+Longevity

A Think Tank initiative dedicated to **adult vaccination**

FINAL REPORT

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Authors by alphabetic order
Catarina Hermenegildo, M.Sc.
Diogo Franco, M.Sc.
Henrique Lopes, PhD.
João Diogo, M.Sc.
Mariana Castro, M.Sc.

Acknowledgement

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Message from the Chairman of the NOVA Center for Global Health

Vaccines are unequivocally one of the greatest achievements of Medicine. The vaccination programs implemented over the past decades by nations around the world stand as one of humanity's most significant accomplishments in Public Health and healthcare systems. If any doubts remained, the pandemic years have clearly demonstrated the pivotal role that technological innovation applied to vaccines, when combined with effective and committed political alignment, plays in our society.

Technological innovation has paved the way for remarkable improvements and outcomes in meeting the needs of populations – not only in health but across various domains. However, the truth is that, without the right policies and a constant drive to do more and better – because there will always be more to achieve – such innovation falls short.

It is this drive to contribute with evidence, reflection, and proposals that support better health policies that guides our daily work at the NOVA Center for Global Health. With this purpose in mind, we launched the +Longevity (*+Longevidade*, originally) project, a Think Tank initiative designed to emphasize the importance, necessity, and future pathways for strengthening adult vaccination approaches, aiming to maximize their contribution as a health protection factor and a promoter of healthy aging.

Over recent decades, in Portugal and worldwide, vaccines have safeguarded our society, particularly our children, from infectious diseases that were once devastating and responsible for millions of deaths. If today we are scarcely aware of the risks and consequences of many of these diseases, it is thanks to the success of vaccination strategies.

However, in the face of a demographic scenario characterized by pronounced aging, accompanied by an increasing burden of chronic diseases and systemic challenges in Global Health – such as the consequences of climate change and antimicrobial resistance – it is crucial to explore and reinforce the role that vaccination can play in society, not just during the early years of life but throughout the entire lifespan.

Vaccination is a social commitment that we must all embrace, from the first to the last of our days. We hope that the findings and recommendations generated within the framework of the +Longevity initiative will serve as a valuable and relevant contribution, enabling everyone – from policymakers to citizens – to recognize it in this light.

Dr. Ricardo Baptista Leite

Message from the *+Longevity* Think Tank Chairman

Reducing morbidity and mortality from vaccine-preventable diseases among adults and the elderly is, today, an opportunity that cannot be overlooked in Portugal, given the significant size of the population aged 65 and older.

Intelligent preventive measures, grounded in the judicious use of innovative vaccines among other actions, have the potential to extend longevity while adding more healthy years to life.

It was within this context that the +Longevity (*+Longevidade*, originally) initiative emerged, promoted by the NOVA Center for Global Health, bringing together experts from various specialties and different generations.

In this regard, it became evident that a significant proportion of premature mortality and excess mortality among adults – particularly the elderly – is attributable to vaccine-preventable transmissible diseases, notably respiratory infections of both viral and bacterial origin.

From a scientific perspective, the effectiveness of vaccination against certain infections is well-established, particularly in reducing the severity of disease, which is also reflected in decreased hospitalizations and reduced need for intensive care treatments.

Achieving this requires ensuring equitable vaccination coverage for the target population, including the most vulnerable individuals. Properly organized vaccination efforts can achieve high coverage rates by immunizing all those who need it.

The State, which already finances multiple vaccination initiatives for adults – including vaccines provided free of charge to at-risk groups and others that are subsidized – must ensure the development of Adult Vaccination through the State Budget. Furthermore, it is well-known that the costs of vaccination are offset by the outcomes it delivers: fewer hospitalizations, reduced admissions to intensive care, and lower expenditures on medications (including savings on the use of antimicrobials).

Dr. Francisco George

Index

Message from the Chairman of the NOVA Center for Global Health 3

Message from the +Longevity Think Tank Chairman 5

List of Abbreviations 8

The +Longevity Initiative 9

Executive Summary 10

The context 13
The demographic challenge and longevity 14
The opportunity of adult vaccination 17

Methodology 21
Timeline of Meetings 23
Panel of participants 23

Vaccine-preventable diseases in adults: what does the future hold? 25
Vaccination as a lifelong prevention axis 27
Adult vaccination in the context of public health policies 28
The healthcare system as a promoter of lifelong vaccination 30

The economic and social impact of adult vaccination prevention 45

A pathway for the future of adult vaccination in Portugal 53

The Recommendations of the +Longevity Think Tank 56

Bibliographic references 79

List of Abbreviations

ACSS	Central Administration of the Health System (Administração Central do Sistema de Saúde)
ANF	National Pharmacies Association (Associação Nacional das Farmácias)
CATS	Health Technology Assessment Commission (Comissão de Avaliação de Tecnologias de Saúde)
COPD	Chronic Obstructive Pulmonary Disease
CTV	Technical Vaccination Commission (Comissão Técnica de Vacinação)
DGS	Directorate-General of Health (Direção-Geral da Saúde)
EU	European Union
GAVI	Global Alliance for Vaccine Initiative
LE	Life Expectancy
MTSSS	Ministry of Labor, Solidarity, and Social Security (Ministério do Trabalho, Solidariedade e Segurança Social)
OECD	Organisation for Economic Co-operation and Development
PAEAS	Action Plan for Active and Healthy Aging (Plano de Ação para o Envelhecimento Ativo e Saudável)
QALY	Quality-Adjusted Life Years
SDG	Sustainable Development Goals
SPMS	Shared Services of the Ministry of Health (Serviços Partilhados do Ministério da Saúde)
UN	United Nations
UNICEF	United Nations International Children's Emergency Fund
WHO	World Health Organization
VPD	Vaccine-Preventable Diseases

Authorship

This report was prepared by the NOVA Center for Global Health (NCGH), in collaboration with the +Longevity project team. The contributions of all team members were instrumental in the development and completion of this project.

Acknowledgments

We would like to extend our deepest gratitude to Dr. Francisco George, Chairman of the +Longevity Think Tank sessions, for his invaluable contributions and guidance throughout this process.

We also express our sincere thanks to the project Ambassadors, Professor Dr. Adalberto Campos Fernandes, Professor Dr. Céu Mateus, and Dr. Filipe Froes, whose expertise and commitment were critical to the success of this initiative.

Finally, we offer special thanks to all the healthcare professionals, researchers, and policymakers who participated in the discussions and Think Tank sessions. Their experience and valuable contributions significantly enriched this project. Their involvement was crucial in creating a comprehensive and multidisciplinary vision on the subject. Below, we list the names of the participants:

Ana Clara Silva
António Teixeira Rodrigues
Cândida Abreu
Carmen Garcia
Diana Costa
Gustavo Tato Borges
Joana Costa
José Hermínio Gomes
Klára Dimitrovová
Luís Filipe Pereira
Luís Mendão
Marta Valente Pinto
Mónica Seidi
Nuno Marques
Raúl Pereira
Ricardo Mexia
Ritá Sá Machado
Sara Cerdas
Sofia Duque

The +Longevity Initiative

The NOVA Center for Global Health coordinated the +Longevity Think Tank, recognizing the importance of fostering reflection within Portuguese society on the enhanced role that vaccines can play as a factor in prevention and in promoting active and healthy aging.

This initiative brings together diverse voices and multidisciplinary perspectives of recognized expertise, with the aim of debating challenges, exploring opportunities, and contributing to the future agenda of actions and policies that can maximize the health benefits of adult vaccination in Portuguese society.

The Think Tank comprised three discussion sessions, each focusing on distinct yet complementary and critical dimensions (clinical, economic, and health policy). These discussions were instrumental in building consensus on a set of priority actions and proposals to be disseminated among policymakers and the scientific community.

The recommendations presented in this report are based on an evidence-driven analysis. While the contributions of participants were considered and served as a foundation for the development of these proposals, the recommendations described here do not necessarily reflect the individual or personal opinions of all participants involved in the process.

This project was supported by GSK Portugal.

The NOVA Center for Global Health

The NOVA Center for Global Health (NCGH) is a scientific research unit integrated into the NOVA Information Management School (NOVA IMS), specializing in the fields of Global Health, Evidence-Based Health Policies, Health Data Science, and Health Technology and Intervention Assessment.

Executive Summary

The reflection that structured the Think Tank was organized around three main pillars, which corresponded to the sequence of the working meetings:

- The population over **65 years old is the age group with the highest growth rate worldwide**[1], and therefore requires adequate health policy responses. In this context, raising awareness about the role vaccination can play in protecting the health and quality of life of adults is of utmost importance;

- Portugal is the **6th OECD country** with the highest average life expectancy after 65 years of age. However, it **ranks 4th worst** when considering the years of healthy life after this 65-year benchmark[2]. Projections indicate that, in the next 30 years, **over one-third** of the Portuguese population will be over 65 years old[3];

- Achieving life expectancy gains is important, but efforts must also focus on ensuring its **quality**.

- In the European Union (EU), **48% of countries already have a vaccination strategy specifically targeted at adults**, either through a vaccination schedule (standalone or integrated into a lifelong vaccination program) or through communication and awareness campaigns specifically aimed at this population[4];

- **Vaccination provides health and economic benefits, widely substantiated by evidence**. Investment in vaccination has been shown to be cost-effective, delivering health gains that far outweigh the health consequences that would arise in a context where vaccination strategies and innovations were not available or covered by the NHS;

- It is essential for the country to, while honoring the historical success of the National Vaccination Program in Portuguese society, recognize vaccination as a significant contributor to harmonizing longevity with quality of life;

- As part of this initiative, a review of existing literature in the European context was conducted to quantify the economic impact of vaccine-preventable diseases in adults. This analysis demonstrated that, in several **European Union countries with some similarities to Portugal**, these diseases result in annual impacts amounting to **hundreds of millions of euros**. Based on data gathered for different national contexts, an extrapolation of the economic and social impact – including medical costs for disease management and indirect costs related to productivity losses and, in some cases, social benefits – was made for the Portuguese context. The calculated values suggest an aggregate annual economic impact of **€245.4M**, encompassing the following diseases: **Pneumococcal Disease, Influenza, Human Papilloma Virus (HPV), Herpes Zoster (Shingles), and Respiratory Syncytial Virus (RSV)**;

- Viewing vaccination as a health policy has focused both on its ability to reduce specific mortality associated with various diseases and on the health gains derived from reduced morbidity. Vaccination not only prevents deaths but also decreases the severity of diseases, reducing hospitalizations and complications while improving the population's quality of life. It is important to discuss various costs, reflecting as a society on the l**ong-term economic and social benefits generated by vaccination**. Specifically regarding adult vaccination, it is estimated that vaccination programs targeting adults generate an economic return to society **19 times** greater

than the investment[5], alongside humanistic gains and reduced pressure on healthcare systems;

- Although the direct benefits of vaccination to the country are widely recognized, it is crucial to foster political consensus on the importance of strengthening investment in adult vaccination protection.

- In an effort to contribute to strengthening policies in this area, the +Longevity Think Tank developed a set of **21 recommendations**, organized into **three main axes**:

1. Investment in Prevention and Healthy Aging

- Adult Vaccination Program
- Literacy Narrative for Adult Vaccination and Longevity
- Integration of mechanisms in the preventive approach
- Assessing the impact of vaccination in addressing Global Health challenges
- Redefining management indicators for vaccination strategies
- Personalization in data collection and management
- Incentive models for community prevention

2. Healthcare System Capacity and Community Synergies

- Strengthening the intervention of Community Care Units (CCU) and Public Health Units (PHU)
- Enhancing installed capacity and synergies for surveillance
- Conducting a study to evaluate barriers to adult vaccination access
- New financing models for vaccination
- Multi-annual contracting of vacines
- Platform for best practices in vaccination strategy and coverage management
- Co-financing complementary interventions for vaccination coverage

3. Safeguarding the Commitment of the Adult Population to Vaccination

- Transparency and quality in communication and dissemination of evidence
- Population segmentation in narratives and action lines
- Real-world simulation and impact assessment of vaccination strategies
- Multisectoral cooperation to promote literacy
- Strategic alignment with the Action Plan for Active and Healthy Aging (PAEAS - *Plano de Ação para o Envelhecimento Ativo e Saudável*)
- Investment in strategies for infodemiological management
- Interventions supported by behavioral science algorithms

The context

The context

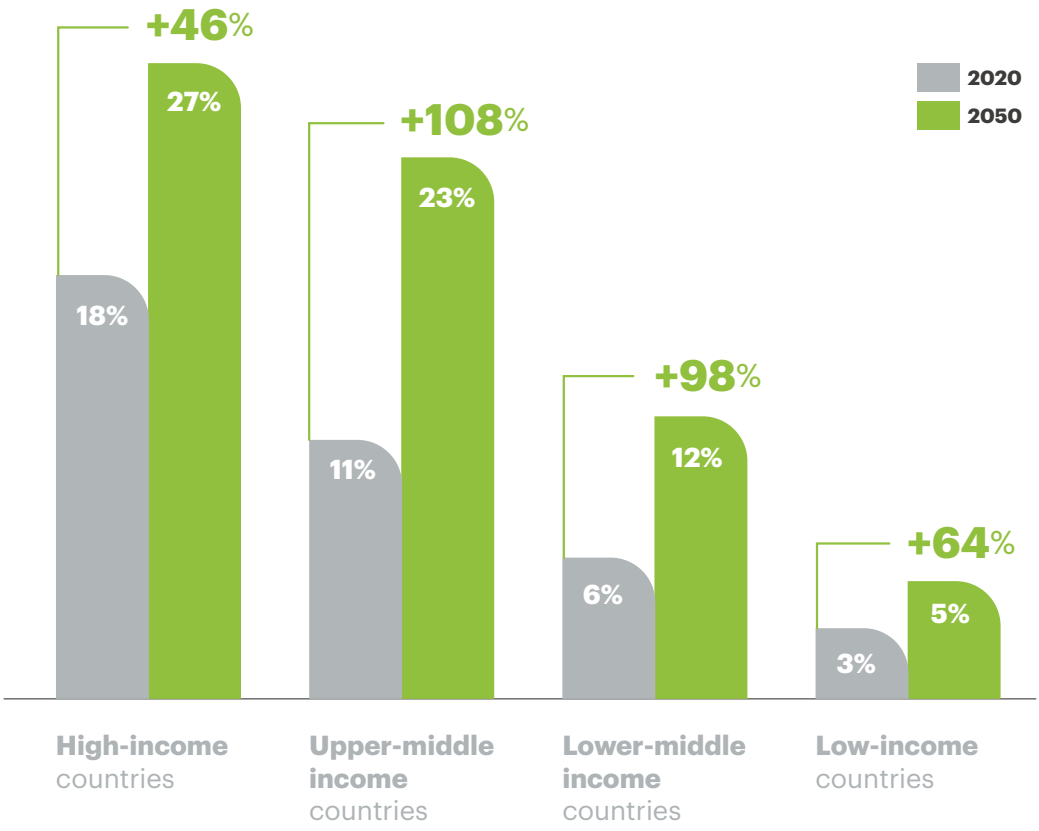
The demographic challenge and longevity

The world is currently facing a global trend of demographic aging. The population **aged 65 and older** represents the age group with the **fastest growth rate**, both in the present and projected for the future[1]. Contrary to common perception, this trend is not limited to more developed or higher-income countries but is, in fact, a phenomenon encompassing all populated regions of the planet.

By 2050, it is estimated that **1 in 6 people will be over the age of 65**, and the number of individuals aged 80 and older will triple. The factors driving this demographic transformation are diverse. However, economic and technological progress, particularly innovation in mechanisms that ensure health protection and care, play a particularly significant role. On the other side of the equation, the influence of contemporary economic and social contexts (as well as sociological evolution) on birth rates also contributes to a net increase in the proportion of the population living to more advanced ages.

Populations that are better protected against once-lethal pathogens, with higher levels of education and literacy, often benefiting from improved access to healthcare and social protection, and exposed to better socioeconomic conditions throughout their lives, tend to experience extended horizons of longevity.

In Portugal, projections indicate that over the next 30 years, more than 1 in 3 people will be over the age of 65[3]—an evolution that surpasses the average forecast for Europe.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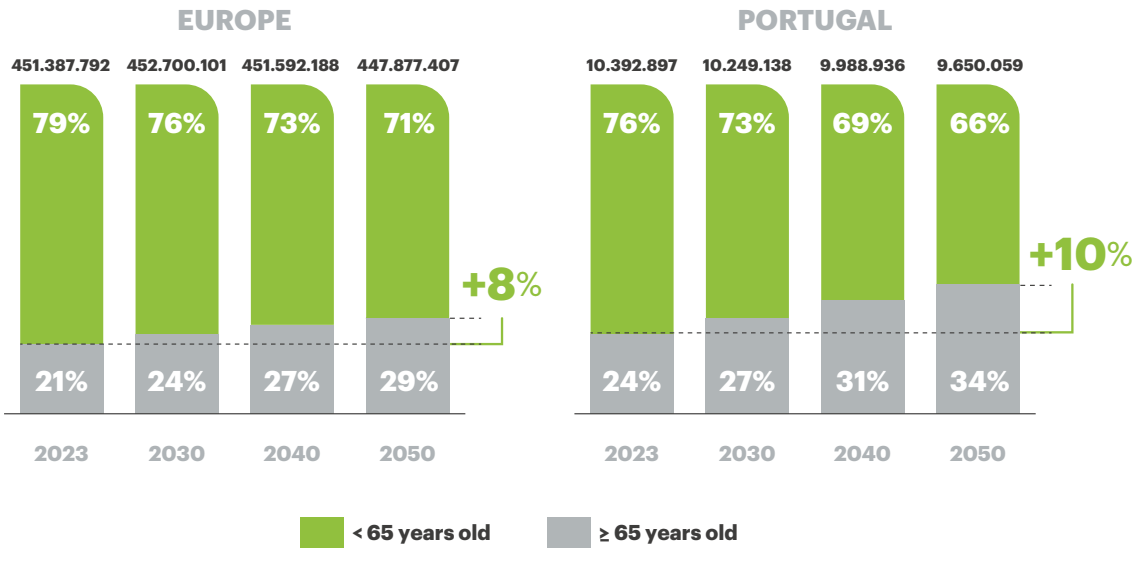
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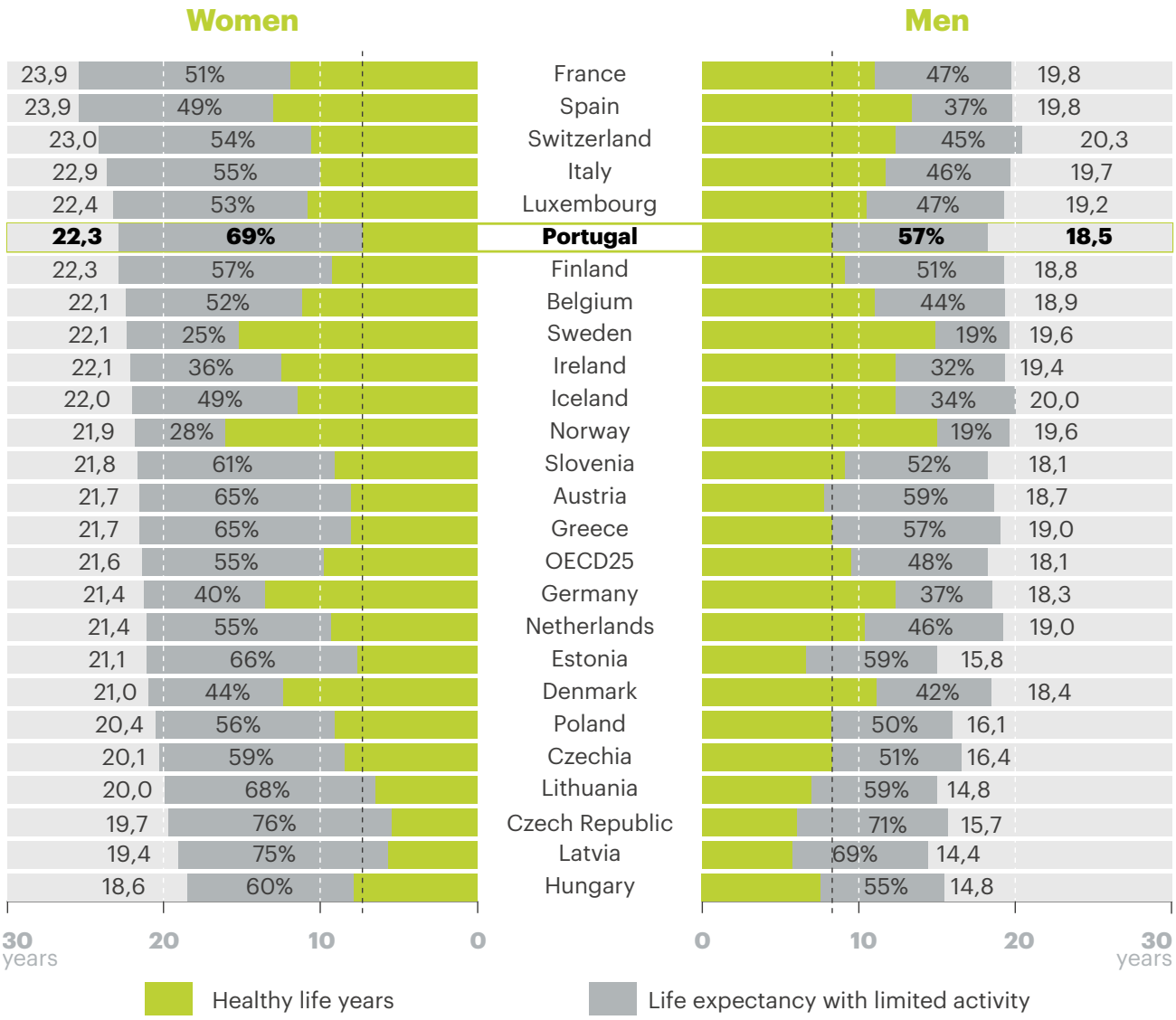
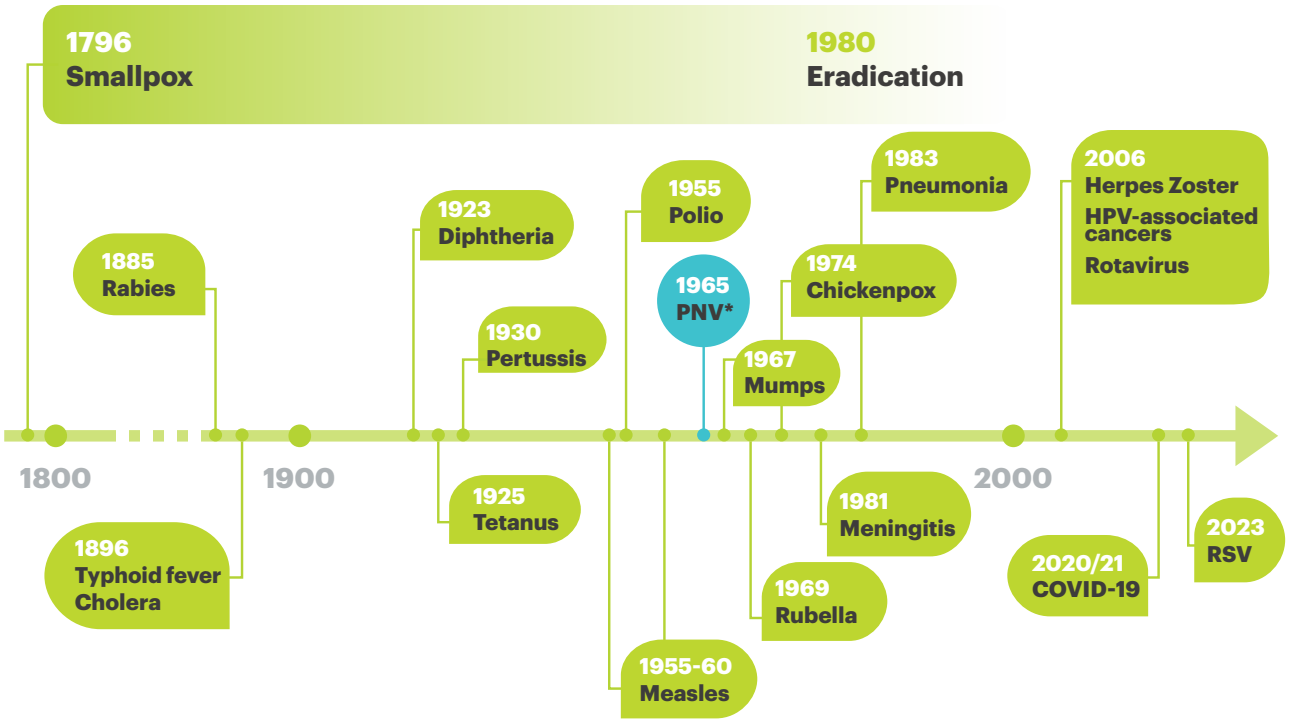
Among OECD countries, average life expectancy (LE) has increased by 5.7 years over the past five decades[2]. Nevertheless, the prospect of living longer does not guarantee that these additional years will be lived with quality. This is primarily due to the gradual and natural deterioration to which the human body is inevitably subject. In parallel with demographic aging, there is an equally significant trend in the increased prevalence of non-communicable chronic diseases (such as cardiovascular, respiratory, mental, and oncological diseases). However, thanks to therapeutic technological innovation, society now has mechanisms to better control clinical manifestations, slow disease progression, and prevent potential fatal complications.

In 2019, OECD countries reported that, on average, people live an **additional 20 years beyond the age of 65**, but **only 10 of those years are lived with quality**[6]. Currently, Portugal ranks as the **6th OECD country** with the highest life expectancy after age 65. However, it holds the **4th worst position** when considering the number of years lived in good health beyond this 65-year benchmark.



The opportunity of adult vaccination

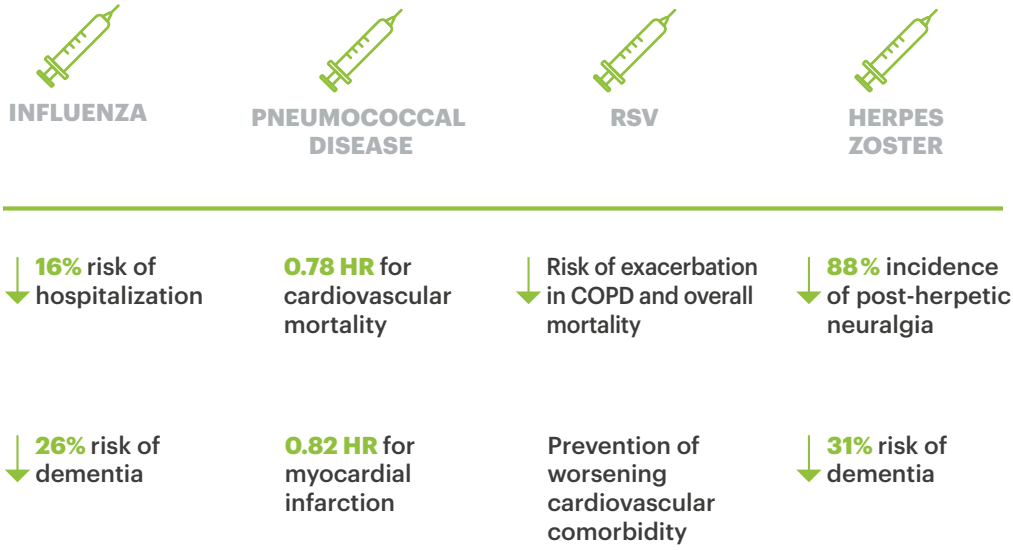
Vaccination is one of the most significant achievements in Public Health and human history, ranked among the ten most impactful milestones in the history of humanity, surpassing innovations such as the car, the clock, and the mobile phone[7]. Over 200 years after Edward Jenner's groundbreaking experimental discovery, vaccines have remained a critical ally in protecting humans (and animals) against biological threats and infectious agents. In their absence, these threats would have a potentially devastating impact on human health and communities[8], representing one of the most extraordinary intersections of science, technology, and health policies.



*National Vaccination Program

Vaccination is, undoubtedly, one of the most cost-effective health interventions worldwide. Vaccines today have the ability to protect humans against more than 30 diseases throughout life, preventing between **3.5 and 5 million deaths annually across the globe**[9]. In Portugal, the history and achievements of the National Vaccination Program are a clear testament to its importance and the health gains it has delivered.

Beyond the potential to prevent specific infections, vaccination targeting the adult population helps to avoid more severe manifestations of those infections[10,11], protect the body from the worsening of pre-existing comorbidities[12-14], and even prevent the onset of other diseases, such as dementia[15].



In a post-pandemic era that has proven vaccines protect at any age, and in light of a global demographic trend urging a new approach to aging, longevity, and well-being policies, the importance of emphasizing the benefits of adult vaccination in this context becomes increasingly evident.

Beyond the protective role commonly associated with pediatric vaccination, adult vaccination offers a critical dimension for promoting health and well-being throughout life.


BD

Methodology

Methodology

The Think Tank consisted of three discussion sessions designed to optimize the collection of insights and contributions on the clinical, economic, and policy dimensions related to the health needs that adult vaccination policies aim to address.

The meetings were held in person at NOVA IMS (Campolide Campus).

The panel of participants aimed to bring together a multidisciplinary, diverse, and representative group of individuals from various sectors of the healthcare ecosystem, with both direct and indirect exposure to the management of Portugal's national vaccination policy.

This panel of individuals was distributed across the sessions according to their alignment with the specific dimension proposed for discussion.

The contributions gathered were compiled and integrated with data and evidence obtained through the project's literature review, culminating in this report.

General Objectives

- Assess the evidence related to the burden and impact of vaccine-preventable diseases in adults in Portugal;
- Identify and share best European practices in this area;
- Promote a multidisciplinary reflection on the importance of enhanced action to optimize health gains through adult vaccination;
- Develop a framework proposal for Adult Vaccination in Portugal;
- Raise awareness and mobilize various stakeholders in the health sector around the identified needs, opportunities, and priority actions.

Timeline of Meetings

April 10 — **MEETING 1**

Vaccine-preventable diseases in adults: what does the future hold?

Discussion on the importance of raising awareness and strengthening the role of adult vaccination policies as a protective factor for health, quality of life, and longevity, specifically through the proposal of an Adult Vaccination Program.

April 24 — **MEETING 2**

Economic and social impact of vaccine-preventable diseases in adults

Focus on the economic impact dimensions (both direct and indirect) associated with these diseases, followed by a reflection on the importance of investing in vaccination and a discussion on the potential need to strengthen this investment and the organizational capacity of the healthcare system to maximize health and quality-of-life outcomes in the adult population.

May 8 — **MEETING 3**

A pathway for the future of adult vaccination in Portugal

Multidisciplinary discussion aimed at jointly identifying priorities, recommendations, and action plans to address the needs identified in previous sessions, thereby contributing to the strengthening and effectiveness of communication, monitoring, and vaccination coverage management policies for the adult age group.

June - September — **PUBLIC DISSEMINATION STRATEGY OF THE THINK TANK +LONGEVITY CONCLUSIONS**

Panel of participants

CHAIRMAN
Francisco George

PARTICIPANTS
Adalberto Campos Fernandes
Ana Clara Silva
António Teixeira Rodrigues
Cândida Abreu
Carmen Garcia
Céu Mateus
Diana Costa
Filipe Froes
Gustavo Tato Borges
Joana Costa
José Hermínio Gomes
Klára Dimitrovová
Luís Filipe Pereira
Luís Mendão
Marta Valente Pinto
Mónica Seidi
Nuno Marques
Raúl Pereira
Ricardo Mexia
Rita Sá Machado
Sara Cerdas
Sofia Duque

1.

Vaccine-preventable diseases in adults: what does the future hold?

Vaccine-preventable diseases in adults: what does the future hold?

The challenge posed to the discussion panel in Meeting 1 was fundamentally clinical: to frame the needs, challenges, opportunities, and priorities to be considered within the scope of health policy interventions. The aim was to continue the trend of mitigating the burden of vaccine-preventable diseases and to enhance the scale and recognition of vaccination's contribution to promoting quality of life and preventing the progression of other conditions, where the association with vaccines is still minimal in the community (e.g., cardiovascular disease, dementia, etc.).

Thus, **Meeting 1** adopted the following angles of analysis and reflection: :

- The burden of vaccine-preventable diseases in adults and the epidemiological trends of recent years in Portugal and Europe;
- The current European context of National Vaccination Programs;
- The challenges, barriers, and opportunities to advance the concept of adult vaccination;
- Vaccination as a factor promoting greater longevity and healthy aging;
- What framework should be established for an Adult Vaccination Program? What best practices can be adopted from other European countries?

Vaccination as a lifelong prevention axis

In 2024, we mark the 50th anniversary of the Expanded Programme on Immunization (EPI), an initiative by the WHO aimed at achieving universal and equitable access for children worldwide to vaccination strategies against an initial set of six vaccine-preventable diseases. A comprehensive analysis and modeling of the impact of this historic milestone over the past 50 years unequivocally demonstrate its benefits: **154 million** deaths averted, **9 billion** years of life gained, and **10.2 billion** DALYs avoided globally[16].

As an innovation segment that proves most valuable among the populations with greater immunological fragility – the youngest and oldest members of society – vaccines and their corresponding immunization strategies have historically been designed to maximize life expectancy at birth. The resulting health gains are grounded in the perspective of continued protection throughout life, based on the greater effectiveness of immunological memory during early life compared to immune stimulation at older ages.

In the more developed regions of the world, the widespread adoption of vaccination seems to have consolidated two ideas that pose challenges for contemporary health systems: the broadly held perception that vaccination is an intervention almost exclusively for children and the confidence that pediatric vaccination provides lifelong protection.

It is essential to reshape this perception and build public awareness that vaccination should remain relevant throughout life, both because immune competence deteriorates over time (a phenomenon known as immunosenescence) and because scientific progress and significantly increased life expectancy have led to the development of more vaccines specifically indicated for older ages.

The achievement of longer life expectancy is important and reflects the collective success of health and sanitation policies, social development and solidarity, education, and territorial cohesion. However, this success entails increased collective responsibilities: living longer years requires progressively greater efforts and a focus on ensuring these years are lived to the fullest, with **quality**. This is particularly crucial in the context of the growing burden of chronic diseases, coupled with the inevitable gradual decline of various essential bodily functions, including immune capacity.

Raising awareness among populations and professionals about the role vaccination plays in protecting the health and quality of life of adults is, therefore, of great importance. Clinical specialists participating in this initiative's Think Tank sessions emphasized that the current profile of individuals in older age groups is significantly different from the past, thanks to the ongoing impact of new generations of medicines and therapeutic solutions, improved living conditions, and other factors. Despite the systemic challenges identified, there are now more elderly individuals with profiles favoring activity and the preservation of their physical and mental functionality, along with greater encouragement for socialization.

However, social, geographic, and economic disparities reveal parallel effects of ageism in segments of the older population. Ageism, characterized by stereotyping and discrimination based on age, can lead to a devaluation of health-promoting behaviors in the elderly.

It is necessary to mobilize policymakers and civil society to recognize that health interventions and public policies aimed at prevention cannot be exhausted by focusing solely on lifestyle improvements. Strategic planning must also fully leverage the protective potential of vaccination across all stages of life.

The success of this approach begins with the need to reshape the perception of the role of vaccines

within the community. This path must be driven by political, scientific, and clinical leaders and unfold along two axes of public awareness and health education:

- IInvesting in a narrative that promotes vaccination as a continuous intervention throughout life, ensuring that all age groups—from childhood to adulthood and senior years—understand the importance of vaccination across the lifespan.

- Strengthening the perceived value of adult vaccination, particularly at older ages, by challenging the misconception that the benefits of vaccination beyond a certain age are limited or even nonexistent.

As vaccination programs have been highly successful, particularly in wealthier countries, many people perceive diseases that have disappeared or significantly declined in epidemiological relevance—such as tetanus, diphtheria, pertussis, measles, and polio—as negligible risks, which in itself poses a public health risk.

Differences must be considered when managing adult vaccination strategies compared to the pediatric context. Strengthening policy agendas in this area does not mean merely replicating pediatric or adolescent interventions in another age group.

Due to the progressive weakening of immune competence, the potential efficacy of vaccines can be lower: some available vaccines do not exceed 50% efficacy, with a tendency to decrease further as individuals age.

However, even without fully mitigating the likelihood of infection and subsequent transmission, vaccination reduces the burden of disease and its potential impact on the individual's quality of life and the healthcare system as a whole.

> "People often struggle to understand that vaccination aims to reduce the complications of a disease. It is harder to advocate for the effectiveness of this intervention when it is intended to prevent something that may still occur (the infection), albeit in a milder form"

The trust factor in vaccine technology must also be considered. Several Think Tank participants reported that their clinical experience revealed a frequent lack of patient confidence rooted in myths and misconceptions. Sometimes, this lack of trust pertains to specific vaccines (e.g., there is often greater resistance to the COVID-19 vaccine compared to others).

Vaccination is one of the most politically engaged areas of healthcare, as it involves elements of public trust and citizenship that are fundamental. In response to the denialist movements that emerged during and after the pandemic, which heightened vaccine skepticism in certain segments of the population, vaccination must be reinforced as a civic act of self-protection and protection of those around us.

Adult vaccination in the context of public health policies

In line with the global successes and impacts achieved, vaccination in Portugal is also recognized as one of the most significant areas of accomplishment in preventive Public Health. The **National Vaccination Program** was implemented on October 4, 1965, ensuring universal and free access to vaccination, as promoted globally by the WHO. It contributed to the eradication of smallpox, the elimination of five diseases, and the control of seven others at the national level.

The legacy of achievements and the work carried out by the coordinating teams of the National Vaccination Program and the Vaccination Technical Commission (CTV), established in 1998, under the direction of the Directorate-General of Health in collaboration with other regulatory agents and sector entities, positions Portugal as a reference country regarding its citizens' trust in vaccines. Portugal leads the EU in this regard, with **75% of its population considering vaccines important, safe, and effective**[17] (despite some decline in trust levels in the post-pandemic context).

Participants advocate that Portugal should leverage its historical success with vaccination to deepen areas of intervention and innovation. These advancements would allow the country to further embed the narrative of lifelong vaccination and strengthen specific actions targeting adults. This approach aligns with trends and measures observed in recent years in an increasing number of European countries, as detailed later in this report.

At a broader strategic level, vaccination is also recognized in the **National Health Plan 2021–2030**[17] as a crucial vector for addressing several systemic Public Health challenges, including the prevention of the reemergence of vaccine-preventable diseases due to climate change, combating antimicrobial resistance, and ensuring universal health coverage. It also emphasizes the continued reinforcement of existing vaccination strategies. Although the specific contribution of adult vaccination to these goals is not explicitly mentioned, it is reasonable to assume that, given the current context and the outlined timeline, this could become a prominent area of intervention.

Additionally, since 2023, Portugal has also implemented the **Active and Healthy Aging Action Plan 2023–2026** (**PAEAS** - *Plano de Ação para o Envelhecimento Ativo e Saudável*), which highlights the fundamental importance of primary prevention and health literacy as key elements for ensuring better quality of life and improved health indicators in older ages. While the connection to vaccination is not explicitly made, several intervention areas are highlighted where its role as a contributory factor for healthy longevity could be enhanced in the national context[18].

Strengthening the role of health policies aimed at promoting adult vaccination in the near future presents challenges and barriers of various natures, which must be addressed to ensure their success:

ACCESS	RESOURCES	LITERACY	INFORMATION	HETEROGENEITY
Geographic dispersion	Financial (public and out-of-pocket)	Misinformation and skepticism	Monitoring of vaccination coverage	Vaccination recommendations
Socioeconomic contrasts	Technical	Health professionals	Epidemiological mapping	Social and health profile of adults
Health care network	Physical	Civil society	Identification of at-risk population	

At the international level, numerous policy guidance documents (WHO, UN, European Council) encourage and emphasize the importance of taking action to strengthen lifelong vaccination as a means of safeguarding healthy aging while simultaneously addressing systemic challenges that affect not only healthcare systems but society on a global scale.

1 **CHRONIC DISEASE**
Protection of the body against the development or worsening of comorbidities associated with NCDs (Non-Communicable Diseases)

2 **HEALTHY AGING**
The recognized protective role of functionality and quality of life in the individual against the worsening of immunosenescence

3 **ANTIMICROBIAL RESISTANCE**
Prevention of infectious disease episodes, mitigating the individual's often incorrect exposure to antibiotic therapy

4 **CLIMATE CHANGE**
Safeguarding public health protection against expected outbreaks and changes in pathogen dynamics due to global warming

5 **HEALTH EMERGENCIES**
Clear leadership in protecting the community against future health threats

6 **UN SDGS (SUSTAINABLE DEVELOPMENT GOALS)**
The contribution of vaccines to community health protection impacts directly or indirectly 14 out of the 17 United Nations Sustainable Development Goals

It is important to highlight the protective effect that science has demonstrated between vaccination and the reduced risk of dementia, cardiovascular events, and the progression of chronic respiratory diseases[19].

Experts also underscore the critical importance of enhancing the role of vaccination as a vector in combating antimicrobial resistance, a phenomenon classified by the WHO as one of the greatest threats to human and animal health. The dynamics of infectious diseases are constantly evolving, and the healthcare system must be prepared for future outbreaks and pandemic events, which will always pose a risk in an increasingly globalized society.

The healthcare system as a promoter of lifelong vaccination

The mechanisms for incentivizing, raising awareness, ensuring coverage, and monitoring the effectiveness of vaccination strategies within the Portuguese healthcare system, particularly the National Health Service, are fundamentally aligned with the execution principles outlined by the Directorate-General of Health and the National Vaccination Program. These are further complemented by indicators associated with specific vaccination strategies (e.g., influenza, COVID-19).

It is essential to consider the integration of certain aspects of organizational management and the tools available within the healthcare network to ensure that actions are continuously monitored.

To enhance the healthcare system's role in increasing vaccination coverage rates in the adult population, the following key factors were highlighted:

1. Active recommendation by a healthcare professional

2. Universal accessibility to vaccine innovations

3. Communication and health literacy

Health literacy must be a systemic responsibility, encompassing all sectors of society. One of its fundamental pillars is healthcare professionals, who play a critical role in encouraging and promoting vaccination. However, their success depends on a collective effort involving care-providing units, multidisciplinary teams, and other community stakeholders.

Investment in strategies to inform and motivate individuals about vaccination should be reinforced as a means to mitigate hesitancy and resistance. The role of nurses, in particular, was emphasized as health education agents due to their unique position of proximity and frequent contact with patients. Additionally, a multichannel approach, including the role of community pharmacists and the pharmacy network, was noted as an important element to be strengthened.

Strengthening health education and the importance of adult vaccination requires a communication plan that leverages the most modern tools.

During the discussion, it was noted that not all general practitioners and nurses are fully updated on the available vaccines and specific needs related to adult vaccination, presenting challenges for continuous training and communication programs.

Although the main theme of the Think Tank sessions was adult vaccination, the proposed interventions should not focus solely on age progression. There are relatively young adults with vulnerabilities, such as risk factors or oncological diseases, that increase their susceptibility to infections, necessitating the implementation of specific interventions for these groups as well.

Many of the communication and intervention tools currently in use still focus on adult vaccination, which would contribute to the promotion and success of campaigns and the achievement of objectives. Communication should target not only citizens but also the entire healthcare ecosystem, including healthcare professionals, public and private organizations, policymakers with an impact on health, and other entities within civil society that are directly or indirectly related to health.

> **"**
>
> **A reimagined approach is needed to highlight the negative consequences of certain diseases for society. The health impacts – and their effects on the healthcare system – are not sufficiently recognized.**

It is critical to have reliable data, which requires a robust system for monitoring vaccination coverage and epidemiological surveillance.

The Think Tank participants acknowledged certain limitations in the vaccination registration process. Similarly, surveillance systems, both national and international, still exhibit a significant degree of underreporting.

It is desirable for society to gain greater awareness of the benefits achieved through vaccination.

The burden of vaccine-preventable diseases in adults

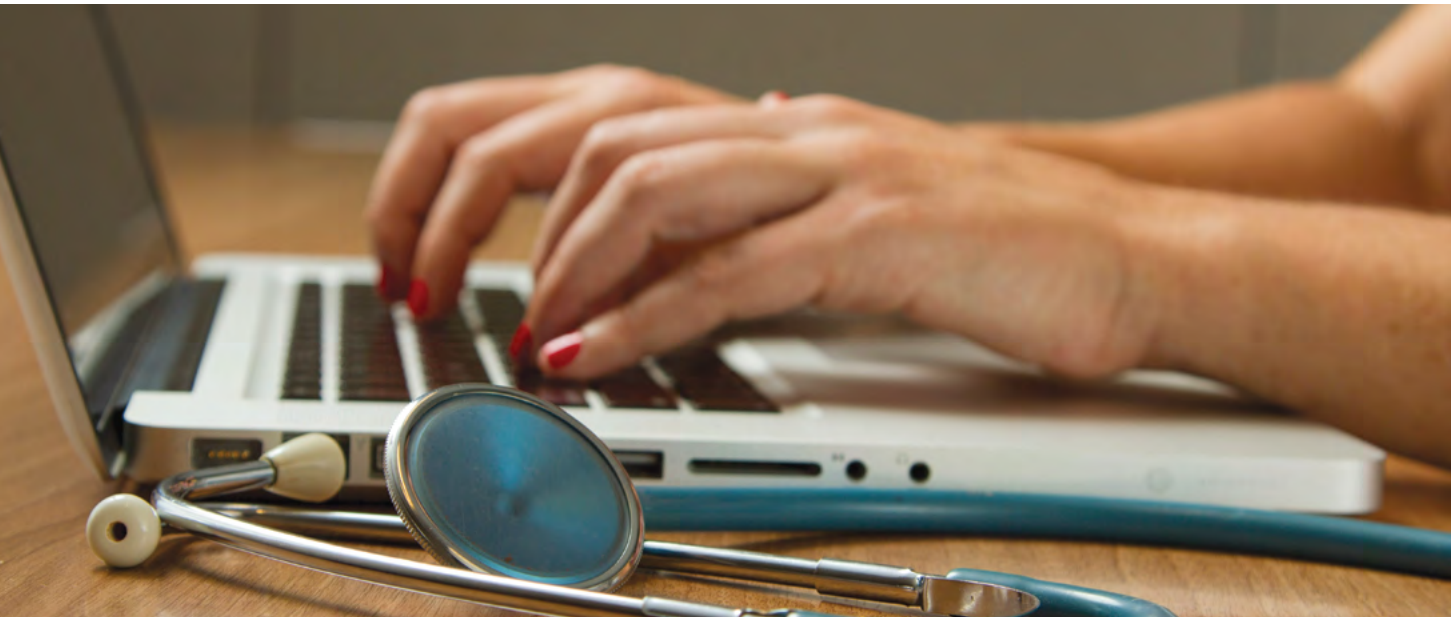
Two hundred years after the development of the first vaccine, despite significant disparities in access to vaccine innovation on a global scale, the reality regarding the threat and burden of diseases caused by infectious agents has changed dramatically. For several diseases, vaccines are now available, presenting a vastly different scenario compared to just over 50 years ago. It is estimated that 40% of the reduction in child mortality during this period has been directly achieved through vaccination interventions[15].

Beyond the benefits brought by immunization programs progressively implemented to eradicate or significantly reduce the presence of various pathogens within the pediatric population, the current context calls for strengthened responses to ongoing epidemiological challenges that more acutely impact the adult population.

An analysis and comparison of various national immunization programs within the European context indicate that the burden of vaccine-preventable diseases with indications for administration in adults is primarily associated with the following conditions: **tetanus, diphtheria, pertussis, pneumococcal disease, HPV-related disease, respiratory syncytial virus (RSV) disease, shingles (herpes zoster), and influenza**. The scope of this analysis does not include COVID-19, although its impact and the need for specific vaccination responses were addressed during the discussions.

Building on the current framework for adult vaccination, one of the key objectives of the Think Tank +Longevity was to highlight the health impacts and outcomes associated with the success of adult vaccination policies, beyond their direct effect on reducing the incidence, morbidity, and mortality of the primary infections they prevent.

The following sections describe the epidemiological impact profile and specific risks in adulthood associated with these pathogens.



Tetanus

Tetanus

Tetanus is a severe acute infection, often fatal, caused by the toxin of the tetanus bacillus (*Clostridium tetani*).

It is not transmissible between humans, circulating in spore form through soil or via the feces of animals (such as cats, dogs, rats, horses, chickens, among others).

Entry into the human body occurs through wounds and skin lesions.

EPIDEMIOLOGY

- Over the past decades, the number of recorded cases and deaths caused by tetanus has decreased drastically due to vaccination strategies.
- Between 1990 and 2019, global incidence dropped by 88%[20].
- In the last decade, the EU recorded an annual average of 76 cases[21].

PATHOPHYSIOLOGY

- The symptoms associated with C. tetani infection are caused by the action of an exotoxin (released by the bacterium in the body) known as tetanospasmin.
- This exotoxin binds irreversibly to peripheral nerve endings, ultimately blocking the release of inhibitory neurotransmitters, leading to muscle spasms, cramps, and seizures. Once bound, the toxin cannot be neutralized, making vaccination the only way to prevent its consequences.

RISK PROFILE IN ADULTS

- Age over 40 is a factor that increases the likelihood of a fatal outcome from infection[22].
- In Italy, where tetanus cases have been more prominent in recent years, 92% of cases occurred in individuals over 65 years old[20].
- In 2021, 57% of tetanus cases reported in Europe occurred in individuals over 45 years old[21].

VACCINATION

- Immunological protection against tetanus is provided through several vaccines available on the market.
- In Portugal, the National Vaccination Program includes a vaccine to be administered at 2, 4, 6, and 18 months, and at 5, 10, 25, 45, and 65 years of age, followed by boosters every 10 years.
- Additional vaccination is recommended during pregnancy.

Pertussis

Pertussis

Whooping cough, also known as pertussis, is a highly contagious respiratory disease caused by the gram-negative bacterium *Bordetella pertussis*.

The infection occurs exclusively in humans and is transmitted through aerosolized respiratory secretions. Each case can infect 12–17 individuals[23].

A disease outbreak does not confer natural immunity, and currently, unvaccinated adolescents and adults serve as a significant reservoir.

EPIDEMIOLOGY

- Between 1990 and 2019, the global incidence rate decreased by approximately 41%, and the number of DALYs associated with the disease declined by 55%[20]. However, in the past 12 months, there has been a resurgence in Eastern Europe, reversing the historical trend.
- Although primarily associated with younger ages, in several European countries, the rate of confirmed cases in adults exceeded 50%, with an incidence among individuals over 50 years of age estimated at 5.8 to 7.6 per 100,000 individuals[24].

PATHOPHYSIOLOGY

- *B. pertussis* invades the respiratory mucosa, increasing mucus secretion, which initially is liquid and later becomes thick and viscous.
- The characteristic cough associated with this disease can lead to incontinence, syncope, and even rib fractures. Other complications, such as apnea, pneumonia, sinusitis, and otitis media, also increase with age.

RISK PROFILE IN ADULTS

- In adults with other comorbidities, the risk of incidence is heightened (e.g., in patients with asthma and COPD, the risk of developing complications from the disease is 4.12 and 2.82 times higher, respectively)[25].
- A study conducted in Portugal showed that the case-fatality ratio (CFR) in hospitalized patients increased substantially with age (from 0.8% in patients under 1 year to 17.4% in patients over 65 years)[26].

VACCINATION

- The National Vaccination Program in Portugal includes the administration of 5 doses of the acellular pertussis vaccine at 2, 4, 6, and 18 months, and at 5 years of age.

Diphtheria

Diphtheria

Acute pharyngeal or cutaneous infection primarily caused by the gram-positive bacillus *Corynebacterium diphtheriae,* which remains endemic in various regions of the world, including Eastern Europe.

Before the introduction of the vaccine (post-World War II), it was one of the leading causes of death in children and young adults[27].

Humans are the only known reservoirs of this bacterium, which is transmitted through secretions or contact with lesions on the skin.

EPIDEMIOLOGY

- The incidence rate is low in the European geographical context, with an average of 96 cases reported annually over the last decade. This figure was influenced by a peak in incidence recorded in 2022, with 356 cases reported[21].
- The global vaccination strategy has reduced cases by more than 90% between 1980 and 2000[28].

PATHOPHYSIOLOGY

- The C. diphtheriae bacillus is generally harmless, but when infected by a beta-phage (a type of virus), it produces diphtheria toxin, which causes inflammation and necrosis of local tissues and subsequently damages the heart, nerves, and, occasionally, the kidneys[29].
- In mild cases, symptoms can be mistaken for a common cold. In more severe manifestations, it can cause death due to airway obstruction, myocarditis, and cranial neuropathy[30].

RISK PROFILE IN ADULTS

- Before 1980, individuals over 20 years of age accounted for only 17% of reported cases. Since then, the proportion of adult cases has increased significantly (to approximately 36%), largely due to the absence of vaccination.
- In unvaccinated individuals, the fatality rate can reach up to 30%[31];

VACCINATION

- The National Vaccination Program includes a vaccine to be administered at 2, 4, 6, and 18 months, and at 5, 10, 25, 45, and 65 years of age, followed by boosters every 10 years.
- The vaccine should also be administered during pregnancy.

Pneumococcal disease

Pneumococcal disease

Pneumococcal disease is triggered by infection with *Streptococcus pneumoniae,* a bacterium commonly colonized in the nasopharynx and transmitted via airborne droplets.

This pathogen exists in nature with 95 different serotypes, each exhibiting a distinct pathogenic profile[32].

EPIDEMIOLOGY

- The disease caused by this infection is one of the leading causes of morbidity and mortality worldwide, accounting for 1.6 million deaths annually[33].
- Although a pediatric vaccination strategy exists, the proportion of persisting cases suggests that the indirect protective effect may not be sufficient to prevent its incidence in the most vulnerable adults.

PATHOPHYSIOLOGY

- Infection by this bacterium manifests as either invasive pneumococcal disease (pneumonia, bacteremia, and meningitis) or non-invasive disease (otitis media, sinusitis, and non-bacterial pneumonia)[33].

RISK PROFILE IN ADULTS

- Age >65 years, seropositivity, pre-existing chronic disease, and immunosuppression are risk factors[34].
- Pneumococcal disease accounts for 30% of hospitalizations due to community-acquired pneumonia in adults[35].
- 10% of individuals aged 60–65 are carriers of *Streptococcus pneumoniae,* with evidence indicating a high risk of pneumococcal colonization in the healthy adult population.

VACCINATION

- The National Vaccination Program includes pneumococcal vaccination in childhood with 3 doses, administered at 2, 4, and 12 months.
- Additionally, citizens aged 65 and older receive a 69% subsidy for booster vaccination with Pn13 or Pn23, with the booster fully subsidized for individuals classified as at-risk.

Influenza

Influenza

Influenza, commonly known as the flu, can be caused by four types of Influenza viruses (A, B, C, D), with A and B being the most prevalent during flu seasons.

The virus spreads through aerosolized droplets, interpersonal contact, or via contaminated objects.

Due to its constant mutation, the virus is able to evade the immune memory acquired from previous infections.

EPIDEMIOLOGY

- It is estimated that each flu season affects approximately 5–10% of the adult population[36].
- In the European region, complications associated with the flu are estimated to cause 72,000 deaths annually[37].

PATHOPHYSIOLOGY

- Influenza infection primarily affects the respiratory tract. Using a surface glycoprotein called hemagglutinin, the virus fuses with the cell membrane in the respiratory epithelium, leading to pulmonary or potentially systemic inflammation.
- Although most people recover from common symptoms within two weeks, in many cases, the disease can progress to more severe stages, requiring hospitalization and even leading to death.

RISK PROFILE IN ADULTS

- 88% of deaths associated with the flu occur in individuals aged >65 years.
- The mortality rate from infections is significantly higher in the >65 age group, being approximately 35 times greater compared to young and middle-aged adults[38].
- Influenza infection worsens pre-existing comorbidities, particularly those of cardiovascular, neurological, renal, respiratory, and diabetic nature.
- Studies show an increase in cardiovascular-related mortality during flu season, with this correlation being proportional to age[39].

VACCINATION

- Since 2023, the flu vaccine has been made available free of charge to all citizens over 60 years old and to at-risk groups.

Human Papillomavirus (HPV)

Human Papillomavirus (HPV)

HPV infection is one of the most common sexually transmitted infections worldwide.

Approximately 200 different types of this virus have been identified, with an estimated 85–90% of the sexually active population being infected, most cases being asymptomatic[40].

However, certain HPV serotypes (particularly subtypes 16 and 18, responsible for 70% of cases) are strongly associated with the development of several types of anogenital cancers, particularly cervical cancer.

EPIDEMIOLOGY

- In Europe, HPV prevalence is estimated at 14.2% in the female population and 12% in the male population.
- 2.5% of cancer cases in Europe each year are associated with HPV infection, 20% of which occur in men[41].

PATHOPHYSIOLOGY

- The viral agent targets the epithelial tissue of the skin or mucous membranes, with particular affinity for the surfaces of the feet, hands, and anogenital tract.
- Its carcinogenic potential is particularly related to the activity of the viral proteins E6 and E7, which interfere with the action of two cellular tumor suppressors in the human body (p53 and Rb)[42];

RISK PROFILE IN ADULTS

- HPV infection is associated with younger adults, correlating with a more active sexual lifestyle. Consequently, prevalence peaks before the age of 35 and gradually declines in subsequent age groups[43].
- The specific prevalence of HPV 16, most frequently associated with anogenital cancer, is highest between the ages of 20–35 and shows a second peak between 50–54 years[44];

VACCINATION

- HPV vaccination is included in the National Vaccination Program for girls at the age of 10 and, since 2020, for boys born in or after 2009, also at the age of 10.
- The maximum age specified by the National Vaccination Program to initiate the vaccination schedule is 17 years for both sexes, with girls able to complete it up to the age of 26 and boys up to the age of 27.

Herpes Zoster

Herpes Zoster

Commonly known as shingles, this disease is caused by the reactivation of the varicella-zoster virus (VZV), which remains latent in the body following a chickenpox infection.

It is a common disease, particularly after the age of 50, due to immunosenescence.

EPIDEMIOLOGY

- In Europe, the incidence is estimated between 5.23 and 10.9 cases per 1,000 individuals[45].
- The lifetime probability of developing shingles is between 25–30%, rising to 50% in individuals aged >80.

PATHOPHYSIOLOGY

- The virus resides in nerve cells and can remain inactive for many years. With age (the greatest risk factor) or during periods of immune system weakening, it may reactivate, causing cutaneous, visceral, neurological, or ocular complications.
- Reactivation produces a vesicular rash, typically unilateral, accompanied by acute pain. Pain is the most common symptom, which can be severe and may progress to post-herpetic neuralgia (PHN).

RISK PROFILE IN ADULTS

- More than 95% of immunocompetent individuals aged >50 are seropositive for VZV, increasing their risk of developing shingles[46].
- Approximately 20% of cases occur between the ages of 50–59, and 50% occur after age 60[47].
- In addition to the increased risk of shingles associated with immunosenescence, studies also indicate a higher risk in patients with COPD, asthma, diabetes mellitus, cardiovascular conditions, chronic kidney disease, depression, or psychological stress.

VACCINATION

- Although not included in the National Vaccination Program, two vaccines are available in Portugal (a live attenuated vaccine and a recombinant vaccine) for the prevention of shingles, with their use recommended by the Portuguese Society of Internal Medicine and the Portuguese Association of General and Family Medicine[48];

Respiratory Syncytial Virus

Respiratory Syncytial Virus

RSV (Respiratory Syncytial Virus) is one of the most common lower respiratory tract diseases.

Although initially associated with children under 5 years old, its impact is now strongly linked to older adults, being one of the most frequent causes of hospitalization in this population.

EPIDEMIOLOGY

- The incidence is estimated at 6.3 cases per 1,000 individuals aged >70.
- In Portugal, it is estimated that RSV causes more than 3,000 hospitalizations annually in the adult age group[49];

PATHOPHYSIOLOGY

- The RSV genome contains 11 proteins, two of which are responsible for binding to the respiratory epithelium, initiating viral replication and the subsequent immune response[50].
- RSV infection is typically mild but can lead to severe complications and consequences in at-risk adults, such as lower respiratory tract infections (e.g., pneumonia), exacerbation of certain comorbidities, cardiovascular complications, hospitalization, and death[51].

RISK PROFILE IN ADULTS

- 92% of hospitalizations caused by RSV occur in individuals over 65 years old[49].
- Subpopulations with comorbidities such as COPD, heart failure, prior transplants, diabetes mellitus, coronary artery disease, and hypertension also have an increased risk of hospitalization and severe disease manifestations[52-54].
- Various studies indicate that the prevalence and impact of RSV are likely to increase in more developed communities, particularly in aging demographic contexts.

VACCINATION

- In recent years, several vaccines have been developed and approved for the prevention of RSV infection in both newborns and adults.
- Starting in October 2024, the Ministry of Health will offer free administration of monoclonal antibodies to newborns for the prevention of RSV infection.

Adult vaccination in the european context

As part of the Think Tank, in addition to analyzing the epidemiological context of vaccine-preventable diseases in adults, a comparative exercise was conducted on the various national vaccination strategies in EU countries and the United Kingdom. The aim was to understand the adoption profile of specific agendas aimed at strengthening vaccination policies for the adult population.

This exercise was based on publicly available information from the vaccination scheduling platform of the European Center for Disease Prevention and Control (ECDC)[55], complemented by official data sources and information regarding the immunization programs in place in each analyzed country. A summary scheme of all processed information is presented below.

*Here, it includes catch-up indications or specific coverage only for at-risk groups.

The analysis immediately highlights areas of relative consistency in vaccination strategies across countries (tetanus/diphtheria, influenza, pneumococcal disease, and pertussis). In the case of pertussis, most countries recommend adult vaccination only during pregnancy. Regarding vaccines introduced more recently to the market, such as those for Herpes Zoster and, more recently, RSV, the former demonstrates widespread inclusion in immunization programs, while the latter has seen limited adoption.

In addition to examining vaccination schedules and adult coverage profiles, the study also explored the institutional and communication approaches adopted by each country. Specifically, it assessed whether countries, regardless of the range of adult-targeted vaccines included in their national immunization programs, demonstrated a commitment to educating and raising awareness within their communities about the importance of adult vaccination and/or lifelong immunization.

As indicated in the summary above, the analysis concluded that within the European Union (EU), **48% of countries** have a strategy specifically targeting adult vaccination. These strategies may take the form of a dedicated vaccination schedule, targeted communication and awareness campaigns, or both. Examples such as **Spain, Greece, Poland, and Italy** were identified as leaders in proactively adopting this narrative and communicating it to their citizens.

Although no longer part of the EU, the analysis also included the United Kingdom, which, while lacking a formal strategy in this domain, currently offers one of the most comprehensive adult vaccination schedules. The UK is also in the process of rolling out RSV vaccination for adults aged 75–79.

Regarding the Portuguese context, while the National Vaccination Program provides public access to vaccines for adults and, in many cases, specific at-risk groups (detailed coverage was not part of the analysis), there is currently no dedicated institutional narrative directed specifically at these age groups. Such a narrative would aim to raise awareness, educate, and encourage vaccination, aligning with the reflections of the Think Tank experts and previous sections of this document.

Many vaccines included in the National Vaccination Program for adults or at-risk groups are communicated to the public through specific norms, often in the form of official documents that are complex and difficult for citizens to understand. This complexity may limit their potential for coverage and community protection.

In the long term, investment in vaccination does not represent a cost to the state, as it is offset by the burden of disease (and healthcare resources) that is prevented[56,57].

A Proposal for an Adult Vaccination Schedule in Portugal

During **Meeting 1**, a co-construction exercise was conducted with the panel of experts, challenging participants to develop a proposed framework for an ideal vaccination schedule tailored to the Portuguese adult population. This exercise also encouraged reflection on the key factors to consider for its practical implementation in the future.

A PROPOSAL FOR AN ADULT VACCINATION PROGRAM

INFECTIOUS AGENT	VACCINATION COVERAGE ASSUMPTIONS
Influenza (seasonal flu)	Universal for individuals **aged 60 and older**
Influenza (HD, high dose)	Residents in nursing homes Individuals **aged 75 and older** (ideally extending to 65 and older) and/or with comorbidities placing them in risk groups
COVID-19	Universal (annual)
Pneumococcal disease	Universal for individuals **aged 65 and older** or with comorbidities placing them in risk groups
Respiratory Syncytial Virus (RSV)	Universal for individuals **aged 65 and older** or with comorbidities placing them in risk groups
Tetanus-Diphtheria-Pertussis	Universal **every 25 years** Universal **every 10 years** starting at **age 65**
Herpes Zoster	Universal **starting at age 50** or from age 18 for individuals in risk groups
HPV	Up to **age 46** for both sexes

Additional Considerations for Program Implementation

The aim is not to create an alternative or disconnected vaccination schedule from the current National Vaccination Program. Instead, the objective is to incorporate into the overarching program – aligned with the concept of lifelong vaccination – a specific schedule directed at the adult population. This would serve as a vehicle for health education, communication, and engagement of stakeholders to optimize vaccination coverage in this demographic.

As previously mentioned, and following the examples set by some European countries, it is considered important to develop visual and communication tools that support a narrative specifically targeted at the adult age group.

The management mechanisms, governance, scientific validation, budgeting, and logistics should align with those currently applied to the National Vaccination Program.

It is proposed to establish synergies with the Social Security authority (and other key sector entities), municipal networks, and occupational health networks, adopting a multidisciplinary approach to amplify the awareness strategy for prevention and the subsequent success of vaccination coverage.

As part of strengthening the vaccination policy agenda, it is recommended to design and implement additional quality indicators beyond the coverage rate itself. These indicators would better illustrate (and incentivize) the success of this new strategy, particularly within primary healthcare units.

2.

The economic and social impact of adult vaccination prevention

The economic and social impact of adult vaccination prevention

The **second meeting** of the Think Tank was designed to stimulate reflection within a multidisciplinary panel on the economic (both direct and indirect) and social impacts associated with vaccine-preventable diseases in adults. The focus was on raising awareness and fostering discussion about the opportunity cost of potential health policy options aimed at improving health outcomes in this area and accommodating necessary transformations to achieve these goals.

The panel brought together policymakers, economists, representatives from government entities, associations, scientific organizations, and key institutions within the vaccination policy ecosystem.

Thus, **Meeting 2** adopted the following angles of analysis and reflection:

- The estimated economic and social impact associated with preventing vaccine-preventable diseases in adults;
- The healthcare system's current capacity to enhance vaccination coverage among adults;
- What commitments does the country need to make to establish a new paradigm for adult vaccination as a key element in promoting active and healthy aging?

The economic and social impact of vaccine-preventable diseases in adults

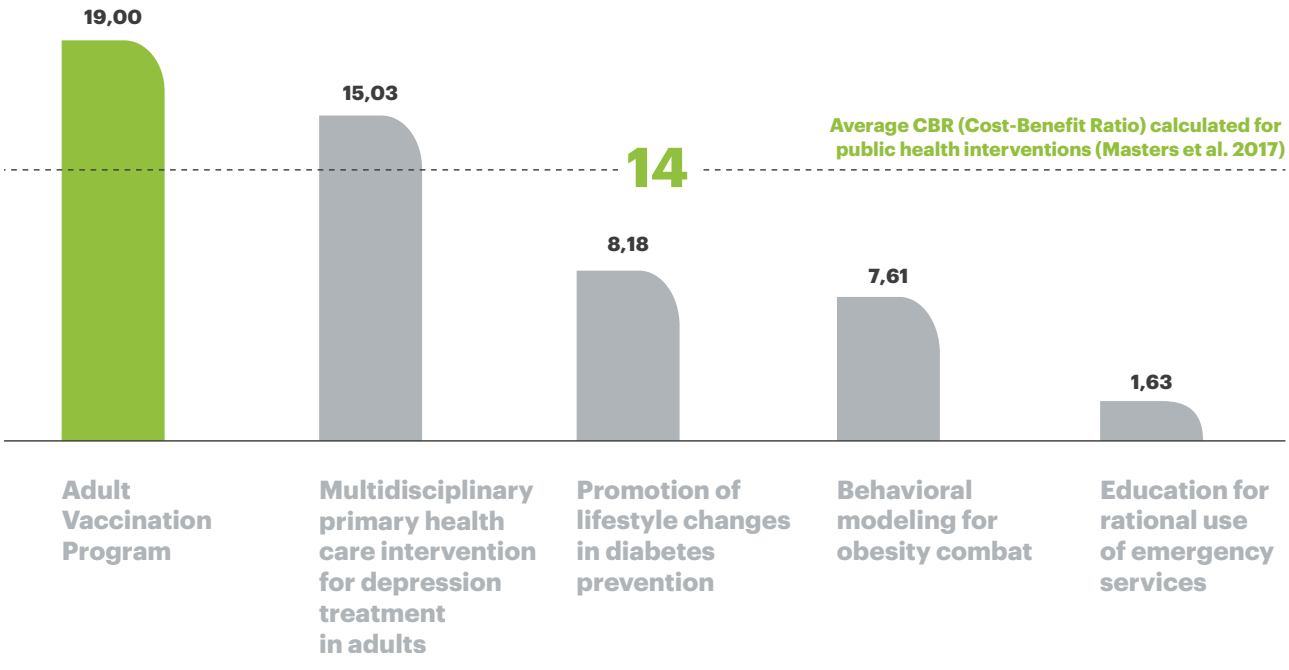
There is now extensive evidence highlighting the positive health and economic impacts of vaccination as a public health strategy, establishing it as one of the most cost-effective health interventions ever, second only to access to clean water[58].

While the broader value and return on investment of vaccination are widely recognized in society, its direct and indirect benefits specifically within the adult population have received less attention compared to vaccination strategies predominantly focused on children.

The reality is that behind the burden of vaccine-preventable diseases in adults lies a significant scale of economic and social impact. Addressing this requires healthcare systems and policymakers to allocate targeted efforts within the preventive agenda and initiatives to promote longevity.

Recent studies estimate that investing in vaccination strategies targeted at the adult population can generate **a return to society 19 times greater than the investment**[5]. This return is distributed across improved health outcomes and savings for the community, the healthcare system, and the economy. This reference value exceeds the average cost-benefit ratio (a return factor of 14 times) observed for interventions in the domain of Public Health[59].

Cost-benefit ratio (CBR) values for selected public health interventions ($, WSIPP, 2024)



As part of the Think Tank +Longevity, a study was conducted to qualify and quantify the impact of the proposed interventions, supporting the discussions in Meeting 2 and contributing to the generation of evidence to guide decision-making and the formulation of policies targeted at this area of intervention.

This study was carried out in partnership with a research team from the National School of Public Health (ENSP), including researchers Henrique Vasconcelos and José Miguel Diniz, under the supervision of Professor Julian Perelman. It aimed to estimate, based on evidence available in the literature, the annual economic impact resulting from the direct and indirect costs associated with vaccine-preventable diseases in adults. **Direct costs** refer to those directly related to the diagnosis and clinical treatment of the disease and its consequences. **Indirect costs** are those indirectly associated with the disease, such as absenteeism due to illness and productivity losses impacting society as a whole.

A literature review of peer-reviewed scientific journals was conducted, limited to original articles published since 2015. The geographic scope of the articles varied depending on the number of results for each pathology or agent, following this algorithm: restricted to Portugal; if insufficient results were found, expanded to countries with climates comparable to Portugal (Spain, France, Italy, Croatia, Malta, Greece, Bulgaria, Cyprus) for diseases with marked seasonality (influenza, respiratory syncytial virus infection, and pneumococcal disease); and further expanded to the EU, UK, and Norway for other diseases.

Due to the limited number of results and the known epidemiology of the diseases, the search for diphtheria, tetanus, and pertussis was abandoned, as the available or foreseeable results with broader search criteria would not be representative of the targeted costs. Thus, the evidence considered allowed for the quantification of impacts for the following diseases: influenza, herpes zoster, respiratory syncytial virus (RSV), COVID-19, pneumococcal disease, and HPV.

The analysis of the included studies highlights the **significant economic burden** these diseases currently impose in several European countries. Given the lack of national data, an **extrapolation of these costs to the Portuguese context was performed**, applying the percentages obtained internationally to Portugal's total or public health expenditures.

Due to the lack of robust epidemiological data, it was not possible to adjust the findings to national prevalence or incidence rates. Therefore, this exercise serves only as an exploratory effort to establish a baseline impact estimate based on the analyzed context. Further studies should deepen this analysis using data collected specifically for the Portuguese context.

In this extrapolation exercise for the Portuguese context in 2023, pneumococcal disease demonstrated a total cost of **€32,891,359**[60,61] (including productivity losses, hospitalizations, and outpatient treatments), while RSV infection represented a cost of **€16,267,321**[60], and HPV infection a cost of **€38,380,712**[62]. When also accounting for the impact on social benefits, herpes zoster infection totaled a cost of **€6,385,196**[63], and influenza infection a cost of **€151,527,792**[61,63]. The evidence analyzed for the impact of COVID-19[64,65], based on the scenario observed in 2020, indicates total costs of **€2,042,206,801**. However, the exceptional nature of that period and the imprecision associated with a linear projection of these values for subsequent years must be acknowledged. Additionally, changes to testing, isolation, and quarantine policies further contribute to the difficulty of making direct comparisons.

Isolating the specifically identified economic impact of COVID-19, while recognizing its exceptional nature, the analysis estimates an annual economic impact of **€245 million from**

DISEASE	MEDICAL COSTS	INDIRECT COSTS AND/OR SOCIAL BENEFITS	TOTAL COST
Influenza	13 725 552 €	137 802 240 €	**151 527 792 €**
Herpes Zoster	5 591 891 €	794 305 €	**6 385 196 €**
COVID-19	1 980 038 051 €	62 168 750 €	**2 042 206 801 €**
Pneumococcal Disease		23 995 168 €	**32 891 359 €**
RSV Infection	16 267 321 €		**16 267 321 €**
HPV Infection	38 380 712 €	N/A	**38 380 712 €**

Table 1 - Summary of annual total costs extrapolated to the portuguese context based on available european studies.

these diseases in Portugal, encompassing medical costs and indirect costs related to productivity and social security.

Although the figures for COVID-19 reflect the exceptional public health emergency of 2020, they still serve as an illustrative example of the significant economic and social impact that a pandemic caused by a now preventable infectious agent can impose on society.

Given the previously stated limitations in accessing national data for this analysis, the need to deepen studies on the actual impact of vaccination strategies is reiterated. It is crucial to identify the preventable fraction of these disease cases attributable to existing vaccines and vaccination programs to calculate the avoidable costs through vaccination. The generation of this evidence would undoubtedly support increased awareness among states about the benefits of preventive tools, not only in terms of health gains but also in economic benefits for society.

Raising awareness within the healthcare system about the importance of robust and systematic data collection is essential. Such data would enable valid analyses for the Portuguese context and facilitate comparisons with other regions. Strengthening this capacity would significantly contribute to supporting future recommendations, decision-making, and the continuous monitoring of vaccination strategies' impact over time.

Additionally, it is important to study the main factors associated with vaccine hesitancy and resistance in Portugal to promote increased vaccination coverage for already recommended vaccines. The mere availability of options with favorable cost-utility evaluations is insufficient to realize their potential benefits if not coupled with the effective implementation of their use.

Barriers and challenges to strengthening an adult vaccination policy agenda

The panel of participants emphasized the importance of discussing strategies to raise awareness and enhance adult vaccination programs in Portugal, considering both demographic perspectives (with an increasingly aging population) and epidemiological factors. These include rising globalization, with fewer barriers to the movement of people, and the growing prevalence of chronic diseases that weaken individuals' immune competence.

There was broad agreement on the critical role of vaccines in reducing premature mortality, disease incidence, impacts on quality of life, and associated cost dimensions, including medical direct costs, non-medical direct costs, and indirect costs stemming from vaccine-preventable diseases.

Due to a limited understanding of their impact, vaccination for adults has received less attention among the Portuguese population. It will be essential for the country, building on the historic success of the National Vaccination Program in Portuguese society, to recognize vaccination as a significant contributor to achieving harmony between longevity and quality of life.

In several regions of the country (mainland and islands), promoting quality aging agendas is particularly critical, not only due to the pronounced aging of the population but also because of geographic isolation and the territorial dispersion of many communities. These factors must be considered when addressing adult vaccination. Additionally, in terms of universal access to the benefits of vaccines, the increased difficulty in accessing healthcare and information for socially and economically vulnerable subpopulations must also be underlined.

To achieve this goal, the health ecosystem must work to optimize equitable access – both socially and geographically – to vaccination solutions developed in recent years and now available.

In some countries, these vaccines already benefit from public funding. It is essential to safeguard the established procedural flow, including technical and scientific evaluation followed by decisions recognizing the value of investing in each vaccine.

Following the proposed framework for an Adult Vaccination Program developed by the clinical experts in **Meeting 1**, the importance of deepening the technical discussion was highlighted, particularly regarding the definition of eligible at-risk groups and the age cut-offs for population coverage for each vaccine included in the proposal.

The opportunity cost of investing in vaccination in the healthcare system

Investment in vaccination has proven to be cost-effective, with health gains far exceeding the sanitary and economic consequences that would arise in a scenario where vaccination strategies and innovations did not exist or were not covered by the National Health Service (SNS).

It is acknowledged that, as with other areas of public policy, the finite nature of resources necessitates a thorough technical and budgetary evaluation to support political decision-making. It is essential to foster a broad and evidence-based societal debate highlighting the urgency of a political – and necessarily budgetary – commitment to investing in adult vaccination **as a vector for health protection and longevity promotion**.

This commitment must also materialize, as previously mentioned, in the strengthening of mechanisms for managing, monitoring, and evaluating ongoing vaccination strategies (in addition to those already under the National Vaccination Program). Overall, it is noted that the current system of tools supporting vaccination strategy management in the country requires improved and more efficient epidemiological surveillance mechanisms. These enhancements would strengthen the data used to characterize the burden of diseases associated with vaccine-targeted pathogens.

Epidemiological surveillance and vaccination monitoring must ensure interoperability between the systems in place across the mainland and autonomous regions.

With enhanced resources for surveillance, the entire system for technical evaluation and impact monitoring of vaccines included in community vaccination programs would also benefit. This includes improving the robustness of critical economic evaluations applied to vaccines. The discussion also pointed to the need for reflection and potential reconfiguration of technical resource cooperation or sharing between the *Comissão Técnica de Vacinação* (CTV) of the Directorate-General of Health (DGS) and the *Comissão de Avaliação de Tecnologias de Saúde* (CATS) of INFARMED.

Regarding the technical evaluation for continuously monitoring vaccines' community impacts, there was consensus on the urgent need to review the metrics currently used to demonstrate the **economic and quality-of-life gains provided by vaccination**. The importance of establishing a consensus-based set of indicators (such as **QALY**, among others) was underlined to capture dimensions of health and well-being value, particularly in older age groups, which current methodologies may undervalue.

To **generate more robust evidence and encourage studies that better depict these impacts**, the need for collaboration between pharmaceutical industry entities was identified, aiming to contribute to this research area.

Strengthening the vaccination strategy requires increased resource allocation and actions, highlighting the importance of **promoting synergies between public, private, and social health sectors**, as well as other areas of society. For example, the corporate sector can play a role through occupational health initiatives.

3.

A pathway for the future of adult vaccination in Portugal

A pathway for the future of adult vaccination in Portugal

Meeting 3 aimed to drive the development of recommendations and action areas that address the needs identified in the previous sessions, thereby generating contributions that raise awareness and motivate decision-makers to implement solutions and achieve the proposed objectives.

The session also included a multidisciplinary panel, holistically leveraging their knowledge and experience.

The contributions were organized into three main intervention areas:

1.
Investment in prevention and healthy aging

2.
Health system capacity and community synergies

3.
Ensuring the adult population's commitment to vaccination

A path forward for adult vaccination in Portugal

Following the discussions promoted in the previous meetings, there is a clear consensus on the need to **concentrate efforts and strengthen investment in adult vaccination as a factor for protection and a means of enhancing quality of life**, in addition to the direct prevention of the disease burden associated with infections.

Recognizing that this is already a reality and an ongoing reflection informing decision-making in many European countries, Portugal must align itself with this dynamic.

Committing to this priority through public health policy means **anticipating responses and preparing today for a future reality**. Portugal's demographic profile, disease burden, and intensified migration dynamics are expected to require strengthened action in prevention, epidemiological control, and the promotion of healthy aging.

The adult population **requires intervention and communication approaches distinct from those designed for the pediatric population**. Experts emphasized the **importance of segmenting communication narratives for each sub-population** (e.g., different age groups within the adult category, at-risk groups, migrant populations, and others with vaccination coverage gaps).

It is essential to acknowledge the current context of heightened distrust in vaccines—despite Portugal remaining a point of reference—and the amplified spread of misinformation, which translates into concerning vaccine hesitancy and resistance. Combating the phenomenon of debunking requires **quality messaging and evidence that fosters a sense of civic responsibility** inherent to vaccination, in line with WHO's 2020 recommendations.

The success of a broader strategy to raise awareness about the importance of adult vaccination must stimulate **operational alignment between health interventions and other public policy tools**, particularly the Action Plan for Active and Healthy Aging.

Strengthened cooperation and shared responsibility among healthcare providers and other agents directly and indirectly involved in health (NGOs, municipalities, pharmacies, IPSS, occupational health services) are essential. The goal is to build an integrated and multidisciplinary chain of awareness and monitoring to enhance vaccination adherence among adults. At the same time, the capacity within the healthcare delivery network itself must be reconsidered and strengthened, from epidemiological surveillance capacity to the roles of functional units such as UCC (Community Care Units) and USP (Public Health Units).

As observed in other areas of the healthcare system, there is a need for **investment, modernization, and operational innovation in data collection and management tools** to support more efficient interventions and enable continuous impact monitoring. Strengthened and personalized health data management will also help optimize the identification of individuals who meet eligibility criteria for at-risk groups requiring specific vaccines.

The healthcare system, and consequently the realm of political decision-making, has been chronically focused on quantifying the direct impacts of diseases on available health resources. This approach limits the ability to **measure the dimensions of quality of life and well-being**, which this discussion seeks to emphasize.

Ensuring universal and barrier-free access to vaccine innovation, both now and in the future, must remain a priority. Additionally, exploring new approaches to vaccine financing and contracting is crucial to achieving greater predictability in budget management. This will allow for new dynamics of cooperation among stakeholders to optimize vaccination coverage.

The Recommendations of the +Longevity Think Tank

(from 1 to 10)

PILLAR	RECOMMENDATION	PRIORITY	IMPACT
INVESTMENT IN PREVENTION AND HEALTHY AGING	Adult Vaccination Program	8,8	8,9
	Literacy Narrative for Adult Vaccination and Longevity	8,6	8,4
	Integration of mechanisms in the preventive approach	8	7,9
	Evaluate the impact of vaccination in addressing Global Health challenges	7,9	8,4
	Redefinition of management indicators for the vaccination strategy	7,3	7,2
	Personalization in data collection and management	7,1	7,8
	Models to incentivize community prevention	6,9	7,2
HEALTH SYSTEM CAPACITY AND COMMUNITY SYNERGIES	Reinforcement of CCU and PHU intervention	7,9	8,1
	Reinforcement of installed capacity and synergies for surveillance	7,7	7,7
	Assessment study on barriers to adult vaccination access	7,7	7,3
	New financing models for vaccination	7,3	7,6
	Multiannual planning in vaccine procurement	7,1	6,7
	Platform for best practices in strategies and vaccination coverage management	7	7
	Co-financing of complementary interventions in vaccination coverage	6,9	6,7
ENSURING THE ADULT POPULATION'S COMMITMENT TO VACCINATION	Transparency and quality in communication and evidence dissemination	8,6	8,2
	Population segmentation of narratives and lines of action	8,1	7,2
	Simulation study and impact assessment of vaccination strategies in real life	7,9	7,7
	Multisectoral cooperation for literacy promotion	7,3	7,7
	Strategic alignment with the Action Plan for Active and Healthy Ageing (PAEAS)	7,1	7,6
	Investment in infodemiological management strategies	7,1	7,3
	Interventions supported by behavioral science algorithms	6,9	7,6

1. Adult Vaccination Program

8,8	PRIORITY
8,9	IMPACT

INVESTMENT IN PREVENTION AND HEALTHY AGING

DESCRIPTION

Reconfiguration of the current National Vaccination Program to strengthen the narrative of lifelong prevention and vaccination indications targeted at adults, in line with epidemiological realities and technological advancements.

The goal is not to create a new, parallel, and disconnected vaccination schedule but rather to segment and support the institutional narrative transformation. This would reinforce the message to the population that vaccination is a preventive tool that accompanies us throughout the entire life cycle, not just during childhood.

Ideally, drawing on the experience of other European countries, the success of this narrative would be enhanced by ensuring that the global National Vaccination Program specifically includes a vaccination schedule tailored to the adult age group.

OBJECTIVES

- Transform the entrenched perception in the community that vaccines are predominantly targeted at the pediatric age group;
- Promote the importance of vaccination within the community as a means to support active and healthy aging;
- Strengthen health literacy and public trust in vaccines;
- Optimize barrier-free access to available vaccine innovations.

INVOLVED AGENTS

- Directorate-General of Health
- Ministry of Health
- Professional Orders in the Health Sector
- Assembly of the Republic
- Scientific Societies and Representative Associations

A SUCCESS STORY

The implementation and communication of vaccination programs specifically targeted at the adult age group is an increasingly prevalent reality across national contexts in Europe. Countries such as **Spain, Italy, Poland, and Greece** now have not only a specific vaccination schedule for adults (in some cases integrated into a broader lifelong Vaccination Program) but also communication, education, and awareness tools to inform citizens about the importance of vaccination and the appropriate timing for administering the respective vaccines.

2. Literacy Narrative for Adult Vaccination and Longevity

8,6	PRIORITY
8,4	IMPACT

INVESTMENT IN PREVENTION AND HEALTHY AGING

DESCRIPTION

Complementary to the implementation of a specific Vaccination Program for the adult age group, it will be important to adopt a communication narrative specifically directed at this population.

The narrative that underpins the importance of adult vaccination and informs about the vaccines available for this age group should clarify and raise awareness among the population about the significant role of vaccination in promoting healthy aging. This includes not only protection against pathogens but also its added value in preventing and mitigating the development and worsening of other diseases.

OBJECTIVES

- Promote the importance of vaccination within the community as a means to support active and healthy aging;
- Optimize communication tools and actions to enhance health literacy and public trust in vaccines among the adult population;
- Optimize vaccination coverage in the adult age group.

INVOLVED AGENTS

- Directorate-General of Health
- Ministry of Health
- Scientific Societies and Representative Associations

A SUCCESS STORY

Complementary to the creation of an Adult Vaccination Program, integrated into its "Lifelong Vaccination Program," **Spain** has been actively working to deliver messages and promote an institutional narrative that emphasizes the importance of vaccination specifically for this age group. These efforts aim to maximize opportunities and sources of information, helping to consolidate a community-wide commitment from each citizen.

3. Integration of mechanisms in the preventive approach

8	PRIORITY
7,9	IMPACT

INVESTMENT IN PREVENTION AND HEALTHY AGING

DESCRIPTION

Rethink the user journey regarding vaccination in the adult age group, aiming to identify check-up points or opportunities for awareness and encouragement to optimize vaccination coverage levels.

Moments of validation, awareness, or encouragement for vaccination coverage should be reinforced both within and outside the citizen's interaction with the healthcare network (for example, the introduction of a specific indicator for the Primary Healthcare Network – CSP).

As an example, it is suggested that the vaccination record be validated at the time of driver's license renewal.

OBJECTIVES

- Consolidation within the community of the lifelong vaccination narrative;
- Optimize vaccination coverage in the adult age group;
- Systemic awareness (within and beyond the healthcare network) of the importance of adult vaccination.

INVOLVED AGENTS

- Directorate-General of Health
- Ministry of Health, Ministry of Labor, Solidarity, and Social Security, and other potentially relevant entities
- Social sector and occupational health sector

A SUCCESS STORY

In **Canada**, the ongoing global immunization strategy (*Canadian Immunization Guide*) implements preventive check-ups for adults, including specific vaccination recommendations during regular medical consultations, aiming to improve vaccination coverage in adults.

4. Evaluate the impact of vaccination in addressing Global Health challenges

7,9	PRIORITY
8,4	IMPACT

INVESTMENT IN PREVENTION AND HEALTHY AGING

DESCRIPTION

Promote, at the national level, the generation of evidence and the execution of impact assessment studies focused on the role of adult vaccination as a contributing factor in addressing other macro challenges in Global Health. These include combating antimicrobial resistance, preventing and/or managing chronic diseases, protecting communities against potential changes in epidemiological dynamics resulting from climate change, and advancing the Sustainable Development Goals.

Health authorities should encourage and allocate resources to establish research lines in this area, fostering close cooperation between the State, organizations holding relevant data, and the academic sector.

OBJECTIVES

- Promotion of literacy and awareness among various stakeholders (from citizens to policymakers) regarding the significant contribution that vaccination can make in the current Global Public Health context;
- Strengthen the ecosystem for generating and studying relevant evidence to quantify the impact of vaccination strategies in the community.

INVOLVED AGENTS

- Directorate-General of Health
- Ministry of Health
- Central Administration of the Health System/Shared Services of the Ministry of Health
- Academia

A SUCCESS STORY

The scientific literature highlights various research exercises and data analyses (at the national level and in systematic reviews) aimed at quantifying the direct and indirect impact of vaccination in several areas within the realm of Global Health. For example, a recent study published in *BMJ Global Health* (Kim, C. et al.) sought to model the extent of antimicrobial resistance potentially prevented by vaccination across the different WHO regions.

5. Redefinition of management indicators for the vaccination strategy

7,33	PRIORITY
7,22	IMPACT

INVESTMENT IN PREVENTION AND HEALTHY AGING

DESCRIPTION

Strengthen the set of performance, contractualization, and epidemiological monitoring indicators to enable continuous evaluation of ongoing strategies and to assign greater relevance to adult vaccination.

Given that the success of adult vaccination strategies involves specific factors (literacy, risk-benefit perception, geographic access, migrant populations, among others), the indicators designed to encourage the healthcare network to improve vaccination coverage must be tailored not only to drive stronger interventions but also to monitor their performance over time.

OBJECTIVES

- Strengthen the importance of adult vaccination coverage within the framework of healthcare network monitoring and performance dimensions;
- Evaluate and support the continuous improvement of strategies to ensure access to vaccination for the adult population.

INVOLVED AGENTS

- Directorate-General of Health
- Ministry of Health
- Central Administration of the Health System/Shared Services of the Ministry of Health
- Social sector
- Pharmacies
- Municipalities

A SUCCESS STORY

Australia has a national platform for monitoring vaccination strategies called *The Australian Immunisation Register (AIR),* which enables the recording and tracking of performance and coverage dynamics for all publicly funded and privately acquired vaccines. Initially established in 1996 as the *Australian Childhood Immunisation Register,* it was reconfigured in 2016 to expand its coverage to vaccines recommended for all age groups.

6. Personalization in data collection and management

7,11	PRIORITY
7,78	IMPACT

INVESTMENT IN PREVENTION AND HEALTHY AGING

DESCRIPTION

Empower and encourage the healthcare system to collect additional parameters (clinical, demographic, and even social) to optimize and personalize the strategies adopted by healthcare teams and professionals on the ground to improve vaccination coverage.

In addition to establishing more indicators for monitoring vaccination strategies, it is also essential to better understand the different target segments within the adult population. This will allow for the subsequent definition of tailored actions and approaches, thereby enhancing the overall success of vaccination efforts.

OBJECTIVES

- Optimize the available tools to encourage vaccination in adulthood;
- Promote health literacy regarding the importance of vaccination among citizens and civil society;
- Optimize vaccination coverage in the adult age group.

INVOLVED AGENTS

- Directorate-General of Health
- Ministry of Health/Economy
- Municipalities
- Pharmacies

A SUCCESS STORY

The **United States** has *Immunization Information Systems (IIS)*, which enable the analysis of demographic data and its correlation with patient clinical data, supporting the personalization and continuous improvement of vaccination strategies in place.

7. Models to incentivize community prevention

6,89	PRIORITY
7,22	IMPACT

INVESTMENT IN PREVENTION AND HEALTHY AGING

DESCRIPTION

Design an incentive package or stimulus plan to promote adult vaccination across various points of interaction with healthcare services and within the community.

Similar to approaches implemented during the COVID-19 vaccination campaigns, where several countries introduced financial and non-financial incentives to encourage vaccination, it is suggested to reflect on potential benefits tied to adult vaccination coverage.

These incentives should be considered broadly, as they may be applied directly to citizens or to entities, companies, teams, and healthcare professionals to maximize vaccination coverage. Vaccination adherence could be linked to occupational benefits or even discounts and advantages in accessing specific types of services.

OBJECTIVES

- Consolidate the characterization and understanding of the target population, enabling the design of personalized and segmented approaches based on specific factors, characteristics, and parameters..

INVOLVED AGENTS

- Directorate-General of Health
- Ministry of Health
- Central Administration of the Health System/Shared Services of the Ministry of Health
- Municipalities
- Social sector
- Pharmacies

A SUCCESS STORY

In **Australia**, the government has implemented a notification system (electronic or postal) since 2020 to inform individuals when they become eligible for the pneumococcal and herpes zoster vaccines.

In the specific context of COVID-19 vaccination, several countries (including the **USA, UK, Russia, and the Philippines**) introduced incentive mechanisms (financial or in-kind) to increase adherence to vaccination strategies.

1. Reinforcement of CCU and PHU intervention

7,89	PRIORITY
8,11	IMPACT

HEALTH SYSTEM CAPACITY AND COMMUNITY SYNERGIES

DESCRIPTION

The Community Care Units and Public Health Units have a structure, positioning, and set of resources/mechanisms that place them in a highly advantageous position to contribute to the success of the vaccination strategy within the primary healthcare network, complementing the role of clinical reference units.

This contribution is particularly recognized in the areas of surveillance, monitoring, health education, and encouraging/stimulating adult population adherence to vaccination. It is essential to reflect on and reconfigure this role through contractualization indicators and by strengthening the integration of actions between these units and the Family Health Units.

OBJECTIVES

- Optimize the available tools to encourage vaccination in adulthood;
- Promote health literacy regarding the value of vaccination among citizens and civil society;
- Optimize vaccination coverage in the adult age group;
- Promote the integration of the healthcare network, particularly in the area of prevention.

INVOLVED AGENTS

- Directorate-General of Health
- Ministry of Health
- National Association of Public Health Doctors / Portuguese Association of General and Family Medicine / Association of Community Care Units

A SUCCESS STORY

In the **USA**, the *"Promoting Pediatric Primary Prevention (P4) Challenge"*, led by the Department of Health and Human Services (HHS), aimed to encourage healthcare teams and primary care units to develop innovative strategies to increase childhood vaccination rates and wellness visits. Financial incentives were provided to those demonstrating significant results in their approaches.

2. Reinforcement of installed capacity and synergies for surveillance

7,67	PRIORITY
7,67	IMPACT

HEALTH SYSTEM CAPACITY AND COMMUNITY SYNERGIES

DESCRIPTION

It is important to strengthen epidemiological and community surveillance mechanisms regarding vaccine-preventable diseases in adults, bringing them to the level of robustness currently observed for other diseases such as pertussis, tetanus, diphtheria, and measles, among others. Limitations in monitoring the epidemiological dynamics of some of these diseases also hinder decision-making processes concerning strategies to prevent them within the community.

In addition to surveillance tools managed within the healthcare network, it is suggested to maximize the potential for cooperation between the healthcare system and various local agents, not only for epidemiological surveillance but also for integrated intervention to mitigate barriers to accessing preventive care.

OBJECTIVES

- Strengthen mechanisms and optimize the available evidence for epidemiological surveillance at the national level and in coordination with the European network;
- Promote multisectoral cooperation dynamics for identifying and mitigating barriers to accessing preventive care and vaccination.

INVOLVED AGENTS

- Directorate-General of Health
- Ministry of Health / Ministry of Labor, Solidarity, and Social Security
- Municipalities
- Pharmacies
- Private Institutions of Social Solidarity/NGOs

A SUCCESS STORY

The *CONNECT* program, led by the Ministry of Health and the Ministry of Home Affairs in **Laos**, with support from the WHO, promotes collaboration among communities, government agencies, healthcare providers, and ethnic and religious groups. This multisectoral approach aims to enhance trust, engagement, and local governance in health. The program utilizes coordination networks via WhatsApp and data monitoring dashboards for local authorities. This initiative has led to significant increases in vaccination adherence and the utilization of maternal and child health services across several communities.

3. Assessment study on barriers to adult vaccination access

7,67	PRIORITY
7,33	IMPACT

HEALTH SYSTEM CAPACITY AND COMMUNITY SYNERGIES

DESCRIPTION

Recognizing that the demographic and socioeconomic landscape of adulthood involves factors and barriers that can significantly compromise equitable access to vaccination coverage, it is suggested to initiate a multidimensional study to qualify and quantify these access barriers on a national scale, with particular regional/local segmentation.

The development of this assessment, potentially as the foundation for a periodic exercise relevant for future planning, will serve as crucial support for a coordinated multidisciplinary strategic intervention, preferably led by the Directorate-General of Health (DGS), integrating various other recommendations outlined in this document.

OBJECTIVES

- Contribute to the generation of evidence at national, regional, and local levels to better support decision-making and intervention regarding vaccination strategies;
- Understand and quantify barriers that compromise equitable access to vaccine innovation across different regions of the country and for various sub-populations within the adult age group.

INVOLVED AGENTS

- Directorate-General of Health
- Ministry of Health
- Academia
- Pharmacies

A SUCCESS STORY

The *National Adult Immunization Plan (NAIP)* in the **United States**, coordinated by the Department of Health and Human Services (HHS), incorporates into its strategy a continuous process of evaluating and monitoring access barriers that may hinder optimal adherence to ongoing vaccination strategies.

4. New financing models for vaccination

7,33	PRIORITY
7,56	IMPACT

HEALTH SYSTEM CAPACITY AND COMMUNITY SYNERGIES

DESCRIPTION

Given the trends projected for demographic changes in the coming years and the expected increase in vaccine innovation to address unmet medical needs in older age, there is a clear need to design new approaches to their public financing.

Thus, it is proposed to study and develop, in synergy with the pharmaceutical industry, evaluation and financing models tailored to the specific nature of vaccines indicated for adults. These models could be aligned with indicators of coverage, health gains, and quality of life. It is also suggested that cooperation between INFARMED (Portuguese National Authority for Medicines and Health Products) and DGS be strengthened in the evaluation of each vaccine within this scope.

OBJECTIVES

- Prepare the healthcare system to ensure early and sustainable access to vaccine innovation in the future;
- Highlight the health impact dimensions associated with adult vaccination.

INVOLVED AGENTS

- Directorate-General of Health
- Ministry of Health/Finance
- INFARMED
- Pharmaceutical Industry

A SUCCESS STORY

The *Results-Based Financing (RBF)* model has been implemented through international cooperation platforms (such as the **World Bank, GAVI, among others**) in developing contexts as a means to optimize access to and the quality of vaccination coverage strategies in these countries. Under this model, the goal is to maximize investment in health technologies by linking it to the health outcomes subsequently generated..

5. Multiannual planning in vaccine procurement

7,11	PRIORITY
6,67	IMPACT

HEALTH SYSTEM CAPACITY AND COMMUNITY SYNERGIES

DESCRIPTION

In line with the reconfiguration of financing models, the approach to the contractual and budgetary management of vaccine stocks could also evolve towards a multiannual contracting logic, thereby providing greater predictability, agility, and stability for both the State and the supplier.

This approach should be considered for vaccine segments where there is robust stabilization of the circulating strains, to avoid compromising population access to the most recent and appropriate innovations for preventing or mitigating the potential disease burden.

OBJECTIVES

- Optimize budgetary, contractual, and stock management related to vaccine procurement.

INVOLVED AGENTS

- Directorate-General of Health
- Ministry of Health
- Executive Directorate of the National Health Service
- Shared Services of the Ministry of Health
- Pharmaceutical Industry

A SUCCESS STORY

In the Baltic countries (**Lithuania, Estonia, Latvia**), it has been common in recent years to practice multiannual contracting, and even joint procurement between countries, for the acquisition of certain vaccines

6. Platform for best practices in strategies and vaccination coverage management

7	PRIORITY
7	IMPACT

HEALTH SYSTEM CAPACITY AND COMMUNITY SYNERGIES

DESCRIPTION

In parallel with the national-scale strategies related to the National Vaccination Program and the management of vaccination coverage, the strong entrepreneurial, dynamic, and proactive virtue of healthcare units (and in cooperation with other agents) across various regions of the country is recognized for optimizing vaccination coverage at the local level within the community.

Recognizing the value of evaluating, disseminating, and expanding the beneficial impacts of these strategies on a micro scale as a way to improve the systemic response, it is suggested to create a platform for systematizing and sharing best practices focused on the management, promotion, and education for adult vaccination.

OBJECTIVES

- Promote the evaluation, dissemination, and amplification of innovative projects that contribute to greater success in the ongoing vaccination strategy;
- Reduce inequities in access and health literacy in the field of vaccination;
- Optimize vaccination coverage in the adult age group.

INVOLVED AGENTS

- Directorate-General of Health
- Ministry of Health/Executive Directorate of the National Health Service
- Relevant Local Partners

A SUCCESS STORY

UNICEF, in collaboration with **WHO** and **GAVI**, has documented best practices and lessons learned from vaccination campaigns in several countries, including **Angola, Bangladesh, India, Papua New Guinea, the Philippines, and Yemen**. These documents highlight the importance of collaboration and co-production at all levels to recover and transform immunization services. Best practices include the use of mobile teams, community education campaigns, and partnerships with local organizations to increase vaccination coverage.

7. Co-financing of complementary interventions in vaccination coverage

6,89	PRIORITY
6,67	IMPACT

HEALTH SYSTEM CAPACITY AND COMMUNITY SYNERGIES

DESCRIPTION

In addition to the financing and contracting of the vaccines themselves, it is important to reflect on potential co-financing segments for complementary but critical interventions to the success of the vaccination strategy. This includes the levels of adherence, trust, and effective coverage of population immunity.

These interventions could involve partnerships established both within and outside the healthcare provider network (e.g., with pharmacies, IPSS, and the private sector) aimed at promoting health literacy, raising awareness of vaccination prevention, contributing to access to and administration of vaccines in more vulnerable sub-populations, among other objectives.

OBJECTIVES

- Optimize the available tools to encourage vaccination in adulthood;
- Promote health literacy regarding the value of vaccination among citizens and civil society;
- Optimize vaccination coverage in the adult age group.

INVOLVED AGENTS

- Directorate-General of Health
- Ministry of Health
- Municipalities
- Pharmacies
- Private Institutions of Social Solidarity and NGOs

A SUCCESS STORY

In **Liberia**, during the second phase of the COVID-19 vaccination campaign, WHO worked with the Liberian government to implement a series of community interventions. These included the use of mobile teams to reach remote areas, the integration of community leaders in awareness campaigns, and coordination with the educational sector to reach parents of children and young people. These strategies significantly increased vaccination coverage, demonstrating the effectiveness of co-financing and intersectoral collaboration.

1. Transparency and quality in communication and evidence dissemination

8,56	PRIORITY
8,22	IMPACT

ENSURING THE ADULT POPULATION'S COMMITMENT TO VACCINATION

DESCRIPTION

Although the COVID-19 pandemic has sparked some increases in vaccine hesitancy across Europe and the world, Portuguese society remains one of the most trusting and believing in the fundamental role of vaccines.

Nevertheless, significant challenges persist in communication and the dissemination of more evidence illustrating the specific benefits of vaccination for the adult population, not only as a means of protection against a specific infectious agent but also as a key factor in promoting quality of life and healthy aging, far beyond the direct and immediate effect of protection.

OBJECTIVES

- Promote health literacy regarding the value of vaccination among citizens and civil society;
- Raise awareness among the population about the broad and multidimensional benefits of vaccination in adulthood;
- Contribute to safeguarding trust and belief in the protective role of vaccines.

INVOLVED AGENTS

- Directorate-General of Health
- Ministry of Health
- Academia
- Healthcare provider network

A SUCCESS STORY

Germany conducted an experimental study that demonstrated that providing clear and repeated information about the benefits of vaccines can reduce vaccine hesitancy. The study involved sending periodic emails with information on the safety and efficacy of vaccines, as well as debunking common myths. The approach resulted in a 27% increase in vaccination uptake among participants, highlighting the effectiveness of sustained, evidence-based communication.

2. Population segmentation of narratives and lines of action

8,11	PRIORITY
7,22	IMPACT

ENSURING THE ADULT POPULATION'S COMMITMENT TO VACCINATION

DESCRIPTION

The adult age group consists of sub-populations associated with specific objectives and challenges in managing vaccination coverage. Given this, the overarching strategy outlined in this document assumes that the entire chain of strategic implementation and actions defined by the authorities for awareness and encouragement of adult vaccination is properly aligned with an appropriate rationale for segmenting these sub-populations, in a logic of personalization and effectiveness.

OBJECTIVES

- Develop specific approaches for each sub-population (communication, access, education), aligned with the defined objectives;
- Maximize the effectiveness of each implemented action, ultimately leading to better uptake and access to vaccination.

INVOLVED AGENTS

- Directorate-General of Health
- Ministry of Health
- Executive Directorate of the National Health Service

A SUCCESS STORY

The **American Medical Association (AMA)** recommends that vaccination campaigns use market segmentation to target specific messages to different sub-populations. These strategies include using communication channels preferred by each group and engaging trusted influencers to increase the effectiveness of the messages. The AMA also developed a guide for physicians, which includes evidence-based messaging guidelines as well as best practices in communication regarding the COVID-19 vaccine, to help increase confidence in the safety and efficacy of vaccines.

3. Simulation study and impact assessment of vaccination strategies in real life

7,89	PRIORITY
7,67	IMPACT

ENSURING THE ADULT POPULATION'S COMMITMENT TO VACCINATION

DESCRIPTION

The evaluation of the gains and impact of adult vaccination programs presents additional methodological and evidence-related challenges compared to the historical focus on pediatric vaccines.

Recognizing these specific characteristics, as well as the importance of contributing more evidence to assess the real (and multidimensional) value of adult vaccines, it is considered essential to implement impact assessment studies specifically linked to the execution of adult vaccination policies. These studies should aim to qualify and quantify the clinical (particularly in terms of quality of life and protection against the development/worsening of other comorbidities), economic, and social benefits that will help reinforce the importance of the investment made.

OBJECTIVES

- Generate evidence at the national level regarding the benefits to society, the economy, and the healthcare system resulting from the implementation of adult vaccination programs;
- Strengthen the culture of evaluation and impact simulation of public health policies.

INVOLVED AGENTS

- Directorate-General of Health
- Ministry of Health
- Executive Directorate of the National Health Service/ Central Administration of the Health System

A SUCCESS STORY

A study conducted in **Bangladesh** and **India** suggests that vaccination, in addition to preventing diseases, also improves health equity and reduces economic inequalities. For example, the rotavirus vaccination in Bangladesh showed significant benefits for the lowest income quintiles, highlighting that vaccination programs can be important tools for health equity.

4. Multisectoral cooperation for literacy promotion

7,33	PRIORITY
7,67	IMPACT

ENSURING THE ADULT POPULATION'S COMMITMENT TO VACCINATION

DESCRIPTION

Promoting health literacy, particularly when targeted at the adult population and older age groups, increasingly requires the commitment and involvement of agents beyond the healthcare provider domain.

Following this trend in recent years and aiming to enhance it within the specific area of vaccination, it is suggested to strengthen the links of cooperation, commitment, and intervention with the private sector (including the important occupational health segment), the social sector, and, more generally, other relevant local partners in a privileged position to convey key messages and raise awareness among the population about the benefits and importance of adult vaccination. These synergies could be translated, for example, into campaigns, screenings, or educational actions.

OBJECTIVES

- Promote health literacy regarding the value of vaccination among citizens and civil society;
- Raise awareness among agents outside the healthcare sector about the importance of adult vaccination;
- Maximize useful contact points and moments for education, signaling, and monitoring vaccination attitudes.

INVOLVED AGENTS

- Directorate-General of Health
- Ministry of Health/Economy/Ministry of Labor, Solidarity, and Social Security
- Municipalities
- Entities managing occupational health
- Pharmacies/Private Institutions of Social Solidarity/NGOs
- Pharmaceutical Industry

A SUCCESS STORY

In **Canada**, *National Immunization Awareness Week* (NIAW), promoted by *Immunize Canada*, is an annual campaign held at the end of April to highlight the importance of vaccination for people of all ages. This initiative aims to raise awareness about the benefits of vaccines, combat misinformation, and promote public health through a wide range of educational and outreach activities. During NIAW, various actions are carried out, such as seminars, workshops, and social media campaigns, to educate the public about the importance of immunization. The campaign also focuses on collaboration between healthcare professionals, schools, communities, and the media to disseminate accurate, evidence-based information about vaccines.

5. Strategic alignment with the Action Plan for Active and Healthy Ageing (PAEAS)

7,11	PRIORITY
7,56	IMPACT

ENSURING THE ADULT POPULATION'S COMMITMENT TO VACCINATION

DESCRIPTION

The *PAEAS* (Action Plan for Active and Healthy Aging) represents a disruptive public policy tool in the national context, aiming to strengthen the implementation and monitoring of interventions in various community dimensions that contribute to the promotion of active and healthy aging in the population.

As this is also the denominator for adult vaccination policies, it is proposed to strengthen the synergies between both strategic agendas, specifically enhancing the *PAEAS* through its Pillar 1 – Health and Well-being, as a driver for prevention, research, and health education initiatives with a focus on vaccination.

OBJECTIVES

- Optimize the available tools to encourage vaccination in adulthood;
- Promote health literacy regarding the value of vaccination among citizens and civil society;
- Strengthen the commitment and public action narrative on valuing vaccination as a contributing factor for active and healthy aging;
- Encourage the generation and analysis of national evidence on the impact of vaccination in promoting quality of life in adulthood..

INVOLVED AGENTS

- Directorate-General of Health
- Ministry of Health/ Ministry of Labor, Solidarity, and Social Security
- Center for Active Aging Competence

A SUCCESS STORY

In **Japan**, particularly in the Fukuoka Prefecture, there is a strong commitment to promoting public health through a comprehensive, community-based healthcare system. This commitment includes awareness campaigns and vaccination programs that ensure the elderly have access to the necessary vaccines to prevent the onset or worsening of diseases and contribute to their active and healthy aging.

6. Investment in infodemiological management strategies

7,11	PRIORITY
7,33	IMPACT

ENSURING THE ADULT POPULATION'S COMMITMENT TO VACCINATION

DESCRIPTION

The post-pandemic context has exacerbated significant phenomena of misinformation, particularly related to vaccination, leading to a decline in trust in vaccines in various parts of the world and within the European context.

Although Portugal remains a reference country in terms of trust and recognition, by the population, of the importance and benefits of vaccines, misinformation sources are now global and highly dispersed across various communication platforms.

Therefore, it is critical to invest more in monitoring and intervention tools in the field of infodemiology and health misinformation, as a way to mitigate its harmful impacts on the community.

OBJECTIVES

- Stimulate research initiatives in the field of infodemiology management;
- Ensure the strengthening of public capacity to monitor and act on health misinformation, safeguarding transparency, truth, and quality in communication dynamics and promoting vaccine literacy.

INVOLVED AGENTS

- Directorate-General of Health
- Ministry of Health
- Academia
- Executive Directorate of the National Health Service

A SUCCESS STORY

The **Pan American Health Organization** (PAHO) has focused on understanding infodemics and misinformation in the fight against COVID-19 in the Americas. This organization has promoted the use of collaboration centers and digital tools to improve the dissemination of accurate information and effectively combat misinformation. PAHO has also launched initiatives to increase community resilience against misinformation through education and community engagement.

7. Interventions supported by behavioral science algorithms

6,89	PRIORITY
7,56	IMPACT

ENSURING THE ADULT POPULATION'S COMMITMENT TO VACCINATION

DESCRIPTION

Behavioral science has gained ground in the field of public health policy, with increasing evidence demonstrating its relevance for the effectiveness of certain interventions, particularly in vaccination coverage.

Given the nature of the barriers and challenges already identified for the success of a new narrative promoting lifelong vaccination, it is suggested to strengthen the existing capacity to plan communication, intervention, and vaccination strategy management strategies based on behavioral science algorithms. These strategies would enable the various agents involved to better understand phenomena of acceptance, motivation, and the citizen's capacity in relation to the vaccination act.

OBJECTIVES

- Optimize the available tools to encourage vaccination in adulthood;
- Promote the success of various ongoing actions through a better understanding of the attitudes of different subpopulations of adults towards vaccination;
- Optimize vaccination coverage in the adult age group.

INVOLVED AGENTS

- Directorate-General of Health
- Ministry of Health

A SUCCESS STORY

In the **United Kingdom**, the National Health Service (NHS) has invested in interventions based on behavioral theory to increase vaccine uptake. These strategies include the use of personalized reminders and motivational interviews, based on data collected on health behaviors. The application of behavioral algorithms helps to segment the population and direct specific messages to different demographic groups, enhancing the effectiveness of vaccination campaigns.

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Longevity