlement of Lagos State, Nigeria. Participants were identified through purposive sampling and data collected from November 2020–February 2021. Twenty boys and girls aged 8–14 years took part in 10 friendship paired interviews; ten women and five men aged 19–50 years who were parents and teachers/school heads had 15 semi-structured one-to-one interviews. Discussions were digitally recorded and transcribed verbatim. Manual thematic analysis of the transcripts generated key themes. Independent coding of transcripts was conducted by authors to reduce bias in the analysis.

RESULTS Three overarching themes were identified: 1. Behavioural norand attitudes towards WASH practices. 2.Environmental settings. 3. The place of technology. Adult participants voiced that the need for care, responsibility and adapting to the poor living conditions are their motivators for sustained WASH practices. However, through health education in schools, child participants acknowledged that fear of disease act as a motivator for continuous WASH practices. It was argued by participants that the cost and access to clean water and improved sanitation facilities for daily use is a luxury

despite being a water settlement. Constant cues and videos such as animations were reported by child participants as helpful in sustaining WASH practices by encouraging them to become change agents.

CONCLUSION This study highlighted the challenges for consideration in effective WASH practices in reducing the risk of noncommunicable diseases and neglected tropical diseases. Tailored integrated WASH interventions in urban slum settings could be explored by future studies.

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Associations between water, sanitation, and hygiene and children's self-reported health status and observed stunting in Manila, Philippines: preliminary findingsS. Sangalang¹, C. Borgemeister¹, T. Kistemann², P. Singson³, V. Anglo⁴, M. Ramos⁴, M. Cumagun⁴ and J. Liao⁴¹University of Bonn, Center For Development Research, Bonn, Germany; ²University of Bonn, Institute for Hygiene and Public Health, Bonn, Germany; ³Ateneo de Manila University, Quezon City, Philippines; ⁴University of the Philippines Diliman, Diliman, Philippines

BIOGRAPHY I was the Principal Investigator of fully funded grants focusing on the environmental health of urban poor children in the Philippines in 2017–2019. I led an interdisciplinary research team in conducting a cluster RCT related to water, sanitation and hygiene in public schools in Manila. I was subsequently hired as a consultant by the World Health Organization (WHO) Philippines Country office to implement a multi-center school survey about adolescent health and disease risk factors. Prior to this work, I was a pediatric nurse at Stanford University in California, U.S.A. and a consultant for the WHO in Bonn, Germany.

OBJECTIVE Children experience health disparities due to inadequate water, sanitation and hygiene (WaSH) in school and at home. Our study aimed to measure associations between school and home WaSH and children's health status and stunting, thereby identifying risk factors of disease.

METHODS We conducted a cross-sectional survey of 15 public primary and secondary schools in Metro Manila, Philippines. We measured schoolchildren's self-reported health, demographic information and perceptions about school and home WaSH via questionnaire. We used anthropometry to measure stunting, defined as a height-for-age Z-score (HAZ) below -2 standard deviations from the World Health Organization (WHO) Child Growth Standards median. We measured the adequacy of school

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WaSH via inspection checklist. We measured the adequacy of home WaSH via questionnaire (children's self-report).

RESULTS We surveyed 828 children and >19% reported being "unhealthy" and 24% reported often feeling hungry before going to sleep. The mean HAZ was -0.71 and 12% (75/675) of children were stunted. School restrooms (N = 70) were observed to be unclean (66%), have a wet floor (67%) and have signs of mold (71%). Over 20% and 81% of school restrooms lacked water and soap, respectively. Nearly 60% and over 57% of children said school restrooms were "unsatisfactory" and "unclean". About 49% and ~37% of children said school handwashing areas were "unsatisfactory" and "unclean". Although most children had a restroom at home, over 11% said that they shared the restroom with another family. Almost 8% said the restroom was outside the home; 3.6% had no toilet. About 8% had no faucet with running water.

CONCLUSIONS Data analysis is in progress. Preliminary findings indicate severe WaSH inadequacies in schools and homes. During our presentation we will report further results, including risk factors of disease and associations between school and home WaSH and children's health and stunting.

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Application of Infection Prevention and Control Assessment Framework (IPCAF) tool in 13 hospitals in Sub-Saharan Africa

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BIOGRAPHY I am a Medical Doctor specialized in Infectious Diseases and Human Parasitology and DTM&H at Liverpool School of Tropical Medicine.

I worked in Tanzania as:

- Medical officer and Health Development Project Coordinator (1981–1983 and 1987–1989).
- Project manager for Malaria control project (2001)
- Project manager in a Public Health project, with relevant responsibilities in the area of HIV/AIDS (July 2015–October 2016)

In 2002 I worked as Hospital Coordination in Peja/Pec, Kosovo (Italian Ministry of Foreign Affairs project).

I was Director of the Infectious Diseases Unit, in San Bortolo Hospital, Vicenza, Italy (2005–2017) where I'm currently working as Consultant.

OBJECTIVE Hospital acquired infections (HAIs) has become a major global priority and it's well known that a large percentage of HAIs are preventable through

effective infection prevention and control (IPC) measures. The Infection Prevention and Control Assessment Framework (IPCAF) is a tool intended to support the implementation and improvement of IPC programmes in acute health care. The study aims to provide baseline data on IPC programmes implementation by using the IPCAF tool in different hospitals in low resource settings where Doctor's with Africa CUAMM is currently running projects.

METHODS The WHO's IPCAF questionnaire was used. A descriptive analysis of each core component and sub-components were performed. The assessment was conducted during 2017 as part of routine hospital services, for which Doctors with Africa CUAMM has official collaboration agreement. All data is strictly confidential, aggregated and analysed anonymously.

RESULTS IPCAF survey was performed in 13 hospitals: 5 private and 8 public; 2 Regional and 11 District hospitals, accounting for a total of 1,403 beds and 83,971 patients admitted during 2017. The mean total score achieved by all hospitals was 352. The final scores showed a great variability within hospitals, levels ranged from inadequate (1 hospital) to intermediate (5) and to basic (7). In all hospitals, the core components better performed were: n. 2 (Guidelines), 5 (Multimodal strategies) and 8 (Built environment, materials and equipment for IPC) with 57%, 50% and 63% score respectively. Eleven facilities declared the availability of an IPC programme, although only five had defined responsibilities stated and an annual work plan available.

CONCLUSION The IPCAF questionnaire is an effective and easy tool to measure and monitor the level of IPC programmes in acute health care facilities in LMICs. From the NGO perspectives, it provides valuable information to address resources to cover the possible gaps of IPC practices.

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Antimicrobial resistance in Colombia under the scope of One Health approach

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BIOGRAPHY Luisa Fernanda is a medical doctor with research training and emergency clinic experience. Also, she is a Master of Public Health from the Royal Tropical Institute in Amsterdam, The Netherlands. Her focus is Global Health, antimicrobial resistance and the relationship between the determinants of health and the burden of communicable and non-communicable diseases.

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INTRODUCTION: Colombia shows increasing rates of antimicrobial resistance (AMR) in humans and animals threatening the capacity of the health system along with economic, social and environmental impact. I aimed to explore the determinants that influence the Ain Colombia using the One Health approach, explore the policies regarding and the infection prevention and surveillance programmes and formulate recommendations to tackle the Athreat.

METHODOLOGY: I performed a literature review, including data published between the period of January 2010 and August 2020. I searched in PubMed, the VU Library and Google Scholar for terrelated to Aand grey literature as well. I screened the articles by quality and relevance to this study. I analysed them using a policy framework that combines the One Health approach with the knowledge, access, use and surveillance on antibiotics.

RESULTS Colombia shows a high fragmentation of the Adata, without a real estimation on the Ainfections and antibiotic use in animals and humans. Health professionals have limited training and education in antibiotic use. Although the country has several regulations about antibiotic access and use and extended surveillance and infection prevention programmes, there is still easy access to antibiotics, high self-prescription rates and a broadened antibiotic misuse.

CONCLUSION Colombia has the regulatory tools and the surveillance network to reduce its Aburden, but the country continues with the same old practices regarding antibiotics.

RECOMMENDATIONS: The country needs to improve both the training of the health professionals and awareness among the general population and farmers about antibiotics to stimulate a reduction of antibiotic use. Lastly, there is a need to strengthen surveillance programmes and law enforcement on Aregulations.

KEYTERMS: antimicrobial resistance, antibiotic, regulation, One Health, Colombia.

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Comparative assessment of the prevalence, practices and factors associated with self-medication with antibiotics in Africa: A systematic review

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BIOGRAPHY Eugene Yeika is an early career medical doctor and an award-winning public health specialist. He has over 5-year experience working with the Ministry of Public Health and NGOs providing healthcare especially in conflict-affected areas notably in the North West Region of Cameroon. Eugene is currently a monitoring and evaluation officer with Strategic Humanitarian Services (SHUMAS) Cameroon. He is also a research fellow at the Clinical Research Education Networking and Consultancy (CRENC). As a researcher he has over 26 publications focusing on tropical diseases, sexo-reproductive health, antimicrobial resistance, COVID19 and many case reports.

OBJECTIVE This systematic review evaluated and compared the prevalence, reasons, sources and factors associated with of SMA within African sub-regions.

METHODS An electronic search of PubMed and Google Scholar databases was performed for observational studies conducted between January 2005 and February 2020. Two reviewers independently screened the abstracts and full texts using the PRISMA flowchart and equally performed quality assessment. Both quantitative and qualitative syntheses of selected studies were carried out.

RESULTS A total of 40 studies from 19 countries were selected for qualitative synthesis. The prevalence of SMA in Africa ranged from 12.1% to 93.9% with a median prevalence of 55.7% (IQR 41%-75%). Western Africa was the sub-region with the highest prevalence 70.1% (IQR 48.3%-82.1%), followed by Northern Africa with 48.1% (IQR 41.1–64.3%). We identified 27 different antibiotics used for self-medication from 13 different antibiotic classes. Penicillins were the most frequently used antibiotics followed by Tetracyclines and Fluoroquinolones. The most frequent indications for SMA were upper respiratory tract symptoms/infections (27 studies). Common sources of antibiotics used for self-medication were community pharmacies (31 studies), family/friends (20 studies), leftover antibiotics from previous treatments (19 studies) and patent medicine stores (18 studies). Commonly reported factors associated with SMA were no education/ low educational status (9 studies), male gender (5 studies) and low income/unemployment (2 studies).

CONCLUSIONS: The prevalence of SMA in Africa is high and varies across sub-regions with Western Africa having the highest prevalence. Drivers of SMA are complex comprising of socio-economic factors, limited access to healthcare coupled with absence or poorly implemented policies regulating antibiotic sales.

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Keywords: Self-Medication with Antibiotics, Prevalence, Practices, Associated Factors, Africa

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Farmer-based application of biolarvicide mixed with pesticides to control malaria mosquitoes in rice fields, Côte d'Ivoire: semi-field experiments

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BIOGRAPHY Julien Zahouli is currently the Good Laboratory Practices (GLP) study director of vector control programme at Centre Suisse de Recherches Scientifiques (CSRS) in Côte d'Ivoire. He is also a postdoctoral fellow at Swiss Tropical and Public Health Institute (Swiss TPH) in Switzerland.

Julien completed a PhD in Epidemiology at University of Basel and Swiss TPH in 2017. Then, he returned back home (Côte d'Ivoire) where he conducts and supports several projects.

His research interests include anthropogenic impacts (agriculture, urbanization, insecticide) on ecology mosquitoes and vector control of malaria and arboviruses (dengue, yellow fever, Zika) in Côte d'Ivoire and Africa.

OBJECTIVE Irrigated rice field is the greatest provider of malaria *Anopheles* mosquito breeding sites in Africa, whereas rice-farmers are poorly involved in vector control. We assessed the efficacy of farmer-based application of a mixture of biolarvicide with pesticides for reducing *Anopheles* larvae density in rice fields under semi-field conditions in Côte d'Ivoire.

METHODS We conducted farmer-based semi-field experiments to determine the effect of a biolarvicide, *Bacillus thuringiensis israelensis* (Bti) mixed with pesticides on *Anopheles* larvae in irrigated rice fields in Côte d'Ivoire. There were three treatment arms: T0 (control block treated with pesticides alone – without Bti), T1 (block treated with a mixture of Bti and pesticides following the persistence of Bti – seven days as indicated by the manufacturer) and T2 (block treated with a mixture of Bti and pesticides following farmer's schedule). Trained farmers using calibrated knapsack sprayers applied all treatments. *Anopheles* larvae and rice grains were collected and quantified.

RESULTS Overall, the intervention blocks T2 and T1 showed lowest *Anopheles* mosquito larvae density

compared to the control blocks T0. The density of the malaria mosquito *Anopheles gambiae* s.l. larvae in T1 was significantly lower compared with T0 ($F = 4.857$; $df = 1$; $P < 0.001$) and T2 ($F = 2.731$; $df = 1$; $P < 0.05$). Moreover, the density of *An. gambiae* s.l. larvae was significantly lower in T2 compared with T0. T2 ($F = 1.731$; $df = 1$; $P < 0.05$). T1 maintained *An. gambiae* s.l. larval density at the lowest level thus suggesting that the best timing interval for application of Bti was seven days.

CONCLUSION Farmer-based application of a mixture of Bti and pesticides significantly reduced *An. gambiae* larvae density, while maintaining yield rice harvest. Farmer-based application combining biolarvicides and pesticides may represent promising complementary measure to control malaria among rice farming communities.

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Implementing a digital health intervention for maternal, child and adolescent health in Tanzania: Lessons learnt from the Afya-Tek project

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BIOGRAPHY Nandini D P Sarkar is a researcher at the Health System Equity and Medical Anthropology units at the Institute of Tropical Medicine (ITM) in Antwerp. A health psychologist from India, her research interests focus on global mental health, integrated service provision, quality of care and human behaviour as related to health and illness, as well as qualitative research methodologies.

OBJECTIVE In Tanzania, there are 600,000 preventable deaths of children aged under-five, over 1.2 million unintended pregnancies and 9,000 preventable maternal deaths each year which is partly due to fragmented service provision. Afya-Tek is a proof-of-concept that deploys a co-created, human-centred Digital Health Intervention (DHI) in two councils of Kibaha, a district in the Pwani region of Tanzania, with the aim of improving care provision and the continuity of care at community level. The aim of this study are to: assess the impact of using digital, biometrically-enabled decision support tools, on the coordination and integration of child, maternal and adolescent health care between community health workers, accredited drug dispensing outlets and primary health facilities; and generate learnings about the

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use of DHIs in local health system low- and middle-income countries.

METHODS The study is a realist evaluation with an iterative, longitudinal multi-phased, mixed-methods design.

RESULTS Initial results show that there is improved patient identification, referral and follow up, as well as timely attendance and care at facility level. The project also highlights the importance of considering a number of key factors when designing and implementing DHIs in a low- and middle-income context. These include socio-economic and sociocultural factors; structural factors, such as electricity and internet availability; health system factors; and individual-level factors, such as health worker motivation and capacity, as well as client acceptance and trust in the DHI. The project also demonstrates the importance of co-creating the DHI tools together with stakeholders in an iterative and collaborative manner.

CONCLUSION By generating context-specific learnings using realist methodologies, the Afya-Tek project showcases how digital technology and innovation can be used to sustainably improve access and continuity of care for maternal, child and adolescent health.

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Universal Health Coverage in Low- and Middle-Income Countries: Does it matter where people live? – A multilevel analysis

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BIOGRAPHY Seun is currently undertaking his PhD at the University of Warwick. Seun's research involves the use of secondary data and data science skills to provide innovative policy options that will promote universal health coverage (UHC) in developing countries.

INTRODUCTION: More than half of the world population lack access to essential and quality health services and this is worse when some specific health services are considered in low and middle-income countries (LMICs). We developed and tested models to examine the individual, neighbourhood and country-level determinants associated with access essential health service (EHS) under the UHC agenda.

METHODS We used datasets from the Demographic and Health Surveys of 58 low and middle-income countries. Suboptimal and optimal access to EHS were computed using nine indicators adapted from the most recent

Global Monitoring Report on tracking UHC by the World Bank and WHO. Descriptive and multilevel multinomial regression analyses were performed using R.

RESULTS Suboptimal and optimal access to EHS varies across the countries, the former ranging from 5.55% to 100% and the latter ranging from 0% to 90.36% both in Honduras and Colombia respectively. In the fully adjusted model, children of mothers with lower educational attainment (RRR 2.11, 95% credible interval [CrI] 1.92 to 2.32) and from poor households (RRR 1.79, 95%CrI 1.61 to 2.00) were more likely to have only suboptimal access to EHS. Similar trends, although in the opposite direction were observed in the analysis involving optimal access. In addition, 57.5% and 27.7% of variances in suboptimal health service coverage is attributable to neighbourhood and country-level factors.

CONCLUSION Neighbourhood-level factors such as level of poverty, illiteracy and rurality, modify access to EHS coverage in LMICs. Policies and interventions aimed at achieving the 2030 UHC goals should integrate socioeconomic and living conditions of people.

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Feasibility of a school-based adolescent girls' training initiative for identification of never- and under-immunized children through community outreach in Pakistan

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BIOGRAPHY Ruqaiya holds a Master's degree in Economics from Columbia University (2020) and a Bachelors (Honours) in Economics from McMaster University. Prior to joining IRD, Ruqaiya worked at The Citizens Foundation as a Project Coordinator spearheading process re-engineering. In 2020, Ruqaiya joined IRD's Maternal and Child Health Program as an Assistant Manager. Her work has focused on gender empowerment and youth engagement, working with adolescent school going girls for improving immunization outcomes in their communities.

OBJECTIVE One in every 5 children globally remains deprived of life-saving vaccines, We developed and implemented the Kiran Sitara (KS; Shining Star) Adolescent Health and Leadership Program (AHLP) among school girls (KSs; grades 8–10) to provide them with leadership, community mobilization, critical thinking and communication skills equipping them to become community

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advocates for immunization. We evaluated the feasibility of KS community mobilization through validating KSs' ability to accurately identify and link never-and under-immunized children with immunization services.

METHODS We implemented a mixed-methods study in six public schools located in peri-urban areas of Karachi, Pakistan. After the development and roll-out of AHLP in schools, KSs conducted door-to-door visits in their neighborhoods to identify never-and under-immunized children. This was followed by verification visits by field staff to establish accuracy. Immunization camps were set up to vaccinate never-and under-immunized children identified by KSs.

RESULTS From January, 28 to February, 22, 2020, 591 KSs visited 10,330 households, screened 3,295 under-2 children and identified 7.5% (247/3,295) never-immunized and 27.0% (889/3,295) under-immunized children, with an accuracy of 95.2% and 61.2%, respectively. In January, 2021, 291 never- and under-immunized children were invited to immunization camps and linked to the Expanded Programme on Immunization (EPI) for effective catch-up. Out of these, 28.9% (84/291) received vaccinations, 57.0% (166/291) did not respond to the invite and 14.1% (41/291) were deemed ineligible (illness, over-age etc.).

CONCLUSION We demonstrate the feasibility of empowering adolescent girls to boost immunization uptake in LMIC settings. Engaging young women from within the community provides a sustainable solution for promoting immunization coverage and equity today and ensuring they will champion the cause in their capacity as tomorrow's mothers. We are scaling-up our solution across the country by implementing AHLP in 250+ schools and creating a force of 100,000+ KSs to magnify our efforts.

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Effect of Mobile Conditional Cash Transfers of different sizes, schedules and design on Childhood Immunization Coverage in Pakistan: An RCT

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BIOGRAPHY Danya Arif is the Assistant Director for the Maternal and Child Health Program at IRD Global and holds a Master's Degree in Development Management

from the London School of Economics. Danya has several years of programmatic and research experience, with a focus on maternal and child health, mHealth, vaccines and operational research. Danya has been actively engaged in undertaking research focused on behavioural economics and the role of cash incentives in improving immunization uptake. She has also been closely involved in providing technical assistance to Governments and scaling up programs to meet the health needs of women and children.

OBJECTIVE Low childhood immunization coverage rates have prompted the need to design effective demand-side interventions to increase uptake. Large incentives (>USD 50) have demonstrated to increase immunization coverage. However, research on small incentives (≤USD 15) is sparse and there is uncertainty regarding their optimal structure in terms of size, schedule and design.

METHODS In this individually randomized trial conducted in Karachi, Pakistan, participants were randomly divided into seven study arms comprising five incentive arms with varying size (amount), schedules (progressivity) and design (certainty of payment), an exclusive Sarm and control arm. Children visiting a study immunization clinic for BCG, Penta-1, or Penta-2 vaccine were enrolled and followed up until at least 18 months of age. The primary outcome was the proportion of fully immunized children (FIC) at 12 months of age analyzed through poisson regression.

RESULTS A total of 11,197 caregiver-child pairs were enrolled between November 6, 2017 and October 10, 2018 across the seven study arms. FIC at 12 months of age was significantly higher in all incentive arms compared to the control. Comparison of coverage rates across incentive schedules (flat versus sharp) did not show any significant differences. Participants receiving non-lottery (sure payouts) had significantly higher FIC coverage at 12 months of age (64.8%) than participants receiving lottery payouts (60.5%, $P < 0.001$). Children in the high-flat incentive arm were significantly more likely to achieve full immunization at 12 months of age (IRR: 1.16, 95% CI: 1.09–1.22; $P < 0.001$) than children in the control group.

CONCLUSION Small-amount mobile-based incentives (USD 0.8–2.4 per immunization visit) can significantly increase (8–16%) fully immunized child coverage rates. Our findings have important policy implications for pursuing incentive-based interventions for increasing immunization uptake and integrating conditionality within the existing cash transfers Program LMICs.

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Towards Universal Health Coverage in Benin: obstacles to using rehabilitation services by disabled peopleC. Assogba¹, E.-T. Godonou² and A. Labat²¹*Ministère de la Santé, Porto Novo, Benin;* ²*Université libre de Bruxelles, Bruxelles, Belgium*

BIOGRAPHY Corneille Tolofon Assogba holds a physiotherapy degree (2003) and a master's degree in Project Management (2010). He worked as a physiotherapist in Benin from 2004 to 2012, then worked as a health intervention planner in the south of the country (2012–14). Since 2014, his role has been to coordinate the development of rehabilitation care nationwide on behalf of the Ministry of Health. The present study was designed during the training course on health system research that he followed in 2017 at the Free University of Brussels.

OBJECTIVE Rehabilitation care is essential after the onset of a disability and help to improve Disabled People's (DP) functional autonomy. In Benin, access to care is not guaranteed for all and very few of the DP who access it manage to complete care. For the effectiveness of UHC, it is important to know the factors that influence their use of rehabilitation care.

METHODS This cross-sectional study with an analytical aim, carried out in 2019, included 318 DP received in rehabilitation in 2018 at the hospital and/or in a community-based rehabilitation district. Interviewed by questionnaire, the DP presented cerebral palsy (37.4%); severe hemiplegic sequelae (30.8%); spinal cord injuries (11.3%); and amputations (11%). Single and multiple logistic regressions were performed to identify significant factors influencing the optimal use of rehabilitation care, defined as the ability to complete rehabilitation treatment as planned and without interruption.

RESULTS of 228 DP who received care at hospital, 46.0% had a suboptimal use of rehabilitation care and only 17.2% benefit from a healthcare coverage measure (insurance or other measures). The significant factors that influence the optimal use of rehabilitation care are: age (OR:0.67, $P = 0.034$), level of education (OR:1.47, $P = 0.007$), coverage of care (OR:0.29, $P = 0.002$), socio-economic level (OR:0.45, $P < 0.0001$), dependence to go to care (OR:2.58, $P = 0.004$), level of dependence (OR:1.86, $P = 0.001$), to benefit of an appropriate/personal mean of transport to go to care (OR:2.05, $P = 0.015$) and postponement of care for financial reasons (OR:4.55, $P < 0.0001$). After adjustment for the other variables, the multiple regression only shows as significant: the socio-economic level (OR:0.46, $P = 0.022$)

and the postponement of care for financial reasons (OR:4.93, $P < 0.0001$).

CONCLUSION In this study, too few DP benefit from healthcare coverage. The impact of the socio-economic level being important and noted, the Beninese authorities have some elements from this study to better address this problem.

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Identifying viable policies for including Venezuelan refugees and migrants into the Peruvian health system

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BIOGRAPHY Pierina Benavente has a Master's degree in Global Health from the University of Bergen and is currently working as research assistant in the Inncovid.-Norge project. Her main focus is on migration and health research and on development of inclusive health policies for migrants and refugees. Pierina has also 14 years of experience in clinical trials.

BACKGROUND AND OBJECTIVE The humanitarian crisis in Venezuela has driven over 5 million people to flee, with a million of them seeking refuge in Peru. This study identified viable policies for including these Venezuelan refugees and migrants into the Peruvian health system.

METHODS A three-round modified Delphi study was conducted to evaluate consensus of proposed policies. Round 1 consisted of a literature review and interviews with 4 key informants to develop the Delphi questionnaire. Rounds 2 and 3 were conducted in Peru by applying the questionnaire to 21 experts in face-to-face meetings. Questionnaire data was analyzed using descriptive statistics. Frequencies were calculated to determine level of consensus (set at $\geq 80\%$) and means were obtained to rank the statements. Role-ordered matrix analysis was performed for the qualitative data collected to further interpret the Delphi results.

RESULTS Seventeen statements reached consensus in all three dimensions: desirability, importance and feasibility. Most were related to services already provided to Venezuelans through vertical prograSix statements did not reach consensus in any category. These related to providing differentiated services or specific policies for refugees and migrants. Qualitative analysis found that health system governance, particularly in regard to the stewardship of migration, to health discussions and to addressing xenophobia, are not clearly defined. Finally, a list of 17 recommended policies was developed based on

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degree of consensus and ranking of the statements. Implementing health promotion services targeted directly at Venezuelans is at the top of this list.

CONCLUSIONS For the Peruvian health system to adequately respond to the needs of this migrant population, it must expand coverage through equitable and inclusive policies that, while targeted at meeting the needs of this humanitarian crisis, can expand coverage to include other vulnerable population groups that are also without care.

116**Evaluating a computerized maintenance management system in a low resource setting**

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BIOGRAPHY Farah Beniacoub is a construction engineer, she has 15 years of experience in development cooperation and has been working for Enabel, the Belgian Development Agency, in Burundi for 7 years. As the Intervention manager of the "infrastructure, equipment and maintenance" component of the health program implemented by Enabel, she coordinates the implementation of a decentralized maintenance strategy in Burundi together with MoH.

OBJECTIVE Verify our hypothesis that implementation of a Computerized Maintenance Management System contributes to a more effective and efficient management of biomedical equipment and health infrastructure in a low resource setting.

METHODS The study population of our action research included all public hospitals and health centers of the provinces of Muramvya and Kirundo. It consisted of: (1) the completion of the maintenance together with the competent human resources; (2) the upgrade of technical platform and workshops; (3) the set-up of an operational frame with logistics for outreach activities to the health centers; (4) the testing of a CMMS; (5) the setup of a funding model for the system. The action research was analyzed in a quantitative and qualitative way covering (i) the use of the CMMS over a period of 3 years (2017–2020), (ii) the study of the feasibility, results and sustainability of the intervention and (iii) identification of any relevant failure- and success factors to be considered for future CM implementations in low resource settings.

RESULTS First, in 2017 a biomedical assets ontology was created, tailored to the local health system and progressively mapped on international medical devices classifications. This ontology was the cornerstone of a web-based CMMS, deployed in the Kirundo and Muramvya provinces. During the study period, the total number of biomedical maintenance interventions increased from 4 to 350 per month, average corrective maintenance delays were reduced from 106 to 26 days and the proportion of functional medical assets grew from 88 to 91%.

CONCLUSIONS This study provides strong evidence for the hypothesis that a sustainable implementation of a CMIS is feasible and useful in low resource settings, if the implementation approach is done within a certain framework.

417**Towards Universal Health Coverage: Key requisites for legitimate health benefit package design**

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BIOGRAPHY Health Economics and Health Financing Expert. PhD candidate and core team member of the Global Health Priorities research group (previously REVISE HTA, rethinking the value of interventions) which reviews the theory and tools to value interventions for priority setting in health care. This research develops, supports and evaluates evidence-informed deliberation processes (EDP) in a variety of decision contexts. Gavin has hands-on working experience on health economics and financing in his home country South Africa and on HTA, institutionalisation of HTA and EDP in Ghana, Tanzania, Pakistan, Kazakhstan.

<https://www.radboudumc.nl/en/research/research-group/global-health-priorities/global-hta-team>

OBJECTIVE A central requirement of any health system pursuing Universal Health Coverage (UHC) is that services made available to the population are consistent with the funds available. The formulation of a standard health benefit package is an essential element of a sustainable national health system. Countries use health technology assessment (HTA) to inform health benefit package design. Evidence-informed deliberative processes (EDPs) support HTA through legitimate decision-making. The objective of this paper is to present lessons from implementing EDPs in different countries around the globe and to learn how they can be used in optimizing national

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HTA processes in low- and middle-income countries (LMIC).

METHODS Countries have started making choices in the design of their health benefit package. As part of our ongoing support to EDP implementation, we have identified a set of country-level key requisites for legitimate health benefit package design. We have developed guidance for countries on how to make choices, based on the theory of evidence-informed deliberative processes, international best practices, surveying HTA practices and experts in LMICs and practical examples from several middle-income countries.

RESULTS Drawing from experiences of EDP implementation over the last two years in Iran, Pakistan, Kazakhstan, Ukraine and Ghana we illustrate the strengths of EDP's and contrast the various strategies used in (re)designing health benefit packages for UHC.

CONCLUSION While the availability of evidence is a central challenge in health benefit package design, countries should carefully consider various components of evidence-informed deliberation involving relevant stakeholders and choose the relevant fit within their decision-making context so as to obtain the broadest possible support base for the eventual adoption of an explicit health benefit package.

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Promotors and barriers to implementation of assistive technology and telecare for people with dementia and their caregivers: a systematic review

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BIOGRAPHY Lydia Boyle is originally from the USA and is educated as a Doctor of Physical Therapy. She has a bachelors degree in Exercise Science and a minor in Nutrition Studies. She is currently a Masters Student at University of Bergen within the Department of Global Health at the Center for International Health in Bergen, Norway. She has a background in neuro-rehabilitation and an interest in neurology related topics. Her thesis will focus on implementation of assistive technology and telecare for people with dementia.

BACKGROUND Dementia is within the top 10 diseases responsible for the greatest burden of disease globally. The 2015 World Alzheimer's Report estimates that by 2050, 71% of people with dementia (PwD) will be living

in low to middle income countries (LMIC). Implementation of assistive technology and telecare (ATT) has great potential to evolve the current status quo for care of persons with dementia.

OBJECTIVES The objective of this study is to identify promoters and barriers to implementation of ATT for PwD and their informal and formal caregivers. In addition, the study will present novel implementation prograss which may improve adoption of ATT.

METHODS The literature search was conducted between January 25 – February 23, 2021 and included peer-reviewed publications indexed in Medline (Ovid), CINAHL, Web of Science, APA PsycINFO and EMBASE. Keywords included MeSH terand phrases synonymous with “dementia” and “telemedicine” and free text words synonymous with “assistive technology” and “implementation”. The study was registered in PROSPERO 25th of February 2021, identification number: CRD42021239448.

RESULTS A total of 1,611 publications were identified in the initial search. After removal of duplicates 962 publications were left for selection. Authors are currently conducting selection and review of the literature using Rayyan, first on the level of title and abstract and then through analysis of full text articles. Data collection and initial analysis will begin after this process is completed. Concrete findings are expected by 01. August, 2021.

CONCLUSIONS: One of the most pressing issues in our society is the provision of proper care and treatment for the growing group of PwD. ATT is a key component in facilitation of safer, longer and independent living for PwD especially in LMIC. Results of this systematic review are of key importance because ATT implementation can extend healthcare services to regions lacking access to quality healthcare.

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Effect of Nepal Perinatal Quality Improvement Project on patient satisfaction: a cluster randomized control trial

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BIOGRAPHY Olivia Brunell is a resident in pediatrics at Uppsala University Hospital and a PhD-student at Uppsala University at the department for women's and children's health. Her main supervisor is Mats Mälqvist and she is a member of the research group UGHRS (Uppsala Global Health Research on Implementation and

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Sustainability). Her research project is on quality improvement of perinatal care in Nepal.

OBJECTIVE To investigate the effect of a scaled-up quality improvement (QI) intervention on patients' satisfaction in hospitals in Nepal.

METHOD We conducted a stepped-wedge cluster randomized controlled trial involving twelve public hospitals in Nepal, between April 2017 and October 2018, where the Nepal Perinatal Quality Improvement Project (NePeriQIP) was implemented. The QI-intervention of NePeriQIP included assessment of perinatal care in the hospitals, training to health workers on resuscitation and essential newborn care and introduction of a set of quality improvement tools to be used in every day practice in the hospitals.

We performed structured exit interviews with women who gave birth in the hospitals ($n = 65,895$) to gather data on their experiences and satisfaction with care. Satisfaction was measured as the combined answer to two questions; the respondent's overall satisfaction with care and whether she would recommend the hospital to a friend. The women needed to respond favorably to both questions to be considered satisfied.

Change in women's satisfaction after the intervention were analyzed using generalized linear mixed model (GLMM) and are presented as odds ratios.

RESULTS After the QI-intervention, women giving birth in the hospitals were more likely to be satisfied with care than before (Adjusted odds ratio 1.66 [95% CI: 1.59–1.73]). However, the results varied between hospitals (AdjOR 0,39–3,57) and the overall proportion of satisfaction was low. Prior to the intervention 58% of the women were satisfied, which increased to 62% after.

CONCLUSION We found that a QI-intervention on newborn resuscitation and essential newborn care have the potential to improve patient satisfaction. Patient satisfaction is an outcome measure of experience of care, which is an important aspect of quality of care. We recommend further studies to investigate which aspects of care that are of most importance to further improve women's satisfaction with perinatal care in hospitals in Nepal.

213**How is equality in access to health services addressed by SOCIEUX+ actions?**

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BIOGRAPHY Sarah Carpentier graduated in sociology and anthropology. After her studies, she did two years of social work with gypsies and homeless people. Next, she worked at the Centre for Social Policy at the University of Antwerp, where she obtained her Ph.D on minimum income dynamics. After, she was a postdoctoral researcher in demography at Université catholique de Louvain. In 2018 she joined Enabel, the Belgian development agency. Since September 2020, she works for Enabel as knowledge development expert for the EU-funded project SOCIEUX+. SOCIEUX+ organises peer-to-peer exchange in the field of social protection and labour market issues.

OBJECTIVE Protecting a population against health hazards is key for well-being and social and economic development. Realising universal health coverage (SDG 3.8), giving all people timely access to qualitative health services, is a catalyst for realising all SDG's and in particular for reducing inequity within countries. The recent Covid-19 pandemic showed the urgency. SOCIEUX+, an EU-funded facility that organises peer-to-peer exchange among public practitioners in the field of social protection, on demand of partner countries, contributed to the realisation of universal health coverage. Change processes were supported in Togo, Azerbaijan, Saint Lucia, Zimbabwe, Laos, Nigeria and the Democratic Republic of Congo. In this paper, we will compare the SOCIEUX+ actions regarding the equity design of financing mechanisms and identify key challenges and drivers for change. We will examine the technical design (revenue collection, pooling and purchasing of health services) and the role accorded to human rights and governance.

METHOD A retrospective analysis of the documents of SOCIEUX+ actions (e.g., mission reports) will be combined with interviews of experts and partner institutions and literature reviews of the situation of beneficiary countries.

RESULTS: The Socieux+ actions clearly contributed to the conception of vision and strategy for countries to make progress in their endeavour to reach more equity. SOCIEUX+ contributions alone are not sufficient for progress to be made effectively and lasting.

CONCLUSION: This ex-post evaluation of the technical design regarding equity and leverages and barriers for change shows that SOCIEUX+ initiatives are effectively contributing to the fight against inequity. It would gain on effectiveness and the results would be more sustainable if the actions would be linked to longer-term and high-intensity initiatives.

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Improving access to healthcare in Sierra Leone: the role of the newly developed National Emergency Medical Service

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BIOGRAPHY Anesthesiologist and Intensive Care specialist, Marta is currently a PhD student at the International Doctoral Program in Global Health, Humanitarian Aid and Disaster Medicine (Università del Piemonte Orientale – UPO & Vrije Universiteit Brussel – VUB). She is involved in several disaster medicine educational activities and serves as the training manager of the National Emergency Medical Service (NEMS) in Sierra Leone. Her research activity encompasses also projects in low resource settings and war zones, such as Uganda and Iraq.

OBJECTIVE To evaluate whether the first National Emergency Medical Service (NEMS) improved access to hospital care for the people of Sierra Leone.

METHODS We performed an interrupted time-series analysis to assess the effects of NEImplementation on hospital admissions in 25 facilities. The analysis was also replicated separately for the area of Freetown and the rest of the country. Study population was stratified by the main Free Health Care Initiative (FHCI) categories of pregnant women, children under 5 years of age and population excluded from the FHCI. Finally, we calculated direct costs of the service.

RESULTS We report a 43% overall increase in hospital admissions immediately after NEinception (RR 1.43; 95% CI 1.26–1.61). Analyses stratified by FHCI categories showed a significant increase among pregnant women (RR 1.54; 95%CI 1.33–1.77) and among individuals excluded from the FHCI (RR 2.95; 95%CI 2.47–3.53). The observed effect was mainly due to the impact of NEon the rural districts. The estimated recurrent cost per ambulance ride and NEyearly cost per inhabitant were 124 and 0,45 USD respectively.

CONCLUSIONS: To our knowledge, this is the first nationwide study documenting the increase in access to healthcare services following the implementation of an

ambulance-based medical service in a low-income country. Based on our results, NEwas able to overcome the existing barriers of geographical accessibility and transport availability, especially in the rural areas of Sierra Leone.

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Measuring 1-year impact of COVID-19 on routine immunizations in Sindh, Pakistan: Analysis of provincial electronic immunization registry

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BIOGRAPHY Subhash Chandir is Senior Epidemiologist and Director for Maternal and Child Health at IRD Global. For over 18 years, he has conducted or participated in various studies and projects in Pakistan, Bangladesh, Indonesia, Kenya, Nigeria, Peru, Ecuador, USA and UAE. His research focuses on infectious disease epidemiology, vaccine-preventable diseases, child health, pregnancy, economic incentives, digital health, artificial intelligence and operational research.

He also serves on the faculty at Harvard Medical School and Johns Hopkins Bloomberg School of Public Health, and is a member of the WHO Digital Health Technical Advisory Group.

OBJECTIVE Since the pandemic outbreak a year ago, COVID-19 has disrupted childhood immunizations globally, with devastating consequences for countries with fragile health systems. We conducted the one-year analysis of COVID-19 lockdown in Sindh, Pakistan, to quantify the pandemic's impact on routine immunizations in the province and the progress of the Expanded Program on Immunization (EPI) in maintaining immunizations.

METHOD We leveraged the real-time immunization records of >3 million children from the provincial Electronic Immunization Registry (EIR). Using the 6-month baseline preceding the COVID-19 lockdown, we quantified the lockdown (Mar 23–May 9, 2020) impact on reducing daily immunization rates. We calculated the change in coverage rates at the one-year mark since the lockdown across both modes of vaccine delivery (fixed and outreach) and the catch-up rate of children who dropped out.

RESULTS There was a 52.5% (26,004/49,531) decline in the daily average number of vaccine doses administered during COVID-19 lockdown as compared to the baseline.

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At the one-year mark since the lockdown, as of Feb 28, 2021, the daily average number of vaccine doses administered increased by 53.2% (26,353/49,531) compared to the baseline. This increase was driven mainly by the doses administered during outreach (146.6% (31,407/21,423)). In contrast, immunizations administered at fixed sites remain 18.0% (5,055/28,108) lower than the baseline. On average, 9,942 children missed their scheduled immunizations during the lockdown, out of whom 21.1% (88,061/417,553) remain uncovered as of Feb 28, 2021.

CONCLUSION Despite the disruption in routine immunization caused by COVID-19, coverage rates at the one-year mark since COVID-19 outbreak have surpassed the baseline rates in Sindh, Pakistan, indicating good progress made in mitigating the impact of the pandemic.

453**Access and utilisation of healthcare services in three states in South Sudan: a mixed methods study**

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BIOGRAPHY Harry is an advisor in health system strengthening with a Master's degree and PhD in Global Health from Vrije Universiteit Amsterdam. Harry is interested in health policy and system research, financing, governance and institutional arrangements and integrating social science theory, mixed methods and action research for strengthening health systems in low- and middle-income countries. Harry has worked in Benin, Indonesia, India and, most recently, South Sudan.

OBJECTIVE The ongoing civil conflict in South Sudan has crippled the nation's efforts at building a public healthcare system, with the proportion of individuals living within 5 km of a health facility decreasing between 2011 and 2016. Even as the Ministry of Health, with external donor support, has sought to broaden access through public healthcare delivery channels, including the community-focused Boma Health Initiative in 2017, there are insufficient data to characterise its impact on the South Sudanese population, or to understand current patterns of access and their link to health-seeking behaviour. We conducted a study to assess access to and utilisation of healthcare services in South Sudan and identify mediating factors of these.

METHODS This is a mixed methods study following a convergent parallel design and implemented across three states: Central Equatoria (urban), Western Equatoria

(rural, settled farming) and Warrap (rural, pastoralist). The qualitative data includes 69 semi-structured interviews and 27 focus group discussions with a mixture of state health officials, health staff or managers and health service users. The cross-sectional survey was administered to 1,228 households.

RESULTS Analysis is still ongoing, yet this study will identify factors influencing healthcare seeking and access to healthcare services, quantify the most prevalent health care needs, assess the awareness and utilisation of community-level boma health worker services and identify citizens' perceptions of access and quality of care. Given 97% of the households surveyed had at least one member needing to seek care in the three months prior to the survey, we expect to answer whether such health needs are being addressed through health service access and identify the factors mediating this.

CONCLUSION Understanding why people seek healthcare and what mediates the use of public services in South Sudan is integral for public health system strengthening and identifying priority areas for reducing morbidity, disability and mortality.

179**Implementation of a telemedicine platform supporting the cachi indigenous communities in Zapallo Grande, Cayapas river, province of Esmeraldas (Ecuador)**

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BIOGRAPHY My name is Paula. I'm 26 years old and I'm a nurse. When I finished my studies at University, I decided to study a Master in International Health and Development Cooperation. As part of my studies I met the NGO Asociación Amigos del Cayapas, I decided to take part of the team and lead the Telemedicine Project in Ecuador. I have also experience in national projects in Spain with vulnerable population and in a medical project in Cambodia.

The Pan American Health Organization (PAHO) supports and encourages the use of Telemedicine as a tool to

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reduce health inequities. The application of health technology mitigates the difficulty in accessing health resources. This is the case of the remote, dispersed and indigenous Cachi communities in Ecuador, which face multiple challenges that hinder services, as it has been witnesses worldwide during 2020 during the COVID-19 pandemic.

OBJECTIVES Design and implementation of a Telemedicine Platform in a health post, located in an indigenous and afroamerican community, in the tropical rainforest of Ecuador, allowing health professionals to: improve quality of care by sharing clinical cases with specialist colleagues, access to updated medical information through teleconsultations, enhance their learning process by discussing complex cases.

METHODOLOGY An international collaboration was set up between the Spanish NGO Asociación Amigos del Cayapas (AAC-CPK), the local Health Centre and the University of Guayaquil. The project team was composed by a diverse group of medics and telecommunication engineers. The methodology used was based on the Logical Framework Approach. The tool design was developed on the ground from January to March 2020, based on the local interests and needs, using qualitative surveys, interviews and technical analysis. An asynchronous (difered) teleconsultation platform was completed by December 2020. Teleconsultations turn-around time are withing 72h and answered by medical specialist who have previously worked in the area with AAC-CPK. In addition, a teaching module was incorporated to the platform, to offer training courses of general interest.

CONCLUSION A culturally adapted telemedicine platform was designed respecting a legal framework and accepted by the healthcare professionals to whom it was directed. It was operationalized during a piloting phase, pending its final evaluation. If proven successful, there is the potential for scaling up in the region after its transfer to the local authorities.

[Correction added on 15 December 2021, after first online publication: affiliations 2 to 4 have been added and linked to the 2nd author, L. Vasquez-Cevallos.]

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Geographic differences in maternal and child health care utilization in four Ethiopian regions: cross-sectional study

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BIOGRAPHY Atkure Defar is a public health researcher working in one of the national public health research institutes since 2011.

Academically, Atkure obtained MPH in Epidemiology from Addis Ababa University and has also received a master of business administration (MBA) from JU with research work on Health Economics. Furthermore, now he is a PhD candidate with a research focus on spatial (geographic) and time variation in maternal and child health problem services utilization before and after the Optimization of Health Extension Program implementation. Atkure has published more than 35 peer-reviewed articles.

OBJECTIVE The aim of the study was to assess the geographic distribution and determinants of utilisation MCH care utilization across four Ethiopian regions.

METHODS A cross-sectional community-based study was employed with two-staged stratified cluster sampling in forty-six districts of Ethiopia. A total of 6,321 women (13–49 years) and 3,110 children below the age of five years residing in 5,714 households were included. We performed a cluster analysis of the selected MCH care utilization using spatial autocorrelation. We identified district-specific relationships between care coverage and selected factors using geocoded district-level data and ordinary least squares and hotspot analysis using Getis Ord Gi*.

RESULTS of the 6,321 women included in the study, 714 had a live birth in the 12 months before the survey. One-third of the women (30%, 95%CI 26–34) had made ANC4+ and almost half of the women (47%, 95%CI 43–51) had delivered their most recent child at a health facility. Nearly half of the children (48%, 95%CI 40–57) with common childhood illnesses sought care at the health facilities. The proportion of fully immunized children was 41% (95%CI 37–45). Institutional delivery was clustered at district level (spatial autocorrelation, Moran's I = 0.217, P < 0.01). Full immunization coverage was also spatially clustered (Moran's I = 0.156, P-value < 0.1). Four or more antenatal visits were associated with women's age and parity, while the clustering of institutional delivery was associated with the number of ANC. Clustering of full immunization was associated with household members owning a mobile phone.

CONCLUSIONS This study showed evidence for geographic clustering in coverage of health facility deliveries and immunization at the district level, but not in the utilization of antenatal care and utilization of health services for common childhood illnesses. Identifying and improving district-level factors that influenced these outcomes

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may inform efforts to achieve geographical equitability and universal health coverage.

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Distance, difference in altitude, and socio-economic determinants of utilization of MCH services in Ethiopia: a geographic and multilevel modelling analysis

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BIOGRAPHY Atkure Defar is a public health researcher working in one of the national public health research institutes since 2010.

Academically, Atkure obtained MPH in Epidemiology from Addis Ababa University and has also received a master of business administration (MBA) from Jimma University, Ethiopia with research work on Health Economics. Furthermore, now he is a PhD candidate with a research focus on spatial (geographic) and time variation in maternal and child health problems and services utilization before and after the Optimization of Health Extension Program implementation. Atkure has more than 35 peer-reviewed publications.

BACKGROUND In the efforts towards universal health coverage, it is essential to reduce inequities in the utilization of health services. We assessed whether geographic distance and difference in altitude between home to health facility and household socio-economic group were associated with utilization of maternal and child health services in rural Ethiopia.

METHODS A household and health facility surveys was conducted from December 2018 to February 2019 in 46 districts of four Ethiopian regions. A total of 11,877 women aged 13–49 years and 5,786 children aged 2–59 months were included. The outcomes were four or more antenatal care visits, facility delivery, full child immunization and utilization of health services for sick children. A multilevel analysis was carried out with adjustments for potential confounding factors.

RESULTS Overall, 39% (95%CI: 35–42) of women had attended four or more antenatal care visits and 55% (95%CI: 51–58) delivered at health facilities. One in three (36%, 95%CI: 33–39) children had received full immunization and 35% (95%CI: 31–39) of sick children used health services. A long distance (AOR = 0.57; 95% CI 0.34–0.96) and larger difference in altitude

(AOR = 0.34; 95% CI 0.19–0.59) were associated with fewer facility deliveries. Larger difference in altitude was associated with a lower proportion of antenatal care visits (AOR = 0.46; 95%CI: 0.29–0.74). A higher wealth index was associated with a higher proportion of antenatal care visits (AOR = 1.67; 95%CI: 1.02–2.75) and health facility deliveries (AOR = 2.11; 95%CI: 2.11–6.48). There was no association between distance, difference in altitude, or wealth index and children being fully immunized or seeking care when they were sick.

CONCLUSION Achieving universal access to maternal and child health services will require not only strategies to increase coverage but also targeted efforts to address the geographic and socio-economic differentials in care utilization, especially for maternal health.

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Exploring Disability Support in Primary Schools in Tanzania: A Case Study of Inclusive Education

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BIOGRAPHY Gabriel Dillon is an alumnus master's student of the University of Bergen, a practicing physiotherapist in Australia and recently he has accepted a Ph.D. Scholarship with the Queensland University of Technology implementing and evaluating exercise program for tertiary students with disabilities. Gabriel's scientific interests are Health, Disability and Inclusion.

BACKGROUND Children with disabilities often experience highly insufficient access to healthcare and education leading to poor social participation in low- and middle-income countries. In Tanzania, the right to inclusive education and to rehabilitation is endorsed policy-wise. Disability support in the primary school setting should be considered an integral part of building strong healthcare systems. Ten years before the Agenda 2030 is to be fulfilled, inclusive support for children with disabilities in primary schools is important to examine, both from an educational and healthcare point of view.

OBJECTIVES This study aimed to explore the needs, strengths and challenges of disability support for primary school-aged children as perceived by key stakeholders in rural and urban Tanzania.

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METHODS A qualitative, exploratory, multi-sited case study design was used to study key stakeholders' experiences regarding disability support. Data was collected through participant observation, document collection, group discussions and semi-structured interviews.

RESULTS Stigma, poverty and a sense of fruitlessness discouraged the inclusion of children with disabilities in school. However, when provided, assistive devices and skills promoted inclusion. Under-resourcing and inaccessible facilities led to immense pressure mostly felt by the teachers. A local NGO engaged communities and brought about social change. Various stakeholders agreed that the government was holding back from investing in inclusive education.

CONCLUSION Inclusive policies are in place in Tanzania, yet implementation of disability support measures seem to be missing. Local NGOs demonstrated how investment in culturally sensitive awareness-raising engaging stakeholders at all levels and empowering individuals and communities can drive greater social and educational support and inclusion of children with disabilities. However, systematic and sufficient economic investment in structures and workforce by the government is needed for such collaborative initiatives to be sustainable.

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Feasibility assessment of introducing immunization-carpool services to facilitate immunization visits of <2 years children in rural Pakistan

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BIOGRAPHY Rozina Feroz Ali is a Program Manager at IRD-Pakistan. She is a clinical doctor with a Master's degree in Health Policy and Management from Aga Khan University. For over 8 years, she has worked on various projects covering childhood immunization, antenatal care, tuberculosis, digital health and adolescent health.

OBJECTIVES The urban-rural disparities in childhood immunization coverage rates are related to known accessibility barriers such as distant-centers, lack of transportation and socio-cultural restrictions on women to travel alone, particularly in rural settings. We assessed the feasibility of establishing immunization carpool services for women using local transport options to facilitate childhood vaccination visits; and its uptake by caregivers of <2 years children.

METHODS Four low-coverage immunization clinics were selected based on the availability of vaccinators and vaccines in Shikarpur, a rural district in Pakistan. Locally

available transport providers were identified and contracted to rent-in vehicles. Carpool vehicles were labeled and community mobilization was done. Data were recorded on the number of catchment areas for each center and their distances from respective centers; the number of round trips and immunization visits facilitated by each vehicle. Children transported to centers were enrolled; their demographic information, immunization details and feedback on carpool services were captured from caregivers.

RESULTS From January to October 2020, 6 vehicles were deployed, which provided free transport services in 98 catchment areas of 4 selected centers. The mean distance of areas from respective centers was 4.0 km (SD: 2.5). On average, each vehicle completed 420 (SD: 58.2) round trips and facilitated 781 (SD: 171) immunization visits. A total of 2,391 children were transported and enrolled, 1,182 (49.7%) of them were females and 1,197 (50%) aged <6-months. Enrolled children, compared to non-enrolled children at the same immunization clinic, showed higher coverage rates for penta-3 (80.7% vs 67.6%) and measles-1 (74.2% vs. 50.6%) vaccines. Reported advantages of intervention include easy commuting (89.3%), time-saving (92%), cost-saving (79%), increased accessibility (97%) and reduced dependence on family members (95%).

CONCLUSION Immunization carpool service is well-accepted by rural women and can improve immunization coverage and equity in rural areas.

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Adapting teaching and learning in times of COVID-19: A comparative assessment among higher education institutions in a global health network

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OBJECTIVE This research examines the ways in which higher education institutions (HEIs) across the tropEd Network for Education in International Health (tropEd) have adapted their teaching and learning approaches in response to the COVID-19 pandemic in 2020 and 2021. HEIs' responses demonstrate global health approaches emphasising cooperation and communication, rather than international health driven strategies emphasising quarantine and control. Key lessons learnt for multiple dimensions of teaching and learning in global health are thus identified and challenges and opportunities discussed.

METHODS Data collection includes cross-sectional online surveys among tropEd member institutions ($n = 19$) in mid-2020 and 2021 and a complementary set of open-ended questions generating freetext responses ($n = 9$). Standardised data were analysed using descriptive statistics, textual data were analysed using a Framework Analysis approach.

RESULTS While early on in the pandemic the focus was on a quick 'emergency' switch to online teaching formats to ensure short-term continuity and developing the administrative and didactic competence and confidence in digital teaching, the later phases of the pandemic were characterised by a greater emphasis on quality and longer-term reform in higher education in global health. Initial concerns about the limitations of digital teaching and declines in student numbers, have evolved into a greater recognition of opportunities in terms of inclusivity, the necessity of cross-border cooperation and a global health approach. The extent to which the lack of physical mobility impacts HI programmes in global health remains debated.

CONCLUSION The COVID-19 pandemic has brought about preventive measures that have had a considerable impact on various dimensions of academic teaching in global health. Going forward, international HEIs' experiences and response strategies can help generate important lessons for academic institutions in different settings worldwide.

426**Interactions between child health and the Sustainable Development Goals – an empirical assessment in Cambodia**

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BIOGRAPHY Daniel Helldén is a medical doctor and PhD student at the Department for Global Public Health at Karolinska Institutet, primarily interested in the intersection between child health and broader sustainable development.

OBJECTIVE With the implementation of the 2030 Agenda and the Sustainable Development Goals (SDGs) there is a need for a framework for understanding how child health is related to other sustainable development outcomes. Cambodia has made great advances in child health and recently adapted the SDGs into the Cambodian Sustainable Development Goals (CSDGs). A systematic assessment of how the SDGs influence child health and vice versa has however been lacking. This study aimed to contribute to such an assessment by considering the interactions between the SDGs and child health in Cambodia.

METHODS The participatory semi-quantitative SDG Synergies method was applied in order to systematically assess the interactions. Over a two-day workshop, 29 governmental and non-governmental stakeholders scored 272 interactions between 17 CSDGs where CSDG 3 represented child health on a seven-point scale from strongly restricting (-3) to strongly promoting (+3). From this a cross-impact matrix was derived and network analysis applied to determine first and second-order effects of the interactions with a focus on child health.

RESULTS Overall, stakeholders perceived in general that there are promoting interactions between the CSDGs and child health and that CSDG 16 (peace, justice and strong institutions) might have the largest synergistic potential for the achievement of the CSDGs. Stakeholders perceived that progress on child health promotes the achievement of all other goals except for CSDG 15 (life on land) in Cambodia. Conversely, progress on all other goals positively influence child health.

CONCLUSIONS The investigation of the interactions surrounding the SDGs and child health in Cambodia provide insights on how complex relationships play out at country level, illuminating critical synergies and trade-offs. This understanding is vital for informing policy coherence and multisectoral partnerships that can accelerate the work towards achieving the 2030 Agenda and the betterment of global child health in Cambodia and beyond.

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Socioeconomic inequality in breast and cervical screening among women in six low- and middle-income countries – decomposition of socioeconomic inequality

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BIOGRAPHY Hoang has a preventive medicine background with an MSc in Global Healthcare Management and an MPH specialising in health equality. She has experience in social epidemiology research.

Global inequality in breast and cervical cancer incidence and mortality can be attributable to global inequality in cancer screening besides other associated factors. Socioeconomic-related inequalities in breast (BCS) and cervical cancer screening (CCS) among women over 21 in six low- and middle-income countries is measured and decomposed in this study.

METHODS This study used data from WHO SAGE Wave 1 (2007–2010). Nationally representative women aged over 21 years in China ($n = 7001$), India ($n = 6330$), South Africa ($n = 1865$), Ghana ($n = 2288$), Russia ($n = 2645$) and Mexico ($n = 1588$) were analysed. Erreygers concentration indices (CIs) for each country were computed and decomposed for the measurement and explanation of inequality in BCS and CCS using wealth index as a rank variable. Multilevel logistic regression models were constructed to assess the association between BCS and CCS and socioeconomic status (SES) considering country as second level.

RESULTS The large proportion of variation in BCS (45%) and CCS (60%) of individuals can be explained by differences between countries. The outcomes were significantly associated with SES (OR richest: 1.85, 95% CI 1.57–2.18 (BCS) and 1.85, 95% CI 1.57–2.19 (CCS); poorest is reference) after controlling for sociodemographic factors. The positive overall CIs indicated that cancer screening uptakes were more represented among the rich. Rural residence (66.4%), SES (38.6%) and currently working (131.6%) were the main contributors to the inequality in BCS in China, South Africa and Russia, respectively. For CCS, SES explained the most of total inequality in China (63.9%) and South Africa (40.1%), while never schooled and rural residence contributed mostly in India (85.5%) in Ghana (110.0%), respectively.

CONCLUSION High SES was positively associated BCS and CCS uptakes. Socioeconomic inequality in both BCS and CCS was pro-rich and against lower SES women. The inequality was explained mostly by SES, education, rural residence and employment.

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Traditional hot-iron-rod healing practices for indigenous sick children in Odisha, India

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BIOGRAPHY Shubharanjan Jena is a public health researcher; expertise in scientific documentary film making.

E. Venkata Rao is a trained public health professional with close to 58 national and international publications and authored chapters in several textbooks.

SK Satpathy Physician cum Public Health expert and he is currently the director of KSPH.

S. Pati, a physician cum scientist is currently the director of RMRC, Bhubaneswar. She has several scientific publications which include prestigious journals like The Lancet, PLOS One etc

Krushna Chandra Sahoo is working as a Public health specialist and is proficient in qualitative research.

OBJECTIVES Prevention of child mortality and morbidity is one of the major public health challenges among indigenous communities in India. Traditional hot-iron-rod healing practices are commonly used for the treatment of children among certain indigenous communities. We explored the mothers, traditional healers and community health workers (CHWs) beliefs and experiences on such practices.

METHODS We have conducted a qualitative study in Nabarangpur, Odisha, India. The In-depth Interviews (IDIs) were conducted with eight mothers, seven traditional healers and four Focus Group Discussions (FGDs) between CHWs. All IDIs and FGDs were performed in the local language, digitally recorded, transcribed, translated into English and analyzed using thematic analysis. We've coded the data with MAXQDA software.

RESULTS Two main themes emerged: 'Existing hot-iron-rod healing practices among under-five children and their post consequences and 'health promotion and prevention with a focus on health system preparedness.' We found that many mothers strongly believe in hot-iron-rod healing and perceived that hot-iron-rod therapy would protect children from disease. It has been embedded in their culture since ancient times.

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CONCLUSIONS Poor health literacy, cultural beliefs, traditional healing decisions are key determinants for hot-iron-rods therapy among indigenous communities. There is a need for an in-depth understanding of health-seeking behaviour, a special training program for health professionals and awareness-raising practices among the indigenous community in order to change such behaviour, which is crucial for building strong health systems to achieve universal health coverage.

KEYWORDS: Odisha; Branding therapy; under-five children; tribal-community; traditional beliefs

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Examining Healthcare Workers' Perspectives & Insights Concerning Availability of Medical Equipment in Three Ethiopian Hospitals: A Qualitative Pilot Study

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BIOGRAPHY Living in Ethiopia, through the loss of close relatives from preventable causes, Eyasu witnessed the poor conditions of the nation's health infrastructure firsthand. He realized the well-being of a country's people relies on the strength of its health system. Now, as an alumnus of Stanford University, he hopes to address health inequity issues regarding shortage of medical equipment occurring in the country.

Ezra is a senior at Stanford University. Inspired to pursue medicine from an early age, Ezra hopes to become a physician-scientist and design medical equipment to improve the overall lives of patients in hospitals.

OBJECTIVE Hospitals in the USA have an abundance of unused medical equipment while many developing countries are in considerable need of these resources. Many nongovernmental organizations (NGOs) have donated medical equipment to health centers in low-resource settings to circumvent this issue; however, studies show many of these donations are not usable by the facilities that receive them. To better serve the partner hospitals of our NGO, Oasis Medical Relief (OMR), we investigated the perspectives and insights of Ethiopian healthcare workers (HCWs) on the medical equipment distribution paradigm of the nation.

METHODS Semi-structured, open-ended interviews ($n = \text{six}$) with HCWs (four physicians and two hospital administrators) working in hospitals in Addis Ababa and Southern Nations, Nationalities and Peoples' Region

(SNNPR) of Ethiopia. Interviews were recorded and transcribed. Categorical content analysis was utilized to develop themes. Topical areas addressed by questions include: populations served, prevalence of diseases, laws and strategies guiding medical equipment distribution, funding and budget for medical equipment, etc.

RESULTS Three themes related to perspectives and insights of HCWs on the current medical equipment distribution paradigm in Ethiopia interviewed include: 1) state of healthcare concerns, 2) medical equipment scarcity, 3) policy-shaping medical distribution paradigm.

CONCLUSION Pre-donation assessments utilized to understand equipment needs is a recognized process to more effectively address medical equipment/supply shortages by the World Health Organization. However, to further strengthen such efforts, qualitative interviews with HCWs are a tool that can be utilized to promote greater understanding that enhances a more effective partnership between NGOs and their partner hospitals. Furthermore, increasing decentralized methods of procuring medical equipment should be further explored to mitigate issues with national distribution of medical supplies.

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Is the utilization of healthcare facilities easy for young people in Burundi?

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BIOGRAPHY Marie Merckling is a young researcher starting her activities in the field of public health after about 10 years of professional practice as an occupational therapist. She owns a master degree in public health specialized in biostatistics and epidemiology. She started to analyze the data of that burundian survey during her master internship at the School of Public Health (ULB) in 2020 and she now has a research contract for the same survey.

OBJECTIVE Burundi has a very young population, with a median age of 17. Therefore, youth is a public health priority to be considered to achieve UHC. This 2019 study aims to identify the determinants and behaviors of youths (10–24 years) in order to guide health policies, particularly regarding Healthcare Facilities (HF) utilization.

METHODS This descriptive study is a 4-stage survey design with 110 clusters. 2085 youths were interviewed in 11 of the 18 provinces of Burundi.

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RESULTS 79.2% of respondents judged HF pleasant/nice to use as youths. However, 22.5% of respondents did not use HF last time they had a severe disease. This proportion is higher for boys (25.5%) than girls (20.3%) and for adolescents (10–19y: 24.0%) than young adults (20–24y: 16.4%). The 3 major reasons given, which together represent 88.9% of the responses, are: lack of money, distance to the HF and self-medication. HF utilization for a severe disease is correlated to education level: 81.4% of literate respondents went to HF while only 66.2% of the (functionally) illiterate did. Besides, HF utilization shows a gradient according to educational attainment among respondents who do not attend school anymore (low: 67.6%, middle: 76.5%, high: 82.7%). In case of illness – regardless of severity – , girls are more likely than boys to attend HF (87.9% vs 81.7%). Self-medication is more used by boys (10,4%) than girls (6,9%).

CONCLUSION More than 1/5 individuals of 10–24y do not use HF when needed. Widespread self-medication appears as an inadequate substitution practice. Besides, gender, age and education level contribute to disparities in HF utilization. The health system provides free care for under 5 children but not much has been done to facilitate the access to care of the youths, specially for the youngest not yet able to afford their own care.

393**Barriers and facilitators to the implementation of community health worker programmes in South Sudan**

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BIOGRAPHY George William Lutwama. MPH, MBA, MD, PhD, is a Ugandan national with over 25 years of experience in clinical practice, public health management, programme management and public health research across East Africa. He has worked in South Sudan for the past 8 years and currently holds the position of operational research manager within Health Pooled Fund that supports 80% of health facilities in South Sudan.

OBJECTIVE Community health workers (CHWs) are crucial for increasing access to health services to communities. Due to decades of conflict and under-funding, access to health care in South Sudan remains severely limited. To improve equitable access to healthcare, the government has introduced the Boma Health Initiative (BHI), a strategy to harmonise community health programmes across the country. To scale up the BHI, it is important

to assess recent CHW programmes and draw lessons for future implementation. This study aimed to explore the characteristics, barriers and facilitators to the implementation of CHW interventions in South Sudan between 2011 and 2019.

METHODS The study used a qualitative approach drawing from 26 key informant interviews and a scoping review of 21 policy documents and donor reports from 2011 to 2019. The results were thematically analysed based on a conceptual framework on factors influencing the performance of CHWs.

RESULTS Funding of CHW programmes has come from international donors, channelled through non-governmental organisations (NGOs) that have implemented a variety of CHW programmes. Communities have been participating in the selection of voluntary CHWs, intervention areas and occasionally in the supervision of activities performed by CHWs. The coordination mechanism among stakeholders have been weak, leading to wastage and duplication of resources. Although training of CHWs is done, training duration was short and refresher-trainings were rare. There were and still are disparities in the type of incentives provided to CHWs. Monitoring and supportive supervision activities have been insufficient; drug misuse and stock-outs were common.

CONCLUSION Despite their challenges, CHW programmes can be implemented in conflict-affected setting of South Sudan if the local human capital is leveraged and engaged by NGOs as implementing partners. Robust coordination efforts are required to build synergies among stakeholders for the effective implementation of the BHI strategy.

65**Can the Eye Health Assessment help high-income countries achieve universal eye health?**

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BIOGRAPHY Jonathan Malcolm is a postgraduate student studying Public Health for Eye Care at the London School of Hygiene and Tropical Medicine.

OBJECTIVE The drive for universal eye health is primarily focused on low- and middle-income countries. However, as demonstrated in the “See the gap” report, systemic inequalities still persist in the eye services of high-income countries such as the UK. To measure the extent that universal eye health is achieved, policy makers often use

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structured assessment tools such as the Eye Health System Assessment (EHSA). Thus far, the EHSA has exclusively been applied to low- and middle-income countries. Given that inequalities still exist in high-income countries, countries such as England may also benefit from this tool. This is the first case study, to our knowledge, of the EHSA being applied to a high-income country, England. The objective was to inform policy makers in England and assess the role of the EHSA in high-income countries.

METHODS A structured assessment of eye services in England was carried out using the indicators in each of the six EHSA modules. Modules include finance, governance, health information systems, service delivery, human resources and medicines and technology.

RESULTS Although the EHSA revealed strong evidence of universal eye health, in regard to General Ophthalmic Services and uncorrected refractive error, England falls behind its neighbouring countries due to inequitable fee structures. Three core recommendations are suggested by the EHSA. Urgent priorities include establishing a national eye care strategy to enhance service integration and increasing the NHS eye care workforce to meet the needs of a demographically diverse population. The tool also indicates that policy should aim to streamline primary care cataract surgery referral pathways to ensure universal access.

CONCLUSIONS: As demonstrated in this case study, the EHSA can be used to conduct a rapid and comprehensive assessment of universal eye health in high-income countries. Recommendations for achieving universal eye health in England have been proposed.

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Novel collaborative efforts have increased capacity for Universities in Tanzania and Ethiopia in Occupational Health and Safety (OHS)

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BIOGRAPHY Simon Henry Mamuya has over 30 years in environmental and occupational training and research. He is Associate of Environmental and Occupational Health. He teaches BSc and MSC and supervise research and PhD at the University in Tanzania. He was Head of the department of Environmental and Occupational Health for eight years. He was project coordinator

Norhed/NORAD project titled Reduction of injuries and occupational health among workers in the developing countries in collaboration with Addis Ababa University and University of Bergen from 2014 to 2020. Has published over 50 papers in peer reviewed Journals.

OBJECTIVE Millions of men and women globally are employed to work in poor and hazardous conditions. Developing countries lack an adequate occupational health workforce to curb the situation. The NORHED project aimed building capacity for quality research and training in occupational health in Tanzania and Ethiopia in collaboration with University of Bergen.

METHODS The project lasted from 2014 to 2020. MUHAS in Tanzania, Addis Ababa University (AAU) in Ethiopia and University of Bergen (UiB) in Norway collaborated to improve occupational health and safety (OHS) courses towards BSc and Master's degrees. We worked to improve MSC curricula and research activities among staff, to improve laboratories in occupational health, on library enhancement and online training. Skype and biannual meetings in Tanzania and Ethiopia were used for regular communication among participants.

RESULTS A total of sixty master students graduated in Occupational Health and Safety at the two universities in the project period. Five PhDs and five postdoctoral candidates have done research in occupational epidemiology, combined with exposure studies. Two laboratories have been strengthened by procurement of equipment and laboratory rebuild. An online course was developed and three book chapters were produced. Thirty-four original manuscripts have been published in peer-reviewed journals and thirty one abstracts presented in conferences. Gender sensitization workshops have been held at MUHAS and AAU Dissemination seminars have been held in Tanzania and Ethiopia, engaging policy makers and practitioners in health and safety.

CONCLUSION The number of trained specialists in occupational health has been augmented in Tanzania and Ethiopia due to the effort of the NORHED- I project. The universities are able to produce competent people to cater for the countries' OHS service needs.

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Listening up: Using patient feedback to strengthen health interventions in neglected tropical disease care

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OBJECTIVES Patient-centred approaches are needed to ensure that health interventions, such as morbidity management and disability prevention (MMDP) and treatment of NTD's, are appropriate and accessible to all in need. Beneficiary feedback mechanisms (BFM) provide a means to collect, analyze and act upon patients' perspectives on health care delivery and provide feedback to stakeholders on actions necessary to address their needs. The Ascend Lot 1 programme aims to support national governments in strengthening BFM. We will present a number of BFM pilots around MMDP activities for lymphatic filariasis, trachoma and visceral leishmaniasis (VL) treatment across the Ascend Lot 1 countries since 2021.

METHODS Centred around alignment with existing system and processes working closely with Ministries of Health, country and disease specific patient feedback approaches were developed and implemented. Where possible, these approaches were integrated into routine programme delivery, including 7–10 day post-operative visits for hydrocelectomy and trachiasis surgeries, client satisfaction surveys for lymphedema and VL patients receiving care and treatment and open ended in person and telephone follow-ups by disease and regional focal persons. Recommended changes to programmatic activities were documented.

RESULTS While results are still coming back, preliminary data has demonstrated that patients are willing, sometimes eager to share thoughts. Initial results from VL patients in Bangladesh have shown that access to care is an issue and Kenyan VL patients have advocated for more decentralised care. Investments in training, sensitisation and human resources are often required to collect feedback.

CONCLUSION Patient feedback is effective in illuminating programmatic shortcomings, but its perceived value and impact of improving programme efficiency must be weighed against its costs. Feedback mechanisms are most cost effective and feasible when integrated within existing project frameworks. Patient expectations should be managed and the added value of BFM must be demonstrated to health ministries to promote systemic uptake.

408**A digital solution for a better health management of refugees in Chad**

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BIOGRAPHY Barbara Matthys is a public health specialist and trained epidemiologist (PhD) with 14 years of experience in project coordination and implementation research. She has provided managerial and technical assistance to a long-term malaria control project in the Democratic Republic of Congo. She currently ensures the technical coordination of a 4-year pilot project developing a digital health support system to empower health professionals in providing quality care to refugees and enhance epidemiological control in refugee camps in Chad. She has conceived, implemented, coordinated and technically backstopped epidemiological and health services-related surveys. She has country experience in sub-Saharan Africa and Central Asia.

The Project 'Digital System for a Better Health Management of Refugees' aims to improve the quality of health care for refugees in Chad. A digital solution integrating 4 tools for clinical and therapeutic decision-making, electronic registers for prenatal consultations and vaccination and a database for disease outbreak alerts, is developed and implemented. The solution's replicability is explored in comparable contexts.

The project phases include feasibility, development, implementation and capitalization. We analysed the medical conditions, services offered and technical competence and the state of infrastructure and information technology in 3 selected health centres in southern Chad covering a refugee population of 45'000. A first set of clinical algorithms for identified common diseases (including mental health conditions) of adults, children and adolescents aged 2 months to 15 years, were developed by clinicians, approved by a Chadian committee of medical experts, digitized and pilot tested in the health centers in partnership with the UNHCR and the Chadian NGO "Centre de Support en Santé Internationale".

The findings from the pilot test guided the next steps, particularly how the clinical decision support system (CDSS) can be integrated into the local process of medical care and what measures are needed to maximize the use of the tools. Challenges include the complexity of the technological solution taking into account the poor internet connectivity, power supply and the SARS-CoV-2 pandemic and related travel restrictions.

The CDSS builds on the choice of symptoms and the scope of application covers a whole life span. We adopted a parallel development and implementation approach: the launch of a basic version is followed by two extensions that are gradually introduced. Since the local project team bears much implementation responsibility, a close

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collaboration with the international project team was established, mainly through virtual exchanges.

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Is it ethically acceptable to not include safe abortion care in universal health coverage?

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BIOGRAPHY Emily McLean is a medical doctor now undertaking her PhD at the University of Bergen looking into ethics and priority setting related to abortion.

OBJECTIVE Abortion done by trained personnel under sanitary conditions is simple and low risk, yet women die every day of abortion complication. This is due to unsafe abortions done by untrained personnel or in unsanitary conditions or both. They account for a substantial part of avoidable maternal deaths, especially in countries with restrictive abortion laws. Poor women have less access to safe abortions and suffer the most.

Universal health coverage (UHC) has a vision of equitable health services without the risk of financial hardship. Providing safe abortion is cheaper than treating complications from unsafe abortions, it prevents women from dying, it protects against financial hardship and promotes gender equality, yet some countries have decided to not include the service in their UHC packages. Given these health, equity and financial benefits, can it be ethically acceptable to not include safe abortion care in the UHC-packages?

METHODS An ethical analysis called the 7-step ethical analysis is used, where relevant information and normative arguments are structured and weighted against each other.

Preliminary results and CONCLUSION International and national laws regulate women's rights and abortion access. The most important stakeholders in this dilemma are women, the state, health workers, the hospital and international institutions. This creates several conflicts of interest, such as (1) the right of women to bodily integrity vs. laws limiting abortion access; (2) international goals to reduce maternal deaths vs. states right to shape national health policies; (3) hospitals' obligation to provide health care vs. health workers right to deny providing specific services; (4) international donors health OBJECTIVES vs. state health OBJECTIVES. The ethical principles of autonomy, doing good, doing no harm, equitable access to health care and fair distribution of resources are here at stake and need to be weighted against each other in order to draw a conclusion.

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Development and feasibility-testing of an artificially intelligent chatbot to answer immunization-related queries of caregivers in Pakistan: A mixed-methods evaluation

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BIOGRAPHY Fatima Miraj is a Senior Research Associate in the Maternal and Child Health Program at IRD Pakistan. She has experience of working within the development sector in Pakistan, with a focus on service delivery and research pertaining to maternal and child health (MCH), childhood immunizations and digital health interventions. She holds a Bachelor's degree in Economics and Finance from the Lahore School of Economics.

OBJECTIVES Despite free vaccination services, gaps in information access impede immunization uptake in low and middle-income countries (LMICs), including Pakistan. We developed Bablibot (Babybot), a local-language, text-based chatbot which connects caregivers to immunization-related information in real-time. Our objective was to evaluate feasibility and acceptability of Bablibot in responding to immunization-related queries among Karachi's low-income communities.

METHODS We developed Bablibot using Natural Language Processing (NLP), Machine Learning and Human in the Loop features and then conducted a sequential mixed-methods pilot in Karachi. Caregivers were recruited when visiting one of 12 selected immunization centers for any childhood vaccine except Measles 2 (given at last vaccine visit). Additional caregivers were reached through targeted text messages. We assessed Bablibot's feasibility and acceptability through user-engagement metrics and thematic analysis of qualitative data generated through interviews with 20 pilot participants.

RESULTS Between March 9, 2020 and February 28, 2021, Bablibot accrued 599 users, responded to 1,605 messages and participated in 752 distinct conversations. Of 2,202 pilot-enrolled caregivers, 203 (9%) had interacted with the bot; additional 396 users were not pilot participants. Most conversations were about due dates (28%; 212/752), side-effect management (18%; 133/752), or delaying vaccination due to child's illness or COVID-lockdown (17%; 129/752). The conversations now constitute a valuable training database for future local-language bots. Over 90% (219/239) of responses to text-based exit surveys indicated satisfaction with Bablibot.

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Qualitative analysis showed caregivers appreciate Bablibot's convenience, reliability and responsiveness.

CONCLUSION Our results demonstrate the feasibility and acceptability of local-language NLP chatbots in providing real-time immunization information in LMIC settings. Text-based chatbots can minimize the workload on help-line operators, in addition to instantaneously resolving caregiver queries that otherwise lead to delay or default. Conversation data generated through Bablibot also provides learning infrastructure for future health-related NLP bots in South Asia.

87**Women, Health and Solidarity: Evidence from a Case Study in Rural Senegal**

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BIOGRAPHY Maria's research area is mainly focused on the relation between public health and socio-economic development, including community health financing and health policy in low income contexts. She holds a MA in Economics and Development and a diploma in Tropical Medicine and Health Cooperation from the University of Florence. She conducted periodic field research in Uganda where she collaborated with UNICEF and Doctors with Africa CUAMM leading several data collections. She is currently a PhD candidate in Development Economics. She has presented her field research at national and European conferences and published on community health insurance in academic journals.

OBJECTIVE In low- and middle-income countries, economic hardship due to health expenditures represents a common risk for households' welfare and women are particularly exposed to negative consequences of catastrophic health expenditures. In Senegal, the goal of Universal Health Coverage has been translated into several reforms to improve financial protection. However, Community-based Health Financing schemes are not yet capable to reach most of the rural population. The objective of this study is to explore potential synergies between membership to community-based women groups and financial protection for health expenses. Specifically, we seek to analyse whether existing mutual-help networks among women can constitute a leverage to improve

health coverage among the rural population of Sedhiou district (Southern Senegal).

METHODS The research design is based on a mixed-methods approach integrating quantitative and qualitative evidence. First, desk review and Key Informant Interviews with district-level stakeholders are performed to identify the main obstacles against accessibility to health services and specific gaps related to maternal care. Second, individual questionnaires are used to examine perceptions, health-seeking behaviours and willingness to pay for health financial protection among members of women groups. Third, Focus Group Discussions with women are carried out to disentangle the reasons of community preferences and behaviours for health financing.

EXPECTED RESULTS After the conclusion of the data collection, we expect to achieve a better understanding on membership to women groups and level of financial protection. It will highlight the relation between women empowerment for sexual and reproductive health on one hand and improvement of accessibility to health care on the other hand.

CONCLUSION Given the goal of Universal Health Coverage, our study will offer policy-relevant insights to enhance accessibility to health care by rural women in Senegal, identifying the potential role played by community-based women groups to facilitate the expansion of financial protection.

315**Identifying a viable macroeconomic framework to restore and improve food security in Venezuela**

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BIOGRAPHY Nutritionist and Dietician from Venezuela with international professional experience in Low- Middle-income settings in Latin America. Focused on studying, diagnosing, preventing and treating health conditions related to nutrition by combining the clinical approach and social determinants of health and food system

Academic Degrees B.Sc. in Nutrition and Dietetics, Sp. in Clinical Nutrition, M.Sc. in International Health.

OBJECTIVE To formulate a macroeconomic policy framework to improve food security in Venezuela by defining strategies implemented when restoring and sustaining food security, based on the role of economics on food security.

METHODS A Scoping literature review in Spanish and English using Pub Med and Scholar Google delineating

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actions to improve food security through macroeconomic development.

RESULTS 58 Selected Sources of Literature (SSL) were included in the final data extraction. The SSL were analyzed and classified according to their aim, methodology and approach and classified into five collections of literature. Each collection of literature was examined providing strategies, actions, or tactics linked to improvements in food security and related to economic development, branded as Food Security Actions (FSAs). A total of 96 Food Security Actions (FSAs) were identified and extracted, several of which were interrelated to others through their similar source, focus, or aim. Therefore, all the FSAs were then individually analyzed, pooled and empirically classified into five general categories, namely: Aid and Assistance, Agricultural Development and Sustainability, Economic Growth, Policy Coherence, Social Development and Protection and Equity. Each contains three specific subcategories, except for the Aid and Assistance category, which only includes one subcategory. The diverse focus of the FSAs collected are key to improve food security in Venezuela.

CONCLUSION A successful food security framework for Venezuela requires the implementation of orchestrated strategies across sectors (local, national and international). The country's food security agenda should be supported as a long-term goal, with clear **OBJECTIVES** beyond issues of transitional political power cycles. The proposed framework encompasses five categories and 96 FSAs, together with financial resources, political will and continuous monitoring to ensure sustainability. If implemented, Food Insecurity could decrease in the short term, reducing poverty and building the path for long-term economic growth and stability.

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Factors influencing global equitable access to COVID-19 vaccines for low-and middle-income countries: a scoping review

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BIOGRAPHY Elizabeth Peacocke is a senior advisor at the Norwegian Institute of Public Health. She was seconded to assist in establishing the Coalition for Epidemic Preparedness Innovations. Her areas of management expertise are related to implementation of public health

initiatives in high-, middle- and low-income country settings. She is currently implementing evidence for policy decision support projects in low- and middle-income countries.

OBJECTIVE COVID-19 threatens the attainment of the goal of UHC by 2030, with increased burden on health systems and halting economic progress. Global vaccination is key to end the COVID-19 pandemic, ensuring sustained and accelerated gains on UHC. By February 2021, eleven COVID-19 vaccines had received approval, but the international community is facing the challenge of how to ensure equitable distribution and access to COVID-19 vaccines globally. Historic approaches indicate that possible inequities in distribution and access are more likely to affect resource-limited countries. The aim of this scoping review was to identify and summarize the factors related to the equitable access of a COVID-19 vaccine for low- and middle- income countries.

METHODS The review followed the PRISMA guidelines for scoping reviews and a five-stage framework for scoping studies. Systematic searches in four databases resulted in 1,492 unique citations of which 13 were selected as meeting our predefined inclusion criteria. Adaptation of a newly proposed multi-value ethical framework for fair allocation of COVID-19 vaccines guided data extraction and analysis.

RESULTS Through our analysis of identified factors, we derived six key messages: 1) Collectively agreed global mechanism frameworks may facilitate equitable access to COVID-19 vaccines; 2) Financial mechanisms such as collective Advanced Purchase Agreements may favour fair allocation; 3) Large-scale vaccine manufacturing and distribution can support fair allocation; 4) Sharing manufacturing know-how with middle income countries can support supply of COVID-19 vaccines; 5) Reciprocity facilitates equitable access and 6) Countries' strength in implementing vaccination programs influence their populations' access to vaccines.

CONCLUSION This scoping review identified the potential challenges facing equitable access to COVID-19 vaccines. The majority of the articles reviewed pointed to collectively agreed and legally binding mechanisms likely to be essential for the fair allocation and equitable access to COVID-19 vaccines between countries.

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Usefulness of urine reagent strips for the diagnosis of bacterial infection in resource-limited settings

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BIOGRAPHY Ramón Pérez Tanoira is clinical microbiologist at Hospital Príncipe de Asturias, associate at university of Alcalá and coordinator of the Master of Tropical Medicine and International Health at the Autonomous University of Madrid.

Nine years participating in research projects in international centers [University of Helsinki (Helsinki, Finland); Gambo Rural General Hospital (Ethiopia), Notre Dame de la Sante Hospital (Dschang, Cameroon), Saint Joseph Hospital (Kitgum, Uganda), Loreto Regional Hospital "Felipe Santiago Arriola Iglesias" and National University of the Peruvian Amazon (Iquitos, Peru)]. 63 scientific publications including two doctoral theses (Complutense University of Madrid and University of Helsinki)

OBJECTIVE Diagnosis of bacterial infection often requires cytometry, chemistry and/or microbiologic culture resources. Unfortunately, laboratories in low-resource settings (LRS) often lack the competency to perform these studies. We sought to determine whether the presence of white blood cells in sterile liquids detected by commercially available urine reagent strips could aid diagnosis of bacterial infection.

METHODS The colorimetric urine reagent strip URI-Clip Test 11 (Menarini), commonly used for visual reading in urine samples, was applied to measure glucose, protein and leucocytes in the pleural ($n = 2$), ascitic ($n = 6$), peritoneal ($n = 4$) and cerebrospinal fluids ($n = 2$) of 14 non-selected patients. The study was performed in the University Hospital Príncipe de Asturias, Madrid from February 22nd until March 14th, 2021. The results, both leucocyte and red blood cell counts, were compared with those obtained under their study with a light-microscope as well as those obtained through the Dimension EXL 200 clinical chemistry and immunoassay analyzer (Siemens), which detects glucose and proteins.

RESULTS Urine strips tested positive on three samples out of the twelve fluids which showed ≥ 10 white blood cells/ μl through microscopy examination. This represents a sensitivity of 30% (95% CI: 16–58), a specificity of

100% and a negative predictive value of 36%. Urine strips showed an intense marked white blood cells in the 75% of samples which had ≥ 200 leukocytes/ μl . A good correlation has been found when detecting glucose and proteins and no statistical differences were found between both diagnostic systems ($P = 0.854$ and 0.196 for glucose and proteins, respectively).

CONCLUSIONS Urine reagent strips could provide a rapid and accurate diagnostic tool when ≥ 200 leukocytes/ μl are present and there is lack of more technical devices. It also showed a good correlation with automated systems, allowing to detect glucose and proteins in sterile fluids. Further investigation of the diagnostic value of these strips is warranted.

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Training program to improve access to opioid analgesics for medical use: a review in Western and Central Africa

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BIOGRAPHY Raffaella Ravinetto, with long-term experience in commercial and non-commercial clinical research, humanitarian organizations and research ethics review, holds a University Master Degree in Pharmacy, a Post-graduate Diploma in Tropical Medical Biology and a PhD in Biomedical Sciences. She is a senior researcher and policy advisor at the ITM Public Health Department, in charge of a portfolio of policy support, research, networking, education and advocacy on medicines in low- and middle-income countries. She is the chairperson of the ITM Institutional Review Board, the chairperson of the MSF Ethics Review Board and she was president of MSF Italy from 2007 to 2011.

OBJECTIVE Functioning palliative care (PC) services, with access to opioid analgesics such as morphine, are essential for achieving Universal Health Coverage. Yet, the access gap between high-income countries (HICs) and low- and middle-income countries (LMICs) is huge. The International Narcotics Control Board estimates that LMICs, despite accounting for 79% of world population, dispose only of 13% of total morphine for pain management (2018). Barriers exist at different levels, i.e. legislation/policy, financing, knowledge/cultural attitude and education/training. A 2020 Resolution of the UN office on Drugs and Crime (UNODC) reiterated the need for educational interventions to improve access to essential opioids in LMICs. We investigated the characteristics of

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educational program in 24 West and Central African countries.

METHODS We performed a PubMed search, with keywords: [palliative care]; [analgesics, opioid]; [education]; [country name]; [Africa, Western]; [Africa, Central]; [Africa]. We integrated this search with policy documents from fifteen national/international PC organisations. The contents of retained articles and policy documents are analysed under the framework of the 2020 UNODC Resolution.

RESULTS Preliminary findings suggest that few training programmes exist: only ten of 24 countries have PC programmes including training activities; PC is part of medical school curricula in six countries; three countries have PC guidelines. The African Palliative Care Association offers trainings in 12 countries and provides training materials to five other countries. Trainings explicitly include the issue of access to opioids in three countries only. Hence, morphine is available in the public health sector of only 7 countries and its annual consumption in the area appears to be far below 1 mg/per capita/year, versus 22.84 mg/per capita/year in a HIC like Norway.

CONCLUSION Western and Central African countries need to develop trainings specifically addressing the procurement of/access to essential opioid analgesics, to help addressing the lack of access for PC and pain management.

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The QUAMED Quality Certification Program: a novel way to increase availability of quality-assured health products for universal health coverage

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BIOGRAPHY Raffaella Ravinetto, with long-term experience in commercial and non-commercial clinical research, humanitarian organizations and research ethics review, holds a University Master Degree in Pharmacy, a Post-graduate Diploma in Tropical Medical Biology and a PhD in Biomedical Sciences. She is a senior researcher and policy advisor at the ITM Public Health Department, in charge of a portfolio of policy support, research, networking, education and advocacy on medicines in low- and middle-income countries. She is the chairperson of the ITM Institutional Review Board, the chairperson of the MSF Ethics Review Board and she was president of MSF Italy from 2007 to 2011.

OBJECTIVE The Sustainable Development Goal 3.8 aims at universal health coverage (UHC), which requires access to affordable, quality-assured medicines and vaccines for all. According to the World Health Organization (WHO) Benchmarking Program, currently only 27% of Member States have a well-functioning national regulatory authority. In poorly-regulated low- and middle-income countries (LMIC), purchasers and final-users remain exposed to the risk of substandard and falsified products. To help reducing this risk, QUAMED, a humanitarian alliance of 28 non-for-profit purchasers, developed and will launch in 2021 a Quality Certification Program (QCP). We will assess the quality systems of pharmaceutical vendors and deliver a publicly-available “quality certification” to those who comply with the WHO Model Quality Assurance System standards (2014).

METHODS Vendors investing in quality systems could have difficulties competing with those with poor quality systems (which might propose lower prices, for non-quality-assured products). Therefore, QUAMED interviewed in 2020 the representatives of a convenient sample of 12 vendors -based or operating in LMIC- to assess their interest in the QCP-model, using a semi-structured interview guide. Furthermore, we discussed the QCP with 6 donor organisations, to explore their interest to use the QCP for prequalifying suppliers for their LMIC programme (“formal recognition”).

RESULTS All interviewed vendors are willing to be audited under QCP, on the condition that QCP certificates are recognised by donor organisations and major purchasers. Encouragingly, all donors expressed interest in recognition of the QCP Program. It appears that the QCP would address a gap, as the WHO pre-qualification program targets individual pharmaceutical products, but not distributors and wholesalers.

CONCLUSION Relevant stakeholders including vendors and donor organisations are interested in a publicly-accessible quality certification program in/for LMIC. By using it, purchasers and donors could create demand for quality-assured products and positively shape the market towards affordable, quality-assured products, that are needed for UHC.

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The role of self-efficacy in performance-based financing: findings from the ResQ study

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BIOGRAPHY Dimitri Renmans is an FWO postdoctoral research fellow at the Institute of Development Policy, University of Antwerp. He holds a PhD in development studies and his main research interest is performance-based financing in the health care sector of low- and middle-income countries. He is currently working on ways to combine the strengths of different methodologies, for example, realist evaluation, qualitative comparative analysis, process tracing and causal loop diagramming. His postdoctoral research project concerns the creation of a comprehensive theory of performance-based financing. More information can be found on: Resqstudy.com

OBJECTIVE To develop a comprehensive theory of performance-based financing (PBF) capable of informing policymakers how to improve the intervention. Such a theory aims to incorporate insights and knowledge from different interventions, contexts and disciplines.

METHODS To do so, we have developed a new approach to research synthesis that is based on realist evaluation science and uses qualitative comparative analysis (QCA). The units of analysis of this approach are the mechanisms that get triggered by the intervention (e.g. extrinsic motivation, intrinsic motivation, self-efficacy, price effect, etc.). Substantive theories are used to identify the contextual conditions that are sufficient and/or necessary to trigger each individual mechanism. In the next step we perform a case-based review where we analyze studies in which the mechanism of interest can be expected to be found. From these studies we collect the data on the earlier identified relevant contextual conditions. After having introduced the data on the cases and the mechanism into a truth table, we perform a QCA on the truth table. This will give us the necessary and sufficient conditions for a mechanism to get triggered, this we call a mechanism concept. Combining the different mechanism concepts will create a theory of performance-based financing.

RESULTS: In this presentation we will focus on the self-efficacy mechanism. We have already identified some of the relevant contextual conditions by looking into Social Cognitive Theory, Theory of planned behavior and social comparison theory. From these theories we have distilled several relevant contextual conditions, in the coming months we will review case studies to populate our truth table and perform a QCA.

CONCLUSION: We are convinced that our methodological approach will prove to be very useful for developing a comprehensive theory of PBF and a promising way to inform health system strengthening interventions.

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Mismatched ambition, execution and outcomes: Health providers and managers' experiences on implementing maternal death surveillance and response system in Tanzania

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BIOGRAPHY MD, MMED, PhD Lecturer, researcher and Obstetrics and Gynaecologist specialist at Muhimbili University of Health and Allied Sciences and Muhimbili National Hospital

OBJECTIVE We aimed to describe perceptions and experiences of health providers and managers in implementing the Maternal Death Surveillance and Response (MDSR) system.

METHODS An exploratory qualitative study was carried out with purposively selected 30 health providers and 30 health managers in four councils from the Mtwara region Southern Tanzania between June and July 2020. Key informant interviews and focus group discussions were used to collect data. Inductive thematic analysis was used to analyse data.

RESULTS Two main themes emerged from this study: 'Accomplishing by ambitions' and 'A flawed system'. The themes suggest that health providers and managers have a high desire to make the MDSR system work by making deliberate efforts to implement it. They reported working hard to timely notify, review death and implement action plans from meetings. Health providers and managers reported that MDSR has produced changes in care provision such as behavioural changes towards maternal care, increased accountability and policy changes. The system was however flawed by lack of training, organizational problems, missing links with other reporting and quality improvements systems, assigning blame and lack of motivation.

CONCLUSION The implementation of the MDSR system in Tanzania faces systemic, contextual and individual challenges. However, our results indicate that health providers and managers are willing and committed to improve service delivery to avoid maternal deaths. Empowering health providers and managers by training and addressing the flaws will improve the system and quality of care.

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Health system resilience through the perspective of health workers managing antenatal and childbirth services during floods in CambodiaD. Saulnier¹, D. Thol², P. Ir², C. Hanson^{1,3}, J. von Schreeb¹ and H. M. Alvesson¹¹Karolinska Institutet, Stockholm, Sweden; ²National Institute of Public Health, Phnom Penh, Cambodia;³London School of Hygiene and Tropical Medicine, London, UK

BIOGRAPHY Dell Saulnier is a health system researcher with a PhD from Karolinska Institutet. Her research focuses on health system resilience to disasters, particularly around issues of governance, legitimacy and interdependence.

Health system resilience has been promoted as one way to increase a system's ability to deal with shocks like floods. Studying health systems that currently exhibit the capacity for resilience when shocked could enhance our understanding about what generates and influences resilience.

OBJECTIVE To generate empirical knowledge on health system resilience by exploring how public antenatal and childbirth health services in Cambodia have absorbed, adapted, or transformed in response to seasonal and occasional floods.

METHODS We explored experiences providing or managing these services during recent flooding in rural Cambodia through 23 interviews with public sector health professionals. The data were analyzed by thematic analysis and related to the Dimensions of Resilience Governance framework.

RESULTS The theme 'Collaboration across the system creates adaptability in the response' reflects how collaboration and social relationships among providers, staff and the community have delineated boundaries for actions and decisions for antenatal and childbirth care during floods. The floods were perceived as having a modest impact on health services. Knowing the boundaries and having preparation and response plans let staff prepare and respond in a flexible yet stable way. The theme was derived from ideas of: i) seasonal floods as a minor strain on the system compared to persistent, system-wide organizational stresses, ii) the ability of the health services to adjust and adapt flood plans, iii) a shared purpose and working process during floods, iv) engagement at the local level to fulfill a professional duty to the community and v) creating relationships between health system levels and the community to enable flood response.

CONCLUSION The capacity to absorb and adapt to floods was seen among the public sector services. Strategies that enhance stability and flexibility may foster the capacity for health system resilience.

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Effectiveness of digital decision support in improving the management of childhood illness in rural Nigeria: a prospective observational studyT. Schmitz^{1,2}, F. Beynon^{1,2}, C. Musard^{1,2}, M. Kwiatkowski^{1,2}, M. Landi³, D. Ishaya⁴, J. Zira⁴, M. Muazu⁴, S. Bulus⁵ and R. Rossi⁶¹Swiss Tropical and Public Health Institute, Basel, Switzerland; ²University of Basel, Basel, Switzerland; ³International Committee of the Red Cross, Jimeta Yola, Nigeria; ⁴Adamawa State Primary Health Care Development Agency, Jimeta Yola, Nigeria; ⁵Paediatric Department, Federal Medical Center Yola, Yola, Nigeria; ⁶International Committee of the Red Cross, Geneva, Switzerland

BIOGRAPHY Torsten Schmitz is a Paediatrician and Paediatric Emergency Care Specialist working as clinical consultant at the Swiss Centre for International Health of the Swiss Tropical and Public Health Institute. His work focuses on the development, validation, implementation and evaluation of digital Clinical Decision Support System (CDSS) and Health Management Information System in low- and middle-income countries. His current project engagements comprise the clinical coordination and deployment of decision support algorithm for paediatric consultations in primary health care clinics in Nigeria, Somalia, as well as in refugee camps in Chad.

OBJECTIVE Digital interventions can support health system strengthening in resource-constrained settings. Clinical decision support system (CDSS) provide evidence-based recommendations to health workers, tailored to individual patients, using clinical algorithm. Recent studies suggest that CDSS hold promise for the management of childhood illness in primary care, but evidence on effectiveness at scale is limited. We evaluated the impact of 'ALMANACH', a CDSS based on the integrated management of childhood illness (IMCI), on health and other outcomes for children attending primary health care clinics (PHCCs) in north-eastern Nigeria.

METHODS We conducted a prospective observational study to compare clinical recovery of children (age 2–59 months) with acute illness in 44 PHCCs implementing ALMANACH vs. 45 PHCCs using paper-based IMCI. We collected sociodemographic and clinical information

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from caregivers and clinical records on Day 0 and recovery data from Day 7 phone follow-up. We calculated odds ratios (ORs) for primary and secondary outcomes. We fitted mixed logistic regression to estimate adjusted ORs, controlling the sample for potential confounders and applied inverse probability weighting to adjust for loss to follow-up.

RESULTS 1,937 children were included of which 1,027 (53%) attended facilities implementing ALMANACH. Clinical recovery was significantly higher among children attending ALMANACH facilities (adjusted OR=2.67, 95% CI: 1.63–4.36). There was no significant difference in overall antimicrobial prescription, but a significant increase in parenteral treatment for severe disease (adjusted OR=2.42 (1.01–5.77) and decrease in oral antibiotics (adjusted OR=0.45 (0.26–0.80)). ALMANACH facilities also showed significant increase in referral for severe disease, communication of diagnosis and follow-up advice.

CONCLUSION Implementation of ALMANACH can improve health outcomes of children attending PHCCs in rural Nigeria. This is likely mediated through the step-by-step digital decision support, guiding health workers through evidence-based recommendations on clinical assessment, diagnosis, treatment and referral. These findings support the (contextually tailored) use of CDSS for health system strengthening.

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Learning from changes concurrent with implementing a complex and dynamic intervention to improve urban maternal and perinatal health in Tanzania

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BIOGRAPHY Reproductive health specialist with 20+ years of experience; leads the CCBRT maternal and Newborn Healthcare program (2010 to date). Specialist in public health initiatives to improve service delivery and strengthen health systems. Demonstrated success in engaging local partners and harnessing stakeholder collaboration, implementing a standards-based approach to care and instituting the perinatal problem identification program. Strong background as a clinical trainer dedicated to

empowering midwives and caregivers through clinical skills building and utilizing data for decision making. Passionate about protecting the dignity of women during pregnancy and childbirth, particularly the poor, the vulnerable, people with disabilities and those with HIV/AIDS.

INTRODUCTION AND OBJECTIVE Rapid urbanization in Dar es Salaam, the main commercial hub in Tanzania, has resulted in congested health facilities, poor quality care and unacceptably high facility-based maternal and perinatal mortality. Using a participatory approach, Dar es Salaam Regional government in partnership with a non-governmental organization, CCBRT, implemented a complex, dynamic intervention to improve the quality of care and survival during pregnancy and childbirth. The intervention was rolled out in 22 public health facilities, accounting for 60% of the city's facility births.

METHODS Multiple intervention components addressed gaps across the maternal and perinatal continuum of care (training, infrastructure, routine data quality strengthening and utilization). Quality of care was measured with the Standards-Based Management and Recognition tool. Temporal trends from 2011–2019 in routinely collected, high-quality data on facility utilization and facility-based maternal and perinatal mortality were analyzed.

RESULTS Significant improvements were observed in the 22 health facilities: 41% decongestion in the three most overcrowded hospitals and a comparable increase in the use of lower-level facilities, a six-fold increase in quality of care and overall reductions in the facility-based maternal mortality ratio (47%) and stillbirth rate (19%).

CONCLUSIONS This collaborative, multi-partner, multi-level real-world implementation, led by the local government, leveraged structures in place to strengthen the urban health system and was sustained through a decade. As depicted in the theory of change, it is highly plausible that this complex intervention with the mediators and confounders contributed to improved distribution of workload, quality of maternity care and survival at birth

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FHH-PHP Model Effectiveness for Hard-to-Reach (HTR) areas and Integration into BPHS in Afghanistan

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BIOGRAPHY Anupama is International Health Policy and Management from Heller School for Social Policy,

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Brandeis University, US and also did MBA graduate in Health care management. Having more than 18 years of experience in Indian and International industry, she has been providing consultative research and project management support to NGO's in Afghanistan. She is also an external auditor of national health facilities for MoHFW India. Ms. Anupama has led TPM, M&E and IE on MCH, WASH, GBV, Food assistance and women empowerment programs.

OBJECTIVES The evaluation of the UNDP-Global Fund-supported Family Health House (FHH)-Private Health-care Provider (PHP) model aimed to examine it as the effective remote areas RMNCAH and ATM model across Afghanistan and its integration (being a vertical program) into the health system under basic package of health services (BPHS). The evaluation assessed the governance functions.

METHODS The evaluation was conducted in Badakhshan and Khost province from Jan-April 2021. Using a mixed evaluation design, a two-stage sampling scheme was adopted. First cluster sampling was performed using PPS, followed by HH selection using SRS. Inductive method was adopted for qualitative analysis. Data triangulation was performed with MoPH HMIS, project PMF and researches. A bivariate analysis was computed to assess the governance functions influence on RMNCAH and ATM.

FINDINGS Utilization of RMCAH and ATM is positively associated with presence of FHH in the same village ($B=0.0363$, 95% CI = 0.0043 – 0.0683) or reachable within 30 minutes by foot. However, utilization of RMCAH and ATM is less likely associated with presence of PHP ($B=0.073$, 95% CI = 0.0075 – 0.082). The top three reported access barriers were: the price of the services provided especially for PHP ($B=-0.0056$, 95% CI = -0.0077 – -0.0036) is inversely related to utilization of services, the lack of female medical staff at PHP and the distance to the nearest facility is related to utilization of services. Shareholder engagement and shared direction were strong, whereas stakeholder engagement was less strong and accountability was the weakest among governance functions.

CONCLUSION FHH is highly effective model for covering white and hard-to-reach areas (HTR). HH's continue to stay vulnerable due to high out-of-pocket expenditure. The lack of sustainability and integration plan at design stage was evident and exacerbated by weak advocacy. FHH-PHP effective integration requires functional gate keeper model of health services and community engagement central to governance.

325**Challenges to documentation of immunization data from the lower-level private-for-profit services providers within an urban context in Kampala, Uganda**

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BIOGRAPHY I am Ssegujja Erick, a male Ugandan with both training and working experience in qualitative research methods. I have a bachelors' degree in Adult and Community Education, a master's degree in Sociology both from Makerere University and a masters degree in Public Health specialising in Health System and Policy Research from the Institute of Tropical Medicine (Antwerp). I am currently concluding my PhD studies from the University of the Western Cape in South Africa specialising in Public Health.

OBJECTIVE Lower-level private for-profit immunization service providers contribute significantly to immunization services among urban dwellers albeit unique challenges to the execution of their duties. This paper examines the implementation challenges to documentation and submission of quality immunization data among service providers and implementing partners in Kampala city.

METHODS 20 key informant interviews were conducted among service providers and immunization implementing partners within Kampala city. Data collection took place between May and June 2020. Interviews were transcribed verbatim and coded using Atlas.ti software. Data was analyzed thematically with quotations to amplify respondent's voices used in the presentation of results.

RESULTS There were challenges through immunization partner requirements to enter data in different formats centrally to MoH standard formats and having immunization schedules different from MoH, rendering data integration difficult. Private provider challenges were lower prioritization of immunization services including data due to less revenue compared to other services offered. Human resource-related problems included high attrition rates, which compromised data compilation skills at the facility, as well as lack of a dedicated staff assigned to data. Data system-related challenges included double counting especially for private providers that are used as outreach posts who provide services but report their data through parent facilities from where they pick vaccines.

CONCLUSIONS Numerous challenges unique to lower level private-for-profit immunization service providers

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impede compilation and submission of immunization data into the central registry system. Addressing these challenges while paying attention to the uniqueness of private for-profit service providers within an urban context can go a long way in addressing the data challenges currently affecting planning for urban immunization services.

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Improving the quality of urban immunization data among lower level private-for-profit service providers in Kampala Uganda: Early implementation experiences

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BIOGRAPHY I am Ssegujja Erick, a male Ugandan with both training and working experience in qualitative research methods. I have a bachelors' degree in Adult and Community Education, a master's degree in Sociology both from Makerere University and a masters degree in Public Health specialising in Health Systems and Policy Research from the Institute of Tropical Medicine (Antwerp). I am currently concluding my PhD studies from the University of the Western Cape in South Africa specialising in Public Health.

OBJECTIVE Implementation scientists and program managers pay particular attention to the value of early implementation experiences in pilot interventions in informing eventual rollout at scale. This paper presents the early implementation experience from an immunization data quality improvement project among private immunization service providers in Kampala City.

METHODS A mixed methods approach with qualitative interviews conducted among focal persons from the 20 participating private facilities, HMIS and EPI focal persons within KCCA were conducted. A secondary data analysis was conducted on the immunization data submitted through the DHIS2 to establish the changes attributed to the intervention while a document review exercise was done on the private facility registers and records to map out improvements in data capture and key actions to streamline immunization data capture at facility level.

RESULTS Embedding immunization data quality improvement within ongoing immunization service coverage improvement efforts played a key role in achieving the project aim. Other factors that supported implementation were a consideration of individual capacity levels of private immunization service providers, focus on focal persons charged with EPI data at facility level, factoring

in high staff attrition to tailor data capacity building efforts, reconsideration of the position of immunization services within the broader service profitability. Finally, paying attention to data quality gaps arising from the nature of clientele served facility improvement efforts while tagging the licensing and vaccine acquisition processes can be good motivators for ensuring compliance with immunization data quality improvements.

CONCLUSION Strategies for improving immunization data quality within the urban private immunization services providers vary significantly from those feasible within public service provision settings owing to their unique challenges. There is a need for tailor made solution to respond to these challenges factoring in the uniqueness and context of immunization service provision within an urban context among private service providers.

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Measuring Effective Coverage for institutional deliveries in a rural district in Uganda: the role of Supportive Supervision data

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BIOGRAPHY I am a Medical Doctor, graduated in Medicine and Surgery in 2009 and specialized in Public Health and Preventive Medicine in 2015.

During specialization, I participated in the Doctors with Africa CUAMM JPO program spending 6 months in Ethiopia.

From 2015 to 2017 I worked as a Project Manager in Sierra Leone, mainly in Pujehun district and as a PH expert in Makeni and Freetown.

I am at the end of a PhD course that will last until July 2021 with the University of Padua, at Doctors with Africa CUAMM.

BACKGROUND An effective coverage indicator incorporates not only health service availability but also offered service quality. To be fully effective, quality monitoring must be continuous and constant with the purpose to identify and fill the gaps early. Almost all studies focused on effective coverage make use of national surveys data that are difficult to replicate and for which information is often not accessible at the district level. In Uganda supportive supervision tools are comprehensive of quality of

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service measures. By focusing on institutional birth in Oyam District, situated in a rural region and with almost 390,000 inhabitants, our study aims to translate those qualitative aspects into an effective coverage metric.

METHODS Data related to institutional delivery are retrieved from DHIS2 and supportive supervision tool. In particular, information regarding health unit catchment area, availability of human resources, tracer medicine and equipment for obstetric service are collected. Documentation regarding delivery management based on patients' individual records and observed during supportive supervisions, are also considered as part of quality assessment.

RESULTS According to literature, we propose a 5-step evaluation of effective coverage defined as: Target population, Service contact coverage, Input adjusted coverage, Intervention coverage and Quality adjusted coverage. Preliminary data from a quarterly supportive supervision conducted in 2019 shows that only 57% of women who delivered in government health units received an appropriate quality of care. For what concerns the non-quality assisted births, more than 80% of them were lost in the Input adjusted step of cascade.

CONCLUSION To be truly considered a tool for improving quality of access, effective coverage evaluation should be accounted in routine monitoring process at district level. We propose to use the effective coverage evaluation to identify the gaps at health facility level and consequently to plan targeted interventions, according to the service disruption found in each unit.

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Estimating the impact on obstetric complication care: comparison between Met Need for Emergency Obstetric Care and Unmet Obstetric Need

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BIOGRAPHY I'm a Medical Doctor graduated in 2012 and specialized in Public Health and Preventive Medicine in 2017.

In 2016 I spent 6 months in Sierra Leone in the Junior Project officer program with Doctors with Africa CUAMM.

During 2017 I worked as PH expert in Sierra Leone and from 2018 I'm employed in Azienda USL in Ferrara, Italy.

OBJECTIVES Measuring obstetric emergency care is a priority for those who deal with maternal health. In contexts where access to reliable information is challenging, it is necessary to find indicators that can measure the impact of hospital activity within its catchment area. The aim of this study was to compare Met Need for Emergency Obstetric Care (EmOC) versus Unmet Obstetric Need (UON) in a rural district in Sierra Leone.

METHODS We conducted a retrospective cross-sectional study of women admitted in Pujehun Maternity Hospital from January 1st to December 31st 2016. We collected information on medical history, provenance, mode of delivery, Major Obstetric Intervention (MOI) received for Absolute Maternal Indication (AMI), maternal and fetal outcome. Met Need and UON were calculated at district level and for 3 sub-districts: Kpanga Kabonde (KKB), Barri and Soro Gbeima.

RESULTS Among 1399 admissions, 585 patients presented at least one Major Direct Obstetric Complication, 264 had an AMI and 169 of them received a MOI for it. Met Need for EmOC was 25.3% at district level, with large differences between sub-districts: 48.7% in KKB, 13.4% in Barri and 14.9% in Soro Gbeima. UON was 28.7% at district level, indicating similarly large district disparities: -8.0% in KKB, 60.7% in Barri and 66.0% in Soro Gbeima.

CONCLUSION UON reveals a greater impact of the hospital in emergency care. Met Need for EmOC was probably underestimated having no data on the complication treated in the peripheral health units. Both Met Need and UON gave consistent information on the disparities within sub-districts. In contexts where only hospital data are available, UON may give a more realistic idea of the impact of a Comprehensive-EmOC in the catchment area. Met Need can be considered still the most suitable indicator to measure the impact of hospital activity if only aggregated data are available.

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Health, wealth and medical expenditures among the elderly in rural Tanzania

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BIOGRAPHY Malale Tungu is a holder of B.A. Ed (Economics and History), M.A. (Economics) and currently is a PhD student in public health (majoring in health economics and governance) at Muhimbili University of Health and Allied Sciences, Tanzania. He has experience in teaching economics, entrepreneurship, leadership and

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management in healthcare. He is interested to develop his career in health economics specifically; economic evaluation of healthcare interventions, priority setting, governance and healthcare financing.

OBJECTIVE This study aimed to analyse the association between health, wealth and medical expenditure in rural residents aged 60 years and above Tanzania.

METHODS Data were collected through a cross-sectional household survey of rural residents aged 60 years and above living in Nzega and Igunga districts. Standardized WHO-SAGE and EQ-5D questionnaires were used. The quality of life (QoL) was estimated using EQ-5D weights. Wealth index was generated from principal component analysis (PCA). Two linear regression analyses (outpatient/inpatient) were performed to analyze the association between health, wealth, medical expenditure and socio-demographic variables.

RESULTS This study comprised of 1899 people aged 60 years and over. The study found a negative and statistical association between QoL and health expenditure (HE) whereby HE decreases with the increase of QoL. A positive and negative relationship between wealth index and HE were observed for the outpatient and inpatient healthcare services, respectively. Also, the study observed a statistical significance associated with the reduced HE for the elderly covered with health insurance and those exempted from paying for the services compared to those who paid themselves or assisted by family members.

CONCLUSION QoL of the elderly deteriorates as they advance in age due to poor healthcare (many diseases), which results in increased HE and reduce SES. Policymakers, especially at local government level, should consider all these factors by removing the barriers accessing healthcare services by the elderly.

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Digital Health Interventions: A Study of Data Quality, Effective Coverage and Inequalities in the Rwanda Childhood Immunization Program

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BIOGRAPHY Thaoussi Uwera is a health informatician from Rwanda with Master of science in Health informatics from the University of Rwanda and she works with the University of Rwanda as an Assistant Lecturer. Thaoussi is currently a PhD student in the University of Bergen Norway. She works on digital health interventions for health system strengthening in her PhD research.

INTRODUCTION: Childhood immunization programme a top priority for all health systems, especially in low and middle-income settings. Despite introduction of an individual-level data digital e-tracker in Rwanda, issues like wrong denominator and implausible coverage rate of over 100% were reported from the health information system. The aim of the study is to assess the extent to which the immunization e-tracker responds to stakeholders' needs and to identify potential digital health interventions (DHIs) most useful to them.

METHODS Qualitative in-depths interviews and focus group discussions are being conducted with health workers, data managers, health system supervisors, program managers, children's caregivers from thirty health facilities in five districts. An interview guide has been formulated based on the constructs of the Human, Organization and Technology-Fit (HOT-Fit) framework. Data quality checks to verify completeness, internal and external consistency for selected childhood immunization indicators for January-December 2020 is underway.

RESULTS Preliminary results from one district show a considerable need for improvement of e-tracker functionalities for health workers and data managers to fulfil their work. Cited functionalities include client lists for subsequent appointments, longitudinal records of all vaccines received and automated vaccine reports. The e-tracker is now primarily used for secondary data entry, in addition to dual documentation on paper records and registers. Interviewees reported worsening of overall data quality because of the additional workload of data entry in the e-tracker.

CONCLUSION This study addresses the World Health Organization's calls for implementation research to identify crucial factors affecting scalable and sustainable implementation of DHIs for health system strengthening. The use of the e-tracker as a secondary data entry tool is a missed opportunity to introduce DHIs that benefit health workers in the immunization program. The results will help improve the use of the e-tracker with additional DHIs for strengthening the childhood immunization program in Rwanda.

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The National Health Observatory of Cameroon: a decision making tool for monitoring Sustainable Development Goals to achieve Universal Health Coverage

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BIOGRAPHY Viviane Fossouo, Epidemiologist, holding a Msc public health, finalizing a PhD in public health at the "université libre de Bruxelles". Working at health observatory of Cameroon for 10 years during which I lead high level processes as the Joint external evaluation of the international health regulation, the establishment of the health data collaborative, contributed to the development of strategic policy documents as the health profile, annual reports of 100 key health indicators tracking SDGs and UHC. I supported a dozen african counties with WHO AFRO in strenghtening emergency preparedness and response and I'm currently suporting Covid 19 response in Botswana.

OBJECTIVE The objective of this study was to describe the health observatory establishment process in Cameroon.

METHODS WHO proposes a 4-phase process for setting up health observatories. The preliminary phase (maximum 1 year) to ensure foundations such as political commitment, identification of the team, host structure, inventory of data sources and development of an action plan. The start-up phase (1 to 2 years) to make strategic choices, set up collaborations, start activities, develop the digital platform. The strengthening phase (3 to 5 years) to draw the long-term financing plan; ensure organisational, legal and ethical consolidation; develop a five-year strategic plan; establish scientific partnerships and collaborations; ensured additional staffing. The phase of full operation to ensure the 4 key functions of gathering, analysing and synthesising, sharing and networking.

RESULTS The establishment of the Cameroon National Health Observatory(NHO) did not follow this linear WHO prescription. During the preliminary phase which lasted 5 years, the political commitment was marked by the development of the legal framework of the NHO, the construction of premises and assignment of dedicated staff. The NHO fully started its activities in 2015 following an advocacy workshop with all the relevant stakeholders. During this workshop a stakeholder mapping

and situational analysis were conducted. A five-year action plan was developed and a mapping of data sources conducted. Despite challenges related to the long-term financing plan, organizational and legal consolidation of the NHO remain, the fully operational phase was marked by the official launch of the Cameroon Health Data collaborative in 2016, the production of the Health Profile, the 100 Key Health Indicators Monitoring Report and the digital platform.

CONCLUSION The NHO has contributed to reducing the fragmentation of the national health information system and has produced information that can be used directly by policymakers to track SDGs to achieve the UHC.

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Strategies for investing in implementation research – the case of ESSENCE on Health Research funders initiative

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BIOGRAPHY Ana Lúcia Weinberg is a Senior Strategic Partnerships officer at the European & Developing Countries Clinical Trials Partnership (EDCTP). Before joining EDCTP she worked as Programme Adviser and Training and Communications Coordinator for the European AIDS Treatment Group (EATG). She is a member of various funders' initiatives and platforincluding ESSENCE on Health Research. She has over 15 years of experience in partnership building, communications, advocacy and capacity building.

OBJECTIVE Implementation research (IR) helps research and public health prograachieve health impact at scale. This field of study, which is being increasingly supported by health research funders, is essential to guide priority-setting and build resilient health systeOur objective is to present the views of a group of 23 health research funders on the best ways to invest in IR and to highlight the importance of integrating IR into health syste

METHODS Semi-structured interviews were conducted with 28 representatives from 23 health research funding agencies between May and September 2019; discussions

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have been synthesized and analysed. Findings helped develop an ESSENCE good practice document.

RESULTS The findings confirm the importance of integrating IR into health systems and provide guidance on the role funders to achieve this. The following strategies were considered to support this process: (1) prioritising support to projects that are designed to take IR skills into the overlapping stream of activity that together constitute health systems; (2) funding research on how IR can influence health policies and help ensure the use of evidence-based research in policy making; (3) supporting the establishment and expansion of academic-political networks, ensuring that these relationships are open and transparent, while ensuring accountability to the ultimate beneficiaries, the local population; (4) considering supporting 'de-implementation efforts' where needed.

CONCLUSION Funding agencies are increasingly aware of the importance of IR as part of the broader effort of supporting health systems. The funders' perspectives are shared to provide clarity on the factors and processes that facilitate highly impactful funding that will ultimately inform researchers, implementers and policy-makers. The good practice document helps guide funders in their prioritisation and funding allocation process.

448**The political economy of priority-setting for health in South Sudan: a case study of the Health Pooled Fund**

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BIOGRAPHY Heloise Widdig is a recent graduate of the Erasmus Mundus Msc in Health Economics and Management. She had the great honor of completing her thesis research at the Royal Tropical Institute in Amsterdam where she investigated the political economy of priority-setting for health within HPF South Sudan. Her research interests lie at the intersection of policy and priority-setting for health within fragile settings.

OBJECTIVE In fragile and conflict affected settings (FCAS) such as South Sudan, where health needs are immense, resources are scarce, health infrastructure is rudimentary or damaged and government stewardship is weak, adequate health intervention priority-setting is especially important. There is a scarcity of research examining the priority-setting environment in FCAS, yet capturing these dynamics is important to develop more context-specific, rational and fair priority-setting practices. The objective of this study is to analyse the

priority-setting practices and experiences in the Health Pooled Fund (HPF) of South Sudan using a political economy framework.

METHODS A mixed methods study was conducted combining document review, 30 stakeholder interviews and a quantitative assessment of service delivery. An adapted version of the Walt and Gilson's policy analysis triangle guided the study's design and analysis.

RESULTS Priority-setting in the context of HPF takes place throughout program design, implementing partner (IP) contract negotiation and implementation of the service package. The National Basic Package does not provide adequate guidance because it is too expansive and unrealistic given financial and health system constraints. The resulting priority-setting process remains implicit, scarcely documented, is primarily driven by donors' interests. Furthermore, power asymmetries exist between actors. At the local level, IPs must manage the competing interests of the HPF program and local health authorities, challenging contextual factors such as shortages of skilled health workers and conflict affecting service provision.

CONCLUSION This study highlights pervasive power asymmetries between donors and national health authorities within the HPF context, which drive a priority-setting process dominated by donor agendas and leave little room for government ownership. These findings emphasise the importance of paying attention to the influence of stakeholders and their interests and frames on the policy process. Ultimately, the process of contracting out services is particularly political and is in need of guidance.

119**Barriers for mHealth Adoption in the Health Care Sector of Ghana**

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BIOGRAPHY Bernice Yamoah is a recent master graduate in Health Economics and Management at the University of Oslo where she works as a Research Assistant, alongside studying International Social Welfare and Health Policy at the Oslomet University.

She has extensive research and managerial experience in the Ghanaian health sector. In the past five (5) years, Bernice has been working to improve health care delivery in developing countries such as Ghana. Bernice's research explores the use of technological devices in delivering quality health care. Her research interests focus broadly

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on Health Management and Policy, Health Economics, Health Technology and Communicable Diseases.

The purpose of the study was to examine barriers to the adoption of mobile health technologies by clinicians in Ghana and assess its impact on health care delivery in the country. Mobile health (mHealth) is the use of devices such as mobile phones, patient monitoring devices, personal digital assistants and other wireless devices to support health care delivery. Grounded in the theory of sociomateriality and coping, the study adopted a qualitative research design and conducted interviews of nine respondents including seven clinicians and two officers from the public health service providers in Ghana. Applying a thematic content analysis of responses, the study found that mHealth adoption was nascent in Ghana though knowledge about mHealth technologies appeared to be popular among most clinicians. mHealth adoption was predominant and encouraged in private healthcare facilities as compared to public health facilities. A major contribution of this study to extant literature was the finding that the challenges of adopting mHealth among clinicians were not only limited to cost but also inherently affected by socio-economic segregation in the population. High illiteracy among patients, cost related issues in the acquisition and maintenance of mHealth technologies and poor customization of mHealth technologies to local needs were among major factors hindering adoption among clinicians in Ghana. Nevertheless, mHealth was found to improve access to healthcare, reduce the time and cost involved in patients traveling to seek for medical attention and relieved clinicians of the unproportionate pressure of having to deal with several patients on a working day. The study thus gives significant insights into the challenges of mHealth adoption in a developing country and may have impact on policy and practice for future organization of health care delivery.

KEYWORDS: mHealth, health care delivery, Ghana, technology, mobile

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Self-reported oral health and oral health-related quality of life among patients with diabetes in a tertiary health facility

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BIOGRAPHY A consultant Oral Physician and a currently PhD student in the University of Ibadan, Nigeria. She has

authored/ co-authored about seven original articles in peer-reviewed journals. She has also attended both local and international conferences and featured in oral and poster presentations. She is happily married to an mechanical engineer with three children.

OBJECTIVES To assess the pattern of self-reported diabetes related oral conditions and oral health-related quality of life (OHRQOL) among patients with diabetes mellitus (DM) at the University College Hospital (UCH), Ibadan.

MATERIALS AND METHODS A cross-sectional study using an interviewer administered questionnaire was conducted among in- and out-patients being managed for DM by the Endocrinology unit of the hospital. Data collected included bio-data, medical history, oral conditions and dental service utilisation. The impact of oral health on quality of life was measured using OHIP-14. Oral examination was done to assess oral mucosal lesions and their oral hygiene status. Data was analysed using SPSS 21.

RESULTS Eighty-four patients with diabetes consisting 23 (27%) in-patients and 61 (63%) out-patients were enrolled. Males were 26 (31%) and females 58 (69%); their ages ranged from 22 to 88 years with a mean of 60.9±12.8 years. Most (67%) of the participants had one or more self reported oral complaints, dryness (20.4%) being the most common and bad breath (4.6%) as the least reported. Oral examination revealed periodontal diseases as the most common lesion from soft (76%) and hard tissue (47.5%) findings. Their oral hygiene status mainly as fair (65%), followed by poor (25%) and good (10%). About two-thirds (61%) had ever seen a dentist, majorly due to toothache. Only the pain and physical disability components of OHIP-14 were found to affect majority of the participants' OHRQOL.

CONCLUSIONS Periodontal diseases were prevalent among patients with DM in our study, which may be responsible for their self-reported complaints. Although, most of our study participants had fair oral hygiene status and dental service utilisation, routine oral care in DM patients should be prioritised for improved OHRQOL.

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Association between parental asthma medication and asthma in offspring

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BIOGRAPHY Masters student in Global health

OBJECTIVE Emerging evidence suggests parental preconception environment and disease processes may influence germ cell epigenetics and thereby offspring health. One study suggested that asthma disease activity increased offspring asthma. However, there is no study examining whether parental asthma medication may influence the risk of asthma in offspring. We evaluated the association between parental asthma medication use during the pre- and post-conception periods with the risk of childhood asthma in offspring.

METHODS This study included 6313 offspring-parent pairs, 2750 offspring of fathers and 3563 offspring of mothers, with data from the European Community Respiratory Health Survey ECRHS-I (1991–1993) and ECRHS-III (2008–2013). At ECRHS III mother and father provided information about the use of inhaled steroids and the age when starting such medication. Information was also collected about their children and whether they had asthma before they turned 10 years of age or not. The association between the parental use of asthma medication during pre and post conception with asthma in offspring was analysed using logistic regression models, adjusting for parental asthma symptomscore, parental education, study centre, parental and offspring sex.

RESULTS Risk of offspring asthma before 10 years of age was higher (odds ratio [OR] = 2.74, 95% confidence interval [CI]: 1.90 to 3.90; and 1.48, 95% CI 1.14 to 1.91) when the father or mother used asthma medication at pre- and post-conception, respectively, compared to offspring whose parent never took asthma medication. Parental asthma severity was adjusted for, further, confounding by genetic inheritance of parental asthma would have been expected to give similar associations with pre- and post-conception medication use.

CONCLUSIONS This study found stronger associations for pre-conception than post-conception asthma medication with offspring childhood asthma, indicating that parental use of inhaled steroids before conception possibly might increase the risk of asthma in offspring.

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Relationship between household socioeconomic status, food insecurity, dietary diversity and access to specific food groups in South African primary schoolchildren

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BIOGRAPHY Johanna Beckmann completed a Master's degree in Vienna in molecular nutrition and is pursuing PhD studies in Basel, Switzerland at the sports faculty. Her research focuses on sport science and nutritional science and their combination.

OBJECTIVE South Africa is experiencing a nutrition transition accompanied by a socio-economic transition. Adequate nutrition is mandatory for good child growth and development. To understand the nutritional impact on South African school children, the objective of this study was to examine how household socioeconomic status (SES) is associated with nutritional status (stunting and obesity), food insecurity, dietary diversity and access to various specific food groups.

METHODS Parents/guardians of 908 children (448 girls, 460 boys, mean age: 8.3 years, SD=1.4) provided information about household SES. Dietary diversity was assessed via a food frequency questionnaire and food insecurity via a hunger scale. Stunted children were defined as < - 2 SD height-for-age and overweight/obese children were defined as > + 1 SD BMI-for-age apart from the median of the WHO Child Growth Standards. Children were classified into five SES quintiles. These quintiles were compared via analyses of variance and chi-2-tests.

RESULTS SES groups showed different dietary patterns. Differences exist between poorest to wealthiest SES quintile groups with decreased prevalence of stunting comparing quintile 1 and quintile 5 with each other ($P < 0.05$). No such differences were seen in the number of diverse consumed food groups but in choice of food groups and food items. Children in the wealthiest quintile consumed more cereals ($P < 0.01$), roots ($P < 0.001$), vitamin A rich vegetables ($P < 0.05$), oil ($P < 0.01$), sweets ($P < 0.05$) and beverages ($P < 0.01$) than the lower SES group.

CONCLUSION The diversity of the diet regarding SES quintiles was significant between the poorest compared to the wealthiest quintile. The wealthiest group consumed more sweets and beverages. The recent transition to a diet with calorie rich and highly processed foods can already be seen in marginalised areas. Further research on nutritional food programs that can reach marginalised areas may help to decrease this public health threat and combat the development of non-communicable diseases.

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Physical inactivity, sedentary behaviour, and overweight/obesity among Nepalese women: A cross-sectional study on the prevalence and associated factorsP. Bhattarai¹, T. Tylleskär¹ and A. Vaidya²¹University of Bergen, Bergen, Norway; ²Kathmandu University, Kathmandu, Nepal

BIOGRAPHY Prabina Bhattarai is a nutritionist and a global health researcher. She received a bachelor's degree in nutrition and dietetics from Tribhuvan University, Nepal in 2017 and a masters degree in global health from the University of Bergen, Norway in 2020. Her major research interest lies in women's health, non-communicable diseases and nutrition.

OBJECTIVE The study aimed to assess the prevalence of overweight, obesity, sedentary behavior, physical inactivity and associated risk factors among Nepalese women.

METHOD A population-based cross-sectional study of 350 randomly selected women was conducted in the Bhadrapur municipality, Eastern Nepal. Data were collected during August–December 2019. Height, weight, socio-demographic and socio-economic variables were collected and body mass index (BMI) was calculated. Both a pedometer and a global physical activity questionnaire (GPAQ) were used to assess physical inactivity and sedentary behavior. Logistic regression in SPSS was conducted to identify the factors associated with overweight/obesity, sedentary behavior and physical inactivity.

RESULTS Based on international BMI cut-offs, 35.2 % were overweight (BMI ≥ 25 <30) and 6.7% were obese (BMI ≥ 30). Increased age (Adjusted odds ratio (AOR) 1.052; 95% confidence interval (CI) 1.023–1.082) and being unemployed/housewives were positively associated with being overweight and obese (BMI ≥ 25). The prevalence of sedentary behavior (< 5000 steps/day) and physical inactivity (< 7500 steps/day) was 13.9% and 39.7 % respectively. A manual worker had lower odds (AOR 0.282; 95% CI 0.080–0.989) of being sedentary than unemployed/housewives. The younger age group (AOR 0.974; 95% CI 0.949–1) and top socio-economic tertile (AOR 1.875; 95% CI 1.076–3.266) were positively associated with physical inactivity. The correlation between GPAQ and pedometer to measure physical activity was 0.12 ($r^2 = 0.12$).

CONCLUSIONS The high prevalence of overweight/obesity among women needs to be addressed. The wide range of physical inactivity level suggests a need for extensive study on physical activity with a wider age group, both

sexes and longer assessment periods. Objective physical activity measurement tools need to be prioritized before GPAQ to quantify physical activity.

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Prevalence and Predictors of Frailty among Rural Older adults in State of Odisha, India

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BIOGRAPHY I am graduate with Physiotherapy and completed my master in Public health. Now I have been working in the field of NCDs and geriatric health and also published some papers in peer reviewed journals.

OBJECTIVES To estimate the prevalence and find out the risk factors of frailty among rural older adults in Tigira, Cuttack district of Odisha, India.

METHODS This cross-sectional study was conducted among 725 rural geriatric (age > 60 years) community dwelling population in state of Odisha, India. The frailty status of the elderly was assessed using prevalidated Frailty Index For Elderly (FIFE) tool and categorised them into frailty, at risk of frailty and robust group. Chronic diseases among the participants was assess using Multimorbidity Assessment Questionnaire (MAQ-PC) tool. Chi-square test was used for hypothesis testing and multinomial logistic regression was used to find out the predictors. Data were analysed using R statistical programming software version 3.6.3.

RESULTS The overall prevalence of frailty and at risk frailty were 56.7% and 37.05%. Among the older adults 593 have any form of chronic diseases whereas 354 were multimorbid. The factors such as Education level, Occupation, Socio-economic status, Economic dependency, BMI and Multimorbidity found to be statistically associated with Frailty. Low socio-economic status (SES) found to be 22 times higher chance of developing frailty in compare to upper SES group.

CONCLUSION The number of chronic diseases was increasing with age and both affected the frailty status of the rural older adults where health care facility is poor. This study providing the evidence regarding risk factors of frailty, which should be handled by early assessment in primary care level for better wellbeing of the rural geriatrics population.

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Prevalence and socio-demographic associations of diet and exercise risk-factors for non-communicable diseases in Bo, Sierra Leone

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BIOGRAPHY Bockarie is a PhD Researcher at the University of Warwick. In 2018, he was appointed as a Research Assistant on the Wellcome Trust project entitled 'Cardiovascular disease in Bo, Sierra Leone'. During this role, Bockarie successfully managed 17 data collectors and a study budget of £130,000 to deliver quantitative data collection from more than 2000 participants and qualitative data collection from 60 participants. Bockarie currently is in the latter stages of his PhD programme at Warwick Medical School.

OBJECTIVE This cross-sectional study investigated the prevalence and socio-demographic correlates of dietary and physical activity risk behaviours amongst adults in Bo District, Sierra Leone.

METHODS Adults aged 40+ were recruited from 10 urban and 30 rural sub-districts in Bo. We examined risk factors including: <150 minutes of moderate and vigorous-intensity physical activity (MVPA) weekly, physical inactivity for >3 hours daily, <5 daily portions of fruit and vegetables and salt consumption (during cooking, at the table and in salty snacks). We used logistic regression to investigate the relationship between these outcomes and participants' socio-demographic characteristics.

RESULTS 1,966 eligible participants were included in the study. The prevalence of behavioural risk factors was 83.1% for <5 daily portions of fruit and vegetables; 40.8% and 91.9% for adding salt at the table or during cooking, respectively and 30.6% for eating salty snacks; 22.4% for MVPA <150 minutes weekly and 43.9% for being physically inactive >3 hours daily. Most MVPA was accrued at work (nearly 24 hours weekly). Multivariable analysis showed that urban individuals were more likely than rural individuals to consume <5 daily portions of fruit and vegetables (Odds Ratio (OR) 1.06, 95% Confidence Interval (1.00–1.11)), add salt at the table (OR 1.86 (1.80–1.92)), eat salty snacks (OR 2.03 (1.97–2.11)) and do MVPA <150 minutes weekly (OR 1.17 (1.13–1.22)). Males were more likely to add salt at the table (OR 1.25 (1.21–1.29)) and consume salty snacks (OR 1.36 (1.32–1.41)) than females but were less likely to report the other behavioural risk-factors examined).

CONCLUSION Dietary risk factors for NCDs are highly prevalent, particularly among urban residents, of Bo District Sierra Leone. Our findings show that forthcoming

policies in Sierra Leone need to consider modifiable risk factors for NCDs in the context of urbanisation.

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Dietary intake in women with and without goitre attending Mnazi Mmoja Hospital in Zanzibar – a cross-sectional study

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BIOGRAPHY Olivia Bysheim completed a Master's Degree in Clinical Nutrition from the University of Bergen, Norway in 2020. She is interested in global nutrition and health challenges and will present findings from a study on the dietary intake of goitre and non-goitre patients in Zanzibar.

OBJECTIVE The objective of this study was to describe the dietary intake of euthyroid women with and without goitre attending the ear-nose-and-throat clinic at Mnazi Mmoja Hospital in Zanzibar.

METHODS A single-centre cross-sectional study was conducted among 48 euthyroid female patients: 24 with goitre and 24 without goitre age-matched ± 5 years. Single 24-hour recall interviews were analysed using minimum dietary diversity for women (MDD-W) and a semi-quantitative food frequency questionnaire (FFQ) was used to describe the dietary intake of sources of iodine and goitrogens. Additionally, iodine concentrations in household salt samples were analysed.

RESULTS In total, 50% of the study population did not achieve the recommended MDD-W (≥ 5 food groups). In the goitre and non-goitre groups respectively, 42% and 58% consumed food from five or more of the MDD-W food groups, indicating higher, more adequate micronutrient status and dietary diversity in non-goitre patients. The mean dietary diversity score was below five for both groups. The FFQ revealed that the daily consumption of marine fish (iodine-source) and the weekly consumption

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of raw cassava (goitrogen) were more frequent in the goitre group. Furthermore, the groups differed in consumption of iodised salt with a lower average concentration of iodine (10.3 mg/kg) in the goitre group compared to the non-goitre group (21.1 mg/kg). In total, only 35% of the salt samples were adequately iodised (>15 mg/kg).

CONCLUSION This study identified insufficient micronutrient intakes and low dietary diversity among female patients regardless of goitre-status. Considering the dietary intake findings, this small study suggests that comprehensive food analysis for iodine and goitrogen content is necessary in Zanzibar. Additionally, the low proportion of adequately iodised salt emphasises the need for monitoring salt iodisation practices and quality control. Future research on micronutrient status and nutritional intakes in Zanzibar are warranted.

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Optimal mid-upper-arm-circumference (MUAC) based discharge criteria for community-based-management of Severe Acute Malnutrition (CM-SAM) in India: a randomized controlled non-inferiority trial

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BIOGRAPHY Raman Mahajan is an enthusiastic and dedicated public health professional (Epidemiologist by training) with experience in health research, Operational research and Monitoring and Evaluation, applied to the fields of neglected and tropical diseases and childhood malnutrition. Raman combines strong quantitative and qualitative skills to design studies, manage data and projects from conception to successful completion, develop monitoring and evaluation tools and perform data analysis.

OBJECTIVE Most CM-SAM interventions worldwide utilise Mid-Upper-Arm-Circumference (MUAC) < 115 mm for eligibility and ≥125 mm for discharge. India, home to over one-third of malnourished children globally, provides facility-based care based on weight-for-height with no guidelines for CM-SAM. Previous observational data suggests relapse in children reaching ≥120 mm is similar to ≥125 mm, whilst time to achieve ≥125 mm nearly

doubled with higher default rates. This trial in the state of Jharkhand, India investigated whether discharge with MUAC ≥120 mm is non-inferior to MUAC ≥125 mm for risk of relapse to SAM or death.

METHODS Over 12 months, children 6–59 months with uncomplicated SAM by MUAC (<115 mm) across 46 centres were randomised discharge at MUAC 125 mm or 120 mm. Endpoints were status at 3 months (primary) and 6 months (secondary) after reaching allocated discharge MUAC. Non-inferiority was concluded if the upper bound (UB) of a one-sided 95% confidence interval was within a 13% margin, based on pragmatic operational indicators.

RESULTS of 633 children enrolled, 316 were allocated to the ≥125 mm arm and 317 to the ≥120 mm arm. of 194 and 236 reaching discharge criteria in each arm respectively, 176 and 216 were eligible for intention-to-treat analysis. Overall, non-inferiority was observed within 3-months; unadjusted risk difference (RD) 6.4%, 95% UB=11.6%, ≥125 mm: *n* = 14 (8.0%; 14 relapse, 0 death), ≥120 mm: *n* = 31 (14.4%; 30 relapse, 1 death). In pre-specified stratified analyses, non-inferiority was observed in children with MUAC 110–114 mm at enrolment (*N* = 285, RD 2.0%, 95% UB 7.5%); however, inferiority was observed with MUAC <110 mm (*N* = 107, RD 17.5%, 95% UB 29.0%). In stratified secondary outcome analyses, conclusions were similar.

CONCLUSION Results support ≥120 mm as discharge criterion in children admitted with MUAC 110–114 mm, but not in those with MUAC < 110 mm. Considering over two-thirds of children are admitted with MUAC 110–114 mm, defining discharge criteria by admission MUAC may have important implications on increasing capacity and cost-effectiveness of CM-SAM programming in India.

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Deterioration of nutritional status in children aged 6–59 months with moderate acute malnutrition in India: a prospective observational cohort study

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BIOGRAPHY Sakib Burza is a practicing clinician and Medical Advisor, Asia for Medecins Sans Frontieres, with an honorary Associate position at London School of Hygiene & Tropical Medicine. His long standing interests lie in the clinical aspects of leishmaniasis, neglected tropical disease research and research into severe acute malnutrition and melioidosis.

OBJECTIVE Limited data exist to inform community management of children with moderate acute malnutrition (MAM), who are normally excluded from severe acute malnutrition (SAM) treatment programmes. This study was conducted to generate evidence of longitudinal outcomes in children aged 6–59 months with MAM (MUAC 115–124mm), without interventional supplementary feeding.

METHODS Children with MAM were enrolled over a 12-month period in 46 centres in Jharkhand state and followed up for 6 months while attending government integrated child development services. Anthropometric, clinical and socio-demographic characteristics were recorded at enrolment. The primary outcome was deterioration to SAM (MUAC <115 or bilateral pitting oedema) or death within 6 months. Risk factors for the outcome were investigated.

RESULTS of 971 children enrolled, 105 (10.8%) were lost-to-follow-up, (mainly seasonal migration related). of 861 children, 595 (61.3%) were female, with a mean (SD) age of 16.0 months (9.7). At enrolment 333 (34.3%) had MUAC 115–119 mm and 430 (44.3%) had weight-for-height z-score <-3. Within 6 months, 133 (15.5%) deteriorated to SAM or died (95% CI: 13.1–18.0%; 5 deaths), two-thirds of whom within 3 months; ($n = 97$, 11.3% deteriorated to SAM and 1 death).

In an adjusted logistic regression model, with an interaction between MUAC at enrolment (115–119, 120–124 mm) and age (6–11, 12–23, ≥ 24 months), significantly increased odds of deterioration to SAM or death were seen amongst those with MUAC 115–119 mm in all age groups ($P \leq 0.02$) and in those under one year with MUAC <125 mm. After adjustment, there was no evidence of associations with socio-demographic factors, breast feeding or WHZ <-3.

CONCLUSION Children under 1 year and children with MUAC 115–119 mm should be closely monitored considering high MAM burdens in India. Increasing the MUAC admission criterion and/or targeted interventions for MAM children at higher risk could be considered. WHZ <-3 not already MUAC <115mm does not appear to be a risk factor for deterioration.

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The double burden of malnutrition and associated factors among South Asian adolescents

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BIOGRAPHY Sara Estecha Querol is a PhD candidate in Health Science at the University of Warwick, UK. Her research areas include food insecurity, health inequalities and malnutrition using participatory action research methods and mixed-methods.

OBJECTIVE Despite the large world adolescent population (1.2 billion), adolescent global health and nutrition have been under-evaluated. The purpose of this study was to investigate the prevalence and associated factors of malnutrition (stunting, thinness and overweight) among adolescents living in the eight South Asian countries (Pakistan, Afghanistan, Bangladesh, India, Maldives, Nepal, Sri Lanka and Bhutan).

METHODS The analysis included 24,053 South Asian schoolchildren aged 12–15 years old that participated in the cross-sectional Global School-Based Student Health Survey (GSHS) between 2009 and 2016. Prevalence of stunting, thinness and overweight were calculated using the WHO Child Growth Reference 2007. Associations between the three forms of malnutrition and their possible associated factors were assessed with binary logistic regression analysis using bootstrapping as a resampling method to estimate standard errors. Analysis was conducted in Stata 16 applying survey commands to account for the two-stage sample design of the GSHS.

RESULTS The overall prevalence of adolescent stunting in South Asia was nearly 13% and ranged from 3.9% in Pakistan to 28.2% in Afghanistan. Thinness pooled prevalence was 10.8% and ranged from 1.5% in Bhutan to 18.6% in Sri Lanka. Overweight pooled prevalence was 10.8% and ranged from 8% in Pakistan to 19% in Afghanistan. In the logistic regression model of the overall pooled sample, the factors associated with adolescent malnutrition were: older age (OR = 2), adequate tooth brushing (OR = 0.7), peer support (OR = 0.8), sedentary behaviour (OR=0.6) and parental involvement (OR = 0.8).

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CONCLUSION A substantial proportion of stunting, thinness and overweight was found among South Asian adolescents. Future interventions to address adolescent malnutrition should take into account associated factors and seek to further understand the relationship between these determinants and all forof malnutrition.

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Oral cancer prevention and early detection: Knowledge, opinions and practices of dentists in Moldova, Belarus and Armenia

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BIOGRAPHY Olga Golburean took her bachelor's as a dental hygienist and master's in global health. She was part of the collaboration project for education and research in oral pathology between Norway, Moldova, Belarus and Armenia, financed by DIKU through the Eurasia program. During this project, she collected data from the dentists in Moldova, Belarus and Armenia to map their knowledge, opinions and practices related to oral cancer prevention and oral mucosal examination.

OBJECTIVE To investigate the knowledge, opinions and practices related to oral cancer prevention and oral mucosal screening among dentists in Moldova, Belarus and Armenia.

METHODS This study is a multi-country cross-sectional survey based on a self-administered questionnaire. All actively practicing dentists in Minsk, Chişinău and Yerevan were invited to participate to the study. Dentists' knowledge about risk factors for oral cancer and its clinical diagnosis, current practices and opinions and perceived barriers to perform oral mucosal screening were assessed. Data were analyzed separately for each country.

All analyses were performed using IBM SPSS Statistics version 25 (IBM Corporation, NY, USA).

RESULTS The overall response rates were 52.3% in Belarus, 34.5% in Moldova and 24.2% in Armenia. Tobacco and prior oral cancer lesions were identified as the main risk factors by the majority of dentists. Wide variability was observed in the knowledge regarding the most common sites for oral cancer; tongue, rim of the tongue and floor of the mouth being identified by less than 55 % of dentists. Most dentists correctly identified leukoplakia as a lesion most likely to be pre-cancerous, while erythroplakia was identified by much fewer in all three countries. A large part of the respondents reported to give counseling to patients regarding tobacco cessation, while giving counseling regarding excessive alcohol consumption was not so common. The most common listed barriers to performing oral mucosal screening reported by the dentists, were lack of training, knowledge and experience.

CONCLUSIONS Results from our study highlights strengths as well as gaps in dentists' knowledge and practices related to oral cancer prevention and early detection. Data from this study can be used as foundation for future educational prografor dentists in order to enhance awareness and knowledge related to oral cancer prevention.

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Preliminary findings from the review of randomized trials reducing meat and/or dairy consumption in adults: Where are they conducted?

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BIOGRAPHY Theogene Habumugisha holds a master's degree in Nutrition and Health from Wageningen University and Research. He is currently a PhD candidate within Global Challenges Program at the Centre for International Health, Department of Global Public

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Health and Primary Care, Faculty of Medicines, University of Bergen. His research focuses on understanding the impact of dietary transition towards reducing dietary meat consumption on environment sustainability and health/nutrition status for the aging population.

OBJECTIVE There is a growing older adult population in Low- and Middle-Income Countries that have a nutritional transition towards affluent diets that are rich in animal products. However, there is a limited attention to this shift in terms of health and environmental issues. This abstract reports on the effect of reducing meat and/or dairy consumption on protein intake, body weight and composition and on the regional distribution of the literature found by the review (PROSPERO Registration: CRD42020207325).

METHODS A systematic review identified randomized trials which reported at least one of the review outcomes. Literatures were searched in MEDLINE, Cochrane CENTRAL; EMBASE, ClinicalTrials.gov and International Clinical Trials Registry Platform and supplemented with manual search. Two reviewers independently screened all records. Data were synthesized through meta-analyses using a random effect model and the results are presented as mean difference (MD) and 95% confidence interval (CI).

RESULTS We identified eligible 27 RCTs which reported review outcomes. Subjects who reduced meat and/or dairy had lower protein intake than their counterparts who consumed meat and/or dairy rich diet (MD: -11 g/d, 95% CI: -16 to -6). Body mass index (MD: -0.3 kg/m², 95% CI: -0.8 to 0.3 and lean body mass (-0.70 kg, 95% CI: -1.5 to 0.1) was lower in the intervention groups. The studies were from US, Canada, Australia, New-Zealand, Europe (Germany, UK, Italy and Finland) and three from Asia (Iran and South-Korea). There were no studies from Africa.

CONCLUSION In times with rapid population growth and urbanization, increased life expectancy and dietary transitions towards affluent diets, there is limited evidence on meat and dairy reduced diets and health outcomes in urban African and South-East Asian populations. There is a need to address dietary patterns among elderly in urban settings of LMICS who might be at high risk of malnutrition.

478**Dietary diversity and food consumption among pediatric patients prior to hospitalization in Hawassa, Ethiopia**

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BIOGRAPHY Vilde Kloster Hjellbakk holds an M.Sc. in Clinical Nutrition from University of Bergen (2018–2020) and a B.Sc in Human Nutrition University of Bergen (2015–2018).

OBJECTIVE To investigate the dietary diversity, diet and nutritional practices in a recently admitted inpatient pediatric population aged 6–59 months in Hawassa, Southern Ethiopia.

METHOD This was a hospital-based cross-sectional study, conducted in the city of Hawassa between November 2019 and January 2020. Caregivers of children being admitted for > 24 hours were interviewed by using a pre-tested structured questionnaire including a 1-week food recall. Dietary diversity was assessed using the FAO 7 food-groups. The questionnaire was translated and back-translated from English to Amharic. Weight and height/length were measured. The definition of severe acute malnutrition (SAM) was a z-score of -3SD of the median WHO growth standard. EpiData Manager and Entry Client (v.4.6) were used for data entry and analysed using STATA version 14 (StataCorp, Texas, USA).

RESULTS A total of 188 caregiver-child pairs were interviewed in the two public hospitals Adare and Referral University Hospital. The majority of the patients were admitted with SAM (33%) or respiratory tract infections (23%). The majority of the children (59%) reported to have a dietary diversity score of less than four. Children with SAM had less dietary diversity than children without SAM seven days prior to admission. Dairy products and grains, roots and tubers were the most commonly consumed food groups. Consumption of other food groups were low. A clear difference was seen in consumption between the two patient groups, where SAM-patients had lower consumption in all categories.

CONCLUSION This study revealed a child population with a high degree of morbidity, extreme poverty and poor nutrition with low dietary diversity. There is a need to focus on nutrition patterns in a clinical setting and advice on feeding to children in need of hospital care. Further research should address both food service at the hospital and therapeutic nutrition-treatment for all pediatric patient groups.

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Predictive risk factors of hypertension in sub-Saharan Africa: A fixed effect modelling study in Burundi

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BIOGRAPHY Arnaud holds a BSc and International certificate on principles of bioethics in research (Haifa University). He is a MD, and ambassador of the International Journal of Medical Student (Pittsburg, USA) and Royal Society of Tropical Medicine and Hygiene student ambassador (UK). On Head of ARNECH Research and Consulting office. Arnaud is highly resourceful and goal-driven statistician with key interests in Designing of effective M&E system and developing tools for routine data collection, data analysis, data visualization and projection using varied regressions to calculate incremental effect of projects interventions on targeted population in Infectious diseases, Chronic and NCDs and Maternal Health areas

OBJECTIVE In this study, using retrospective data from two referral hospitals in Burundi, we model the risk factors associated with hypertension in Burundi.

METHODS Analysis of retrospective data of a sample of 353 randomly selected from a population of 4,380 patients admitted in 2019 in two referral hospitals in Burundi: Military and University teaching hospital of Kamenge. The predictive risk factors were carried out by fixed effect logistic regression. Model performance was assessed by Area under Curve (AUC). Model was internally validated via bootstrapping with 2000 replications. All analysis were conducted in R.

RESULTS Overall, 16.7% of the patients were found to be hypertensive. After adjustment of the model for confounding covariates, associated risk factors found were advanced age (40 years) AOR: 6.03, 95% CI: 1.86–17.19) and above 60 years, (AOR: 12.76, 95% CI: 3.30–14.26). Patients comorbid with chronic kidney failure were 4.95 times more (95% CI: 1.83–15.82) to be hypertensive and among those with family history of hypertension, the adjusted risk were twice. Compared to non-smokers, smokers were 2.87 times more likely to develop hypertension (95% CI: 0.87–9.15). The highest probabilities are observed to patients who are at the same time smokers, overweight, with chronic kidney failure, family history with hypertension with secondary or university as highest educational level. The model had an excellent predictive performance (AUC), accurately predicting 88.71% (95% CI: 84.17%–92.5%) of all observations.

CONCLUSION The relatively high prevalence and associated risk factors of hypertension in Burundi raises a call for concern especially in this context where there exist an

equally high burden of infectious diseases, other chronic diseases including chronic malnutrition. Targeting interventions based on these identified risk factors will allow judicious channel of resources and effective public health planning.

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Nutritional and clinical status of patients with diabetes in Zanzibar – A cohort studyA. Jaboori¹, I. M. Engebretsen², E. M. Vogt³, A. Kassam⁴, E. W. Søfteland⁵ and F. Suleiman⁶

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BIOGRAPHY Holds a master's degree in Human Nutrition from the University of Bergen, department of clinical science since 2020. Biomedical scientist graduated in 2013 from NTNU. Currently working at the microbiology department (Haukeland University Hospital) as a band 6 biomedical scientist within serology.

OBJECTIVES Investigate nutritional and health related factors in patients with diabetes type 2 in Zanzibar.

METHOD This was a follow-up on a 2014 study on a cohort of 100 patients with diabetes attending the diabetes clinic in Mnazi Mmoja Hospital, Zanzibar, Tanzania. Body Mass Index (BMI), blood pressure and laboratory assessments of metabolic status were performed. Dietary data including a Food Frequency Questionnaire (FFQ) and case report form on diabetes complications were administered. Logistic regression models were used to investigate factors associated with dysregulated diabetes (HbA1c \geq 9%). Individual diet diversity score was given to each individual and was based on FAO guidelines for measuring individual diet diversity.

RESULTS Fourteen patients died, 24 were lost to follow-up, hence 62 patients were successfully traced. Further, two patients were excluded, leaving 60 patients available for inclusion (27 female and 33 male), mean age of participants was 55 years. The population was overweight with a mean BMI (SD) 26.9 (5.0) kg/m² and higher values in women compared to men 28.7 (5.9) vs. 25.4 (3.6). The mean HbA1c was 9.5% and fasting glucose – 12.3 mmol/L. Cholesterol values showed a slightly raised low-

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density lipoprotein (mean 3.0 mmol/L). Median blood pressure was 140/90mm/Hg and 68% reported numbness in lower limbs. FFQ results revealed a high consumption of refined carbohydrates and food rich in saturated fatty acids. Food portion sizes were evaluated as being medium to large. Average individual diet diversity score was 7.6.

CONCLUSION The metabolic profile was concerning with poor glucose and lipid control, elevated BMI, hypertension and increasing number of diabetes complications. Unhealthy eating patterns were also observed. Findings from our study also indicate poor availability and utilization of food groups that are low in glycaemic load.

145**Preliminary results from a new eye-screening service in Mbeya, Tanzania**

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BIOGRAPHY Catherine Jamison (MSc, BSc) is a senior ophthalmic image analyst with five years of image-analysis experience in a variety of eye diseases, predominantly diabetic retinopathy and age-related macular degeneration. This has included a variety of projects with low-middle income countries and carrying out training of graders in Tanzania and Eswatini

OBJECTIVE To determine the prevalence and severity of diabetic retinopathy (DR) and other pathologies in patients with diabetes mellitus (DM) attending during the first 6-months of a diabetic retinopathy (DR) screening programme (DRSP) in Mbeya, Tanzania.

METHODS In May 2018, the first fundus camera and retinal laser were received at Mbeya Ophthalmology Unit, Tanzania, as part of the 2020 Links/Queen's Diamond Jubilee Programme. Five staff completed their Certificate of Higher Education in DRSP. In November 2018 an advanced training and quality assurance visit was conducted and all images assessed to determine prevalence and any other pathologies.

RESULTS During the first 6-months of DRSP, 104 DM patients were screened. Only 6% of images were ungradable, all but one due to pathology. Of the gradable images, 39% had no DR, 17% had mild non-proliferative (NPDR), 8% had severe NPDR and 31% had proliferative (PDR); 34% had diabetic maculopathy. Overall, 61% had including 31% with PDR; in a developed DRSP the expected ratio is approximately 33% for any and 1%

for P38% of patients also had drusen, 13% had cataract, 5% had an epiretinal membrane and 3% had suspected glaucoma.

CONCLUSIONS The high rates of disease reflect a screening service in its infancy and the fact that the screened population was from a tertiary diabetes clinic; with increased coverage the prevalence will decrease. The lack of free healthcare for those with Type 2 DM in Tanzania leads to late presentation as rarely causes visual loss until it is too late to treat. However, the inception of this DRSP is a vital step towards reducing preventable blindness in the region.

297**Measurement of resident CD8 T cells in Oral Squamous Cell Carcinoma TMAs**

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BIOGRAPHY A Dentist from the Khyber Pakhtunkhwa province of Pakistan, with a degree in Dental Surgery from Gandhara University and currently undergoing a Master's programme in Global Health at the University of Bergen. Zarak's research is focused on Oral Cancer, a fatal and deforming disease with continuously increasing levels of incidence, currently exhibiting more than 300,000 new cases globally each year.

OBJECTIVE Oral squamous cell carcinoma (OSCC) is a fatal and deforming disease demonstrating increasing incidence, especially in younger patients and globally presenting more than 300,000 new cases each year. Our objective was to establish a method for measuring and visualizing subpopulations of tissue resident immune cells with anti-tumoral activities in Tissue Microarray (TMA) slides of OSCC.

METHODS OSCC TMA cores from 41 patients (1 mm Ø, from The Norwegian Oral Cancer (NOROC)), immunofluorescence (IF)-stained against CD8 and CD103 (T resident, TR), were visualized as whole slides with Olympus VS120 S6 Slide scanner (Molecular Imaging Centre, UiB) with adjustment of conditions for best imaging (VS126 software misses pre-set module for IF on TMAs). QuPath was used for image analysis and quantification, data was analyzed using Microsoft Excel and SPSS.

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RESULTS The 138 TMA cores (multiple cores/cases) analyzed showed high variability in amounts of CD8, CD103 and CD8CD103 cells. Selecting all cores with highest count/case, CD8 had a Mean (M) of 654.71/core, Median (Me) 382/core and Standard Deviation (SD) 733. For CD103 M was 404.51/core, Me 9.00/core and SD 679.47/core. The M for CD8CD103 was 958.44/core, M 659/core and SD 1196.35/core. Analyzing all 138 cores gave respectively M 441.17 Me 185.00 and SD 600.80/core for CD8; M 219.70 Me 10.50 and SD 483.252 per core for CD103; M 520.57, Me 184.50 and SD 847.94 per core for CD8 and CD103.

CONCLUSION Using TMAs and IF permit to spare valuable biobank tissue and reagents, allowing multiplexing and better definition of cell subset definition for prognostic purposes. Our results show a high variability of TR amount in cores among cases, but also in each case. It is expected that the complete analysis of all cores and correlation with clinic-pathological data will provide us with prognostic markers and suggestion on evaluation (hot spots or not).

319**Dietary knowledge, beliefs and practices among pregnant women in a rural health zone in Democratic Republic of Congo: qualitative study**B. Kazenza*University of Kinshasa, Kinshasa, Democratic Republic of Congo*

BIOGRAPHY I'm a Medical doctor and academic assistant at Department of Nutrition. Currently, I'm a PhD student. My interest field is Nutrition of pregnant woman and young adolescent.

Inadequate dietary intake during pregnancy contributes to maternal malnutrition and can have lifelong effects on the health of the child. Maternal malnutrition is common in many low-income countries, including the Democratic Republic of the Congo. Kwango province has a high prevalence of malnutrition, including macro and micronutrient deficiencies among pregnant women. The study aimed to explore the dietary knowledge and practices of pregnant woman in this area.

METHODS This study adopted a qualitative approach using IDIs with pregnant women and key informants and FGDs with community members to explore women's knowledge and practice about diet during pregnancy. Data were collected between January and April 2018. Nine in-depth interviews were conducted with pregnant women who were recruited at antenatal clinics during

their second and third trimester. IDIs were undertaken with selected key informants, who were health workers providing care to pregnant women. In addition, FGDs were conducted with grandmothers and fathers in the community. All IDIs and FGDs were audio-recorded, transcribed verbatim and translated to English. Triangulation method and thematic analyses were used.

RESULTS Overall, women showed a good general knowledge on nutrition and the need for increased and varied foods during pregnancy, but little technical knowledge about nutrients and sources of nutrition. Healthcare facilities, media, NGOs and family members were the main sources of nutritional information. However, they were unable to put this knowledge into practices primarily due to poverty and poor access to a variety of foods. Food taboos, traditional practices and late ANC attendance were identified as factors that influenced dietary practices.

CONCLUSIONS: A variety of social, economic and environmental factors within the local community influenced dietary practices among pregnant women. In order to improve nutrition, a comprehensive approach is needed to address food insecurity, cultural practices and improve health outcomes of both mother and the child.

425**Nourishing communities with small fish to combat micronutrient deficiency – chemical analyses of fresh and processed small fish in Ghana**

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BIOGRAPHY My main area of expertise is food security and nutrition with focus on micronutrients in aquatic foods. I have extensive experience in dietary intervention studies with seafood with special focus on the first thousand days (pregnancy and infants) and development and validation of food frequency questionnaires with biological marker. Today, aquatic food make up a small part of the world's food supply and is not well integrated in solving the goals to achieve "zero hunger" (UN SDG 2) and "good health and well-being". Thus, my research focus

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on how SDG14 can contribute to better nutrition security.

OBJECTIVE According to FAO statistics, the yearly per capita apparent fish consumption in Ghana currently stands at 25 kg. Still the prevalence of micronutrient deficiency (hidden hunger) is a challenge although small fish eaten whole, which is the majority, is regarded as an excellent micronutrient source. In the present study we hypothesize that processing may decrease some of the nutrient content in fish.

METHOD The SmallFishFood project in collaboration with the EAF Nansen Programme, we sampled fresh fish off the Ghanaian coast (12 species); sun-dried, salted and smoked small fish from fish markets in Ghana (6 species). The samples were analysed for proximate composition, Vitamins A, D and B12, fatty acid profile minerals and trace elements (calcium, zinc, iron, iodine) using validated methods in laboratory accredited by ISO 17025:2005.

RESULTS Fish is a highly diverse food group regarding nutrient content and both fresh and processed fish can contribute significantly to the recommended intake of the micronutrients analysed. Both freshwater and marine species are good sources of calcium and vitamin B12. All species except for tilapia are good sources of the fatty acids EPA and DHA. For the rest of the selected nutrients, there is relatively high variation between species. Vitamin A, B12 and iodine content reduced in smoked compared with fresh fish, while the iron content was higher in smoked fish.

CONCLUSION Both marine and freshwater species are “equally good” sources of specific micronutrient. The findings support the hypothesis that smoking may destroy or reduce the content of some nutrients. Higher values of iron measured in the smoked samples may be due to metal contamination post-harvest, but further studies are needed to verify this hypothesis. Studies following the same batch of fish through the different steps along the value chain are needed.

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Tackling bad air and promoting prevention and care for chronic lung diseases in sub-Saharan Africa: Assessing evidence for strategic responses

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BIOGRAPHY Grace Marie Ku, originally from the Philippines, is a family physician and public health specialist who has experiences as a clinician; as a health systems, health policy & development researcher; as lecturer in family medicine/public health/health research/medical & research ethics; and as health services and health research administrator/manager.

She has worked, particularly in resource-constrained settings, on primary care; NCDs; quality and safety in healthcare; access to health services; patient and community engagement; patient’s rights; and medical and research ethics.

She has served as abstracts reviewer/evaluator for the Geneva Health Forum and the International Diabetes Federation Congress; and selection committee member for VLIR-UOS.

Chronic respiratory diseases (CRD) are de facto “neglected diseases” in Sub-Saharan Africa (SSA) although prevalences are significantly rising and more people at younger ages are affected.

Disabilities from CRD intensify with increasing severity, leading to absenteeism, decreased productivity and steep increases in direct and indirect costs for individuals/families, economies and society. The wide implications of increasing prevalence and severity are recognized in SSA; however, there are serious challenges for effective action.

We formulated targeted and feasible strategies that could inspire future interventions to address the issue of CRD in SSA countries.

We conducted scoping reviews of literature and policy documents on CRD in SSA and interviewed key informants in several SSA countries; and identified specific determinants, current health system responses and any ongoing programmes.

Air quality is poor in much of SSA, affecting development of forming/immature lungs and damaging adult lungs. Rural-urban migration contributes to increased population densities. Resultant soaring utilisation of unclean energy and poorly-regulated transport increase outdoor air pollution. Poor working conditions in factories and mines and largescale domestic use of biomass fuel significantly cause indoor air pollution. Holistic approaches to tackle air pollution and application of labour regulations for decent work can be part of the solutions.

Translation of the Framework Convention on Tobacco Control commitments into action should be optimised.

Health system responses to CRDs are poor to non-existent. There are no prevention activities and medications are rarely available; there is low-level CRD knowledge among healthcare professionals and the population.

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“Basic CRD care package” can be introduced and decision-support to healthcare professionals offered.

Engagement of stakeholders – communities; specific groups (e.g., women’s organisations, mutual insurance institutions, professional associations) – can be commenced. Sporadic/scattered projects/progracan be stimulated towards synergistic actions.

An assessment tool determining contextual applicability of strategies can help tailor appropriate responses to the problem.

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Do improved biomass cookstove interventions improve indoor air quality and blood pressure? A systematic review and meta-analysis

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BIOGRAPHY Nitya Kumar is teaching faculty at the Royal College of Surgeons in Ireland, at their Bahrain campus. She is trained in different aspects of public health – from Nutrition at undergraduate level, to public health nutrition at masters and doctoral level, to epidemiology at post-doctoral level. Her research experience in the past decade spans across disciplines of undernutrition in pediatric population in India, to cardio-vascular health and breast cancer in the USA, to health impact of indoor air quality in adults in Malawi.

OBJECTIVES This systematic review and meta-analysis examines the most recent evidence on the impact of Improved Cook Stoves (ICS) on Household Air Pollution (HAP) and blood pressure (BP).

METHODS A literature search was conducted using scientific literature databases and grey literature. Studies were included if they were published between January 2012 and June 2020, reported impact of ICS interventions in non-pregnant adults in low/middle-income countries and reported post-intervention results along with baseline of traditional cookstoves. Outcomes included 24- or 48-hour averages of kitchen area fine particulate matter (PM_{2.5}), carbon monoxide (CO), mean systolic BP (SBP) and mean diastolic BP (DBP). Meta-analyses estimated weighted mean differences between baseline and post-intervention values for all outcome measures.

RESULTS Nine studies were included; eight contributed estimates for HAP and three for BP. Interventions lead to

significant reductions in PM_{2.5} (-0.28 mg/m³, 95% CI: -0.46, -0.10), CO (-6.59ppm, 95%CI: -10.73, -2.46) and SBP (-2.82 mmHg, 95% CI: -5.53, -0.11); and a non-significant reduction in DBP (-0.80 mmHg, 95%CI: -2.33, 0.73), when compared to baseline of traditional cookstoves. Except for DBP, greatest reductions in all outcomes came from standard combustion ICS with a chimney, compared to ICS without a chimney and advanced combustion ICS. WHO air quality targets were met by post-intervention values for CO but not for PM_{2.5}.

CONCLUSION Our review suggests that ICS with a chimney results in the greatest reductions in HAP and BP. Further research on qualitative impact of such ICS on end-users is required to understand feasibility of adoption at scale.

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Fruit consumption among young people aged 10 to 24 in Burundi: A descriptive cross-sectional survey (2019)

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BIOGRAPHY Léonard Ntakarutimana is parasitologist by training with a DEA & MSc both obtained at the University of Yaounde I Faculty of Science. He also holds a MPH & a Health System Research University Certificate obtained respectively at the Leuven Catholic University and Free Brussels University School of Public Health. Léonard Ntakarutimana holds a Health Policy and System Research Certificate obtained at the Antwerp Institute of Tropical Medicine.

He is Researcher-Lecturer at National Institute of Public Health of Burundi since 15 years. His domains of interest include maternal, newborn, child, youth and adolescent health; Community health; Performance-Based Financing; and Health Systems.

OBJECTIVE Fruit consumption is very important because they are rich in vitamins, minerals and antioxidants and are valuable allies in reducing the risk of cancer, obesity and cardiovascular disease. This study assesses eating behaviors and associated factors in 1,964 young people aged 10 to 24 in Burundi.

METHODS This is a four-stage cross-sectional cluster survey carried out in 11 of Burundi’s 18 provinces, where 110 enumeration areas were randomly selected. The data were collected using a questionnaire on the ODK platform and the results analyzed using Stata 15.0.

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RESULTS 25.3% of respondents say they rarely (less than once a week) consume fruit; girls being more concerned (27.0%) than boys (22.9%). A decreasing gradient is observed across the age groups; young adolescents (10–14 years) and adolescents (15–19 years) being relatively more affected (25.4% and 23.7% respectively) than young adults (20–24 years) of whom only 18.4% rarely consume fruits. In addition, frequency of fruit consumption appears to be linked to nutritional status as 39.2% of all overweight and obese young people (2.6% of respondents) rarely consume fruits compared to only 24% in young people of normal weight.

CONCLUSION One in four young people rarely consume fruits with a gender dimension. Could the fact that the youngest are the most affected be related to their low autonomy in the choice of diet? Further investigations are needed to better understand this phenomenon. Our results are consistent with the idea that increasing the frequency of fruit consumption helps improve nutritional status in young people. Therefore, it would be interesting to identify in young Burundians the barriers to fruit consumption despite their relatively good physical availability throughout the country.

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Does parental tuberculosis infection increase the risk of asthma in their offspring? A Norwegian registry-based study

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BIOGRAPHY Mexican medical doctor with specialization in Pediatrics, currently studying the Master Program in Global Health by the University of Bergen and employed as young researcher by Helse Bergen, in Norway, with main research focus on multi-generation studies related to asthma and allergies in humans.

INTRODUCTION The links between early life infections with asthma and allergies have been extensively studied, however, previous work is limited to a one-generation setting. Murine models suggest infections may impact on immunity in future offspring.

OBJECTIVE To study the impact of parental tuberculosis infection in different time windows prior to conception, on asthma and rhinitis in their offspring.

METHODS The Norwegian Tuberculosis Registry included 24426 persons (1962–2010), who had 18619 offspring. Analyses included 5970 offspring (mean birth

year, 1987) with parental tuberculosis ≤ 50 years, born after 1965, alive in 2004 and registered in the Norwegian Prescription Database (2004–2020). Asthma ($n = 1299$) and rhinitis ($n = 1703$) were defined by diagnosis + type of medication + prescribed medication ≥ 1 year. The associations of parental tuberculosis in age windows <8 years, 8–15 years, >15 years but before conception and after birth (reference category), with offspring asthma and rhinitis, were analyzed using logistic regression adjusted for parent's sex and offspring's sex, birth year and tuberculosis.

RESULTS The risk of asthma in offspring was higher in those with parental tuberculosis <8 years than in those with parental tuberculosis after their birth (odds ratio [OR] 1.38; 95% confidence interval [CI], 1.12–1.72). Significant associations with offspring rhinitis were not identified (1.04, 0.85–1.27). After stratification by gender, a significant association of mother's tuberculosis <8 years with daughter's asthma was found (1.63, 1.06–2.50), while associations of parent childhood tuberculosis with offspring asthma were not significant for mother-son (1.35, 0.88–2.08), father-son (1.20, 0.76–1.89) and father-daughter (1.43, 0.94–2.20).

CONCLUSIONS Parental tuberculosis in childhood was associated with higher risk of asthma in their future offspring, most pronounced for maternal tuberculosis as associated with asthma in daughters. We speculate that tuberculosis in childhood may have profound impact that may be transferred to offspring, following possible sex-specific patterns. The nature of such impact needs further study.

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Muscle strength as a simple measure for screening prediabetes and type 2 diabetes mellitus risk among adults in Malawi

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BIOGRAPHY Chrispin Mahala Manda recently graduated with a Doctor of Philosophy in Medical Sciences from the Doctoral Program in Clinical Sciences from the University of Tsukuba, Japan. Before coming to Japan, he worked at Zomba Central Hospital in Malawi as a Medical Laboratory Scientist for 3 years. It is from there that he got interested in non-communicable disease research and recently has focused on prediabetes and type 2 diabetes in rural and urban Malawi. He has also conducted studies in Japan with a community cohort study of 10000 individuals participating in annual health examinations.

OBJECTIVE Muscle strength has been reported as a predictor of both prediabetes and type 2 diabetes mellitus (T2DM). Therefore, handgrip strength, a simple measure of muscle strength has been suggested for screening prediabetes and T2DM risk. However, the utility of handgrip strength measurement in settings of low-and middle-income countries and SSA, in particular, is unknown. This study examined the relationship of handgrip strength with prediabetes and T2DM among rural and urban-dwelling adults in Malawi.

METHODS This was a cross-sectional study nested in a follow-up study of prediabetic and prehypertensive individuals identified during an extensive NCDs survey that enrolled adults from rural and urban Malawi. Participants were interviewed; had anthropometry, handgrip strength and blood pressure measured; and had fasting blood assessed. A total of 261 participants (women: 64%) were recruited between November 2018 and February 2019. Univariate and multivariate binary logistic regression analyses were performed to examine the association of prediabetes and T2DM with relative handgrip strength.

RESULTS The mean (SD) age of the participants was 49.7 (13.6) years and 54.0% were between the ages of 40 and 59 years. The mean (SD) absolute handgrip strength and relative handgrip strength were 28.8 (7.3) kg and 1.16 (0.40) kg/BMI, respectively and the mean relative handgrip strength differed significantly ($P < 0.001$) by T2DM status. In the unadjusted model, the odds ratio (OR) of prediabetes and T2DM per unit increase in relative handgrip strength was 0.12 [95% CI; 0.04–0.33]. The result remained significant after adjusting for age (continuous), sex, place of study, hypertension, dyslipidemia and level of education (AOR [95% CI]; 0.19 [0.03–0.95]).

CONCLUSIONS The findings suggest that handgrip strength could be a relatively inexpensive, noninvasive measure for contributing to risk scores to identify high-risk individuals for screening diabetes in low-income

settings, where the majority of T2DM patients are younger and lean individuals.

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Hygienic status of middle-aged and elderly people in Armenia

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BIOGRAPHY Mikayel Manrikyan is a DDS, PhD, doctor of sciences (medical), he is the author and co-author of 63 scientific articles, of the Department of Pediatric Dentistry and Orthodontics YSMU

OBJECTIVE An important role in dental health care is provided by the individual's personal responsibility, especially for oral care. In old age it is much likely to face some problem of the oral cavity, such as the need to wear dentures, which often lead to deterioration in the dental status.

METHODS The hygienic state of the oral cavity in 1493 people of the adult and elderly population of Armenia was studied using the OHI-S "dental plaque" index, taking into account the social status and place of residence. All participants signed a consent form in accordance with the Declaration of Helsinki.

RESULTS In the 35–44-year-old group, a poor level of oral hygiene was registered in the regions and Yerevan, which made up 2.8 ± 0.6 and 2.06 ± 0.7 on average. In the social groups of workers, employees and unemployed regions and Yerevan, oral hygiene was at an unsatisfactory level – 2.4 ± 0.8 , 2.6 ± 0.7 , 2.7 ± 0.5 , 2.3 ± 0.7 , 1.9 ± 0.6 , 2.05 ± 0.9 respectively.

In the age group 65 and older, the values of the OHI-S in the regions and the city were unreliable due to the absence of a large number of index teeth. In individuals with dentures, a satisfactory (27%) or poor (73%) degree of contamination of prosthetic structures was revealed. In the examined patients with a high degree of contamination of dentures, *Candida* lesions of the oral cavity were observed in 37% of cases.

CONCLUSION Middle-aged and elderly patients who have good oral hygiene have a significantly lower number of pathological conditions and diseases of the oral cavity compared to patients of the same age who have irregular

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oral hygiene, which indicates that it is justified to teach them the correct skills of oral care. It is necessary to develop a protocol of recommendations of oral health care for the people with orthopedic constructions in the elderly.

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Essential and non-essential trace elements assessment among under 5 children in rural Popokabaka, DRC: a community-based cross-sectional study

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BIOGRAPHY Mbunga is PhD Student at Kinshasa School of Public Health, in GrowNut Project, a consortium with CIH-UiB for Higher education in Nutrition Epidemiology in DRC. He is working on micronutrient deficiency in children

OBJECTIVE Information on the levels of essential and non-essential (toxic) trace elements among children from rural settings is lacking in the Democratic Republic of Congo (DRC). We aimed at assessing the blood level of 9 trace elements in a representative under 5 children sample from the rural area of Popokabaka, DRC.

METHODS We carried out a community-based cross-sectional study in Popokabaka. Around 6 milliliters of venous blood were drawn from 412 children aged 1 to 5 years old and processed using trace-element-free equipment. The serum samples were analyzed using the Agilent 8900 Triple Quadrupole (QQQ) Inductively Coupled Plasma- Mass spectrometry. Sensitivity measures (Limit of detection(LOD)/Limit of quantification (LOQ); $n = 10$) were determined in mg/L as Cu (0.001/0.0049), Zn (0.06/0.20), Se (0.0008/0.0027), As (0.0002/0.00055), Mo (0.0007/0.0022), Cd (0.000006/0.000019), W (0.0001/0.00037), Hg (0.0002/0.00083) and Pb (0.0006/0.0021). Mean and standard deviation [Me \pm SD] was calculated for trace element with at least 60% of quantification. Prevalence of deficiency for essential trace elements or toxicity for non-essential ones were determined at 95% of confidence.

FINDINGS Essential trace elements (Cu, Zn and Se) were quantified in all 412 samples and distributed as Cu [1.5 \pm 0.387] mg/L, Zn [0.6 \pm 0.186] mg/L and Se [0.05 \pm 0.015] mg/L. The prevalences of deficiency were Cu 1.5% (95% CI: 0.7%-3.2%), Zn 64.6% (59.8%-69.1%), Se 86.9%(83.3% -89.8%). Except for total arsenic, which was quantified in 59.7% of the samples and reached toxic concentrations in 3.4%(2.0-5.7%), other non-essential elements (Mo, Cd, Hg, Pb and W) were quantified in less than 10% of the children and with values far below the respective toxicity references.

CONCLUSION The study highlights the severity and extensiveness of zinc and selenium deficiency and the presence of arsenic toxicity in children of Popokabaka. Further research is needed to specify the causes of these trace element imbalances.

KEYWORDS: trace element, essential, non-essential, children, Popokabaka

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Mixed methods inquiry into early complementary feeding of infants in the Dominican Republic

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BIOGRAPHY John D. McLennan is a Clinical Investigator and Associate in the Departments of Psychiatry and Community Health Sciences at the University of Calgary in Canada. He is a public health specialist and child psychiatrist. He has worked on child health projects in the Dominican Republic with non-governmental agencies for over 25 years with a special focus on infant and child feeding practices, in addition to studying other parenting rearing strategies.

OBJECTIVE Although ever breastfeeding is common in the Dominican Republic, exclusive breastfeeding (EBF) in the first few months of an infant's life is very uncommon and decreasing over time. This study aimed to identify patterns of early complementary feeding and maternal rationales for these practices. Such information may inform health promotion efforts to advance EBF.

METHODS Mothers of children under 12 months of age living in a low-resource peri-urban community had three opportunities to contribute to the study: (i) responding to feeding questions embedded in standardized questionnaires used at a well-baby clinic, (ii) participating in focus groups and (iii) engaging in home-based, semi-

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structured individual interviews. Textual data from the individual interviews and focus groups were systematically reviewed and coded to facilitate identification of key constructs through a qualitative descriptive approach. Quantitative questionnaire data were analyzed to identify feedings practices as a function of child age.

RESULTS The majority (>86%) of mothers reported breastfeeding at all monthly age bands up to six months. However, EBF was rare, with more than half of mothers reporting use of other milks and other foods by the infants' second and fifth month, respectively. Overarching themes to explain early complementary feeding from the qualitative data can be broadly summarized by the complementary perceptions that there are problems with relying on breastfeeding alone and that there are benefits to early complementary feeding in the early months of an infant's life. Key constructs included perceptions that infants' nutritional needs would not be met without early complementary feeding and that there are limitations and consequences for women and infants from EBF.

CONCLUSIONS Although mothers typically endorsed breastmilk as the preferable and best option for infant feeding, this did not translate into EBF and was not presented as contradictory to the use and perceived benefits, of early complementary feeds.

73**Implementation of School Oral Health Program in Gauteng, South Africa.**M. Molete*University of the Witwatersrand, Johannesburg, South Africa*

BIOGRAPHY Mpho Molete is a Specialist in Community Dentistry who holds an MSc in Dental Public Health from Kings College London and an MDent in Community Dentistry from the University of the Witwatersrand. She is PhD candidate at the Wits School of Public Health and a Consortium for Advanced Research Training in Africa (CARTA) fellow.

Her academic post is based at the Wits Department of Community Dentistry where she is involved in undergraduate and postgraduate teaching. She has published in both local and international journals and her research interest includes child oral health, health systems and implementation science research.

OBJECTIVES School settings are an essential platform for promoting oral health at early stages of a child's life; hence implementation of such programs needs to be well executed in order to obtain long term favorable oral

health outcomes among children and adolescents. The study therefore sought to assess the extent of policy implementation of school oral health program in the Tshwane district of Gauteng and to determine factors affecting the quality of implementation at participating schools.

METHODS This was a convergent parallel mixed method design that involved separate collection of quantitative and qualitative data which was merged during the interpretation phase. Ten oral hygienists coordinating a number of school programs in the district were invited to participate. One school from each of the oral hygiene list was then randomly selected as study sites. At the schools, the oral hygienists were observed and interviewed using a mapping tool and an implementation fidelity checklist.

RESULTS The oral hygienists carried out 28% of the program content; adherence to the policy OBJECTIVES was 40% and over 100% of the children were covered. The themes emerging from the qualitative data included inconsistent policy interpretation, contextual challenges and poor stakeholder mobilization.

CONCLUSIONS The coverage of the school children was above what was set out by policy however it compromised the program quality. Inconsistent policy interpretation resulted in variations of the program activities. Contextual factors affected the type of services meant to be offered and poor stakeholder mobilization hindered successful implementation. Broader stakeholder collaboration and training on policy content are therefore needed to improve policy implementation of school oral health programs.

KEYWORDS: School oral health, policy implementation, fidelity

495**Immigrant parents' perceptions related to control of their children's sugar consumption**A. N. Åstrøm¹, M. Mustafa² and E. F. Nasir²¹*Department of Clinical Dentistry, Faculty of Medicine, University of Bergen;* ²*King Faisal University SA, University of Science and Technology, Sudan*

BACKGROUND Previous reports have established that frequent intake of sugary drinks and snacks are risk factors for development of Early Childhood Caries.

AIM This study focuses on immigrant parents living in Norway, with children aged 0–6 months. The aim was to examine (i) parents' knowledge of and attitudes to control of sugar consumption and the parents' own sugar intake (ii) parents' intention to control their children's

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sugar intake, as predicted by the Theory of Planned Behavior (TPB).

DESIGN: A cross-sectional study of immigrant parents of non-western background, who were attending child public health centers for child vaccination.

RESULTS 345 immigrant parents (response rate 71%) agreed to complete personal structured interviews during their visit to the health centers. In accordance with the TPB and after adjustment of socioeconomic factors, attitudes, subjective norand perceived control, in declining order of importance, remained statistically significantly associated with the intention to control sugar intake.

CONCLUSION Socially disadvantaged immigrant parents presented with poor knowledge of the impact of sugar consumption on oral health, frequently consumed sugar themselves and had weak intentions of controlling their children's sugar intake. Culturally adapted oral health intervention prograshould be implemented for immigrants, with a special focus on children's dietary habits.

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Resting heart rate and risk of incident heart failure and pulmonary heart disease: prospective cohort study of 0.5M Chinese adults

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BIOGRAPHY Ndip is a physician with training in Epidemiology. His research interest is on chronic non-communicable diseases (NCDs) affecting populations in sub-Saharan Africa and other developing countries. He has a particular interest in understanding the distribution and causes of heart failure in sub-Saharan Africa and how these differ from those in Western populations. He has published over 60 articles on chronic NCDs in sub-Saharan Africa and globally.

OBJECTIVE Resting heart rate (RHR) seeto be an interesting modifiable risk factor for heart failure (HF). Higher levels of RHR have been associated with higher risk of HF in prospective cohort studies in western populations. However, uncertainties persist about the shape and strength of this association and the role of bias and confounding. Moreover, evidence on this association has not been reported in a non-Western population. We sought to investigate the association of usual RHR with incident HF and pulmonary heart disease (PHD).

METHODS This was a cohort study of middle-age China adults recruited from 10 regions into the China Kadoorie

Biobank during 2004–8 and followed up through record linkage to morbidity and mortality registers. We excluded participants with coronary heart disease, rheumatic heart disease and those on beta-blockers at baseline. Cox regression analysis was used to evaluate the association of usual RHR with incident HF and PHD. The likelihood ratio test was used to quantify the effect of confounding and assess for interaction. The Cox PH assumption was assessed using plots of the Schoenfeld residuals with time. Two-tailed *P*-values less than 0.05 were considered statistically significant. Data was analysed using Stata 16.1 and R 3.5.1.

RESULTS We observed a J-shaped association between usual RHR and incident HF. At a RHR ≥ 70 beats per minute (bpm), each 10 bpm higher usual RHR was associated with a 24% (95% confidence interval = 1.17–1.31) higher risk of HF. Each 10bpm usual RHR was associated with a 74% (95% confidence interval = 1.67–1.81) higher risk of PHD across the entire range of usual RHR.

CONCLUSION Higher levels of usual RHR was associated with higher risk of HF and PHD in this study. Mendelian randomisation is needed to evaluate the unconfounded association of usual RHR with HF and PHD.

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Individual- and policy-level predictors of cessation behavior among adult male smokers in Vietnam

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BIOGRAPHY Phuong Nguyen is currently a researcher at the Center for Population Health Sciences, Hanoi University of Public Health. She is also a Ph.D. candidate at Sahlgrenska Academy, University of Gothenburg.

Phuong Nguyen has more than 5 years working in Public Health areas as a researcher and coordinator for relevant projects. Her main topic of interest is tobacco control, cancer prevention and health promotions.

This submitted abstract is part of her Ph.D. project, which is evaluate the effectiveness of tobacco control in Vietnam

Aims: Vietnam remains one of the top nations with the highest tobacco consumption, where nearly every one-in-two men smoke cigarettes. This study aito examine the individual- and policy-level predictors of cessation behaviors among adult male smokers in Vietnam.

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METHODS A longitudinal cohort study was employed to survey 2000 male smokers in Hanoi, Vietnam. After one year of follow-up, the response rate reached nearly 80%. As 61 people categorized as quitters were dropped because they did not quit completely, a total of 1527 people were included in the final analysis. With the covariate selection *P*-value of 0.2, we applied a backward stepwise selection method to select individual-level factors associated with quitting behaviors for the multivariable models where all policy-level factors were still included.

RESULTS About 25.0% of follow-up participants had quit intentions and only 15.7% quit successfully. Intention to quit was positively associated with higher household monthly income, quit attempt, higher self-efficacy, fewer smoking friends and being affected by cessation support policy. In contrast, smoking cessation was positively associated with being older, attempted to quit previously, higher self-efficacy, having friends that quit smoking and being affected by health warning labels.

CONCLUSION Targeting smoking cessation through novel interventions should apply a greater focus on individuals that were in older age groups, had attempted to quit previously and still in an early stage of addiction.

316**Co-morbid anemia and stunting among children 2–5 years old in southern Ethiopia: a community based cross-sectional study**

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BIOGRAPHY Recently I am a Ph.D. student in a joint program with Hawassa University and the University of Bergen. My educational and work experience is I have involved in a health institute since 2002 as a nurse, 1 year as an anesthetic nurse for 3 years, as Public health professional for 7 years and as a nutritionist for 5 years. I got my work experience from hospital colleges and universities.

BACKGROUND Stunting and anaemia are the two top prevalent nutritional problems of children in low-income countries. Both have a negative impact on physical growth and cognitive development and often co-exist. There are few studies in Ethiopia that assessed co-morbid anaemia and stunting (CAS) and context-specific factors associated with it.

OBJECTIVE The objective of this study was to assess the prevalence of CAS and factors associated with CAS among children aged 2 to 5 years, in southern Ethiopia.

METHODS A community-based cross-sectional survey was conducted among 331 randomly selected children in 2017. Mothers were interviewed using a structured questionnaire to obtain a child, mother and household information. Anthropometric measurements and blood samples for haemoglobin were collected. Stunting was defined as height-for-age Z-scores (HAZ) less than -2 standard deviation and anaemia was defined as altitude adjusted haemoglobin levels less than 11.0 g/dl. CAS was defined when a child was both stunted and anaemic. Bivariable and multi-variable logistic regression analyses were used to identify factors associated with CAS.

RESULTS of 331 children studied, 17.8% (95% CI, 13.87%; 22.4%) had CAS. Factors found significantly linked with higher odds of CAS were household food insecurity [Adjusted odds ratio (AOR) (95%CI); 2.6 (1.1; 6.9)], child age increasing [AOR (95% CI); 1.0 (1.0; 1.1)] and family size increasing [AOR (95%CI); 1.3; (1.1–1.6)]. Factors found significantly linked to lower odds of CAS were livestock ownership [AOR (95%CI); 0.3; 0.1–0.6] and iron supplementation during last pregnancy [AOR (95%CI); 0.3; 0.1–0.7].

CONCLUSIONS CAS among children in the study area are of concern, it is associated with household food insecurity, iron supplementation during pregnancy and family size. Therefore, comprehensive interventions focusing on improving household food security and promoting Iron supplementation for pregnant women are suggested.

KEYWORDS: stunting, anaemia, CAS, household food insecurity, food security

135**The level of hypertension knowledge to identify vulnerable groups in Myanmar**

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ment of Public Health, Faculty of Medicine, Surakarta, Indonesia; ⁷Health Strategy and Policy Institute, Hanoi, Vietnam

BIOGRAPHY I am third year global health PhD-student researching the contribution of community groups to health, especially diabetes and hypertension in Southeast Asia. Next to my PhD trajectory, I am working as a researcher at Applied Health Sciences department in the University Medical Center Groningen, where I am specialized in the research topics informal care and smoking cessation.

OBJECTIVE Non-communicable diseases have become a major public health threat to low- and middle-income countries, such as Myanmar. Specifically, the burden of hypertension is continuous on the rise. Inadequate knowledge about hypertension and its management among people may hinder its effective treatment management. The aim of this study are to assess the level of knowledge on risk factors, symptoms and complications for hypertension and to identify the more vulnerable groups that deserving specific attention.

METHODS Data was used from a cross-sectional survey collected through structured questionnaires in 2020 of a stratified random sample of 660 participants. Independent sample T-tests and linear regression models were conducted to explore associations.

RESULTS The level of hypertension knowledge about risk factors, symptoms and complications, was moderate to high in Myanmar and did not vary by being hypertensive or being a community group member. Older people had less knowledge than younger people ($B = -1.01$; 95% confidence interval -2.009 to -0.019) and people with jobs than people without ($B = 1.19$ (95% CI 0.596 to 1.792)). Other socio-demographic factors, i.e. marital status, living area, educational level and gender, were not associated with the level of hypertension knowledge.

CONCLUSION The level of hypertension knowledge is moderate to high in Myanmar. Educational level and job-status were associated with the level of knowledge, showing that low-educated and unemployed people are vulnerable groups. In order to effectively lower the burden of hypertension in Myanmar, attention should be paid to factors influencing hypertension knowledge and program should pay specific attention to older and non-working people.

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Diet quality and physical activity in a Colombian Caribbean community in nutritional transition: study of non-communicable diseases risk factors

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BIOGRAPHY Medical Doctor, Ph.D. Candidate for the Doctorate Medicine Tropical of Universidad de Cartagena. Her work has been focused on the study of Non-communicable diseases.

BACKGROUND Non-Communicable Diseases (NCD) are issues with a high health impact in all regions worldwide, especially in zones with higher vulnerability indexes. Diet patterns and physical activity are factors involve in the development and progression of these diseases and have been described as the main determinants of nutritional transition in the populations. On the Colombian Caribbean Coast, in the Barú peninsula is located a rural community in transition that exhibits vulnerability conditions and poor health indicators, being susceptible to the development of NCD.

OBJECTIVE The present work aimed to describe the diet quality (DQ) and physical activity (PA) levels: determinants of nutrition transition, in this rural community on the Colombian Caribbean Coast.

METHODS A cross-sectional study was carried out. Demographic and socioeconomic data were collected. Diet quality was assessed through the Alternative Healthy Eating Index – 2010 (AHEI-2010); the physical activity levels were assessed through the Global Physical Activity Questionnaire (GPAQ). Metabolic and behavior records for NCD were inquired. Interaction models were used to analyze the relationship between sociodemographic and socioeconomic variables and the determinants.

RESULTS A total of 45 participants were included, residents of the community. The median QD score was 40.29 RIC [34.76–44.95]. Most of the participants present a high level of PA. The most frequently reported metabolic record was dyslipidemia (17%), followed by arterial hypertension (13%). The effect of income on the DQ score was higher for younger participants.

CONCLUSION DQ score was found below that reported at national level. PA levels were found similar to those reported in other rural communities. The Barú community seem to be in the early stages of the transition. It is necessary to make other studies that follow the tendency and

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delve into other aspects relates to the development of NCD in communities in vulnerability conditions.

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COVID-19 pandemic and non-communicable diseases: a mixed-method study in Odisha, India

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BIOGRAPHY Krushna Chandra Sahoo, MSc, MS, PhD (Karolinska Institutet, Sweden) is presently working as Public Health Specialist, Health Technology Assessment (HTAIn), ICMR-Regional Medical Research Centre, Dept. of Health Research, Ministry of Health & Family Welfare, Govt. of India. He awarded the scholarship for the doctoral degree from the Erasmus Mundus External Cooperation Window Lot 15 in 2008. He is a socio-behavioral health scientist. He has working experience in health system research, socio-behavioral health and equity in health care delivery focusing on care pathways and patients navigation pathways, evidence-based policy and community engagement. He has expertise in mixed-method research.

OBJECTIVES The World Health Organization advocates for a national preparedness strategy for need-based non-communicable diseases (NCDs) during a public health emergency. People living with non-communicable diseases (PLWNCDs) may encounter problem due to restricted mobility, lack of access to healthcare and lack of logistics during the pandemic. The report looked at the effect of the COVID-19 pandemic on NCD service.

METHODS An explanatory-mixed-method research was performed in Odisha, India. A total of 600 quantitative interviews were conducted using the Likert scale and 12 in-depth interviews were conducted to investigate COVID-19 based NCD program. The Mantel-Haenszel chi-square test was used to determine the major variation in the effect of COVID-19 on routine treatment. Thematic analysis was used to interpret the qualitative data.

RESULTS Findings revealed that nearly two-thirds of participants encountered difficulties in their routine investigation (69%), day-care (67%) and reaching the hospital (61%). Around half of them reported having trouble in physicians-appointments (59%), emergency treatment (56%), access to the pharmacy (47%) and delay in healthcare (46%). Although fear, anxiety and loneliness remained stressors, many of them learned to adapt and emerge resilient to the changing situation. Various factors

at the individual, family, community and organizational levels have contributed to better coping. Self-health monitoring, indoor exercise, spiritual practices, the continuation of previous prescriptions, telephone advice from physicians, have been complemented by strategies that have facilitated their physical and psychological well-being during the pandemic.

CONCLUSIONS This study indicates the need for telemedicine-enabled healthcare with the role of maintaining digital health records. A cohesive doctor-pharmacy-patient engagement is vital for managing NCD care during a pandemic and any similar humanitarian emergencies. Additionally, community literacy and community health entrepreneurship model, including home-based NCD treatment, should be encouraged.

KEYWORDS: COVID-19, healthcare, long-standing chronic condition, chronic diseases

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School-based water, sanitation and hygiene intervention to improve children's nutrition, and hydration status in Manila, Philippines: A cluster-randomized controlled trial

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BIOGRAPHY I have been the Principal Investigator of fully funded grants focusing on the environmental health of urban poor children in the Philippines in 2017–2019. I led an interdisciplinary research team in conducting a cluster RCT related to water, sanitation and hygiene in public schools in Manila. I was subsequently hired as a consultant by the World Health Organization (WHO) Philippines Country office to implement a multi-center school survey about adolescent health and disease risk factors. Prior to this work, I was a pediatric nurse at Stanford University in California, U.S.A. and a consultant for the WHO in Bonn, Germany.

OBJECTIVE Children experience malnutrition and dehydration due to inadequate water, sanitation and hygiene (WaSH) facilities and limited availability of health education program in schools. Our study aimed to evaluate the impact of a school-based WaSH intervention on children's nutrition and hydration in Manila, Philippines.

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METHODS We conducted a cluster-randomized controlled trial in 15 public schools, assigning two schools to the control group (CG) and randomizing 13 schools to one of three intervention groups (IGs): IGA, IGB and IGC, which corresponded to low-, medium- and high-intensity health education, respectively. The intervention had four components: (1) WaSH policy workshop for school personnel; (2) health education for children; (3) hygiene supplies; (4) WaSH facilities repairs. We measured nutrition outcomes via anthropometry and World Health Organization (WHO) definitions. We measured dehydration (i.e. urine specific gravity ≥ 1.020) via urine test strips. We compared outcomes between the CG and three IGs at baseline and after 8 months.

RESULTS At baseline our sample was 756 children (CG: 78; IG: 678 [IGA: 116; IGB: 356; IGC: 206]); after 8 months our sample was 701 children (CG: 82; IG: 619 [IGA: 104; IGB: 334; IGC: 181]) (retention rate $\sim 93\%$). At baseline 12% of children were stunted, 2.8% were severely thin and 22.8% were overweight. At baseline 90% of children were dehydrated. After 8 months prevalence rates of stunting, severe thinness and overweight decreased. The odds of stunting were significantly lower in IGA than in the CG. Dehydration prevalence decreased in IGA, IGB and IGC compared to the CG. The odds of dehydration were significantly lower in IGB than in the CG.

CONCLUSIONS The intervention decreased children's malnutrition and increased hydration. Sensitivity analysis is in progress. We will report further results about the impacts of low-, medium- and high-intensity health education on nutrition and hydration outcomes during our presentation.

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Evaluation of a liver-screening for non-alcoholic fatty liver disease (NAFLD) in Azaguié southern Côte d'Ivoire

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BIOGRAPHY Schneitler is a specialist in internal medicine, gastroenterology and infectiology with a focus on tropical medicine. The special focus is on parasitic and mycobacteriological diseases. She trained at the university hospitals in Düsseldorf, Leipzig and Homburg. She successfully completed her diploma in tropical medicine at the Bernhard Nocht Institute, Hamburg. Schneitler is currently learning microbiology in Homburg.

Noncommunicable diseases (NCDs) are of increasing importance in low- and middle-income countries. In order to enable targeted diagnostics and therapy in NCDs, appropriate screening methods are needed. In this study, controlled attenuation parameter (CAP) and liver stiffness measurement (LSM) by Fibroscan® was evaluated as a non-invasive screening method of NAFLD.

In five villages of Azaguié district, southern Côte d'Ivoire, the CAP and LSM of each participant was measured using Fibroscan 430 Mini + ® (Echosens, France). In addition, anthropometric, parasitological, physical and clinical data were collected.

Based on a census, it was known that 1880 people over the age of 18 (52.02% women, 47.97% men, average age 41.66 years) would be able to participate. 696 (36.49%, (51.87% women, 48.13% men)) participants were examined with the Fibroscan mini430+®, 2 were excluded due to lack of measurability, 255 (36.63%) were assigned to a case group due to a liver elasticity value of more than 6kPa. The mean age was 45.04 years. The participants had a mean BMI of 22.12kg/m² (13.67–46.03), the distribution in nutritional status according to the WHO showed a pathologically abnormal value in 38.07% and an increased BMI in 25.43%. The waist showed a mean value of 79.1 cm (59–124 cm), in 693 of the cases the use of the M – probe was sufficient, only twice had to be changed to the XL – probe. In the screening, a mean liver elasticity of 6.1 kPa (2.3–75) was measured, with an error deviation of 15.49. A CAP mean value of 194.40 dB/m was measured (100–400). On average, 2.2 minutes were required for one examination. With an average of 10.4 valid measurements per examination.

Fibroscan 430 mini +® has demonstrated to be a fast and efficient screening method in low resource settings to show NAFLD and higher liver damage.

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Cognitive and motor development in preschool-aged children born to mothers with hyperglycaemia first detected in pregnancy in urban South AfricaL. Soepnel^{1,2}, V. Nicolaou¹, C. Draper¹, N. Levitt³, K. Klipstein-Grobusch^{2,4} and S. Norris^{1,5}

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BIOGRAPHY Larske Soepnel is a medical doctor currently completing her PhD research into the long-term effects of maternal diabetes on childhood health and development in South Africa. Her interests are in the interaction and intersection of global child and maternal health, the rise in non-communicable diseases and the pervasive burden of malnutrition and infectious diseases.

OBJECTIVE It is estimated that up to 279 million children, largely from low- and middle-income countries (LMICs), do not reach their developmental potential. Hyperglycaemia first detected in pregnancy (HFDP), on the rise in urban sub-Saharan Africa, may negatively impact foetal neurodevelopment, with potential long-term cognitive consequences for the child. However, data on this association from Africa is lacking. We therefore aimed to investigate this association in 3- to 6-year old children in Soweto, South Africa.

METHODS We compared cognitive skills measured with the Herbst Early Childhood Development Criteria test in 95 exposed children born to mothers with HFDP and 99 HFDP-unexposed children. Fine and gross motor skills were secondary outcomes. Ordinal regression analysis with known confounders was performed for children born at-term.

RESULTS of children exposed to HFDP, 24.3% scored 'high' and 25.7% scored 'low' in the cognitive subsection of the test, as opposed to 37.7% and 12.9% in the HFDP-unexposed group, respectively. In ordinal regression, exposed participants had a significantly lower odds of scoring in a higher cognitive category when adjusting for maternal confounders and socio-economic status (OR = 0.33, 95%CI 0.15–0.74, $P = 0.007$). No difference was found in gross motor development between the two

groups; differences in fine motor development were attenuated after adjustment for maternal pregnancy factors and household socioeconomic status (OR = 0.62, 95%CI 0.28–1.37, $P = 0.239$).

CONCLUSIONS Exposure to maternal HFDP was negatively associated with cognitive development at preschool age. Optimising maternal preconception health and stimulating early childhood development, particularly in LMIC settings with multiple risk factors for poor cognitive development, could help more children reach their developmental potential.

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The effect of infant vitamin B12 supplementation on neurodevelopment: A follow-up of a randomized placebo-controlled trial in NepalM. U. Chandyo¹, I. Kvestad², R. K. Chandyo³, S. Ranjitkar⁴, M. Hysing⁵, C. Schwinger¹, M. Shrestha⁴, S. Basnet⁴, L. Shrestha⁴ and T. A. Strand¹

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BIOGRAPHY PhD Candidate at Centre of International health, University of Bergen, Norway.

Work experience: As a pediatrician and Field Coordinator mostly working in community based randomized clinical trials assessing effect of micronutrient (such as zinc and B12) supplementation on infection, growth and cognitive development. Most of these studies are conducted with collaboration with University of Bergen, Norway. I also work closely on breastfeeding promotion and support group in the local community.

BACKGROUND Suboptimal vitamin B12 status is common in infants worldwide and may affect neurodevelopment. The most critical period for brain development is before a child's 2nd birthday, however, standardized tests measuring neurodevelopment are more reliable when administered later in life.

OBJECTIVE To measure the effect of daily supplementation of vitamin B12 for one year starting from infancy on neurodevelopmental outcomes beyond 30 months of age.

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DESIGN This is a follow-up study of a randomized, double-blind, placebo-controlled trial in 600 Nepalese infants who were randomized to 2 µg of vitamin B12 or a placebo daily for a year. There were no effects of the intervention on neurodevelopment when measured immediately after end of supplementation. We measured neurodevelopment 1 and 2 years after obtaining these primary outcomes. At the 1st visit (age 30–35 months, $n = 555$) we used the Bayley Scales of Infant and Toddler Development, 3rd edition (Bayley-III). At the 2nd visit (age 42–47 months, $n = 533$) we used the Wechsler Preschool and Primary Scale of Intelligence 4th edition (WPPSI-IV) and subtests of the Neuropsychological Assessment, 2nd edition (NEPSY-II). We also measured the effect of the supplements in predefined subgroups on the WPPSI-IV, full scale intelligence quotient (FSIQ).

RESULT The mean (SD) WPPSI-IV FSIQ in the vitamin B12 group was 84.4 (8.4) and 85.0 (8.6) in the placebo group (mean difference -0.5 (CI-1.97, 0.94), $P = 0.75$). There were no beneficial effect of vitamin B12 on any of the Bayley-III or NEPSY-II subtests, or in the WPPSI-IV subgroups.

CONCLUSION Providing 1–2 recommended daily allowances of vitamin B12 for a year in infants at risk of vitamin B12 deficiency does not improve neurodevelopment. Our findings do not support widespread vitamin B12 supplementation during infancy.

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Inequalities in the risk of comorbidity between mental and somatic diseases among immigrants and Norwegians

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BIOGRAPHY Dawit Shawel Abebe is an Associate at the Faculty of Health Sciences, Oslo Metropolitan University. Dawit has a Ph.D. in Public Health/Epidemiology from the Faculty of Medicine, University of Oslo. His research focuses on risk factors and developmental trends of mental health problem from adolescence to adulthood and comorbidities between mental disorders and somatic diseases. He is also investigating social gradients in health and health service utilization, including ethnicity and health (immigrant health). His research is based on quantitative research methods.

OBJECTIVE The aim of this study is to examine the inequalities in the risk for comorbidity between mental

and somatic diseases among individuals with and without an immigrant background.

METHODS Data from national registers, for the years 2008–2016, were used. The study population consisted of all legal residents in Norway per January 1, 2008, aged 18 years or older ($N = 3,244,837$). The outcome variables were twenty-two somatic diseases based on the ICD-10 diagnoses. The exposure variable was mental disorder diagnosis (0/1; no/yes). Poisson regression model was applied to estimate incidence risk ratio with 95% confidence intervals. The analysis was adjusted for age, sex and household poverty. To study inequalities in the risk, we included an interaction term between mental disorder and immigrant background.

RESULTS Mental disorder patients reported elevated risks for most somatic diseases compared to those without mental disorders regardless of immigrant backgrounds. Immigrants had lower or did not have significantly different risks for the majority of investigated somatic diseases compared to Norwegians. Exceptionally, immigrants from Sub-Saharan Africa had a greater predicted probability for hypertension; ischemic diseases; metabolic disorders; and chronic lower respiratory diseases, including diabetes among those from the Middle East and North Africa and non-EU Eastern Europe.

CONCLUSION The increased risk of comorbidities between mental disorder and several somatic diseases including the ethnic inequalities in the patterns of comorbidities should receive increased focus in the health care system. Future research should aim to better understand the underlying mechanisms behind the study findings in order to find whether the differences in somatic comorbidities may be a result of barriers regarding to healthcare help-seeking among immigrants or whether immigrants have better health than Norwegians.

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Integrating mental health care into health system in Burundi: barriers and current opportunities

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BIOGRAPHY Achour AIT MOHAND has been working with Enabel, the Belgian Development Agency, since 2006. He is Psychiatrist and holds an MPH from the Institute of Tropical Medicine (Antwerp, Belgium).

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His public health expertise focuses on Mental Health particularly experience with Mental Health System Development in LMIC context. Substantial experience in training, mentorship and capacity building in Mental Health.

He is currently working in Burundi with a Project funded by European Union to support resilience of Burundian population. Before that he worked in Rwanda with a Project to support the integration of mental health care in the health system.

OBJECTIVE Mental health in Burundi is still not fully integrated into the national health system. Access to mental health care remains difficult which led the ministry of health to draft a mental health strategic plan to integrate mental health care into PHC. Few Partners are supporting this process in the field. The objective is to show progress, current challenges and key lessons learnt in the integration of mental health care into Primary Care.

METHODS Overall, the operational steps included the training of general nurses and general practitioners working in district hospitals and health centres to deal with mental disorders, supervision and patient referral system, ensuring availability of psychotropic medicines, recruiting mental health nurses in hospitals as well as integrating indicators into monitoring and evaluation systems.

RESULTS Mental health is part of the healthcare package of health centres and District Hospitals. Up to now only few general hospitals have integrated mental health care. The national essential medicine list has been revised and now include psychotropic drugs which can be used at health centres, district hospitals and referral structures. Community Health Workers were trained to ensure an integrated mental health care component at community level. Training of general practitioners and general nurses is ongoing. Mental health nurses are not yet recruited.

Challenges hampered the integration process, particularly low funding, lack of qualified human resources, cultural barriers related to certain negative beliefs regarding mental health illness. The psychotropic drug supply circuit is inefficient and there are difficulties regarding the coordination of interventions and partners.

CONCLUSION The process of integration is slow, however opportunities arose as the mental health is considered as a priority area of intervention by the Ministry of health and mental health is back in discussions with the Covid-19 pandemic. Furthermore, there are partners who expressed to invest in this area.

383**The cost of a peaceful mind: Evidence from Kenya**

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BIOGRAPHY Nursena Aksünger is pursuing her PhD in Economics at Vrije University, Amsterdam. Her project aims to understand how poverty and mental health are inter-linked. In addition, she is a researcher at PharmAccess Foundation with a focus on access to maternal care.

OBJECTIVES This research examines the short-term effects of income shocks on depression and distress of low-income individuals in Kenya using detailed financial transactions and mental well-being data.

METHODS A total of 607 low-income adults were followed throughout 2020. The model's parameters are predicted with the two-way difference GMM estimator. Depression score is used as the primary outcome variable. Weekly changes in financial flows, physical health status and time trends are included as explanatory variables.

RESULTS: A one-point increase in the lagged depression score increases the depression score by 0.12 point in the subsequent wave. Each 700 KES increase in the average weekly income (equal amount of weekly income drop after the first month of the Covid-19) lowers the depression score by an additional 0.19 point. Moreover, a similar amount of increase in the average income of other household members also has a negative, albeit small, effect on the depression score. One unit increase in the severity of own physical health problem increases the depression score by 0.47 point, while health shocks affecting a child increase the depression score of household members by 0.10 point.

CONCLUSION It is found that low income, depression persistency and severe health shocks lay at the core of poverty's psychological tax in the short term. Health shocks have the most critical role in determining the mental health status of individuals. Therefore, policymakers should support affordable, inclusive and quality health care to reduce the mental burden attached to health shocks.

Moreover, when individuals had severe income shocks, the contribution of other household members to the household budget became resorting mechanism for them financially and mentally. Therefore, it is essential to take the psychological benefits of poverty alleviation into account while providing financial support to low-income households in Kenya, especially during the Covid-19 pandemic.

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Perinatal death triples the prevalence of postpartum depression among women in Northern Uganda: a community-based cross-sectional study

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BIOGRAPHY PhD student at College of Health Sciences, Makerere University, Kampala, Uganda. Lecturer at Lira University, Lira, Uganda. Worked as program officer with different USAID funded projects implemented in Uganda before joining academic institution Qualified with Master's degree in Public Health (BRAC University, JPGSPH) and Bachelor of Science In Nursing (Makerere University) *Interested in Maternal Child Health and Reproductive Health.*

OBJECTIVE To examine the association between perinatal death and postpartum depression among women in Lira district, Northern Uganda.

METHODS We conducted a community-based cross-sectional study of 1,789 women. Trained research assistants screened women for postpartum depressive symptoms day 50 postpartum using the Edinburgh postpartum depression scale (EPDS). Socio-demographic, economic, birth and survival status of the neonate were collected during pregnancy and within one week postpartum. We used generalized estimating equation for the Poisson family with a log link using Stata to estimate the prevalence ratio of the association between postpartum depressive symptoms (EPDS scores ≥ 14) and perinatal death. Mothers who lost their babies between 7–49 days postpartum were excluded.

RESULTS Of the 1,789 participants symptomatically screened for postpartum depression, 377 (21.1%) [95% confidence interval (95%CI): 17.2%, 23.0%] had probable depressive symptoms. The prevalence of postpartum depressive symptoms among the 77 women who had experienced perinatal death (37 stillbirths and 40 early neonatal deaths (≤ 7 days of life)) was 62.3% [95% CI: 50.8%,

72.6%] compared to 19.2% [95% CI: 17.4%, 21.2%], among 1,712 with live infants at day 50 postpartum. Women who had experienced a perinatal death were three times as likely to have postpartum depressive symptoms those who had a live birth [adjusted prevalence ratio 3.45 (95% CI: 2.67, 4.48)].

CONCLUSION The prevalence of postpartum depressive symptoms, assessed by EPDS, was high among women who had had a perinatal death in Northern Uganda. Women experiencing a perinatal death need to be screened for postpartum depressive symptoms in order to intervene and reduce associated morbidity.

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Narcotics engagement and criminality among school-attending adolescents in Bissau, Guinea-Bissau: A cross-sectional analysis

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BIOGRAPHY Jon Edmund Bollom has an MA in Development Studies from the University of Iceland. He is currently a PhD student at the School of Social Sciences at the University of Iceland. He is presently engaged in the study of the social determinants of trajectories of higher education engagement in Guinea-Bissau. Jon previously conducted quantitative research upon the determinants of drug use and criminality in school-attending young people in Bissau, Guinea-Bissau. Prior to recommencing his studies, Jon had been working as a Director of Studies in Xiamen, China for three years.

OBJECTIVE Referencing Sustainable Development Goal 3 (health and well-being for all) and Goal 16 (justice for all), the UN office on Drugs and Crime supports interdisciplinary interventions focussing on social determinants of drug use and criminality. Such behaviours are often adopted during adolescence, influencing later health and life-choices. Data on drug use and its determinants in resource-poor settings is scarce, hindering attempts at intervention programming. The aim of the study was to describe criminality and drug behaviours among school-attending adolescents in the capital Bissau, Guinea-Bissau.

METHODS In June 2017, survey data was collected through a locally adapted Planet Youth questionnaire across 16 secondary schools in Bissau, targeting those

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aged 15–16 years. In total, 2,039 adolescents were randomly chosen from a specially compiled class-based register with 4,470 students through multi-stage, random cluster process. Subsequent varimax principal component analysis of 312 variables captured data-driven models of drug use behaviours.

RESULTS Just over a quarter (27.3%) of respondents reported lifetime alcohol use, 10.8% reported lifetime smoking incidence and 3.6% indicated lifetime cannabis use. In each instance, the '15 years and above' age bracket was the most significant period of initiation, signifying increased instigation in later adolescence. Linear regression analysis revealed that experience of drinking alcohol and of sexual and group violence predicted drug use and criminality. Whilst male sex and changing schools predicted violence, female sex and poor family finance predicted theft. Both violence and theft were predicted by drug use and false police accusation. Drug use was predicted by school dismissal, relationship breakdown and male sex.

CONCLUSION Alcohol, tobacco and marijuana use were closely linked, indicating simultaneous use of several drugs. Single interventions may prevent several antisocial behaviours and interventions tackling multiple drugs may prove equally effective to those addressing one.

185**Life after the 74th genocide: Addressing collective trauma of the Yezidi community in Iraq and its implications for sustainable return**

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BIOGRAPHY Rebecca Boogaard is a recent graduate of international development and disaster risk management. She is a devoted young professional with a special interest in the mental health and psychosocial wellbeing of people affected by conflict. As a student she worked for local organizations in international settings in Africa and the Middle East. Currently Rebecca is working as a junior Mental Health and Psychosocial Support (MHPSS) expert for Dutch INGO Cordaid.

BACKGROUND Six years after the Islamic State's genocide of the Yezidi community in Northern Iraq, the scars of ethnic cleansing still deeply mark the souls and minds of survivors. The wide scale of trauma-related problem in contrast to the limited response capacity led to the need for research on the determinants of collective trauma, the needs for improving community mental health and

psychosocial wellbeing and its relation to promoting sustainable returns.

METHOD The study applied a combination of literature research and qualitative and quantitative data collection through key informant interviews and door-to-door questionnaires with male and female returnees in Sinjar, Northern Iraq.

RESULTS Poor living conditions, lack of safety and economic opportunity, combined with continuing impunity and lack of recognition of their suffering and human rights, were the strongest factors hindering an enabling environment for sustainable return or healing and recovery from trauma. Facilitating healing through enhancing a safe environment combined with Mental Health and Psychosocial Support (MHPSS) interventions that target the wider community appears to be a priority.

CONCLUSION The findings show the complexity of trauma and multidimensional factors within the socio-economic context that are of influence on the psychological wellbeing of community members. It is therefore recommended to adopt a multi-layered approach towards collective trauma healing that targets national level needs such as provision of basic needs, safety and security, acknowledgement and justice; community level needs such as returning the missing and kidnapped, upscaling MHPSS programming and job and (informal) education opportunities; and interpersonal/family level needs, in particular healthcare and compensation for losses.

Perspectives: The recommendations of this research will support the commissioning organization, Cordaid, in its program design on MHPSS to ultimately promote the psychological wellbeing of Sinjar's Yezidis.

226**Explanatory models of PTSD and Depression among Afghan refugees in Norway**

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BIOGRAPHY Dixie Brea Larios is a Ph.D. candidate at the Department of Psychosocial Science, UiB. She holds a Master of Public health, epidemiology and biostatistics from UiT and a BA in Sociology from UC Berkeley and UiB, with a focus on migration and health. She also holds a professional diploma in Education from UiO for the areas of health, social sciences and languages and a dentistry degree from Iberoamericana University in the Dominican Republic. Through qualitative interviews and

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a quantitative study, she is looking at coping strategies of mental health problems among refugees living in Norway in her research project.

BACKGROUND Refugees form a group that may be at higher risk for mental health problems. By using explanatory models of posttraumatic stress disorders (PTSD) and depression, this study aims to investigate how the Afghan refugee population resettled in Norway understands and manages these mental health problems.

METHODS We conducted 6 gender-separated, semi-structured focus group interviews with Afghan refugees (total $N = 27$). The focus groups' size ranged from 2 to 6 participants. By using vignettes describing characters with depression or PTSD symptoms, we asked 27 participants to give advice to the vignette character. The focus group interviews were conducted in Norwegian and a translator was used for the Dari and Pashto languages. The interviews lasted about 90 minutes, were recorded and transcribed verbatim and thematically analyzed with the aid of NVivo qualitative research software program.

RESULTS Participants were able to identify the mental health problem of the vignette character and discussed the situation regarding social expectations, conflicts, consequences and previous situation in Afghanistan. Findings showed strong patterns of causal and risk factors and gender differences accepted by the Afghan cultural heritage and traditions, but also adjusted to the Norwegian model.

CONCLUSION Understanding the Afghans' perceptions and interpretations of mental health problems and the Afghan traditional culture, coupled with feelings of security associated with resilience and acculturation in Norway may enhance help-seeking behaviors and increase the effectiveness of treatment programs for improving refugee mental health and future coping strategies.

KEYWORDS: refugees, explanatory models, PTSD and depression, coping strategies, help-seeking behaviors, health services

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What helps and challenges Somali women's lives in the UK during their transition to motherhood: An idiographic case study

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BIOGRAPHY I am a newly qualified doctor working in North Wales where I enjoy spending time exploring the great outdoors. Between my years at Cardiff medical

school I completed a degree in Global Health at the University of Bristol which opened my eyes to the complexities and challenges of migration and health. The work I am presenting today is from research conducted during this degree and has sparked an interest in the health psychology and behaviour change, which I hope to explore in my future career either through further research, training, or in my clinical practice.

OBJECTIVE Pregnancy and early motherhood can be a stressful time for women with implications for both the mother's wellbeing and their baby's development. Migrant women face a variety of additional stressors adjusting to a new country. Recent studies have shown higher rates of autism in children among migrant groups such as Somalis in Western countries, with prenatal stress being a potential cause. Therefore, we aimed to understand what promotes a positive and engaged experience for Somali migrant women during their transition to motherhood and how practitioners can best support them.

METHOD A single, semi-structured interview was conducted. Following a Women's Group meeting, the participant was selected as she met the criteria of being Somali and pregnant within the last three years whilst living in the UK. The interview was audio-recorded, transcribed and analysed using interpretative phenomenological analysis.

RESULTS This in-depth interview revealed a rich story of how one woman's experience evolved from a vicious circle of shame, isolation and loss of confidence to a virtuous circle of feeling at the heart of the community and inspiring confidence in others. The facilitators of this gradual shift between circles of confidence required a certain 'fitting together', or alignment, for effective behaviour change. These included: support from family and peers, concern for her daughter, meeting other women and realising she felt ready to change.

CONCLUSION The facilitators of this shift from vicious to virtuous circles became a focus point of our findings and appear to benefit from an alignment of interpersonal factors. This experience of alignment is aided by persistent encouragement from trusted individuals, positive motivation and the feeling of circumstances clicking into place. Practitioners can incorporate this concept when supporting Somali migrant women during their transition to motherhood as well as signposting them to social interventions such as Women's Groups.

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Do minorities and groups under-represented in yoga experience barriers to yoga participation? A qualitative study of northern UK citiesS. S. J. Brown*Leeds Beckett University, Leeds, UK*

BIOGRAPHY Research Assistant, PHD Student School of Health and Community Studies

OBJECTIVE A review of the literature indicates that the modern mindful movement practice of yoga is almost exclusively undertaken in the UK and global north by white, educated women (Cartwright, 2020). This study asks if minorities and other under-represented groups are therefore experiencing barriers to yoga participation. Yoga has been increasingly demonstrated to offer mental and physical benefits. Barriers to participation would therefore represent significant disadvantage as minorities already experience lower than average levels of health and wellbeing.

METHODS The study employs a qualitative case study methodology and storytelling techniques to surface lived experiences. Study participants are adults from societal minorities or groups currently under-represented in yoga in the UK and global north. These include people who are from Black, Asian or other minority ethnic backgrounds, disabled, LGBTQ+, from disadvantaged communities or lower socio-economic groups, identify as male, trans or gender neutral, have larger body types, are aged over 65 or from religious or cultural communities. Recruitment is from yoga classes aimed at diverse and disadvantaged communities in northern UK cities – historically areas with high levels of deprivation and low levels of health and wellbeing.

RESULTS Initial findings from a pilot indicate that study participants do experience barriers preventing them from accessing yoga. Thematic analysis identifies four barrier types: two personal – (Lack of Role Models and yoga's Unfamiliarity/Alien-ness) and two structural (Practical (cost, transport etc) and Perceived (personal interpretations of requirements such as clothing and body shape)).

CONCLUSIONS: Examining the findings through the lens of appropriate theoretical frameworks (social capital and social determinants of health) establishes that barriers to yoga participation represent a significant health and wellbeing inequality and disadvantage. Minority groups typically experience poorer health and shorter lifespans and have lower levels of health and wellbeing. Steps should therefore be taken to facilitate yoga participation for these groups.

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Homesickness, anxiety and depression among African international students in Indonesia during Covid-19 outbreakC. Cyuzuzo*Universitas Airlangga, Surabaya, Indonesia*

BIOGRAPHY Master's student in Immunology at Universitas Airlangga, Surabaya, Indonesia.

INTRODUCTION International students are exposed to multiple mental health crisis due to social, environmental and culture shocks in foreign lands but it gets worse in presence of life-threatening disease outbreak. This research was conducted to evaluate the homesickness, anxiety and depression among African international students in Indonesia during Covid-19 Outbreak.

METHODS This study was conducted on 86 random students that are pursuing their studies in different public and private universities in Indonesia. The data were collected by distributing google form via email and social media groups and the responses from the respondents were recorded and analyzed statistically.

RESULTS The study findings revealed that there is a correlation between Covid-19 pandemic and the development of various mental health crisis where 33 students (38.37 %) developed homesickness, 11 students (12.79%) developed anxiety and 2 students (2.33 %) manifested low-grade depression. Homesickness was especially observed in females (72.72 %) whereas anxiety was more common in males (90.90%). The study findings demonstrated that there is a strong negative correlation between student financial statuses and the development of homesickness ($r: -0.977$, $P: 0.023$) and anxiety ($r: -0.944$, $P: 0.056$).

CONCLUSION All in all, the fear to contract coronavirus, lockdowns, financial instability, death toll of citizens and medical professionals, run out of medical facilities and social media hoaxes are significant risk factors of mental health crisis among African international students in Indonesia.

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Parental income during preschool age and the risk of mental disorder in adolescence and early adulthood in migrants and non-migrantsK. A. Hynek and M. Straiton*Norwegian Institute of Public Health, Oslo, Norway*

BIOGRAPHY Hynek is a PhD candidate at the Faculty of Health Science at OsloMet and is affiliated at NIPH. Her

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current research focuses on risk factors and consequences of mental disorders among young migrant women in Norway.

Straiton is a senior researcher at NIPH. She has a PhD in psychology and an interest in gender issues and migrant health. Working with both quantitative and qualitative data, her research focuses on migrant's mental health, use of healthcare services and barriers and facilitators to care.

OBJECTIVE The aim of the study is to examine whether the association between parental income during preschool age and the risk of mental disorder in adolescence and early adulthood is different for migrants and non-migrants. We also aim to examine differences by sex.

METHODS We combine information from four Norwegian national registers, by using a de-identifiable version of personal identification number assigned to all Norwegian born and all legal residents with at least six months stay. The study population consists of majority population (Norwegian born with at least one Norwegian parent and foreign born with at least one Norwegian parent), descendants (Norwegian born with two foreign-born parents) and migrants (born abroad with two foreign-born parents). Only individuals who migrated up to the age of four are included. The study sample will consist of about 500,000 individuals. We apply discrete time analysis and include an interaction term between parental income and migrant background to examine differences in outpatient mental health service use (a proxy for mental disorder) between migrants and non-migrants.

(Expected) **RESULTS** Overall, we expect to find that low parental income during preschool years is associated with greater risk of mental disorder in adolescence and early adulthood. However, we expect that the strength of the association will vary by migrant background, region of origin and by sex.

CONCLUSION Social inequalities in health may have an onset already in childhood and may impact mental health in both adolescence and adulthood. Mental disorders with onset early in life may influence the ability to gain social capital such as education and result in loss of income in both migrants and non-migrants. Future interventions should therefore focus on reducing social inequalities in childhood in order to improve the mental health in young people.

31**Knowledge of sepsis – a survey of Irish University Students**

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BIOGRAPHY Tochukwu Igboanugo is a doctorate degree student at the School of Public Health, University College Cork, Ireland where he also earned his Masters of Public Health (MPH). He obtained his medical degree from the College of Medicine, Nnamdi Azikiwe University, Nigeria. When he is not working, you can find him engrossed with soccer on the television or in a volley court.

OBJECTIVE Sepsis is a potentially life-threatening condition and has an estimated 6 million deaths worldwide annually. Delay in recognition of the symptomatic sepsis due to low public awareness is a major cause of the annual rise of sepsis mortality. Various studies have reported that sepsis survivors demonstrate increased cognitive impairment and functional disability compared to non-sepsis hospitalised patients. The term *sepsis* is largely unknown among the general population. Surviving sepsis depends on timely intervention, educating the public on sepsis and seeking immediate medical intervention. This study assessed the knowledge of sepsis among third-level students

METHODS Third-level undergraduates of an Irish university were invited to participate in this cross-sectional study through an online survey system. Descriptive and inferential statistics were used to describe the findings.

RESULTS Nearly all the students (96.9%) had heard of the term sepsis. College-based education (30.5%) and conventional media like newspaper and television (22.9%) were the major source of sepsis awareness among students. About three per cent of the students had not heard of sepsis. The updated definition of sepsis proposed by the European Society of Intensive Care Medicine (ESICM) described sepsis as a dysregulated immune response to infection, i.e., infection plus systemic inflammatory response (SIRS). 25.5% of College of Medicine and Health students and 70.2% of students from other colleges thought sepsis can occur without an infection. However, one-half of the general student population (50.4%) considered sepsis to have the highest mortality among stroke, heart attack, breast cancer and bowel cancer.

CONCLUSION This present study demonstrated that sepsis awareness among students is not associated with the essential knowledge and perception of sepsis. Colleges and universities are ideal settings to educate students about sepsis. However, there is a need to move from

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simple sepsis awareness acquisition to knowledge and dangers associated with it.

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The psychosocial burden of sickle-cell anaemia as reported by parents of affected children in Kinshasa, the Democratic Republic of Congo

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BIOGRAPHY Patricia Lelo is a medical doctor from the Democratic Republic of Congo who completed her training as physician in 2002. In 2015, she completed her master degree in Public Health at the University of Lorraine, France. Patricia Lelo has been working at Kalembelembe Pediatric hospital since 2004 as physician and has been actively involved in different pediatric projects at the hospital. She is currently a Phd candidate at the University of Bergen and her project looks at Neurodevelopment, cognition and psychosocial aspects of children affected by sickle cell anaemia in Kinshasa, Congo.

OBJECTIVES There is limited information on the psychosocial burden, knowledge, perception and management of sickle-cell anaemia in Africa in general and the Democratic Republic of Congo (DRC) in particular. The present qualitative study was conducted in order to explore knowledge, perception and psychosocial burden of parents, caregivers of children affected by sickle cell anaemia in Kinshasa, the DRC.

METHODS We conducted a descriptive study using qualitative approach and focus group with in-depth interview and discussion with parents and caregivers of children affected by sickle cell anaemia. The focus group was formulated in five thematic issues: Knowledge and perception of the disease, the diagnosis, societal view and perception of children affected by sickle cell anemia, psychosocial and cultural burden and management of sickle cell anaemia. Data were analyzed using thematic analysis.

RESULTS In total 26 parents/caregivers responded positively to the invitation and participated to the focus group. The following challenges and difficulties were mainly reported by parents: lack of psychosocial support, stigmatisation, difficulties with social and school integration for the children, lack of knowledge and poor perception of the disease, financial challenges to ensure routine medical check-up, follow-up and management of symptoms and complications.

CONCLUSION Our findings suggest the need for an holistic approach to better understand and offer proper

psychosocial support and management to children and families affected by sickle cell anaemia in Kinshasa, the Democratic Republic of Congo.

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Using system dynamics to better understand the Antivax movement under the impacts of COVID 19

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BIOGRAPHY Using system dynamics/computational modeling and simulation to analyse complex health and social issues, particularly under impact of COVID to inform decision making.

Previously, a project officer with experiences in managing projects on migrant protection, human trafficking.

Worked in Malaysia, Norway and Myanmar, mainly with United Nation Agencies of UNHCR and IOM on Health, Migration and Migrant Protection areas.

Vaccinations are among the most critical public health tools for reducing the spread of infectious diseases such as smallpox, rinderpest and polio from causing destruction and death. They are now an almost forgotten history, thanks to mass vaccination. Despite these success stories, the Antivax movement persists. The Pandemic has created a new reality where everyone in the world faces a previously unknown disease and its impacts. A unique opportunity has emerged for understanding how attitudes change toward vaccination throughout the Pandemic. Will the Pandemic kill, fuel, or slow down the Antivax movement?

The present project uses the system dynamics approach to model and better understand the Antivax movement under the impacts of COVID. Although COVID 19 vaccine performing primarily as symptom reducers are less likely to contribute as rapidly to herd immunity, mass vaccination aito bring diseases under control.

The comparison of with and without COVID simulation scenarios shows that COVID indeed increases the perceived risk of disease and consequently increases the number of Pro Vaccine. In contrast, the rise of misinformation of vaccination, amplified by the social media filter bubble, the perceived risk of vaccines is higher, Undecided Individuals' tendency to turn into Antivaxxers is higher. Meanwhile, the new COVID Recovered Individuals (with severe symptoms) become Pro Vaccine, further depleting the Undecided Individual and Antivaxxer numbers.

To conclude, a competition emerges between Pro Vaccine and Antivaxxers in persuading Undecided

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Individuals to their sides, respectively. Short-term policy includes dialogues/simple and targeted information should be used to clarify Undecided Individuals concerns accordingly instead of the usual fact-based information. Mid and long-term policy focuses on tackling misinformation from being amplified in social media filter bubbles.

50**Geriatric depression and quality of life in Ethiopia: A community cross-sectional study**K. J. Mohamed*Salale University, Fitcha, Ethiopia*

BIOGRAPHY Multi-disciplinary professional experience in the field of nursing, mental health, public health, research and community services with extensive experience in design, development and implementation of different types of projects. I have prompt experience of research and project as a principal investigator and advise. My area of expertise goes with maternal and child health, women and gender health, adolescent and sexual health, mental health, health care research, health ethics, public health researches, consultant and grant writing, and also familiar with different statistical packages including SPSS, STATA, EPI Info and Epi Data. Currently focal person for CPAR on behalf of Salale University.

OBJECTIVE Depression and low quality of life are severe conditions that lead to disability and mortality, common in high and low-resourced countries. Therefore, this study aimed to assess geriatric depression, quality of life and associated factors among elderly persons in the low resourced country.

METHODS A community-based cross-sectional study was used from March to April 2020. Standardized and pre-tested geriatric depression scale (GDS) and World Health Organization Quality of Life (WHOQOL)-BREF was used to assess depression and quality of life, respectively. A multi-stage sampling technique was employed to select woreda and study participants. Epi-data version 4.3 and SPSS version 23 were used for data entry and analysis, respectively. Bivariable and multivariable in logistic regression analysis was done and significance was obtained at the odds ratio with a 95% confidence interval and *P*-value <0.05.

RESULTS A total of 822 elderly persons participated in face to face interviewed-administered questionnaire. The prevalence of geriatric depression and poor quality of life was 54.5% and 51.8%, respectively. Advanced age, single participants, not having a formal education, living

alone and having chronic diseases were significantly associated with both the depression symptom and low overall WHOQOL-BREF. Depression was correlated with low quality of life.

CONCLUSION We found that elderly persons have a high risk of depression symptom and a low quality of life. The Ethiopian Ministry of Health should develop psychological interventions, providing ongoing education for the elderly and monitoring the health of the elderly population to address the specific needs of elderly persons who have been impacted by the aging process.

344**Workplace stress and associated factors among vehicle repair workers in Hawassa City, Southern Ethiopia**H. Mulugeta, A. Tamene, T. Ashenafi, S. Thygersson and N. Baxter

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BIOGRAPHY Hailemichael Mulugeta (MPH in Environmental and Occupational Health), currently I works as a lecturer and researcher at the University of Debre Berhan, College of Health Science. Last two years, I was an academic staff at Dilla and Hawassa University Ethiopia. Also, I was a guest lecture at Addis Ababa business and Medical college, Ethiopia. My experience is emphasized on Environmental and occupational-related determinants of Health especially accidents. I have seven publications in international peer-reviewed open access journal.

OBJECTIVE The current study aimed to determine the prevalence of self-reported workplace stress and associated factors among vehicle repair workers in Hawassa City, South Ethiopia.

METHODS A cross-sectional study design was employed among 347 vehicle repair workers from January 25 to February 22, 2019. Questionnaires were administered using interviews. Additional tools were used for weight and height measurements. The main findings were analyzed using descriptive statistics, bivariable and multivariable logistic regression. The strength of association of

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variables was presented by odds ratio along with its 95% CI. The statistical assessments were considered significant at $P < 0.05$.

RESULTS A total of 344 workers participated in the study. The prevalence of workplace stress among participants was 41.6% with 95% CI: (36.3–47.1). Factors associated with workplace stress were more than 10 years of work experience [AOR: 2.40; 95% CI (1.29–4.50)], work-related musculoskeletal disorder [AOR: 3.39; 95% CI (1.99–5.78)], squatting and lying work posture [AOR: 4.63; 95% CI (1.61–13.3)] and servicing large vehicles [AOR: 1.96; 95% CI (1.14–3.38)].

CONCLUSION: This study showed that the overall prevalence of work-related stress was substantial. The independently associated factors were workers' service years, symptom of body pain and the work environment. Preventive measures need to be implemented in vehicle repair workshops by focusing on work environment improvements.

470**A qualitative analysis of negative feelings among filicidal mothers in Rwanda**

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BIOGRAPHY Jean d'Amour MUZIKI is completing his Master of Science in Clinical psychology. He did Postgraduate Diploma in education and Bachelor of Art in Clinical Psychology. After he had been working as psychologist, a child protection and welfare officer in National Commission for children since May 2013, he was transferred to National Child Development Agency in November 2020 to keep performing child protection related activities. Jean D'Amour's current research is focused on the role/influence of negative emotions and psychological disorders on happiness and satisfaction about life.

OBJECTIVES Despite the tremendous efforts made to know more about negative emotions experienced after committing a violent crime, little is known about the negative feelings that evolve from negative emotions and their implication on happiness and satisfaction with life among filicidal mothers. Objectives of the study were to

(a) to explore the feelings of anger, guilt, shame, depression and anxiety among filicidal mothers, (b) to identify how expressed negative feelings impact on happiness and satisfaction with life and (c) to investigate the strategies for management of experienced negative feelings.

METHODS Using a transcendental phenomenology research design developed by Moustakas (1994), face-to-face in-depth interviews were conducted with twenty filicidal mothers from Nyarugenge prison. Data were audio recorded, transcribed verbatim and analysed by using phenomenological analysis. ATLAS.ti 8 Windows was used to manage information.

RESULTS: Negative feelings evolving from negative emotions were clustered into themes. First, themes for anxiousness are emotional changes, bodily changes, cognitive problem and social withdrawal. Second, themes for depression are bodily responses, emotional responses and avoidance behaviors. Third, feelings of anger were clustered in intolerance. Fourth, avoidance behaviors and poor self-judgment is a unique theme for feelings of shame. Then, feelings of guilt formed acute stress, regret and self-blame as a unique theme. After that, two themes such as lack of the link with the community and mixture of worries emerged in impact of negative feelings on day-to-day life. Finally, three themes like abnormal defence, surrender and support from community resources emerged in strategies to manage experienced negative feelings.

CONCLUSION The study findings provide a general picture on experienced negative feelings that can guide mental health interveners and different stakeholders through appropriate intervention.

209**“She gives to her child who doesn't even talk”: Children's perceptions and experiences with alcohol use in Uganda**

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BIOGRAPHY Joyce Nalugya is a child and adolescent psychiatrist at Mulago Hospital, Kampala Uganda. Joyce holds a Bachelor of Medicine and a Master of Medicine in Psychiatry from Makerere University. Joyce is the program director on the child and adolescent diploma training course offered at MUST and led the development of the Ugandan Ministry of Health child and adolescent mental health policy guidelines in 2017. As a PhD scholar on the TREAT C-AUD project and NURTURE Fellow at Makerere University she focuses on identifying risk factors, age specific academic achievements and screening of alcohol use by primary school age children.

OBJECTIVE Early onset drinking has been found to be associated with alcohol use disorders and other problems later in life. This study aimed at capturing the perception and experiences of primary school Ugandan children aged 6 to 13 years on childhood alcohol use and the factors related to it.

METHODS This was a qualitative study conducted from February to March 2020 in Mbale district. We conducted eight focus group discussions (FGDs). The groups were stratified by age (6–9 and 10–13 years), sex and school status (in school and out of school). A total of 56 primary school age children were purposively sampled by age, from eight villages. Both parents and children were approached for both verbal and written informed consent and assent. Data was collected by using a translated and pretested focus group discussion guide. All FGDs were conducted in the language the participants felt comfortable with, in Lumasaaba, Luganda or English. The FGDs were audiotaped and transcribed verbatim and later translated to English. Data was coded and analyzed according to themes.

RESULTS Our findings reveal that primary school age children in Mbale district, Eastern Uganda know alcohol and the different brands of alcoholic beverages available. They also know that children even as young as 3 years old do drink alcohol. They give their perceptions on the reasons for childhood drinking including relieving stress. The factors associated with childhood alcohol use identified were parents and parenting styles, advertisement and marketing, peer influence, accessibility and availability of cheaper brands.

CONCLUSIONS This study gives insights into primary school children's perceptions of alcohol use. The findings in this study may be used to inform further research including screening and burden as well as policy and interventions for prevention and treatment.

KEYWORDS: Primary school age children, Perceptions, experiences, alcohol use, associated factors, Uganda

195**Early childhood development and mental health in Sub-Saharan Africa**

H. Risvoll

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BIOGRAPHY Henriette Risvoll is a psychologist, currently working as a research assistant at the University of Bergen, where she is studying interventions and programmes related to early childhood development (ECD) and mental health. She has written a report on ECD and mental health in collaboration with SOS Children's Villages Norway and has previously worked as a clinical psychologist. Professional interests include global mental health, especially related to promotion and prevention, humanitarian settings and children's development.

The overall objective of this study was to provide knowledge on parenting programmes which can be used to promote mental health and early childhood development (ECD) in low- and middle-income countries (LMIC). The aim was to identify effective approaches and delivery mechanisms of parenting programmes to strengthen the quality care of children, particularly in vulnerable settings, focusing on sub-Saharan Africa (SSA).

In this desk study, a systematic literature search was conducted. From more than 4700 studies identified initially, 144 potentially eligible studies were scanned, of which 19 were included for in-depth information. These studies were also interpreted in view of the wider literature on parenting and ECD from other regions.

Interventions seem to work best and give more synergy when they are integrated and multi-sectorial, where parenting content is part of other interventions (e.g., nutrition and social protection). Participation of local communities is important for success and sustainability, as well as for evaluation and research. Context and culture are crucial and may be barriers, so adaptation of programmes and delivery is necessary, but building on evidence-based programmes may be better than creating new ones.

In general, we have limited understanding of why interventions worked, which highlights the need for more thorough investigation into the efficacious components in interventions for future development and implementation of effective programmes.

A recent holistic framework of nurturing care seems to be useful for understanding needs and resources, as well as for what and how to provide support. There is a robust body of evidence suggesting that early interventions in

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parenting and nurturing care together with stimulating and safe environments pay off. The potential is great for low-cost and high-impact support for children in LMIC through the strong influences of caregivers for child mental health outcomes and in combining them with scalable non-specialist approaches.

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A study on current mental health status of Covid frontline workers in a tertiary care hospital, Chengalpattu district, Tamilnadu

G. Sampath and P. Prahlad

Chengalpattu Medical College, Chennai, India

BIOGRAPHY A postgraduate in the department of community medicine with a public health experience as a medical officer in primary health center for 8 years and as a district officer for 3 years. has attended many conferences and presented posters in it. Have helped 8 postgraduates in their dissertation works.

OBJECTIVE To screen the current mental health status of Covid frontline workers in a tertiary care hospital using General Health Questionnaire (GHQ-12).

METHOD A cross sectional study done in Sep 2020 among the frontline workers in Chengalpattu Medical College who are involved in Covid duty. The frontline workers are divided into subgroups as postgraduates (247), interns (100), staff nurses (180), other technicians (155). By stratified random sampling 25 samples will be drawn from each subgroups so that a sample size of 100 was attained. An online questionnaire was administered through social media comprising of brief sociodemographic details followed by General Health Questionnaire 12. Data were converted to excel for and appropriate analysis was done in SPSS 25 software.

RESULTS The age of postgraduates was 30.77 ± 5.58 years, of interns 23.62 ± 4.55 years, of staff nurses 35.03 ± 8.03 years, of other technicians 27.48 ± 10.09 years. The prevalence of increased mental stress among the study population was 18.3%, of which medical staff (postgraduate and interns) comprised 21.66%. Unpaired t test was done and was found to be significant (P value = 0.029). Cronbach's alpha for reliability was 0.826.

CONCLUSION Significant psychological stress was found among frontline workers. Coping with stress is important to prevent upsurge of mental illness and the following measures are recommended: Regular screening of at-risk individuals, Adoption of early psychological support, 24/7 e-psychiatric counselling/helpline, Promoting Self advocacy, Appropriate acknowledgement: 'it's okay not to be

okay', Yoga, meditation and exercise and motivational sessions, Long term surveillance.

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Schoolchildren's hygiene-related health literacy and handwashing practices: results of a cluster-randomized controlled trial in Manila, Philippines

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BIOGRAPHY I have been the Principal Investigator of fully funded grants focusing on the environmental health of urban poor children in the Philippines in 2017–2019. I led an interdisciplinary research team in conducting a cluster RCT related to water, sanitation and hygiene in public schools in Manila. I was subsequently hired as a consultant by the World Health Organization (WHO) Philippines Country office to implement a multi-center school survey about adolescent health and disease risk factors. Prior to this work, I was a pediatric nurse at Stanford University in California, U.S.A. and a consultant for the WHO in Bonn, Germany.

OBJECTIVE Children practice poor handwashing due to inadequate water, sanitation and hygiene (WaSH) facilities and limited availability of health education program schools. Our study aimed to evaluate the impact of a school-based WaSH intervention on children's hygiene-related health literacy (HL) and handwashing (HW) practices in Manila, Philippines.

METHODS We conducted a cluster-randomized controlled trial in 15 public schools, assigning two schools to the control group (CG) and randomizing 13 schools to one of three intervention groups (IGs): IGA, IGB and IGC, which corresponded to low-, medium- and high-intensity health education, respectively. The intervention had four components: (1) WaSH policy workshop for school personnel; (2) health education for children; (3) hygiene supplies; (4) WaSH facilities repairs. We measured hygiene-related HL via questionnaire and HW via observation. We compared outcomes between the CG and three IGs at baseline and after 8 months.

RESULTS At baseline our sample was 756 children (CG: 78; IG: 678 [IGA: 116; IGB: 356; IGC: 206]); after 8 months our sample was 701 children (CG: 82; IG: 619

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[IGA: 104; IGB: 334; IGC: 181]) (retention rate ~93%). At baseline 79% of children knew where germs could be found and 81% knew how germs could be spread. At baseline 83% and 31% of children knew when and for how long HW should be practiced, respectively. After 8 months the odds of correctly reporting when to wash one's hands were higher in IGB and IGC than in the CG. The odds of correctly reporting HW duration were higher in IGA and IGB than in the CG. Mean overall HL scores were higher in IGA and IGC than in the CG. Observed HW prevalence increased from 11% to 25%.

CONCLUSIONS While the intervention increased hygiene-related HL, more research and urgent action is needed to further improve schoolchildren's HW practices.

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Cultural participation as mental health promotion

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BIOGRAPHY Hildegunn Marie Tønnessen Seip is associate of psychology at Ansgar University College in Kristiansand, Norway. With a background in communication and peace/conflict studies, she holds a PhD in psychology from the University of Oslo. Her research interests include migration, inclusion, eco-psychology and dance.

Hege Bjørnsetøl Beckmann is associate of music and health at the University of Agder, Kristiansand, Norway, with a PhD from the Norwegian Academy of Music. Her research interests revolve around music as a health resource in everyday life. Beckmann is also involved in projects exploring benefits of creative activities in school and kindergarten.

OBJECTIVE The project aimed at deepening our understanding of how cultural participation can serve as mental health promotion for young people. Participating in different forms of musicking, dancing, arts projects and creative communities can provide refuge and resources for young people at risk of marginalization and mental ill-health (Beckmann, 2014; Fancourt & Finn, 2019; Seip, 2020).

METHODS The paper synthesizes data from interviews and participant observation we have conducted in multicultural settings and collaboration projects in Norway and on study trips to Bhutan and Zambia. This synthesizing thematic analysis draws more general theoretical and practical lessons from these interviews and observations.

RESULTS A range of young voices clearly expresses how important cultural participation is to them and their well-being. It strengthens their everyday joy, sense of belonging, sense of community and affect regulation and widens

their range of coping strategies. The discussion elaborates on the interaction between traditional and emerging/contemporary musical expressions, identity issues and community vs. individual musicking.

CONCLUSION Cultural participation deserves more attention in the mental health promotion field. Cultural and contextual sensitivity and listening to young voices can help professionals engage in creative interaction that promotes health. All in all, facilitating creative arenas for young people has great potential for improving their lives.

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Improving services and help-seeking for male survivors of violence in Uganda urban slums

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BIOGRAPHY Gloria is a specialist in public health and development, with additional training in the social and behavioural sciences.

Her areas of specialisation are policy and health systems, RMNCAH and the well-being of disadvantaged, vulnerable or marginalised (DVM) populations. Gloria's work is both facility-based and also in communities including humanitarian contexts and urban slums.

OBJECTIVE More than 60% of Kampala's population reside in informal settlements, including slums. The COVID-19 lockdown resulted in loss of income sources for many people in Kampala slums, leading to a surge in sexual and gender-based violence (SGBV) cases. Little is known about the prevalence or experiences of men and boys. We investigated violence suffered by men between March – December 2020 and their experiences seeking help in three slum communities of Kampala, Uganda.

METHODS Mixed methods, using both qualitative and quantitative methods. Sample size was 807 (660=quant, 147=qual). This paper presents data from the study's qualitative arm.

RESULTS Most (98.6%) men had lost their ability to provide for their families and women became sole household providers, majority (88.5%) through commercial sex work (CSW). This role reversal resulted in increased violence against men including denial of conjugal rights, physical violence and emotional violence. Nearly all

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(99%) male survivors did not seek services like counselling or formally report victimization. Men's ability to negotiate for safe sex was also compromised. This was attributed to the norm of silence when women perpetrate violence against men, fear of ridicule and inaction from authorities or relevant service providers. Neither mental health and psychosocial support services (MHPSS) nor SGBV services have adequately incorporated the element of VAM and other unlikely survivors of violence.

CONCLUSION Study findings highlight complex but critical intersections between VAM, CSW, SRH, COVID-19 and livelihoods. Livelihood role reversals significantly contribute to a heightened likelihood of VAM. Moreover, men are less likely to seek for help or services. This study recognises gains made in SRH, SGBV and HIV; however, critical gaps still remain. Inclusion of VAM services and cross-sectoral signposting (e.g. for livelihoods) on the continuum of service provision will significantly contribute to mental health, social norms, family stability and national development during and post the COVID-19 era.

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“There is nowhere to take the child”- Managing childhood substance use in Mbale District, Uganda: A qualitative study

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BIOGRAPHY Vilde Skylstad is a medical doctor and PhD candidate at the Centre for International Health, University of Bergen. She is part of the research project 'TREAT Child Alcohol Use Disorder (C-AUD) in Eastern Uganda: Screening, diagnostics, risk factors and handling of children drinking alcohol' (RCN# 285489). As well as being academically invested in addiction medicine, she has worked clinically in the field as a nurse assistant and doctor at the emergency room for overdoses and addiction in Bergen and Oslo.

OBJECTIVE In 2014, we identified harmful alcohol use by 5–8-year-old children in Mbale District, Uganda. To further examine this finding, we undertook the present study, aiming to explore the experiences and perceptions of community members regarding how childhood substance use is managed in this area.

METHODS In 2016, we conducted eight focus group discussions with 48 parents and 26 key informant interviews. The participants had diverse backgrounds in education, health, law, child protection, local council, alcohol production and youth work. Thematic analysis was performed to identify themes.

RESULTS “We don't talk about it”: The participants were deeply concerned about childhood substance use. Despite this, it was not part of community discussions due to a lack of initiative and leadership in addressing it. Participants described that their mandate to intervene was curtailed by child-rearing responsibilities increasingly being vested in the nuclear family. Further, the attention to children's rights left participants scared of legal prosecution if they intervened using corporal punishment.

“There is nowhere to take the child”: Schools, police and remand homes were considered appropriate arenas for addressing childhood substance use, but available resources and training were inadequate. Since substance use was not considered a medical problem, health sector help was only sought for adverse consequences, such as injury.

“The government has not done so much”: The participants called for government intervention and clear laws that would regulate the availability of alcohol to children but had limited trust in the capacity and commitment of the government to act.

CONCLUSION The participants were concerned about childhood substance use. However, their perceived capacity to act was undermined by inadequate formal backing in the law combined with a lack of authority to interfere in child-rearing. A strengthening of collective agency and public policy is necessary to urgently tackle childhood substance use.

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Postpartum depression in Sri Lanka

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BIOGRAPHY I am a 5th year medical student from University of Bergen, Faculty of Medicine, Norway. In

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2019 I got the opportunity to travel to Galle in Sri Lanka on a field visit during a global health course and I became interested in mental health questions in low and middle income countries.

OBJECTIVES Postpartum depression is an important public health concern. The prevalence of postpartum depression is estimated to be 13% worldwide. The purpose of this study was to estimate the prevalence of postpartum depression in Sri Lanka and to investigate some associated risk factors.

METHODS This was a cross sectional study conducted among 975 mothers in Galle district, Sri Lanka. Postpartum depression was assessed using the Edinburgh Postpartum Depression Scale where persons scoring 9 or more have depression. Data from routine records on pregnancy, delivery, postnatal care was collected to investigate possible predictors of postpartum depression. Crosstabulation and multivariable logistic regression was performed to identify risk factors for postpartum depression.

RESULTS The prevalence of postpartum depression with EPDS score >9 was found to be 9.4% (95%CI 7.8–11.4). Higher risk of postpartum depression was associated with the hypertension (aOR 3.6 95% CI: 1.2–10.9), newborn death (aOR 28.9; 95%CI 4.5–185), BMI 25.0–29.9 compared to normal BMI (aOR 2.6 95% CI: 1.5–4.5), maternal age 30–39 compared to 20–29 (aOR 2.2 95% CI: 1.3–3.8) and former history of mental illness (aOR 32.9; 95%CI 7.9–136.2). One in five women reported thoughts of self-harm.

CONCLUSION Around one in ten Sri Lankan mothers experience symptoms of postpartum depression. Mothers at increased risk of postpartum depression should be identified at ANC and referred when needed, particularly attention paid to those who lost one before and those with previous mental illness.

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Smartphone addiction and its association with common mental disorders among students attending the university of Dschang, West region, Cameroon

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BIOGRAPHY Martial Sonkoue Pianta is a young Cameroonian who graduated with a Masters degree in Public health from the University of Dschang in 2018 and is currently studying medicine at the Faculty of health sciences of the University of Bamenda. He is passionate about improving health in low income settings and research. He has worked with several organisations providing assistance to the vulnerable.

OBJECTIVES To determine the prevalence of smartphone addiction and common mental disorders as well as the association between smartphone addiction and these mental disorders in Dschang university students who use smartphones.

METHODS A cross-sectional study was conducted. Randomly selected students completed a survey comprising Patient Health Questionnaires seven and nine (PHQ-9 and PHQ-7) to screen for depression and anxiety respectively and the Smartphone Addiction Scale-Short Version (SAS-SV) to grade smartphone use. The association between smartphone use and common mental disorders was assessed using logistic regression modelling.

RESULTS We recruited 634 participants. The prevalence of smartphone addiction was 20.98% [C.I:17.99%–24.32%]. The prevalence of depression and anxiety were 34.86% [95% CI: 31.25–38.65] and 19.27% [95% CI: 16.81–22.99] respectively. The odds of depression in students with addiction was 5 times the odds of depression in students without addiction [OR: 4.96, 95% CI: 3.30–7.45, $P < 0.001$]. The odds of anxiety in students with addiction was 2 times the odds of anxiety in students without addiction [OR: 2.44, 95% CI: 1.58–3.77, $P < 0.001$]. After adjusting for age, sex, faculty, cycle of study, marital status, religion, chronic diseases, sexual abuse and suicidal ideation, there remained a statistically-significant association between smartphone addiction and both depression [OR: 4.46, 95%CI: 2.92–6.84, $P < 0.001$] and anxiety [OR: 2.08, 95% CI: 1.31–3.30, $P = 0.002$].

CONCLUSION In this setting, it is crucial to foster strategies of prevention and promotion in mental health especially among problematic smartphone users.

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Mental wellbeing and depression among persons affected by leprosy in Nepal and Indonesia

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Medical Center, Amsterdam, Netherlands; ⁵Diponegoro University, Semarang, Indonesia

BIOGRAPHY Wim van Brakel holds a medical degree, an MSc in Infectious Disease Epidemiology and a PhD in leprosy. He has worked in Nepal and India in leprosy control and research. van Brakel is Medical Director of NLR and a member of the Steering Committee of the Leprosy Research Initiative. He chairs the ILEP Technical Commission and the NNN DMDI Cross-Cutting Group. van Brakel is passionate about working towards a world free of leprosy through prevention of leprosy and disabilities, stigma reduction, mental wellbeing and social inclusion of all persons affected by NTDs.

OBJECTIVES Leprosy and its consequences, particularly stigma, physical complications and disabilities, affect the mental wellbeing of (former) patients. Much less known is that the mental wellbeing of their families is also affected, although data on this are still sparse. We will present recent results of instrument validation and assessment of mental wellbeing and depression among persons affected by leprosy and highlight the need to implement appropriate interventions to address this area of need.

METHODS Mixed-methods studies using the Herdman/Stevenson framework were done in Central Java, Indonesia and in Province 2, Nepal, to validate the PHQ-9 (depression) and WEMWBS (mental wellbeing; Nepal only) and to collect data on depression and mental wellbeing among persons affected by leprosy. The study in Indonesia used convenience sampling, while the study in Nepal used random sampling of members of self-help groups. Community controls were also included.

RESULTS With some minor modifications, both scales were found culturally suitable and easy and quick to use. Despite being members of a self-help group, 38% of respondents in south-east Nepal had poor mental wellbeing ($n = 142$) and 25% a level of depression that would warrant intervention. These frequencies were 0% and 9.3%, respectively, among 54 community controls. Fifty percent had recent thoughts of self-harm or suicide. The prevalence of depression was 22% among 114 persons affected in Central Java, Indonesia.

CONCLUSIONS Two mental health instruments were culturally validated in Nepal and one in Indonesia for use among persons affected by leprosy. Subsequent prevalence studies revealed poor mental wellbeing and a high prevalence of depression. We hope that these studies contribute to raising awareness of the mental health needs of persons affected. Interventions to mitigate the negative impact of leprosy on mental wellbeing should be implemented. Further population studies of mental wellbeing are needed, also including family members of persons affected.

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Strengthening individual and family resilience against leprosy-related discrimination: a pilot intervention study

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BIOGRAPHY Anna van 't Noordende is a program support and PhD research officer for NLR. Her PhD study focuses on the perception of leprosy (assessment, impact and interventions at individual, family and community level).

OBJECTIVE To develop and pilot an intervention to strengthen individual and family resilience against leprosy-related discrimination.

METHODS We used a before-after study design with a mixed methods approach. The 10-week family-based intervention was designed to strengthen the resilience of individuals and families by enhancing their protective abilities and capacity to overcome adversity. The study was conducted in urban areas in Telangana state and in rural areas in Odisha state, India. Persons affected and their family members were included using purposive sampling. Two questionnaires were used pre-and post-intervention: the Connor-Davidson Resilience Scale (CD-RISC, with high scores reflecting greater resilience) and the WHOQOL-BREF (with higher scores reflecting higher quality of life). In addition, semi-structured interviews were conducted post-intervention. Data were collected at baseline, a few weeks after completion of the intervention and in the Odisha cohort again at six months after completion.

RESULTS Eighty participants across 20 families were included in the study (23 persons affected and 57 family members). We found a significant increase in CD-RISC scores for persons affected and family members from Odisha state, this improvement was maintained at six-month follow-up. There was no increase in CD-RISC scores post-intervention among participants from Telangana state. WHOQOL-BREF scores were significantly higher at follow-up for persons affected in both states and for family members in Odisha state. No families dropped out of the study. In the qualitative feedback, all participants described drawing benefit from the

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programme. Participants especially appreciated the social dimensions of the intervention.

CONCLUSIONS This pilot study showed that the family-based intervention to strengthen resilience among persons affected by leprosy and their family members was feasible and has the potential to improve resilience and quality of life. A large-scale efficacy trial is necessary to determine the effectiveness and long-term sustainability of the intervention.

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Impact of pharmacist intervention on antidepressant medication adherence and disease severity in patients with major depressive disorder

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BIOGRAPHY Hadiza Yusuf is a PhD Clinical Pharmacy student of Ahmadu Bello University Zaria, Nigeria and a lecturer at the Department of Clinical Pharmacy & Pharmacy Administration University of Maiduguri, Maiduguri, Nigeria. She does research in mental health and pharmaceutical care. She has some of her research work published in local and international journals.

OBJECTIVE Medication adherence is emerging as a major public health challenge particularly in patients with depression. The aim of this study was to explore the usefulness of a pharmacist intervention to improve antidepressant medication adherence and disease severity in patients with major depressive disorder.

METHODS This randomised controlled trial was conducted between April 2019 and March 2020 among 101 patients at the Federal Neuro-Psychiatric Hospital, Maiduguri, Nigeria. Consenting patients were randomised into usual care or intervention groups using a computer-generated list. The pharmacist intervention included educational counselling sessions of between 15–30 minutes, delivered through one-on-one discussions with individual patients. Data were collected at baseline, 3 months and 6 months. Medication adherence and depression severity

were assessed using the Medication Adherence Rating Scale and Beck Depression Inventory respectively.

RESULTS At baseline, both the usual care and intervention groups had low mean scores for medication adherence [5.22 (SD = 1.51) vs 5.46 (SD = 1.46)] and high mean scores for depression severity [24.16 (SD = 13.50) vs 27.07 (SD = 16.12)]. At 6 months, there was a significant difference ($P < 0.001$) between the mean medication adherence scores of 5.22 (SD = 1.90) and 9.15 (SD = 1.62), in the usual care and intervention groups respectively. A significant difference ($P = 0.033$) was also observed at 6 months between the mean depression severity scores of the usual care and intervention groups [21.40 (SD = 11.52) and 17.34 (SD = 6.96)]. Medication adherence ($P < 0.001$, Partial eta squared = 0.279) and depression severity ($P < 0.001$, Partial eta squared = 0.170) positively changed with time in the presence of the intervention.

CONCLUSION Pharmacist intervention significantly improved antidepressant medication adherence and disease severity in patients with major depressive disorder. Enhancing pharmacist involvement in the long term management of these patients, especially with respect to interventions to optimise adherence will go a long way towards reducing depressive symptoms and improving patient outcomes.

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Changes in surgical volume, workforce and productivity in Sierra Leone between 2012 and 2017

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BIOGRAPHY Juul Bakker is a medical doctor in Global Health and Tropical Medicine from the Netherlands. She has a master degree in International Health and has been working as a medical doctor in several low- and middle-income countries with a focus on obstetrics, public health, training and quality improvement.

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OBJECTIVE The Lancet Commission on Global Surgery recommends a minimum of 20 surgical specialists and 5,000 annual operations per 100,000 population by 2030. In 2012, Sierra Leone was far from reaching these targets. This study aimed to assess the changes in surgical activity, surgical workforce and surgical productivity between 2012 and 2017.

METHODS A nationwide, retrospective mapping of surgical activity and workforce in 2012 was repeated in 2017. All 60 facilities performing comprehensive surgery in Sierra Leone in 2017 were identified and data was obtained from surgical records and through structured interviews with facility directors. Annual estimates were calculated and compared with 2012.

RESULTS The surgical workforce increased from 164.5 to 312.8 full-time positions. The annual volume of surgeries was enhanced by 15.6% (95% CI: 7.8–23.4%) from 24,152 to 27,928 (26,048 – 29,808) operations. With simultaneous population growth, this led to a decrease in surgical volume from 400 to 372 procedures per 100,000 population and an unmet operative need of 92.7%. The mean productivity of surgical providers went from 2.8 to 1.7 surgeries per week per full-time position. An increasing number of caesarean deliveries were performed in public institutions, by associate clinicians.

CONCLUSION The unmet need for surgery in Sierra Leone remains very high, despite an increase in the surgical workforce, subsidizing maternal healthcare and initiation of a surgical task-sharing program. The decline in surgical productivity with simultaneous increases in the surgical workforce calls for further exploration of the barriers to access and delivery of surgical care in Sierra Leone.

462**Barriers to increasing surgical productivity in Sierra Leone: a qualitative study**

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BIOGRAPHY Juul Bakker is a medical doctor Global Health and Tropical Medicine from the Netherlands. She

has a master degree in International Health and has been working as a medical doctor in several low- and middle-income countries with a focus on obstetrics, public health, training and quality improvement.

OBJECTIVE Despite an enormous increase in the number of surgical providers in Sierra Leone between 2012 and 2017, the unmet surgical need remained high at 92.7% and the surgical provider productivity decreased. This study aimed to explore the factors that influence the surgical productivity according to surgical providers.

METHODS In this explanatory qualitative study, in-depth interviews were conducted with 21 surgical providers and hospital managers in order to discuss the factors influencing surgical productivity in Sierra Leone. Interviews were analysed by using a thematic network analysis.

RESULTS Surgical providers experienced a broad range of factors within and outside the health system that influence their productivity. The main barriers involved both patient and facility financial constraints, lack of resources, weak regular of providers and a small surgical workforce, who experience a lack of recognition. Initiation of a Free Healthcare Initiative for obstetric and paediatric care, collaborations with partners or non-governmental organizations and increased training opportunities for highly motivated surgical providers were identified to increase surgical productivity.

CONCLUSION Broader nationwide health system strengthening is required to facilitate an increase in surgical productivity and meet surgical needs in Sierra Leone. Reduced out-of-pocket expenditure, improving supplies and expanding training opportunities for new and established surgical providers can increase the surgical capacity. For sustainability and to improve the retention of surgical providers, recognition and fair remuneration are needed.

441**A problem exposed: treatment and outcome of hip fractures in rural Tanzania**

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BIOGRAPHY After graduating from medical school in 2015, Anneloes continued with a postgraduate training in Global Health and Tropical Medicine. As a Global Health doctor Anneloes worked in Haydom Lutheran Hospital, Tanzania, where she started a PhD project on

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lower extremity fractures. Currently, she is working for Global Surgery Amsterdam and the Amsterdam UMC as a PhD student.

OBJECTIVE Most patients in Tanzania have limited access to safe surgical care. Most patients with hip fractures are therefore, treated non-operatively, unlike the general accepted standard of care which is surgery. The aim of this study is to provide an overview of the different treatment modalities and outcomes of patients with a hip fracture in a large rural referral hospital in Tanzania.

METHODS An observational prospective cohort study was conducted in a rural referral hospital with a health catchment area of 2 million people. Between August 2019 and August 2020 patients admitted with a hip fracture were included. Up to one year after admission observations and structured interviews were conducted to collect patient reported outcomes on their recovery.

RESULTS Diagnosis: 47 patients were included. 30 patients had a fragility fracture and 5 patients had additional injuries.

TREATMENT 11 patients received no treatment; 5 received a boot cast; 22 patients received skeletal traction, with only 9 patients completing the full traction period; 1 girdlestone was performed; 7 patients received an intramedullary nail; and, 1 patient was referred for internal fixation of the fracture to another health facility.

OUTCOME One year follow up was achieved in 32 patients. Mortality rate was 28% and 2 patients were lost for follow up (follow up rate 96%). of the 32 patients, the following was determined: 14 patients could walk fully weight bearing; 14 patients were dependent on axillary crutches for modality; and, 4 patients were fully dependent on other people for movement.

CONCLUSION We conclude that most patients are treated non-operatively (global standard is surgery), resulting in limited functional outcome and high mortality rates. Our data shows the importance of increased reporting of hip fracture treatment and outcome in sub-Sahara Africa. We call for more awareness to address this serious issue in global surgery.

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Monitoring functional outcomes after trauma in humanitarian settings: Construct validity and reliability of the Activity Independence Measure Trauma (AIM-T)

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BIOGRAPHY Physiotherapist from Belgium, after having worked with Médecins Sans Frontières (MSF) and Médecins du Monde (MDM) in Ivory Coast, Afghanistan and Turkey with patients after trauma, I have provided technical support to Humanity & Inclusion (HI) Rehabilitation teaduring emergency responses. I am now PhD student at Karolinska Institute, conducting a research project on outcomes after trauma in humanitarian settings, in collaboration with MSF and HI.

OBJECTIVE To improve trauma care in humanitarian settings there is need for standardized outcomes measures. The Activity Independence Measure Trauma (AIM-T) was developed by Médecins Sans Frontières (MSF) and Humanity & Inclusion in Afghanistan to measure and monitor outcomes of patients after trauma. Its ability to capture activity independence as well as user variability has not yet been tested. This study assessed its construct validity and inter-rater reliability.

METHODS This cross-sectional study was conducted in four MSF-run/supported health facilities in Burundi, Central African Republic, Cameroon and Iraq. For construct validity testing, 195 patients were assessed with the AIM-T, the Barthel Index (BI) and validated pain scores (Visual Analogue Scale or Faces Rating Scale). Median AIM-T scores were compared between groups of patients stratified by number of injuries and acuteness using the Mann-Whitney test. Correlations between AIM-T, BI and

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Pain scores were analyzed using the Spearman Correlation Coefficients (SCC). To assess inter-rater reliability, 84 patients were re-evaluated independently by a second rater and Intraclass Correlation Coefficients (ICC) were calculated for each pair of raters.

RESULTS There were significant differences between the AIM-T scores of patients based on the number of injuries and acuteness ($P = 0.001$). The AIM-T showed an inverse low to moderate correlation with both pain scores (SCC = -0.312 for VAS and -0.520 for FRS) and a strong positive correlation with the BI (SCC = 0.791). Inter-rater reliability in the four health facilities was considered good to excellent (ICC range 0.833–0.952).

CONCLUSION In the above settings, the AIM-T was able to discriminate between different types of patients after trauma, was diverging from measure of different construct and converging with measure of similar construct, confirming its construct validity and was reliable between raters. The AIM-T is a promising standardized tool to monitor outcomes of trauma care and is currently used in a multi-site longitudinal study.

463**Cardiac surgery and cardiology in Ethiopia**

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BIOGRAPHY PhD student at Department of Circulation and Medical Imaging, Norwegian University of Science and Technology, Trondheim, Norway and MD at Department of Heart Disease, Haukeland University Hospital, Bergen, Norway.

OBJECTIVES Acute rheumatic fever (ARF) and subsequent rheumatic heart disease (RHD) affect more than 35 million people worldwide and estimated deaths due to RHD exceeds 300 000 annually. It is a major burden in low-and middle-income countries (LMICs). Penicillin treatment of patients with RHD is recommended to reduce new episodes of acute rheumatic fever and thus postpone disease progression. But when severe disease is present, cardiac surgery is the only curative treatment,

which is not available in most LMICs. At Tikur Anbessa Specialized Hospital (TASH), Addis Ababa, Ethiopia, we aimed to build cardiac surgery service (CCS) through a bilateral education program. We also evaluate the outcome of patients with severe RHD operated compared to patients conservatively treated at 12 months.

METHODS 46 patients were operated during 5 missions from March 2016 to November 2019, which included training in all relevant disciplines with regards to start a local and independent CCS at TASH. Comparison with a cohort of 49 controls with similar disease conservatively treated, was done at 12 months.

RESULTS: All patients were operated successfully. Survival rate at 12 months was 89% in the surgical group which, despite undergoing open heart surgery with its inherent risks, was non-inferior to the natural course of the control group ($P \geq 0.45$). All, except 6 surgical patients were in NYHA class I after 12 months and 84% had resumed work.

CONCLUSIONS: Building CCS in LMICs institutions to treat severe RHD is an important issue and see-feasible if the training is structured, planned and have a long-term vision. The surgical results after 12 months are acceptable. Functional level and back to work status was high in the surgical group. As patients with severe RHD in general have a poor prognosis, we predict patients undergoing surgery will have better long-term prognosis and increased functional level.

487**Assistive technology**

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BIOGRAPHY Cathy Holloway, Co-founder, Academic Director of GDI Hub and at UCL's Interaction Centre.

Assistive technology (AT) is used by people living with disabilities to live their lives. Wheelchairs and prosthetic devices aid mobility; hearing aids aid communication. AT helps achieve each of the United Nation's Sustainable Development Goals (SDGs). However, the WHO estimates only 10% of the 1 billion people who need AT have access to it. The need for AT is often unmet or undermet (when the need is met with an inferior product to the one the user requires). Generally, there is a deficit in data to know the AT needs of populations and this drives underinvestment in the sector. Furthermore, much investment in AT innovation happens in high income countries and not where there is greatest need – in low-and middle-income countries

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(LMICs). However, through co-design, collaboration and innovation it is possible to develop partnerships which enable innovation to reach people in low resource settings whilst also demonstrating the value of AT to governments.

This talk will focus on examples of innovation in LMICs and how an AT innovation ecosystem is emerging in Nairobi, Kenya. It will explore the development of a global need database to help drive government and multi-lateral conversations. Secondly it will explore the mapping of the AT innovation ecosystem and third it will look at specific examples of AT innovation trialling through the establishment of innovate Now, Africa's first AT accelerator. It will close reflecting on the need for partnerships in delivering equitable access for AT in LMICs and the need for increased investment into AT if the SDGs are to be achieved.

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Strengthening rehabilitation capacity in the South Asian Association for Regional Cooperation through a public-private based Inter-Professional Master's Program in Rehabilitation Science in Bangladesh

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BIOGRAPHY Assistant Professor, Project & Course Coordinator, Department of Rehabilitation Science, Bangladesh Health Professions Institute (BHPI), Centre for the Rehabilitation of the Paralyzed (CRP)

OBJECTIVE To discuss the development of a rehabilitation workforce by Centre for the rehabilitation of the Paralyzed – Bangladesh Health Professions Institute (CRP-BHPI), through a regional Inter-professional Masters' program in Rehabilitation Science (MRS) that aims to alleviate the shortage of qualified rehabilitation professionals and prepare them for the leadership roles in the field of clinical practice, academia, research, management and policy in the South Asian Association and Regional Coordination Member States.

METHODS A review of the program was conducted at BHPI, an academic institute of the NGO-based CRP collaborating with Dhaka University. Information was collected from the alumni and relevant documents.

RESULTS The program resulted in 119 alumni including the 5th batch of the Rehabilitation Master program

(MRS) students completing the course in March, 2021. Among them, 60 were from Bangladesh; 39 from Nepal, followed by Afghanistan ($n = 11$), Sri Lanka ($n = 3$), India ($n = 3$), Bhutan ($n = 2$) and The Maldives ($n = 1$).

The students represented a wide variety of professions. The majority were physiotherapists (58.33%; $n = 70$) followed by occupational therapists (16.66%; $n = 20$), medical doctors (6.66%; $n = 8$), nurses (5.83%; $n = 7$), speech and language therapists (5.00%; $n = 6$), prosthetists and orthotists (2.50%; $n = 3$), psychologists (2.50%; $n = 3$), health educator and counselor (1.66%; $n = 2$) and public health specialist (0.83%; $n = 1$), respectively.

The program has created an exceptional opportunity for female rehabilitation professionals from SAARC states to graduate at master level. More than half ($n = 66$) of the students were women.

CONCLUSION This private-public run CRP-BHPI master program contributes in strengthening clinical, educational and management rehabilitation capacity in the SAARC Member States and as a regional center of excellence running inter-professional and gender equitable education. The aim is to further strengthen higher education and research capacity at PhD level to increase a regionally sustainable rehabilitation workforce.

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Surgical Ambulance Referrals in Sub-Saharan Africa – Financial Costs and Coping Strategies at District Hospitals in Tanzania, Malawi and Zambia

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BIOGRAPHY Martilord Ifeanyi obtained a Bachelor of Medicine; Bachelor of Surgery (MBBS) qualification from University of Nigeria Nsukka (UNN) in 2013 and a master's degree in Health Economics, Policy and Law (HEPL) from Erasmus University Rotterdam, in the Netherlands, in 2017. Martilord is currently a final year PhD candidate at the Department of Health Evidence, Radboud University Medical Centre, Nijmegen, the Netherlands; and is

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interested in costs and cost-effectiveness of health interventions and financing for universal health coverage (UHC) in sub-Saharan Africa. He is the Founder/CEO, EMAI Health Systems & Health Services Consulting, Nijmegen, the Netherlands

OBJECTIVE In sub-Saharan Africa, district hospitals (DHs) which are strategically located to provide basic (non-specialist) surgical care for rural populations, have in many instances been compromised by resource inadequacies, resulting in frequent patient referrals, sometimes inappropriately, to specialist hospitals. This study aimed to quantify the financial burden of surgical ambulance referrals on DHs and explore the coping strategies employed by these facilities in navigating the challenges.

METHODS We employed a multi-methods descriptive case study approach, across a total of 14 purposively selected DHs – seven, in Tanzania, three in Malawi and four in Zambia. Qualitative data related to coping mechanisms were obtained through in-depth interviews of hospital managers while quantitative data related to costs of surgical referrals were obtained from existing records (such as referral registers, ward registers, annual financial reports, other administrative records) and expert estimates. Interview notes were analysed by manual thematic coding while referral statistics and finance data were processed and analysed using Microsoft office Excel 2016.

RESULTS At all but one of the hospitals, respondents reported inadequacies in numbers and functional states of the ambulances. No statistically significant correlation was found between referral trip distances and total annual numbers of referral trips, but hospital managers reported considering costs in referral executions. The total cost of ambulance use for patient transportation ranged from I\$2k to I\$58k per year. Between 34% and 79% of all patient referrals were surgical, with total costs ranging from I\$1k to I\$32k per year.

CONCLUSION Cost considerations strongly influence referral decisions and practices, indicating a need for increases in budgetary allocations for referral services. High volumes of potentially avoidable surgical referrals provide an economic case – besides equitable access to healthcare – for scale-up of surgery capacity at the district level, as savings from decreased referrals could be reinvested in referral system strengthening.

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Economic costs of providing district- and regional-level surgeries in Tanzania

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BIOGRAPHY Martilord Ifeanyi obtained a Bachelor of Medicine; Bachelor of Surgery (MBBS) qualification from University of Nigeria Nsukka (UNN) in 2013 and a master's degree in Health Economics, Policy and Law (HEPL) from Erasmus University Rotterdam, in the Netherlands, in 2017. Martilord is currently a final year PhD candidate at the Department of Health Evidence, Radboud University Medical Centre, Nijmegen, the Netherlands; and is interested in costs and cost-effectiveness of health interventions and financing for universal health coverage (UHC) in sub-Saharan Africa. He is the Founder/CEO, EMAI Health Systems & Health Services Consulting, Nijmegen, the Netherlands

OBJECTIVE This study aimed to calculate and compare the costs of providing surgical care at the district and regional hospitals in Tanzania.

METHODS Two district hospitals (DHs) and the regional referral hospital (RH) in Arusha region were selected. All the staff, buildings, equipment and supplies deployed in running the hospitals over a 12-month period were identified and quantified from interviews and hospital records. Using a combination of step-down costing and activity-based costing, all costs attributed to surgeries were established and distributed over the individual types of surgeries. These costs were delineated into pre-operative, intra-operative and post-operative components.

RESULTS The total annual costs of running the clinical cost centres ranged from \$567k at Oltrumet District Hospital to \$3,453k at Mt Meru Referral Hospital. The total costs of surgeries ranged from \$79k to \$813k; amounting to 12–22 % of the total costs of running the hospitals. Unit costs and relative shares of capital costs were generally higher at the district hospitals. Two-thirds of all the procedures incurred at least 60% of their costs in the theatre. Open reduction and internal fixation (ORIF) performed at the regional hospital was cheaper (\$618) than surgical debridement (plus conservative treatment) due to prolonged post-operative inpatient care

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associated with the latter (\$1,177), but was performed infrequently due mostly to unavailability of implants.

CONCLUSION Lower unit costs and shares of capital costs at the RH reflect an advantage of economies of scale and scope at the RH and a possible underutilization of capacity at the DHs. Greater efficiencies make a case for concentration of surgical services at the RHs, but there is a stronger case for scaling up district-level surgeries, not only for equitable access to services, but also to drive down unit costs there and free up RH resources for more complex cases such as ORIF.

102**Changing pattern of acute poisoning: an ambispective study from Jodhpur, India**

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BIOGRAPHY Akhilesh Kumar is currently working as an academic junior resident in the Department of Internal Medicine, All India Institute of Medical Sciences, Jodhpur and an early career researcher interested in tropical medicine and infectious diseases.

OBJECTIVE Acute poisoning is a medical emergency with significant morbidity and mortality in the tropics with an estimated annual mortality around 0.3 million worldwide and 60 per million in India. Our objective was to study the clinical profile and outcome of acute poisoning presenting to our center from January 2019 to February 2021.

METHODS This is an ambispective cross-sectional study of patients >18 years with acute poisoning. Data including demographics, type of poisoning, time to reach medical care and outcome were collected. The retrospective data were collected from medical records from January 2019 to May 2020. The prospective data collection was from June 2020 to February 2021 after written informed consent. The project was approved by Institute Ethics Committee (AIIMS/IEC/2020-21/2083).

RESULTS of the 175 patients included, 62.9% ($n = 110$) were males, mean age was 33.4 ± 13.3 years. Median time to reach first medical facility was two hours with 21.3% ($n = 30$) reaching within 30 minutes and 46.5% ($n = 66$) within 60 minutes. The commonly consumed poisons were prescription and recreational drugs, 34.9% ($n = 61$), followed by agricultural poisons 28.0% ($n = 49$). Prescription drugs constituted 18.3% ($n = 32$), of which benzodiazepines were most common, 9.1%

($n = 16$). Among recreational substances, 16.6% ($n = 29$), most common was opioid overdose 6.3% ($n = 11$). Among agricultural poisons, phosphate compounds were most common 13.2% ($n = 23$), followed by organophosphorus 9.2% ($n = 16$). Accidental poisonings [28.0% ($n = 49$)], were mostly recreational. Prior psychiatric comorbidity was present in 9.7% ($n = 17$). Mortality was 3.6% ($n = 6$) of whom four were aluminum phosphorus and one each of paraquat and benzoic acid poisoning.

CONCLUSION Our study highlights the changing pattern of poisoning in Rajasthan, India from agricultural to prescription and recreational drugs in contrast to previously reported studies from India. It is important for tropical physicians to be cognizant of the changing pattern and consider recreational drugs in the differential diagnosis of unknown poisoning.

455**Delay in access to rehabilitation care for disabled persons in Benin: what are the determinants?**

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BIOGRAPHY Elie-Tino Godonou is a young public health professional who just finalized a master specialized in policy and health system. He is now doing a second master focused on epidemiology and biostatistics. He is also a physiotherapist and had practiced in Benin before starting public health training in the school of public health of the University libre of Brussels. He is now doing an internship in that school, in the research center – "Health policies and systems - International health", to analyze quantitative data.

OBJECTIVE People with physical disabilities are prone to health inequalities in their experience with health care system in Benin. Rehabilitation care for these people with severe conditions is important and is not included in the care package. Rehabilitation care is provided at the hospital and in community-based rehabilitation (CBR) services. The aim of this quantitative study is to identify the determinants of the delay in access to rehabilitation care experienced by disabled people (DP).

METHODS The 2-stage sampling consisted in selecting the medical rehabilitation and CBR services where a systematic sampling of DP was carried out. A logistic regression model identified the factors that influence the delay to access care.

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RESULTS of 318 DP, 57.19% had not received rehabilitation care immediately after the onset of disability. Bivariate analysis (CHI2) show that there is a statistically significant relationship between the immediate start of rehabilitation care and variables such as age ($P < 0.0001$), PD education level ($P = 0.042$), socio-economic level ($P = 0.014$), nature/cause of the handicap ($P = 0.001$), perception of the cause of the handicap ($P = 0.030$) by the DP and caregiver availability ($P = 0.005$). The different simple logistic regressions identified the significant factors which are: age (OR: 0.58, $P = 0.001$), level of education (OR: 1.33, $P = 0.024$), socio-economic level (OR: 0.66, $P = 0.005$), nature/cause of the handicap (OR: 0.82, $p = 0.031$). However, multiple logistic regression, adjusted for the significant variables noted in the bivariate analysis, identified only two significant factors, age (0.33, $P = 0.004$) and socio-economic level (0.68, $P = 0.042$).

CONCLUSION To reach universal health coverage, vulnerable population, especially DP, should not be forgotten. It is thus important for policy makers to reduce the barriers to access rehabilitation care. Facilitate an access without delay, based on the determinants highlighted here, is required for the best recovery possible of disabled people.

456**Hospital rehabilitation care pathways for people with physical disabilities in Benin**

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BIOGRAPHY Aline Labat has worked 10 years as a physiotherapist in France and then studied public health at the University libre of Brussels. Just after her master degree, she started working in the same university as a researcher in the research center "Policy and health system – International Health" and now also as a lecturer. She is working in sub saharan Africa and her main working topics are health systestrengthening, quality of care and access to care with a specific focus on young people and disabled people.

OBJECTIVE In low-income countries, people with physical disabilities (PPDs) face disparities in accessing and using rehabilitation care. They often have a non-optimal care pathway limiting their possible autonomy. The aim of this quantitative study is to analysis their care pathway from the onset of the disability.

METHOD A quantitative survey by questionnaire was conducted in 2019 among PPDs (Cerebral-palsy, Spinal cord injuries, Hemiplegia, Amputation, Poliomyelitis sequelae) who received rehabilitation care in a hospital in Benin.

RESULTS of the 207 PPDs who received rehabilitation care at hospital, only 60.9% (126) received information regarding the usefulness of rehabilitation care immediately after the onset of the disability. Among the immediately informed patients, 84.9% (107) immediately started rehabilitation care. The main reasons for delayed start were: late information (68.7%), need to see a "healer" before seeking formal care (7.3 %), unable to pay for care (16.7%), use of traditional care (10.4%). Only 66% (70) of the 107 PPDs who received the information and started immediately rehabilitation care, did not interrupt their care until the end of the treatment. For the one who interrupted, the reasons were: dissatisfaction on the quality of care (14.1%), distance (11.1%), non-appropriate means of transport (14.1%), lack of financial means to cover care (72.6%) and demotivation (14.1%). Finally, 71,0% of PPDs who received information and started care without delay declared being able to complete rehabilitation care until a full recovery or a sufficient autonomy increase (90.0% among those who never interrupted; 36.1% for those who had to interrupt care).

CONCLUSION This study shows that only 30.6% of PPDs have an optimal pathway, without delay to start, nor interruption and are able to finalize their care. It illustrates that access to rehabilitation care must be improved specially with the increase of NCDs and their consequences in terof disabilities.

407**How to address unmet assistive technology needs in Southern Africa: Key findings from a qualitative regional study**

R. Matter

Ideas That Matter Consulting, Seattle, USA

BIOGRAPHY Rebecca Matter has two decades of research, evaluation and project management experience in the disability and aging field. She has worked on a range of state, national and global projects that address the rights of people with disabilities, injuries and chronic conditions. For the past decade, she developed partnerships and implemented projects to increase access to assistive technologies (AT) within low-income countries. Rebecca completed her PhD in Public Health from the

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University of Cape Town, South Africa in 2020. Her doctoral thesis is entitled What works to increase access to AT within Southern Africa.

OBJECTIVE Most people who need assistive technologies (AT) in Southern Africa do not have access. For those who get access, the AT products and services often do not meet their short or long-term needs. I conducted a regional study to (1) identify and describe the barriers to appropriate and lasting AT and, (2) inform strategies to strengthen the AT sector across Southern Africa.

METHODS A regional qualitative study design was used that included multiple data sources (i.e., stakeholder interviews, documentation review and observations). An adapted health system framework was applied to shape the study design and analysis. Most data came from South Africa and Zimbabwe and represented public, industry and non-profit sectors across a range of AT types (e.g., vision, mobility, hearing).

RESULTS: Data were analyzed and synthesized into causal maps that present underlying factors of common AT user experiences such as lack of AT access or lack of sustained AT use overtime. Solutions were then developed to address underlying factors. This presentation will highlight a few solutions (called strategic levers) to implement at the national level that address unmet AT needs within Southern Africa. These strategies aim to reduce key supply chain, procurement and provision bottlenecks.

CONCLUSION Strengthening the AT sector within Southern African countries and across the region, begins and ends with understanding AT user experiences. By understanding the complex array of underlying factors that lead to AT user experiences, it is possible to develop strategic levers that address the foundational and pervasive weaknesses within the AT sector.

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Traumatic spinal cord injury in a rural low income setting in Tanzania: Occurrence and life thereafter

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BIOGRAPHY Haleluya Moshi, PhD, Physiotherapist. Associate Kilimanjaro Christian Medical University College (KCMUCo), Tanzania.

PURPOSE To inform rehabilitation stakeholders of the most common causes of traumatic spinal cord injury and prerequisites for survival in rural low-income settings.

METHODS A mixed method was used. Prospective one year quantitative data was collected from patients

admitted with traumatic spinal cord injury in a consultant hospital in north-eastern Tanzania and analyzed descriptively. A modified constructivist grounded theory approach was used for the analysis of in-depth interviews from 10 purposively selected individuals with traumatic spinal cord injury for between 7 and 28 years in typical Tanzanian rural low-income area.

RESULTS In one year, 84 persons who sustained SCI were admitted in the hospital due to fall from trees 54 (64.2%), road traffic accidents 26 (31%) and other causes 4 (4.8%). Based on the total population of the Kilimanjaro region, the annual incidence rate was 38 new cases per million inhabitants. The qualitative study identified internal and external coping resources for persons with traumatic spinal cord injury living in the rural low-income setting. Internal coping resources were: secure in God, increased awareness of health risk, social and problem solving skills. External resources were: having a reliable family, varying support from the community, a matter of possession and attaining means for mobility. Self-acceptance and accepting the available external support was later identified as a core category that determined the realization and utilization of these resources.

CONCLUSION The majority of traumatic spinal cord injuries in rural low income settings of Tanzania are caused by falls from trees. Despite hardships faced by persons with spinal cord injury in these settings, they have identified internal and external coping resources which support their lives. However, they have to reconcile themselves with the available family and community support.

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Disability, rehabilitation and assistive technology; Challenges faced by disabled children among the Tonga of Binga in Zimbabwe

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BIOGRAPHY Jennifer Muderedzi; PhD and MPhil: Community Health (University of Oslo-Norway); MSc Occupational Therapy (University of Kent-UK); Registered nurse (UK). I am an academic, community health professional, researcher, administrator and experienced psychosocial occupational therapist. Have taught occupational therapy and physiotherapy undergraduates at the university of Zimbabwe. I have worked as a health services commissioner for the government of Zimbabwe. I have published on 'Living conditions of people with disabilities in Zimbabwe; Coping of families with disabled children; Vulnerable groups and structural violence

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among the Tonga and others. I am passionate about human rights and voluntary work.

BACKGROUND Disability is a major public health concern worldwide, more so for children. Poverty reduces access to healthcare treatment and rehabilitation. Because of the costs, lack of public transport as well as lack of parental knowledge about available services, a large number of families have never seen healthcare professionals. As a result this makes disability and rehabilitation services not a priority. Community based rehabilitation may be present in some areas but this has been unsuccessful due to inappropriate models of service delivery.

Rehabilitation is a set of interventions that aim to enable disabled people to reach and maintain their optimal physical, sensory, intellectual, psychological and social function. It provides them tools they need to attain independence in interaction with their environment. However numerous barriers are noted when places and activities that the children were supposed to access are not accessible for example personal activities of daily living, education and civic life.

OBJECTIVE Explore disability causes, CBR among the Tonga and challenges due to lack of rehabilitation and assistive technology.

METHOD A total of 53 participants (birth-13 years of age) were enrolled in a qualitative -ethnographic study (2005–2013). Data was collected through in-depth interviews, participant observation and focus group discussions. Thematic analysis was conducted to discern recurring patterns within the data

RESULTS Lack of rehabilitation services. Disability causes were noted to be poor perinatal care, infectious diseases, HIV/AIDS epidemic, congenital diseases, malnutrition, trauma and lack of water and sanitation. Among the challenges faced were children's rights not being recognised, barriers to inclusion and communities not enriched when others are left behind and not contributing to society.

CONCLUSION Rehabilitation and assistive technology is paramount to disability. Causes of disabilities and challenges can be eliminated by the government through goodwill and policy implementation.

182**Identifying children with hearing loss in local schools in Tanzania**

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BIOGRAPHY Tone Øderud is a Senior Researcher at SINTEF. She has 30 years of experience from contract research and managing national and international R&D projects in the domain of service delivery of assistive technology, disability issues and community rehabilitation.

20 years of experience from development of services and assistive technology for people with disabilities in Namibia and Zimbabwe together with governmental organisations, non-governmental organisations and organisations of people with disabilities. 4 years of experience from developing community-based hearing care services for school children in Tanzania, including the development of new screening tools using tablet computers and the concept of gaming.

BACKGROUND WHO has estimated that there are around 466 million people worldwide that have disabling hearing loss and 34 million of these are children. The majority of children with hearing impairment live in low- and middle-income countries (LMICs) and most of the children remain undiagnosed, untreated and without provision of adequate services and hearing devices.

The objectives were to develop an innovative tool for screening children's hearing in local primary schools and to demonstrate that hearing loss might be prevented and possibly treated in local communities.

METHOD Participatory research design and qualitative methods were applied for the development of the innovative tool for screening, involving children, parents, schoolteachers, hearing experts and authorities. Traditional audiometry using audiometer and new innovative methods using game-based tablet audiometry were used for screening of children's hearing. Otoscopic examination was done to exclude any potential abnormalities in the outer and middle ear.

KEY RESULTS A new game-based tool for community-based screening of children's hearing has been developed utilising commercially available tablets, headphones and dedicated software for gaming. The screening tool was tested in three primary schools in Tanzania on 407 children. The prevalence of hearing loss among the children

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varied from 7.1% – 16.7% depending on the various schools. The main causes of hearing loss were from ear-wax or foreign body blocking the ear channel (45.5% – 91.7%) or otitis (22.7% – 45.5%).

CONCLUSION Screening of children's hearing might be conducted locally in schools and hearing loss from ear-wax and infections might also be prevented or treated locally, by locally trained staff. The project supports Inclusive Education, the Sustainable Development Goals no. 1, 3, 4, 10 and 17 and "Leave No One Behind".

422**The GRACE project: gender aspects in rehabilitation of persons with amputation in conflict – Affected environments**

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BIOGRAPHY Cliona O'Sullivan is a physiotherapist and Assistant at University College Dublin. She graduated from Robert Gordon University, Scotland in 1997 and worked for 10 years in a variety of clinical areas in Ireland, Scotland and Burkina Faso, West Africa. She has a keen interest in global health and endeavours to foster an awareness of global health issues among students. Her research spans musculoskeletal health, health systems and global health and she collaborates with international universities and non-governmental organisations.

OBJECTIVE Women with disabilities in conflict affected countries face profound disadvantage, such as poverty, unemployment and gender-based violence. Recent work by this group highlights that fewer women and girls attend for rehabilitation in conflict affected countries and that amputation is the most common clinical presentation among women with disabilities (Barth et al, 2020). Further exploration of the gender dimension in rehabilitation in conflict affected contexts is important as exclusion from services reduces rehabilitation potential of women, with significant social and economic impact, particularly on women and their children.

The GRACE Project is a 3-year funded project (2021–2023) that aims to better understand the impact of gender on amputation injury profiles, clinical characteristics, access to and acceptability of rehabilitation services to promote gender sensitive approaches so that health

outcomes are optimised for all people with amputation in conflict affected environments.

METHODS The project incorporates both qualitative and quantitative study methods. It consists of three distinct work packages (WP); a quantitative study involving retrospective analysis of data from twelve conflict affected countries and two qualitative studies based in Cambodia and Ethiopia using a Community Based Participatory Research (CBPR) approach. The WPs will address the specific study **OBJECTIVES** to understand:

1. Sex differences in demographic factors, amputation cause and clinical characteristics among service users with amputation attending ICRC supported physical rehabilitation services across twelve conflict affected or low-income countries (WP1)
2. Perspectives of people with amputation who have and have not attended rehabilitation about access, acceptability and perceptions of rehabilitation (WP2)
3. Perspectives of health workers and community leaders on how gender aspects impact rehabilitation service access, delivery and outcomes (WP3)

RESULTS Preliminary findings from WP1 will be presented.

REFERENCE Barth et al. Users of rehabilitation services in 14 countries and territories affected by conflict, 1988–2018. *Bulletin of the World Health Organization* 2020; 98:599–614.

220**Occupational injuries among telecom construction and service workers in Dar es Salaam, Tanzania**

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BIOGRAPHY Gloria Sakwari is a lecturer in Environmental and Occupational Health at Muhimbili University of Health and Allied Sciences. She has conducted research in several areas in the discipline of environmental and Occupational health namely, Dust exposure and respiratory health, Water hygiene and Sanitation, Injuries and skin diseases in construction sector and noise exposure. She has worked with the Ministry of Health to develop water sanitation and Hygiene strategy and reviewed the National Environmental Health Strategic plan for 2020–2026 for Tanzania. Her belief is every person has a right to live and work in a clean and safe environment.

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OBJECTIVE The study aimed to assess determinants for occupational injuries among telecom construction and service workers in Dar es Salaam region, Tanzania.

METHOD A cross-sectional study was conducted among 385 telecom construction and service workers in Dar es Salaam region, Tanzania. Stratified sampling technique was applied to get participants for this study. The selected companies were among those who construct and maintain telecom infrastructures in Tanzania. A questionnaire was used for data collection, data were entered to SPSS-version 23 for analysis where chi-square test and logistic regression models were used to explain the differences between groups.

RESULTS Out of 385 telecom construction and service workers 210 (54.5%) reported to have been injured at any time within the past year. Of these injuries, cut (49.0%), abrasion (29.5%) and electric shock (19.0%) were commonly reported among telecom construction and service workers. Parts of the body affected were hands (50.5%), fingers (36.7%), lower limbs (9.5%), head (7.1%) and chest (5.2%). Charting or talk with a mobile device while driving [AOR: 3.1, 95% CI: (1.5–6.3)], the one-time health and safety training [AOR:3.5, 95% CI: (1.4–8.6)] and frequency of site supervision [AOR:2.3, 95% CI: (1.2– 4.2)] were safety factors that increased the odds of occupational injuries among the workers. Other factors such as sleep disorders, service duration, education level, employment pattern, salary and area of residence were also linked to increased odds of having occupational injuries.

CONCLUSION Occupational injuries were reported among telecom construction and service workers even though they had reported having PPEs. Temporary workers and those with low education sustained more injuries than their counterparts.

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Health system response to a plane crash during the COVID 19 pandemic: Lessons from Malappuram, India

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¹District Medical office, Directorate of Health services, Malappuram, India; ²The George Institute for Global Health, Delhi, India; ³Access Health International, Delhi, India

BIOGRAPHY Sakeena is a medical doctor who graduated from Calicut medical college and completed her masters in public health from Achuthamenon Centre of Health Science Trivandrum. She was part of the cohort of the

Global Health Delivery Intensive Program by Harvard University in 2018. Sakeena has nearly 24 years of experience in the Health sector working in the health department of Kerala where she presently works as District medical officer of Mallapuram.

INTRODUCTION On 7th August 2020 an international air carrier with 184 passengers and 6 crew members crashed in Calicut airport, Malappuram Kerala, skidding away from a tabletop runway and falling into a slope resulting in 21 deaths and a hundred injured. An unprecedented recovery effort was organised by district authorities during the COVID19 pandemic. We documented these events to discern lessons.

METHODS The lead author coordinated the rescue as the District Medical officer of Malappuram at the time of the crash, constructed a written timeline, which was supplemented with a content analysis of state government orders, health department data and newspaper reports. Aspects of response were analysed using the Crisis Standards of Care System Framework (2012) (1).

RESULTS Federal and state government cooperation with extensive community engagement: The district administration and Airports Authority of India activated a pre-existing disaster management plan. Nearly 800 civilians supported the airport security, fire services and police with relief activities.

Emergency Management and Public Safety: A dedicated air crash rescue cell was established, serving as an information clearinghouse through rescue efforts. A protocol for emergency management of a crash during a pandemic was also developed.

Emergency Medical Services and Hospital care: 15 hospitals and three medical college hospitals provided round-the-clock coordinated care.

Public health/COVID wraparound: All passengers and rescue volunteers ($N = 1144$) were COVID tested and quarantined. Two passengers and 24 Airport security officers tested positive for COVID 19, the airport municipal area was declared a containment zone. There were no additional reported deaths.

CONCLUSION Established disaster mitigation protocols, complemented by adaptive coordination between the district administration, health department, police, fire services and a large group of civilians resulted in minimal loss of life and morbidity in a crash during a pandemic. This experience offers numerous lessons for future disaster/pandemic responses.

[Correction added on 15 December 2021, after first online publication: ‘K. Sakeena’ has been added as the first author and affiliation 1 has been removed from ‘H. Sankar’.]

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Prevention of road traffic collisions and associated neurotrauma in Colombia: An exploratory qualitative study

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Cambridge University Hospitals Trust

INTRODUCTION Neurotrauma is an important but preventable cause of death and disability worldwide, with the majority being associated with road traffic collisions (RTCs). The greatest burden is seen in low- and middle-income countries (LMICs) where variations in the environment, infrastructure, population and habits can challenge the success of conventional preventative approaches. It is therefore necessary to explore local perspectives to allow for the development and implementation of effective and sustainable context-specific strategies.

METHODS This study took place in Colombia where qualitative data collection was carried out with ten key informants between October and November 2019. Semi-structured interviews were conducted and explored perceptions on RTCs and neurotrauma, preventative strategies and interventions and the role of research in prevention. Interview transcripts were analysed by thematic analysis using a framework approach.

RESULTS Participants' confirmed that RTCs are a significant problem in Colombia with neurotrauma as an important outcome. Human and organisational factors were identified as key causes of the high rates of RTCs. Participants described the current local preventative strategies, but were quick to discuss limitations and challenges to their success. Key barriers reported were poor attitudes and knowledge, particularly in the community. Suggestions were provided on ways to improve prevention through better education and awareness, stricter enforcement and new policies on prevention, proper budgeting and resource allocation, as well as through collaboration and changes in attitudes and leadership. Participants identified four key research areas they felt would influence prevention of RTCs and associated neurotrauma: causes of RTCs; consequences and impact of RTCs; public involvement in research; improving prevention.

CONCLUSION RTCs are a major problem in Colombia despite the current preventive strategies and interventions. Findings from this study have a potential to influence policy and practice by illustrating different solutions to the challenges surrounding prevention and by highlighting areas for further research.

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Treatment and in-hospital outcomes of open tibial fractures in rural TanzaniaF. Smit^{1,2,3}, A. Eleveld^{1,2,3}, G. Mtui^{1,2}, M. Botman^{2,3}, D. van Embden³, F. Bloemers³ and M. Ritt³¹Haydom Lutheran Hospital, Tanzania; ²Global Surgery Amsterdam; ³Amsterdam University Medical Centres, the Netherlands

BIOGRAPHY Fleur Smit is a young doctor 25 years old, who graduated in 2020. She has been in Tanzania for six months to conduct research on open tibial fractures. She has a great interest in global surgery and would like to combine clinical work with research in the future in order to improve access to and surgical care worldwide. Currently working as an emergency medicine resident and as PhD-candidate for Global Surgery Amsterdam and Amsterdam UMC.

OBJECTIVE Road traffic injuries (RTIs) cause 1.3 million deaths annually. Africa has the highest number of RTIs that results in mortality. Open tibial fractures are a common result of RTIs and have serious socio-economic effects. In addition to this, nine out of ten people in low- and middle-income countries do not have access to basic surgical care, for example for open tibial fractures. The data about this in Tanzania is scarce. Western research is often not applicable for developing countries. The aim of this study is to assess the management and complications of open tibial fractures in rural Tanzania.

METHODS In this prospective observational cohort study all open tibial fractures due to trauma treated in Haydom Lutheran Hospital in Tanzania between August 2019 and August 2020 were included. Data was collected about patient demographics, trauma, treatment and in-hospital complications.

PRELIMINARY RESULTS A total of 64 patients were included with a male:female ratio of 3.9:1. 64.7% fractures had a Gustillo-anderson classification 3A. Road traffic accidents were the most common cause. 61.8% got external fixation as definitive stabilisation and 20.6% a nail. The time between initial and definitive stabilisation was 11 days. 79.4% got a debridement and primary closure as primary wound management. The time between injury and definitive soft tissue reconstruction was 0.5 days. Wound infection was the most common complication and it was more often present in the group external fixation as definitive stabilisation.

CONCLUSION RTAs are the major cause of open tibial fractures. The majority of the fractures was initially stabilised with external fixation. In most cases primary wound management was a debridement and primary

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closure. Wound infection was the most common complication. It is advised that a national specific guideline on open tibial fractures and associated complications is drafted and in place, to improve surgical care.

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The value of optic nerve sheath diameter measurement in assessing intracranial pressure using bedside ultrasound in resource limited setting

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Currently the customary practice at Black lion and other tertiary hospitals in Ethiopia, when dealing with patients who sustained traumatic brain injury is widely based on clinical judgment and radiologic evaluation.

The purpose of this pilot study was to address two major issues in Ethiopia. One was to evaluate ICP in patient with head trauma (severe, moderate or mild) and assess the value of bedside ultrasound in assessing the ICP and the potential effectiveness in augmenting decision making process.

All patients that present to the ED or referred to the Neurosurgery service with presumed ICP as a complication of trauma during the study period were included in the study. Participating physicians had received structured didactic/cognitive orbital ultrasound training. After the training session, physicians continue their current practice in managing patients who have suspected ICP and add bedside ultrasound evaluation of the ONSD.

On prospective evaluation, we were able to scan 87 trauma patients at ED and ICU. The median age was 27 years (1–78). 78% of the patients were male. 21 patients (24.1%) had GCS < 8 at presentation and ONSD measurement at ED in all these patients was > 5 mm. 5 out of 21 severe TBI patients had improvement in their GCS after treatment and they had some change on their ONSD measurement on re-evaluation one day later which correlated with their clinical improvement. 35 patients (40.2%) had GCS 14–15 at presentation. 32 out of 35 mild TBI patients had ONSD < 6 mm at initial evaluation. Despite these efforts the practice and documentation was quite poor as we tried to retrieve some of the information retrospectively from the patients chart.

Bedside ONSD measurement can be a reliable means to follow and augment clinical decision making process on management of patients with raised ICP following

trauma in a setup where invasive ICP monitoring is non-existing and doing serial CT-scan is not practical.

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The burden of skin wounds in rural West Africa: a population-based assessment combined with community-based wound management

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BIOGRAPHY Born and raised in Italy, Simone Toppino, M.D., studied medicine at the University of Pavia, Italy and later moved to Ulm University Hospital, Germany, for his residency training. In 2019 he joined the German doctorate program at Heidelberg University Hospital working as clinical investigator in the research project on community-based wound management in rural C  te d’Ivoire “Identify and treat wounds early”. He currently works as a third-year medical resident in internal medicine at Kantonsspital St. Gallen, Switzerland, while continuing to support the research project. He plans to specialize in infectious diseases and tropical medicine.

OBJECTIVE To determine the burden and the clinical epidemiology of skin wounds in rural West Africa through a population-based assessment in a Health and Demographic Surveillance System (HDSS) area. To ensure appropriate treatment of all detected patients in a community-based wound management model currently tested and implemented in the area.

METHODS We conducted a cross-sectional study to assess the clinical epidemiology of skin wounds – defined as broken skin barrier – in a HDSS-area of rural C  te d’Ivoire. We combined a household-based survey for active case finding with a health service-based study for passive case finding. We collected clinical and epidemiological data on patients with skin wounds and provided standardized WHO-recommended treatment to all patients. Wound management was community-based and integrated into the cross-sectional study through trained local healthcare personnel.

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RESULTS We surveyed 3737 HDSS-registered people, covering 98.4% of the targeted population. Overall wound prevalence derived from combined active and passive case finding was 10.5%. Most patients were children below the age of 14 years. Most wounds were due to injuries, followed by furuncles, burns, Buruli Ulcer and other aetiologies. Early acute wounds dominated the findings with, however, also substantial suffering from chronic massively neglected wounds that persisted unseen and untreated by the health services for many years.

CONCLUSION Skin wounds represent a neglected problem in rural West Africa. Our results underline the need for integrated strategies of wound management that target all skin wounds independent of the cause and prevent chronic, debilitating wounds by early detection and treatment in the community with simple means.

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Assessment of mass-trauma epidemiology in absence of databases – A Systematic Media Review in Rwanda

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BIOGRAPHY Lotta Velin is a PhD student at the Center of Disaster Medicine and Traumatology, Linköping University in Sweden, focusing on global surgery and mass-trauma surge capacity in Rwanda. Velin is graduating from medical school at Lund University in June 2021. In 2019–2020, Velin completed a year as a research associate at the Program in Global Surgery and Social Change, Harvard Medical School, where she mainly worked on projects regarding surgical-site infections and associated antimicrobial resistance in rural Rwanda. Other previous projects have looked at the intersections of climate change and global surgery and equity in global health practices.

OBJECTIVE Surge capacity refers to the preparedness of health systems to face sudden patient inflows, such as mass-casualty incidents (MCI). To develop MCI protocols, it is essential to understand the local MCI epidemiology, which is poorly studied in low- and middle-income countries where trauma databases are frequently lacking. In

this study, we assessed if a systematic media review could be used to analyze mass-trauma epidemiology in Rwanda.

METHODS A systematic media review was conducted of non-academic publications of MCIs in Rwanda between January 1st, 2010 and September 1st, 2020 using NexisUni. All articles identified by the search strategy were screened using inclusion/exclusion criteria to assess eligibility. Data were extracted in a RedCap form and analyzed using descriptive statistics.

RESULTS Among 3187 articles identified, 256 met inclusion criteria. In total, 118 MCIs were described, of which 61.9% were road-traffic accidents, 19.5% natural hazards, 17.8% man-made events and 0.9% other. of Rwanda's 30 districts, 29 were affected by mass-trauma, with the rural Western province seeing the largest number of MCIs and the highest injury and death tolls. Road-traffic accidents was the leading cause of MCI until 2017 when natural hazards became most common. The median number of injured persons per event was 11 (IQR 5–18) and the median number of on-site deaths was 2 (IQR 1–6); with natural hazards having the highest numbers of injuries and deaths (16.5 [IQR 6–22] and 6 [IQR 2–18] respectively).

CONCLUSION In Rwanda, MCIs caused by road-traffic accidents have decreased, while landslides/floods are increasing, preventing a decrease in trauma-related mortality. Mass-casualty protocols in Rwanda should put an emphasis on rural areas and include modified referral protocols for mass-casualty events. By training journalists in “mass-casualty reporting”, the potential of the “systematic media review” could be further enhanced, as a way to collect MCI data in settings without databases.

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Access to Sexual and Reproductive Health Care Services of Women Internally Displaced by the Boko Haram Insurgency in Nigeria

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BIOGRAPHY Olufemi Mayowa Adetutu is an academic staff member and a social researcher at Obafemi Awolowo University Ile-Ife, Nigeria. He had his PhD in Demography and Social Statistics and graduated as a fellow of the Consortium of Advanced Research Training in Africa.

His research interests focus on sexual and reproductive health of young people, gender and migration studies,

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family demography and maternal and child health. I have written academic papers that are related to these areas. I had made spirited effort towards addressing population and public health problem in Nigeria through research and community services.

OBJECTIVES The Boko Haram insurgency has caused havoc and humanitarian crises of monumental grave consequences. Besides many lives lost to the dastardly acts of the sect group, hundreds of thousands of individuals, especially vulnerable women and children, households and communities have been disrupted, uprooted and displaced. This has generated public health concerns with resultant negative implications for obstetric and pediatric care, gender-based issues and other sexual and reproductive health care services: access to contraception and condo and cervical cancer screening are largely inaccessible and non-prioritized; there are impacts on HIV and other sexually transmitted infections and gender-based violence.

METHODS Qualitative data were collected from women aged 18 years and over in three internally displaced camps through 6 focus group discussions and expert opinions from the coordinators of the IDP camps. Interviews were based on perspectives of participants on five key themes, plus their socio-demographic characteristics: access to antenatal and delivery care, family planning and gender-based violence issues, sanitary pads and other SRH needs.

RESULTS Results speak to lack of access to antenatal, delivery, family planning, HIV and other STIs screening and gender-based services with resultant poor health outcomes, including unwanted pregnancies, sexual violence, delivery complications and maternal morbidity and mortality. However, there was provision of sanitary pads and counselling on protective sexual intercourse in the camps. Lack of resources caused women to have unprotected sex; they had nobody but themselves to individually confront sexual coercion by men.

CONCLUSION Sexual and reproductive health care services are poor for women displaced by the Boko Haram Insurgency in Nigeria. Policy interventions and programmes should focus on quality sexual and reproductive health care services, unconditional cash transfer and relief materials to the vulnerable women and children.

286**Denied and disputed paternity and coping strategies of young women in Nigeria**O. Adetutu*Obafemi Awolowo University, Ile Ife, Nigeria, Ile Ife, Nigeria*

BIOGRAPHY Olufemi Mayowa Adetutu is an academic staff member and a social researcher at Obafemi Awolowo University Ile-Ife, Nigeria. He had his PhD in Demography and Social Statistics and graduated as a fellow of the Consortium of Advanced Research Training in Africa. His research interests focus on sexual and reproductive health of young people, gender and migration studies, family demography and maternal and child health and on addressing population and public health problem in Nigeria through research and community services.

OBJECTIVES There is a systematic absence of studies on disputed paternity and how young women cope with an unwanted pregnancy. However, cases of denial of responsibility for pregnancy abound among the poor vulnerable populations where men are not empowered and engaged in problem behaviour. Most young men implicated in this uncouth activity refuse paternity tests. After failed attempts to call young men to take responsibility and care of the hapless young girls, maternal parents most often bear the financial, emotional and moral responsibility of support the pregnant young women.

METHODS Using a phenomenological research design, 10 adolescents who lived the experience of denied paternity were interviewed. Results showed females were agonised by the financial burden, stigma, constant worry from unresolved paternity dispute. Victims also said their condition was based on negative sexual behaviour and disobedience and that men rejected responsibility and relocated because of financial problems, shame of claiming children whose pregnancies were denied and lack of child support.

CONCLUSION Denied and disputed paternity affected young women socially, physically and psychologically. The government should empower girls and create awareness on using DNA to confirm paternity of denied pregnancies.

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Adolescent club approach for adolescent sexual health promotion: a qualitative appraisal of community leaders' perceptions in Adaklu District, GhanaP. Agordoh¹, C. Azagba², D. Klu³, E. Ansah³ and M. Gyapong³¹University of Health and Allied Sciences, Ho, Ghana, Ho, Ghana; ²Adaklu District Health Directorate, Ghana Health Service, Adaklu, Ghana, Adaklu, Ghana; ³Institute of Health Research, University of Health and Allied Sciences, Ho, Ghana, Ho, Ghana

BIOGRAPHY Percival Agordoh is an Assistant Lecturer at the Department of Nutrition and Dietetics, University of Health and Allied Sciences in Ghana. He presently serves as the Interim Vice President of the Ghana Academy of Nutrition and Dietetics. He is a Registered Dietitian and holds an MPhil in Dietetics and a BSc in Community Nutrition. Agordoh's research interests include adolescent nutrition & health; maternal, infant and child health; health reforms; nutrition quality of life for healthy ageing as well as indigenous foods.

OBJECTIVE To explore community leaders' perspectives on a model community-based, health worker-managed adolescent clubs intervention designed to promote adolescent sexual reproductive health and rights (ASRHR) and reduce teenage pregnancy rates in rural communities in Adaklu District.

METHODS Data was collected using focus group discussions (FGD) among community leaders. Each of the 11 FGD had a minimum of 8 and a maximum of 12 participants. Interviews were tape-recorded, transcribed verbatim and analyzed using deductive thematic analysis.

RESULTS Community leaders opined that adolescent clubs effectively engaged young people beyond school hours, positively impacted adolescents' general behavior of club members and contributed to the overall reduction in the number of teenage pregnancies in their communities. They highlighted a contemporary need to grant access to reproductive health information and services to adolescents signaled by 3 themes: limited parental (maternal) sexual communication, the proliferation of sexual information on the media and an absence of prohibitive cultural norms. Although they were involved in club formations, they felt uninformed of the details of club activities. Their principal recommendations included being involved as active participants or resource persons for club meetings and to be empowered to be complementary partners to reinforce lessons at home. Participants included 45 females and 75 males.

CONCLUSION This study provides early evidence for the use of community-based, health-worker-manned adolescent clubs as an effective adolescent sexual health promotion strategy. Once stakeholders' involvement is adequately refined, the adolescent club concept will be an auspicious strategy whose feasibility for scale-up in other rural settings is promising.

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Contraception: Prevalence and types used among Female secondary students in a local area in Rivers State Nigeria.K. Andrew¹, A. Okpani² and F. Adeniji³¹University of Port Harcourt, Port Harcourt, Nigeria; ²University of Port Harcourt, Port Harcourt, Nigeria; ³University of Port Harcourt, Port Harcourt, Nigeria

BIOGRAPHY Kelechi Andrew is a PhD candidate at the University of Port Harcourt, Nigeria where she hopes to obtain a Doctorate degree in Population and Reproductive Health. Her work focuses on a virtual behavioral intervention on risk reduction of sexually transmitted infections and its impact on Sexual and Reproductive Health of young people.

OBJECTIVE The purpose of this study was to determine the prevalence of contraceptive use and ascertain the types of contraceptives used by female secondary school students in Obio Akpor Local Government Area.

METHODS The study used a cross sectional design and a multistage random sampling method to recruit 315 secondary school students who were sampled using a pre-tested semi-structured interviewer-assisted questionnaire and data collected was analyzed using Statistical Package of Social Science (SPSS) Version 20.0.

RESULTS Results showed a response rate of respondents of 96.83% with 3.17% non-respondents, aged 13–18 years with mean age of 15.45 years, 95% Confidence interval, Standard Deviation of 1.33. The rate of contraceptive ever used by respondents was 35%, 34% had used at last sexual activity while only 20% were consistently using contraceptives. Contraceptives used by respondents included condom, post coital pills and withdrawal method with 88.24%, 8.82%, 2.94% respectively.

The results further showed that older students aged 16–18 years used more contraceptives than the younger students (13–15 years) with a probability of $P = 0.100$.

CONCLUSION This study revealed that the contraceptive prevalence among the students was poor and there is a serious need to increase adolescents' access to

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contraception and reproductive health services and information, as this will help avoid unplanned pregnancies, promote healthy lives and well-being, improve reproductive health and meet the third and fifth sustainable development goals.

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The 10 Group Classification System (TGCS) applied in a urban referral hospital in Sierra Leone: an observational study

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BIOGRAPHY Resident Doctor in the fifth year in Gynecology and Obstetrics at the University of Padova. I am 31 years old. I work at the Obstetric Clinic of Padua (Italy). I worked for 6 months (from August 2020 to February 2021) at the Princess Christian Maternity Hospital, the largest maternity referral hospital in Freetown, Sierra Leone. This last training experience was made in the context of the Junior Project officer (JPO) of the "Doctors with Africa CUAMM" an Italian non-governmental organization.

OBJECTIVE The increasingly frequent use of Caesarean Section (CS) without a valid indication leads to an increased risk of mortality and morbidity for women and newborns, particularly in a context of countries with limited resources. The aim of the study is to evaluate the distribution of CS within the 10 Group Classification System (TGCS) on women giving birth at Princess Christian Maternity Hospital (PCMH), the largest maternity referral hospital in Freetown, Sierra Leone, serving a population of 1.5 million inhabitants.

METHODS A retrospective observational study has been conducted from 1st October 2020 to 30th January 2021. Data of 1975 deliveries were collected and classified according to TGCS. For each CS information regarding the indication and the health worker profile who performed the surgery were registered. Data on maternal and fetal outcome were also collected.

RESULTS The institutional CS rate was 49.3%. In Group 1 a CS rate of 43.1% emerged with a contribution of 24.6% of the total CS and a rate of 33.3% in Group 3 contributing for 25.9% of the total CS. 29% of CS were

performed for prolonged or obstructed labour. 68.2% of CS were performed by a Surgical Health officers. In the observed period, 132 fetal deaths occurred, of which 31% were in Robson's class 3.

CONCLUSIONS: High CS rates were observed in low risk groups. Several indications for obstructed labour or prolonged labour highlight the presence of many cases with mechanical dystocia. This finding could be only partly linked to the fact that the PCMH is a tertiary hospital with numerous referral cases and also to particular conditions of the population studied. This study reveals the need to reduce the number of unnecessary interventions and to improve clinical management.

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Stillbirths from year 2067 BS to 2076 BS in Western Regional Hospital, Pokhara, Nepal: A descriptive study

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BIOGRAPHY In 2013, with very little overview, I enrolled myself in Bachelor of Public Health. Being recruited as Survey Enumerator in Save the Children Nepal, helped me face the real world health issues. I published an article on breastfeeding in an international journal by the end of my undergraduation. The fieldwork and researches throughout generated a strong interest to build my career towards health welfare. I chose one of the best researched based university, University of Bergen, to further pursue my Master's degree in Global Health. Currently, I am volunteering in Redd Barna Bergen as an International Representative.

OBJECTIVE A stillbirth is the birth of a baby born with no signs of life at or after 22 weeks gestation, but often using 28 weeks or more in less developed health systems. The aim of this study was to assess the rate of stillbirth from year 2067 BS to 2076 BS (Nepali calendar) at a tertiary care hospital in Pokhara, Nepal and describe stillbirth by selected background characteristics.

METHODOLOGY: This is a Retrospective Descriptive Study on SB trend during a decade. The details for birth were only available for SB thus restricting risk analysis, but the total number of deliveries including live births were also collected. The trend of SB rate was calculated and analysed by year and month during the past decade of Nepali calendar. The SB rate was described by cross tabulation with sociodemographic and obstetric determinants.

RESULTS Between 2067 BS to 2076 BS, a total of 91330 women attended for delivery. 90261 women gave live

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births and 1204 had one or more SB. The number of SB babies was 1167 from singleton pregnancies, 12 from twin pregnancies where the other twin was alive and 50 where both twins were SB. The SB rate varied by year between 9.8 and 17 per 1000 births. 64% (95% CI 62–67) of SB babies had LBW, reflecting that most of them were premature. 62.8% (95% CI 58–66) of male singletons had LBW, as did 66.5% (95% CI 62–70) of females. Mothers under 20 years had SB with LBW in 70% (95% CI 62–77) of cases, mothers aged 20–34 in 64.1% (95% CI 61–67) and mothers aged 35 years and more in 55.4% (95% CI 44–66).

CONCLUSION In our study, we found that the SB rate varied by year and season. These variations may also reflect external factors.

418**Iterative development of smartphone based screening of neonatal jaundice**

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BIOGRAPHY Pediatrician. PhD Candidate. CEO at Picterus AS.

BACKGROUND Neonatal jaundice is an important cause of newborn morbidity and mortality and results in more than 100,000 deaths annually. Most cases occur in Sub-Saharan Africa and South-East Asia. Early detection is a key factor in improving current state, but there is a lack of accurate, available and affordable tools.

Based on previous research on bio-optic properties of newborn skin, we have developed a technology to estimate bilirubin levels from digital images. This technology has been adapted into a system with a smartphone application and a color calibration card. To enable successful implementation of novel tools, it is important that these tools not only have necessary technical functions and fulfil regulatory standards, but also are developed in accordance with user needs.

METHODS/RESULTS We used an iterative approach and developed prototypes of the system. We used both expert opinion, clinical studies as well as user testing, with objective to evaluate performance as well as gather information to guide further development. This information was defined as requirements for the system and were classified in four different categories: Technical, User Experience, Regulatory and Market/Production.

Clinical studies were performed on healthy, term born newborns aging 0 to 15 days. User testing was performed

in “Guerilla style”, where potential users were approached with prototypes of the system, tested the system and gave immediate feedback. Three iterations of the system were developed based on collected requirements. Final version was tested in formal usability studies for regulatory approval.

CONCLUSION An iterative approach which includes user testing can rapidly give an improved version of novel tools.

307**Responsive parenting: a convergent mixed-methods synthesis of learning from community stakeholders for improved adolescent sexual and reproductive health**

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BIOGRAPHY Charles Kofi Azagba is a District Director of Health Services in Ghana Health Service. He holds Master of Public Health from University of Ghana, Bachelor of Education (Health Sciences) from University of Cape Coast. He has 18 years working experience in Health programming, Monitoring, Surveillance and Health Administration in Ghana.

OBJECTIVE Responsive parenting relates to encouraging feelings of trust within one’s child; trust in their parent and trust in themselves. Adolescents aged 10 to 19 years are confronted with trust and psychosocial challenges in their development of healthy sexual and reproductive health attitudes and behaviors. The stimulus from their environment as much as their parents help to nourish or repress risky sexual behaviors in them. This paper examines evidence from multiple stakeholders by providing an analysis of the gap of responsive parenting for complementing the sexual and reproductive needs of their adolescents.

METHODS A convergent mixed-methods design was used to collect data in 30 communities for baseline evaluation of a project to engage stakeholders for effective decision-making in addressing teenage pregnancy in the Volta region of Ghana. Qualitative data was based on focus groups and in-depth interviews. Quantitative data was collected from adolescent-caregiver pairs sampled with a

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modified EPI cluster sampling technique in 221 households using an adapted WHO questionnaire.

RESULTS Majority of adolescents live with their mothers (53%), have never had a communication about sex with either their father (63%) or mother (53%); although the average age at first sex was 14.7 years. Caregivers are not aware of their wards' sexual relationships (53%), do not approve of romantic relationships (94.1%) yet only 19.5% frequently talk about sex with their children. Focus groups data shows that caregivers lacked adequate capacity to provide sexual education to adolescents and will want health workers to build their capacity to do so thereby confirming gaps in parenting.

CONCLUSION Responsive parenting is critical for improved adolescent health. The study demonstrates that all stakeholders consider responsive parenting essential for the holistic nurturing of the growing adolescent of any sex. Efforts to support the family unit (particularly mothers) to be responsive should be explored by all stakeholders.

75**Cardiac disease in pregnancy: challenges and maternal and neonatal outcomes from a tertiary centre in Johannesburg, South Africa**

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BIOGRAPHY Irina Balieva is currently working as a post-graduate in Global Health and Tropical Medicine in the Netherlands. She was born in Bulgaria, grew up in Norway and later moved to the Netherlands to study at the University of Groningen. During her degree she did several of her internships in Curaçao and in South Africa. During her year and a half in South Africa, she did research on the diagnosis of pulmonary hypertension in a low recourse setting and on cardiac disease in pregnancy.

OBJECTIVES To explore maternal and neonatal outcomes of cardiac disease in pregnancy in a low-resource setting, in order to reduce preventable morbidity and mortality.

METHODS A record review of 74 women with cardiac disease, delivering at Charlotte Maxeke Johannesburg Academic Hospital throughout 2017, was performed.

RESULTS Rheumatic heart disease was the most common cardiac diagnosis ($n = 21$, 28.4%), followed by pulmonary hypertension ($n = 13$, 17.6%) and congenital heart disease ($n = 12$, 16.2%). The mean week of presentation was gestational week (\pm standard deviation) 17.0 (± 7.1) and five (6.8%) women presented only after delivery or a miscarriage. Eight women (10.8%) underwent a very high-risk pregnancy, according to the modified World Health Association classification for cardiac disease in pregnancy. There was one (1.4%) maternal and two (2.7%) perinatal deaths. Neonatal complications included preterm delivery ($n = 20$, 32.3%) and small for gestational age ($n = 10$, 16.1%). There were 6 (8.1%) elective and 5 (6.8%) spontaneous abortions. The majority delivered by cesarean section ($n = 42$, 66.7%). Cardiac complications ($n = 30$, 40.5%) included heart failure ($n = 15$, 20.3%), pulmonary hypertension ($n = 11$, 14.9%) and blood transfusions ($n = 8$, 10.8%). Women with rheumatic heart disease had a higher risk of developing any cardiac complication than women with other cardiac diagnoses ($P = 0.005$). Higher heart rate on presentation was associated with later developing heart failure ($P = 0.016$).

CONCLUSION Cardiac disease in pregnancy was associated with a high prevalence of maternal and neonatal complications. Mothers with rheumatic heart disease, in particular, experienced more complications and should be closely followed. Tachycardia as an early symptom of heart failure should be noted. Challenges in management include low awareness of possible complications among patients and health care providers and late presentation in pregnancy, with many women in our study undergoing a very high-risk pregnancy. Pre-conceptual counselling and managing pregnant women at a dedicated centre by a multidisciplinary team could, however, improve outcomes.

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Prematurity in Madagascar: Prevalence and elements to assess determinants and consequences of preterm births from the freeBILy study cohort

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BIOGRAPHY Dominik Benke works as field representative of the Bernhard Nocht Institute in Madagascar, coordinating several studies with a focus on schistosomiasis in women and children. He graduated from Würzburg Medical School in 2016 and has two years of work experience as a resident in internal medicine at the University Medical Centre Hamburg-Eppendorf.

Prematurity is the leading cause of death in children under five years. Estimated prevalence and associated mortality are highest in Africa. The freeBILy consortium consists of four African and four European partner institutions. In Madagascar, it focuses on pregnant women and their children to evaluate a test-based schistosomiasis treatment in a cluster randomised controlled trial. Data collected in our cohort of 2902 women will contribute to better identify the determinants of preterm births with a special focus on limited-resource contexts supporting evidence-based interventions for the improvement of children's health.

Upon women's enrolment, gestational age was determined by last menstrual period. Possible determinants of prematurity were assessed, including maternal age, educational level and occupation, history of previous pregnancies and history of the current pregnancy. Body weight, blood pressure, dipstick urinalysis and haemoglobin concentration were assessed during the 6th and 8th month of pregnancy. In intervention centres, a point-of-care circulating cathodic antigen (POC-CCA) test for schistosome infection was performed and if possible, schistosomiasis treatment was given. Weight, size, sex and a set of vital signs of the newborns were documented at birth. Follow-up visits at 9 and 24 months are still ongoing, assessing growth and medical history of the children. Adverse

outcomes are reported according to the requirements of clinical trials. Neurocognitive development will be assessed in a sub-study at 24 months and beyond.

Out of 2864 live births, 482 were premature (16.8%). Risk factors and outcomes will be analysed upon completion of the trial.

Our study will allow the evaluation of risk factors and consequences of prematurity in a population for which data on preterm births is extremely scarce. Our results will contribute to establish prevention programmes within the framework of antenatal care and advocate for the improvement of obstetric and neonatal care interventions in limited resource settings.

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Which public health interventions are effective in reducing morbidity, mortality and health inequalities from infectious diseases amongst children in LMICs

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BIOGRAPHY Elodie Besnier is a PhD candidate at the department of Sociology and Political Science at the Norwegian University of Science and Technology (NTNU) in Trondheim, Norway. Her research at the Centre for Global Health Inequalities Research (CHAIN) focuses primarily on public health interventions and health inequalities in children in low- and middle-income countries. Before joining NTNU, Elodie worked in the policy and advocacy sector for public health and health non-profit organisations across Europe.

Despite significant progress in the last few decades, infectious diseases remain a major threat to child health in low- and middle-income countries (LMIC) – particularly amongst more disadvantaged groups. An overview of the best available evidence covering public health interventions reducing morbidity, mortality and health inequalities in children aged under 5 years is needed.

To address this gap, we carried out an umbrella review (a systematic reviews of reviews) to identify evidence on LMIC countries. The reviews of interest described the effects of public health interventions (promotion, protection, prevention) on morbidity, mortality and/or health inequalities due to infectious diseases amongst children.

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Ten databases were searched for records published between 2014–2019 alongside a manual search of gray literature. Articles were quality assessed using the Assessment of Multiple Systematic Reviews tool (AMSTAR 2). A narrative synthesis was conducted.

We identified 41 systematic reviews synthesizing 322 individual primary studies. A majority of reviews reported on preventive interventions ($n = 30$) with a minority on promotion ($n = 11$), but almost no reviews covering health protection interventions ($n = 1$). Effective interventions for improving child health across the whole population, as well as the most disadvantaged included communication, education and social mobilization for specific preventive services or tools, such as immunization or bed nets. For all other interventions, the effects were either unclear, unknown or detrimental, either at the overall population level or regarding health inequalities. We found few reviews reporting health inequalities information and the quality of the evidence base was generally low.

Our umbrella review identified some prevention interventions that might be useful in reducing under five mortality from infectious diseases in LMICs, particularly amongst the most disadvantaged groups.

188**Silent politics and unknown numbers: Rural health bureaucrats and Zambian abortion policy**

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BIOGRAPHY Anthropologist and PhD candidate who has done long term fieldwork on abortion policy and access in Zambia.

OBJECTIVE This paper addresses the gaps between knowledge, policy and practice in reproductive health by exploring the processes of translating Zambian abortion policy from paperwork to practice in one of Zambia's predominantly rural provinces. Central to these processes are rural health bureaucrats tasked with administering and monitoring a myriad of reproductive health policies and programmes.

METHODS The study is based on 11 months of ethnographic fieldwork in Zambia from September 2017 to August 2018 and included participant observation in health management and policy meetings and in-depth interviews with rural health bureaucrats.

FINDINGS Our findings reveal a complex landscape of reproductive health politics and moral double binds and allow insight into the gap between Zambia's seemingly liberal abortion policy and the lack of access to abortion services in rural areas. Despite the bureaucrats' knowledge about abortion policy, none of the hospitals in the study province offer legal abortion services. The bureaucrats tend to bypass abortion-related issues and treat them with silence in public settings and policy meetings. The silence resonates with the lack of data on abortion and post-abortion care in district- and provincial health offices and should be understood in relation to the dominant moral regime of the Zambian Christian nation.

CONCLUSION The paper calls for increased focus on the politics of reproduction and reproductive governance to enhance the understanding of the slow progress in scaling up safe abortion services in Zambia.

189**The access paradox: Abortion law, policy and practice in Ethiopia, Tanzania and Zambia**

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BIOGRAPHY Astrid Bystad is a social anthropologist with three decades of research experience within reproductive health from Eastern Africa. She has been the PI for Research Council of Norway funded project 'Competing discourses impacting girl's and women's rights: Fertility control and safe abortion in Ethiopia, Tanzania and Zambia'.

OBJECTIVE Explore the relationship between abortion law, policy and women's access to safe abortion services within the different legal and political contexts of Ethiopia, Tanzania and Zambia.

METHODS The research had a qualitative comparative design and was conducted in Lusaka, Addis Ababa and Dar es Salaam as hubs for government agencies and international organisations. It targeted formal organisations as policy implementers and stakeholders in support of – or in opposition to – the existing abortion laws. Semi-structured interviews were carried out with study participants (79) differently situated vis a vis abortion, exploring their views on abortion-related legal- and policy frames and their perceived implications for access.

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RESULTS The abortion laws are classified as ‘liberal’ in Zambia, ‘semi-liberal’ in Ethiopia and ‘restrictive’ in Tanzania, but what we encountered in the three study contexts was a paradoxical relationship between national abortion laws, abortion policy and women’s actual access to safe abortion services. The study findings moreover reveal that the texts that constitute the three national abortion laws are highly ambiguous. The on-paper liberal Zambian and semi-liberal Ethiopian laws in no way ensure access, while the strict Tanzanian law is hardly sufficient to prevent young women from seeking and obtaining abortion. In line with Walt and Gilson’s call to move beyond a narrow focus on the content of policy, our study demonstrates that the connection between law, health policy and access to health services is complex and critically dependent on the socio-economic and political context of implementation.

CONCLUSION Legal frameworks are vital instruments for securing the right to health, but broad contextualized studies, rather than classifications of law along a liberal-restrictive continuum are demanded in order to enhance existing knowledge on access to safe abortion services in a given context.

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Sexuality, disability and gender – stories from South Africa

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BIOGRAPHY Stine Hellum Braathen Research Manager, SINTEF Digital, Department of Health Research. Braathen has been doing research and published extensively in the field of disability studies in Norway and in southern Africa since 2004. She has been involved in several projects concerning sexual and reproductive health and disability/vulnerability.

BACKGROUND The way in which we experience our sexuality is shaped by what society and the cultural context that we are in understands about sexuality. For people with disabilities, participation in sexual life is often complicated. This complication stems from the attitudes of the world “out there” than the physical or psychological impairment of the individual. Social views about what is “normal” sexuality and what is not, what is acceptable and what is not, what is feminine, what is masculine, impact on how we view the sexual lives of people with disabilities.

OBJECTIVE This presentation will explore the intersections of disability and gender in shaping experiences of sexuality for people with physical disabilities in South Africa.

METHODS We will draw upon qualitative data using Photovoice methodology. Photovoice involves participants using photographs as a way of recording aspects of their daily lives and experiences relevant to the issue being investigated. These photographs then act as material for eliciting personal narratives during a research interview.

RESULTS Male and female informants told similar stories of feeling uncomfortable in their sense of themselves and they felt that they did not “measure up” as men and women according to the expectations of society. Through the in-depth stories of informants, along with their photographs we will explore this discomfort.

CONCLUSION Societal attitudes concerning disability and sexuality stem from a general lack of knowledge and awareness. For these things to change, social representations of masculinity and femininity in the context of sexuality—in movies, magazines, textbooks, sexual education curricula, music videos and elsewhere—need to include men and women with disabilities.

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“I got what I came for”: a qualitative exploration into family planning client satisfaction in Dosso region, Niger

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BIOGRAPHY Calhoun is the Deputy Director of the Full Access, Full Choice project, housed at the Carolina Population Center at the University of North Carolina at Chapel Hill. She has more than 15 years of experience in research and evaluation with a focus on reproductive health and family planning in sub-Saharan Africa and South Asia. In addition, she is currently pursuing a PhD at the Athena Institute, VU University in Amsterdam.

OBJECTIVE Client satisfaction is recognized as an important dimension of family planning (FP) service provision, yet there is no consensus on how to measure satisfaction or its complex relationship with quality of care (QoC).

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The objective of this study is to explore how female clients describe satisfaction with FP services and how these features relate to elements of QoC.

METHODS Between February–March 2020, 2,723 FP clients (ages 15–49) were interviewed using a structured survey tool across 45 public health posts in Dosso region, Niger. The focus of this analysis is on a random sample of 104 of the clients who were additionally asked four open-ended questions regarding what they liked or did not like about their FP visit. Responses were audio recorded, transcribed, translated into English, coded and analyzed thematically.

RESULTS The most common positive attribute mentioned was that the woman received “what she came for”, which was either method-specific or receipt of any FP method. When discussing features of a satisfactory visit, respondents described interpersonal aspects of services, such as if the provider welcomed her and treated her with respect, or the importance of short waiting time. New FP clients emphasized the importance of being counseled on different methods, being told about side effects and being told when to return. In contrast, continuing FP clients spoke positively about short visits where they were able to quickly receive their desired method.

CONCLUSION The importance of counseling and provision of information as well as interpersonal relations have long been recognized as key elements of QoC, yet our findings emphasize that these components may be more or less important depending on the reason for visit. If we provide the same elements of service to all FP clients, such as comprehensive counseling, we risk lower levels of satisfaction and therefore quality.

110**Sexual risk behavior among migrant population in Sweden**

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BIOGRAPHY I am a PhD student Global and Sexual Health research group at the Department of Global Public Health, Karolinska Institutet and a research assistant at the Swedish Institute for Global Health Transformation (SIGHT) at the Royal Swedish Academy of Sciences, based in Stockholm, Sweden.

My PhD research is in SRHR, focusing on the risk behaviors and risk factors in migrants in Sweden, but I

am also a global health researcher focusing on the Agenda 2030.

I am a Lancet Commissioner with the "Lancet-SIGHT Commission on peaceful societies through health and gender equality" and co-founder of Women in Global Health Sweden.

This study examined the self-reported sexual risk behaviors and sociodemographic characteristics in the young migrant population in Sweden. Data was collected through a pre-tested cross-sectional survey in high-schools and Swedish language schools for foreigners between December 2018 and November 2019. The survey was available in Arabic, English, Farsi, Tigrinya, Somali, Spanish and Swedish.

The analyses included 1563 respondents aged 15 to 25. A multivariate logistic regression model was used to determine the adjusted odds ratio of the key outcome and independent variables.

Results show higher odds for sexual risk-taking behavior in the past year among those of older age and among those of more than four years of stay in Sweden. Living with a partner or being married was related to increased sexual risk behavior. Belonging to Islam was a protective factor for sexual risk-taking behavior compared to being Christian or Buddhist/Hindu. Being from Afghanistan was also a protective factor. The reason for coming to Sweden and having a residence permit were not associated with risky sexual behavior.

The study concludes that the sexual risk behavior of migrants is highest four and more years upon arrival to Sweden. The acculturation process and gained knowledge during that time matters, especially when dealing with adolescents and the young population. This is important for creating interventions aiming at migrants immediately upon migration to capture issues that can lead to risky behavior post-migration.

362**Performance of health workers on neonatal resuscitation care following scaled-up quality improvement interventions in public hospitals of Nepal**

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BIOGRAPHY Dipak Raj Chaulagain is from Nepal with public health background. He has completed Master of Public Health from Nepal and is currently a PhD candidate in Department of Women's and Children's Health, Uppsala University. His overall theme for PhD studies is "Scaling-up a neonatal-resuscitation quality improvement model for improved health service providers' performance to advance neonatal survival in Nepal". He has more than 14 years of experience in managing public health program in Nepal. He has a keen interest in health research especially in improving the quality of health services.

BACKGROUND AND OBJECTIVES High-quality resuscitation among non-crying babies immediately after birth can reduce intrapartum-related deaths and morbidity. Helping Babies Breathe program aims to improve performance on neonatal resuscitation care in resource-limited settings. Quality improvement (QI) interventions can sustain simulated neonatal resuscitation knowledge and skills and clinical performance. This study aimed to evaluate the effect of a scaled-up QI intervention package on the performance of health workers on basic neonatal resuscitation care among non-crying infants in public hospitals in Nepal.

METHODS A prospective observational cohort design was applied in four public hospitals of Nepal. Performances of health workers on basic neonatal care were analysed before and after the introduction of the QI interventions.

RESULTS Out of the total 32,524 births observed during the study period, 3031 newborn infants were not crying at birth. A lower proportion of non-crying infants were given additional stimulation during the intervention compared to control (aOR 0.18; 95% CI 0.13 – 0.26). The proportion of clearing the airway increased among non-crying infants after the introduction of QI interventions (aOR 1.23; 95% CI 1.03 – 1.46). The proportion of non-crying infants who were initiated on bag and mask ventilation (BMV) was higher during the intervention period (aOR 1.28, 95% CI 1.04 – 1.57) compared to control. The cumulative median time to initiate ventilation during

the intervention was 39.46 seconds less compared to the baseline.

CONCLUSION QI intervention package improved health workers' performance on the initiation of BMV and clearing the airway. The average time to first ventilation decreased after the implementation of the package. The QI package can be scaled-up in other public hospitals in Nepal and other similar settings.

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Vitamin D deficiency in low-birth-weight infants in Uganda

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BIOGRAPHY Martin Chebet is a general paediatrician who qualified from Makerere University Kampala, Uganda in 2018 where he received the young achiever's award in recognition for his academic excellence. He is a Lecturer at Busitema University in Eastern Uganda. He has special interest in neonatology related research. He has been at the forefront of stream lining training of medical student and residents in the department of Paediatrics and Child Health at Busitema University. He is currently in the process of registering as PhD Student at the University of Bergen.

OBJECTIVE Vitamin D deficiency affects 7–86% of infants globally and results in recurrent infection and impaired growth. Low-birth-weight infants in Uganda are at risk of vitamin D deficiency due to limited sunlight exposure and dependence on breastmilk (for those less than six months of age). We aimed to determine the prevalence and factors associated with vitamin D deficiency among low-birth-weight infants aged 6 weeks to 6 months at Mulago national referral hospital in Uganda.

METHODS We conducted a cross-sectional study at Mulago Hospital between September 2016 and January 2017. Upon obtaining informed consent, we administered a structured questionnaire and performed a physical examination on the participants. Blood was drawn for calcium, phosphorus and vitamin D estimation. We measured serum vitamin D25(OH) using the electrochemiluminescence method. Vitamin D deficiency was defined as < 20 ng/ml and vitamin D insufficiency was defined as 20 ng/ml to < 30 ng/ml. To determine factors associated

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with vitamin D deficiency, we fit a multivariable logistic regression model with exposure factors determined a priori. Data were analysed using Stata version 14.

RESULTS We enrolled 297 participants, 49.2% (167/297) of whom were males. The median infant age was 9 weeks (interquartile range 7–13). All infants had less than one hour of sunlight exposure and over 90.6% (269/297) had received multivitamin supplements containing vitamin D. The prevalence of vitamin D deficiency was 12.1% (36/297); 95% CI (8.9%–16.4%). The prevalence of vitamin D insufficiency was 19.9% (59/297); 95% CI (15.7%–24.8%). Factors associated with vitamin D deficiency were male sex AOR 2.5; 95% CI 1.1–5.7 and hypophosphatemia AOR 3.7; 95% CI 0.96–14.6.

CONCLUSION Vitamin D deficiency was common among low-birthweight infants in Uganda although almost all of them had received multivitamin supplements containing vitamin D. The Ministry of Health should consider developing guidelines on vitamin D supplementation among low birth infants.

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Early Prediction of risk of neurological impairment. A pilot study in children born in a Low-Medium Income country (LMIC)

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BIOGRAPHY Child neurologist and psychiatrist. She has worked as resident doctor in the rural hospital of Tosamaganga, Tanzania in 2019.

OBJECTIVE The number of children with disability in LMIC is increasing. We investigated the feasibility and the effectiveness of the general movements Assessment (GMsA) and of the Hammersmith Neurological Examination, two non-invasive, standardised tools for evaluating the integrity of the nervous system in the first months of life, in children born at the rural Hospital of Tosamaganga, Tanzania.

METHODS We enrolled 105 newborns with at least one risk factor such as perinatal asphyxia, seizures, prematurity, or sepsis. We performed the Hammersmith at birth, 3,6,9 and 12 months and the GMsA at birth and at 3

months. Children were classified at low, medium, or high risk of neurological impairment. We analysed the predictive value of both methods in detecting high-risk children at 12 months.

RESULTS We identified 24 children at high risk of neurological disorders. We also found that both the GMsA and the Hammersmith had a higher predictivity at three months than in the neonatal period.

CONCLUSION The study demonstrates the feasibility of neuromotor disorders early prediction without the employ of neuroimaging, in a sustainable way. Its results strongly suggest implementing neuromotor risk-evaluation prograss to allow early interventions.

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Meeting the unmet need for modern contraceptives in Ethiopia: Results and implications of an extended cost-effectiveness analysis

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BIOGRAPHY Marta Røttingen Enden is a medical student enrolled in the research track programme at the University of Bergen. She is affiliated to the Bergen Centre for Ethics and Priority Setting (BCEPS).

OBJECTIVE This extended-cost-effectiveness analysis investigated health outcomes and financial risk protection (FRP) associated with meeting the demand for modern contraceptives (MC) for all Ethiopian women. We aimed to estimate the effects of meeting the demand for MC on a national scale, as well according to specific wealth quintiles.

METHODS We developed a Markov model to investigate the effects of meeting the demand for MC and followed a hypothetical cohort of 1,252,000 women throughout their reproductive lives, from the age of 15 to 49 years. We created five models with wealth quintile-specific input data. Health outcomes were reported in quality-adjusted life-years (QALYs) gained and intermediate health outcomes, such as the total number of averted unintended pregnancies, induced abortions and pregnancy-related deaths averted. The economic effect of meeting the demand for MC was assessed by estimating the FRP benefits in terms of averted out-of-pocket payments and reduction in the number of cases of catastrophic health expenditure (CHE) by quintile.

RESULTS Meeting the demand for MC was deemed highly cost-effective, with an ICER of 96,60 USD/QALY

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gained per woman. A total of 676,300 QALYs were gained and approximately 1,900,000 unintended pregnancies, 250,000 induced abortions and 9,000 pregnancy-related deaths were averted over the 35-year period. When the demand for MC was met, almost 40,000 cases of CHE were averted in the poorest quintile. The total governmental cost was higher in all quintiles when the demand for MC was met compared to the baseline scenario, with the largest percentage increase in governmental spending amongst the poorest quintiles.

CONCLUSION Meeting the demand for MC fulfills the priority setting criteria set by the Ethiopian Ministry of Health and contributes to making the Ethiopian health care system more equitable.

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Prevalence of syphilis infection among pregnant women delivering at a government-funded referral hospital in Kampala, Uganda

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BIOGRAPHY Melanie Etti is a clinical research fellow in Infectious Diseases and Microbiology currently working at the Institute for Infection and Immunity, St. George's University of London, previously based in Kampala, Uganda. Her research and clinical interests include global public health, particularly the development and evaluation of strategies for the reduction of communicable disease spread in resource-limited settings.

Hannah G Davies is a PhD candidate based in Kampala, Uganda. Her research is focused towards improving the safety of maternal vaccines in resource-limited settings by strengthening the infrastructure for identifying, reporting and investigating potential adverse events after immunisation.

OBJECTIVE Congenital syphilis is a significant cause of adverse pregnancy outcome worldwide. The World Health Organization recommends universal antenatal screening for syphilis to reduce the risk of vertical transmission, however this is not routine practice in many low- and middle-income countries (LMICs). There is also limited prevalence data regarding maternal syphilis infection in many LMICs including Uganda. We sought to

determine the prevalence of syphilis infection among pregnant women recruited to the ProGreSs study who were attending Kawempe National Referral Hospital, a government-funded hospital facility in Kampala, Uganda, for the delivery of their infants.

METHODS Participants were recruited between April 2019 and November 2020. 5ml venous blood was collected from each participant and initial serological testing using a rapid plasma reagin (RPR) test was performed. Confirmatory treponemal-specific testing using a Treponema pallidum particle agglutination (TPPA) assay was performed for participants with a reactive RPR test. Consent was sought from participants to obtain the results of HIV point-of-care testing performed during routine antenatal care. All participants with reactive RPR and positive TPPA were recalled to the hospital for empirical antibiotic treatment.

RESULTS 3670 samples were analysed. 61 (1.7%) participants had both reactive RPR and positive TPPA (95% CI 1.3–2.1%). HIV infection was more common among syphilis seropositive (reactive RPR and positive TPPA) participants than seronegative (unreactive RPR) participants (29.5 vs 9.6 $P < 0.001$).

CONCLUSION The results of our study demonstrate a low prevalence of maternal syphilis infection among our study cohort, although a significant association between syphilis and HIV infection was identified. This low prevalence estimate may reflect the urban setting in which the study was conducted, with greater sexual and reproductive healthcare access for women than in rural settings. Universal antenatal syphilis screening remains recommended as a cost-effective means of reducing the incidence of congenital syphilis and associated adverse birth outcomes.

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Adolescent Girls' Perspectives on Human Papillomavirus Vaccination in Sindh, Pakistan: A qualitative study

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BIOGRAPHY Vittoria offeddu is a Senior Manager in the Maternal and Child Health Program at IRD Global. VO completed a PhD in epidemiology at the Max Planck Institute for Infection Biology in Berlin, during which she assessed protective effectiveness of antibody responses in

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individuals naturally exposed to the malaria parasite. She later completed a Master of Public Health at the Hong Kong University, with a thesis on the control of avian influenza in poultry markets. Her research interests include uptake and determinants of vaccination in pregnant women and children, adolescent health and adolescent access to healthcare, vaccination programs and vaccine perceptions.

OBJECTIVES In Pakistan, cervical cancer is the third most frequent cancer among women. Most cases are caused by sexually-acquired infections with human papillomaviruses (HPV). Vaccination of adolescent girls against HPV significantly reduces the incidence of cervical cancer. HPV vaccination is available in Pakistan but is not included in the national immunization schedule. We conducted a formative study to develop recommendations for the implementation of an HPV vaccination program in Pakistan from the perspective of adolescent girls.

METHODS We recruited unmarried girls aged 16–19 years in schools and community settings in Karachi. We conducted four focus group discussions (FGDs) with 12 participants each. The topic guide assessed (i) girls' knowledge of cervical cancer and HPV vaccination, (ii) vaccination decision-making dynamics within families, (iii) factors considered important for successful implementation of HPV vaccination program in their community. FGDs were analyzed by thematic analysis using nVivo.

RESULTS Overall, participants displayed a positive attitude towards HPV vaccination, although many basic concepts related to female reproductive health were not familiar to them. Female relatives were indicated as girls' preferred point of contact for discussions on HPV and cervical cancer, but fathers were portrayed as definitive decision-making authorities on vaccination. Participants indicated vaccine hesitancy as the most likely obstacle to the successful implementation of HPV vaccination. Participants gave critical inputs for the development of a HPV vaccination program that has a large outreach and good accessibility in their community. Solid trust relationships between girls' families, program managers and other stakeholders emerged as key requisites for the program's success.

CONCLUSION Adolescents demonstrated great capacity to think practically about a HPV vaccination program and gave pertinent recommendations on many aspects of crucial relevance for a future program's acceptability. Integrating their perspectives will be essential to design a better-targeted program that is implemented effectively in the local context.

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Optimisation of methods for a human infection model for Group B Streptococcus (the TIMING study): a pilot, prospective cohort study

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BIOGRAPHY Ilsa Haeusler is a paediatric and neonatal registrar, working in London hospitals. She is an aspiring paediatric infectious disease clinical epidemiologist and is working towards a Master's degree in epidemiology at the London School of Hygiene and Tropical Medicine. Her research interest is particularly focused on paediatric infectious disease problem resource-poor settings.

BACKGROUND The development of a controlled human infection model (CHIM) for Group B Streptococcus (GBS) will advance our understanding of host immunity and pathogen interaction and should increase the feasibility of GBS vaccine efficacy trials. There are a number of areas which require further investigation to optimise GBS CHIM, including how colonisation changes in individuals over time.

METHODS We recruited non-pregnant women of child-bearing age for screening then two-weekly follow-up visits (7 follow-up visits). At each visit, rectal and vaginal swabs were taken. These were cultured for GBS using LIM broth and chromogenic agar, confirmed by MALDI-TOF mass spectrometry. PCR was used to serotype positive isolates.

RESULTS 70 women were enrolled (median age 26). 21 (30.0%) were GBS positive at screening. The proportion of those positive decreased over the study visits, with only 10 (19.6%) positive at visit 7. of those with complete follow-up data ($n = 46$), 18 (39.1%) were colonised at least once. 28 (60.9%) were persistent non-carriers and only 3 women were persistent carriers. 37 of 46 women who completed the study were negative at baseline, of whom 8 became positive at one of the following visits (rate of acquisition 21.6%). Conversely, 9 of 46 women were positive at baseline, of whom 5 became negative at least once during subsequent visits (rate of loss 55.6%). There were 136 isolates identified. The most common serotype across visits was 1a (19.1%), followed by serotype 3 (16.9%) and 2 (12.5%).

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CONCLUSIONS The rates of acquisition and loss of GBS serotypes are high in non-pregnant women. Our next steps are to look at GBS antibody concentration at mucosal surfaces, including vaginal secretions, to determine the relationship between colonisation and antibody concentration.

CLINICAL TRIAL REGISTRATION: ClinicalTrials.gov NCT04059510

169**Effects of economic support and community dialogue on early marriage in Zambia**

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BIOGRAPHY Hanne Keyser Hegdahl is a medical doctor and a PhD student at the University of Bergen, Norway. She graduated from medical school at the University of Bergen in 2017 and went straight on to a PhD after graduation. Her interest in research started already as a medical student and she published her first article on gender imbalances in HIV prevalence in 2016. She works mainly with epidemiological methods and her main area of interest is sexual and reproductive health. She is currently involved in a randomised controlled trial in Zambia.

OBJECTIVE To assess the effectiveness of economic support, alone and in combination with a community intervention, on incidence of and socioeconomic inequality in early marriage in Zambia.

METHODS Data come from a cluster-randomised trial in rural Zambia. Recruitment was conducted in 2016 and all girls from grade 7 in 157 selected schools were eligible to participate. Schools were randomised to either economic support, combined economic support and community dialogue, or control. Economic support consisted of cash transfers to girls and their parents and payment of school fees for girls continuing to secondary school. The community dialogue consisted of community and youth meetings that aimed to enhance sexual and reproductive health knowledge and supportive community norThe interventions lasted from 2016 to 2018. Hazard ratios were calculated using Cox proportional hazards regression and the Weibull parametric survival model. Equity effects were examined using stratified analysis and interaction analysis. All analyses were by intention-to-treat.

RESULTS 4922 girls assented to participate. Mean age at baseline was 14.1 years. Compared to the control, incidence of marriage before age 18 was 21% and 14% lower in the combined and economic arms, respectively,

but with confidence intervals including the null (combined vs. control HR 0.79, 95% CI 0.61 – 1.04; economic vs. control HR 0.86, 95% CI 0.65 – 1.13). There was no substantial difference in incidence between the two intervention arThe effect estimates for incidence of marriage before age 16 were similar to those for the older age group, but with wider confidence intervals due to lower incidence. Incidence was generally higher in lower socioeconomic strata and the interventions did not reduce this inequality.

CONCLUSION Combining economic and community support may be effective in reducing early marriage, with a smaller effect for economic support alone, but the interventions did not reduce socioeconomic inequalities.

428**Examining neonatal resuscitation practices in Uganda – a video-observational study**

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BIOGRAPHY Daniel Helldén is a medical doctor and PhD student at the Department for Global Public Health at Karolinska Institutet, primarily interested in the intersection between child health and broader sustainable development.

OBJECTIVE Neonatal mortality, often due to birth asphyxia, remains stubbornly high in sub-Saharan Africa. Guidelines for neonatal resuscitation, where achieving adequate positive-pressure ventilation (PPV) is key, has been implemented in low-resource settings. However, the actual clinical practices of neonatal resuscitation have rarely been examined in these settings. The primary aim of this prospective observational study was to detail the cumulative proportion of time with ventilation during the first minute on the resuscitation table of neonates needing PPV at the Mulago National Referral Hospital in Kampala, Uganda.

METHODS From November 2015 to January 2016, resuscitations of non-breathing neonates by birth attendants were video-recorded using motion-sensor cameras. The resuscitation practices were analysed using the

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publicly available free-of-charge application NeoTapAS and the statistical software RStudio.

RESULTS From 144 recorded resuscitations, 99 were included for analysis. The median (IQR) ventilation fraction during the first minute of ventilation was 0.53 (0.39–0.71). Resuscitations having a ventilation fraction ≥ 50 percent ($n = 58$) were compared to resuscitations with a ventilation fraction < 50 percent ($n = 41$). The time to initiation of PPV were 66 (42–102) seconds overall and after initiating PPV the duration of interruptions during the first minute were 20 (12–26) seconds and 39 (34–43) seconds for respective group ($P < 0.001$). The majority of interruptions were caused by stimulation (28%), unknown reason (25%) and suction (22%).

CONCLUSION Our findings show a low adherence to standard resuscitation practices in 2015–2016. This emphasises the need for continuous educational efforts and investments in staff and adequate resources to increase the quality of clinical neonatal resuscitation practices in low-resource settings urgently needed to reduce neonatal mortality.

310**Technology-enabled sexual health education interventions: A systematic review**

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BIOGRAPHY Keren Herrán is a senior at the University of Maryland, Baltimore County. She is earning an Individualized Study BS degree titled, “Global Health Considering Environmental Factors” and an Honors College certificate. Witnessing health inequalities in her DC metropolitan immigrant community and repeatedly visiting her parents’ Salvadoran and Puerto Rican hometowns sparked Keren’s interest in global health. She will enter her doctoral training in public health the fall of 2021 and ultimately aspires to spearhead sociobehavioral interventions that benefit Latino populations.

OBJECTIVE Despite the recognized benefits of sex and reproductive health education, it is considered to be limited, inadequate and poorly implemented worldwide. For instance, within Latin America and the Caribbean (LAC), 70% of students do not have access to CSE. However, the rise of new digital platform can be leveraged as a communication tool to provide adolescents healthy and engaging comprehensive sexual education.

This systematic review identifies and assesses the evidence on the effects of interactive technology-based sexual education platform on the sexual behavior and sexual reproductive health knowledge of adolescents. This review also evaluates the quality of existing literature and provides recommendations for future studies.

METHODS After noting that no systematic review on this topic exists, a search strategy using a sequence of terms was developed. A total of 104 results were generated after applying this search to PubMed, EBSCOhost and Web of Science. By specifying time periods of publication and utilizing language filters, the search was further narrowed. Four articles were selected for final analysis after applying exclusion criteria, reading abstracts and reading full length articles. Data was extracted from each study and organized into a table comparing intervention designs and outcomes. Subsequently, the Jadad scale was utilized to assess each publication’s reporting quality. We then mapped the distinct theories used in each intervention and further explored associated results.

RESULTS AND CONCLUSION This review reveals gaps and uncertainties in the literature due to understudied areas and shortcomings in current study designs. Future studies should conduct more trials, include both genders, explore long term effects and include a greater diversity of adolescents by focusing on Global South regions and adolescents not in school, among other key suggestions. Randomized control trial reporting could improve by disclosing randomization methods and using blinding methods.

121**What are the factors associated with femininity of contraception among sexually active male in Nigeria? Evidence from Cross-Sectional Survey.**

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BIOGRAPHY I am PhD student in Department of Demography and Social Statistics from Obafemi Awolowo University Ile-Ife. My area of focus are sexual and reproductive health, migration, population and development and Ageing.

OBJECTIVE Despite several attempts to improve male support of family planning utilization most men still believe in femininity of contraception. Femininity of contraception is the perception that males should not worry about using contraception and women who are using contraception will become promiscuous. This study

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examines factors associated with femininity of contraception among sexually active males in Nigeria.

METHODS Cross-sectional secondary data was extracted from 2018 Nigeria Demographic and Health Survey (NDHS). A weighted sample size of 9837 sexually active men was included in the analysis and binary logistic regression was applied using Stata version 13. The main outcome variable was femininity of contraception. The explanatory variables are socio-demographic and behavioral characteristics.

RESULTS The results indicated that approximately 51% of the respondents supported femininity of contraception. The odds of femininity of contraception significantly decrease with higher educational level (OR=0.764; CI: 0.630–0.926), knowledge of HIV/AIDS transmission (OR=0.574; CI: 0.514–0.642) and partner antenatal support (OR=0.890; CI: 0.804 – 0.985), while it increases significantly with tendency of intimate partner violence (OR=1.737; CI: 1.221 – 2.471) and experience of transactional sex (OR=1.566; CI: 1.329 – 1.845).

CONCLUSION Factors such as education, knowledge of HIV/AIDS transmission, partner antenatal support, tendency of intimate partner violence and experience of transactional sex should be considered in improving the content of the existing behaviour change communication of sexual and reproductive health program in reducing femininity of contraception in the country.

126**Predictive factors of antenatal care in Burundi: towards an understanding of spatial distribution**

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BIOGRAPHY Arnaud. I holds a BSc and International certificate on principles of bioethics in research (Haifa University). He is a MD© and ambassador of the International Journal of Medical Student (Pittsburg, USA) and Royal Society of Tropical Medicine and Hygiene student ambassador (UK). On Head of ARNECH Research and Consulting office. Arnaud is highly resourceful and goal-driven statistician with key interests in Designing of effective M&E system and developing tools for routine data collection, data analysis, data visualization and projection using varied regressions to calculate incremental effect of projects interventions on targeted population in Infectious diseases, Chronic and NCDs and Maternal Health areas.

OBJECTIVE The use of obstetric care by pregnant women enables them to receive antenatal and postnatal care. This care includes counselling, health instructions,

examinations and tests to avoid pregnancy-related complications or death during childbirth. To avoid these complications, the World Health Organization (WHO) recommends at least four antenatal visits. This study deals in general with the spatial analysis of antenatal care (ANC) among women aged 15 to 49 with a doctor and associated factors in Burundi in particular.

METHODS Data were obtained from the second Demographic and Health Survey (DHS) carried out in 2010. A spatial analysis of the prevalence of ANC made it possible to map this prevalence by region and by province and to interpolate the cluster-based ANC prevalence at unsampled points using the kernel method with an adaptive window. The dependent variable is the prenatal consultation (yes/no) with a doctor and the explanatory variables are place of residence, age, level of education, religion, marital status of the woman, the quintile of economic well-being of the household and place of birth of the woman.

Factors associated with ANC were assessed using binary mixed logistic regression. Data were analyzed using R software, version 3.5.0.

RESULTS The findings of this study clearly show that ANC prevalence varies from 0 to 16.2% with a median of 0.5%. A pocket of prevalence was observed at the junction between Muyinga and Kirundo provinces. Low prevalences were observed in several locations in all regions of the provinces. They also show that the woman's education level and place of delivery are significantly associated with antenatal care.

CONCLUSION Prevalence of ANC is not the same across the country. It varies from region to region and province to province. However, there is no intra-regional or intra-provincial heterogeneity in the prevalence of ANC.

198**How does pre-pregnancy BMI influence the association between maternal region of origin and Caesarean Delivery?**

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BIOGRAPHY I am a 35 years old medical Doctor from the Gambia with 5 year's work experience with the main focus on maternal & child health and currently doing a master's degree (final year) in International Community Health at the University of Oslo.

In my previous role as a senior Doctor in Pediatrics and Obstetric units of Bundung Maternal & Child Health Hospital (BMCHH), I improved the performance, operations, and productivity of my team by reducing maternal and child morbidity and mortality substantially making the hospital the best in service delivery in the country.

OBJECTIVE To explore the association between maternal region of origin and caesarean delivery by pre-pregnancy BMI in primiparous women.

METHODS We linked records from 118,459 primiparous women and their births registered in the Medical Birth Registry of Norway between 2013 and 2017, with data from Statistics Norway. Maternal region of origin was categorized based on Global Burden of Disease (GBD) super-regions. Pre-pregnancy Body Mass Index (BMI) was categorized into underweight (<18.5 kg/m²), normal weight (18.5–24.9 kg/m²) and overweight/ obese (≥25 kg/m²). The outcome was emergency and elective caesarean delivery (CD). We estimated the association using Multinomial regression analysis and present adjusted Relative Risk Ratio (RRR) with 95% Confidence Intervals (CI) including age, education, marital status, year of birth, smoking and paternal birthplace as covariates.

RESULTS A total of 17% had a caesarean delivery. Among normal weight women, those originating from Sub-Saharan Africa and East Asia & the Pacific had a decreased risk of elective CD compared to Norwegian women (RRR = 0.56, 95% CI 0.36–0.87; RRR = 0.56, 95% CI 0.41–0.76, respectively). Normal weight women from Sub-Saharan Africa also had the highest risk of emergency CD (2.63, 2.30–3.02), even though women from all regions except high-income were at an increased risk. Underweight women originating from East Asia and Pacific had a lower risk of elective (0.35, 0.14–0.88) but an elevated risk for emergency CD (1.58, 1.10–2.27). Underweight women from Sub-Saharan Africa had the highest risk for emergency CD (2.92, 1.62–5.24). Overweight/obese women from Europe & Central Asia had an increased risk of elective CD (1.52, 1.15–2.01), whereas overweight/obese women from Sub-Saharan Africa had the highest risk for emergency CD (2.20, 1.82–2.65).

CONCLUSION We observed an association between maternal region of origin and CD by pre-pregnancy BMI

with highest risk for emergency CD among normal weight women originating from Sub-Saharan Africa.

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The perspectives of asylum seekers when accessing sexual health services in Cork and Kerry

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BIOGRAPHY I am a graduate of the Master of Public Health programme in Cork, Ireland, with a strong background in health and social education. I currently work in the non-profit sector in the area of disability services and I am an intern with the Irish Global Health Network and ESTHER Alliance working on grant management, communications, social media and events. My research and career interests are in the areas of global health and development, migrant health, sexual and reproductive health and rights and general public health and disease. I am open to all research and employment opportunities. See more at <https://www.linkedin.com/in/maisiemjones/>

OBJECTIVES The aim of this study is to gain an understanding of the collective experiences of asylum seekers when accessing sexual health services in Cork and Kerry so that this research may inform how future policies and service provision can be targeted towards addressing these specific needs. Specifically, the objective is to determine the perceived barriers and facilitators to accessing sexual health services among asylum seekers and to get an understanding of the overall lived experiences of asylum seekers when accessing these services.

METHODS This is a qualitative study which utilised data from 14 semi-structured interviews conducted with asylum seekers between May and June 2019. Participants were over 18 and living in direct provision in Cork or Kerry. This study used a content analysis to interpret the data and develop categories which produced the results.

RESULTS Participants demonstrated varying levels of understanding of sexual health and sexual health services. Several barriers and facilitators were identified which can be grouped into socioeconomic, political/legal, systemic and social/cultural/religious barriers and facilitators.

CONCLUSION The findings from this study highlighted several areas for improvement in the provision of information and services relating to sexual health for asylum seekers and revealed the importance of addressing these issues to fulfil the purpose of public health by promoting health, preventing disease and prolonging life for all members of society.

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Determinants of sexual communication between adolescents and their parents in Adaklu District, Ghana: Multinomial logistic regression analysisD. Klu¹, M. Gyapong¹, E. Ansah¹, P. Agordoh² and C. Azagba³¹*Institute of Health Research, University of Health and Allied Sciences, Ghana, Ho, Ghana;* ²*School of Allied Health Sciences, University of Health and Allied Sciences, Ho, Ghana;* ³*Adaklu District Health Directorate, Adaklu-Tsreffe, Ghana*

BIOGRAPHY Desmond Klu (PhD) is currently a Research Fellow at the Institute for Health Research, University of Health and Allied Sciences in Ghana. Klu trained for his first degree in Economics and Sociology at the University of Cape Coast, pursued his masters degree and PhD in Population Studies at the Regional Institute for Population Studies, University of Ghana. Klu's areas of research are Maternal and Child Health, Adolescent Health, Sexual and Reproductive Health, Climate Change and Environmental Health, Non-Communicable Diseases and Malaria.

OBJECTIVE Poor sexual communication between adolescents and their parents results in high rates of negative sexual practices such as teenage pregnancy. Contributing factors to this poor sexual communication between adolescent and their parents in a high teenage pregnancy setting are not adequately explored especially in high teenage pregnancy settings. We sought to fill this gap by examining the factors that predicts sexual communication between adolescents and their parents in the Adaklu district of the Volta region of Ghana.

METHODS A baseline cross-sectional household survey of 221 adolescents aged 10–19 years in 30 randomly selected communities was used. A well-structured questionnaire was developed and administered to the respondents. A multinomial logistics regression analysis was used to examine which factors significantly influenced sexual communication between adolescents and their parents,

RESULTS Only 11.3% and 27.6% of adolescents had sexual discussions with both parents and only one parent respectively in Adaklu district. Adolescents males (AOR = 0.21, CI = 0.06–0.75), aged 10–14 years (AOR = 0.41, CI = 0.04–0.57), non-members of health club (AOR = 0.46, CI = 0.21–1.00) and living with only their father (AOR = 0.19, CI = 0.06–0.61) have lower odds of communicating with their parents on sexual issues. However, adolescents who easily communicate with their fathers (AOR = 7.58, CI = 1.53–37.63), easily

communicate with their mothers (AOR = 11.71, CI = 1.23–111.80), never had sex (AOR = 4.80, CI = 9.68–20.18) and are not sexually harassed (AOR = 7.31, CI = 1.41–37.71) had higher odds of discussing sexual issues with their parents.

CONCLUSION Adolescent-parental sexual communication in Adaklu District is very poor. This situation requires more empowerment for adolescents to discuss sexual issues with their parents through increased adolescent health club activities and building capacity of parents with the right information on sexual and reproductive health by health staff within the district.

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Congenital rubella syndrome in Togo: cases reported between 2012 and 2017A. Koba¹, W. Halatoko¹, K. Akolly¹, K. Kourkou Kpante², K. Badziklou¹ and A. Kere Banla¹¹*Institut National D'hygiène/Ministère de la Santé, lomé, Togo;* ²*Division Surveillance Intégrée des Urgences Sanitaires et Riposte (DSIUSR), lomé, Togo*

BIOGRAPHY Komla Adjaho Koba is a Biological Engineer at the National Institute of Hygiene in Lome, Togo.

With a master's degree in public health, he has been the technical supervisor of serology department for five years. This department is the National Reference Laboratory for Measles, Rubella and Yellow Fever in Togo.

He has participated in several national surveys on HIV, Hepatitis B and C, Onchocerciasis, Buruli ulcer and Brucellosis.

His professional goal is to become an epidemiologist.

OBJECTIVE The purpose of this study was to describe the epidemiology of CRS cases identify by the sentinel surveillance system from 2012 to 2017. This preliminary work established the burden of CRS prior to rubella vaccine introduction in tin the immunization schedule.

METHODS Suspected cases of CRS were reported by clinicians and blood samples were tested using ELISA. An Epi-info 3.5.1 database containing demographic and clinical information were analyzed using R. The Wilcoxon test, Pearson's chi-square, t-test and Fischer's exact test were used to test for differences between groups and 2-tailed P-values were used, significant at 0.05 probability level (P<0.05).

RESULTS 112 infants were recruited between 2012 through 2017 and 18 (16.1%) were confirmed to be positive for rubella by ELISA. Clinical manifestations in confirmed cases included heart disease (13/18), cataract (12/18), glaucoma (1/18), mental retardation (1/18),

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splenomegaly (1/18) and strabismus (1/18). Hearing impairment was not reported. None of the mothers had been vaccinated against rubella.

CONCLUSION Surveillance has provided evidence of the existence of CRS in Togo. The burden of CRS confirms that all women of childbearing age should be vaccinated against rubella virus. We recommend that CRS surveillance be continued and strengthened.

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Benefits, risks and clinical practices related to augmentation of labour with oxytocin in low- and lower-middle-income countries: A systematic review

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BIOGRAPHY The applicant graduated as a doctor in 2017 from the University of Aarhus in Denmark. She has worked 3 years as a doctor, the past 2 years in Obstetrics and Gynecology. She spent totally around one year at Masanga Hospital in Sierra Leone and 3 months at Edna Adan Hospital in Somaliland working with maternal health. In December 2020 she enrolled as a PhD student at University of Copenhagen, PartoMa research group. The field of her PhD is intrapartum care, specifically management of prolonged labour and use of oxytocin augmentation in mega maternity units in Dar es Salaam, Tanzania.

BACKGROUND AND OBJECTIVE Oxytocin is widely used worldwide to augment labour, with the purpose to reduce prolonged labour and cesarean sections. It is a high-alert medication that causes significant harm when used incorrectly. No studies have evaluated the risks and benefits of oxytocin in low- and lower-middle-income countries (LLMICs). To fill in this gap, our objective was to systematically review the use of oxytocin augmentation and its association to cesarean sections (CS) and perinatal outcomes in LLMICs.

METHOD Pubmed, Embase, Cochrane and Google Scholar were searched until December 2020 for studies presenting oxytocin augmentation rates or assessing the associations between oxytocin and CS or perinatal outcomes. Data was extracted and assessed for quality by two reviewers using pre-piloted structured sheets based on the Cochrane Handbook. PROSPERO registration number: CRD42020219821.

RESULTS We identified 1,936 studies of which 44 met inclusion criteria. Rates of oxytocin augmentation in the studies varied between 1% and alarming 90%. Literature was scarce on when in labour oxytocin augmentation was initiated, duration and dosage. Six case control studies and two cohort studies assessed perinatal outcomes and were pooled. Six of these showed an increased risk of adverse neonatal outcomes (Apgar score < 7, neonatal encephalopathy, or stillbirth). A meta-analysis of these eight studies showed an odds ratio of 1.72 (95% CI 1.56 – 1.89) for adverse neonatal outcome. No studies met inclusion criteria for assessing the effect of oxytocin augmentation on CSs.

CONCLUSION Despite limitations of some studies, the findings strongly suggest that oxytocin augmentation is associated with adverse neonatal outcomes. A co-existence of under- and overuse was seen across the studies and suggests either gaps in clinical guidelines or barriers in guidelines uptake. Future research should investigate the underlying factors influencing the safety of oxytocin augmentation and clinical guidelines tailored to resource limited settings are warranted.

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Experiences of communication between women with maternal near-and healthcare providers in Southern Tanzania

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BIOGRAPHY Hilda Alinda Kwezi is a nurse and midwife passionate about working with pregnant women, adolescent and young people in making sure that they understand their reproductive health rights, received appropriate information and services. She is currently the masters by Research and Publication on Reproductive and Child Health sub-program at Muhimbili University of Health and Allied Sciences.

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Hilda has experienced working with pregnant women, young mothers and adolescent to have access to SRH information and services. She believes that her works helps decision makers on improving health care system in the country especially to women, adolescent and young people.

OBJECTIVES This study aimed to explore experiences of communication as an element of quality of care among women who had experienced Maternal Near in Southern Tanzania.

METHODS From September to November 2018, women who attended two selected hospital in Mtwara region for birth and developed maternal complication were screened using an adapted version of World Health Organization criteria for maternal near-miss. In-depth interviews were conducted at their homes four weeks after being discharged. The information collected focused on the experience of care of women regarding communication and a thematic analysis was used to identify emerging themes.

RESULTS The interviewed women were between the ages of 18 and 34, five women had postpartum hemorrhage, three had eclampsia, one had severe pre-eclampsia and another one had an antepartum and postpartum hemorrhage. Three major themes that were reflecting on the women's experiences emerged during analysis: (1) being informed about the care and interaction, (2) being engaged and encouraged and (3) Failing to ask providers questions.

CONCLUSION Women expressed being well informed, engaged, encouraged and involved by health care providers during care. Women who were unconscious during care, were unaware regarding what happened to them for the reason that they were uninformed. This has implications on the provision of quality maternal and newborn care in health facilities. In order develop approaches that will help to strengthen health care provider communication skills there is a need for further research to understand health care providers experiences of communication with maternal near-patient specifically those who were unconscious during provision of care.

452**Sexual and reproductive health behaviors amongst young people in Burundi**

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BIOGRAPHY Marie Merckling is a young researcher starting her activities in the field of public health after about

10 years of professional practice as an occupational therapist. She owns a master degree in public health specialized in biostatistics and epidemiology. She started to analyze the data of that burundian survey during her master internship at the School of Public Health (ULB) in 2020 and she now has a research contract for the same survey.

OBJECTIVE Burundi has a very young population, with a median age of 17. This study aim to identify the behaviors of youths (10–24 years) in the field of sexual and reproductive health.

METHODS A four-stage survey design, with 110 clusters, was conducted in 2019. 2085 youths were interviewed in 11 of the 18 provinces of Burundi.

RESULTS Among 1902 respondents, 21.3% declared they already had a sexual intercourse (SI). First SI happens early with a median age of 17 (p25-p75: 12–18), especially for boys among whom 23.0% had their first SI before they were 10. In youngest respondents (10–14y), 42.0% of first SI happens with neighborhood members vs respectively 21.1% and 6.1% in 15–19 and 20–24 year-olds. Unexpectedly, first SI occurs earlier for individuals who are or have been to school: 34,8% had their first SI before 15 against only 12.5% for those who did not attend school.

Use of contraceptive method is rare among young people: 24.2% of respondents used a condom during last SI. This proportion grows to 38.3% including other contraceptive methods. Use of condoms more frequent by individuals who had first SI after 15 years of age (27.1%) than those who had first SI before (15.7%). Key reasons of not using a condom are pregnancy project (38.6%), non-planned SI (19.1%), non-return of menstrual periods after childbirth or breastfeeding (12.8%) and partner opposition to using condom (7.4%).

Among girls who already had SI, 64.4% were or have been pregnant. This proportion increases to 96.8% for girls who do not or did not attend school.

CONCLUSION This survey reveals several behaviors in youth sexual health in Burundi. Early sexual education should be strengthened to enable informed choices and improve sexual knowledge about both biological and rights aspects among young people in Burundi.

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Peripheral oxygen saturation during neonatal resuscitation in Uganda

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BIOGRAPHY Pediatric resident with interest in neonatology and international health. Have worked in pediatric projects with Doctors Without Borders in Guinea-Bissau and Borno, Nigeria. Is currently the chairperson of the Swedish Pediatric Society's section on Global Child and Adolescent Health.

OBJECTIVE To investigate SpO₂ and heart rate in the first 10 minutes after birth in neonates who received positive pressure ventilation (PPV) according to the Helping Babies Breathe (HBB) protocol and compare results with SpO₂ targets set by the American Heart Association (AHA).

METHODS A cross-sectional study was conducted at Mulago Hospital, Kampala, Uganda as a sub-study of the NeoSupraTrial (Pejovic, 2020). Neonates in need of positive pressure ventilation (PPV) according to HBB were selected by convenience and SpO₂ was measured by pulse oximetry and heart rate by dry-electrode ECG. Distressed neonates could receive supplemental O₂, but only after PPV. All resuscitations were video recorded and data was extracted by video review at one-minute intervals from 2–10 minutes after birth.

RESULTS 68 neonates were initially selected and 49 were included in analysis. Median SpO₂ at 5 minutes ($n = 39$) was 67% (Interquartile range (IQR) 49–88) and 59% of the observations were below AHA target range of $\geq 80\%$. At 10 minutes median SpO₂ ($n = 44$) was 93% (IQR 80–97) and 32% were below AHA target of $\geq 85\%$. When only observations during ongoing PPV at the time point were analysed, median SpO₂ at 5 minutes ($n = 18$) was 52% (IQR 34–66) and 83% were below AHA target. At 10 minutes ($n = 15$) median SpO₂ was 72% (IQR 57–89) and 67% were below AHA target. Median heart

rates were above AHA target of 100 beats per minute at all time intervals.

CONCLUSIONS A high proportion of neonates resuscitated according to HBB failed to reach the AHA SpO₂ target during and after PPV, increasing the risk of hypoxic-ischemic encephalopathy. The need of supplemental O₂ given during neonatal resuscitation in low-resource settings still needs to be evaluated.

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Parental pre-puberty overweight and offspring adult height

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BIOGRAPHY Nurse, MSc.

OBJECTIVE There is extensive focus on maternal conditions in pregnancy influencing offspring health and risk of disease. Parental influences acting on the gamete environment long before conception could possibly also affect offspring phenotype. We hypothesize that parental childhood overweight and obesity could influence growth patterns and adult height in their offspring. We explored the associations of parental overweight starting before or after puberty with offspring's own adult height.

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METHODS We included 929 adult offspring (age, 18–54 years, 54% daughters) of 308 fathers and 388 mothers (age, 40–66 years). Self-reported figural body silhouettes, ranged from 1–9 (lean to obese), were used to assess parents' overweight. Associations of parents' overweight with offspring's height was explored by using a two-level linear regression model. The model had a random intercept term at level-2, the interaction between exposure and offspring's sex as fixed effects and cluster-robust standard errors (study centres=cluster-variable).

RESULTS Fathers' overweight before puberty was associated with reduced adult height in his offspring [β (95%CI): -3.44(-6.15, -0.74) cm in sons and -2.67(-4.60, -0.74) cm in daughters] compared to fathers who had never been overweight. Mothers' overweight before puberty was associated with reduced adult height in daughters [β (95%CI): -1.88(-3.37, -0.39) cm], not significant in sons [-1.50(-3.45, 0.45) cm], compared to mothers who had never been overweight. Fathers' or mothers' overweight starting after puberty was not associated with offspring adult height. The findings were independent of offspring's own pre-puberty overweight.

CONCLUSION Parental overweight starting before puberty was associated with reduced adult height in offspring. A sex-specific pattern with more consistent associations for fathers' than mothers' pre-puberty overweight was indicated. The findings suggest that the metabolic environment in the pre-puberty, long before conception, may be important for the growth and health of future offspring.

69**Complications during pregnancy in immigrant women in Norway**

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BIOGRAPHY I am a Norwegian registered nurse (2002) and midwife (2011) with a MSc in midwifery (2017). I have previously studied International Maternal and Child Health at Uppsala University, Sweden (2004) and have been working as a nurse in Western Africa.

At present I am a PhD candidate at the Western Norway University of Applied Sciences. My research focuses on complications during pregnancy and childbirth in immigrant women giving birth in Norway. This is an epidemiological study, investigation the prevalence and the recurrence of hypertensive complications in immigrants, compared with non-immigrants in Norway during 26 years (1990–2016).

INTRODUCTION/OBJECTIVE Placental abruption, defined as the premature separation of placenta, is a serious complication in pregnancy. While its incidence varies across countries, the information of how abruption varies in immigrant populations is limited. The aim of this study were to estimate the incidence of placental abruption in immigrant women compared to non-immigrants by maternal country and region of birth, reason for immigration and length of residence.

METHODS We conducted a nationwide population-based study using data from the Medical Birth Registry of Norway and Statistics Norway (1990–2016). The study sample included 1,558,174 pregnancies, in which immigrant women accounted for 245,887 pregnancies and 1,312,287 pregnancies were to non-immigrants. Crude and adjusted odds ratios with 95% confidence intervals (CI) for placental abruption in immigrant women compared to non-immigrants were estimated by logistic regression with robust standard error estimations (accounting for within-mother clustering). Adjustment variables included year of birth, maternal age, parity, multiple pregnancies, chronic hypertension and level of education.

RESULTS The incidence of placental abruption decreased during the study period for both immigrants (from 0.68% to 0.44%) and non-immigrants (from 0.80% to 0.34%). Immigrant women from the sub-Saharan African region had an adjusted odds ratio of 1.35 (95% CI: 1.15–1.58) compared to non-immigrants for placental abruption, whereas immigrant women from Ethiopia had an adjusted odds ratio of 2.39 (95% CI 1.67–3.41). We found a small variation in placental abruption incidence by other countries or regions of birth, length of residence and reason for immigration.

CONCLUSION Immigrant women from sub-Saharan Africa, especially Ethiopia, have an increased risk of placental abruption when giving birth in Norway. Reason for immigration and length of residence had little impact on the incidence of placental abruption.

Optimization of nutrition and a healthy lifestyle during pregnancy as well as targeted information on early signs of abruption should be emphasized.

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Fear of childbirth and depressive symptoms among pregnant women: A cross-sectional survey in TanzaniaA. Massae¹ and A. Massae²¹*Uppsala University, Uppsala, Sweden;* ²*Muhimbili University of Health and Allied Sciences, Dar es Salaam, Tanzania*

BIOGRAPHY Massae is an Assistant lecturer of Community Health Nursing at Muhimbili University of Health and Allied Sciences (MUHAS). She is a nurse-midwife, graduated in 2008 from MUHAS and holds a master degree in midwifery and women's health, from Makerere University. She has ten years of experience in maternal and child health research. Massae is currently pursuing a PhD in maternal, reproductive and Child health at Uppsala University in Sweden. She has conducted 5 research in reproductive health and she has submitted three articles to the medical journals for publication.

OBJECTIVE Prevalence of fear of childbirth (FoB) and depressive symptoms (DS) among pregnant women and determine predictors of each and both, focusing on sociodemographic and obstetric predictors.

METHODS A cross-sectional study was conducted at six health facilities in two districts in Tanzania between 2018 and 2019. In total, 694 pregnant women with gestational age between 32 and 40 weeks and expecting vaginal delivery were consecutively recruited and assessed for FoB and DS. We collected data through interviews using 6 and 4-point Likert Scale of the Wijma Delivery Expectancy Questionnaire Version A and Edinburgh Postnatal Depression Scale, respectively. We performed multivariable logistic regression to investigate the predictors of FoB and DS.

RESULTS The prevalence rates of FoB and DS among pregnant women were 15.1% and 17.7%, respectively. FoB and DS were more likely in women aged above 30 years (AOR 6.29, 95% CI 1.43–27.84) and in single mothers (AOR 2.57, 95% CI 1.14–5.78). Women with secondary education and above and those who had given birth previously were less likely to have FoB (AOR 0.22, 95% CI 0.05–0.99) and DS (AOR 0.27, 95% CI 0.01–0.87). Women who had previous obstetric complications and those who did not receive any social support from male partners in previous childbirth were more likely to have FoB and DS. FoB was strongly associated with DS (AOR 3.42, 95% CI 21.20–5.53). DS only was more common in women who had inadequate income (AOR 2.35, 95% CI 1.38–3.99) or had previously experienced a perineal tear (AOR 2.32, 95% CI 1.31–4.08).

CONCLUSIONS Women's fear and DS associated with pregnancy and upcoming childbirth can be described by various factors. It is vital for perinatal health care providers to identify at-risk women early, to offer support during pregnancy and childbirth.

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Exploring Sexual health in Tanzania: perceived barriers among health care providers and medical students from training of health professional's study

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OBJECTIVE To explore health care provider experiences and perspectives on barriers to handling sexual health problem in Tanzania.

METHODS We conducted 18 focus group discussions with health care professional discipline and students in the health professions in Dar es Salaam, Tanzania. The study purposively recruited 121 participants from the fields of nursing, midwifery and medicine whereby 60 were experienced health care providers and 61 were final year students. Thematic analysis approach was implemented for data analysis.

RESULTS Four main categories of barriers emerged from the analysis: (1) influence of socio-demographic factors, such as the provider-patient age, sex and religious differences; (2) communication barriers due to the limited familiarity of sexual words in Tanzanian society, use of professional jargon in patient communication and patients' inability to communicate in Kiswahili as a national language; (3) structural barriers within health facilities centred on the lack of confidentiality and privacy within health facilities; and (4) presenting complaints and patient's behaviour or background.

CONCLUSION There are several key barriers preventing sexual health discussions between health care providers

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and patients that may affect the quality of patient service delivery. Additional clinical training is warranted for medical students and professionals to optimize the sexual health care for this population.

186**Reproductive healthcare-seeking experiences among homeless women in Delhi: results from an ethnographic study****B. Mathew and D. Nambiar***The George Institute for Global Health India, Delhi, India*

BIOGRAPHY The presenting author has been involved in conducting research with the homeless population in Delhi, India, since 2018. Presently she is involved in a project that looks at barriers faced by urban homeless women in accessing Maternal and Child Health Services during COVID-19 in Delhi.

OBJECTIVE India's decrease in maternal mortality ratio is unevenly distributed: sub-groups such as the urban homeless face a disproportionate burden. They are intended to be covered by reproductive healthcare programs, but their experiences are untracked. The objective of the study was to understand the reproductive healthcare-seeking experiences of homeless women in Delhi.

METHODS An ethnography was undertaken with pregnant and lactating women living in two locations (temporary structures under a flyover, road dividers and pavements) of Delhi. We observed five women, representing a range of stages and experiences of ante-natal, intra-natal and post-natal services. Multiple interviews with each participant and field-notes documenting the lives of participants such as facility visits and experiences, housing (and relocation) status were compiled over 14 months. Iterative analysis of data was done using thematic coding with constant comparison.

RESULTS The interface of pregnant/lactating women with Community Health Workers (CHW) was inconsistent and based on location. Securing government-provided maternity entitlements was uncommon. The unpredictable housing situations of participants made it difficult to access services. Rat infestations impaired storage of medicines and health records and lack of security was a concern when trying to maintain sanitation and hygiene. Healthcare experiences varied: women giving birth for the first time were treated well, while those with many children faced harsher treatment and obstetric violence. Some women were forced to adopt family planning methods. Access to health services was reported to be

characteristically bad in one hospital, compared to others.

CONCLUSION Pregnant and lactating homeless women in Delhi face many challenges similar to those reported by women in rural India, such as obstetric violence and forced family planning. Others, like having varying interface with CHWs, ecological exposures (vermin, heat) and the irregularity of care-seeking due to insecure tenancy were unique. Research is needed on strategies to address barriers to reproductive healthcare-seeking.

230**Experiences and perceptions of side effects and myths: Young Kenyan women's willingness to use contraceptive methods****C. McGuire¹, L. M. Calhoun¹, M. Mandal¹, B. Onyango² and I. S. Speizer¹***¹Carolina Population Center, the University of North Carolina at Chapel Hill, Chapel Hill, USA; ²The African Institute for Development Policy, Nairobi, Kenya*

BIOGRAPHY Courtney McGuire is a Research Associate at the Carolina Population Center at the University of North Carolina at Chapel Hill. Since 2018, she has worked with the Full Access, Full Choice project, a Bill and Melinda Gates Foundation supported initiative focused on expanded method choice for adolescents and youth. Previously, she worked as an Evaluation Manager for the Johns Hopkins University Center for American Indian Health on the Fort Apache Reservation in Whiteriver, Arizona. She holds a Masters in Public Health from Emory University and a Bachelors of Arts from the George Washington University.

OBJECTIVE Young Kenyans represent a growing proportion of the population yet face key challenges to family planning (FP) use including knowledge gaps and fear of side effects. The objective of this study is to understand young Kenyan women's perspectives on contraceptive side effects and myths and how these relate to future willingness to use methods.

METHODS In-depth interviews were undertaken in three counties with 32 women aged 18–24 years who had used two or more modern methods. Respondents completed a pile sorting exercise to understand their preference for specific methods and method characteristics and then they described their experiences with each contraceptive method used.

RESULTS While respondents most frequently reported using and experiencing side effects with, injectables and/or implants, they still expressed willingness to use these

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methods in the future. Some stated that the benefits of using an effective modern method like an implant outweighed the challenges of experiencing undesirable side effects. Respondents who had not used implants were willing to adopt the method in the future because the benefits of birth spacing exceeded their fears of potential side effects. Experienced injectable users stated they were willing to use injectables again in the future, partly due to the ease of discontinuing them. No respondent had used IUDs, yet almost all declared they were unwilling to use them in the future, citing a fear of side effects and various method-specific myths.

CONCLUSION This study explores young Kenyan women's understanding of method characteristics based on their own experiences, reports of other women's experiences and exposure to myths and misinformation about methods. Their influence on young women's willingness to use contraception in the future is method-dependent. As FP protarget young people, they should address young women's fear and experience of side effects and understanding of method characteristics when designing progra

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When the law cracks doors slightly open: Ethical dilemmas among abortion service providers in Addis Ababa, Ethiopia

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BIOGRAPHY Emily McLean is a medical doctor now undertaking her PhD at The University of Bergen on ethics and priority setting related to abortion care.

OBJECTIVE In 2005, Ethiopia changed its abortion law. Abortion is now legal if the woman's pregnancy is a result of rape or incest, if her health is endangered, if the fetus has a serious deformity, if she suffers from a physical or mental deficiency, or if she is under 18 years of age. The word of the woman, if in compliance with the law, is sufficient to qualify for an abortion. In this context, where the law cracks the door slightly open, health workers become important in deciding who gets access to safe services and who doesn't, creating ethical dilemmas. The objective of this study was to explore abortion providers' personal experiences, reflections and ethical dilemmas related to providing abortion care.

METHODS Data collection took place from March to May 2016 in Addis Ababa, at different health clinics

providing abortion. Thirty in-depth interviews and three focus group discussions were conducted with 41 abortion providers at governmental and non-governmental clinics. Content analysis was drawn upon in the interpretation of the findings.

RESULTS When working in a context where the law has slightly opened the door for abortion seeking women, the health workers describe conflicting concerns, burdensome responsibilities and ambiguity concerning how to interpret and implement the law. They describe efforts to balance their religious faith and values against their professional obligations and concern for women's health and well-being. This negotiation is particularly evident in the care of women who fall outside the law's indications. They usually handle ethical dilemmas and decision-making alone. Many face stigma from colleagues and therefore keep their job hidden from family and friends.

CONCLUSIONS Health workers in Ethiopia experience ethical dilemmas trying to maneuver between the abortion law, their personal values and their genuine concern for the health of women.

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Impact of economic support alone or together with community dialogue on catastrophic health expenditure and utilization of healthcare in Zambia

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BIOGRAPHY Amani Mori is currently a senior researcher at Christian Michelsen Institute, Norway. He is also an international consultant and has performed assignments for WHO, PRICELESS-SA, JSI etc. He obtained his PhD in Health Economics at the University of Bergen (UiB) in Norway in 2015. Between 2016–2020, he worked as a postdoctoral fellow and senior health economist at UiB and the Centre for Intervention Science in Maternal and Child Health (CISMAC), respectively. He has been teaching health economic courses at UiB and Muhimbili University of Health and Allied Sciences in Tanzania since 2016 as well as coordinating project collaborations.

OBJECTIVE To evaluate the impact of economic support alone or in combination with community dialogue on catastrophic health expenditure (CHE) and utilization of health care among households participating in a cluster

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randomized controlled trial focusing on adolescent child-bearing in rural Zambia.

METHODS The participants in the trial were adolescent girls from 157 schools in 12 rural districts enrolled in grade 7 in 2016. The trial consisted of control, economic support and economic support plus community dialogue. The economic support included a cash transfer of 3 USD/month for the girls, 35 USD/year for their guardians and payment of school fees (22–150 USD). An expenditure survey was conducted among participating households from February–September 2018 (1.5–2 years after the intervention period started). CHE was defined as health payments exceeding 10% of total household expenditure or 40% of total non-food expenditure. Impact was measured by relative risks generated from Generalized Linear Models while the change in socioeconomic distribution was measured by concentration index.

RESULTS 3,878 guardians representing 4,100 out of 4,922 participants in the 157 study clusters were interviewed. About 10% of the households in the control arm experienced CHE based on total household expenditure. Utilization of healthcare and the incidence of CHE were lower among the poorest households than the least poor in all the three study arms. The interventions did not clearly affect the overall risk of CHE and utilization of healthcare, nor change the distribution of these outcomes across socioeconomic groups.

CONCLUSION Economic support alone or in combination with community dialogue aiming to reduce early child-bearing, did not have a clear impact on levels and socioeconomic distribution of CHE and utilization of healthcare in rural Zambia.

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Management of masturbation as a sexual health problem by health professionals and students in Dar-es-Salaam, Tanzania: Qualitative Focus Group Study

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BIOGRAPHY Mushy is an Assistant lecturer of Community Health Nursing at Muhimbili University of Health and Allied Sciences (MUHAS). She is a Nurse Midwife, graduated in 2009 from MUHAS and holds a master's

degree in midwifery and women's health, from Makerere University. She has seven years' experience in maternal and child health research. Mushy is alumni of Afya Bora Consortium by the University of Washington and seven other African universities in Africa and the US. Mushy currently is a Ph.D. student at St. Luke's International University, Tokyo. Mushy works as Co-researcher in a study funded by NIH.

BACKGROUND Across Africa, there are strong cultural taboos against masturbation. As part of a broader study investigating the sexual health training needs of the health providers, we conducted a study to investigate how masturbation is addressed as a clinical issue in clinics in Tanzania.

METHODS An exploratory qualitative study design conducted in June 2019 involving 18 focus groups among healthcare providers and students in the health professions (midwives, nurses, medical doctors). We interviewed a total of 61 students and 58 providers. The study participants were purposively selected and the design was purposively stratified to examine findings across the three main healthcare providers and by experience (clinicians versus students). A semi-structured interview guide in the Kiswahili language was used. The study participants were presented a case scenario of a 14-year-old boy who was found masturbating in his room by his father and asked how this case would be handled in a clinical setting. Data were analyzed following inductive-deductive thematic analysis. Major themes and subthemes were identified.

RESULTS Two main themes emerged: (1) knowledge about the management of masturbation and (2) views about the effects of masturbation. Clinical interventions providers would try include normalization of masturbation as a pubescent behavior combined with advice to stop the adolescent from masturbating, a recommendation to watch for negative effects immediately post-masturbation and referral to a psychologist for treatment. Across providers and students, masturbation in adolescence was seen as clinically problematic, potentially leading to multiple issues in adulthood including sexual dissatisfaction with a spouse, psychological dependency and erectile dysfunction, loss of sexual sensitivity in intercourse, premature ejaculation and penis size reduction.

CONCLUSION When designing sexual health curricula for Tanzania, it is important to include accurate information about masturbation as a normal and healthy sexual practice to address widely held myths about its effects on health.

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Travelling Thai Surrogates: Flexibility, Im/mobility and Risk in a Changing Reproductive Landscape

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BIOGRAPHY Elina Nilsson is a PhD student at the Centre for Gender Research at Uppsala University. She holds a BA in Cultural Anthropology and a MA in Gender Studies. Her doctoral project explores transnational commercial surrogacy in Thailand and draws upon interviews with former surrogate mothers on their experiences of the surrogacy process and the life after. Her research interests lie in medical anthropology, notions of kinship, intimate labour, mobility, transnational reproduction and reproductive technologies. She is in particular interested in ethnographic methods and the geographic region of Thailand and South East Asia.

OBJECTIVE Transnational commercial surrogacy used to be a booming business in Thailand, but due to a series of scandals, all forof commercial surrogacy were banned in 2015. In response to this the industry introduced more flexible business models where surrogates, as well as embryos and medical staff, are moved across borders through hybrid surrogate arrangements (Whittaker 2018). Little is known about the experiences and conditions of the women who cross international borders when engaging in this clinical, embodied and reproductive labor. With this paper I wish to address this research gap by examining the ways in which a continuation of the surrogacy business in Asia today is enabled by the flexibility and spatial im/mobility of women from the poorer regions of Thailand.

METHODS The findings for this paper are part of my PhD-project on women's experiences of acting as surrogates for international clients in Thailand. For this, former surrogates were recruited through snow-ball sampling and semi-structured, in-depth interviews were conducted with 12 women during a total of four months of fieldwork in Thailand during 2018–2019.

RESULTS of the 12 women interviewed, five had acted as surrogates after the ban 2015. In order to circumvent the laws, they had been required to travel to countries such as Laos, Cambodia and China, for both embryo transfer and delivery. Besides being a risky journey, the women's cross-border travels were marked by feelings of spatial and temporal imprisonment, being isolated and having their freedom restricted awaiting delivery.

CONCLUSION While the women's im/mobility and flexibility is a precondition to act as a surrogate, they are not 'in charge' of the process or the flows, but instead their

mobility is managed and monitored by others, often placing them in precarious positions.

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Contraceptive services for Kenyan youth: the role of Community Health VolunteersH. Ormel¹, G. Oele², M. Kok¹, H. Oruko², B. Oluoch², E. Smet³ and D. Indalo²

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BIOGRAPHY Hermen Ormel is a public health specialist with expertise in the field of sexual and reproductive health and rights, including HIV. His main areas of interest are capacity development, research and evaluation, digital health, community health and gender issues. In recent years, Hermen was involved as Principal (Co-) Investigator in research in Sierra Leone (mobile health), the 5-country Reachout programme (performance of close-to-community services) and the Amref Health Africa Kenya research on contraceptive service access for young people. Hermen is also Co-Coordinator of KIT's Master of Public Health programme.

OBJECTIVE Access to contraceptive services is a cornerstone of human well-being. While Community Health Volunteers (CHVs) promote family planning in Kenya, the unmet need for contraceptives among youth remains high. CHVs seem to pay little specific attention to the contraceptive needs of the youth. This study therefore aimed to explore the factors that influence the role of CHVs in access and uptake of contraceptive services by youth in Kenya.

METHODS We conducted a qualitative study exploring the role of CHVs in increasing access and uptake of contraceptive services among youth aged 18–24 years in Narok and Homabay Counties, Kenya. We undertook 37 interviews and 15 focus group discussions involving CHVs, youth, community members, community leaders, youth leaders and health programme managers. Data were recorded, transcribed, translated, coded and thematically analysed, according to a framework that included community, CHV and health system-related factors.

RESULTS CHVs often operated in traditional contexts that challenge contraceptive use among unmarried female and male youth and young married couples. Yet many CHVs seemed to have overcome this potential 'barrier' as well as reigning misconceptions about contraceptives. While private and facility-based public contraceptive

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services were somehow available, CHVs were the preferred service provider for many youth due to ease of access and saving time and transport costs. This was influenced by varied perceptions among youth of CHVs' knowledge, skills and attitudes regarding contraceptives and provider-client interaction and specifically their commitment to maintain confidentiality.

CONCLUSIONS: CHVs have the potential to increase access to contraceptives for young people, reducing unmet need for contraceptives. Their knowledge, skills and attitudes need strengthening through training and supervision, while incentives to motivate them and broadening the range of contraceptives they are allowed to offer should be considered.

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Apgar-score and maternal region of origin: a population-based registry linkage study in Norway

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BIOGRAPHY Medical student from the University of Oslo, currently in my fourth year. Selected to the medical school research program from 2020–2022, with a grant from Research Counsel of Norway (RCN). Participating in the multidisciplinary research group “Mipreg”, a research program funded by RCN, which aims equity in health and tries to close the outcome gap in maternity care to immigrant women in Norway. Also active in student affairs in Oslo.

OBJECTIVE To evaluate the association between maternal region of origin and five-minute Apgar-score in newborns and to explore how this association varies by length of residence in Norway.

METHODS We used data from a population-based registry linkage study including all singleton live births in Norway between 2008 and 2017 ($n = 575\,224$), linking records from the Medical Birth registry of Norway (MBRN) with data from Statistics Norway. Our outcome was five-minute Apgar-score categorized as normal (7–10), low (4–6) or very low (0–3) as registered in MBRN.

From the Multinomial logistic regression we report adjusted relative risk ratio (RRR) with 95% confidence interval (95% CI). Year of birth, maternal age, education, parity, smoking and pre-pregnancy BMI were included as covariates. We further stratified our analysis by length of residency in Norway, respectively <5 years, ≥5 years or <0 years.

RESULTS During our study period, 34% of all births were by women origination from outside Norway. Apgar-score was distributed with 1.02% ($n = 5\,840$) considered low, 0.30% ($n = 1\,721$) considered very low and 0.07% ($n = 385$) with a missing score. Women from sub-Saharan Africa with length of residency <5 years had the highest risk for giving birth to a newborn with a low or very low Apgar-score, respectively adjusted RRR = 2.25 (95% CI 1.72–2.94) and 3.08 (1.78–5.30). This risk decreased with length of stay ≥5 years respectively RRR = 2.20 (1.69–2.86) for low and RRR = 1.95 (1.20–3.15) for very low Apgar. The same pattern was seen across different length of residency, with decreased risk of very low Apgar-score among women with length of residency ≥ 5 years.

CONCLUSION Our study shows that maternal region of origin was associated with lower Apgar-score and generates new knowledge about the impact of length of residency in host country.

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Determinants of timely utilization of antenatal care at the community level in rural Bangladesh

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BIOGRAPHY Jesmin Pervin has been working with icddr, b since 2002 in different capacities and currently working as Associate scientist in Maternal and Child Health Division of icddr, b. Her areas of expertise are maternal and perinatal health. In the area of maternal, newborn and child health she has few publications as first author and as co-author in these areas. Currently she is perusing her PhD under the Department of Global Public Health and Primary Care in University of Bergen since 01.09.2017.

OBJECTIVE Timely healthcare utilization for antenatal care (ANC) services ensures the good health of mothers

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and babies. This study aims to assess the pattern of ANC use and associations between timely ANC utilization and socio-economic determinants in two sub-districts in Bangladesh.

METHODS This cross-sectional study used data collected as part of a cluster-randomized controlled trial, eRegMat, which enrolled pregnant women from October 2018 to June 2020. Data were collected through a structured questionnaire. Bivariate and multivariate logistic regressions were employed to determine associations and the results were presented by odds ratio (OR) with 95% confidence interval (CI).

RESULTS Data were available on 3293 pregnant women. Attendance of timely first one, two, three and four ANC visits were 59%, 38%, 16% and 4.2%, respectively. We found a first timely ANC visit to be associated with women over 30 years of age vs. under 20 years of age (AOR: 1.52, 95% CI: 1.05 – 2.20); nulliparity vs. parity ≥ 2 (AOR: 1.30, 95% CI: 1.04 – 1.62); with a husband who had >10 years of education vs. a husband with up to 5 years of education (AOR: 1.50, 95% CI: 1.19 – 1.91); being in the highest wealth quintile vs. in the lowest wealth quintile (AOR: 1.39, 95% CI: 1.08 – 1.79). Women in the highest wealth quintile were 1.6 times more likely to have a timely first two (95% CI: 1.26–2.04) and timely first three ANC visits (95% CI: 1.13–2.13). None of the available socio-economic factors were associated with four timely ANC visits.

CONCLUSIONS The study observed the variation of ANC utilization by selected socio-demographic characteristics. To increase ANC use and ensure optimum health during pregnancy and delivery, the maternal health care program should prioritize the women whose husbands have little education, who live in low socio-economic conditions and who are younger.

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Knowledge, attitudes and behaviour of girls and boys influencing adolescent pregnancy in Asia and the Pacific: A scoping review

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BIOGRAPHY Sakalidis has a background in breastfeeding and maternal/newborn health research. More recently, she has completed her Masters in International Health,

focusing on the sexual and reproductive health and rights of adolescent girls in Asia.

OBJECTIVE Adolescent pregnancy continues to impact the lives of girls across Asia and the Pacific. Early marriage and socio-economic factors are well-known drivers influencing adolescent pregnancy. It is unclear how other factors driven by cultural shifts in Asia and the Pacific may be influencing the knowledge, attitudes and behaviour of both adolescent girls and boys and subsequent adolescent pregnancy in the region.

METHODS We conducted a scoping review of studies assessing the knowledge, attitudes and behaviour of girls and boys and their influence on adolescent pregnancy in Asia and the Pacific. Peer-reviewed journals and grey literature from January 2009 to December 2019, were included. Data were extracted and analysed thematically according to a framework addressing the underlying drivers of adolescent pregnancy.

RESULTS The search generated 2924 items for screening, of which 81 articles were included across 16 countries in Asia and the Pacific. The majority of the literature focused on South Asia, with the least frequent coverage in the South-East Asia and Pacific regions. Poor levels of sexuality education were frequently identified (38/81 studies). This intersected with attitudes surrounding socio-cultural pressure to marry early (26/81 studies); gender and power inequity (20/81 studies); and behaviours including poor contraceptive use (34/81 studies). Critical data gaps emerged concerning relationships and premarital sexual intercourse, especially amongst boys and very young adolescents. Despite traditional views and early marriage being common, limited literature suggested an openness to premarital sex amongst adolescents in several countries.

CONCLUSION Addressing key gaps in the literature including very young adolescents, boys and South-East Asia and the Pacific regions are required to enhance our understanding of the factors influencing adolescent pregnancy. More comprehensive sexuality education and a focus on both traditional and changing attitudes towards premarital sex and marriage should be considered in future programming to reduce adolescent pregnancy in Asia and the Pacific.

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Sexual behaviour and associated factors among school adolescents in VietnamC. Santoso¹ and C. T. Thi Ngoc²¹University of Debrecen, Debrecen, Hungary; ²Hue Medical College, Hue, Vietnam

BIOGRAPHY Cornelia is currently a PhD student in Hungary.

OBJECTIVE The aim of our study was to examine the prevalence and factors associated with having had sexual intercourse among school adolescents in Vietnam.

METHODS Secondary analysis of cross-sectional nationally representative data from the 2013 Vietnam Global School-based Student Health Survey (GSHS) was conducted. The data included 3,331 students aged 11–18 years. Multiple logistic regression was employed to explore the association of demographic, substance use and psychosocial factors with sexual intercourse. All statistical analyses were carried out using svy command in STATA 14.0, considering the complex sampling design of the survey.

RESULTS Around 6.5% have had sexual intercourse and 1.6% have had more than one sexual partner. Older age (OR=1.34; 95% CI 1.12–1.60), having tried smoking (OR=3.80; 95% CI 2.24–6.46), having tried illegal drugs (OR=6.47; 95% CI 1.53–27.4) and psychological distress (OR=1.91; 95% CI 1.45–2.52) were associated with having had sexual intercourse. Other factors were not found to be associated with sexual intercourse in our study.

CONCLUSION The findings support the need to incorporate a more comprehensive sexual health education into the school curriculum, taking into account mental health and other health risk behaviours.

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Distribution of reusable menstrual health kits among Maasai girls in Northern TanzaniaF. Schneider^{1,3}, P. Neugebauer^{2,3}, A.-M. Salaja³, L. Sabore⁴, M. Frederik⁴ and N. Mkenda⁴¹St. Franziskus Hospital, Münster, Germany; ²Luisen-hospital, Aachen, Germany; ³Endulen e.V., Germany; ⁴Endulen Hospital, Tanzania

BIOGRAPHY Florian Schneider is a pediatrician by training and is involved in Mother and Child health in Northern Tanzania since 2006.

OBJECTIVE Menstruation hinders Maasai girls to attend school. One solution might be distributing reusable,

locally produced menstrual kits. We evaluated the effectiveness over a period of two years.

METHODS From 2018 to 2020 795 reusable menstrual kits were distributed in a Maasai Secondary School in combination with teachings. In 2019, questionnaires with 9 multiple-choice questions were handed out. 50.25 % (n = 201) were returned. In 2020, another questionnaire with 33 in-depth (open) questions was handed out. 100 % (n = 395) returned the questionnaires.

RESULTS In the first questionnaire 39.30% of the girls stated to use the kits every month and 25.37% used it all their menstrual period. 10.95% had reduced sick days and felt more comfortable to go to school, 29.35 % saved money, 27.36% felt more comfortable and more self-confident and 9.95% said that their personal hygiene had improved. However, 8.96% said that the kits didn't hold the blood properly due to heavy bleeding.

The second questionnaire revealed that 51.47% girls still used the reusable menstrual kits. 97% of the students have used the kits since distribution. The students were between 13 and 19 years old (mean 16.47 years) and ranged from Form 1–5; most of them were in Form 5 (38.11%). 30.40 % of the girls started to menstruate when they were 14 years old (mean 14.34 years). 88.37% of the girls were able to talk about menstruation mainly with mothers. 50.28 % of the girls had difficulties to manage their period. Menstrual health information at school was positively perceived (86.10 %) and 87.26% of the girls did have a safe and clean place at school. Overall the meetings were received positive.

CONCLUSION The distributed reusable menstrual kits were useful, worked well, reduced sick days and were appreciated in a challenging cultural environment.

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Diversity of Rotavirus strain in children less than 3 years of age: Community Based Study

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Center for International Health, University of Bergen, Bergen, Norway

BIOGRAPHY I enrolled university of Bergen under Center for International Health as PhD fellowship. I did my master degree from Wageningen University, the Netherlands in Medical biotechnology. I received NFP fellowship From University. Currently I am working as Medical Biotechnologist in Walter Reed AFRIResearch Unit Nepal. I am specialized in molecular virology and my interest of subject is infectious disease, related to public health issues as well as bioinformatics which is of great

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importance nowadays. I am involved in many research related to child health, infectious disease and surveillance of disease.

OBJECTIVE Rotavirus (RV) is known to be the most common cause of severe gastroenteritis among children below 5 years of age. The prevalence of RV infection in communities determines the spread of rotavirus infection in susceptible populations. We investigated community acquired cases of asymptomatic and symptomatic RV infections in children from birth to 36 months of age in community-based birth cohort of Nepal, Bhaktapur.

METHODS Monthly surveillance and diarrheal stool were collected from 240 children enrolled at birth, of which 238 completed three years of follow up. Samples were screened for rotavirus by an ELISA. All RV screened positives were further genotyped by reverse transcription polymerase chain reaction for VP7 and VP4 genes.

RESULTS 5224 stool samples were collected from 238 children followed from birth to 36 months of age. The episodes of diarrhea occurred in 92.4% (230/238) children in the cohort. In 3 years of study period, RV was most frequently seen in children with sympto(7.5%) compared to non-symptomatic children (0.8%). RV detection rate was seen higher in children above 3 months to 21 months of age. Although rotavirus is known as winter diarrhea, it is detected throughout the year except month of August. The highest positivity was observed in months between December and March, showing the highest peak in January. Four common G types were seen accounting G2 (30%), G1 (29%), G12 (19%) and G9 (16%). The most predominant genotypes seen were G2P[4] (30%) followed by G1P[8] (27.0%), G12P[6] (14.0%), G9P[8] (10%) and remaining were mixed and untyped.

CONCLUSION Our study illustrates that rotavirus is the most common cause of gastroenteritis in young children in the community with variety of genotypes circulating. In addition to health education and sanitation management in the communities, interventions such as vaccination are also needed for controlling rotavirus infection.

200**Molecular detection of enterovirus in Nepalese children****S. Shrestha***University of Bergen, Bergen, Norway*

BIOGRAPHY Sanjaya K. Shrestha is working as Director of Walter Reed/ AFRIR Research Unit Nepal (WARUN) conducting medical research on different infectious diseases including but not limited to influenza surveillance,

diarrheal diseases, Malnutrition due to Enteric Diseases (MAL-ED) in Children, Antimicrobial Resistance study etc. Shrestha is also undergoing PhD training at University of Bergen, Norway. He has done his MBBS from University of Chittagong in Bangladesh and did his MD in Family Medicine from Tribhuvan University of Nepal.

OBJECTIVES Enterovirus (EV) is transmitted through fecal oral routes and can cause severe neurological Acute Flaccid Paralysis (AFP) disorder. The aim of this study is to screen stool and respiratory samples for enterovirus in Nepalese children for guidance on required surveillance and containment measures.

METHOD This study included archived stool and respiratory sample from approved studies. A total of 196 randomly selected archived stool samples from children below 36 months of age negative for different enteric pathogens tested under MAL-ED study and 589 influenza negative respiratory ILI samples from children less than 15 years of age were included in this study. Extraction was done using QiaAmp Viral RNA Mini Kit (QIAGEN) according to manufacture instruction. Screening was done using two different primers sets. For respiratory samples oligonucleotide primer and probe sequences that were developed by Brittain-Long et al and Lars P. Neilsen was used that targets the 5' non-translated region (NTR) of the enterovirus genome. For stool samples RT PCR was performed using primers that target the VP1 region which detects all types of enterovirus.

RESULTS Enterovirus was detected in 9.2% of respiratory samples with majority in children below 5 years of age during January to March. Two samples had tested positive for D-68 with PCR which needs to be confirmed with sequencing. Enterovirus was detected in 17.3 % of stool samples tested with majority found in children at age group 0–11 months from June till September.

CONCLUSION The epidemiologic and genetic information incorporating molecular EV surveillance in children to identify the Enterovirus types with additional sequencing information may assist in global containment of enterovirus causing AFP.

391**Asylum-seeking women's perspectives regarding a mental health screening method during pregnancy: a qualitative study**

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Groningen, Groningen, The Netherlands; ³Medical Centre Leeuwarden, Leeuwarden, The Netherlands

BIOGRAPHY Elena Soldati is in the last year of her Master of Medicine at the University of Groningen, the Netherlands and is originally from Italy. During her study she volunteered in Greece and Italy in refugee camps multiple times for medical NGOs. She currently volunteers in a shelter house in the Netherlands for women who were sex workers and victims of human trafficking. She is the founder and president of a medical student committee dedicated to raising awareness on health and migration among health care workers.

OBJECTIVE This study aims to identify a suitable and acceptable method to screen for depression, anxiety and post-traumatic stress disorder (PTSD) in pregnant asylum seekers.

METHODS We conducted semi-structured interviews with pregnant asylum seekers. Before the interview participants filled out a demographic questionnaire and a mental health screening test, the Refugee Health Screener 15 (RHS-15). During the semi-structured interview, we discussed the acceptability and suitability of the RHS-15 to screen and start a dialogue about PTSD, anxiety and depression. To analyse data, an inductive thematic analysis was performed by two researchers. The interviews took place at the Asylum Seeker Centre of Ter Apel, the Netherlands in the months of November and December 2020.

RESULTS Eight asylum seeking women participated in the study. The following main themes were identified: 'Importance of mental health screening', 'Talking about mental health' and 'Use of the RHS-15'. Pregnant asylum seekers find themselves in an underserved and disadvantaged situation. They find it meaningful and acceptable to talk about mental health with their midwife or other health care professionals, but they would not initiate a conversation on mental health spontaneously. They would appreciate encouragement in disclosing matters regarding their mental health and help with navigating the Dutch health-care system. Barriers and enablers to talk about mental health included a language barrier, cultural differences, relationship with health care providers and practical barriers. Participants considered the RHS-15 suitable for mental health screening.

CONCLUSIONS This is the first study in Europe that assesses the suitability and acceptability of mental health screening in pregnant asylum seekers from their perspective. Asylum-seeking women would appreciate a mental health screening during pregnancy and think the RHS-15 is an acceptable and suitable method. Further research is necessary for health care providers and policy makers to

consider implementing mental health screening for all pregnant asylum seekers.

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Antenatal Uterotonics as a Risk Factor for Intrapartum Stillbirth and First-day Death in Haryana, India. A Nested Case-control Study

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BIOGRAPHY in epidemiology and global health and directing Centre for Intervention Science in Maternal and Child Health (www.cismac.org), Sommerfelt coordinates collaborative ventures with researchers in Asia and Africa aimed at treating and preventing important childhood infections and promoting child growth, development and survival. His research spans molecular microbiological and immunological studies aimed at vaccine development and includes intervention trials of downstream interventions to prevent important childhood infections and reducing their nutritional insult. He is member GAVI Alliance's Independent Assessment Committee for Advance Market Commitment for vaccines of the Data Safety Monitoring Board for WHO's Solidarity trials for COVID-19 vaccines.

BACKGROUND/OBJECTIVE Use of uterotonics like oxytocin to induce or augment labor has been shown to reduce placental perfusion and oxygen supply to the fetus and studies indicate that it may increase the risk of stillbirth and neonatal asphyxia. Antenatal use of uterotonics, even without the required fetal monitoring and prompt access to cesarean section, is widespread, yet no study has adequately estimated the risk of intrapartum stillbirth and early neonatal deaths ascribed to such use. We conducted a case-control study to estimate this risk.

METHODS We conducted a population-based case-control study nested in a cluster-randomized trial. From 2008 to 2010, we followed pregnant women in rural Haryana, India, monthly until delivery. We visited all live-born infants on day 29 to ascertain whether they were alive. We conducted verbal autopsies for stillbirths and neonatal deaths. Cases (n = 2,076) were the intrapartum stillbirths and day-1 deaths (early deaths) and

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controls (n = 532) were live-born babies who died between day 8 and 28 (late deaths).

RESULTS Antenatal administration of uterotonics preceded 74% of early and 62% of late deaths, translating to an adjusted odds ratio for early deaths of 1.7 (95% confidence interval 1.4, 2.1) and a population attributable risk of 31% (95% confidence interval 22%, 38%). If the use of oxytocics before delivery is as common in India as a whole as it was in our study area, 184,000 (95% confidence interval 131,000, 228,000) deaths can be averted if oxytocics are used appropriately.

CONCLUSIONS While oxytocin injections after delivery to prevent maternal deaths from postpartum bleeding should be upheld, it is critically important that existing guidelines for appropriate antepartum use of the drug is implemented. Improved adherence to these guidelines worldwide can save the lives of hundreds of thousands of babies every year.

See video abstract: <http://links.lww.com/EDE/B707>.
Published paper: https://journals.lww.com/epidem/Fulltext/2020/09000/Antenatal_Uterotonics_as_a_Risk_Factor_for.9.aspx

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Poor, high parity women in rural Tanzania have remained unserved by hospital-based childbirth. Analysis of national data over two decades

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BIOGRAPHY Manuela is trained as a doctor and holds a Master in Public Health from LSHTM. Presently a PhD candidate at Vrije University (Amsterdam) and the Institute of Tropical Medicine (Antwerp), Manuela studies inequity in childbirth care utilization in sub-Saharan Africa.

Manuela lived and worked for 15 years in different African countries, with the longest period in Tanzania. As a clinician and public health technical assistant, she has been involved in long-term humanitarian program (on maternal, pediatric, HIV, TB and refugee health), in Somaliland, Uganda and Tanzania and has coordinated research projects in Tanzania. Additional early career cancer research experience.

OBJECTIVE Women are increasingly using facilities for childbirth in sub-Saharan Africa, but quality of maternity care varies across the health system. In Tanzania, all facilities offer childbirth care, though only hospitals consistently offer comprehensive emergency obstetric care. To achieve universal health care, the Tanzanian health system has expanded since independence, particularly in its primary health care (PHC) component (health centres and dispensaries). The objective of this study was to assess whether socio-economic inequity in hospital-based childbirth uptake had reduced over time at different parity levels.

METHODS Data from five nationally representative Demographic and Health Surveys were analysed (1996, 1999, 2005, 2010 and 2015/16), with place of birth as outcome (home, PHC or hospital). Household wealth and parity were independent variables of interest. Multinomial logistic regression, controlling for relevant variables and post-estimation margins analysis with wealth/parity interaction were used to estimate women's percentage uptake at each location.

RESULTS Between 1996 and 2015/6, among women having their first baby, hospital births increased in all wealth groups, with minimal socio-economic inequity. Hospital-based childbirth uptake in high parity (≥ 5) women remained constant and very low (poorest women: 13% in 1996 to 12% in 2015/16, richest: 18% to 23%). Births in PHCs remained unchanged in primiparous women, while among high-parity women, they increased over time in all wealth groups, more markedly among the richest. Births in the surveys' recall periods increased from approximately 6 to 9.4 million, with a 57% increase in facility numbers.

CONCLUSION In two decades, in spite of health system expansion, poor, rural, high (≥ 5) parity women have remained underserved by hospital-based care in Tanzania. Though all women are at risk, this evidence calls for policies targeting this higher risk group and strategies to improve hospital-based childbirth uptake by these women.

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A quality improvement initiative to improve the duration of kangaroo mother care in tertiary care neonatal unit of South India

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BIOGRAPHY Completed MBBS and MD from SMIMER, Surat. *DM Neonatology Resident at Chengalpattu Medical college.*

BACKGROUND India has the highest number of preterm births and maximum number of neonatal deaths due to prematurity. Chengalpattu Government Medical College had 11,593 deliveries annually, in the year 2020, with 2252 of neonates being Low birth weight. A Cochrane Review of 2016 concluded that KMC reduces the morbidity and mortality in LBW infants. The average duration of KMC in our unit was around 4.2 hrs/ baby/ day.

OBJECTIVE To improve the duration of KMC in LBW babies from short duration (< 4 hrs) to continuous duration (> 12 hrs) over 8 weeks.

METHODS The implementation phase was conducted during January- February, 2021. QI team comprising of staff nurses, resident doctors and senior consultants was formed. Potential barriers to KMC were listed using Fishbone analysis. Various possible interventions identified and a priority matrix constructed to decide the sequence of introduction of changes. The following measures were introduced sequentially and tested by multiple Plan-do-study-act cycles:

- Ensuring the availability of KMC charts,
- Combining KMC chart with weight chart,
- Documentation of KMC duration,
- Increasing number of KMC chairs
- Family Centred Care Unit and Mother- NICU,
- Increasing Father KMC,
- KMC slings,
- Videos in local language for education,
- Rewards for mothers.

OUTCOME INDICATOR Duration of KMC was recorded by bedside nurses on daily basis.

RESULTS 86 newborns were enrolled in the implementation phase. At the end of 8 weeks, the average duration of KMC increased to 14.4 hrs/ baby/ day from 4.2 hrs/ baby/ day. The study is now in post implementation phase and daily data collection is being done to evaluate the sustainment of improvement.

CONCLUSION Sequential Quality improvement measures helped to increase the average duration of KMC in unit.

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Community Kangaroo Mother Care in South India. Continuum of care for low birthweight neonates after discharge from Sick Newborn Unit

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BIOGRAPHY Sathya did her MD in pediatric medicine at Madras Medical College in South India and Masters in public health at John Hopkins University, US. She is currently pursuing PhD in department of Global Health and Primary Care, Bergen, Norway.

She is involved in developing neonatal care at Chengalpattu Medical college for past 2 decades. She is interested in developing low cost newborn care in resource poor settings and community follow up of high risk neonates.

OBJECTIVE Globally more than 20 million infants are born with LBW and 70% of deaths in the neonatal period occur in LBW infants. Kangaroo Mother Care (KMC) has been shown to be a method to improve survival in LBW infants. WHO policy states that KMC initiated in the hospital be continued at home. Community KMC refers to prolonged skin-to-skin contact of LBW babies at home, after discharge from health facility. The status of community KMC (cKMC) is not known. We aimed to estimate the practice of cKMC and factors affecting cKMC after discharge from SNCU.

METHOD We enrolled 420 LBW neonates at the time of discharge from the SNCU, CMCH, South India where all parents of LBW neonates are counselled regarding cKMC and breastfeeding practices at discharge. Families of LBW neonates were followed up in the community two months after discharge and the use of cKMC was evaluated.

RESULT Among the 420 enrolled families, 7 were lost to follow up. of the families, 111 (26.9%) never practiced cKMC, 5 (1.7%) practiced < 30 days, 158 (38.2%) from 30 to 60 days, 139 (33.2%) for 60 days and more. During the day, 137 (33.2%) of the mothers practiced cKMC for less than 4 hours, 94 (22.8%) for 4- 8 hours, 37 (9%) for 8–12 hours and 34 (8.2%) for more than 12 hours. To practice cKMC, 227 (75.2) of the mothers had a separate room in the home and 272 (90%) had a mat or bed. The family support for cKMC varied; 87 (27.2%) of the mothers had support from the grandparents, 78

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(25.8%) from the father and one third of mothers had no one to support.

CONCLUSION Continuum of cKMC after discharge from the SNCU is inadequate, efforts are needed to improve cKMC practice to ensure survival of LBW neonates after discharge.

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Investigating risk factors for under-five mortality in an HIV hyper-endemic area of rural South Africa, 2000–2014

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BIOGRAPHY Boikhutso is a researcher and bio-statistician at the University of KwaZulu Natal(South Africa). His research interests are on Generalized linear models and Public health issues.

OBJECTIVE The aim of this study is to investigate the risk factors for under-five mortality in an HIV hyper-endemic area of rural South Africa, from 2000–2014.

METHODS We conducted a statistical analysis of 759 births from a population-based cohort in rural KwaZulu-Natal Province, South Africa, from 2000 to 2014. A Cox Proportional Hazards model was used to identify the risk factors and key socio-demographic correlates of under-five mortality leveraging the longitudinal structure of the population cohort.

RESULTS The results indicated that under-five and infant mortality are significantly associated with a low wealth index of 1.49 (1.007–2.48) for under-fives and 3.03 (1.72–5.34) for infants. Children and infants with a lower wealth index had a significantly increased risk of mortality as compared to those with a high wealth index. Other significant factors included: source of household drinking water (borehole) 3.03 (1.72–5.34) for under-fives and 2.98 (1.62–5.49) for infants; having an HIV positive mother 4.22 (2.68–6.65) for under-fives and 3.26 (1.93–5.51) for infants and period of death 9.13 (5.70–14.6) for under-fives and 1.28 (0.75–2.20) for infants.

CONCLUSIONS: Unsafe household water sources and having an HIV-positive mother were associated with an increased risk of under-five mortality in this rural setting. The significant risk factors identified align well with the Sustainable Developmental Goals(SDG) 2030 targets for reducing child mortality, which include improved nutrition, sanitation, hygiene and reduced HIV infections. Current trajectories suggest that there is some hope for

meeting the 2030 SDG targets in rural South Africa and the region if the identified significant risk factors are adequately addressed.

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Effect of timing of mother's death on child survival in a rural HIV hyper-endemic South African population

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OBJECTIVE Maternal mortality remains a tragedy and a key determinant for child survival. The aim of this study is to investigate the survival of children who lost their mothers soon or after their births in a rural setup with high HIV prevalence in South Africa.

METHODS This study used a data set from Africa Health Research Institute in rural South Africa. The study population comprised children (0–10 years of age) from 2000 to 2014. We employed a Cox regression modelling approach to estimate greatest temporal hazard of the child after the death of their mothers, accounting for the confounding influence of wealth index of the household and HIV status of the mother.

RESULTS We found 62,600 live births and that 2191 children died when they were less than or equal to 10 years old. The mortality rates for < 5 and 5–9 years is 882.25 and 117.75 per 1000 live births respectively, with a maternal mortality rate of 447.3 deaths per 100,000 live births from 2000 to 2004. Child mortality risk was very high in less than 6 weeks after their mother's death (HR 3.45 [95%CI: 1.3–6.54]) and decreased drastically after 3 years following her death (HR 0.8 [0.2–6.3]). This increased risk was more pronounced among children aged less than 1 month and living in poor households.

CONCLUSIONS: Children (younger than 10 years) in rural households are at their highest risk of dying within 6 weeks of mother's death and this risk decreases substantially after the highly vulnerable window. Thus, understanding this risk and its timing in relation to a mother's death is critical to guide interventions and stress the relevance of assessing the interaction between clinical care and socio-economic program addressing the needs of orphans.

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Underlying determinants of maternal mortality in a rural South African population with high HIV prevalence (2000–2014): A population-based cohort analysis

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BIOGRAPHY Boikhutso is a researcher and bio-statistician at the University of KwaZulu Natal (South Africa). His research interests are on Generalized linear models and Public health issues.

OBJECTIVE Maternal mortality is one of the significant health indicators of any country and it's a frequent subject in many global health discussions. Even though the global trends have shown a decrease on maternal mortality, many countries in sub-Saharan Africa failed to achieve the MDG 5 target in 2015. There is no specific single solution for reducing maternal mortality but there is unanimity that a reliable health system with skilled personnel is vital for addressing maternal mortality. This study therefore seeks to identify the risk factors for maternal mortality in typical rural sub-Saharan African countries.

METHOD A longitudinal population based cohort study was conducted using data from 2000 to 2014 in Africa Health Research Institute (AHRI). The Cox regression method was used to assess the influence of selected risk factors using the Mosley-Chen model on maternal mortality. A total of 20701 women aged 15–49 years were included in the study.

RESULTS The study found 212 maternal deaths from 32,620 live births with a maternal mortality ratio (MMR) of 650 per 100,000 live births. The main causes of death were communicable diseases (38.2%), AIDS and TB (31%) and Unknown causes (11.8%). An increased risk of death was identified on, poor wealth index (HR 3.92[1.01, 15.3]), period of death 2000–2006 (HR 32.1 [3.79, 71.5]) and number of deliveries (6.76[2.70, 16.9]) were associated with a high risk of maternal mortality after adjusting for other independent variables included in the study.

CONCLUSION Socio-economic status, number of deliveries and period of death were found to be associated with maternal death in rural South Africa.

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Space-time variations in child mortality in a rural South African population with high HIV prevalence (2000–2014)

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OBJECTIVE The aim of the study was to identify the key determinants of child mortality 'hot-spots' in space and time.

METHODS Comprehensive population-based mortality data collected between 2000 and 2014 by the Africa Centre Demographic Information System located in the Umkhanyakude District of KwaZulu-Natal Province, South Africa, was analysed. We assigned all mortality events and person-time of observation for children <5 years of age to an exact homestead of residence (mapped to <2m accuracy as part of the DSA platform). Using these exact locations, both the Kulldorff and Tango spatial scan statistics for regular and irregular shaped cluster detection were used to identify clusters of childhood mortality events in both space and time.

RESULTS of the 49 986 children aged < 5 years who resided in the study area between 2000 and 2014, 2010 (4.0%) died. Childhood mortality decreased by 80% over the period from >20 per 1000 person-years in 2001–2003 to 4 per 1000 person-years in 2014. The two scanning spatial techniques identified two high-risk clusters for child mortality along the eastern border of the study site near the national highway, with a relative risk of 2.10 and 1.91 respectively. Clusters had significantly higher adult HIV Prevalence, deaths due to HIV/AIDS and /or TB and deaths due to communicable causes as compared to the non-cluster.

CONCLUSION The high-risk communities detected in this work and the differential risk factor profile of these communities, can assist public health professionals to identify similar populations in other parts of rural South Africa. Identifying child mortality hot-spots will potentially guide policy interventions in rural, resource-limited settings.

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Space-time patterns in maternal mortality in a rural South African population with high HIV prevalence (2000–2014)

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BIOGRAPHY Boikhutso is a researcher and bio-statistician at the University of KwaZulu Natal (South Africa). His research interests are on Generalized linear models and Public health issues.

OBJECTIVE The main objective of this study was to identify the spatial and temporal maternal mortality hot spots in a rural population with high HIV prevalence.

METHODS Population-based mortality data from 2000 to 2014 for women aged 15–49 years from the Africa Centre Demographic Information System located in the Umkhanyakude district of KwaZulu-Natal Province, South Africa were analysed. Our outcome was classified into two definitions: Maternal mortality; the death of a woman while pregnant or within 42 days of cessation of pregnancy, regardless of the duration and site of the pregnancy, from any cause related to or exacerbated by the pregnancy or its management but not from unexpected or incidental causes; and ‘Mother death’; death of a mother whilst child is less than 5 years of age. Both the Kulldorff and Tango spatial scan statistics for regular and irregular shaped cluster detection respectively were used to identify clusters of maternal mortality events in both space and time.

RESULTS Maternal mortality declined over the study period from approximately 600 per 100,000 live births in 2000 to 400 per 100,000 live births in 2014. There was no strong evidence of spatial clustering for maternal mortality in this rural population. However, the study identified a significant spatial cluster of mother deaths in childhood ($p = 0.022$) in a peri-urban community near the national road. Based on our multivariable logistic regression model, HIV positive status (Adjusted odds ratio [aOR] = 2.5, CI 95%: [1.5–4.2]; primary education or less (aOR = 1.97, CI 95%: [1.04–3.74]) and parity (aOR = 1.42, CI 95%: [1.24–1.63]) were significant predictors of maternal mortality.

CONCLUSIONS: The identification of a clear cluster of mother deaths shows the possibility of targeting intervention program vulnerable communities, as population-wide interventions may be ineffective and too costly to implement.

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A comprehensive approach to address mental health needs of sexual and gender-based violence survivors in Eastern Congo

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BIOGRAPHY Nienke van den Akker works as SRHR and (S)GBV expert for Cordaid, an international NGO working in and on fragility. Besides, she works as a general practitioner in The Netherlands.

CONTEXT Protracted conflict in Eastern Democratic Republic of Congo has led to widespread sexual and gender based violence ((S)GBV). Stigmatization and impunity often prevent survivors from seeking assistance, while lack of adequate support services has devastating consequences for their mental health (MH) and wellbeing. To gain better understanding of the mental health of survivors of (S)GBV and evidence-based MH approaches to guide future (S)GBV programming, this study was initiated.

OBJECTIVE To determine how symptoms of MH are expressed by survivors of (S)GBV in Eastern-DRC and how effective (S)GBV programming could respond to MH needs in a comprehensive and evidence-informed manner.

METHODS Quantitative and qualitative data were collected during field research in North- and South-Kivu in 2020. Surveys were distributed among 520 households using the LQAS sampling method and semi-structured interviews held with 270 (S)GBV survivors between 10–60 years. Desk research was conducted to fill information gaps that surfaced during data-analysis.

RESULTS Half the respondents report social stigmatization, and/or social rejection after experiencing (S)GBV, increasing the impact on their MH. Reported MH symptoms include depressive thoughts, anxiety, self-blame, rumination and concentration loss. Despite the high prominence of MH issues, survivors did not express a clear demand for MH support, but rather financial/ livelihood support, medical and judicial support.

Literature indicates fear of social stigmatization and unawareness or lack of quality services are reasons for low care-seeking behavior.

MHPSS interventions should be culturally sensitive and adapted to local contexts and needs by making use of counselling, community-based approaches and considering engagement of traditional healers.

Conclusion & recommendations: (S)GBV survivors express various MH symptoms, but this does not

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translate into a clear demand for MHPSS. More attention should be given to awareness raising, fighting stigma and changing harmful gender norms in the community, while strengthening safe, accessible and quality MHPSS services for survivors.

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Prevalence of Gonorrhoea and associated knowledge, attitude and risky behaviors and preventive practices among high school students: A cross-sectional study

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BIOGRAPHY Fitsum Tigu, is an Assistant of Microbiology and Biotechnology at Addis Ababa University, Department of Microbiology and Molecular Biology. He received his PhD in 2018 from University of Chinese Academy of Sciences, Institute of Microbiology, China and MSc in 2013 and BSc in 2007 by Applied Microbiology and Applied Biology respectively from Addis Ababa University, Ethiopia. His research interest is on food and industrial microbiology and biotechnology, particularly on probiotics, fermentation optimization of local foods and beverages and studying the fate of pathogenic microorganism in foods that cause public health problems. Furthermore, he study on community health issues.

OBJECTIVE The aim of the study was to determine the prevalence of gonorrhoea and the associated knowledge, attitude and risky behaviors and preventive practice of high school students in Addis Ababa, Ethiopia.

METHODS A cross-sectional study was conducted among 410 students from grade 11 and 12 of Medhane-alem preparatory school using self-administered questionnaires. Statistical analysis was carried out using SPSS version 22.0 software. Chi-square test and odds ratio were done at 95% CI using significance level of $P < 0.05$.

RESULTS The prevalence of gonorrhoea among the students was 5.4%. Only 40% of participants were knowledgeable on gonorrhoea transmission and less than 50% of them had positive perception towards gonorrhoea infected people. Over 55% of the students had no sexual history but the rest had previous sexual experience and were exposed, at least, to one risky behavior. Logistic regression analysis revealed that higher acceptable sexual practice was observed among students with good knowledge than students with poor knowledge (AOR = 2.12, 95% CI 1.42–3.18, $P < 0.001$).

CONCLUSIONS Overall, higher prevalence rate and low knowledge level was observed among the study group. Negative attitudes and unsafe sexual practices were

reported by the students. Sexual health education and prevention are necessary among the high school students.

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Ethnographic study on the effects of COVID-19 and government's mitigation measures on rural and urban-slum dwellers in Ghana

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BIOGRAPHY Matilda Aberese-Ako works at the Institute of Health Research, University of Health and Allied Sciences, Ghana. Matilda does research in Organisational and Medical Anthropology. She is also a postdoctoral fellow on the Malaria Capacity Development Project. Her current research projects include anthropological studies on interpersonal, socio-cultural, environmental and community factors influencing pregnant women's decision to access malarial interventions in Ghana, socio-cultural beliefs, attitudes and practices on anemia in pregnancy and low birth weight in babies and studies on socio-cultural effects, lived experiences and government engagement with communities on COVID-19 interventions.

OBJECTIVE To understand and describe community experiences in coping with COVID-19 and their response to government's intervention measures.

METHODS This purely qualitative study was conducted in one COVID-19 hotspot urban-slum and one rural area with people who had tested positive with COVID-19, community members, leaders and government officials. A total of 46 In depth interviews, 8 Focus group discussions and Non-participant observation of community activities were conducted to understand how COVID-19 protocols were being observed and how it was reshaping socio-cultural and economic lives of participants. All digitally recorded interviews were transcribed and together with the observation notes were uploaded to qualitative software NVivo 12 to support data coding and thematic analysis. Ethical approval was obtained from an appropriate authority.

RESULTS Community members improvised locally appropriate equipment to help them observe the COVID-19 prevention protocols. The mitigation measures adopted by the government did not reach most of the needy in the study communities. It led to gender-based leadership crises, affected socio-cultural harmony, health seeking behaviour and increased distrust of government intervention efforts. Communities adopted various coping

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strategies to deal with the crisis such as individuals cutting down on spending, one spouse taking up the burden of taking care of the family and depending on friends and family members for support. Others were praying to the Supreme Being and for youth contributing money to buy food for the aged.

CONCLUSION The government needs to improve its strategy in the provision of information on COVID-19 measures to poor communities and to provide material and financial support as well as social services and amenities to poor communities. It should also expand access to the Livelihood Empowerment Against Poverty programme and free subscription to the national health insurance scheme to more families.

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Dilemma of Preventing Covid-19 Via Lockdown and Well-being of Nigerian Women in the Informal Sectors

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BIOGRAPHY Olufemi Mayowa Adetutu is an academic staff member and a social researcher at Obafemi Awolowo University Ile-Ife, Nigeria. He had his PhD in Demography and Social Statistics and graduated as a fellow of the Consortium of Advanced Research Training in Africa. His research interests focus on sexual and reproductive health of young people, gender and migration studies, family demography and maternal and child health. I have written academic papers that are related to these areas. I had made spirited effort towards addressing population and public health problem in Nigeria through research and community services.

OBJECTIVES Total lockdown and other negative outcomes of COVID-19 affect the livelihood or quality of life of people working in the informal sector because of disruption of economic activities. Worse still, women make up the majority of people in the informal sector or marginal workers. They lack access to salary and other safety nets and cash transfer and relief materials remain elusive. Hence, this study examined the combined effects of total lockdown and other outcomes of COVID-19 on the quality of life (QoL) of women in the informal sector.

METHODS A cross-sectional study was conducted via online-based questionnaire using the snowball sampling technique created on Google form and distributed to participants through social media platform and WhatsApp group. All participants with access to internet were eligible and

a total of 512 respondents filled out the questionnaire that required between 10–15 minutes to complete.

RESULTS A lower QoL was associated with higher education, verbal violence at home, fear of poverty, fear of COVID-19, concerns about long-term effects of economic disruption on business, lack of cash transfer and other relief materials. However, family togetherness, husband being in formal employment and quality time to relax were significantly associated with better QoL.

CONCLUSION This study showed that total lockdown and other outcomes of the COVID-19 affected negatively QoL of women in the informal sector. However, some positive impacts were found, such as family togetherness, ample time to relax and husbands being in formal employment. Government should provide social security safety nets and monitor its implementation.

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Community and provider acceptability of the COVID-19 vaccine: A systematic review and meta-analysis

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BIOGRAPHY Christian Akem Dimala is a medical doctor and public health consultant who trained first at the University of Buea in Cameroon and then at the London School of Hygiene & Tropical Medicine of the University of London. He went on to continue with his post-graduate medical education at the University Hospitals of Leicester and the University of Leicester where he also held honorary research fellow positions under the NIHR. His areas of interest include sustainable public health interventions to reduce cardiovascular and infectious disease burdens in Communities. He is currently an Internal Medicine Resident Physician at the Reading Hospital

BACKGROUND The novel coronavirus disease (COVID-19) vaccines may help control the current pandemic but would require immunization levels that would achieve herd immunity. This study aimed to quantify current COVID-19 vaccine acceptance rates, as well as characterize the determinants, enablers and barriers to vaccine acceptability across the globe by synthesizing published evidence.

METHODS A systematic review and meta-analysis of studies was performed on studies assessing the acceptability of a COVID-19 vaccine published between November 1st, 2019 and November 31st, 2020. PubMed, Embase

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and Cochrane central were searched for eligible studies. Data extracted from retained studies was analyzed using STATA statistical software. A quantitative and narrative synthesis was produced.

RESULTS A total of 35 eligible articles (38 studies) involving a total of 70,997 participants across 7 regions and 35 countries were included. All studies were cross-sectional survey designs. The pooled vaccine acceptance rate across 32 studies was 71% (95% CI: 66–76%, $P < 0.001$, $I^2 = 99.4\%$, range: 29–97%). The pooled vaccine acceptance rate of parents for their children across 4 studies was 52% (95% CI: 37–67%, $P < 0.001$, $I^2 = 99.1\%$). Vaccine uptake was significantly higher among males ($n = 13$ studies), older age groups ($N = 7$) and healthcare providers ($N = 2$). Enablers of vaccine uptake included perceived individual susceptibility to COVID-19 infection ($N = 11$), prior influenza vaccination ($N = 7$) and high vaccine effectiveness ($N = 6$). The most common barriers to vaccine uptake were general negative attitudes towards vaccines/vaccine hesitancy ($N = 8$), concerns over vaccine safety and efficacy ($N = 6$), vaccine side effects ($N = 5$) and misinformation or conspiracy beliefs around the experimental COVID-19 vaccines ($N = 2$).

CONCLUSIONS There is a good acceptance of COVID-19 vaccines globally despite wide variations across countries. Public health campaigns may benefit from capitalising on identified enablers and dispelling important barriers with regards to vaccine safety.

Keywords: COVID-19, Vaccine, Acceptance

471**COVID-19 induced Guillain-Barré syndrome: A rare complication of SARS-CoV-2 infection**

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BIOGRAPHY Muhammad Hanif is a graduate of Khyber medical college, Peshawar and currently, he is working as an internal medicine resident at Hayatabad medical complex, Peshawar, Pakistan. He is ECFMG certified.

SARS-CoV-2 causing COVID-19 initially began in Wuhan, China and now has been declared a pandemic by the World Health Organization (WHO). Coronavirus can cause multiple systemic symptoms, predominantly affecting the respiratory system. In addition to respiratory symptoms, it can cause various complications ranging from neurological to myocardial injuries. Guillain-Barre

Syndrome (GBS) is an acute polyradiculoneuropathy affecting more often lower limbs than upper limbs and is often related to previous infectious diseases.

In our case, a young female presented with typical symptom of GBS after having COVID-19 and was later on confirmed with nerve conduction study and lumbar puncture. After 3 sessions of plasmapheresis, she improved clinically and was discharged home. She was advised to return to follow-up after one month.

Although it is a known fact that SARS-CoV-2 can cause respiratory and gastrointestinal symptoms, but physicians should be aware of the neurological manifestations of GBS possibly related to SARS-CoV-2 infection, as multiple cases have been reported in the literature. Although most GBS patients generally present with respiratory infections before the onset of neurologic symptoms, the clinician's alertness to neurologic manifestations is crucial as sometimes typical COVID-19 respiratory symptom may not be present on patient admission. Also, as data regarding the pathogenesis of GBS in COVID-19 patients are scarce, further large-scale studies should be conducted to understand the pathogenesis of this association.

468**Can COVID-19 cause pancreatitis? A rare complication of SARS-CoV-2 infection**

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Coronavirus disease-2019 (COVID-19) emerged as a cluster of atypical pneumonia in Wuhan, China in December 2019 and has been declared a pandemic by the World Health Organization. COVID-19 patients mostly present with respiratory symptom like dyspnea, cough and fever. Various neurological, myocardial, renal and gastrointestinal complications have been reported associated with SARS-CoV-2. Acute pancreatitis is one of the common causes of upper abdominal pain, caused by alcohol consumption, gall stones and various viruses and drugs.

We are presenting the case of a young female who was recently diagnosed as COVID-19 and later on developed acute pancreatitis without any other risk factors. Serum

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lipid profile, serum calcium, anti-neutrophilic antibodies and virology were sent for analysis to determine the causative factor, the results of which were unremarkable. She had no history of alcohol intake, smoking or drug abuse. She was diagnosed with acute pancreatitis secondary to SARS-CoV-2, as there were no other risk factors. She was started on a soft diet on day 6 of her admission. Her condition improved significantly over time and she was discharged on the 7th day of her admission in a stable condition with oxygen saturation of 95% without oxygen support.

The physician should be vigilant enough about this possible complication because early intervention could decrease the mortality associated with this condition. During this ongoing pandemic, the physicians should always keep in mind such complications to prevent hazardous outcomes.

64**Can immediate sequential bilateral cataract surgery be used to overcome the NHS COVID-19 cataract backlog?****J. Malcolm***London School of Hygiene and Tropical Medicine, London, UK*

BIOGRAPHY Jonathan Malcolm is a postgraduate student studying Public Health for Eye Care at the London School of Hygiene and Tropical Medicine.

OBJECTIVE On the 28th of March 2020, The Royal College of Ophthalmologists recommended that NHS eyecare units stop elective procedures due to the COVID-19 pandemic. Subsequently, cataract services ceased for 14 weeks. A cataract surgery backlog of around 121,352 cases is likely to have amassed during this time.

Immediate sequential bilateral cataract surgery (ISBCS) is a safe and efficient alternative to delayed sequential bilateral cataract surgery. Currently, only 7.3% of bilateral cataract surgery in the UK is ISBCS, while in European countries such as Finland it comprises around 50%.

This study aimed to estimate the extent to which increasing the volume of ISBCS performed in the UK will provide an opportunity to decrease the COVID-19 cataract backlog by improving service efficiency.

METHODS Estimates of current service provision was obtained from published National Ophthalmology Database data. Economic modelling based on O'Brart et al.'s ISBCS surgical efficiency model was used to estimate the number of additional cataract surgeries that could be performed annually if England were to perform the same proportion of ISBCS as Finland.

RESULTS Approximately 185,320 bilateral cataract surgeries are performed annually in England, 13,560 of which are ISBCS. If 50% of bilateral cataract surgery in England were ISBCS, our economic modelling forecasts that between 14,238 to 42,714 extra cataract surgeries could be performed annually without needing any additional theatre space or staff.

CONCLUSION ISBCS is a safe procedure that could help to overcome the COVID-19 cataract backlog by improving service efficiency. However, if ISBCS is the only strategy employed, the backlog will take at least 3 years to resolve. Using ISBCS in conjunction with other strategies such as rationing based on visual acuity is recommended.

122**Effect of COVID-19 lockdown on hospital admissions and mortality in rural KwaZulu-Natal, South Africa: interrupted time series analysis****A. McIntosh¹, M. Bachmann¹, M. J. Siedner^{2,3}, D. Gareta², J. Seeley^{2,4} and K. Herbst^{2,5}***¹Norwich Medical School, University of East Anglia, Norwich, UK; ²Africa Health Research Institute, South Africa; ³Department of Medicine, Harvard Medical School, Boston, USA; ⁴Department of Global Health and Development, London School of Hygiene and Tropical Medicine, London, UK; ⁵DSI-MRC South African Population Research Infrastructure Network, South Africa*

BIOGRAPHY Amy McIntosh is an academic junior doctor currently working in the NHS, interested in public health and global obstetrics and gynaecology.

OBJECTIVE To assess the effect of lockdown during the 2020 COVID-19 pandemic on daily all-cause admissions and by age and diagnosis sub-groups and odds of all-cause mortality in a hospital in rural KwaZulu-Natal (KZN).

METHODS We conducted an observational cohort study using data from the referral hospital for 17 primary care clinics in uMkhanyakude district. Data were collected by the Africa Health Research Institute on all admissions from 1st January to 20th October 2020. Changes and trends in daily all-cause admissions and risk of in-hospital mortality before and at each stage of the national lockdown from 27th March 2020, was estimated by Poisson and logistic interrupted time series regression, with stratification for age, sex and diagnosis.

RESULTS 5848 patients contributed to 6173 admissions. Daily admissions decreased during level 5 lockdown for infants (incidence rate ratio (IRR) compared to pre-lockdown 0.63, 95% confidence interval (CI) 0.44–0.90), 1–5 year-olds (IRR 0.43, 95% CI 0.28–0.65) and for

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respiratory diagnoses (IRR 0.57, 95% CI 0.36–0.90). From level 4 to level 3, total admissions increased (IRR 1.17, 95% CI 1.06–1.28) as well as for men >19 years (IRR 1.50, 95% CI 1.17–1.92) and respiratory diagnoses (IRR 4.26, 95% CI 2.36–7.70). Among patients admitted to hospital, odds of death decreased during level 5 compared to pre-lockdown (adjusted odds ratio (aOR) 0.48; 95% CI 0.28–0.83), then increased in later stages.

CONCLUSION Level 5 lockdown is likely to have prevented the most vulnerable population, children under 5 years and those more severely ill, accessing hospital care in rural KZN, as reflected by the drop in admissions and odds of mortality. Subsequent increases in admissions and in odds of death in hospital, could be due to improved and delayed access to hospital as restrictions were eased.

236**Experienced stigma by COVID-19 patients – A mixed methods study**

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BIOGRAPHY Professional Experience

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2012–2014: Medical assistant at the NGO ‘humedica – international aid’

2013–2018: Doctoral thesis in mental health

2014: Diploma of Tropical Medicine (Bernhard-Nocht-Institute Hamburg)

2014–2017: Assistant Doctor of Internal Medicine at the Kliniken-Ostallgäu-Kaufbeuren

Since 2016:

Voluntary medical doctor at ‘Doctors of the World’ Munich

2017: Subspecialisation in emergency medicine

2017 – 2018: Master of Science in Global Health at the Karolinska Institute, Stockholm

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OBJECTIVE Stigma is a social phenomenon, which implies a negative attitude towards people with a certain condition. Regarding health, stigma generates psychological stress and causes affected people to hide their condition with severe consequences for their own health and in case of infectious diseases, for public health. In the context of the COVID-19 pandemic, the risk of stigmatization has been addressed early and reports of

discrimination against affected people have accumulated since. The objective of this research is to assess this stigma and to characterize patterns of stigmatization as well as coping mechanisms.

METHODS We conducted a mixed-method study with sequential explanatory design. A questionnaire adopted from Fife & Wright was sent to 150 COVID-19 survivors in the area of Ulm, Germany. After descriptive analysis of the received questionnaires and group comparison using t-Test and ANOVA, 15 patients were selected for in-depth interviews. Purposeful sampling included patients with high and low perceived stigma, different severity of disease, different gender and age group allowing for a broad assessment of the phenomenon. After transcription, codes and themes were assessed using content analysis.

RESULTS Sixty-one questionnaires were analyzed, 58% of respondents were male and median age was 51 years. Analysis revealed experienced ‘social rejection’ and ‘internalized shame’ as leading dimensions, followed by ‘social isolation’. ‘Financial insecurity’ played a minor role. There was no difference in experienced stigma comparing gender, age or disease severity groups. Qualitative analysis identified feelings of guilt, lack of control, social exclusion and vilification as common codes, often resulting from harmful misinformation. Coping strategies involved vindication, social cohesion but also disregard of legal constraints.

CONCLUSION COVID-19-related stigma is common yet barely assessed. Straightforward, coherent and evidence-based information about COVID-19, its transmission and legal implications need to be disseminated to avoid public insecurity and subsequent discrimination of affected people.

321**Adjusting to the new-norm of COVID 19 in Ghana, Norway and the USA**

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BIOGRAPHY Sam is a of cross-cultural psychology at the University of Bergen, Norway. Sam divides his responsibilities between the Department of Psychosocial Science (Faculty of Psychology) and the Department of Global Public Health and Primary Care (Faculty of Medicine).

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Sam's main research interest is on how culture influences human behaviour from a comparative perspective

OBJECTIVE One year after COVID-19 was declared a pandemic, the virus had infected close to 118M and killed over 2.6 M people globally. As the global numbers of infections continue to rise, the world is racing to vaccinate billions of people. Until recently when vaccination was introduction to fight the virus, national governments and public health authorities relied on a combination of three key measures: testing, quarantine and contact tracing; changes in behavior that reduce transmission (e.g., social distancing, wearing of masks); and targeted lockdowns of outbreak hotspots. At the individual level, people are adopting and/or rejecting the top-down measures to varying degrees. The objective of the study was to explore how are individuals have adhered to these health regulations. The study also explored whether adhering to these regulations was related to self-reported mental health problem

METHOD An online questionnaire with a battery of scales examining various covid-19 related activities, mental health symptoms was administered to nearly 700 participants in Ghana, Norway and the USA.

RESULTS Preliminary analyses of the collected data indicate that whereas participants in all the countries did not consider the changes they had to make in their lives as a bother, they did not adhere to them to the same degree. Whereas Ghana was the country keeping strongly to these changes early in the pandemic, six months later, Ghana was the country least adhering to them. A negative correlation was found between following these regulations and the extent of mental health problems reported.

CONCLUSION Individuals in different countries have followed the regulations put forward by their local health authorities differently. Following these regulations also appeared to impact negatively on one's mental health in all countries.

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Meeting health needs in fragile settings: exploring health seeking behavior during the COVID-19 pandemic in South Sudan

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OBJECTIVE Health system fragile settings are insecure political and resource environments vulnerable to health shocks, as was seen during the 2014–2015 west African Ebola outbreak. COVID-19 is similarly expected to hit hardest in fragile settings, such as South Sudan. To mitigate the potential indirect health effects of COVID-19, there is a need to assess how COVID-19 is influencing health seeking behavior and access. South Sudan's management of COVID-19 also contributes to understanding of health system resilience in fragile settings. This study aimed to assess the impact of COVID-19 on health seeking behavior in South Sudan.

METHODS The mixed-methods study follows a convergent parallel design: 69 semi-structured interviews and 27 Focus Group Discussions were conducted with health system stakeholders and community members and household surveys were administered at 1,134 households. To contextualize South Sudan's public healthcare response, a literature review will be conducted.

PRELIMINARY RESULTS Most respondents were aware of COVID-19, although misconceptions about the virus and fear of stigma exist. From the qualitative data, reported impacts of COVID-19 on health seeking behavior included obligatory mask wearing in health facilities as extra financial barrier to access and people avoiding seeking care in health facilities due to fear of catching the virus or testing positive. Health seeking behavior seem to have returned to pre-COVID levels after the initial months of the pandemic and a general lack of concern regarding COVID-19 is now reported.

PRELIMINARY CONCLUSION COVID-19 has limited health seeking both in terms of the ability to access as well as the choice to utilize health care, which can have severe indirect effects on other high burden diseases, as with Ebola. By understanding these dynamics in relation to the national COVID-19 response in South Sudan, this study hopes to provide insights into whether this response was proportionate to the level of shock.

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Stealing food from our plates: COVID-19's impact on nutrition security in rural Bangladesh

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application of spatial epidemiological techniques to support local solutions to global health problems.

OBJECTIVES An estimated additional 3.9 million South Asian children could suffer from wasting as a result of COVID-19's socio-economic impact and risk factors contributing to childhood stunting are exacerbated. Food insecurity, reduced income and restricted health could set back years of progress in the fight against childhood malnutrition.

The Max Nutri-WASH programme implemented in 62 unions in South Coastal Bangladesh aims to address childhood stunting using a community-led approach of integrated WASH and health interventions. A phone survey was conducted among its beneficiaries to take stock of the impact of the lockdown on livelihood, food security, child nutrition and hygienic practices.

METHODS Phone interviews were conducted among 407 caretakers of children under 5 between January and February 2021. Nineteen-hundred households were selected using a simple random sampling approach stratified by implementing NGO from a census of households

compiled in 2017–18, the response rate was 21%.

Descriptive analyses were performed in Stata version 15.

RESULTS Almost all respondents experienced a loss of income (95%) and one-third (36%) of respondents working in the service industry lost their job during the lockdown. Coping strategies included borrowing money (77%) and reduced consumption on foods and household items (78%), especially among the poorest and poorer households. Furthermore, 77% of respondents decreased consumption of at least 4 food products for their children particularly protein-rich products such as eggs, fish, meat and dairy.

CONCLUSION An alarmingly high number of households had to cut food consumption for their children as a result of loss of income. The poorest households, who are disproportionately affected by malnutrition, are bearing the brunt of these consequences. The COVID-19 pandemic will negatively impact the nutritional status of young children and exacerbate existing health inequities in Bangladesh.