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PENTS | NATIONAL STRATEGIC TELEHEALTH PLAN 2019-2022

PENTS | PLANO ESTRATÉGICO NACIONAL PARA A TELESSAÚDE 2019-2022

Technical File
SPMS - Shared Services of the Ministry of Health, EPE
Portuguese National Centre of Telehealth
National Strategic Telehealth Plan 2019-2022 (PENTS)

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PRESENTATION OF THE STRATEGIC PLAN

The SPMS through CNTS - The Portuguese National Centre of Telehealth, presents here the first strategic document in the telehealth field for the National Health System, but not limited to the National Health Service.

This is a unique document, given its method, the range of stakeholders involved and the vastness of the topic. It has not been said everything already, and it could be further discussed and outlined in detail in operational plans. It will be a strong component for ENESIS 2020/2022 as telehealth needs to be fully integrated within the everyday sphere of health care and in the broader eHealth technological matrix - given its spatio-temporal nature.

The document can identify and validate the main challenges, but also needs and future trends. Our ambition is to create more opportunities to the Portuguese population through telehealth, in order to garantee greater access, equity and quality health care.

“At a distance, but closer

Henrique Martins
Chairman of the Board of Directors at Shared Services of the Ministry of Health, EPE

INTRODUCTORY NOTE

We live in increasingly aging societies, with a growing burgen of chronic multi-morbidity and consequent problems in terms of acess and sustainability. Making use of the information and communication technologies, as in many other areas of our life, has emerged as a natural way to leverage new solutions that best meet society's needs.

The eHealth, and particularly telehealth, have been internationally recognized by several health systems as an opportunity of rising to the major challenges in health promotion and care. Telehealth, besides its capacity to transpose geographic barriers and guarantee the continued monitoring, facilitates information sharing and better coordination of care. In Portugal, as is the case with other countries, multiple initiatives appeared with new models of health care based on the concept of telehealth – both public and private sector.

The teleconsultations, teletriage, telemonitoring, telediagnosis and telescreening are some examples of this reality. In the SNS, many of these initiatives are local – that is, developed by professionals' teams in hospitals and primary health care centres. Others have regional or even national coverage.

But how do we scale the good examples? How do we maximize the potential of telehealth and add value to society as a whole? How do we turn initiatives into an articulated and synergistic system, which is more than the sum of its parts?

Only through a national strategy, with a clear overview of the goals to be achieved and supported by policy-makers, managers, professionals, patients and caregivers it will be possible to achieve this ambition.

That is why in October 2016 the Council of Ministers created, through the Resolution 67/2016, the Portuguese National Centre of Telehealth within the SPMS, EPE. It was assigned with the task of "promoting Telemedicine and ...(the) use Information and Communication Technologies, as an integral part of the health care reform processes in order to achieve a higher level of articulation, integration and improvement of quality of care... ".

It is within this context that the Portuguese National Centre of Telehealth (CNTS) presents this proposal for the first National Strategic Telehealth Plan (2019-2022). As the first strategic plan in this area at national level, the authors considered noteworthy to dedicate a section to the clarification of concepts and to depict the current status of telehealth in Portugal. It was described major international trends and innovative pathways and opportunities in this area reflected on. The ambition of this work was to be comprehensive and achieve a consensus regarding the path to follow. Therefore, it was the enquiry of more than 50 stakeholders – from the entities of the Ministry of Health, to the professional associations, care providers, executive management, patients' associations, experts in the telehealth field, the academy among others – that lead to the definition of the six Strategic Lines for the Development of Telehealth and the twelve related measures.

All of us must surely agree that investing in telehealth is not limited to the introduction of new technologies in administrative processes and care, as would require everyone's effort and willingness to change: change the way institutions, professionals, patients and caregivers relate to each other; change to a more collaborative, synergistic and sharing culture.

The Strategic Lines and their related measures will considerably help to achieve the creation of conditions that enable such change. However, it is with the commitment of all, that we are able to fully take advantage of this essential tool, which is the telehealth, to generate all the benefits that it can provide to our society.

Micaela Monteiro
Director of the Portuguese National Center of Telehealth, SPMS, EPE

GLOSSARY OF ACRONYMS

ACSS Central Administration of the Health System, IP
ACES Health Centres Groupings
ARS Regional Health Administration, IP
CAIC Monitoring Committee for Clinic Informatization
CHUC Coimbra Hospital and University Centre, EPE
CHUCB Cova da Beira Hospital Centre, EPE
CHL Leiria Hospital Center, EPE
CNTS Portuguese National Centre of Telehealth
CSP Primary Health Care
CSH Hospital Health Care
CRT Regional Telehealth Coordinators
DGS Directorate General of Health
EHR Electronic Health Records
ENESIS National Strategy for the Health Information Ecosystem
GTT Telemedicine Working Group
R&D Research and development
IPO Portuguese Oncology Institute, EPE
LEDTS Strategic Lines for the Development of Telehealth
MCDT Auxiliary Diagnostic and Therapeutic Means
MS Ministry of Health
NOC Clinical Guidelines Standards
OCDE Organization for Economic Cooperation and Development
PDS Health Data Platform
PDS Live Live Health Data Platform
PENTS National Strategic Telehealth Plan
PIT Internal Telehealth Promoters
PNS National Health Plan
GDPR General Data Protection Regulation
RNU Portuguese Patient Registry
RPT Telehealth Promotion Networking
REF Electronic Health Record Referral
RSE Live Live Electronic Health Record
SICO Information System of Death Certificates
SNS National Health Service
SNS24 SNS 24
SPA Administrative Public Sector
SPMS Shared Services of the Ministry of Health, EPE
SRSA Regional Secretariat for Health - Government of Azores
SRSM Regional Secretariat for Health - Government of Madeira
ITC Information and Communication Technologies
USLAM Local Health Unit of Alto Minho, EPE
ULS Local Health Unit
ULSM Local Health Unit of Matosinhos, EPE
VAI Integrated Access Pathway
WHO World Health Organization

ACKNOWLEDGEMENTS

Institutional Stakeholders: Central Administration of the Health System, I.P., Regional Health Administration of Alentejo, I.P., Regional Health Administration of Algarve, I.P., Regional Health Administration of Centro Region, I.P., Regional Health Administration of Lisbon the Tagus Valley, I.P., Regional Health Administration of North, I.P., Agency for Public Services Modernization, I.P., Portuguese Association for hospital administrators, Portuguese Association of Telemedicine, INFARMED - National Authority for Medicines and Health Products, I.P., Coordination eSIS – Health Information Ecosystem, Directorate General of Health, Health Cluster Portugal, Portuguese Nurses Association, Portuguese Pharmacists' Association, Portuguese Medical Association, Health in Dialogue Platform, National Coordination for the Reform of Integrated Continued Care, Regional Secretariat for Health – Government of the Azores and the Regional Secretariat for Health –Government of Madeira.

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METHODOLOGY

In order to achieve the objectives of the National Strategic Telehealth Plan (PENTS), a robust and transversal methodological strategy was defined to accommodate the necessary adaptations and present the results in a direct and clear way.

Through the complementarity of different methods, ranging from documentary analysis to questionnaires and interviews with experts, and institutional stakeholders, as well as the conduction of an international benchmarking and design thinking workshops, it was possible to perform a quantitative and qualitative analysis. As a result, a robust methodological approach was developed, which is illustrated in the following figure (Figure 1).

Each of the identified methods was implemented for different purposes that and it is important to emphasize.

Documentary Analysis

The documentary analysis was characterized by an exploratory and qualitative research on telehealth and its current legislation, placing references in a historical context or as a comparative method between the different interpretations of the documents analysed. This analysis also allowed the preparation of questionnaires and interview scripts in a more coherent and cohesive manner.

Questionnaires/ Interviews with experts and Institutional Stakeholders

Questionnaires, as well as interview scripts were elaborated with the purpose of clarifying a set of questions and doubts that emerged throughout the documentary analysis.

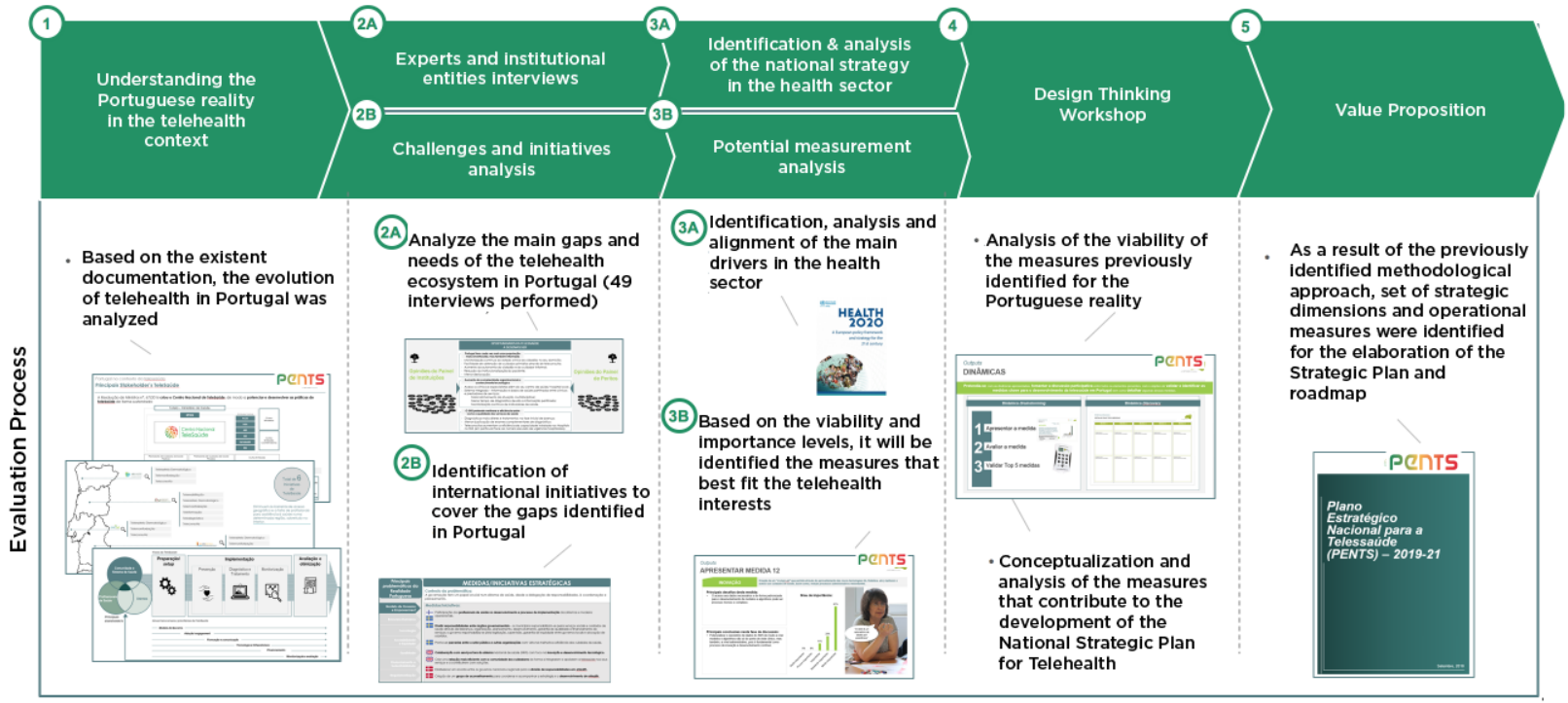


Figure 1: Methology adopted for the elaboration of PENTS

In total, 49 interlocutors (including public and private institutional stakeholders) accepted the invitation to participate in the drafting of the PENTS. In its majority, these were telehealth experts or major institutions in the health ecosystem which constitute a representative sample to identify and validate not only the key challenges but also needs and future trends within the telehealth framework phases.

The different interviews and questionnaires were previously prepared on the basis of a standard structure that addressed each phase of telehealth independently (Figure 2):

- Preparation and Setup
- Implementation - prevention, diagnosis, treatment and monitoring;
- Evaluation and optimization

The main topics identified in Figure 3, were addressed transversally, although adapted to the specific experience of each of the interlocutors.

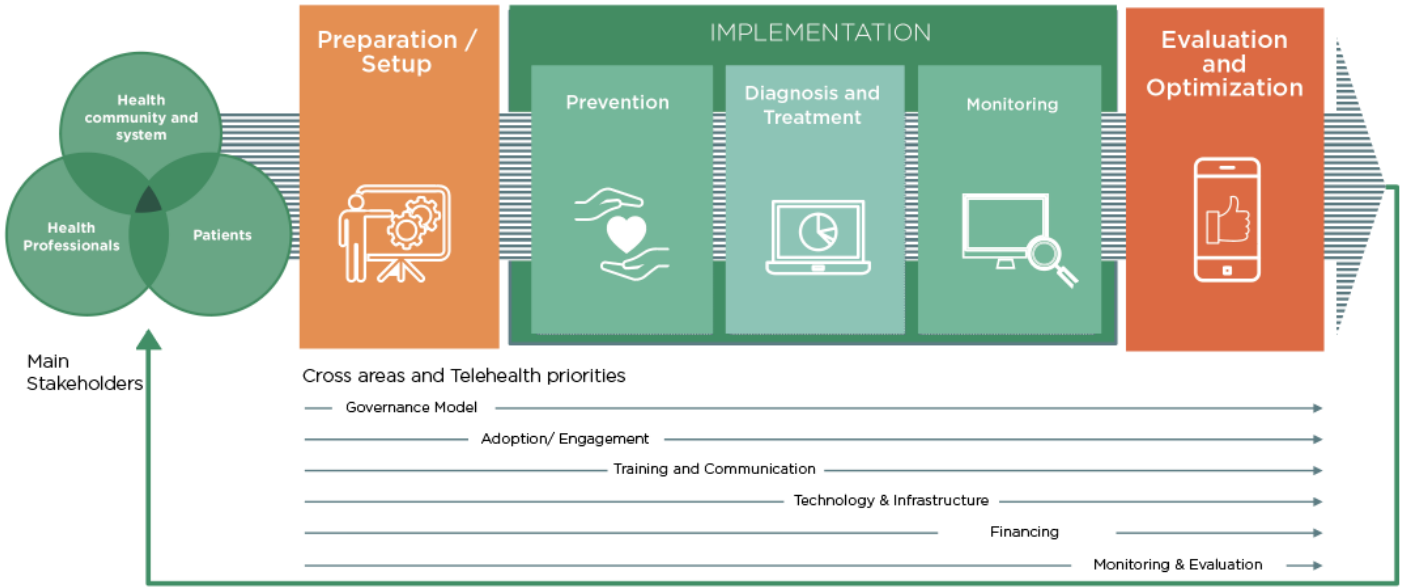


Figure 2: Telehealth Framework

Main Topics Approached

"From your point of view, what are the main gaps and needs in each of these topics? ..."

"Given your own experience, what are the possible solutions?..."

Figure 3: Main topics covered in the questionnaire and interviews

International Benchmarking

The International Benchmark was based on the identification of the best practices and international trends that allowed addressing the major challenges identified in Chapter II.

As illustrated in Figure 4, the methodology used addresses 3 steps.

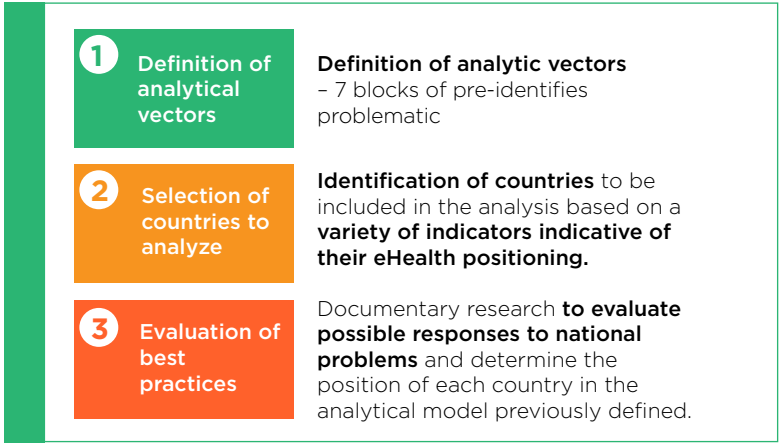


Figure 4: Methodology used for the benchmarking analysis

Thus, the selection of countries started with a quantitative analysis (EU Countries' mHealth Market Ranking, Research2Guidance, 2015) and followed three criteria:

- Market maturity by assessing indicators such as adoption of eHealth, as well as the level of digitalization of the population and regulation on mHealth (a term referring to the practice of health through mobile devices).
- The maturity of the European countries on eHealth assessed by politicians and entities responsible for health policy development.
- Identification of countries with a National Health Service similar or partially similar partially similar to that of Portugal (for example, the Beveridge Model).

Design Thinking Workshops

Two workshops were held with the participation of multiple personalities of recognized merit in the area of telehealth. In order to stimulate the working groups, the workshops were based on the following methodology:

- Identification of "disruptive" and evolutionary initiatives with impact on telehealth processes, systems, organization or policies;
- Explanation and discussion of the rationale behind each initiative to the rest of the group;
- Individual voting of the initiatives to select the TOP5, based on prioritization and importance.

Chapter II presents the result of this analysis.

Executive Summary

PENTS is a proposal from the Shared Services of the Ministry of Health, E.P.E. (SPMS) under the coordinating scope of the Portuguese National Centre of Telehealth (CNTS) as defined in the Resolution of the Council of Ministers No. 67/2016 of October 26. Being the first strategic plan for telehealth carried out in Portugal and one of the first in the world, its vision is to create a broad strategy that reflects the role of telehealth in the National Health Service (SNS) in harmony not only with the National Health Plan Revision and Extension to 2020, but also with the *Programme of the 21st Constitutional Government* and the *Health 2020: the European policy framework and strategy for the 21st century* (WHO).

EHealth, telehealth and telemedicine are currently areas of growing importance in the context of a health sector highly pressured by external factors such as economic, financial, political-legal, demographic, technological, educational, socio-cultural and organisational.

The objective of PENTS is to define a strategy to leverage the telehealth, taking advantage of Information and Communication Technologies (ICT), as valid means in the management of health and its services. Consequently, the use of telehealth will have to boost the development of the health sector in Portugal in terms of health gains and quality of life, as well as operational efficiency. Telehealth offers new answers to major challenges, namely those of accessibility and proximity to health care, integration of care, training of citizens, patients and caregivers in the SNS, among others, remaining an important catalyst of digital transformation in healthcare.

PENTS should be seen as an instrument that integrates the strategy for the development of telehealth and whose main objectives are:

- Elaboration of a current vision of telehealth in Portugal, by listening to experts and key institutional stakeholders on the subject, as well as by analysing relevant documentation.

- Characterization of valuable proposals with distinctive and innovative characteristics for the sustainable growth of Telehealth in Portugal, by analysing and structuring the key components of the experience of stakeholders in the provision of Telehealth services.

- Definition of the Telehealth strategic axes for the period 2019/2022, and elaboration and characterization of a set of practical and concrete actions that leverage its development.

- Draw up a roadmap to operationalize the proposed plan, as well as recommendations for future implementation.

As a result, this document is organized in 4 chapters. The first chapter is a contextualisation of the health sector, in particular of the SNS, describing some of the challenges it faces. Telehealth presents in this context a summary of the state of the art at a national level and it explains the premises that justify the elaboration of PENTS.

The second chapter identifies and describes the major challenges of telehealth, which were later grouped into 7 blocks of challenge. Throughout the analysis, some of the main advantages and opportunities of telehealth are also identified.

In the third chapter, integrating innovation and new health technologies as a fundamental part, identifies the most promising trends in the area of telehealth, as well as the main steps for a successful implementation of the digital transformation.

Chapter four defines the 6 major Strategic Lines for the Development of Telehealth (LEDTS):

I. Good governance and development of human capital;

II. Ensuring interoperability and Security;

III. Building infrastructure capacity and information systems improvement in a collaborative and citizen-centre SNS;

IV. Integration, continuity and proximity of the health care;

V. Evaluation and sharing of the good practices that promote the innovation and ensure access, quality and efficiency of health care;

VI. Continuous commitment to innovation, research and development in order to generate, test and implement new ideas and solutions.

Consequently, 12 specific measures are materialised and are complemented by a set of activities.

The 12 measures identified are:

1. Ensure a sustainable model for telehealth;
2. Make telehealth a means to create synergies;
3. Create a "Living Lab";
4. Simplify the Governance Model for the telehealth activity;
5. Ensure information security and the interoperability of the information systems;
6. Guarantee the operational conditions needed for the exercise of telehealth;
7. Evaluate and control the quality of the telehealth services in the SNS;
8. Map and plan the telehealth initiatives;
9. Develop new telehealth offers;
10. Promote and disseminate the concept of eHealth to citizens and professionals and raise their awareness of its added value;
11. Ensure that PENTS has synergies with other strategic initiatives;
12. Train, develop and qualify the Human Capital.

The elaboration of PENTS has benefited from a broad consensus and has integrated contributions from SNS entities, telehealth experts and users at national level. The developed methodology integrated and consolidated the health, economy, politics and social dimensions, and is detailed at the end of the document.

Finally, it should be emphasized that a successful implementation of the measures identified requires an active and participative involvement of all health stakeholders that directly and/or indirectly influence the pursuit the objectives of PENTS.

I. CONTEXTUALISATION

Telehealth Development in Portugal

I. CONTEXTUALISATION

The public health sector is characterised by the complexity and dynamism of the SNS. The SNS works closely with a group of partners, from associations, health care units and research centres to large and small companies that are strongly committed to the development of entrepreneurial and innovative initiatives.

The SNS, whose fundamental purpose is to guarantee the right of all citizens to health protection with timely, equitable and universal access to the necessary health care, according to their clinical situation and regardless of their economic conditions, has been making significant progress and is increasingly focused on the needs and priorities of citizens, seeking to adapt and respond effectively to them.

Indeed, the achievements over its almost 40 years of existence – increase in the average life expectancy, reduction in maternal and child mortality rates and reduction in avoidable mortality rates, which are better than the European Union (EU) average – show an improvement in the efficiency and quality of the access to health care.

However, the health care sector is exposed to external factors (Figure 5) that influence its development and create pressures on an ongoing basis. Like many developed countries, Portugal suffers from low birth rate, which is among the lowest in Europe (OECD, 2016). This factor, coupled with the increase in the average life expectancy of the Portuguese, results in a global aging of the population, a tendency that is expected to prevail until 2080 (WHO, 2018).

In addition, both the aging and the lifestyle adopted by the population increase the risk factors associated with the prevalence of multiple chronic diseases, which must be strictly and continuously monitored given their growing economic weight in the health sector (PNS review and extension 2020, 2015).

These combination of factors, at a time when the productivity levels and the increase in health expenditure are matters of concern (PORDATA, 2017), associated with the funding of public policies caused by the approval of more expensive innovative therapies (biological, biosimilar, among others), contribute to put the health sector in Portugal under pressure to guarantee a sustainable economic model for the SNS, a situation that can be further aggravated due to the expected decrease in the active population.

Therefore, it is necessary to promote continuous improvement by developing innovative ways to provide health care and management solutions that maximize the efficiency of the existing resources, in the same way as in the global context (Portrait of Health, 2018).

The successful implementation of the National Strategy for the Health Information Ecosystem 2020 (ENESIS 2020), drafted and approved in 2016 with the aim of ensuring access and sharing of information among citizens and health professionals, as well as the simplification and dematerialisation of records and procedures in the SNS, will play a major role in mitigating or even eliminating some of the external constraints that remain a challenge to the sustainability of the SNS.

In addition, telehealth is an innovative and sustainable solution that contributes to the digital transformation strategy through the principle of bringing the citizen closer to health by solving the geographic inequalities, improving access to health care and guaranteeing a more continuous and articulated follow-up between the different levels of care, thus contributing to greater effectiveness and efficiency of the SNS (CNTS, 2018).

On this regard, it has been increasing numbers of strategic initiatives for the development of telehealth in Portugal. A good example is the creation of legislation in this area, which initially clarified procedures and responsibilities, and later (Order No. 2445/2012) defined the contracting process with an incentive to hold teleconsultations, where the payment to hospitals vis-à-vis the production is increased by 10%.

Figure 5: Illustration of the main external factors of the health care sector

The SPMS had and has a fundamental role in the progress of these strategies both through the successful development of telehealth initiatives and the implementation of IT systems and platforms to support the health information ecosystem, of which the following stand out:

I. The clinical registration software - **SClínico**. It computerises and systematises clinical records in primary and hospital care. It contributes to the records standardization, in order to guarantee the normalization of the information and to increase its quality. It enables the sharing of data among health professionals in different areas, thus contributing to a more effective, efficient and coordinated performance by the health professionals - at local and national levels.

II. The **Live Health Data Platform (PDS Live)**, as a means to perform real-time video teleconsultations with the possibility of sharing information (for example, images and medical results) in clinical context, associated with an episode of provision of care.

III. The **Electronic Health Record (EHR).** It integrates the citizen's contacts into the health system and leads to a single citizen's clinical record. It allows gathering key information about each citizen that can be accessed by them, by the health professionals and by the entities providing the health services involved in their care. It enables a better management in terms of quality, safety and efficiency.

IV. The **Citizen's Area** – interface of services between the SNS and the citizen. It allows access to the RSE, making it possible to consult clinical data and results from medical examinations. It allows and encourages citizens to contribute with relevant information to complete their clinical records. It gives access to a set of services that previously forced the citizen to visits the health units. Examples of this are setting up an appointment with the family doctor, asking for chronic medication prescriptions, access the digital vaccination record, the information on the waiting time for a surgery, among others. This is a highly relevant means to empower citizens in the active management of their health and to bring them closer to the SNS.

V. The **Electronic Health Records - Referral (EHR-REF)** – electronic system for referral among SNS providers. Supports deferred teleconsultation based on the clinical information in digital format.

VI. The **Medical Electronic Prescription (PEM)**, with the functionality Paperless Prescription, made it possible to prescribe and dispense medications electronically. It, thus, allows the citizen to receive the prescription from afar and also creates conditions for the acquisition of medication remotely.

VII. The **Paperless Exams project**. It allows the dematerialisation of the procedures for requesting, executing and billing Complementary Diagnostic and Therapeutic Means (CDTM), and ensures that their results are integrated into the RSE. In this way, gains for the SNS in information management and efficiency are guaranteed while the convenience of the citizen and health professional is also improved.

VIII. The **app MySNS**. It allows following the SNS news and receiving general notifications, including public health alerts. It also provides quick access to SNS 24, gives information regarding health institutions (Hospitals, primary health care centres and pharmacies) contacts and location and allows users to evaluate their satisfaction with the SNS.

IX. The **app MySNS wallet**. It carries information available on the RSE to the mobile, safeguarding the security and the protection of individual data. Through a logic of modular "cards" (examples: eVaccination Record, Allergy Record, Electronic Prescription), it allows citizens to customise their "portfolio" according to their needs and preferences.

Telehealth Framework

eHealth, Telehealth and Telemedicine

Both **eHealth** and telemedicine are concepts directly related to telehealth whose importance in the global health sector has been increasing.

Through the use of ICT, eHealth includes the improvement of health promotion, education and management, as well as the entire health cycle (Matos, Santana, Mendes, Marques & Mestre, 2014; Gonçalves, Castelo-Branco & Campanella, 2018). It is a comprehensive and constantly growing area due to the rapid changes in technology.

Telemedicine is the provision of health care at a distance by doctors who use ICTs for prevention, assessment, diagnosis, treatment and rehabilitation. The provision of this service materialises both in terms of research and assessment and in the continuing training of health care providers in order to promote the health of citizens and society (World Health Organization, 2009).

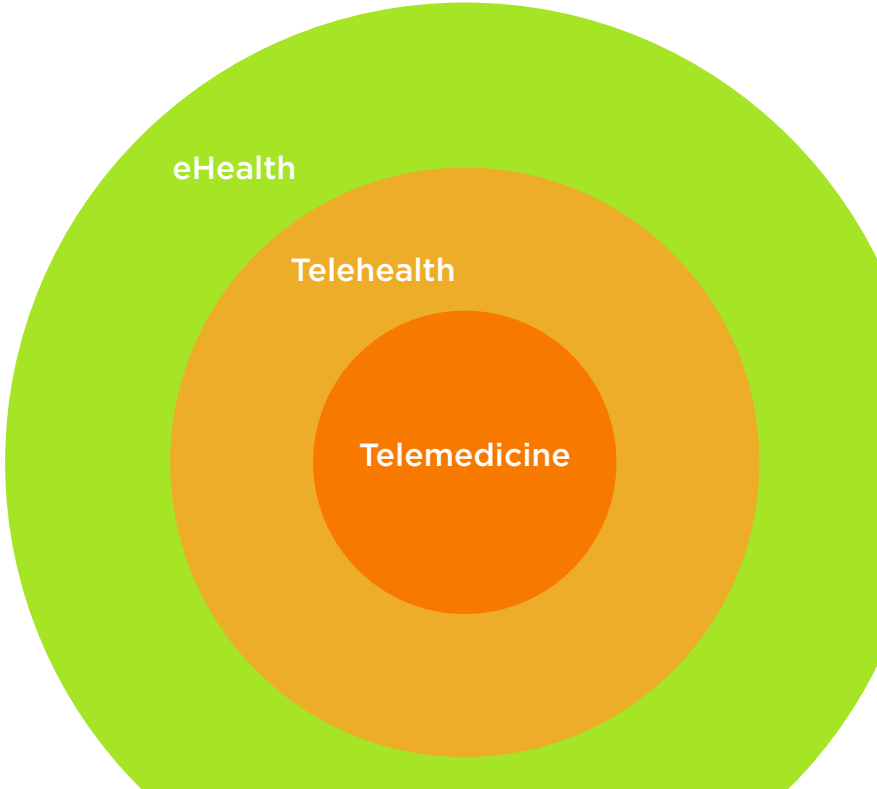
Telehealth is the use of ICT to support health from afar through the provision of care, the organisation of the services and the training of health professionals and citizens. This concept is not restricted to medical activity, but rather includes all health care professionals. It contributes to overcoming the geographical and temporal barriers in the access to health, to promoting greater coordination, integration and continuity of the health care (CNTS, 2018). Thus, the concept of telehealth encompasses the concept of telemedicine and is covered by the concept of eHealth (Figure 6).

Additionally, in regard to its interaction model telehealth can be characterised in an asynchronous or synchronous manner:

- Asynchronous services consist in the storage of the information collected in the presence of the citizen and its communication via the receiver in deferred time (e.g. video or image recordings). One of the main advantages of this model is the participants' autonomy of its management of their time, with no need to coordinate agendas. This opens space for more efficient procedures, that are reflected in more successful responses to the user's needs.

- Synchronous services happen when the parties involved exchange information in real time (for example, video conference). One of the main advantages derives from the real-time interaction between the parties involved that allows a faster adaptation to the new issues that may arise (e.g. in the context of the case discussion).

Figure 6: Integration of the concepts eHealth, Telehealth and Telemedicine



In a cross-cutting way, telehealth has countless advantages from which not only citizens but also professionals and health institutions, and consequently the SNS itself, can benefit. Its main advantages are:

i. To contribute to the organisation of health care in a more integrated, coordinated and articulated way to develop a network that increases and facilitates access to excellence centres and medical specialties by those most in need, thus also creating greater equity within the SNS;

ii. To allow the continuous monitoring of patients' health, enabling them to the jointly manage their illness with professionals and outside the healthcare facilities, in a more timely intervention to give them the opportunity to avoid an aggravation of their illness, need for emergency care or unscheduled hospitalisations, as well as to adapt the frequency of consultations to their needs;

iii. To enable health professionals to share their knowledge and experience when managing cases monitored by several professionals. It also allows better identification of the need for referral to other specialties, it thus contributes to the reduction of waiting lists and the optimisation of the capacity that exists in the institutions;

iv. To allow the redesign of intra- and inter-institutional processes in order to increase the safety, quality and efficiency of the service provided. Referrence to the specialty of dermatology accompanied by written clinical information and images is a good example of this. Such redesign allows a triage of the patients by clinical priority. In a subgroup of cases, asynchronous teleconsultation is a possible way to answer patients´ needs, thus avoiding them a visit to the health care facilities and, at the same time, freeing up time for face-to-face consultations;

v. To increase the convenience for the citizen, obviating the need for patients and caregivers to go to primary care centres or hospitals and, consequently, saving time and money and reducing absenteeism.

These and other factors represent a strong argument for taking forward the generalisation of telehealth services in order to improve the quality, safety and efficiency of health care delivered, increase equal access, as well as health literacy and, consequently, reduce morbidity, increase the quality of life and ensure the sustainability of the SNS in view of the inevitable increase in demand and associated costs.

Telehealth in Portugal

Temporal Evolution

The first telehealth activities on public record took place in 1998 with the creation of the telephone helpline "Dói, Dói? Trim, Trim!" and the teleconsultations in the area of paediatric cardiology at the Paediatric Hospital of Coimbra. In 1999 a telemedicine network was built between primary and hospital health care in Alentejo (Figure 7). Later in 2005, the helpline "Dói, Dói? Trim, Trim!" gave rise to Linha Saúde 24.

Subsequently, several regulatory and operational actions were prepared, including the publication of the Directive 2011/24/EU on Cross-Border Health care, which includes the increase in the price of teleconsultations, the creation by SPMS of the Telemedicine Working Group (GTT) integrated in the Monitoring Committee for Clinical Informatization (CAIC)[1], the preparation of the Teleconsultation Roadmap, the development of the PDS Live platform, the creation of the Clinical Guidance Standards (NOCs) within the scope of telemedicine by the Directorate-General of Health, the definition of the Telemedicine Framework Agreement[2], the establishment under the SPMS of the Portuguese National Centre of Telehealth (CNTS), according to the Resolution of the Council of Ministers no. 67/2016 of 26 October, and, finally, the creation of the SNS Contact Centre (SNS 24)[3], which has been under the CNTS's responsibility since July 2017.

Telehealth is currently growing with multiple projects, mainly local and in the pilot phase. There is a clear need to scale in a coordinated manner by replicating good examples and to benefit from national coordination and strategy, from planning to implementation and monitoring[4].

[1] Entity created by the Dispatch No. 9725/2013 of July 24
[2] Instrument enabling the acquisition of telemedicine goods and services. In service since December 7, 2016
[3] Creation by Decreto-Lei 69/2017 of June 2016
[4] NOTE: Perceptions and information collected through interviews and surveys to institutional stakeholders in the healthcare sector and telehealth experts.

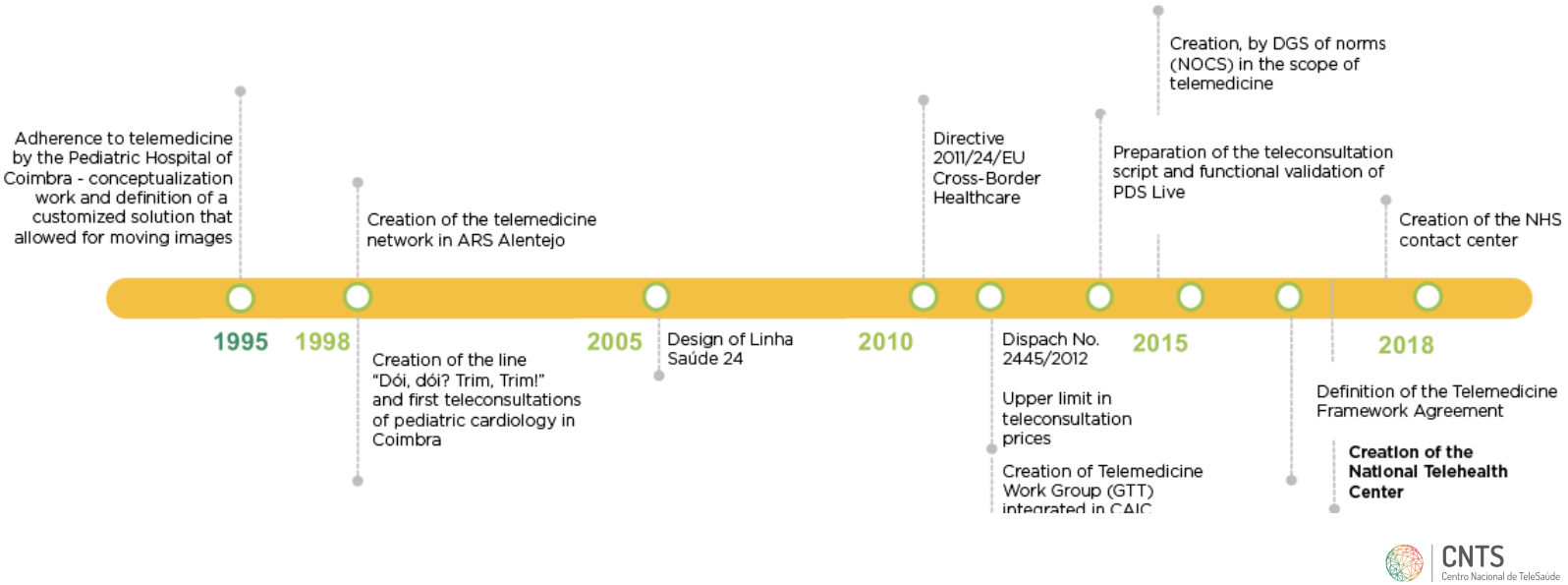


Figure 7: Telehealth timeline in Portugal

SPMS EPE Serviços Partilhados do Ministério da Saúde

CNTS Centro Nacional de TeleSaúde

SPMS & CNTS

SPMS was created by Decree-Law no. 19/2010 of 22 March and amended by Decree-Law no. 108/2011 of November 17, Decree-Law no. 209/2015 of September 25, Decree-Law no. 32/2016 of June 28 and Decree-Law no. 69/2017 of June 16. Its mission is to "to provide specific shared services in the health area and in the areas of purchasing and logistics, financial services, human resources, information and communication systems and technologies and other complementary and subsidiary activities, to all SNS establishments and services, regardless of their legal nature, whether E.P.E.s or Public Administration Sector (SPA) entities, as well as to the bodies and services of the Ministry of Health (MS) and any other entities when carrying out activities in the health field" (SPMS, 2018).

Being so, SPMS plays a relevant and responsible role in the digital transformation of the health area. It is responsible for technological products and services (Figure 8) for citizens, professionals and health institutions. The Portuguese National Center of Telehealth was created according to the Resolution of the Council of Ministers (RCM) no. 67/2016 of October 26 and was integrated into SPMS by the Decree-Law No. 69/2017 of June 16. It acts to promote, manage and coordinate the telehealth services and initiatives and carries out Research & Development (R&D) and teletraining activities.

The CNTS mission is to "facilitate the citizens' access to health, to ensure its equity and to increase the efficiency of national resources by taking advantage of information and communication technology" (CNTS, 2018) and its vision is "Health without space and time barriers" (CNTS, 2018).

Figure 8: Non-exhaustive universe of products and services provided by SPMS

In this context, the CNTS established the following 4 main objectives of action:

• To contribute to the development of the national telehealth promotion strategy;

• To stimulate the research for solutions that represent innovative proposals for the use of telehealth;

• To contribute towards the creation of new models of health care leveraged by ICT and with added value to the citizen and the system;

• To develop the Contact Centre SNS24 as a vital link of the integration of care and citizen´s proximity to the SNS.

National Telehealth Initiatives

The multiple examples of initiatives carried out since the 1990s as well as the current involvement of the entire health ecosystem in Portugal, show that telehealth is progressively part of the way health services are provided in the country. It is a natural evolution, as in so many other areas of everyday life where ICT transposes geographical barriers, accelerates processes and facilitates access to services. It is through an articulated and planned effort that it will be possible maximize telehealth potential to ensure equitable access to quality care and leverage its integration.

Iniciatives Promoted by CNTS

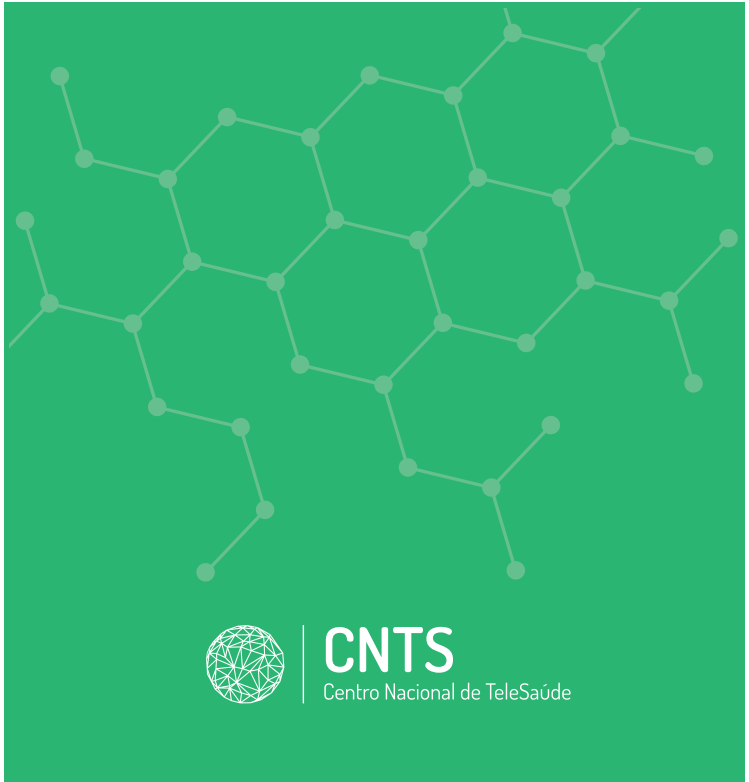
Since the creation of the CNTS, on October 26 2016, until the current year of 2018, several initiatives have been developed and therefore contributed to the adoption of telehealth in a more structured, sustained and consistent way. The most relevant were:

- Key stakeholders mapping and conduction of a national survey for 238 entities;
- Stimulation of the Telehealth Promotion Network (RTP), which brings together 5 Regional Telehealth Coordinators (CRT) appointed by the ARS and the 88 Internal Telehealth Promoters (PIT), representatives of Primary and Hospital-based Health care;
- Definition of requirements for telehealth to be integrated into SNS Information Systems (eg VAI, RSE REF, RSE LIVE) and monitoring of the development teams to ensure the integration of the telehealth support functionalities;
- Activation of the teleconsultation points (eg hospitals; CSP; Prisons – up to September 2018, > 210 active points were recorder);
- Creation of a Cost-Effectiveness Model (from a Value-Based Health care perspective) in partnership with the Universidade Nova de Lisboa to guarantee projects sustainability and scalability;
- Mapping of telehealth initiatives in Portugal;
- Identification of best practices;
- Dissemination of telehealth concepts and examples among institutions, professionals and citizens;
- Telehealth training;
- Further works towards the National Strategic Plan for Telehealth proposal;

- Participation in research projects in close partnership with the Academy in the area of telehealth;
- Follow-up European projects within telehealth scope;
- Since July 2017, CNTS also coordinates the SNS Contact Centre, SNS 24. The SNS 24 results from the transfer of the "Linha de Saúde 24", previously integrated within DGS, to SPMS through Decree-Law No. 69/2017 of July 2017.

The SNS 24 services are classified into four main areas: triage, counselling and follow-up services; clinical and non-clinical information services; administrative services and telecare services.

In the year 2017-2018, there has been a growth in demand for these services by citizens, as illustrated in Figure 9.



The SNS 24 is the largest provider of telehealth services in the country. In 2018 more than 1,000,000 (one million) calls answered by the nurses.

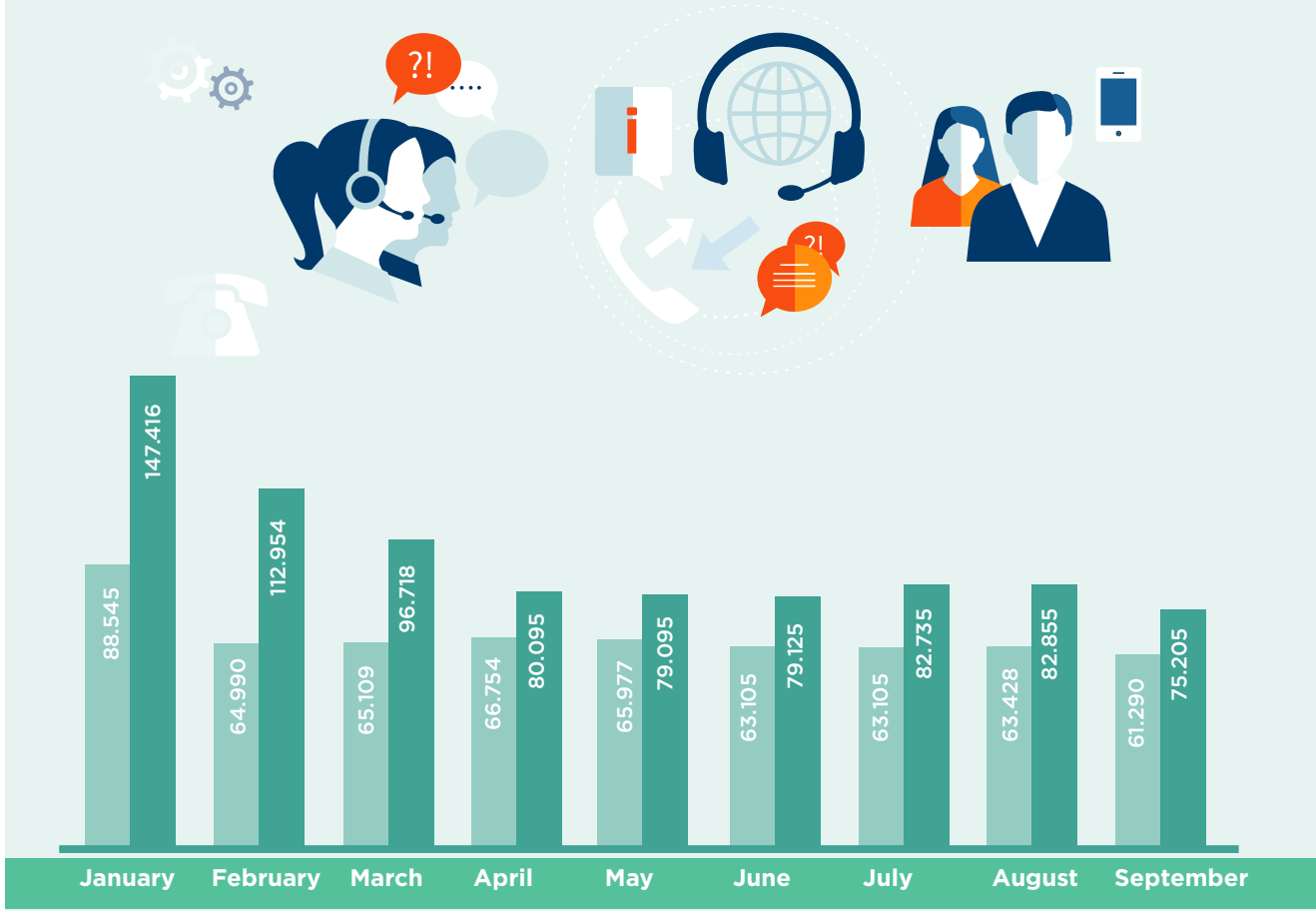


Figure 9: The number of calls answered in 2017 and 2018 by the SNS24
Source: SPMS/CNTS.

Initiatives Promoted by the SNS Health Institutions:

Many telehealth initiatives are developed by the health care providers themselves - hospitals and primary health care - which are enacted to respond to locally identified needs. They put technology at the service of the community through new approaches and models of health care delivery.

Thus, the implementation of telehealth is advancing at an accelerating pace, practically in the entire national territory and in a variety of ways, namely through teleconsultation, telemonitoring, telediagnostics, telerehabilitation, telescreening and teletraining (Figure 10).

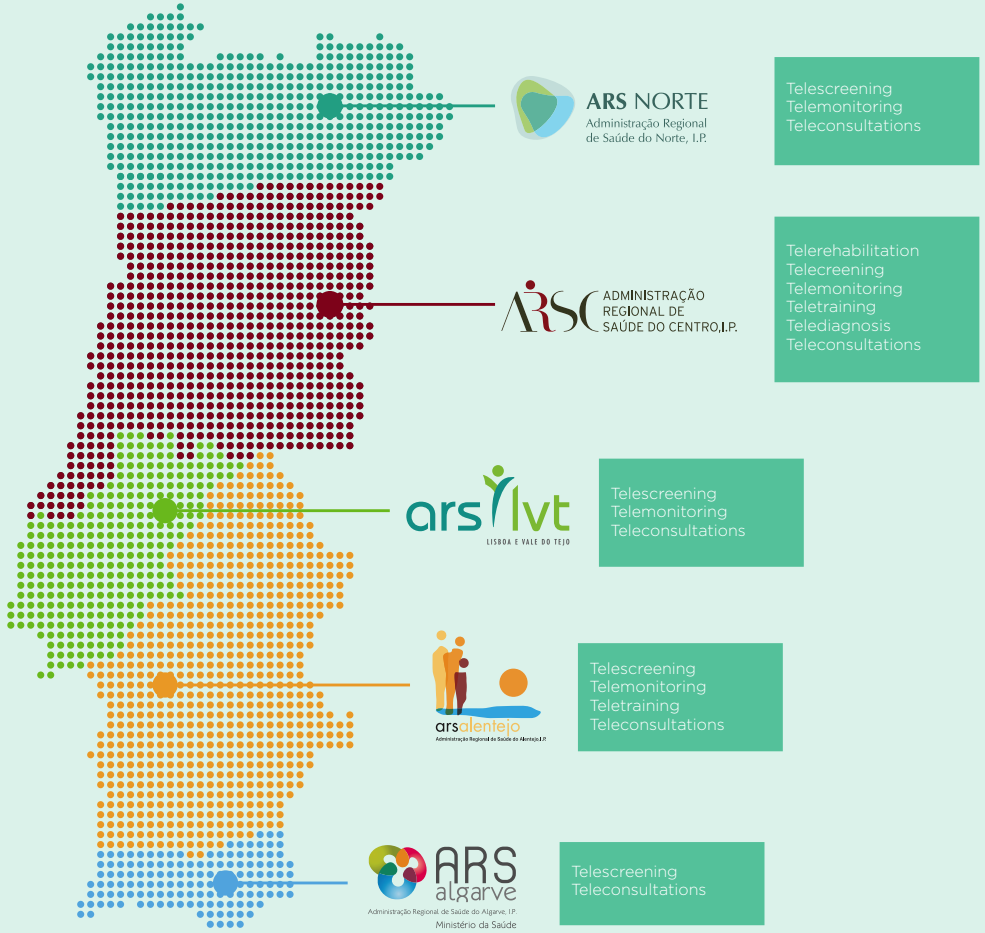


Figure 10: Initiatives mapping Portugal 2018; Source: SPMS, EPE

I. Teleconsultation

Teleconsultation is a consultation in which the health professional, at a distance and using Information and Communication Technologies (ICT), assesses the clinical situation of a person and plans the provision of health care. The Teleconsultation can happen in real or deferred time.

Teleconsultation enables professionals of different levels of care to be brought closer together, optimises the management of resources in the SNS, improves the access of citizens to health care, reduces the number of visits by users and caregivers and promotes the empowerment of citizens in the management of their health.

A good example of the benefits is the deferred teleconsultation of dermatology in the context of referral from primary health care to a first hospital consultation:

Clinical written information, complemented by photo images of the skin lesion, accompanies the request for a first consultation sent via information systems. The dermatologist who receives the request can better assess the clinical emergency, and schedule the appointment accordingly. In a relevant percentage of requests, the clinical information is sufficient for the hospital doctor to recommend the family doctor a solution for the clinical condition – thus preventing the patient from having to go to the hospital.

For example, in the Local Health Unit of Matosinhos (ULSM) referral to dermatology is routinely done by sending the clinical information and photos. In 2018, ULSM conducted 2,585 consultations that were referred using that system (ACSS, 2018).

In 2018 were performed 26,496 teleconsults in 26 Health Units. The most frequent specialties were dermatology, cardiology, paediatric cardiology, nephrology, physical and rehabilitation medicine (SICA, 2018). A total of 18,075 minutes of teleconsultations use were recorded on the SNS telehealth platform (RSE Live).

The Order No. 6280/2018, determines that referral by the SNS primary health care to a first hospital Dermatology-Venereology consultation must be made by sending an

image of the skin lesion, which will render deferred teleconsultations a standard practice. Of the total number of referrals to Dermatology, referrals using Dermatological Telescreening increased in number from 14% (2017) to 21.7% (2018) (ACSS, 2018).

II. Telemonitoring

Telemonitoring is a tool that consists of the use of communication technologies to remotely monitor the biometric parameters of citizens, such as blood pressure, heart rate, capillary blood glucose, weight, oximetry and temperature, which are transmitted to the caregiver. Its main objective is to improve the delivery of health care to citizens, and consequently improve their quality of life. Particularly in chronic diseases, it aims to detect early signs and symptoms of decompensation, providing an opportunity for intervention before the citizen needs hospitalisation (M. R. Cowie, S. D. Anker, J. G. Cleland, G. M. et al., 2014).

Thus, it is possible to avoid hospital admissions, as well as visits to emergency services since patients and caregivers learn to recognize the alarm signals and consequently, increase their autonomy.

The contracting of health care in the SNS provides for the implementation of telemonitoring programmes. The Local Health Unit of Alto Minho (ULSAM), for example, has created a telemonitoring programme for patients with Chronic Obstructive Pulmonary Disease (COPD). At the end of the first year of this project, there was a 60% reduction in emergency visits, a 70% decrease in hospital admissions, and a 28% decrease in costs in the population of patients included. A satisfaction assessment questionnaire showed that 100% of the users were satisfied (ULSAM, 2018). This result shows that this type of solutions is sought out by the users, who easily adhere to it.
In 2018, 8 hospitals contracted Telemonitoring Programs (ACSS) in the areas of heart failure, acute myocardial infarction and chronic obstructive pulmonary disease.

III. Telescreening

Telescreening is the remote search, using information and communication technologies, for an asymptomatic disease, a risk factor or an unnoticed harmful condition. As a rule, it is part of a disease prevention strategy at the person's own initiative or that of the system.

The Regional Health Administration of North, for example, has a screening program for diabetic retinopathy through which approximately 300,000 diabetics have been screened since 2009. Retinopathy was detected in 10% of them and they were referred to specific treatment.
Diabetic patients are invited to their health centres, where a technician captures an image of their retina and sends it through information systems to a diagnostic centre in Porto.

The diagnostic centre identifies the patients with indication for treatment of diabetic retinopathy and they are called for ophthalmology consultations in their local hospitals.
In this way, the screening process is carried out prior to the ophthalmology consultations, which optimizes the work of the specialists since they only receive patients who really need a consultation.

Therefore, the waiting lists can be shortened and the waiting time for an ophthalmology consultation is reduced.

IV. Telediagnosis

Technological developments in the means of diagnosis has allowed us to obtain diagnoses that are more reliable and accurate. Increased access to these means results in the need to analyse and evaluate an ever-increasing number of clinical examination results.

The existence of diagnoses made remotely, based on medical examinations done, is already a reality today. Teleradiology and telepathology are examples of this process.

The E-Pathology, or Digital Pathology, at the Cova da Beira Hospital Centre (CHUCB), in Covilhã, is an example and a national reference in this area. It allows the technical activities and the macroscopic examination to be performed in loco by a duly accredited diagnostic and therapeutic technician, under the responsibility of a pathologist doctor in remote supervision. Samples from the surgical/medical

or imaging intervention arrive at the Pathology Laboratory of the CHCB accompanied by an electronic request, are observed by an accredited technician who makes his macroscopic examination with remote supervision by the pathologists. The subsequent laboratory processing is carried out with periodic remote quality control by the pathologists. The slides obtained are scanned and sent to the laboratory, where they are observed and the diagnosis made. The pathologist who observes the slides from all cases prepares a report that is returned to the CHCB.

With this method, the waiting time for the results was reduced by 40%. Thus, it is possible to diagnose in a more timely manner and adopt faster medical and/or surgical therapies, as well as reduce the length of hospital stay. Directly and indirectly, this model also results in a reduction of hospital costs and optimisation of the available human resources.

V. Telereabilitation

Rehabilitation after surgery or hospitalisation is an essential part of the continuity of care that allows the patient to recover physiologically, particularly when there is an early return to the daily activities. The rehabilitation is usually carried out in specialised centres, such as clinics and hospitals, which have a high demand, with economic and time costs for both the users and caregivers. Telerehabilitation is an innovative and alternative method that allows remote access to the rehabilitation team.

The Leiria Hospital Centre (CHL), for example, has implemented a Telerehabilitation Programme for osteoarticular shoulder and knee pathology. It includes a Telerehabilitation platform that allows the clinical team to prescribe, monitor and adapt rehabilitation programmes, thus enabling remote orientation and follow-up of the patient.

The strategic objectives of this Program are:

- To establish common programs between primary and secondary care in highly prevalent and resource-intensive pathologies, avoiding unnecessary outpatient consultations;
- To set up a structured therapeutic program for patients with chronic osteoarticular pathology, currently with no real response in the areas of influence of the CHL, Pinhal Litoral Group of Health Centres (ACES) and ACES Oeste Norte;
- To define the central role of the user by giving the conditions to be the main actor in the therapeutic program. In September 2018, of the 87 patients included in the Program, 86.05% adhered to therapy 7 days a week, for a total of 616 hours of therapy (about 1.5 hours/day).

VI. Teletraining

The training of health professionals and others in the context of the health activity is considered an essential process for the evolution of the health institutions. Enabling easy access to content and information, regardless of space and time constraints, has been possible thanks to teletraining initiatives.
The Alentejo Teletraining Programme is the most structured and long-standing example in the SNS, having started its activity in 2008. Every year, it promotes several teletraining actions by videoconference, which enabled the training of more than 3,400 professionals between 2008 and 2016. As a space for the sharing of projects, realities and experiences, it brought the health units closer together and made a more profitable use of the professionals' time and the financial resources available.
In 2012, ARS Alentejo began the process of implementing the Quality Management System for teleconsultations and teletraining (in accordance with ISO 9001: 2008).

The SPMS Training Academy provides the eStudo platform developed by SPMS, EPE, for distance learning. It is an essential support tool for teletraining, and is also used by other entities integrated within the SNS or under the supervision of the Ministry of Health for the development of their courses.

Total number eStudo platform trainees: 837.

These examples of telehealth initiatives demonstrate the breadth of opportunities for new organization models of care and training - in all clinical areas and involving all types of professionals.

PENTS

The Strategic National Telehealth Plan (PENTS) appears as an instrument for the aggregation of the strategy for the development of telehealth. Its main objectives are:

- The development of an integrated and current vision of the Telehealth in Portugal through the auscultation of experts and key institutional stakeholders on the subject, as well as by analysing the relevant documentation;
- The characterisation of valuable proposals with distinctive and innovative characteristics for the sustainable growth of Telehealth in Portugal, by analysing and structuring the key components of the experience of stakeholders in the provision of Telehealth services;
- The definition of the Telehealth strategic axes for the period 2019/2022, and development and characterisation of a set of practical and specific actions that leverage its development;
- The draw up of a roadmap for the operationalization of the proposed plan, as well as recommendations for future implementation.

II. MAIN CHALLENGES AND OPPORTUNITIES

The main challenges and opportunities of Telehealth

Main Challenges

As a result of the questionnaires and interviews carried out, in addition to the validation of the current state of the Portuguese reality presented in Chapter I, the main challenges identified in the telehealth ecosystem in Portugal were mapped (Figure 11).

Subsequently, the frequency of references to each challenge in the questionnaires and context interviews was analysed. The result of this analysis (Figure 11) is quantified as a percentage of the total number of interlocutors who contributed to PENTS.

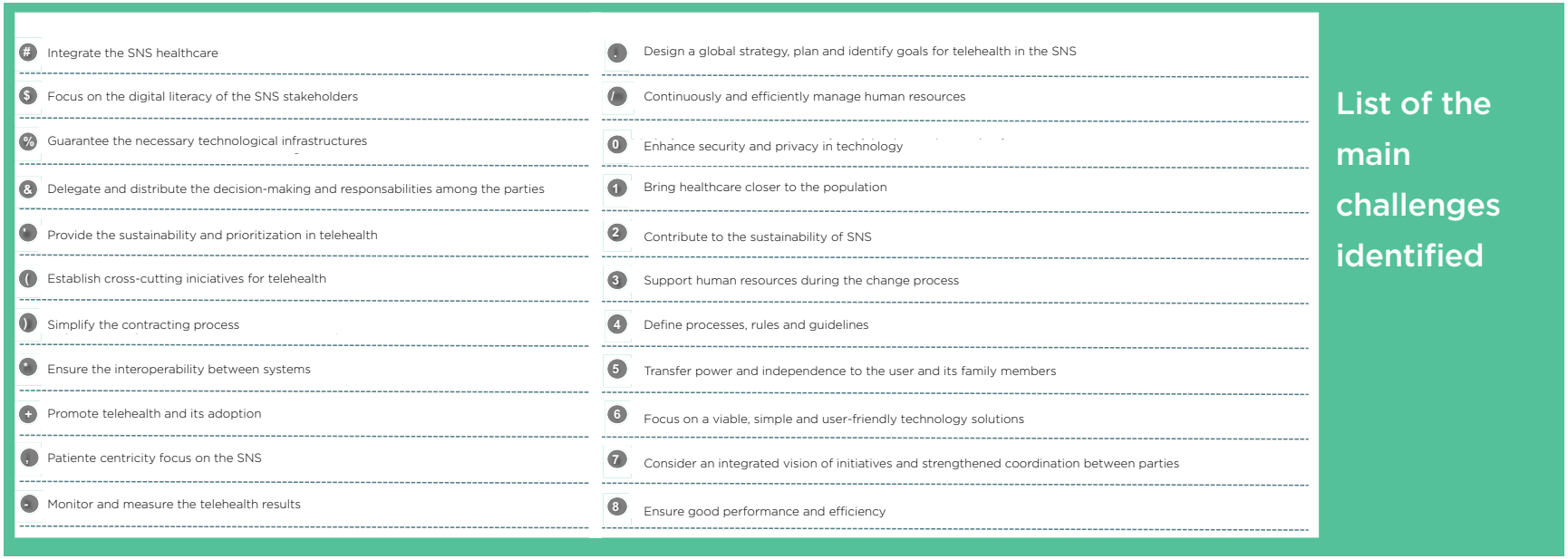


Figure 11: Main challenges identified

It is noteworthy that the main challenges identified were definition of processes, standards and guidelines; bringing health care closer to the population; integration of the SNS health care; ensuring the necessary technological (technical and operational) infrastructure; and continuous and efficient management of human resources. Issues of information security and privacy, patient safety and medical liability are also challenges to be taken into account.

For the optimum achievement of the objectives at the level of challenge, solutions and measures, 7 groups were defined – Governance and Empowerment Model; Human Resources, Technology, Accessibility and Equity; Quality; SNS Financing and Sustainability and Regulation – for the purpose of grouping the challenges into homogeneous sets or sets that should be analysed together, as shown below (Figure 12).

Most mentioned challenges in the development of telehealth

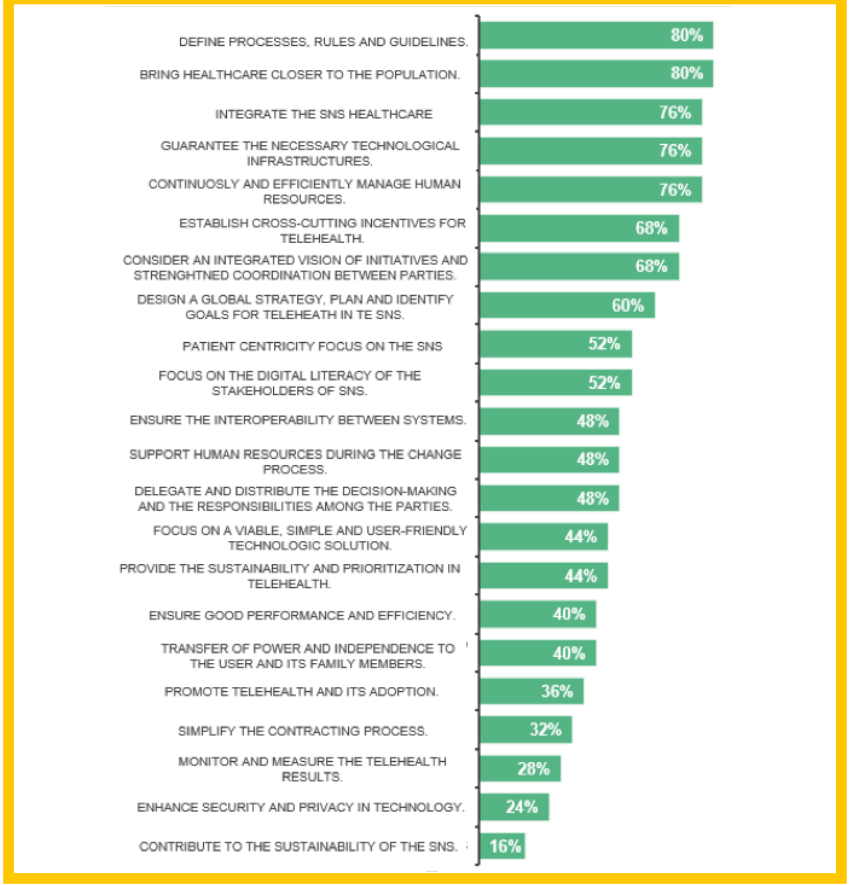


Figure 12: Most mentioned challenges in the development of telehealth

Following the definition of the challenges groups, specific actions were then allocated to each group, as shown in Figure 13.

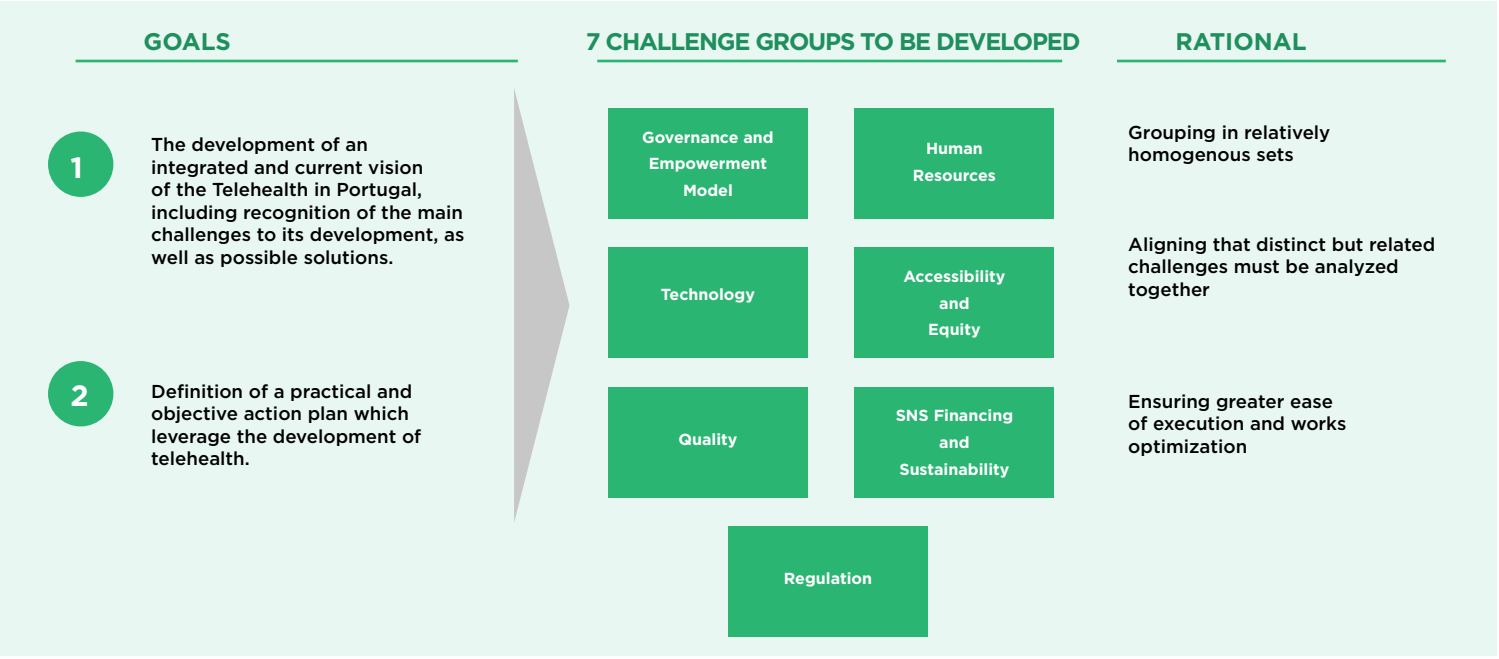


Figure 13: Identification of 7 challenge groups

CHALLENGE GROUPS

Governance and Empowerment Model	· Design a global strategy, plan and identify goals for telehealth in the SNS · Consider an integrated vision of initiatives and strengthen coordination between parties · Provide priority and sustainability in telehealth · Delegate and distribute the decision-making and responsabilities to parties
Quality	· Monitor and measure the telehealth results. · Ensure good performance and efficiency
Human Resources	· Continuously and efficiently manage human resources · Focus on the digital literacy of the stakeholders of SNS · Promote telehealth and its adaption · Support human resources during the change process · Transfer power and independence to the user and its family
Technology	· Guarantee the necessary technological infrastructures · Ensure the interoperability between systems · Enhance security and privacy in technology · Focus on a viable, simple and user-friendly technologic solution
SNS Financing and Sustainability	· Establish cross-cutting incentives for telehealth · Contribute to the sustainability of SNS
Regulation	· Simplify the contracting process · Define processes, rules and guidelines
Accessibility and Equity	· Integrate the health care of SNS · Aproximar os cuidados de saúde da população · Patient centricity of SNS

Figure 14: Actions which can contribute to each one of the 7 challenge groups

Main Opportunities

In an area marked by rapid technological developments – robotics, blockchain, artificial intelligence, among others – there are many challenges but also numerous opportunities. The evolution in this field has been creating solutions mainly for the challenges that exist in the access to health care.

Thus, throughout the analysis developed the various interlocutors also identified some of the main advantages and current opportunities of telehealth, highlighting 4 primary areas:

I. Improve health habits

A more efficient management of the citizens' behaviour, by encouraging healthier habits. This will prevent disease and, as a consequence, allow rationalising the use of human and material resources.

II. Improve access to health care

Use teleconsultation to speed up the process of making clinical diagnoses, refer patients to specialised care, reduce travelling and waiting times for consultations and promote a greater equity within the SNS.

III. Better articulation

With better articulation between care providers and citizens, access to detailed, digitalised and continuously updated clinical information will enable a strong integration of care, thus promoting faster and more effective actions of prevention, diagnosis and treatment.

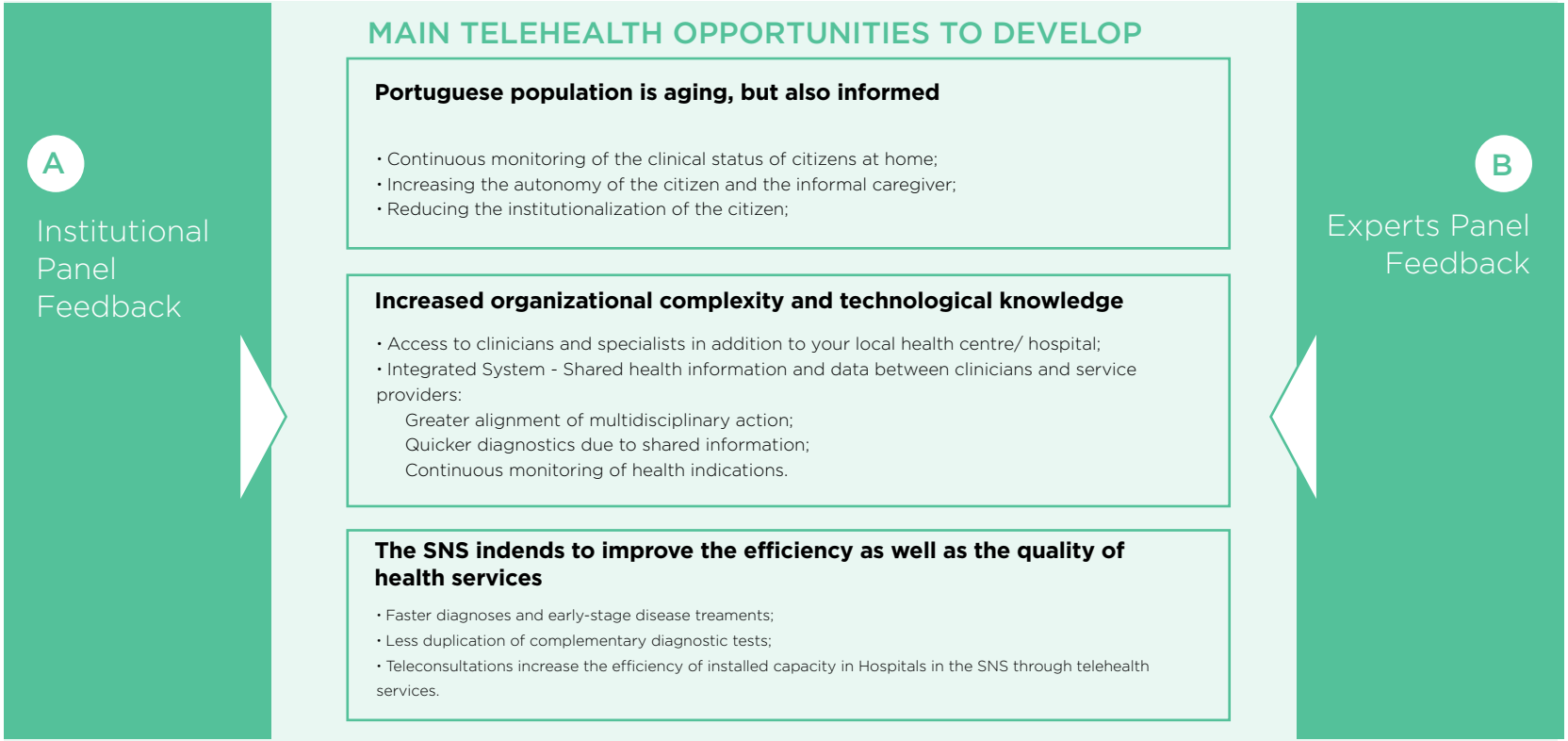
IV. Improve health care

With practices of continuous assistance and a more efficient management, it is possible to have a positive impact on the management of diseases, especially the chronic ones, and to improve the adequacy of the health care provided to the needs of the citizens.

In addition, the main opportunities for telehealth development were also identified, following a combination of bottom-up and top-down approaches, as has already been identified.

The result of these inputs is described in the following image (Figure 15).

Figure 15: Main Telehealth Opportunities



III. INNOVATION AND INTERNATIONAL TRENDS

The most promising trends in the area of telehealth

Innovation

Given the changes in society, innovation is a concept that is increasingly ingrained today. It is thus necessary to develop solutions to current and future problems that stand out from the previous insufficient standards. According to Tom Kelly, founding partner of IDEO5, innovation involves achieving 3 factors: "a new idea, its implementation and the guarantee that it adds value"

The health sector is conducive to innovation with the constant development of new services and products.
The emergence of technologies such as robotics, analytics, artificial intelligence and cognitive technologies, nanotechnology, quantum computing, wearables, Internet of Things (IoT), blockchain, machine learning, among others, make us believe that we are facing a paradigm shift in health care delivery, where the rise of predictive health models are emerging as a strong component of this change and where telehealth may be a key factor.
Innovation is an integral part of and transverse to the Strategic Lines for the Development of Telehealth, identified in Chapter IV, so it is justified to approach in this issue separately.

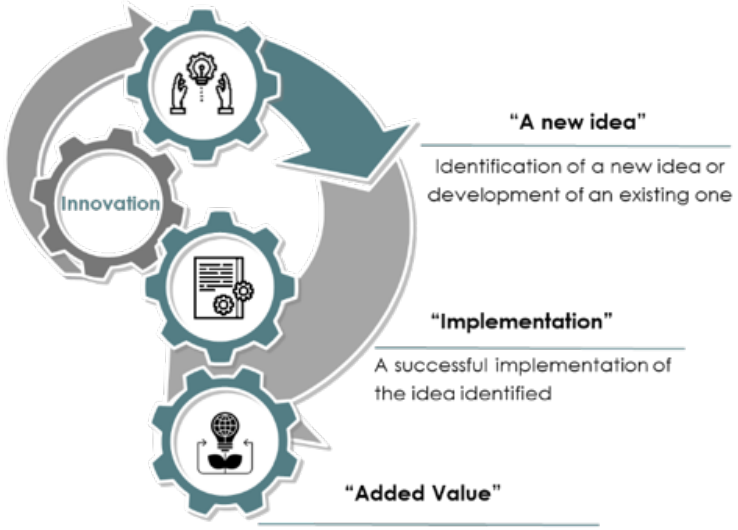


Figure 16: Innovation Illustrative Process
Source: ENESIS Analysis, IDEO

Digital Revolution

The digital revolution in the health sector can be linked to the ongoing Industrial Revolution 4.0 (Industry 4.0), which is a concept focused on the promotion of individualisation and virtualisation in different industrial domains.

However, the industry's transposition into the health sector is also due to the fact that the patient's background and experience are classical models of value chains that are no different from those of any other industry. The future of health care requires that it be structured in a modular manner as it progressively changes from a fixed environment – where the citizen goes to the health institution – to a model disseminated and oriented towards the empowerment of the citizen – where the citizens develop a set of competencies, while permanently receiving data on their health, and, in turn, manage their physical and psychological condition autonomously (Thuemmler and Bai, 2017).

In addition, Industry 4.0 is closely linked to clear economic objectives and holds the potential for a differentiation worldwide, based on 6 principles that can be passed on to the health sector, and where telehealth, in particular, reflects itself, namely:

Interoperability
In addition to the interoperability of the information systems themselves, objects, machines and people need to be able to communicate with each other through the Internet of Things and the Internet of Services using predefined semantics – for example, through sensors in an accessory (eg a clock) that a person wears, readings are communicated to a system that, using algorithms, evaluates whether it should notify a central where health professionals operate or send a message through a chatbot6.

Real-time operating capability
It consists of virtually instantaneous acquisition of data and processing, enabling real-time decision-making – for example, referral of citizens to a particular type of health care based on data or diagnostic algorithms.

[6] A computer program that simulates a human communicating with people

Virtualization
The possibility of creating a virtual copy of physical health care institutions in order to track, monitor and act remotely using the numerous sensors and metrics that accompany the citizen in the daily life – for example, Home Hospitalization (virtual hospital), a model in which citizens receive health care through teleconsultations, medical devices, monitoring, and are treated at home by health professionals.

Decentralization
Decision-making can be done in real time by a cyber-physical system7 according to the needs of the patient. In addition, health care professionals not only receive suggestions, but can also add information about treatment lines. Therefore, the modules of the intelligent system will work in a decentralised way in order to improve the efficiency of health services – e.g. monitoring the patient's physical rehabilitation in real time and remote in order to improve the quality of their treatment.

Guidance to services
Using a set of data extracted from various medical devices (e.g. pulse, blood pressure, body fat, etc.) and, in a simple and non-invasive way, suggest a service that focuses on meeting the needs of the user to manage his/her health (eg improving his/her physical condition, losing weight, etc.).

Modularity
Production according to demand (coupling and uncoupling of modules in production), which offers flexibility to efficiently and effectively change the tasks of health professionals in case of seasonal or other fluctuations (eg flu, natural disasters, etc.).

[7] Reporting elements that coordinate and communicate with sensors and in turn monitor virtual and physical models that modify the virtual and physical environment in which they are executed

However, in order to implement a successful digital transformation process, certain conditions must be met[8], such as:

Motivation, social and political support – Portugal is already in a prominent position in the process of digital transformation with successful cases such as the Medical Electronic Prescription, E-Vaccine Bulletin, SICO, among others. Demonstrations of political commitment also exists, such as the publication of the Resolution of the Council of Ministers that sets out ENESIS2020. "Such consensus will be decisive in the re-examination of the legal aspects of health data so that, with a different legal framework, we can go further in the use of data that already exist, and that required so much effort from health organizations and professionals".

The eSkills of health professionals and the literacy of citizens - Digital literacy is a necessary means to increase user take-up and achieve the desired outcomes. In addition to the health sector, its various stakeholders, for example from the financial and education sectors, must also be committed to creating awareness and digital training campaigns and courses in order to overcome the existing barriers to the use of portals and other technologies made available by government agencies and even companies.

Technical skills – The number and skills of the existing IS/ICT staff will need to be significantly increased because, in a digital age, they are key to developing and accelerating this transformation. In the future, "it will be just as important to have good computer programmers in a hospital as it is to have good internists and surgeons. Recognizing that is fundamental for themselves and for digital change".

Strengthening the action of the digital transformation agents – Change is something that is not always easy to adopt or even understand, as it gives rise to some resistance (Figure 17).

[8] The innumerable conditions were based on the White Paper and the article, Digital SNS and the conditions of digital transformation in health, Henrique Martins, 2017

In the case of digital change, things are even more complex since it implies:

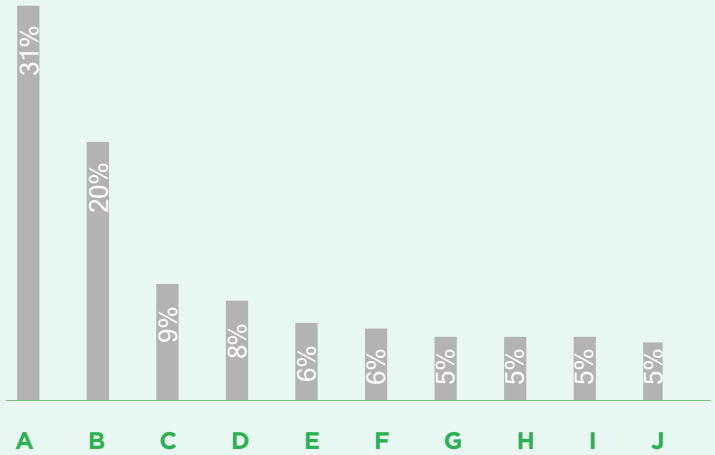
- A strategic change (eg adaptation to external factors, such as customers, suppliers, competitors or others, leading to deep transformative changes);
- A change in the structure (eg changes in the way an organisation performs its functions, adjustments in its organisation from an hierarchical point of view);
- A change of processes and/or systems (eg changes aimed at improving the efficiency and productivity of a flow of players, but above all a digital change management strategy (Figure 18) that defines communication and training initiatives in order to mitigate the barriers that may be hindering the adoption of the new desired behaviours).

Robust infrastructures, fast networks and appropriate hardware – It obviously implies a strong investment using its own budgets, similar to what the 21st Constitutional Government has done for the health area with, for example, the acquisition of more than 10,000 computers to equip the Primary Health care. In addition, it will be important for public hospitals to across the board reach level six or seven of the Electronic Medical Record Adoption Model (EMRAM).

Digital pillars and experience - Without a national registry of citizens, always updated and with reliable data, it will be difficult to have a reference of who is who, their family and their allocations, such as benefits, exemptions and assigned family doctor or nurse. The Portuguese Patient Registry (RNU) and RSE are the main foundations for digital transformation at the national level, as they serve as a benchmark, as a link between health providers and as a tool for data sharing.

Mobile Principle – Mobility and portability are principles that should be followed in the telehealth solutions. The mobility of citizens in their personal or professional life should not

What are the main causes of failure in change?



A: Resistance, mainly from the leaders;

B: Lack of support from the managers;

C: Shortsightedness (lack of overview of the business)

D: Lack of collaborators training;

E: Poor leadership on the part of the area responsible for change

F: Niches/ power struggles;

G: Poor success in previous changes;

H: Low budgets;

I: Demographic profile/ generational leap;

J: Lack of technological maturity

Figure 17: Main causes of failure in change
Source: ENESIS Analysis

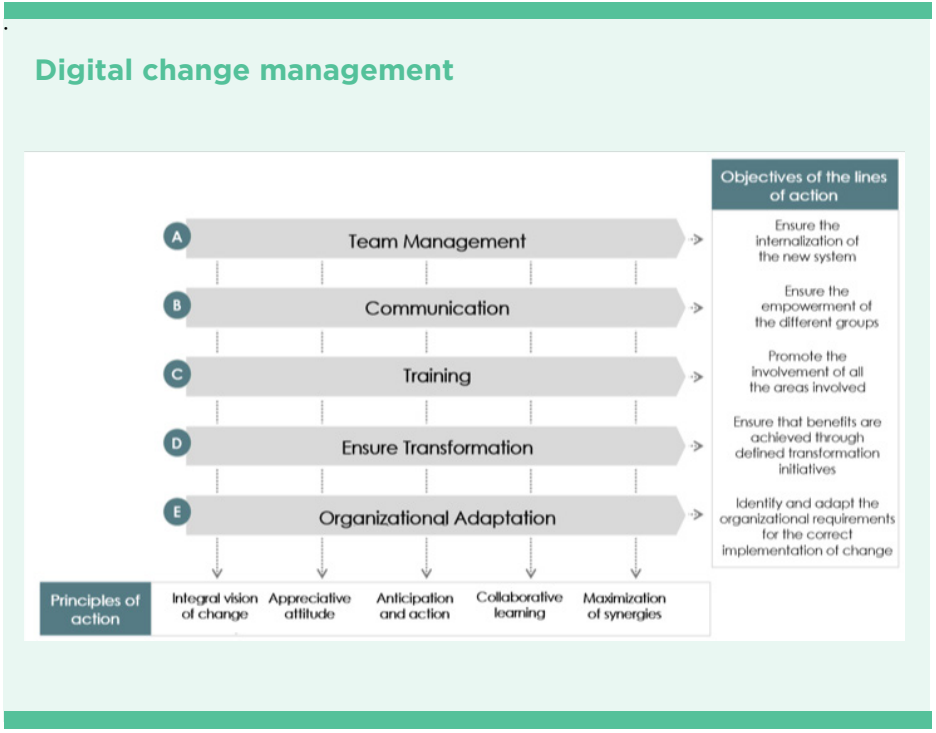


Figure 18: Digital change management – objectives and lines of action. Source: ENESIS Analysis

be a barrier to health care access (through IT resources), nor should it be a limitation to the exercise of professionals in the different contexts in which they operate (e.g. home hospitalisation, telemonitoring, among others).

All2All Thinking – It is necessary to enable health professionals and citizens to connect in a simple, safe and effective way, creating a relationship increasingly close to both parties' expectations.

Information Security, Cybersecurity and Data Privacy as a service – these issues are of particular importance in the health sector, as since May 25th 2018 all entities that collect, use or process personal data have to comply with the General Data Protection Regulation (GDPR). As a consequence, companies are in a critical phase of defining and implementing initiatives, namely at the IT level, which must be accelerated. SPMS has prepared the Portuguese Guide on Data Privacy in the Health Sector, with the aim of providing

information on the conditions for processing personal data, allowing the public entities within the SNS, on the one hand, to carry out a preliminary assessment of the level of adequacy and compliance with the respective rules and, on the other hand, to become aware of the rules and of the impact that the new GDPR and the Directive on Network and Information Security (EU) 2016/1148 will have on their organisations.

Telehealth as a principle and not as a supplement – ICT will increasingly be a powerful tool to create new forms of providing health care, and the digitalisation of health should contribute to changing the way health professionals organise themselves around the patient and their family, allowing them to take a much more active role in the management of diseases. As a principle and as part of the workflow between health professionals, telehealth should be a means that adds value to the citizen and to the system.

Thus, **telehealth should help in bringing innovation to health care delivery models outside the institutions**, and innovation should strengthen **the usefulness of telehealth as a means of supporting health care delivery.**

These trends should be integrated whenever they contribute to adding value to the citizen and to the SNS. Citizens should also contribute to improving the SNS by gaining more knowledge and confidence to play an active role in their care and by submitting their health data to be included in ongoing research.

However, telehealth is still a means based on the creation of new ways of delivering health care, which are being implemented in a sustainable way and which unquestionably add value to citizens and the SNS itself.

Telehealth International Trends

Improving the access, quality and efficiency of health services through innovative ICT-based solutions is now a clear eHealth strategy in developed countries (eHealth and quality in health care, Ossebaard and Gemert-Pijnen, 2016).

The European Commission sees eHealth as a priority and encourages the creation of a comprehensive strategy in the European Union (EU) countries. Among other initiatives, it provides funding programs (e.g. Horizon 2020) and emphasizes the importance of technological regulation so as to encourage the standardisation of systems in this regard. For example, the creation of referral tables with referral/treatment criteria and definition of concepts in order to facilitate cross-border exchanges of health information (European Commission, 2018).

It was considered important to carry out a benchmarking analysis in order to evaluate international telehealth measures and initiatives that respond to the seven groups of national challenges identified in Chapter II.

Based on the methodology previously presented, 5 countries were selected (Figure 18).
These countries have a high degree of market maturity, were given a high score in the evaluation by decision-makers, and have a national health system similar or partially similar to that of Portugal (e.g. the Beveridge Model) with a focus on the universality and financing model variables. They are: Finland, Sweden, the Netherlands, Denmark and the United Kingdom. All these countries are, like Portugal, in the first fifteen countries of the Euro Health Consumer Index ranking (2017).

The identification of the best practices as possible responses from each country to the 7 challenge groups was the next step.

In this way, the main measures and initiatives that best apply to the Portuguese reality were identified. The following conclusions stand out:

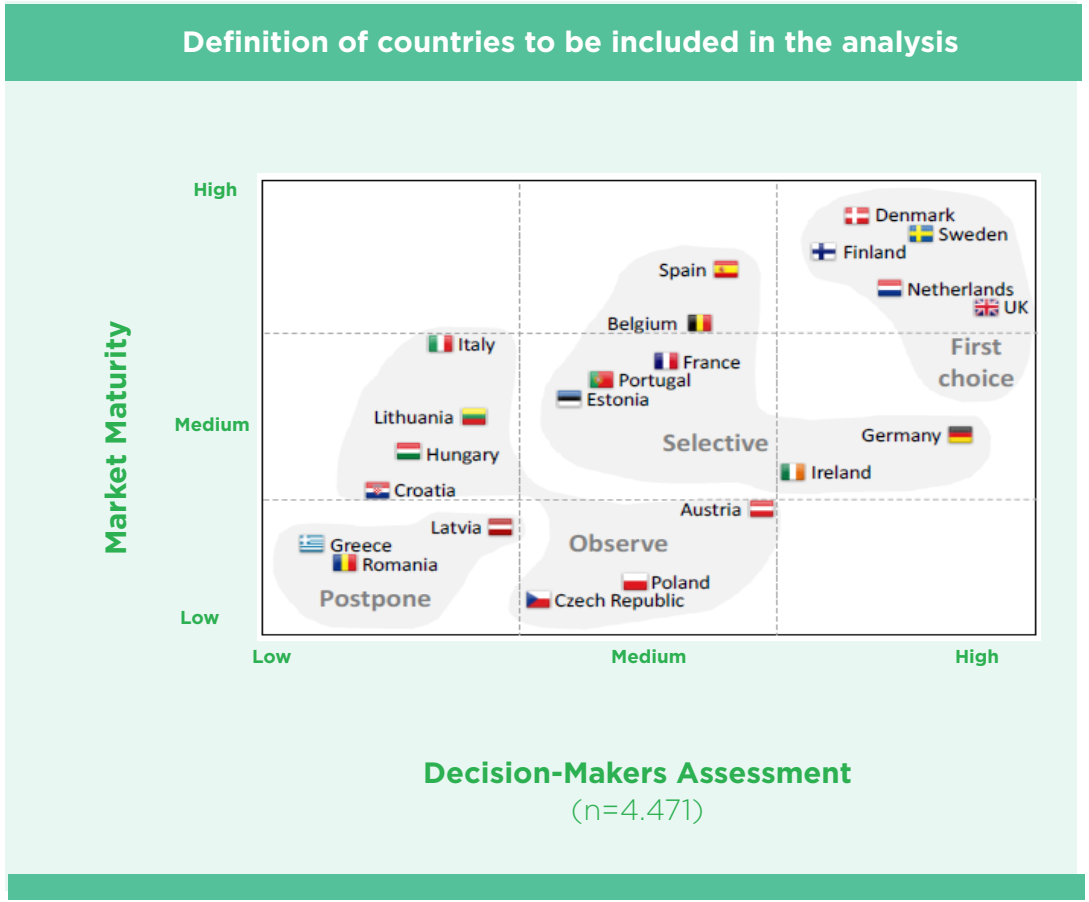


Figure 19: Selection of 5 countries for the analysis
Source: EU Countries' mHealth Market Ranking, Research2Guidance, 2015

Governance Model and Empowerment

Context: Governance plays a crucial role in a health system, from delegation of responsibilities to planning and coordination.

Conclusions: The countries concerned consider that it is important to establish public-private partnerships and involve health professionals in the development of telehealth systems and operational models. A clear and transparent division of the responsibilities between the actors and the existence of constant coordination and monitoring throughout the implementation of the strategy are seen as equally important.

Human Resources

Context: Human resources and their management in a health system are clearly a priority issue and one of the most important factors for its success. In addition, the empowerment of citizens, family members and caregivers is essential to the sustainability of the SNS.

Conclusions: The countries under review stress the importance of digital literacy and advocate education and technological training for both health professionals and citizens. They identify the need to encourage citizens to use digital alternatives and, in return, provide them with more responsibility and health control (empowerment of citizens).

Technology

Context: The adaptability of health systems to new technologies in the face of their constant evolution and the interoperability of the systems are decisive factors for the improvement of the quality of the health care provided.

Conclusions: The main international initiatives and measures include the standardisation of the information systems, the implementation of the Electronic Health Record (EHR) in a personalised/single manner, the technical work to ensure the security and privacy of health data and the creation of eServices for citizens.

Accessibility and Equity

Context: Access to health care is one of the most critical factors in a health system, and it should be addressed by planning and developing solutions that promote accessibility and equity.

Conclusions: The provision of videoconferencing systems for health professionals and citizens is one of the initiatives that was identified to promote better and faster access to health care. The various countries studied also highlight the use of telemonitoring and telerehabilitation solutions, such as the creation of a contact centre for health counselling and platforms for electronic prescription. The improvement of accessibility for informal caregivers and the implementation of a "Virtual Hospital" (where hospitalisation is carried out at the home of citizens, who receive health care through teleconsultations, medical devices, monitoring and, when necessary, treatment by nurses and other health professionals – avoiding going to hospital and reducing transportation costs and discomfort, as well as improving their quality of life) were measures that were also highlighted.

Quality

Context: Strengthening and improving the performance of the SNS is an actual challenge. Evaluation and monitoring are essential areas in a health system for achieving the desired level of quality and efficiency.

Conclusions: For this group of Challenge, measures and initiatives were outlined, which include the analysis of health outcomes through indicators and metrics and the development of national approaches for the evaluation of telehealth services.

Financing and Sustainability of the SNS

Context: A health system presupposes the existence of financing and sustainability over time.

Conclusions: The countries under review mentioned the need to provide funding and to identify guidelines for innovation and progress in telehealth in order to make a contribution to sustainable economic development. Ending the use of paper in health documents completely, ensuring more security in certain areas of the health

system (e.g. electronic dispensing of medicines), through better monitoring of the system and transparency, was also a prominent measure.

Regulation

Context: Proper functioning of a health system in part depends on the existence of clear and well-identified processes and standards.

Conclusions: The main measures to tackle this group of Challenge include the standardisation of concepts, terms and structures to facilitate health communication and the adoption of the opt-out model (which presupposes inclusion unless otherwise stated) within the scope of digital clinical records.

From an overall perspective, this analysis allowed to reach the following conclusions:

- An efficient model of governance is seen as a cornerstone for the evolution, innovation and sustainability of the SNS;
- Technology, accessibility and equity are complementary and integral parts;
- Quality monitoring is essential for greater control of the planning and compliance with the established objectives, as well as to promote the adoption of effective measures to ensure continuous improvement of the health services;
- Initial financial investment and identification of guidelines play a critical role in a system that must be sustainable;
- Regulation is a topic addressed by countries focused on integrating eHealth services in order to create a legal and protection framework that is solid and coherent;
- Several international initiatives coincide with measures already implemented or under development in Portugal.

MAPPING OF INTERNATIONAL INITIATIVES WITHIN THE CHALLENGE GROUPS

Figure 20: Mapping of the initiatives and international experiences within the 7 challenge groups

IV. DEFINITION OF STRATEGIC LINES AND MEASURES

The Strategic Future of Telehealth

IV. Definition of Strategic Lines and Measures

Strategic Lines for the Development of Telehealth

Bearing in mind the challenges and opportunities identified by the different analyses of the national and international context, the definition of Strategic Lines for the Development of Telehealth (LEDTS) is crucial for a successful and sustainable development of telehealth in Portugal.

To this end, a methodology consisting of 3 phases was developed:

1. Identification of relevant national and international documentation in the field of health at the strategic and operational levels;

2. Alignment of the strategic axes of the selected documentation;

3. Assessment of the correlation between the strategic axes and the 7 challenge groups identified for the definition of LEDTS.

In the first phase, a set of relevant institutional documents that included strategic plans was identified and analysed, to ensure the national and international strategic alignment with PENTS. From these, 3 documents with different levels of performance (Figure 21), which were considered fundamental for the development of LEDTS, were selected:
- Health 2020: a European policy framework and strategy for the 21st century (WHO)
- Programme of the 21st Constitutional Government
- National Health Plan

The document Health 2020 presents the new framework for the European health policy and integrates a strategy that takes into account the developments in the area of eHealth. It defines 2 major strategic axes:

I. To improve the health of the European population and to reduce health inequalities;
II. To improve leadership and participatory governance in health.

These axes aim to support the action of governments and society in order to "significantly improve the health and well-being of populations, reduce health inequalities, strengthen public health and ensure people-centred health systems that are universal, equitable, sustainable and of high quality" (Health 2020, p. 11, 2013).

The Programme of the 21st Constitutional Government (page 92, 2015) presents a strategic vision for health in Portugal and considers that "the reinvigoration and recovery of the SNS and its performance are one of the most arduous challenges for the next decade". In this context, it defines the 9 strategic axes listed below:

I. Promote health by creating a new ambition for public health;

II. Reduce the inequalities between citizens in the access to health care;

III. Strengthen the power of the citizen within the SNS, promoting the availability, accessibility, convenience, celerity and humanisation of the services;

Figure 21: Selected Documents

IV. Expand and improve the capacity of the primary health care network;

V. Improve hospital management, clinical information flow and the articulation with other levels of care and other agents in the sector;

VI. Expand and improve the integration of the National Continuous Care Network and other support services for dependent persons;

VII. Improve the management of human resources and the motivation of Health care professionals;

VIII. Improve the Governance of the SNS;

IX. Improve the Quality of Health care.

The allocation of resources and the objective of creating more effective services for the SNS are addressed in the National Health Plan in a cross-cutting manner through the definition of 4 strategic axes:

I. Citizenship in Health;

II. Equity and Adequate Acess to Health care;

III. Quality in Health;

IV. Healthy Policies.

Its ambition is to "maximize health gains by the integration of sustained efforts in all sectors of society, and the use of strategies based on citizenship, on equity and access, on quality and healthy policies" (National Health Plan, p. 8, 2015).

In the second phase of the methodology, the strategic axes of the three documents were aligned. Figure 22 shows the results of that process.

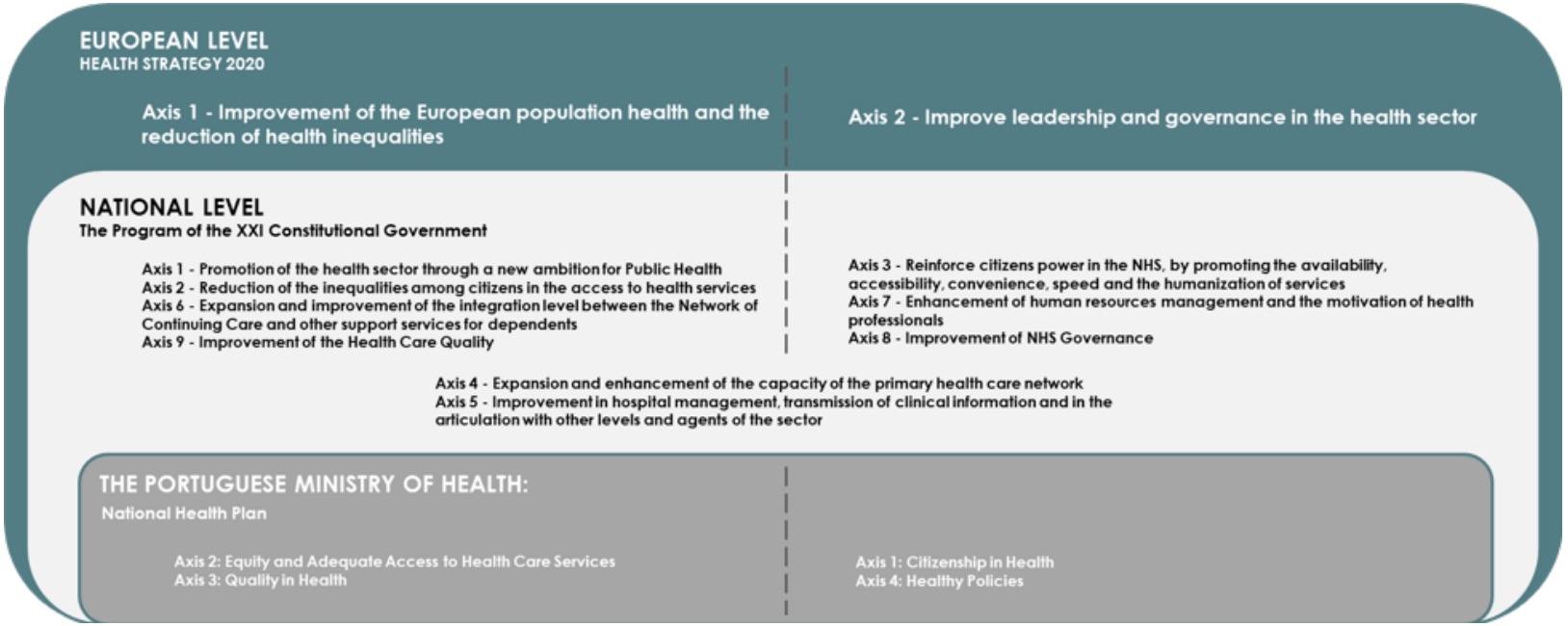


Figure 22: Alignment between the Strategic Axes of the selected documents

Finally, the correlation between the strategic axes and the 7 challenge groups was assessed, since the axes of the 3 documents reinforce the need to solve the identified challenges (Figure 23).

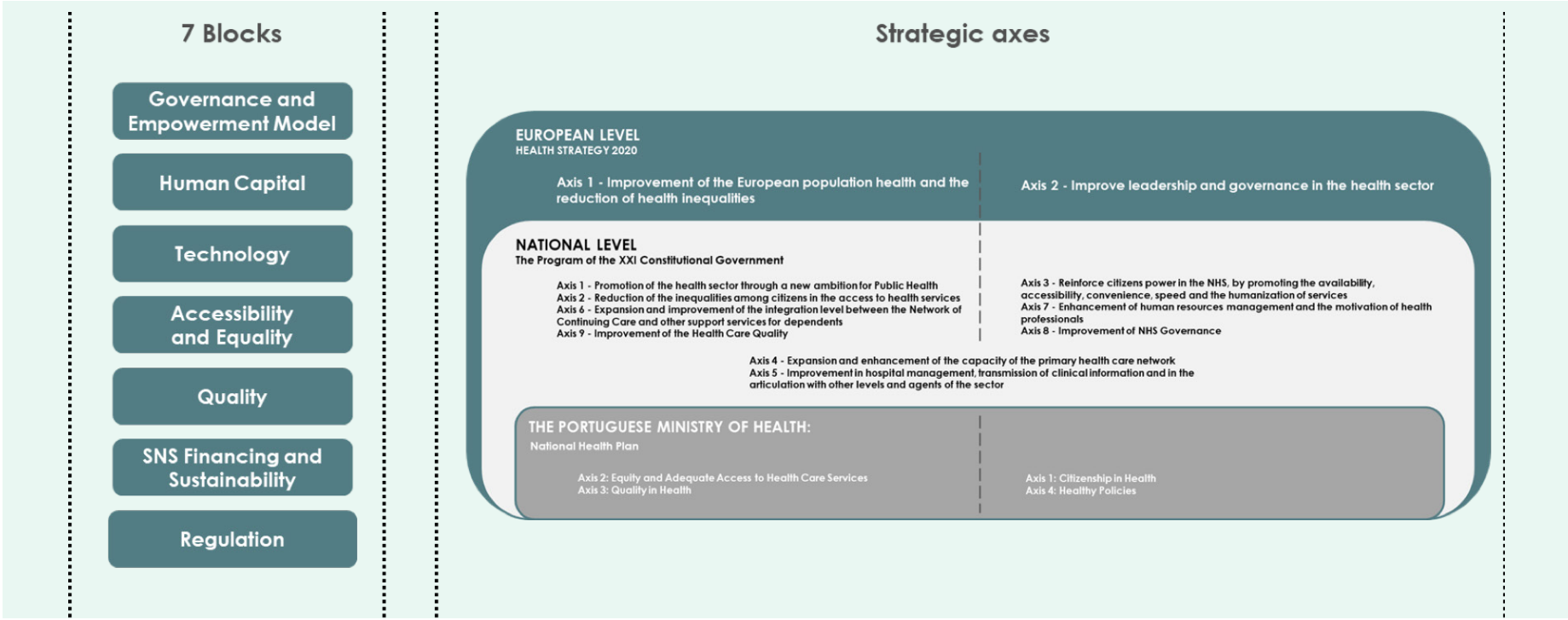
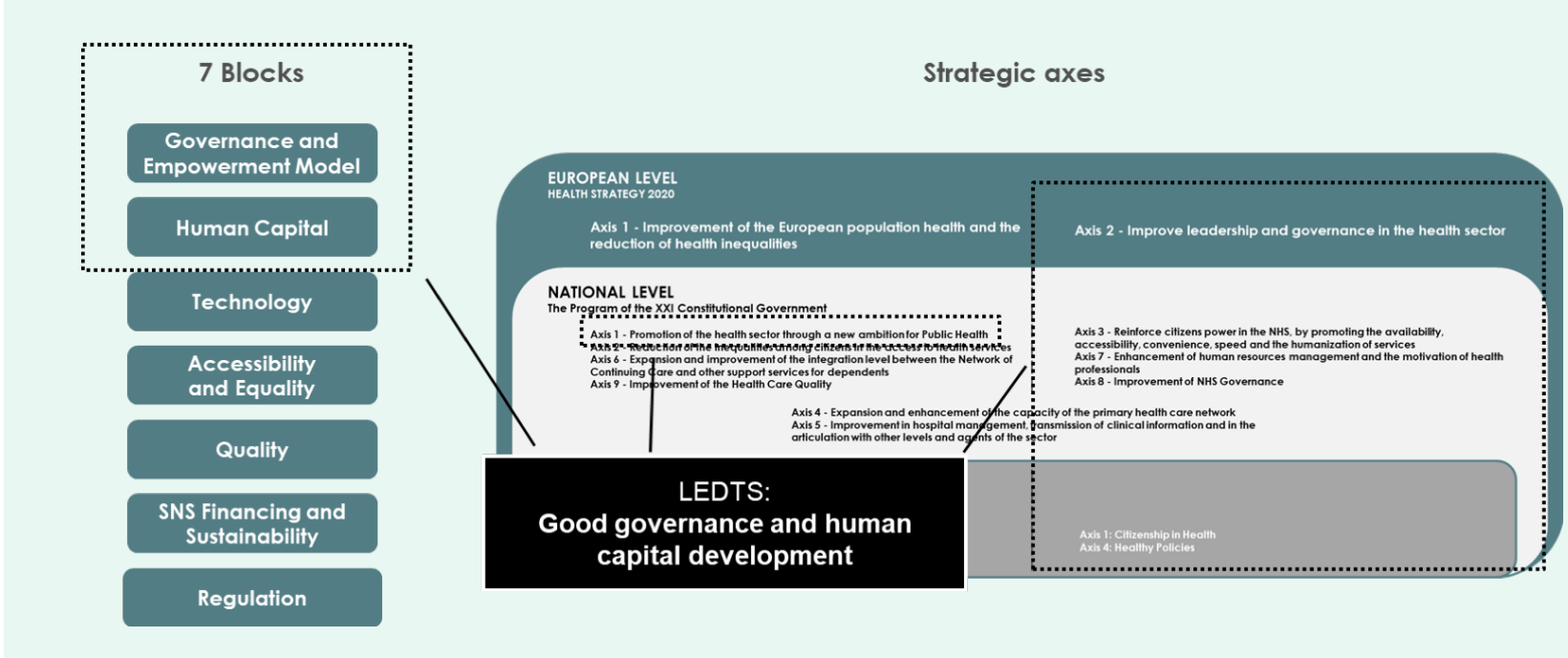


Figure 23: Assessment of the correlation between the strategic axes and the 7 blocks of challenges

Therefore, 6 Strategic Lines for the Development of Telehealth (LEDTS) were established. These lines aim to create an overall strategic vision that addresses the main groups of identified challenges while maintaining a clear alignment with the European and national health strategy.

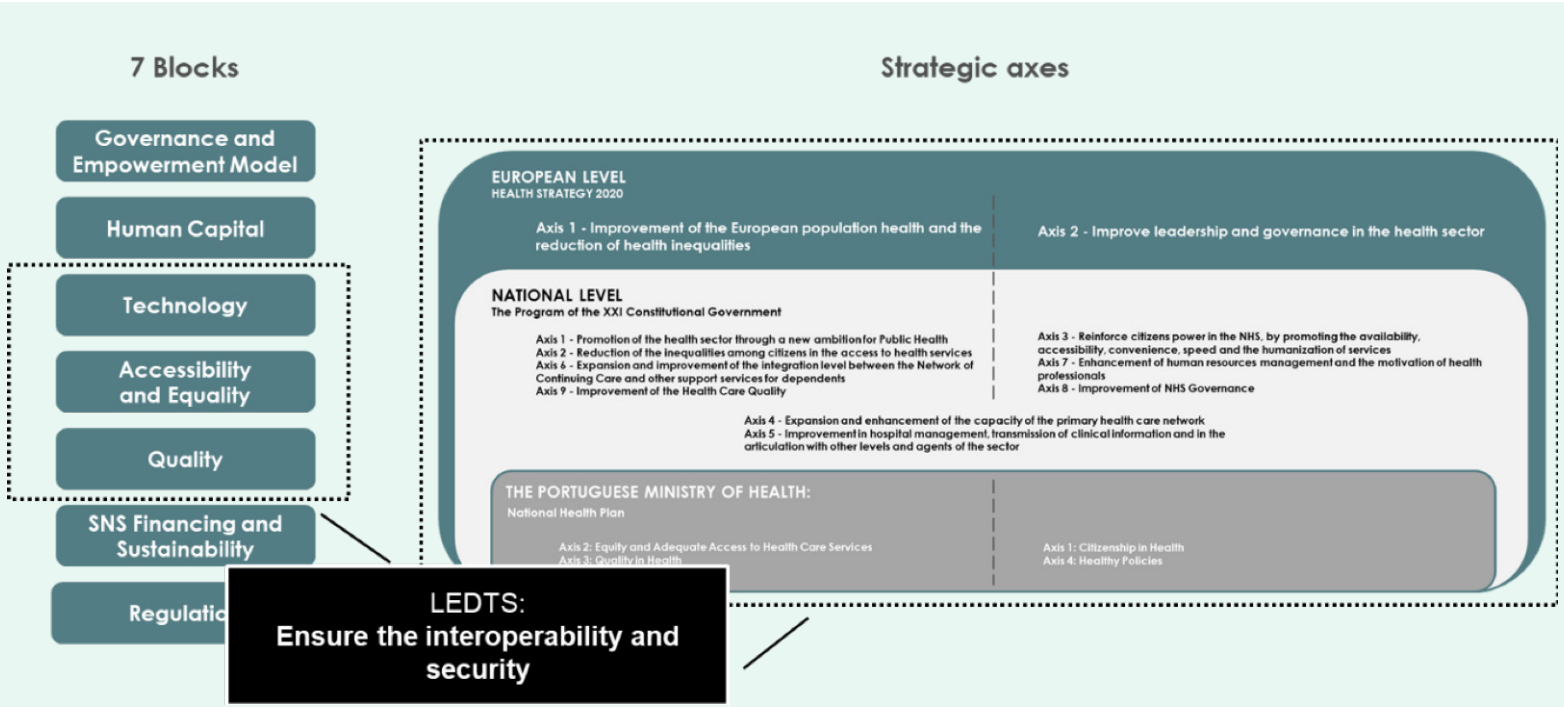
Figure 24 shows the first LEDTS, named "Good governance and development of the human capital". It corresponds to the groups "Model of Governance and Empowerment" and "Human Resources" and is aligned with axis 2 of the Health 2020 document, with axes 1, 5, 7 and 8 of the Programme of the XXI Constitutional Government and with axes 1 and 4 of the National Health Plan.

Figure 24: Introduction of the first LEDTS



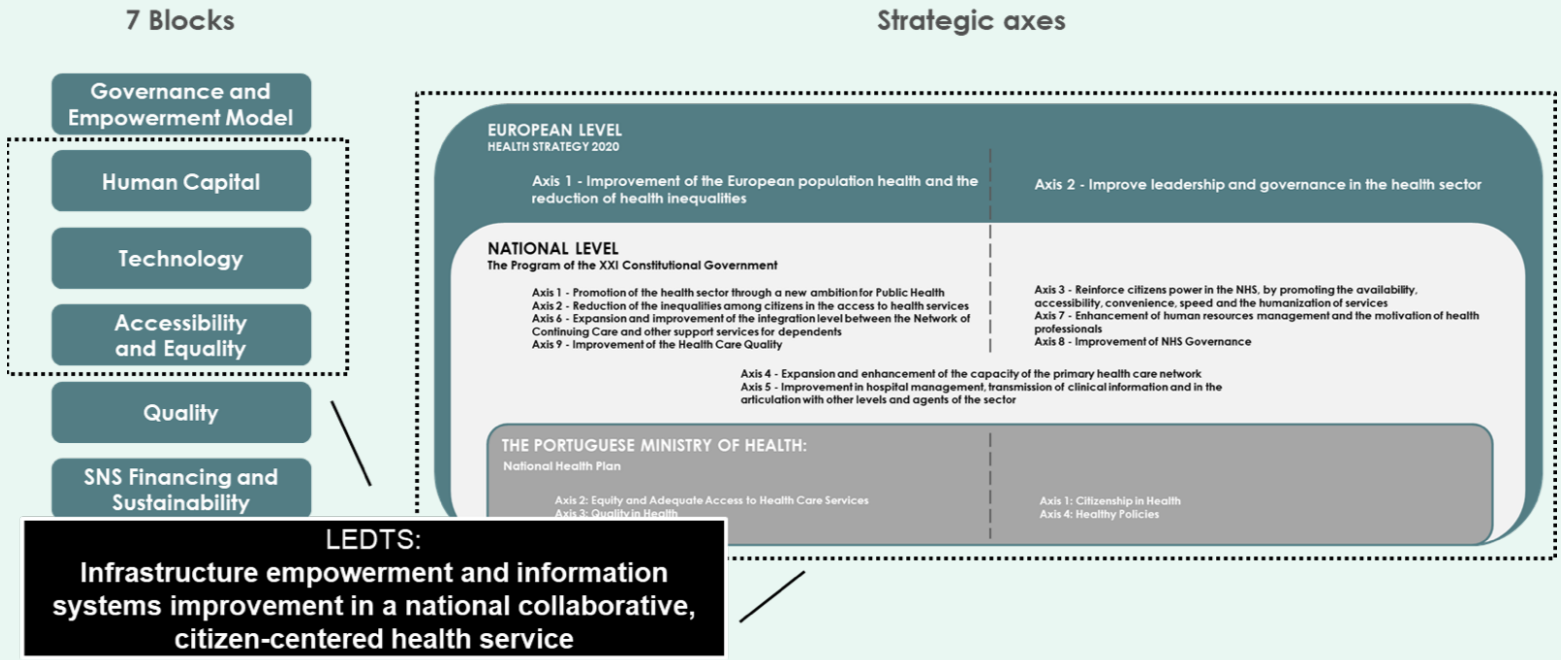
The second LEDTS is named "Ensuring the Interoperability and Safety" (Figure 25). It is associated with the groups "Technology", "Accessibility and Equity" and "Quality" and is aligned with axis 1 of the Health 2020 document, with axes 2, 3, 4, 5 and 9 of the Programme of the XXI Constitutional Government and with axes 1, 2 and 3 of the National Health

Figure 25: Presentation of the second LEDTS



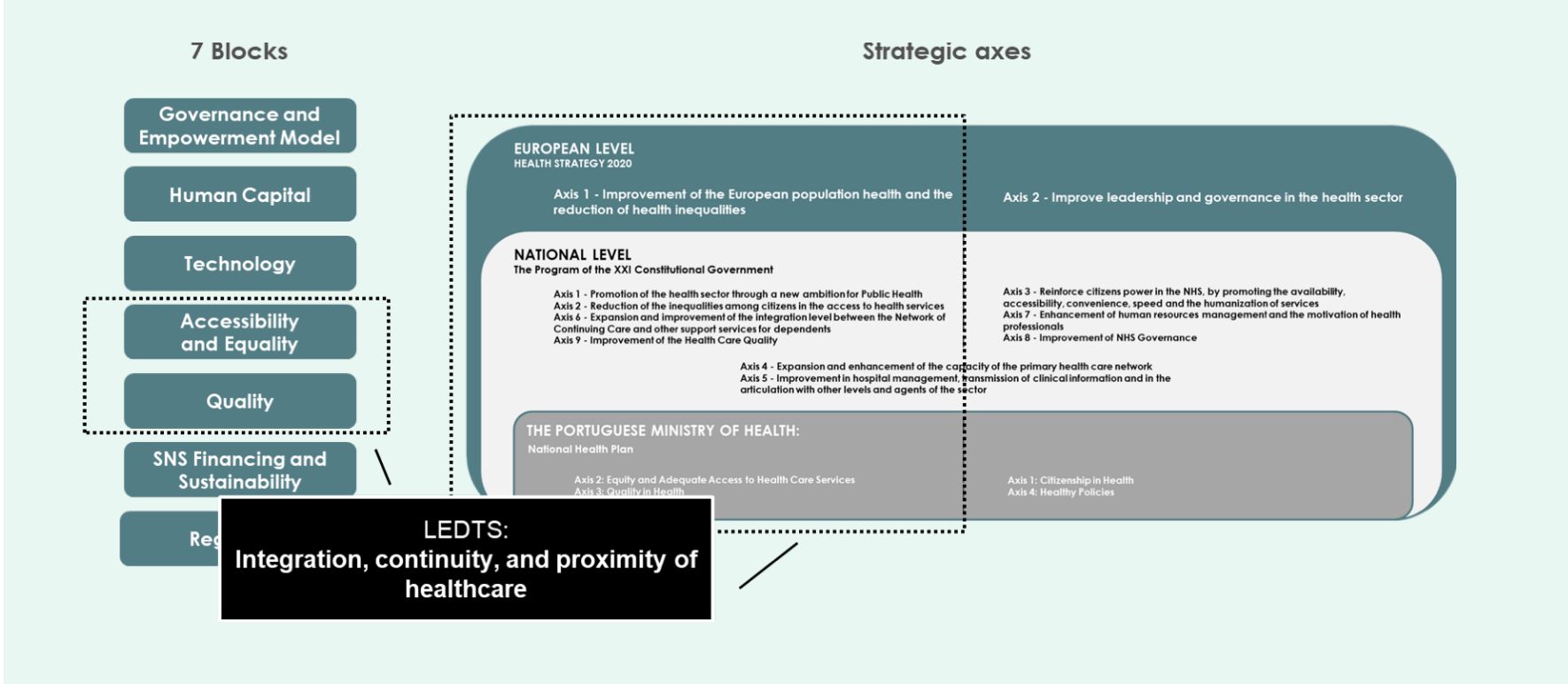
"Building the capacity of the infrastructures and the interoperability of systems in a collaborative and citizen-centred National Health Service" is the definition of the third LEDTS. It is linked to the groups "Human Resources", "Technology" and "Accessibility and Equity" and is aligned with all the strategic axes presented (Figure 26).

Figure 26: Presentation of the third LEDTS



The fourth LEDTS is defined as “Integration, continuity and proximity of the health care” (Figure 27). It is associated with the groups “Accessibility and Equity” and “Quality” and is aligned with axis 1 of the Health 2020 document, with axes 2, 3 and 9 of the Programme of the 21st Constitutional Government and with axes 2 and 3 of the National Health

Figure 27: Presentation of the fourth LEDTS



Once again general and comprehensive, the last two LEDTS cut across all challenge groups and all strategic axes. They are defined as "Evaluating and sharing of good practices that promote innovation and ensure the quality and efficiency of the health care" and "Continuous commitment to innovation, research and development in order to generate, test and implement new ideas and solutions" (Figure 28).

Figure 28: Presentation of the fifth LEDTS

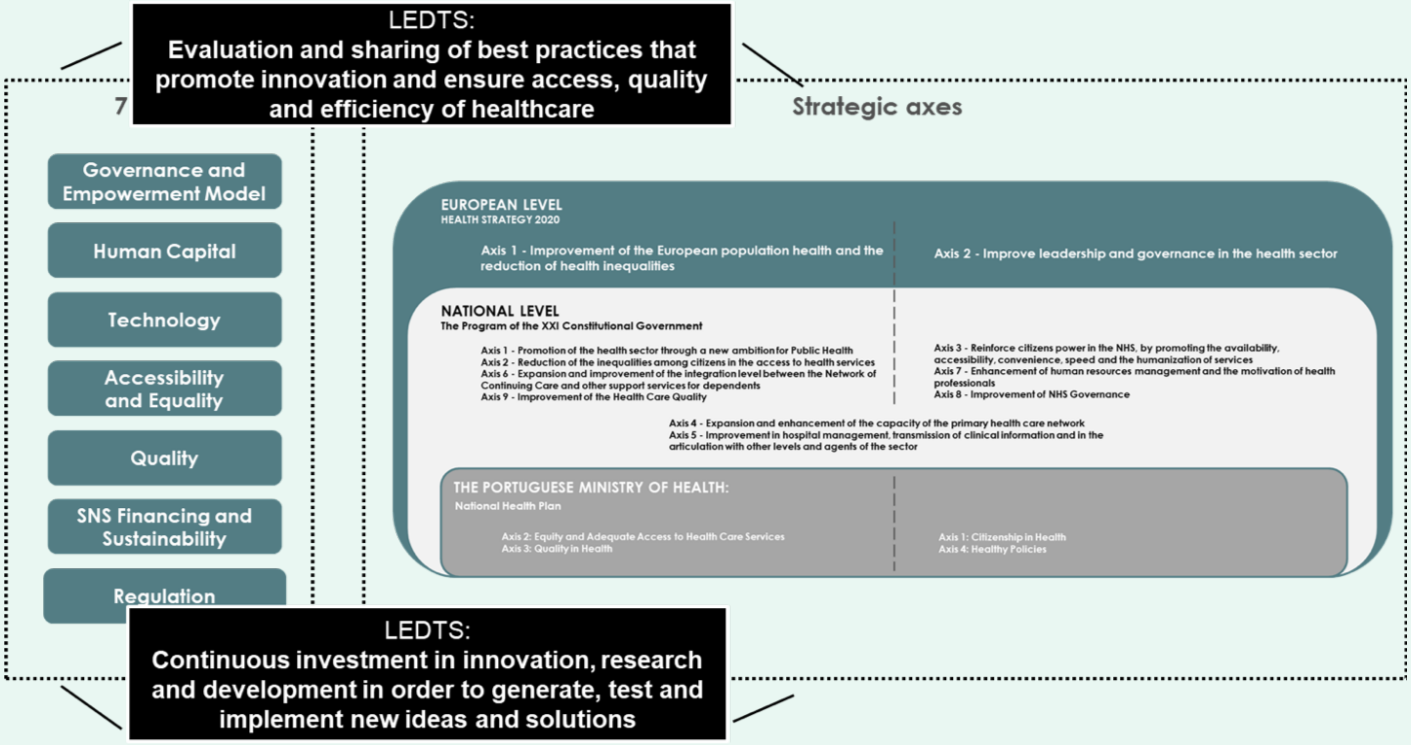
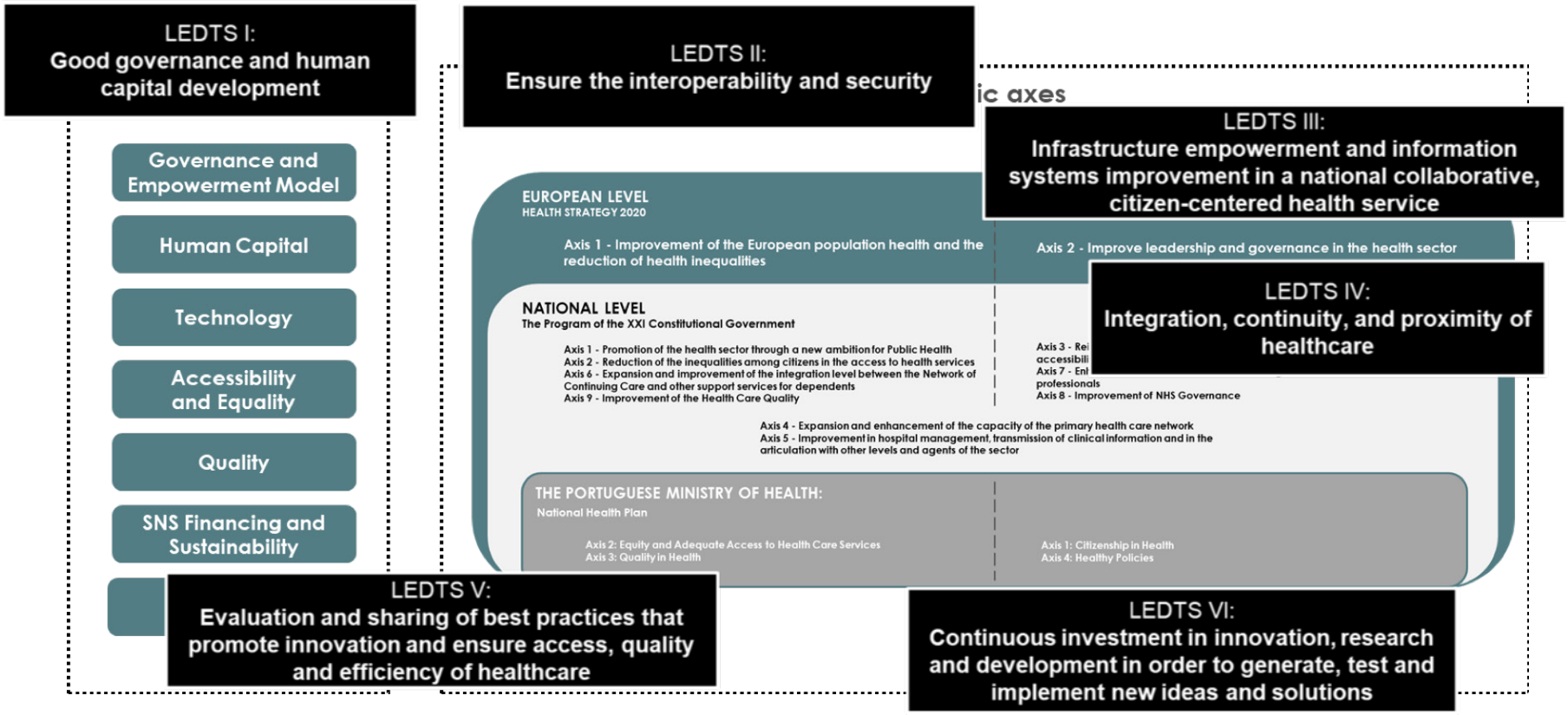


Figure 29: Presentation of all 6 LEDTS



Finally, the 6 LEDTS of PENTS (Figure 29) are defined as a reference for the elaboration of a more operational plan and, consequently, raising the need to characterize concrete measures for the strategic development of telehealth in Portugal in the next four years.

I. Good governance and human capital development

II. Ensure the interoperability

III. Infrastructure empowerment and information systems improvement in a national collaborative, citizen-centere health service

IV. Integration, continuity and proximity of health care

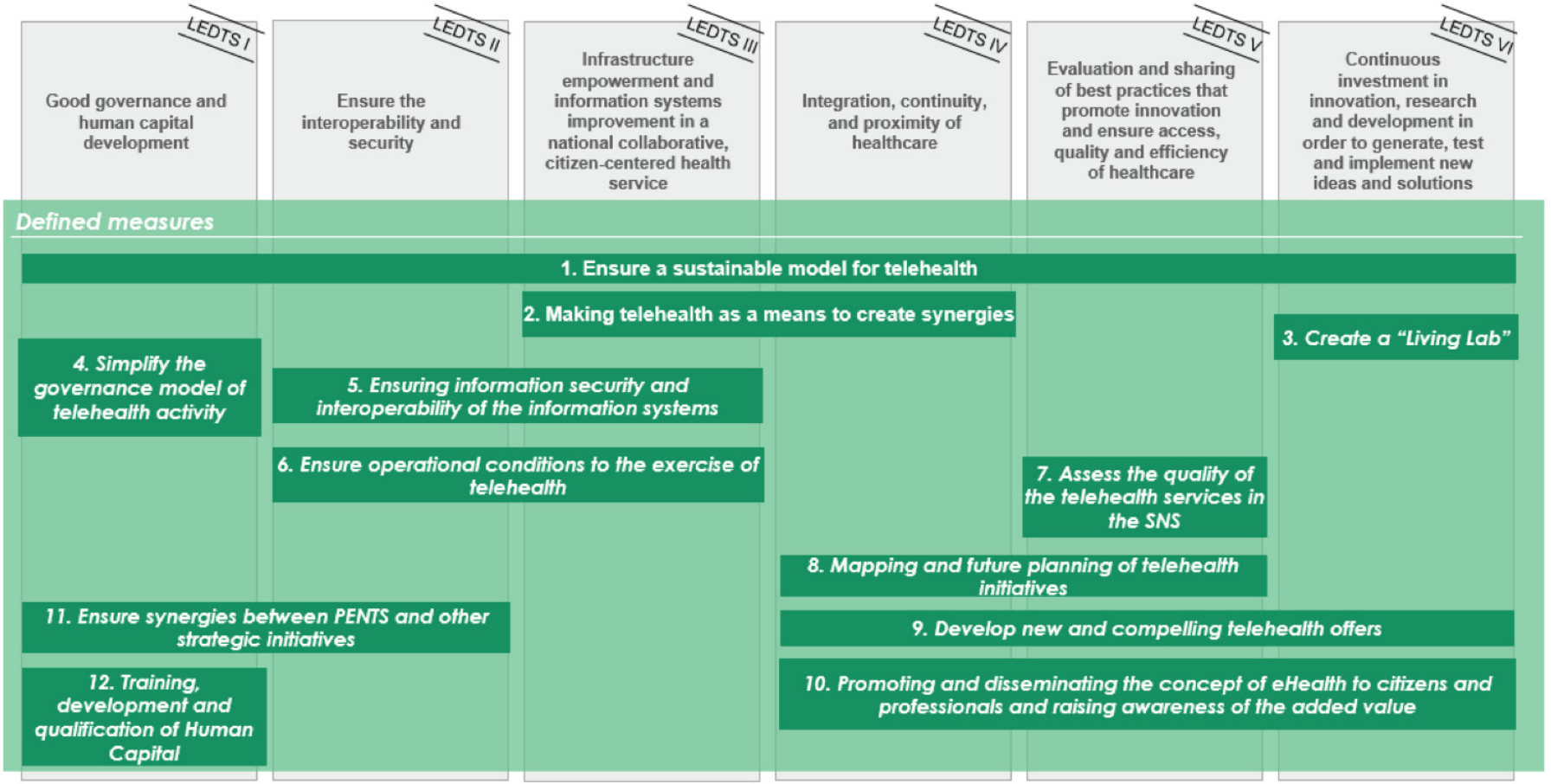
V. Evaluation and sharing of best practices that promote innovation and ensure access, quality and efficiency of health care

VI. Continuos investment in innovation, research and development in order to generate, test and implement new ideas and solutions

Measures Definition

Based on the 6 LEDTS defined, 12 measures were developed for the PENTS. The following figure presents the mapping of the measures elaborated with the respective LEDTS.

Group of measurements with LEDTS



Below, it is presented for each measure developed, the respective future vision and the proposed activities to be operationalised in order to achieve a successful implementation.

MEASURE 1

ENSURE A SUSTAINABLE MODEL FOR TELEHEALTH

FUTURE VISION

Telehealth should be based on sustainable practices with added value to the citizen and the SNS (quality of health care, health and welfare gains, productivity improvments, among others)

START
2Q 2019

CONCLUSION
4Q 2021

ENTITIES INVOLVED

Ministry of Health (MS), Ministry of Education (ME), SPMS, DGS, ACSS, INFARMED, ARS, AMA, others

PROPOSED ACTIVITIES

- Identify in the health care reorganization process, to what extent telehealth has proven added value in order to improve access and equity in health
- Aggregate telehealth functionalities in the Citizen's Area (for example, contact with the family doctor, teleconsultations, among others) in order to provide an interface in the provision of care and citizen's empowerment in the self-management of their health
- Ensure that from a procedural point of view, the sourcing method for telehealth services is in line with contracting process of the hospitals
- Evaluate the use of the existing technologies (software and hardware) and devices (for example smartphones, smartTV, among others) on telehealth to the detriment of developing new ones, in order to reduce time-to-user - since it accelerates the development and compliance process with legal, procedural and technological requirements
- Develop and test cost-effectiveness models from the perspective of value-based health care (funding model for the health care provided based on the patients health and well-being results) in the telehealth areas (for example, telemonitoring, teledermatology, among others)
- Develop Business Cases in order to assess the economic viability and quantify health gains for citizens, efficiency and other conclusions of telehealth initiatives
- To include eHealth on academic higher education (for example, as a specific module on telehealth)

MEASURE 2

MAKING TELEHEALTH AS A MEANS TO CREATE SYNERGIES

FUTURE VISION

Telehealth as a link of synergies in the communication and integration of care.

START
2Q 2019

CONCLUSION
2Q 2020

ENTITIES INVOLVED

MS; SPMS; ARS; Public Health Care Providers (PCSP); Social Security (SS); Associations of Pharmacies; Parish Councils; Universities; Research Institutes; Start-Ups; others

PROPOSED ACTIVITIES

- Enhance the networking of health professionals, namely in the activities of the Network fot the Tomotion of Telehealth, constituted by the Regional Coordinators and Internal Promoters of Telehealth
- Create greater proximity to formal and informal caregivers in order to recognize, value and understand their needs, promoting the growing importance of their role in the SNS (in homes and family environment)
- Estimate potential development needs of existing technologies in order to support the integration of care at the level of multidisciplinary and multiprofessional consultations
- Evaluate alliances that enhance better access to health care because of their proximity (for example, pharmacies, parish councils, among others)
- Identify partnerships that, through their ability to innovate/ develop new solutions in the field of telehealth (for example universities, IT companies, among others) can impove the access, quality and equity of the SNS

MEASURE 3

CREATE A "*LIVING* LAB"

FUTURE VISION

Continuous creation of knowledge through the analysis and treatment of the data generated and adding value to the system (for example health gains, efficiency, among others)

START
2Q 2019

CONCLUSION
4Q 2020

ENTITIES INVOLVED

MS; SPMS; Universities; Research Institutes, Start-Ups; Private entities in the area of research and technology; Foundations; Others

PROPOSED ACTIVITIES

- Define the objectives of the Living Lab in order to generate progress in knowledge
- Identify the team profiles needed to develop Living Lab activities (for example Researcher, Data & Analytics, among others)
- Evaluate potential partnerships with institutions (for example the SPMS Training Academy, Foundations, Start-Ups, Healthcare Providers, Companies, etc) that have innovative tele-health services and/or products that demonstrate the capacity to develop them
- Optimize and monitor existing SNS24 clinical algorithms
- Develop new analytical models (algorithms) that simplify obsolete or complex procedures, as well as improve the quality and efficiency of the services provided.

MEASURE 4

SIMPLIFY THE GOVERNANCE MODEL OF TELEHEALTH ACTIVITY

FUTURE VISION

A simple, functional and effective governance model that guarantees the creation of value in line with the defined strategy.

START
2Q 2020

CONCLUSION
1Q 2021

ENTITIES INVOLVED
MS; SPMS; Outros

PROPOSED ACTIVITIES

- Simplify the Governance Model of the telehealth activity from the decision-making autonomy point of view as well as for the targeting and monitoring of telehealth initiatives
- To increase the information sharing among the different institutions of the SNS, in terms of the management and operationalization of digital transformation processes.

MEASURE 5

ENSURING INFORMATION SECURITY AND INTEROPERABILITY OF THE INFORMATION SYSTEMS

FUTURE VISION

The complementary and articulated use of the information systems, both in terms of technology and semantics

START
4Q 2019

CONCLUSION
4Q 2020

ENTITIES INVOLVED

MS; SPMS; AMA; Others

PROPOSED ACTIVITIES

- Identify the needs and requirements at the level of the TIC infrastructures that allow greater interoperability of systems in the area of telehealth, as well as a cost-benefit analysis if the changes suggested to support management decision-making
- Promote the adoption of common terminologies and codes (for example SNOMED)
- Evaluate the use of international standards (for example ISO 13131 and/or interoperability standards (for example DICOM)
- Ensure information security mechanisms and user data

MEASURE 6

ENSURE OPERATIONAL CONDITIONS TO THE EXERCISE OF TELEHEALTH

FUTURE VISION

Health professionals trained with: Processes; Legal framework; Adequate (easily accessible) telehealth equipment, including network and infrastructure

START
1Q 2020

CONCLUSION
3Q 2020

ENTITIES INVOLVED

MS; SPMS; DGS; ARS; OM; OE; Others

PROPOSED ACTIVITIES

- Identify the existing needs of health professionals in order to enable them to fully perform their duties in the field of telehealth.
- To define requirements for videoconferencing and message exchange systems that support the practice of telehealth in the SNS in order to allow interactions between citizens and health professionals
- Replace the current teleconsultation tool with video call by a new one that meets the identified requirements
- Legislative review of gaps identified by the legal area - civil liability, data protection, information systems and informed consent in terms of medical acts
- Define specific schedules - health professionals duty roles - for the exercise of telehealth in health units

MEASURE 7

ASSESS THE QUALITY OF THE TELEHEALTH SERVICES IN THE SNS

FUTURE VISION

Improvement of the Telehealth services in the SNS through their inclusion in the quality assessment cycle

START
4Q 2019

CONCLUSION
4Q 2020

ENTITIES INVOLVED

MS; SPMS; ACSS; DGS, ARS; Others

PROPOSED ACTIVITIES

- Define metrics and indicators to support the creation of a scorecard to monitor and evaluate the performance of telehealth services and that works as support for strategic decision making.
- Allocate to the CNTS and its network of regional coordinators and internal promoters of telehealth the responsability for monitoring local, regional and national initiatives based on the respective indicators
- Publish and disseminate periodic evaluation reports

MEASURE 8

MAPPING AND FUTURE PLANNING OF TELEHEALTH INITIATIVES

FUTURE VISION

An integrated vision of telehealth initiatives in the SNS, a more structured planning of the initiatives and monitored implementation.

START
3Q 2019

CONCLUSION
3Q 2020

ENTITIES INVOLVED
MS; SPMS; ARS; PCSP; Others

PROPOSED ACTIVITIES

- Map, plan and prioritize telehealth initiatives that are good practices and with scalability and replicability.
- To carry out a continuous monitoring of the process of insertion of telehealth practices at national level in order to ensure the quality from the very beginning
- Develop a set of technical files per pathology and areas of practice (eg Cardiology, Physical Rehabilitation, Case Management, among others) that systematize the case study and its success factors, results and benefits and plan

MEASURE 9

DEVELOP NEW AND COMPELLING TELEHEALTH OFFERS

FUTURE VISION

A nationwide telehealth services offer, providing better access to health care and greater efficiency of the system.

START
2Q 2020

CONCLUSION
4Q 2022

ENTITIES INVOLVED

MS; SPMS; ARS; PCSP; Others

PROPOSED ACTIVITIES

- Develop new service lines in SNS24 at the level of telecare, integrated and in complementarity with face-to-face services
- Evaluate the extension of the SNS24 Contact Center's scope to the provision of specializes medical services in order to complement and strengthen the support network for Primary Health Care (CSP) and, therefore, the citizen.

MEASURE 10

PROMOTING AND DISSEMINATING THE CONCEPT OF THE eHEALTH TO CITIZENS AND PROFESSIONALS AND RAISING AWARENESS OF THE ADDED VALUE

FUTURE VISION

Citizens and professionals understanding that telehealth is a tool to integrate into care, which allows to increase and facilitate access to health care increase the efficiency of the SNS.

START
4Q 2019

CONCLUSION
4Q 2022

ENTITIES INVOLVED

MS; Finance Ministry (FM); SPMS; ACSS; Universities; PCSP; Others

PROPOSED ACTIVITIES

- Produce digital content (e.g. communication on social networks, periodic newsletter) to promote telehealth
- Streamline the National Telehealth Network by promoting the benefits of eHealth and by stimulating the sharing of information and networking among hospitals, health centers and other health care providers
- Promote debates and reflection on the legal/ regulatory context that involves eHealth and telehealth in particular.
- Include primary and continuing health care in the policies of incentives for the adoption of telehealth

MEASURE 11

ENSURE SYNERGIES BETWEEN PENTS AND OTHER STRATEGIC INITIATIVES

FUTURE VISION

PENTS implementation articulated with the other strategic initiatives of the govermmental structures

START
1Q 2019

CONCLUSION
4Q 2022

ENTITIES INVOLVED
MS; SPMS; Outros

PROPOSED ACTIVITIES

- Monitor and support the PENTS implementation and other strategic initiatives (e.g. Electronic Health Record - REF and LIVE), through project execution control, monitoring, communication, among others
- Manage and implement actions in the area of telehealth through the stimulation of the CNTS action plans with other governance structures

MEASURE 12

TRAINING, DEVELOPMENT AND QUALIFICATION OF HUMAN CAPITAL

FUTURE VISION

To stimulate the continuous improvement and the capture/retention of human capital in the area of telehealth, through heavily interesting in training, development and qualification of health professionals.

START
3Q 2019

CONCLUSION
4Q 2022

ENTITIES INVOLVED

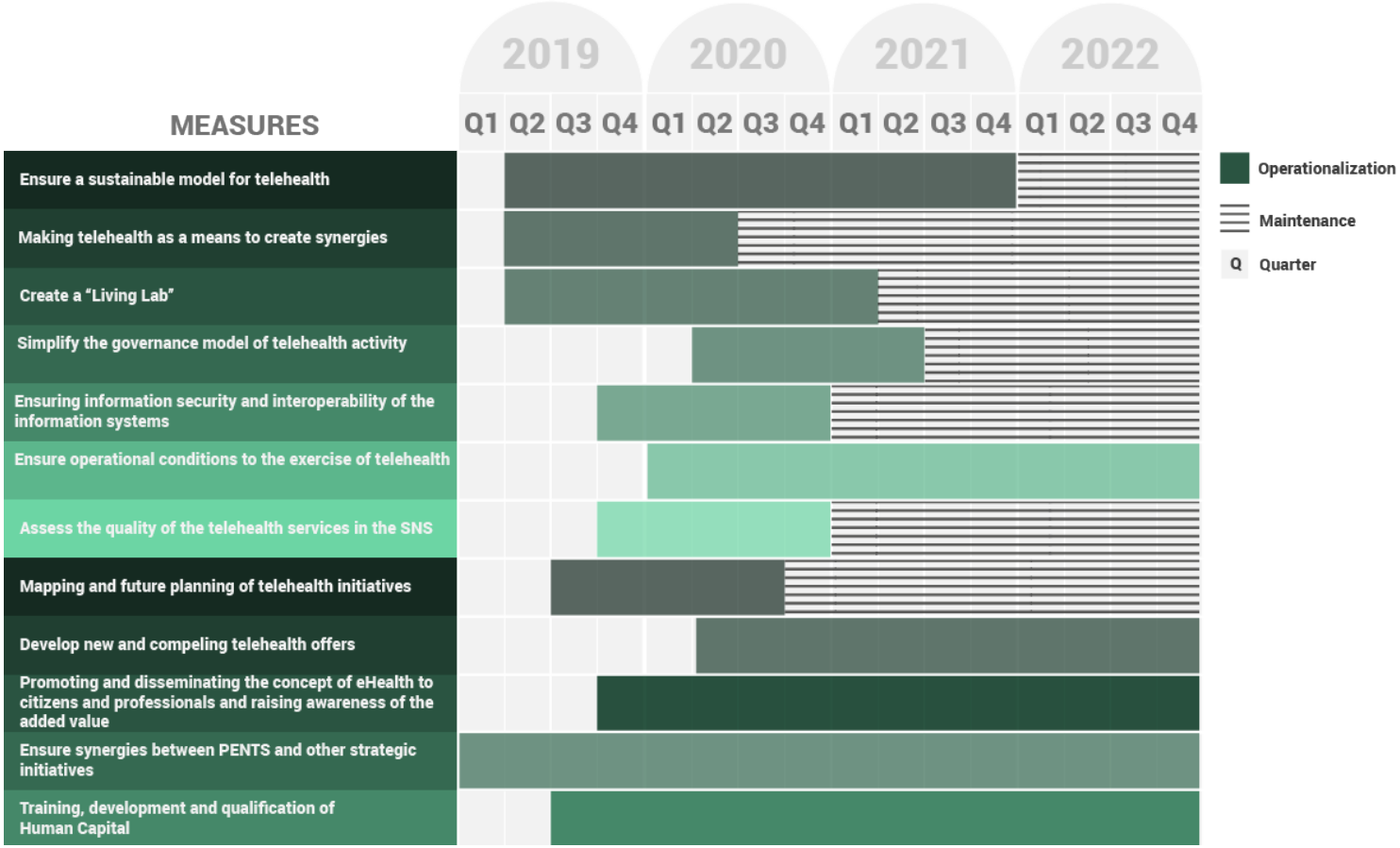
SPMS; ARS; Public Health Care Providers (PHCP); Others

PROPOSED ACTIVITIES

- Identify training needs to develop skills in telehealth
- Create a regular and structured training offer for the development and qualification of Health Professionals, Patients Associations, among other agents
- Encourage continuous improvement programs, organizational culture and learning, community of practices and knowledge management

Roadmap Strategy

It is considered the following plan for the operationalisation of the activities proposed:



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