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RESILIENCE IN THE PORTUGUESE HEALTH SYSTEM AND ITS RESPONSE TO THE COVID-19 PANDEMIC

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Abstract

This Work Project evaluates the resilience of the Portuguese health system and its response to the COVID-19 pandemic. Methodologically, it combines graphical analysis of National Health System activity for quantitative and the Executive Board's statutes and initiatives for qualitative assessment. Despite enhanced digital alternatives, operational gaps and values below pre-pandemic levels suggest underlying issues. While well-conceived organizational reforms exist, implementation delays and persistent challenges in emergency services are evident. The aspirations for resilience are acknowledged, yet limited data necessitates speculative assessment. The health system contends with post-pandemic repercussions, emphasizing the ongoing need for attention and proactive solutions to achieve resilience.

Keywords: Resilience, Health Systems, Health System Resilience, Serviço Nacional de Saúde (SNS), Covid-19, Health Economics and Management

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1. Introduction

The COVID-19 pandemic has posed an unprecedented test for healthcare systems worldwide, and the Portuguese health system has been no exception. With the pandemic, talks of resilience and the recovery of health system have been reintroduced. Researchers worldwide have started to discuss how to assess the resilience of a health system and what characteristics are needed to be able to withstand any hypothetical shock. For this, health systems need to learn and prepare.

The purpose of this Work Project is to explore how Portugal navigated the challenges of the pandemic, focusing on its resilience in the face of such a shock, thus the main research question will be: **"**How did the Portuguese health system respond to the COVID-19 pandemic, and what lessons can be learned for improving the system's resilience in the face of future shocks?". This Work Project builds upon existing literature and previous methods and adapts them to the available information and current context in Portugal's National Health System, analyzing both quantitative activity indicators and qualitative aspects such as the health system's governance to assess

resilience. This thesis seeks to add to the ongoing discussions on health system resilience in the context of global health crises and shocks.

2. Literature Review

In recent years, the concept of resilience has gained popularity. It has been used in various fields of study, but it was not until the 2009 European sovereign debt crisis that it first appeared in discussions regarding health systems. The 2009 crisis and its aftermath revealed the state of health systems across Europe and raised a question as to whether they had the ability to handle sudden resource shortages, reorganize service delivery and adapt in the face of new circumstances if needed (European Commission Directorate General for Health and Food Safety, 2022). These discussions about resilience started again when West Africa was experiencing the Ebola virus epidemic during 2013-2015, showing how a virus can become a problem if the health system is not capable of a rapid and integrated response (Kieny et al., 2014).

In March 2020, the COVID-19 pandemic began impacting European countries, and it put a significant strain on most healthcare systems, generating a direct and indirect impact on morbidity and mortality, revealing structural fragilities (European Commission Directorate General for Health and Food Safety, 2022). However, the pandemic has provided opportunities to identify and learn from the weaknesses, as well as evaluate future measures to ensure sustainability and resilience of the health system (Oliveira et al., 2022).

2.1 Definition of Resilience in the context of Health Systems

The definition of “health system resilience” remains open ended. The scoping reviews of literature regarding health system resilience reveal that the concept remains somewhat confusing (Turenne et al., 2019). Fridell et al. identify significant variations between existing definitions, and

specific suggestions on how to become resilient to shocks, remain comparatively vague (Fridell et al., 2019). Some researchers distinguish between sudden shocks, slower moving impacts, and chronic stresses (Kruk et al., 2017); and others defend everyday resilience as imperative to combat chronic stresses (Barasa et al., 2017). There have even been some researchers who criticize the overall concept for shifting crisis responsibility onto less powerful health system agents (such as families), potentially normalizing ineffective coping strategies, and overlooking power dynamics and historical influences on health system behaviors (Witter et al., 2023).

Although a single definition seems hard to reach, most do agree on certain general topics within the scope of the definitions. Firstly, they regard resilience as the degree of change a system can undergo while maintaining its functionality (Biddle et al., 2020). More specifically, there is a sense that resilience is a response to a specific event or circumstances that demand an acute response from the health system, however some also argue that chronic, structural stresses that are cumulative over time can provide a measure of resilience (Biddle et al., 2020). Secondly, the health system should have the ability to maintain core activities and minimize as much as possible any negative consequences of the shocks (Witter et al., 2023). Thirdly, there are mentions of characteristics and capabilities a health system must exhibit to be resilient, such as absorptive, adaptive, or transformational capacities in the face of shocks of different intensity (Blanchet et al., 2017). Absorptive capacity relates to the capacity of a health system to maintain the same level (quantity, quality, and equity) of healthcare services using the same level of resources and capacities, despite the shock. Adaptive capacity means the ability to deliver the same level of healthcare services with fewer/different resources, and the transformational capacity describes the ability of health system actors to transform the functions and structure of the health system to respond to a changing environment. To some extent, these capacities have a degree of overlap,

especially absorptive and adaptive, however, there are some limitations. For instance, a heavy reliance on the absorptive capacity may lead to complacency in the health system. If the system continually absorbs shocks without addressing the causes and underlying vulnerabilities, it may delay essential transformations, or there could be mismanagement of resources in an attempt to improve adaptability. Nevertheless, they remain the most accepted keywords when defining resilience, as they are well accepted by many experts. Furthermore, resilience is necessary for the functioning of a health system, but it is not sufficient to ensure a "good" functioning. It does not directly imply a strong and stable system, as it can be resilient but underperforming in stable conditions, and it can be strong in stable conditions but still susceptible to the impact of shocks (Witter et al., 2023).

Additionally, some add that a preparedness stage before the crisis and a learning stage after contribute to improve resilience, that is, after experiencing and learning from shock A, a system should be more prepared for shock B (Thomas et al., 2020). Even so, despite the lessons learned, the level of preparedness that a health system can have is ambiguous and highly dependent on the type of shock it experiences, and the idea of being prepared can lead to complacency (Witter et al., 2023). Policy makers can face difficulties in being "prepared": choose between bearing the costs of maintaining long-term preparedness for a specific shock that might never occur, or not investing at all and risk unpreparedness (Witter et al., 2023). Therefore, depending on the level of disruption of the shock, and if the crisis is unprecedented, then there is no proper way of preparing for it with a long-term mindset, only in terms of short term to a certain extent. Even in terms of long-term preparation, equipment and tools can decay, expire, or become obsolete over time, and countries with theoretically higher public health service capabilities might not necessarily be more effective in controlling the concrete shock for several reasons (Ding et al., 2020).

Given this variety of opinions, for the purposes of this Work Project, a definition of health system resilience must be used, and so the definition offered by the European Commission appears to be the one that is most complete: "Health system resilience describes the capacity of a health system to **(a)** proactively foresee, **(b)** absorb, and **(c)** adapt to shocks and structural changes in a way that allows it to **(i)** sustain required operations, **(ii)** resume optimal performance as quickly as possible, **(iii)** transform its structure and functions to strengthen the system, and **(iv)** (possibly) reduce its vulnerability to similar shocks and structural changes in the future" (European Commission Directorate General for Health and Food Safety, 2022, p. 6).

2.2 Health Systems in Portugal

The principal healthcare provider in Portugal is the Serviço Nacional de Saúde, the National Health Service (NHS), a universal tax-financed system that covers all residents, and under certain situations, undocumented migrants. The Ministry of Health (MoH) regulates the NHS and is responsible for developing health policies, overseeing their implementation, as well as directly and indirectly administering and managing various institutions. As it is a tax funded system, the MoH is responsible for managing the governmental budget allocated for the NHS.

The NHS coexists and overlaps with two other systems: the health subsystems, which are occupation-based health insurance schemes serving groups and professions such as civil servants, police, military, and banking; and voluntary health insurance (VHI) schemes, that facilitate access to private hospitals and other services. Around 25% of the population was covered by a health subsystem or private health insurance as of 2017 (Simões et al., 2017), and it continues to grow in Portugal, accounting for 8.6 % of health financing (Oliveira et al., 2022). Furthermore, as mentioned in Oliveira et al. 2022, although access and care in the NHS is free, until recently, most services required payment of flat-rate user charges. The new legislation is not likely to reduce

Portugal's high level of out-of-pocket spending significantly, which is the second largest source of health system revenue at 30.5 % – much higher than the EU average of 15.4 % (Oliveira et al., 2022).

In terms of the NHS's governance, the existence of an Executive Board was approved in August of 2022. The Executive Board will make the adjustments and implement the main priorities and health policies that are defined by the Ministry of Health. It also will coordinate the National Network for Integrated Continuous Care and the National Network for Palliative Care, which allows it to provide a more comprehensive response to users. The most recent statutes were published on the 12th of October 2023, and they outline the structure of the Executive Board, which will have 300 workers divided into 11 departments and will organize the entirety of the functions of the NHS.

The NHS was, until recently, divided into 5 Regional Healthcare Administrations (RHA) that covered the country's geographic distribution. They were responsible for implementing national health goals and coordinating public hospitals, primary care centers, and the long-term care network (Oliveira et al., 2022). However, these RHAs will cease to exist as the Executive Board of the NHS will take over their planning and organization aspects. The Local Health Units (LHU) will take over the operational activities of providing care: they combine the care provided by health centers and hospitals into a single entity. Each LHU concentrates the human, financial and material resources, making it easier for citizens to access and move between health centers and hospitals according to their needs. To cover the whole country, 31 new LHUs will be created, meaning the country will be entirely covered by 39 LHUs. The main objective of this major reform is to remove administrative levels, according to Fernando Araújo, the Board's Director (Lusa, 2023). Another part of the reform approves the full dedication regime, a new model for organizing

the work of healthcare professionals in the NHS, where health professionals will be paid according to their performance in certain metrics instead of a flat salary in all model B Family Health Units (FHU). The generalization of model B FHU improves the NHS's capacity response. Theoretically, it increases motivation among professionals and improves user satisfaction. With the expansion of care capacity, this transition to model B will mean that 250,000 citizens will have access to family doctors, which will improve overall access to the system.[1] All these changes will be implemented starting on the 1st of January 2024.

3. Methodology

As discussed, the actual analysis of the resilience of a health system is not an easy task. This is partly due to its somewhat abstract nature, as well as the difficulty of developing a method that can assess both the quantitative and qualitative features that most experts agree are important indicators for resilience, as both can provide important information regarding the functioning of a health system (Rogers et al., 2021). An Irish case study used both quantitative and qualitative analysis to yield data and their quantitative data was collected from government documents and sources (Thomas et al., 2013). Therefore, in an attempt to assess the resilience of the Portuguese health system, this Work Project will separate the quantitative and qualitative into two sections. The quantitative section will have data regarding the activity of the NHS which is available in the NHS's Transparency Portal[2] over the timeframe of January 2018 to September 2023. The private health sector does not have this type of data available as recently or as detailed, thus most of the resilience analysis will focus on the NHS. The qualitative aspect will be assessed with a case study discussion of the NHS's Executive Board. The official statutes were published in October of 2023,

[1] "Nova Organização Dos Cuidados de Saúde: Conheça a Grande Reforma Do SNS Para 2024" 30 of August, 2023
[2] Transparência (sns.gov.pt)

but structural changes to the NHS have already started since January 2023. The case discussion will cover whether the existence of this Board and its new structure affects resilience and in what manner.

3.1 Timeline

Since there is monthly data available, the analysis will break the pandemic timeline[3] into specific parts that are related to the definition of resilience that was presented earlier. There will be 4 stages, also illustrated in Figure 8:

1. **Pre-pandemic:** this stage spans from as early as January 2018 to February 2020, before the coronavirus was found in Portugal. Although by late 2019/early 2020, the virus was already a growing concern globally, the lack of information and novelty of the virus made it difficult to prepare. Additionally, the WHO did not formally declare COVID-19 a Pandemic until March 2020 (WHO, 2020).

2. **Shock:** this stage spans the period between March 2020 and April 2021. The first cases reported in Portugal occurred at the beginning of March of 2020, the first lockdown was announced on the 12 of March and the first state of emergency announced on the 18th. This shock stage lasts through the year with various changes in terms of legal restrictions, easing after the end of the first lockdown in May 2020 to a state of calamity, but reemerging in late October/November due to an increase in infections. Despite this wave, no extra restrictive measures for Christmas are defined. This, along with a new and more infectious strain, means that Portugal became the leader in confirmed cases per million inhabitants in January of 2021 (Demony and Waldersee, 2021). This led to the second lockdown starting

[3] "Cronologia. Principais acontecimentos de 2 anos de pandemia em Portugal" Notícias ao Minuto, 26 of February 2022.

on the 21st of January, and it lasted until the first stages of deconfinement on the 15th of March 2021. Additionally, vaccines started to be distributed as early as late 2020. This gradual deconfinement process lasted until the 1st of May 2021 when the state of emergency was eased to a state of calamity, and most public spaces reopened with restrictions such as masks and social distancing.

3. **Absorption:** the absorption stage starts on the 1st of May of 2021 until almost 2 years later, on the 5th of May 2023, when the WHO declared the pandemic no longer a public health emergency (WHO, 2023). This period covers the continuation of a successful vaccination campaign (ABC News, 2021), the Digital COVID-19 Certificates that started during the summer of 2021, and the rise of the Delta and Omicron Variant. These variants were more infectious but not as dangerous in terms of mortality, which led to a massive increase in cases during the beginning of 2022, but fewer deaths. During the rest of 2022 and beginning of 2023, as the number of doses of vaccines increased and overall immunity rose, government mandated measures eased until masks were only used in hospitals and care homes, and these were no longer mandated in April 2023. This is a long period of absorption, but its edges slightly merge with the shock and post-pandemic stages.

4. **Post-pandemic:** This period goes from May 2023 until September 2023. This period had some transformative aspects, especially on the governmental and NHS side as will be further explored later. New developments and transformations did not solely happen during this stage, as health systems underwent several changes and renovations especially regarding telehealth and digital monitoring of patients. September was chosen as the cut-off month as it was the latest data available.

Given the definition of resilience, this timeline will allow us to see the pre-pandemic and proactive stage, the impact of the shock, the absorption and adaptation stage, and the post-pandemic stage. Figure 1 shows the evolution of the cases and deaths in Portugal from the first case detected in early March 2020 to September 2023[4], so it provides a view of stages 2, 3, and 4, and this temporal separation is indicated by the grey columns (which will be present in all figures).

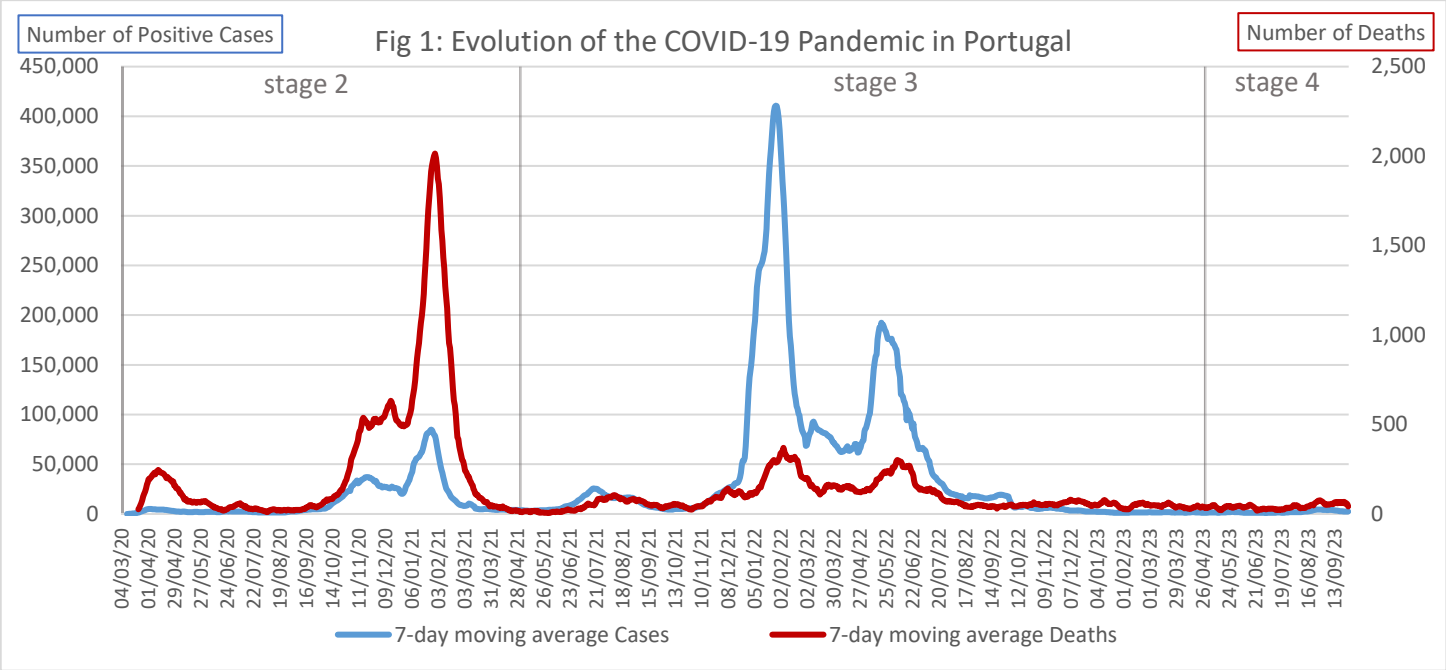


Figure 1 illustrates what was previously described: a surge in deaths at the beginning of the pandemic during the shock, as well as at the end of 2020 and early 2021, with a surge in positive cases that leads to above 2,000 weekly deaths, which results in a deconfinement that ends when stage 3 begins. The absorption stage has a massive spike in cases during the Omicron and Delta waves, reaching 400,000 weekly new cases, but the mortality level is smaller than in previous strains. What follows is a period of relative stability in both infections and deaths, leading to stage 4, which shows no significant change.

[4] The original raw data taken from the General Directorate of Health (DGS) was recorded daily, so a 7-day moving average was done to have a smoother view of the evolution of cases and deaths.

4. Quantitative Analysis

The activity datasets that were analyzed were the following:

1. **Surgical Interventions:**[5] the number of surgeries performed that were programmed (which includes the ones performed in the ambulatory service or the conventional service), and the urgent surgeries.

2. **Emergency Room (ER) Usage:** shows the number of ER visits divided by General, Pediatric, Obstetric, and Psychiatric. There is also data regarding the number of emergencies assisted separated by bracelets using the Manchester Triage system.

3. **SNS24 Usage**: there is data regarding the usage of the helpline and the number of answered and received calls.

4. **Number of Medical Consultations** (in Hospitals and Primary Care Centers): there is data on the number of first and subsequent appointments in hospital care (in-person and through telemedicine), and for the primary care centers there is the number of in-person appointments and the ones that were not in-person or unspecified.

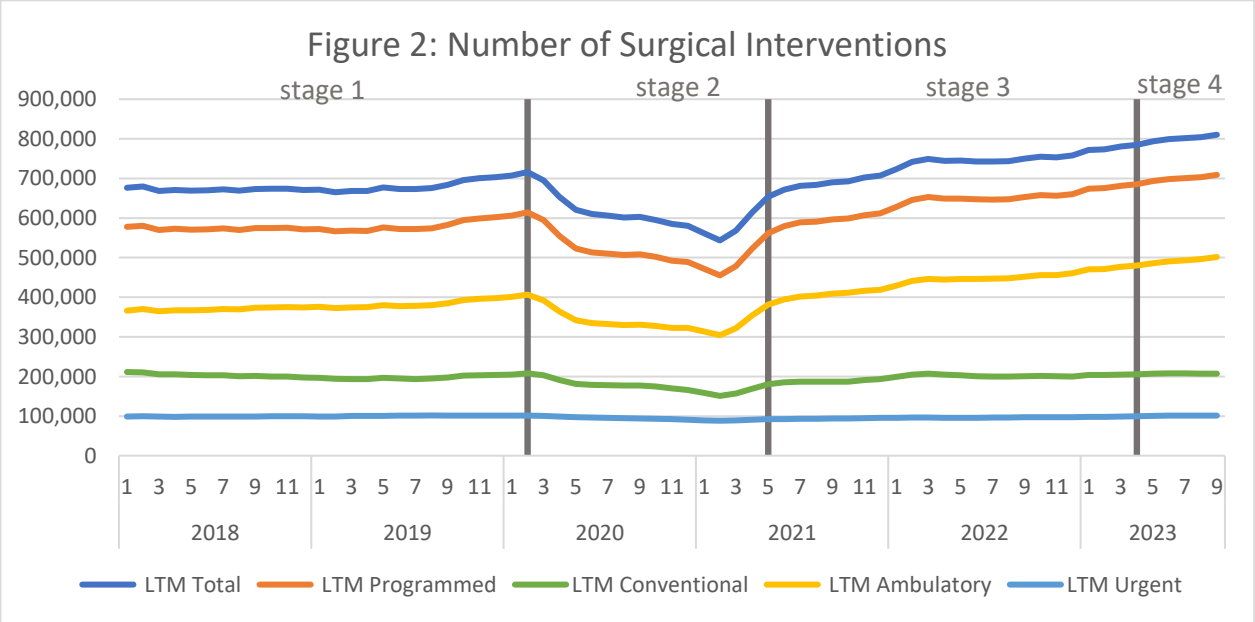
5. **Preventive Cancer Screenings**: has data regarding mammography screenings, colon and rectal (C&R) cancer screenings, and cervical screenings. For mammograms, the eligible users are women aged 50 to 70, for cervical screenings it is a broader range of ages from 25 to 60; and for C&R screenings it includes both men and women from age 50 to 75.

[5] This dataset, as well as some others, was recorded monthly and cumulatively in the original dataset, so a 12-month moving average (Last Twelve Months, or LTM) was used to remove seasonality so that a smooth, monthly view is possible for analysis purposes.

These indicators were chosen since they show a general overview of activity in the NHS, between the traditional healthcare given in hospitals through surgeries and consultations; the care given in ERs; the utilization of alternatives to hospitals such as primary care centers and SNS24, and finally the oncological screenings which show the aspect of preventive healthcare. Additionally, some simple regression analysis was performed to understand the trends presented by the data at the various stages and compared between activities.

4.1 Graphical Visualization and Analysis

Starting with the surgical interventions in Figure 2, the pre-pandemic stage shows mostly consistency over the previous 2 years, rising at the end of 2019 at a rate of 33.94 (see Table 2), but then most of the programmed surgeries (made up of conventional and ambulatory surgeries) dropped during stage 2. Before stage 3 officially begins according to the defined timeline, most of the activity in hospitals starts to increase around February of 2021, and this effect is seen in most Figures analyzed. Before the lockdown in January 2021 was implemented, major hospitals in Lisbon such as Santa Maria Hospital and Garcia de Horta Hospital warned that they were

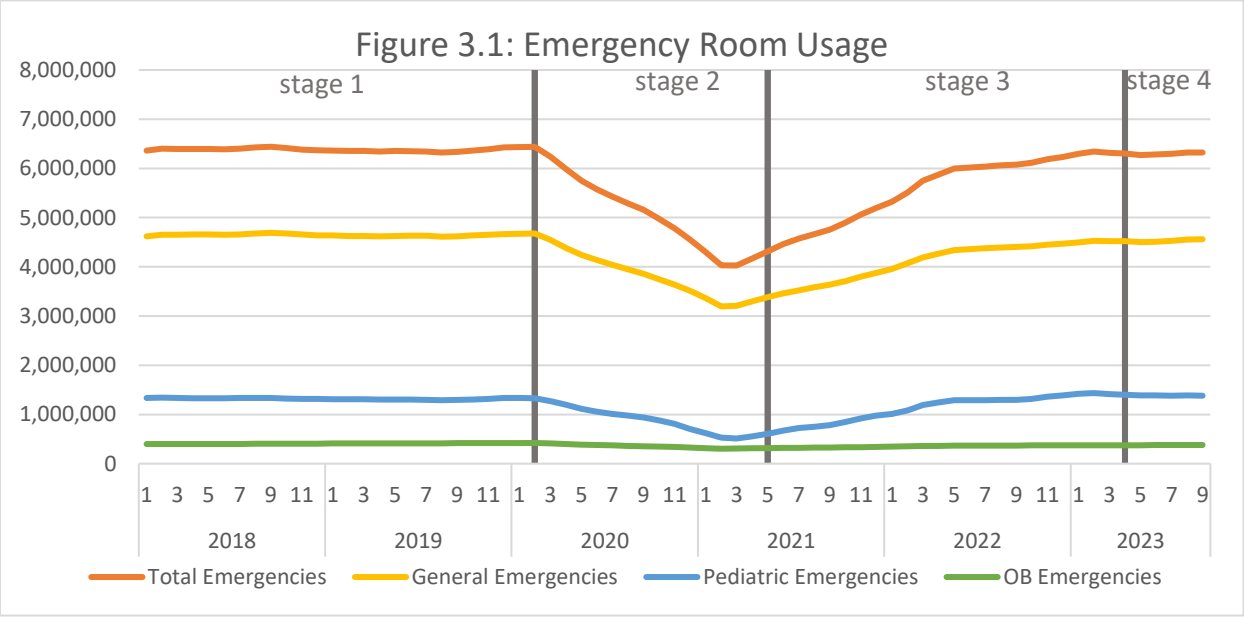


overstretched[6] and in a pre-catastrophe situation.[7] Once the situation was more controlled due to the implemented restrictions, lockdown, and the vaccination campaign, non-urgent activity in hospitals starts to increase during the gradual deconfinement process. In stage 3, they have been steadily increasing, initially attempting to make up for the delayed surgeries but with the easing restrictions and "safer" variants, more programmed surgeries could be performed again. The number of urgent surgeries hardly changed due to their crucial need. However, there is a danger brought on by a high bed occupancy rate with recovering patients: it made them more at risk for hospital infections and meant that less beds were available for at risk patients with COVID-19 related complications (OECD, 2021). At stage 4, we see the continued trend of increasing number of programmed surgical interventions, largely due to an increasing trend in the ambulatory surgeries. These patients do not remain in the hospital for recovery for longer than 24 hours, which is an indication of transformation in the system, and more beds available for other more critical patients. Even though this was a trend that already was seen before COVID-19, the pandemic accelerated new models of care, and as ambulatory surgery has gradually been more accepted, new forms such as home hospitalization are starting to appear.[8]

In Figure 3.1, we can see the ER usage. There is a very high drop during the shock, and a relatively slow recovery, slower than the surgeries. The numbers of all types of emergencies are almost back to the pre-pandemic stage, showing that the efforts of the NHS to funnel less critical cases may not be quite reducing the numbers as wanted[9]. In Figure 3.2, the types and number of emergencies attended are shown. The typification of emergency is done according to the

[6] "Hospital Santa Maria está em sobre-esforço e tem limites" (Lusa, 2021)
[7] "Hospital Garcia de Orta em ″cenário de pré-catástrofe″ com todas as camas Covid ocupadas" (TSF, 2021)
[8] "Novo Recorde de Cirurgias de Ambulatório" NHS, 2023
[9] "'Ligue SNS 24, Salve Vidas' Garantiu Consulta No Próprio Dia Ou Seguinte a 8.500 Utentes" NHS, 2023

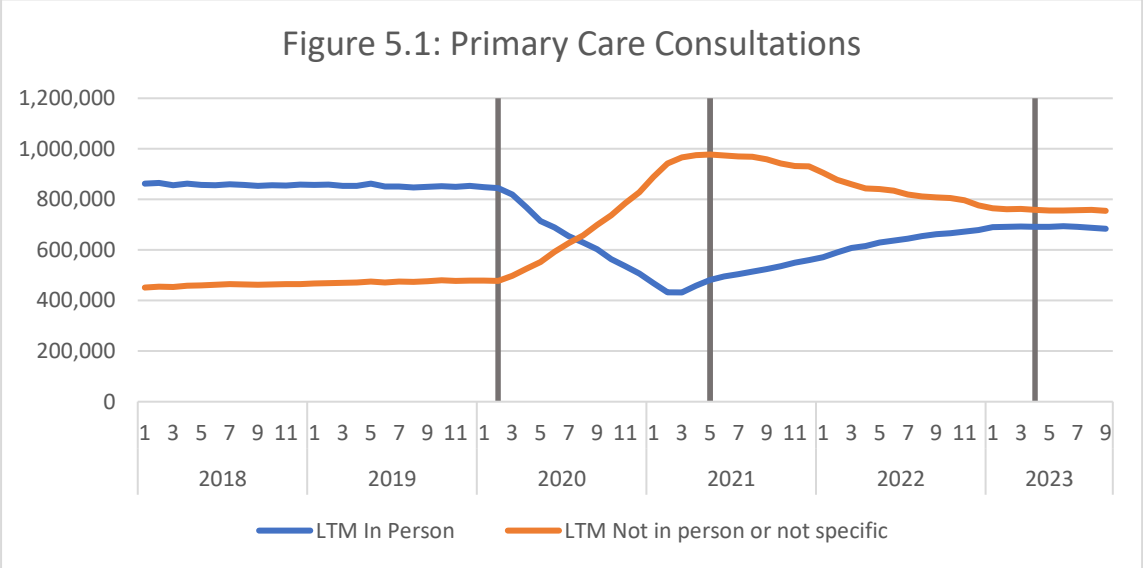
Manchester Triage System[10], where Red is the most urgent and Blue the least urgent. According to the level of urgency, there are recommended waiting times, Red being immediate care and Blue up to 240 minutes, as seen in Table 1. In Figure 3.2, there is a significant number of yellow and green emergencies, which correspond to medium and medium-low urgency. Orange and yellow bracelets are increasing at a higher rate than pre-pandemic levels (see Table 3.2). Despite the efforts and campaigns to decrease the use of the ER unless necessary, only green patients show a higher level of usage than before the pandemic, but with a significant decreasing rate for stage 4 (-457.7).



Complementing the ER data, we have the activity of NHS's telephone helpline, the SNS24. We can see that Figure 4 clearly shows the patterns of the various waves of infections. There is only data from 2020 onwards, even though the helpline serves various purposes, not only COVID-19 related. Its biggest advantage is the redirection to the right treatment in the most efficient way. Since SNS24 already existed before the pandemic,[11] it meant that it was a service that could be scaled up and down as needed with the rising infections, instead of built from the ground up: it

[10] Protocolo Triagem Manchester | Grupo Português Triagem
[11] Decreto-Lei n.º 69/2017 (2017)

improved the agility of the first response to the shock, and became commonly used in the second lockdown. The helpline received almost 5 million calls in January 2022 at the peak of its activity during the Omicron wave. However, even before the end of the absorption stage, the usage of the line had already decreased and gone back to initial pandemic levels. That is not to say that its overall utility has been lost, since citizens are now more conscious of its existence. Along with the helpline, the rise of telemedicine and digital health was noted, as seen in Figure 5.1.



In primary care, the in-person appointments and digital appointments followed had a mirror-like relationship as the pandemic progressed. In-person appointments decreased, and digital appointments had a boom, even surpassing the in-person appointments in pre-pandemic levels. This might have been because of the redirection towards care that was not necessarily hospitals, where health workers had more availability. What is curious is that the new plateau reached just after stage 3 and into stage 4 shows that there are more consultations that are not in the primary care centers than in person, whether they be digital or in some other form. This is an example of transformation of the provision of healthcare that reached a new “steady state” where digital alternatives are preferred in primary care, even though both have negative slopes, in person

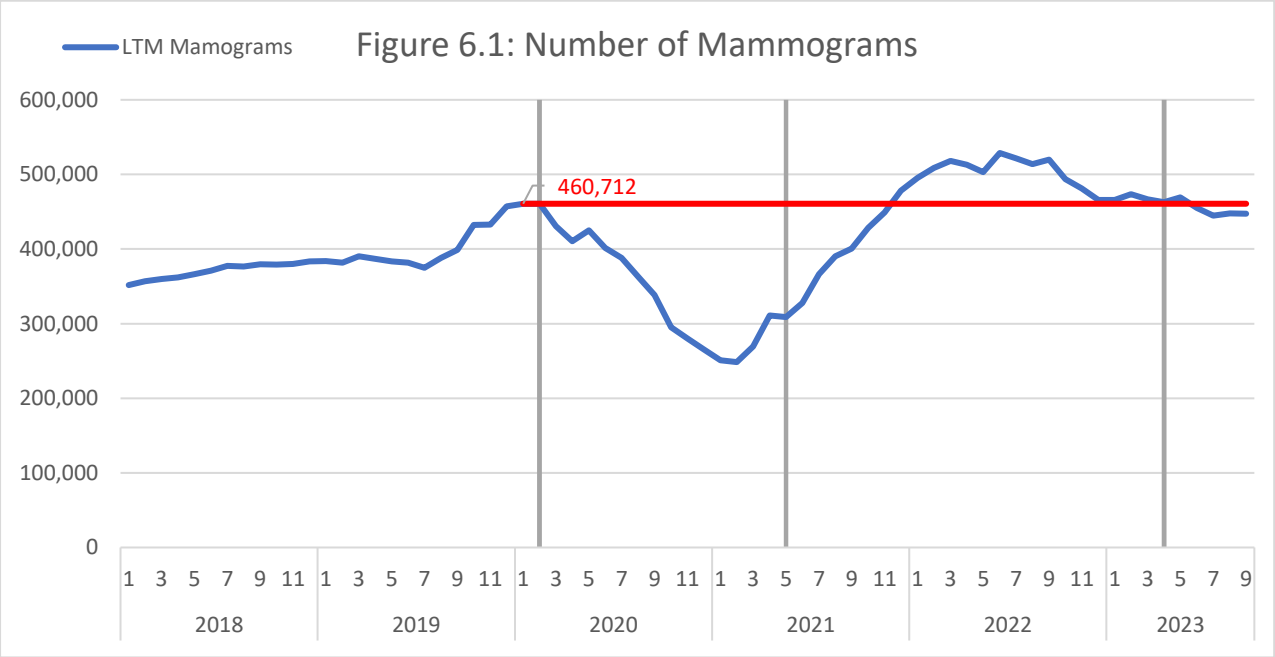
consultations are decreasing more, and at a faster rate than in stage 1 (see Table 5.1). This new normal could have implications in other parts of the NHS, and although telemedicine is already present in hospital consultations, it does not have this level of prevalence.

Figure 5.2 shows hospital appointments decreasing during the first wave and stage 2. The levels in stage 4 for first visits have not increased by much, however there is an increase in the number of subsequent visits. This can mean various things: the first visit needed additional tests to confirm a diagnosis and more subsequent visits were needed after that, visits may have been routine to follow some treatment plan, or the first appointment did not provide the right diagnosis or outcome.

Regardless, it seems that there is not a great change in the trends between stage 1 and stage 4, however, once we look at the number of hospital appointments in telemedicine in Figure 5.3, we see a marked increase that began during January 2021 at the peak of infections, and it peaked one year later, decreased at a steady rate during 2022 and at smaller rate in 2023. The spike in subsequent visits seen at the beginning of 2021 indicates that patients were being accompanied during the lockdowns, either from COVID-19 infections or other situations. Still, most recent values show that while both 1st and subsequent visits are decreasing, although 1st visits at a lower rate of 7.07 (Table 5.2).

Finally, the oncological screenings suffered a decrease in numbers. It is estimated that around 5,000 cancer patients were left undiagnosed because of COVID-19 (Simões, 2022). The lack of screenings has led to tumors being discovered later in the development stage, leading to higher costs of treatments and reduced chances of survival (Ferrão, 2022). Figure 6.1 shows the

development of the mammograms with a red line representing a maximum achieved before the pandemic.



In late 2019 there is a slight increase before the shock stage, increasing at a rate of 441.9 screenings per month (see Table 6.1). The spike in screenings at the beginning of 2021 at a higher rate now, 509 screenings per month, is expected: new screenings, routine ones, as well as overdue ones. The MoH stated that in 2022 there was an effort to increase breast cancer screenings, with 98% of eligible women being called, but admitted that cervical and C&R were still behind (and this can be observed in Figure 6.2). The Minister cited logistical complications being the main reason for this decrease, not disregarding the lack of health professionals as a contributing factor.[12] While the increased rate of recovery is explained, the total area variation under and above the pre-pandemic maximum of 460,712 at first glance shows that the screenings lost were not completely

[12] "Ministro admite que rastreio do cancro do colo do útero não recuperou desde pandemia"

recovered, assuming that the demand for screenings and eligible users remain the same. However, looking at a yearly comparison (see Table 6.2), cumulatively, the screenings have a positive outcome, with a total variation of 114,041 at the end of January 2023. Nevertheless, the screenings fall in 2023, even going below pre-pandemic levels, demonstrating no change that would improve the volume of screenings. Similar levels of decrease are seen in the cervical and C&R cancer screenings in 2020, however the recovery for both start much later, during 2022. Figure 6.2 shows the C&R exams with a greater area above the line, and though the cervical exams start recovering later, there is a positive slope higher than any other recorded at 526.7 screenings, which shows promise.

In Figure 6.3, we can look at the proportions of users that are eligible and have in fact done a screening. The proportions tell a similar story to the screenings, the mammograms started to increase earlier than the others. The National Strategy Against Cancer in Portugal has the objective of reaching 65% proportion of all eligible citizens with screenings by 2030, as well as a 100% geographic coverage rate, given that rural areas have a lower incidence of screenings. Additionally, three more screening plans will be introduced for gastric cancer, prostate cancer, and lung cancer. They were chosen because their early identification leads to better results in terms of reduced mortality.[13]

Overall, this temporal analysis of the activity of the NHS shows some identifiable patterns, as well as some transformation of services to digital alternatives. The increase in usage of primary care consultations is an encouraging sign for a more resilient system, however, recently the emergency rooms for some specialties have been suffering a shortage of workers and some can no

[13] "Portugal prepara plano de rastreios dos cancros da próstata, do pulmão e gástrico" - SIC Notícias

longer remain open during the weekends, especially for obstetric and pediatric patients. The oncologic screenings show improvement in their latest numbers for cervical and C&R, but for mammograms there are decreasing trendlines, suggesting a decrease in efforts.

5. Qualitative Analysis

The Executive Board's mission is to coordinate care and implement the priorities and objectives defined by the MoH. After almost a year of existence, it has already communicated some changes, notably:

1. The Reorganization of the Emergency Services: several publications that outline a temporary reorganization of the care response operating model of the emergency services which will strengthen the coordination between various NHS institutions. New regulations for the emergency services of various specialties: pediatrics, psychiatry, child psychiatry, urology, and gastroenterology. In all of them, it is emphasized that before going to any ER, the SNS24 helpline should be contacted or 112 for an emergency.

2. Operation "Safe Birth": since April 2023, there have been 3 communications regarding this plan that seeks to promote the security, safety, and confidence of pregnant women and children regarding their specific healthcare needs in the NHS. It includes a list of maternities in the country that are either in full operation and or have scheduled closure days.

3. The Pediatric Emergency Services Plan for Winter of 23/24: similar to the operation "Safe Birth", there is a plan and list of the emergency services that are in full operation, and which ones have restrictions.

This discussion will cover whether the existence, activities, and proposals of this Board and its new structure affects resilience and in what manner, using Table A2 (taken from Thomas et al. 2020), where resilience-enhancing strategies are outlined, and divided into assessment areas. Governance and leadership are deemed to be the one of the strongest indicators when assessing the resilience of health systems (Forsgren et al., 2022), therefore, this analysis of the NHS's leadership can give an indication regarding resilience.

Looking at Table A2, the first assessment area begins with "Effective and participatory leadership with a strong vision and communication". From what is described in their statutes[14] , the EB (Executive Board) clearly demonstrates this objective and ambition. The statutes highlight the creation of NHS-EB as a "profound change" that "demonstrates the government's unequivocal commitment to ensuring the existence of a solid, resilient and adaptable NHS". Additionally, the statutes mention that it provides the EB with an effective operational capacity, which will enable it to "implement the policies and actions that will promote fair access, optimize the use of resources and continuously improve the quality of the services provided, within the concept of an NHS network". Indeed, as of 2023, the EB has assumed central responsibility for the management of the NHS, in "an innovative and dynamic approach that enables the coordination and cooperation of all the parts of the system". Moreover, their publications on the reforms and reorganizations prove to be an effective way to communicate these changes, showcasing a set of contingency plans and protocols that are to be followed. In terms of accountability, there are departments (Department of Quality Control in Health and Safety of the Patient, and the Economic and Financial Sustainability Department) that state some responsibility over ensuring financial accountability and the quality

[14] Translated into English, taken from Portaria n.º 306-A/2023 | DR (diariodarepublica.pt)

and safety of the healthcare services provided. Overall, the EB certainly demonstrates a strong vision and participatory leadership through their communications.

The matter of "coordination of activities across government and key stakeholders" is more directed towards a country's health system rather than an entity such as the NHS. Nonetheless, the EB collaborates with entities such as the Central Administration of the Health System (CAHS) and Shared Services of the Ministry of Health (SSMH), as well as collaborating with both private and social entities in the provision of healthcare. The publications regarding the Emergency Services Regulations and the Reformation all involved medical inputs from healthcare professionals and medical specialists, demonstrating coordination across these key stakeholders. They are especially important to collaborate with in the Reorganization of the Emergency Service and Operation "Safe Birth", since they have special urgency: maternities in the Lisbon area have been overcrowded due to some institutions closing and the remaining ones taking in extra patients, and emergency rooms are in a similar situation.

Regarding the "organizational learning culture that is responsive to crises", the are mentions of the importance of learning from the results obtained clinically, financially, and in terms of patient satisfaction, indicating a commitment to organizational learning: "carry out, in coordination with CAHS, the continuous assessment of performance indicators and the activities of health system institutions and services". Specific mechanisms for assessment are only mentioned in the case of using satisfaction surveys "for the beneficiaries, patients, and healthcare professionals". While there seems to be a commitment to assessment and improvement, it seems lacking on the learning aspect, a key pillar of the resilience cycle, nonetheless it can be presumed that the assessments can lead to learning and change.

In terms of “effective information systems and flows”, there already exist some databases that showcase a variety of metrics related to the performance and activity of the NHS’s primary care with public access provided by SSMH.[15] The EB’s Department of Digital Transformation has a responsibility to "provide reliable and accessible health information to the user, health professionals and the various health entities, through a multi-channel communication plan, including the real-time incorporation of the information systems of the NHS entities with the NHS Portal." This department also has the responsibility to "encourage the development and use of artificial intelligence solutions, integrated into NHS information systems, to support clinical decision-making, efficiency in the provision of care, and management of resources”. Therefore, although there are no specific mentions of a data source for public access, there are mentions across several departments about the care and integration of an information system that flows between the entities. Additionally, specific mentions of using the data for analysis purposes exist in the responsibilities, the Training, Research, Innovation and Development Department: "promote the systematic analysis of data collected in NHS units in order to create research dynamics that generate evidence in the real world”.

Finally, looking at the “surveillance enabling timely detection of shocks and their impact”. There are no mentions specifically regarding epidemiological shock, merely regarding the promotion of scientific and academic research in “institutions and other organizations working in this field, as well as enhancing the potential of clinical and epidemiological research and translation for continuous improvement and excellence in the provision of care to NHS users”. The existence of the various departments and their specific responsibilities is an encouraging sign, as this suggests that since there is a wider range of observation and more avenues that are under surveillance than

[15] Public database can be found here: bicsp.min-saude.pt/pt/contratualizacao/idg/Paginas/default.aspx

just the epidemiologic shocks, there could be more preparation for other types of shocks. The emphasis on assessment and improvement of services also suggests mechanisms to identify change in need and access to services.

Overall, the EB and their statutes suggest a well thought out organizational change, although admittedly a very profound change that has not yielded results yet, since there have been delays in the implementation plan (Pinto, 2023). The reformations of the emergency services have just started out in November 2023 and the situation does not show dramatic improvements. The operation "Safe Birth" started on April 2023, and yet the situation has not improved despite initiatives such as the concentration of the OB-GYN and neonatology services from Santa Maria Hospital to the São Francisco Xavier Hospital in August of 2023, and now São Francisco Xavier has also had to partially close, and the Alfredo da Costa Maternity has taken on the extra burden.[16] The consequences of a lack of doctors have been felt for some time, even though Figure 7 shows an increase in doctors and nurses since 2018. It seems that though resources and investment exist, there is still something missing from the SNS, possibly organizationally related (screenings were not as up to date due to logistical failures). The Health Regulatory Entity's reports on surgical waiting times for 2022 show a constant increase in surgeries compared to previous years, and an increase in patients that exceeded their waiting times, which has been a snowball effect since the pandemic (ERS, 2022 & 2023). With the aftermath of the pandemic still being felt, it seems that activity is still lagging. It will be a challenge for the EB to be able to act in the long run when there is still work to be done in the short run. Nonetheless, in terms of the analysis with Table 2, the statutes and existing publications suggest that the EB is actively taking steps towards a more

[16] "Fecho de urgências de obstetrícia coloca sob grande pressão Maternidade Alfredo da Costa" - SIC Notícias, 2023

resilient and communicative system. To some extent, it can be said that this Emergency Services crisis constitutes the first crisis that the EB must face and overcome, to further strengthen the NHS.

6. Conclusion

Portugal could possibly be ready for another respiratory infection such as COVID-19, having the public know-how of confinement, an information system with telemedicine and helplines and other digital alternatives appearing, a different kind of shock that implies a high level of need for urgent care might have a great negative impact. Preparing for every possible scenario is a large demand, however the current strains on the Emergency Services are concerning. In terms of other activity measures, whilst the system did experience some degree of transformation, some indicators were not necessarily better off: the regression showed negative values when the opposite was wanted (in the case of primary care teleconsultations, or the mammograms), or the same levels pre-pandemic were not achieved. The quantitative analysis was limited to what was available in the Transparency Portal, so a further study could dive deeper into assessing not only the activity and productivity of the NHS, but also the population's "necessity" and what kind of health "consumption" should the population be having to become more resilient, for instance with increased prevention or bolder proactive solutions from the government and leadership side. The qualitative analysis indicates the Executive Board has ambitions and objectives to become more resilient and sustainable, however with only a handful of publications to analyze and new reforms still to come into place, only conjectures regarding effectiveness can be made. To conclude, the hardships and lessons learned in response to the pandemic resulted in a better understanding of new models of care, where they can be applied, and brought forth reforms that are likely to improve the NHS. Nevertheless, this evaluation did not show an extremely resilient system, rather one that is still recovering and feeling the aftermath of the pandemic in many of its activities.

7. References

Literature Review:

Barros, Pedro Pita, and Eduardo Costa. 'Acesso a Cuidados de Saúde, 2022: As Escolhas Dos Cidadãos No Pós-Pandemia', March 2022. Acesso a Cuidados de Saude, 2022.pdf (unl.pt)

Biddle, Louise, Katharina Wahedi, and Kayvan Bozorgmehr. 'Health System Resilience: A Literature Review of Empirical Research'. *Health Policy and Planning* 35, no. 8 (1 October 2020): 1084–1109. https://doi.org/10.1093/heapol/czaa032.

Blanchet, Karl, Sara L. Nam, Ben Ramalingam, and Francisco Pozo-Martin. 'Governance and Capacity to Manage Resilience of Health Systems: Towards a New Conceptual Framework'. *International Journal of Health Policy and Management* 6, no. 8 (4 April 2017): 431–35. https://doi.org/10.15171/ijhpm.2017.36.

Ding, Xuhui, Zhongyao Cai, Wei Zhu, and Zhu Fu. 'Study on the Spatial Differentiation of Public Health Service Capabilities of European Union under the Background of the COVID-19 Crisis'. *Healthcare* 8, no. 4 (24 September 2020): 358. https://doi.org/10.3390/healthcare8040358.

European Commission. Directorate General for Health and Food Safety. *Assessing the Resilience of Health Systems in Europe :An Overview of the Theory, Current Practice and Strategies for Improvement.* LU: Publications Office, 2022. https://data.europa.eu/doi/10.2875/191483.

Expert Panel on effective ways of investing in Health. *The Organisation of Resilient Health and Social Care Following the COVID-19 Pandemic*. Luxembourg: Publications Office of the European Union, 2020. Organisation of resilient health and social care following the COVID-19 pandemic (europa.eu)

Forsgren, Lena, Fabrizio Tediosi, Karl Blanchet, and Dell D Saulnier. 'Health Systems Resilience in Practice: A Scoping Review to Identify Strategies for Building Resilience'. *BMC Health Services Research* 22, no. 1 (19 September 2022): 1173. https://doi.org/10.1186/s12913-022-08544-8.

Fridell, My, Sanna Edwin, Johan Von Schreeb, and Dell D. Saulnier. 'Health System Resilience: What Are We Talking About? A Scoping Review Mapping Characteristics and Keywords'. *International Journal of Health Policy and Management* 9, no. 1 (17 September 2019): 6–16. https://doi.org/10.15171/ijhpm.2019.71.

Gocke, Daniel, Charlotte Johnston-Webber, Alistair McGuire, and George Wharton. 'Building Sustainable and Resilient Health Systems'. Partnership for Health System Sustainability and Resilience, May 2023. WEF_PHSSR_Building_Sustainable_and_Resilient_Health_Systems_2023.pdf (weforum.org)

Haldane, Victoria, Chuan De Foo, Salma M. Abdalla, Anne-Sophie Jung, Melisa Tan, Shishi Wu, Alvin Chua, et al. 'Health Systems Resilience in Managing the COVID-19 Pandemic: Lessons from 28 Countries'. *Nature Medicine* 27, no. 6 (June 2021): 964–80. https://doi.org/10.1038/s41591-021-01381-y.

Kieny, Marie-Paule, David B Evans, Gerard Schmets, and Sowmya Kadandale. 'Health-System Resilience: Reflections on the Ebola Crisis in Western Africa'. *Bulletin of the World Health Organization* 92, no. 12 (1 December 2014): 850–850. https://doi.org/10.2471/BLT.14.149278.

OECD. *Portugal: Perfil de Saúde Do País 2021*. OECD Publishing, 2021.

Oliveira, Mónica D, Aida Isabel Tavares, Ana Vieira, and Matilde Pacheco. 'Sustainability and Resilience in the Portuguese Health System', November 2022.

Paschoalotto, Marco Antonio Catussi, Eduardo Alves Lazzari, Rudi Rocha, Adriano Massuda, and Marcia C. Castro. 'Health Systems Resilience: Is It Time to Revisit Resilience after COVID-19?' *Social Science & Medicine* 320 (March 2023): 115716. https://doi.org/10.1016/j.socscimed.2023.115716.

Rajan, Selina, Martin McKee, Cristina Hernández-Quevedo, Marina Karanikolos, Erica Richardson, Erin Webb, and Jonathan Cylus. 'What Have European Countries Done to Prevent the Spread of COVID-19? Lessons from the COVID-19 Health System Response Monitor'. *Health Policy* 126, no. 5 (May 2022): 355–61. https://doi.org/10.1016/j.healthpol.2022.03.005.

Rogers, Heather L., Pedro Pita Barros, Jan De Maeseneer, Lasse Lehtonen, Christos Lionis, Martin McKee, Luigi Siciliani, Dorothea Stahl, Jelka Zaletel, and Dionne Kringos. 'Resilience Testing of Health Systems: How Can It Be Done?' *International Journal of Environmental Research and Public Health* 18, no. 9 (29 April 2021): 4742. https://doi.org/10.3390/ijerph18094742.

Russo, Giuliano, Inês Rego, Julian Perelman, and Pedro Pita Barros. 'A Tale of Loss of Privilege, Resilience and Change: The Impact of the Economic Crisis on Physicians and Medical Services in Portugal'. *Health Policy* 120, no. 9 (September 2016): 1079–86. https://doi.org/10.1016/j.healthpol.2016.07.015.

Safi, Mariam, Bettina Ravnborg Thude, Frans Brandt, and Robyn Clay-Williams. 'The Application of Resilience Assessment Grid in Healthcare: A Scoping Review'. Edited by Yusuke Tsutsumi. *PLOS ONE* 17, no. 11 (4 November 2022): e0277289. https://doi.org/10.1371/journal.pone.0277289.

Sagan, Anna. *Health Systems Resilience during COVID-19: Lessons for Building Back Better*. Copenhagen, Denmark: European Observatory on Health Systems and Policies, 2021.

Saulnier, Dell D, Karl Blanchet, Carmelita Canila, Daniel Cobos Muñoz, Livia Dal Zennaro, Don De Savigny, Kara N Durski, et al. 'A Health Systems Resilience Research Agenda: Moving from Concept to Practice'. *BMJ Global Health* 6, no. 8 (August 2021): e006779. https://doi.org/10.1136/bmjgh-2021-006779.

De Almeida Simoes, Jorge, Gonçalo Figueiredo Augusto, Inês Fronteira, and Cristina Hernández-Quevedo. 2017. "Health Systems in Transition." *Portugal Health System Review* 19 (2). https://iris.who.int/bitstream/handle/10665/330211/HiT-19-2-2017-eng.pdf?isAllowed=y&sequence=7.

Thomas, Steve, Conor Keegan, Sarah Barry, Richard Layte, Matt Jowett, and Charles Normand. 'A Framework for Assessing Health System Resilience in an Economic Crisis: Ireland as a Test

Case'. *BMC Health Services Research* 13, no. 1 (December 2013): 450. https://doi.org/10.1186/1472-6963-13-450.

Thomas, Steve, Anna Sagan, James Larkin, Jonathan Cylus, Josep Figueras, and Marina Karanikolos. 'Strengthening Health Systems Resilience: Key Concepts and Strategies'. European Observatory on Health Systems and Policies, 2020.

Turenne, Charlotte Pailliard, Lara Gautier, Stéphanie Degroote, Etienne Guillard, Fanny Chabrol, and Valéry Ridde. 'Conceptual Analysis of Health Systems Resilience: A Scoping Review'. *Social Science & Medicine* 232 (July 2019): 168–80. https://doi.org/10.1016/j.socscimed.2019.04.020.

Waitzberg, Ruth, Cristina Hernández-Quevedo, Enrique Bernal-Delgado, Francisco Estupiñán-Romero, Ester Angulo-Pueyo, Mamas Theodorou, Marios Kantaris, et al. 'Early Health System Responses to the COVID-19 Pandemic in Mediterranean Countries: A Tale of Successes and Challenges'. *Health Policy* 126, no. 5 (May 2022): 465–75. https://doi.org/10.1016/j.healthpol.2021.10.007.

Webb, Erin, Cristina Hernández-Quevedo, Gemma Williams, Giada Scarpetti, Sarah Reed, and Dimitra Panteli. 'Providing Health Services Effectively during the First Wave of COVID-19: A Cross-Country Comparison on Planning Services, Managing Cases, and Maintaining Essential Services'. *Health Policy* 126, no. 5 (May 2022): 382–90. https://doi.org/10.1016/j.healthpol.2021.04.016.

Winkelmann, Juliane, Erin Webb, Gemma A. Williams, Cristina Hernández-Quevedo, Claudia B. Maier, and Dimitra Panteli. 'European Countries' Responses in Ensuring Sufficient Physical Infrastructure and Workforce Capacity during the First COVID-19 Wave'. *Health Policy* 126, no. 5 (May 2022): 362–72. https://doi.org/10.1016/j.healthpol.2021.06.015.

Witter, Sophie, Steve Thomas, Stephanie M Topp, Edwine Barasa, Mickey Chopra, Daniel Cobos, Karl Blanchet, Gina Teddy, Rifat Atun, and Alastair Ager. 'Health System Resilience: A Critical Review and Reconceptualisation'. *The Lancet Global Health* 11, no. 9 (September 2023): e1454–58. https://doi.org/10.1016/S2214-109X(23)00279-6.

Zhao, Laijun, Yajun Jin, Lixin Zhou, Pingle Yang, Ying Qian, Xiaoyan Huang, and Mengmeng Min. 'Evaluation of Health System Resilience in 60 Countries Based on Their Responses to COVID-19'. *Frontiers in Public Health* 10 (9 January 2023): 1081068. https://doi.org/10.3389/fpubh.2022.1081068.

Zibwowa, Zandile, and Redda Seifeldin. 'Health Systems Resilience Toolkit'. WHO, May 2022. Health systems resilience toolkit: a WHO global public health good to support building and strengthening of sustainable health systems resilience in countries with various contexts

Newspaper Articles and Other Media Publications:

- "'Ligue SNS 24, Salve Vidas' Garantiu Consulta No Próprio Dia Ou Seguinte a 8.500 Utentes." 2023. SPMS. September 26, 2023. https://www.spms.min-saude.pt/2023/09/ligue-sns-24-salve-vidas-garantiu-consulta-no-proprio-dia-ou-seguinte-a-8-500-utentes/.
- *ABC News*. 2021. "How Portugal Managed to Have World's Highest Vaccination Rate - ABC News," October 5, 2021. https://www.abc.net.au/news/2021-10-05/how-portugal-managed-to-have-the-highest-rates-of-vaccination/100514138.
- "About Us." 2023. SNS24. October 13, 2023. https://www.sns24.gov.pt/en/sobre-nos/#telephone-line-808.
- Berjikian, Kal. 2023. "Longas Listas de Espera E Detecção Tardia: Como O COVID-19 Ainda Afeta O Rastreio Do Cancro." Euronews. Euronews.com. February 4, 2023. https://pt.euronews.com/2023/02/04/longas-listas-de-espera-e-deteccao-tardia-como-o-covid-19-ainda-afeta-o-rastreio-do-cancro.
- "Cancer Screenings." 2023. SNS24. October 6, 2023. https://www.sns24.gov.pt/en/tema/doencas-oncologicas/rastreios-oncologicos/.
- Carrilho, Ana. 2021. "Pandemia Travou 450 Mil Rastreios Ao Cancro. Lançada Petição Em Defesa Dos Doentes Não Covid - Renascença." Rádio Renascença. Rádio Renascença. July 7, 2021. https://rr.sapo.pt/noticia/pais/2021/07/07/pandemia-travou-450-mil-rastreios-ao-cancro-lancada-peticao-em-defesa-dos-doentes-nao-covid/245295/.
- "Consulta - Estratégia Nacional de Luta Contra O Cancro 2021-2030." 2021. Consultalex.gov.pt. June 30, 2021. https://www.consultalex.gov.pt/ConsultaPublica_Detail.aspx?Consulta_Id=248.
- Demony, Catarina, and Victoria Waldersee. 2021. "Nearly Half of Portugal's COVID-19 Deaths Were in January." Reuters. February 1, 2021. https://www.reuters.com/business/healthcare-pharmaceuticals/nearly-half-portugals-covid-19-deaths-were-january-2021-02-01/.
- ERS. 2022. "Informação de Monitorização Sobre Tempos de Espera no SNS no 1º Semestre de 2022." *Entidade Reguladora Da Saúde*. https://www.ers.pt/media/zsphxh2w/im-tempos-de-espera-no-sns-1-sem-2022.pdf.

- ERS. 2023. “Informação de Monitorização Sobre Tempos de Espera no SNS no 2º Semestre de 2022.” *Entidade Reguladora Da Saúde*. https://www.ers.pt/media/i4oftk0j/im_te_jul_dez_2022-18_04_2023.pdf
- “Estratégia Nacional de Luta Contra O Cancro 2021-2030 Entra Em Consulta Pública.” 2023. Www.dgs.pt. 2023. https://www.dgs.pt/documentos-em-discussao-publica/estrategia-nacional-de-luta-contra-o-cancro-2021-2030-entra-em-consulta-publica.aspx.
- Ferrão, Fátima. 2022. “Pandemia Deixou Quase 5 Mil Cancros Por Dia Por Diagnosticar.” DN. Diário de Notícias. January 28, 2022. https://www.dn.pt/sociedade/pandemia-deixou-quase-5-mil-cancros-por-diagnosticar-14534510.html.
- “Fecho de Urgências de Obstetrícia Coloca Sob Grande Pressão Maternidade Alfredo Da Costa.” 2023. SIC Notícias. SIC Notícias. December 10, 2023. https://app.sicnoticias.pt/pais/2023-12-10-Fecho-de-urgencias-de-obstetricia-coloca-sob-grande-pressao-Maternidade-Alfredo-da-Costa-73458708.
- “Governo E Médicos Chegam a Acordo Para Aumentos Salariais Em 2024.” 2023. Portugal.gov.pt. November 28, 2023. https://www.portugal.gov.pt/pt/gc23/comunicacao/noticia?i=governo-e-medicos-chegam-a-acordo-para-aumentos-salariais-em-2024.
- Lopes, Vítor, Madalena Ferreira, Manuela Carneiro, Catarina Marques, Paulo Gabriel, and Miguel Costa. 2023. “Mês ‘Dramático’ No SNS: Saiba Quais Os Hospitais Com Urgências Encerradas E as Alternativas.” SIC Notícias. SIC Notícias. November 1, 2023. https://app.sicnoticias.pt/pais/2023-11-01-Mes-dramatico-no-SNS-saiba-quais-os-hospitais-com-urgencias-encerradas-e-as-alternativas-dd017ba0.
- Lusa, Agência. 2022. “Cronologia. Principais Acontecimentos de 2 Anos de Pandemia Em Portugal.” Notícias Ao Minuto. Lusa. February 26, 2022. https://www.noticiasaominuto.com/pais/1941961/cronologia-principais-acontecimentos-de-2-anos-de-pandemia-em-portugal.
- Lusa. 2021. “Hospital Santa Maria Está Em Sobre-Esforço E Tem Limites.” Jornaldenegocios.pt. Jornal de Negócios. January 16, 2021. https://www.jornaldenegocios.pt/economia/coronavirus/detalhe/hospital-santa-maria-esta-em-sobre-esforco-e-tem-limites.
- “SNS. Administrações Regionais de Saúde Vão Acabar Até Ao Fim Do Ano.” CNN Portugal.

CNN Portugal. March 15, 2023. https://cnnportugal.iol.pt/administracoes-regionais-de-saude/fernando-araujo/administracoes-regionais-de-saude-vao-acabar-ate-ao-fim-do-ano/20230315/6411d07fd34ef47b87532b5c.

- "Ministro Admite Que Rastreio Do Cancro Do Colo Do Útero Não Recuperou Desde Pandemia." 2023. DN. DN. February 4, 2023. https://www.dn.pt/sociedade/ministro-admite-que-rastreio-do-cancro-do-colo-do-utero-nao-recuperou-desde-pandemia--15780240.html.
- "Nova Organização Dos Cuidados de Saúde: Conheça a Grande Reforma Do SNS Para 2024." 2023. Portugal.gov.pt. August 30, 2023. https://www.portugal.gov.pt/pt/gc23/comunicacao/noticia?i=nova-organizacao-dos-cuidados-de-saude-conheca-a-grande-reforma-do-sns-para-2024.
- "Novo Recorde de Cirurgias de Ambulatório." 2023. Sns.gov.pt. June 19, 2023. https://www.sns.gov.pt/noticias/2023/06/19/novo-recorde-de-cirurgias-de-ambulatorio/.
- Pinto, Salomé. 2023. "Nova Gestão Do SNS: 'Tempo Perdido Tem Custos', Diz Marcelo." ECO. Eco. November 3, 2023. https://eco.sapo.pt/2023/11/03/nova-gestao-do-sns-tempo-perdido-tem-custos-alerta-marcelo/.
- "Portugal Prepara Plano de Rastreios Dos Cancros Da Próstata, Do Pulmão E Gástrico." 2023. SIC Notícias. SIC Notícias. February 3, 2023. https://sicnoticias.pt/pais/2023-02-03-Portugal-prepara-plano-de-rastreios-dos-cancros-da-prostata-do-pulmao-e-gastrico-8d6f1fe4.
- "Quem Somos - Direção Executiva Do SNS." 2023. Min-Saude.pt. May 3, 2023. https://www.sns.min-saude.pt/quem-somos/.
- "SIC: Acordo Com O Sindicato Independente Dos Médicos." 2023. Sindicato Independente Dos Médicos. December 1, 2023. https://www.simedicos.pt/pt/noticias/5347/sic-acordo-com-o-sindicato-independente-dos-medicos/.
- Teles, Gonçalo. 2021. "Hospital Garcia de Orta em "cenário de pré-catástrofe" com todas as camas Covid ocupadas" TSF Rádio Notícias. TSF. January 16, 2021. https://www.tsf.pt/portugal/sociedade/hospital-garcia-de-orta-em-cenario-de-pre-catastrofe-com-todas-as-camas-covid-ocupadas-13240251.html.
- "Urgências Sob Pressão, Há 33 Hospitais Do País Com Problemas." 2023. SIC Notícias. SIC Notícias. December 11, 2023. https://sicnoticias.pt/pais/2023-12-11-Urgencias-sob-pressao-ha-33-hospitais-do-pais-com-problemas-ac6a4767.
- "WHO Chief Declares End to COVID-19 as a Global Health Emergency." 2023. UN News.

May 5, 2023. https://news.un.org/en/story/2023/05/1136367.

- "WHO Director-General's Opening Remarks at the Media Briefing – 5 May 2023." 2023. Who.int. May 5, 2023. https://www.who.int/news-room/speeches/item/who-director-general-s-opening-remarks-at-the-media-briefing---5-may-2023.

All datasets taken from the NHS's Transparency Portal: Explore — Transparência (sns.gov.pt)

Portuguese Legislations regarding the NHS:

- Portaria n.º 306-A/2023 | DR (diariodarepublica.pt): 12 of October 2023, Approves the statutes of the Executive Board of the NHS
- Decreto-Lei n.º 61/2022 | DR (diariodarepublica.pt): 23 of September 2022, Approves the organic of the Executive Board of the NHS
- Decreto-Lei n.º 52/2022 | DR (diariodarepublica.pt): 4 of August 2022, Approves the first statutes of the Executive Board of the NHS

Publications made by the NHS's Executive Board, as of 13/12/2023:

- Regarding the Reorganization of the Emergency Services: Deliberacao-SU-Nacional-2.pdf (SECURED) (min-saude.pt) and other publications during the month of November 2023
- Regarding the Operation "Safe Birth", latest publication for Winter 23/24: Nascer em Segurança no SNS – Inverno 23/24 - Direção Executiva do SNS (min-saude.pt)
- Pediatric Emergency Services Revision/Proposal: Deliberacao-SU-Pediatria.LVT_.DESNS_signed.pdf (min-saude.pt)
- Pediatric Emergency Services (Plan for the Winter of 23/24): CARTAZ-PEDIATRIA_OUTUBRO-A-JANEIRO_1700.pdf (sns.gov.pt)
- Concentration of the gynecology/obstetrics and neonatology services of Hospital Santa Maria at Hospital São Francisco Xavier: Concentração do serviço assistencial de ginecologia/obstetrícia e de neonatologia do Hospital Santa Maria no Hospital São Francisco Xavier - Direção Executiva do SNS (min-saude.pt)
- For more information: Publicações - Direção Executiva do SNS (min-saude.pt)

8. Annex

Table 1: Manchester Triage System and waiting times. Information taken from the Portuguese Group of Triage.[17] Click to return to the text.

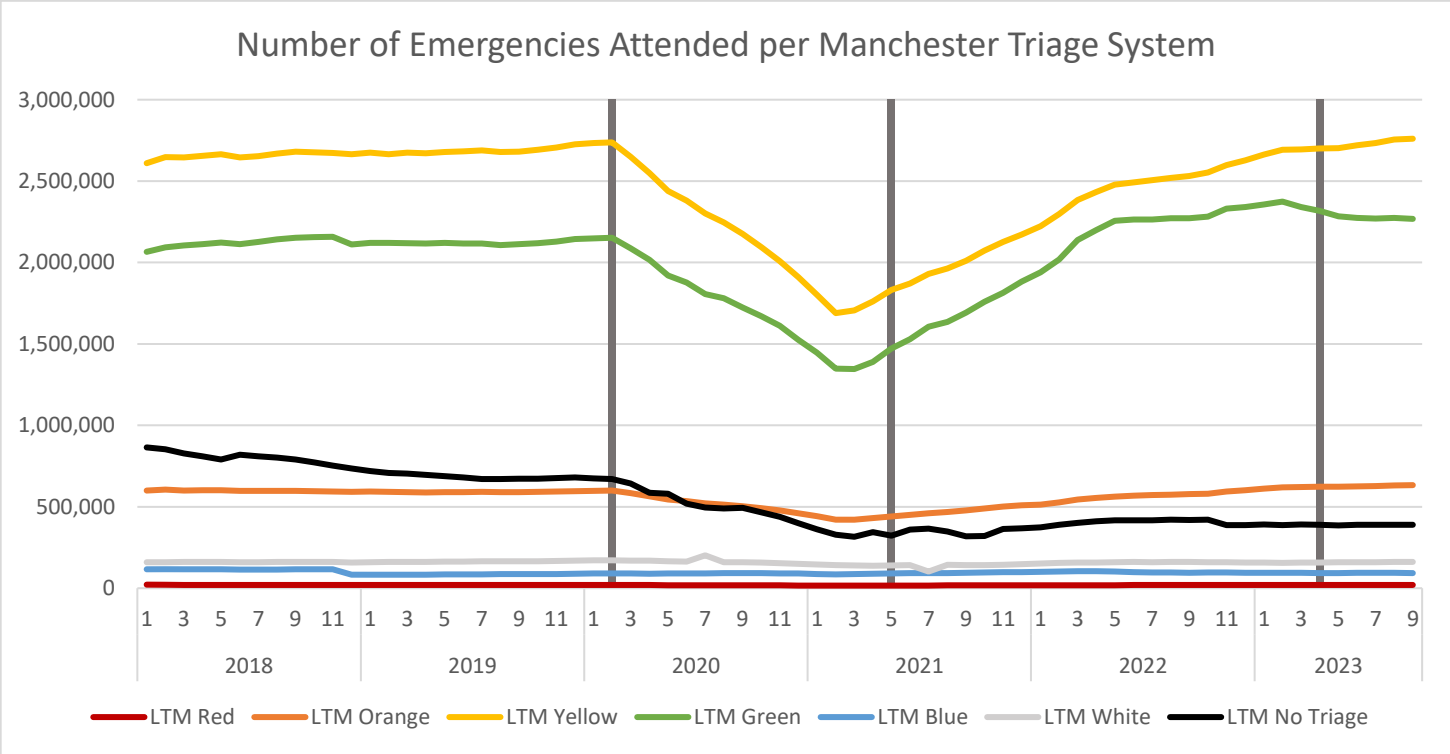
Color	Urgency	Waiting Time (mins)	Rationale
Red	Emergency	0	Needs immediate care
Orange	Very Urgent	10	Needs close to immediate care
Yellow	Urgent	60	Needs care but can wait some time
Green	Less Urgent	120	Can wait for care or be referred to other health services
Blue	Not Urgent	240	Can wait for care or be referred to other health services

Table 2: Summary of Regression regarding Surgery. Click to Return to text.

	Surgery				
Stages	Total	Programmed	Conventional	Ambulatory	Urgent
S1 (pre-pandemic)	33.94	29.38	- 11.35	40.73	4.56
S2 (shock)	- 383.87	- 349.64	- 126.81	- 222.83	- 34.23
S3 (absorption)	166.35	157.81	32.72	125.09	8.54
S4 (post-pandemic)	150.66	140.39	9.25	131.14	10.27

[17] "Protocolo Triagem Manchester | Grupo Português Triagem." 2021. Grupo Português de Triagem. February 17, 2021. https://www.grupoportuguestriagem.pt/grupo-portugues-triagem/protocolo-triagem-manchester/.

Figure 3.2: Number of Emergencies Attended per Manchester Triage System. Click to Return to text.



Tables 3.1 and 3.2: Regressions of Emergency Room and Manchester Triage System. Click to Return to text.

Table 3.1	Emergency Room			
Stages	Total Emergencies	General Emergencies	Pediatric Emergencies	OB Emergencies
S1	-34.61	-20.43	-43.51	29.43
S2	-6,158.18	-3,796.29	-2,052.53	-305.81
S3	3,184.61	1,818.88	1,268.72	94.30
S2+S3	3,685.35	2,119.27	1,452.63	109.97
S4	1.42	179.11	-205.97	29.23

Table 3.2	Manchester Triage System						
Stages	Red	Orange	Yellow	Green	Blue	White	NT
S1	-0.87	-13.81	98.10	31.18	-56.15	11.29	-282.11
S2	-9.98	-449.92	-2,709.10	-2,053.99	-7.12	-83.29	-851.33
S3	6.46	287.43	1,491.85	1,682.17	11.94	51.38	154.13

S4	-2.06	74.55	374.98	-457.68	-7.11	22.18	-3.45

Figure 4: Operational Activity of the SNS24 Helpline. Click to Return to text.

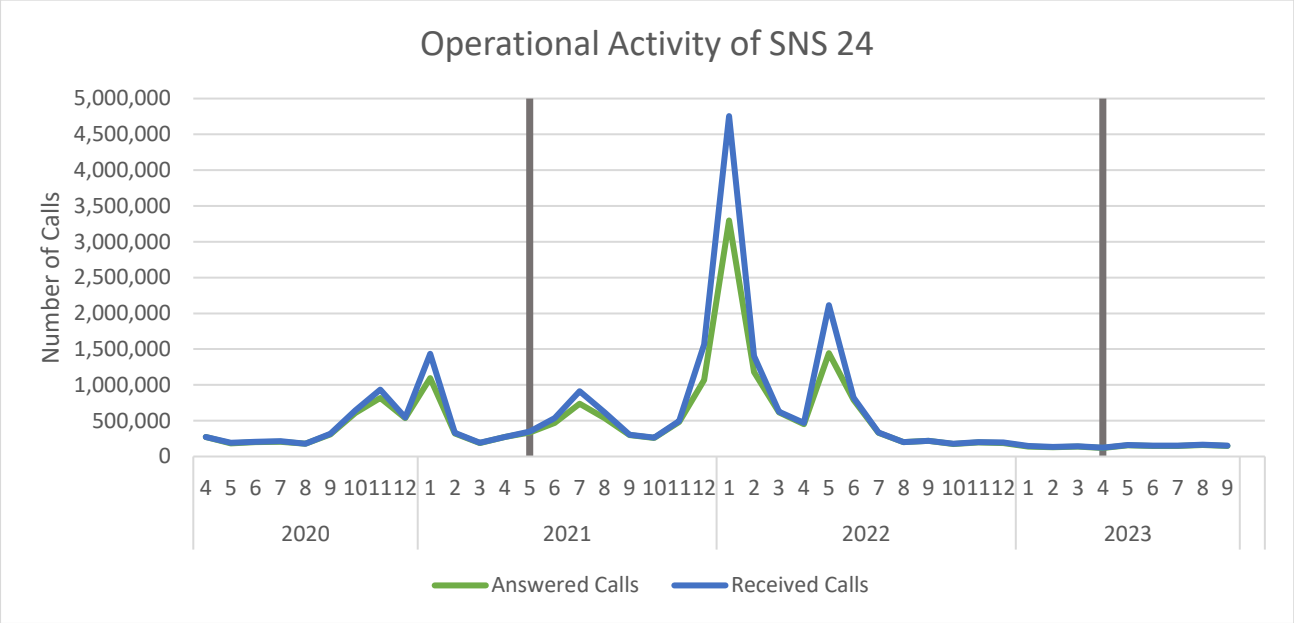


Figure 5.2: Hospital Consultations. Click to Return to text.

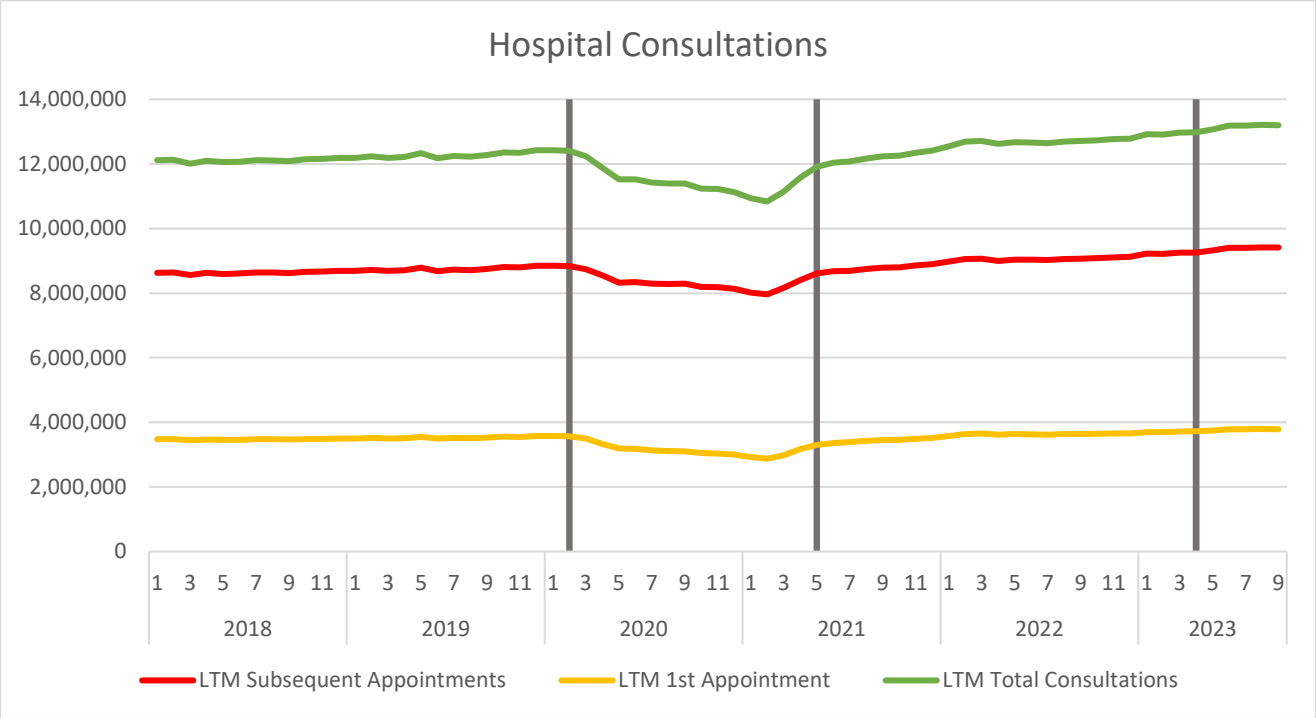


Figure 5.3: Hospital Appointments through Telemedicine Channels. Click to Return to text.

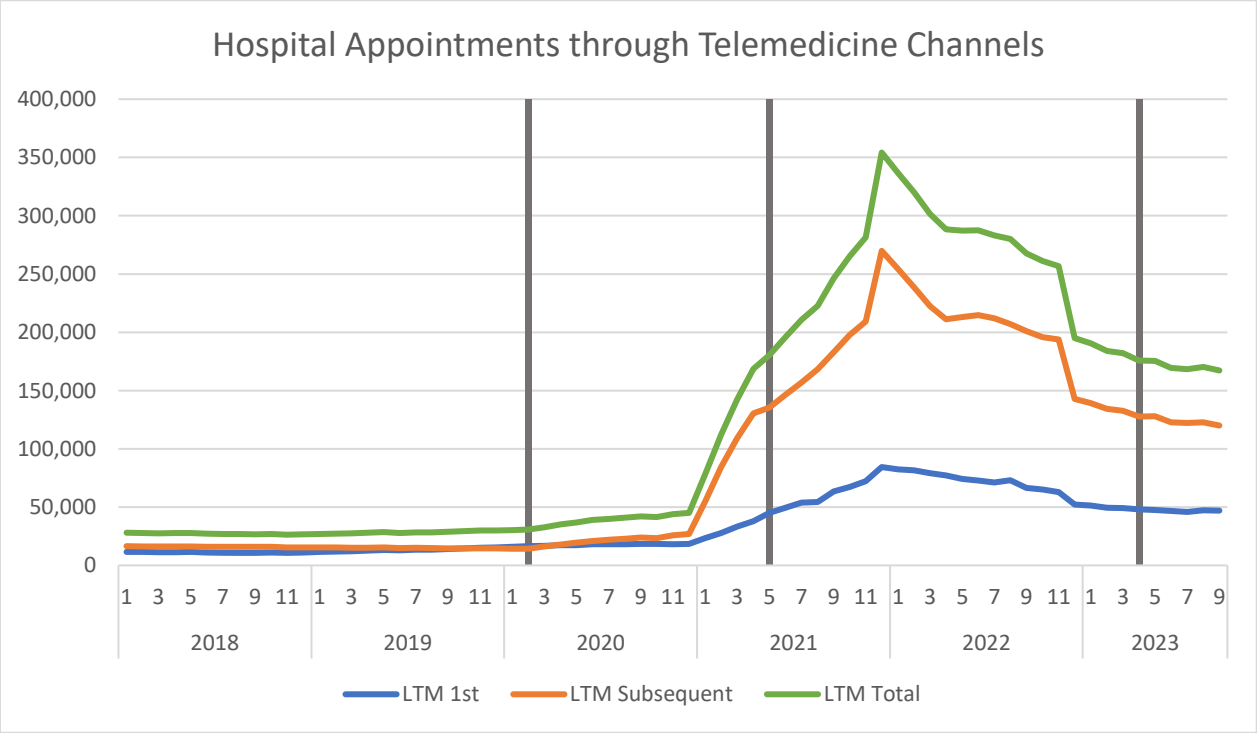


Table 5.1 and 5.2: Regressions of Consultations (Hospital and Primary Care). Click 5.1 to return, and 5.2 to return.

5.1	In-Person Hospital Consultations			Primary Care	
Stages	Total	1st	Subsequent	LTM In Person	LTM Not in person or not specific
S1	454.37	142.90	311.48	-15.87	35.88
S2	-2,543.07	-1,180.30	-1,362.77	82.71	-1,000.33
S3	94.13	1,377.76	535.39	336.45	-366.06
S4	1,390.87	412.11	978.76	-49.37	-9.98

5.2	Hospital Consultations through Telemedicine		
Stages	Total	1st	Subsequent
S1	3.28	6.15	-2.89
S2	257.12	38.49	218.59
S3.1	679.58	166.25	513.19
S3.2	-350.61	-84.15	-266.46
S4	-55.61	-7.07	-50.51

Figure 6.2: Number of Cervical and C&R Screenings. Click to Return to text.

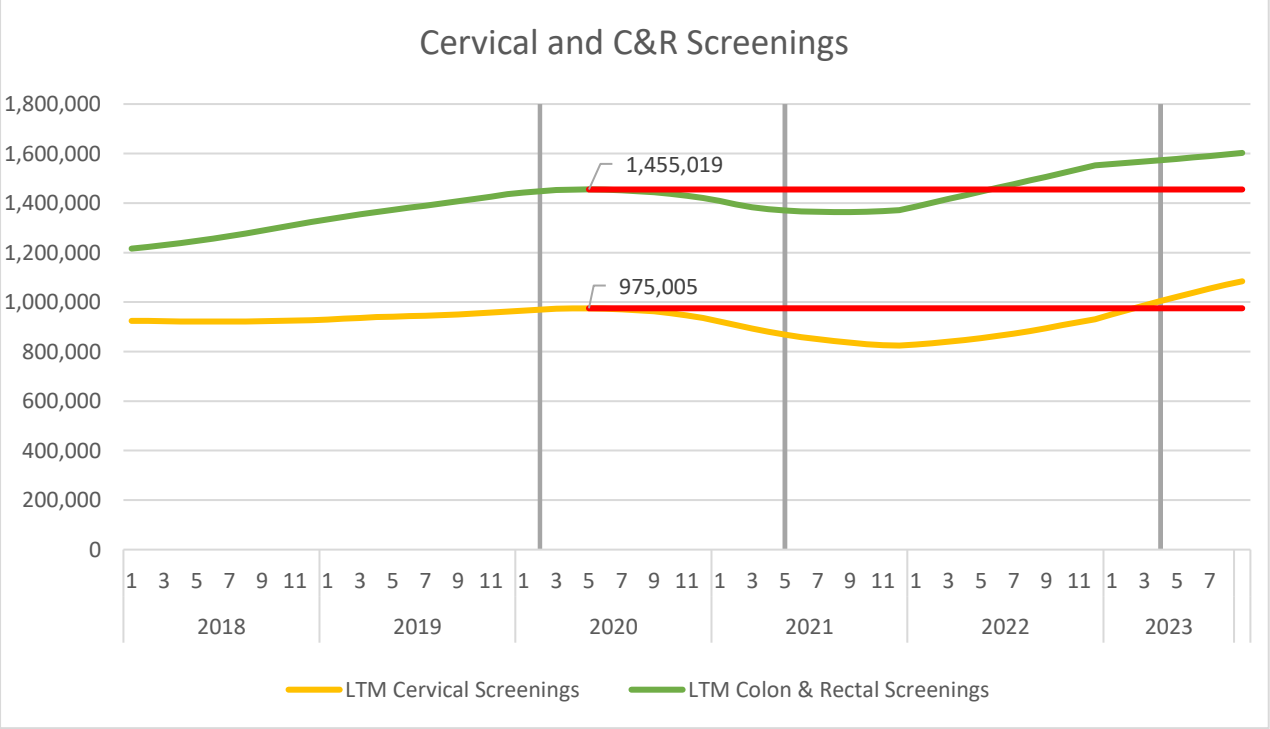


Figure 6.3: Proportion of users with screenings updated in the NHS's database. Click to Return to text.

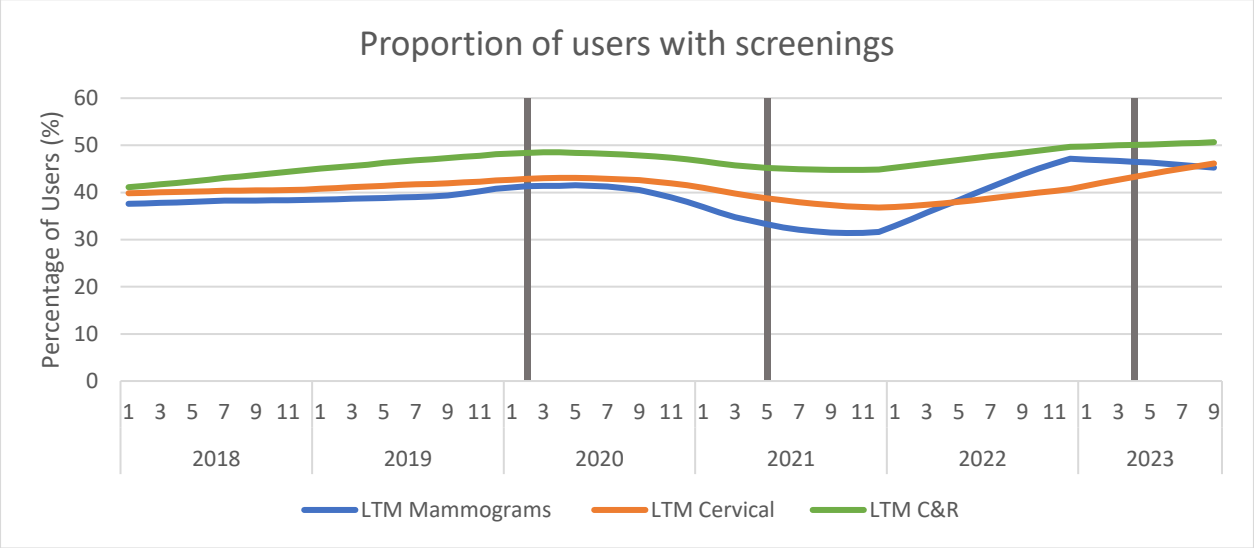


Table 6.1: Regressions of Consultations (Hospital and Primary Care). Click to Return to text.

	Oncologic Screenings		
Stages	Mammograms	Cervical	C&R
S1	106.76	59.30	323.38
S2	-638.22	-215.39	-182.42
S3	509.02	188.94	361.23
S4	-118.48	526.71	188.66
S1.1 (Jul 2019-Jan2020)	441.84		

Table 6.2: LTM analysis. Click to Return to text.

	Mammograms			**Cervical**			**C&R**		
	Screenings	Variation	% Change	Screenings	Variation	% Change	Screenings	Variation	% Change
Jan-18	351,638			924,619			1,216,122		
Jan-19	384,013	32,375	9%	929,882	5,263	1%	1,333,923	117,801	10%
Jan-20	460,712	76,699	20%	965,646	35,764	4%	1,442,051	108,128	8%
Jan-21	250,827	-209,885	-46%	921,829	-43,817	-5%	1,408,643	-33,408	-2%
Jan-22	495,260	244,433	97%	827,985	- 93,844	-10%	1,385,997	-22,646	-2%
Jan-23	465,679	-29,581	-6%	949,685	121,700	15%	1,557,100	171,103	12%
	Sum of Variation	114,041		Sum of Variation	25,066		Sum of Variation	340,978	

Figure 7: Number of Healthcare Professionals in the NHS. Click to Return to text.

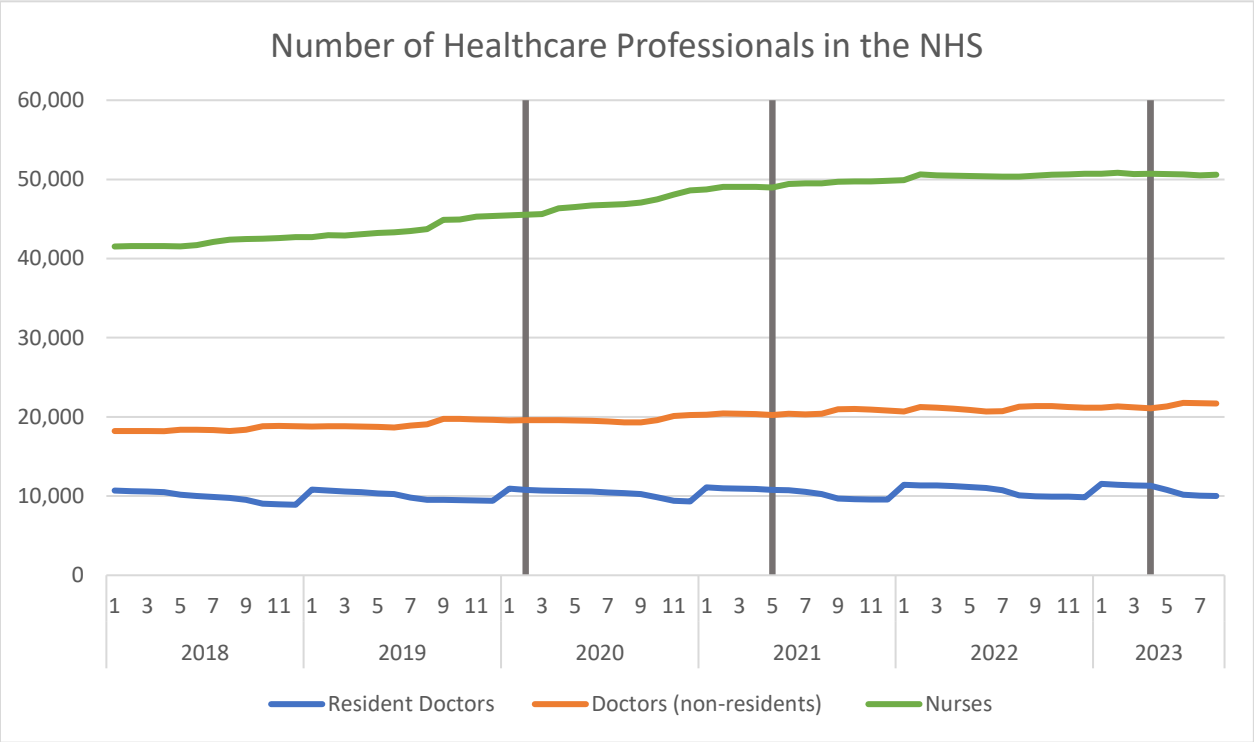


Figure 8: Timeline with dates, done by author. Click here to Return to text.

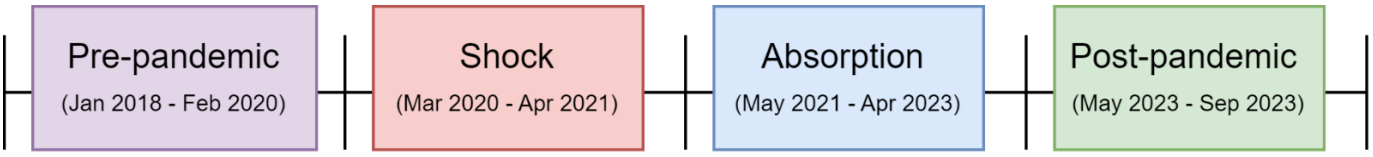


Table A2:: examples of assessment areas grouped by resilience-enhancing strategies (Thomas et al., 2020) Return to Text

Strategy	Examples of assessment areas
Governance	
1. Effective and participatory leadership with strong vision and communication	• Set of contingency plans and protocols, emergency legislation • Functional management capacity for governance • Stakeholder participation and engagement • Leadership/steering and clear chain of command • Accountability of government agencies • Effective governance structures (transparency, accountability, stakeholder involvement) • Clear and feasible plan for response measures • Setting strategic direction • Established public trust in response agencies • Effective communication
2. Coordination of activities across government and key stakeholders	• Collaboration between sectors • Agreements with relevant actors (e.g. international agencies, non-state providers, NGOs)
3. Organizational learning culture that is responsive to crises	• Innovative organizational culture, culture of learning • Use of feedback and analysis in informing decision-making • Mechanisms to assess, audit and learn from response to shock and implement change
4. Effective information systems and flows	• Flow of information between stakeholders, data-sharing mechanisms • Flow of data, information and analysis into decision-making and evaluation • Mechanisms of timely dissemination of guidelines and protocols • Communication infrastructure (hard: phone, Wi-Fi; soft: press, community, NGOs) • Existence of data collection and linkage systems
5. Surveillance enabling timely detection of shocks and their impact	• Epidemiological surveillance and early warning systems • Existence of mechanisms to identify change in need and access to services

List of Acronyms Used

Used in WP	Meaning	Portuguese Acronym	Meaning
NHS	National Health Service	SNS	Serviço Nacional de Saúde
NHS-EB	National Health Service's Executive Board	DE-SNS	Direção Executiva do SNS
MoH	Ministry of Health	MdS	Ministério da Saúde
LHU	Local Health Units	ULS	Unidades Locais de Saúde
RHA	Regional Health Administration	ARS	Administração Regional de Saúde
FHU	Family Health Units	USF	Unidades de Saúde Familiar
ER	Emergency Room		Urgências
C&R	Colon and Rectal	CR	Colo e Reto
CAHS	Central Administration of the Health System	ACSS	Administração Central do Sistema de Saúde
SSMH	Shared Services of the Ministry of Health	SPMS	Serviços Partilhados do Ministério de Saúde