digital health & health data *strategy*

GOVERNMENT OF MALTA
MINISTRY FOR HEALTH
AND ACTIVE AGEING

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FOREWORD

Hon Jo Etienne Abela

Minister for Health & Active Ageing

The launch of Malta's first Digital Health and Health Data Strategy marks a pivotal moment in our nation's healthcare journey. This forward-looking strategy establishes a transformative framework for a patient-centred, digitally enabled and data-driven health system; one that is designed to deliver more equitable, efficient and innovative care for the Maltese population in the years ahead.

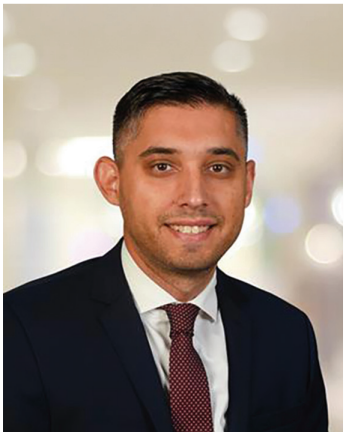
Digital transformation in health has evolved from a distant aspiration to a clear and essential priority. The COVID-19 pandemic underscored the vital role of digital technologies in safeguarding continuity of care, enhancing public health responsiveness, and empowering individuals to take a more active role in managing their health. Building on those lessons, this strategy sets out to outline a clear and comprehensive vision to embed digital innovation across every dimension of Malta's healthcare system.

As Malta's first national strategy dedicated entirely to digital health and health data, this strategy reflects a broader governmental commitment to progress and modernisation across all areas of society. While we continue to advance efforts to foster innovation, reduce disparities, and strengthen public services in an increasingly digital age, the transformation of healthcare requires its own focused and strategic direction. This framework provides that guidance, steering future investment and reform, and positioning digital health as a central pillar of our national health agenda. Through this lens, we aim to deliver care that is more connected, inclusive, and resilient for all.

At the core of this digital transformation is a commitment to people. As technology continues to reshape the way healthcare is delivered, it is essential that individuals are empowered with the skills and confidence to engage meaningfully with digital tools. Promoting digital health literacy is not merely a technical consideration, it ensures that everyone can benefit from the opportunities digital health affords. This transformation is equally about equipping healthcare professionals with the capabilities to deliver care more effectively, and about fostering a culture of trust, collaboration, and innovation that places human experience at the centre of progress. In this spirit, artificial intelligence is poised to play a transformative role, enhancing diagnostics, personalising treatment, and optimising care delivery through data-driven insights and precision tools.

As we embark on this digital transformation journey, we do so with a vision and a shared responsibility. I invite all stakeholders to join us in realising the full potential of digital health for a healthier, more connected nation.

CALL TO ACTION



Mr Euchar Sultana

Chief Information Officer

A well-designed digital health ecosystem has the potential to improve healthcare access, efficiency, and quality for all. By investing in digital tools and better use of health data, we can create a system that supports patients, healthcare professionals, policymakers and health researchers alike, while ensuring that equity and security remain at the forefront of this transformation.

Health data is a critical enabler of better decision-making, improved patient care, and more effective public health interventions. Secure, interoperable, and high-quality data allows for smarter resource allocation, real-time monitoring of health trends, and stronger responses to public health challenges. Ensuring that health data is governed responsibly, protected, and used ethically is fundamental to building trust in digital health solutions.

In an era where citizens, patients, and healthcare providers expect seamless digital services and secure, data-driven healthcare, we recognize the need to bridge gaps in accessibility, interoperability, and innovation. Our Digital Health and Health Data Strategy sets out a holistic roadmap to drive meaningful digital investments, ensuring that healthcare remains equitable, inclusive, and future-ready.

This strategy is not solely the responsibility of the Ministry for Health and Active Ageing, but a collective effort that depends on collaboration across the public and private sectors, academia, and civil society. Together, we can ensure that digital health solutions are not just technically advanced but also practical, ethical, and universally accessible.

As we move forward, we remain committed to a flexible and adaptive approach, acknowledging that emerging technologies, evolving healthcare needs, and regulatory developments will shape our journey. This document lays the foundation for a digitally enabled healthcare system that works for everyone. We invite you to be part of this transformation and collaborate with us in shaping the future of digital health in Malta and beyond.

PURPOSE AND AIMS

This strategy sets the direction that the Ministry for Health and Active Ageing is taking **to further leverage technology and digital tools to achieve its healthcare goals** and objectives, as identified in the National Health Systems Strategy 2023-2033 and other strategies. It also aligns with the National Digital Strategy and other relevant policy documents, showing the path that Government is taking to adapt to the ever-changing digital landscape and take advantage of the opportunities presented by advances in technology.

Strategy to further leverage technology and digital tools to achieve its healthcare goals

The strategy pursues the following high-level objectives:

1

Increased patient engagement

Digital tools empower patients to take an active role in managing their own health by giving them access to their own health information, enabling them to track their progress, allowing them to give feedback and suggestions, and providing them with access to health services that can be provided online and tools for better communication with their healthcare providers.

2

Improved healthcare delivery

Access to accurate, comprehensive and up-to-date patient information helps healthcare providers deliver more efficient and effective care, monitor patient progress more closely, identify potential health risks earlier, and provide more personalised care. This leads to better diagnosis and treatment decisions, improved patient outcomes, and reduced healthcare costs.

3

Enhanced research

Digital tools facilitate the collection and analysis of a large volume of health data, which can be studied to identify health trends and patterns, develop new treatments and therapies, and inform public health policy.

4

Improved data security and privacy

Patient data must always be secured and protected from unauthorised access or use; this is essential for maintaining patient trust and confidence in the healthcare system.

5

Improved solution resilience

Implementation of solutions that are highly available, secure, and scalable will meet future needs and improve availability; implementation of disaster recovery strategies protects systems that are critical for the delivery of patient care.

6

Reduced total cost of ownership

Implementation of common systems for functionality that spans across public healthcare providers reduces the total costs of acquisition, operation, personnel and integration.

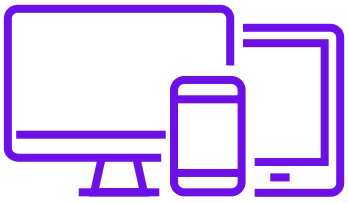
This strategy converts these high-level objectives into concrete actions that address the specific needs of citizens, patients, and health professionals. It pursues the critical objective of further enabling patient-centred care, with a particular focus on achieving tight system integration and continuity of care across the whole healthcare ecosystem, especially by reducing fragmentation of patient records. It also looks at public health needs and the way in which anonymised data may be used to achieve advances in medicine and healthcare. It defines the essential ingredients for interoperability between healthcare IT systems, which is crucial to reduce fragmentation of patient records. It describes essential governance structures and important enablers for successful and secure digital transformation and presents the opportunities that digital health provides for radical innovation of healthcare.

BACKGROUND AND GOALS

There has never been a more pressing and exciting time for health to embrace and harness innovation and new technologies. In December 2022, the Ministry for Health launched the National Health Systems Strategy (NHSS) for Malta 2023-2033[1]. This policy document continues to build on the strategic direction being pursued by the Maltese Government to ensure that health features as a key priority across all national policies and sectors, with the core objectives being to improve population health and wellbeing, improve the individual patient care experience, improve value in healthcare, and to strengthen and support the health workforce. An additional priority area in this strategy relates to incorporating digital health into innovation, technology, and research for better health.

This Digital Health and Health Data Strategy sets the direction for the continued and enhanced application of digital technologies across the national healthcare ecosystem for the years up to 2030. It aims to put data at the heart of digital health. It also acts as a facilitator for further investment in digital health as established by the NHSS for Malta 2023-2033 and the National Digital Strategy 2022-2027[2] which calls for a holistic, digital transformation journey for our country and recognises the importance of focusing on specific thematic areas which utilise digital technologies as an enabler, including the health sector. Furthermore, Malta's Smart Specialisation Strategy 2021-2027[3] highlights how the health sector continues to be an area of strong research and innovation potential for Malta, with "Digital Tools to Support Healthcare, focusing on e-Health and Bioinformatics" being prioritised as one of the niche areas of focus within the strategy.

The COVID-19 pandemic showed that health systems need to respond to the changing environment in which they operate and be well positioned to exploit the opportunities which new technologies and new paradigms present. Despite much effort, prior to the pandemic, there was much unrealised potential for digital health across the whole of Europe. The pandemic, however, brought with it unique challenges whilst also creating an immediate necessity for the use of digital health tools in the context of the rapid development at the time. Digital health tools were utilised to respond to the pandemic in five principal areas: supporting communication and information; monitoring and surveillance; testing and diagnosis; supporting the provision of health services; and rollout of vaccination programmes.



Policy action in regulation, financial mechanisms, provision of training to develop competencies on the use of digital health tools, and technical infrastructure investment have been vital in supporting and facilitating the adoption of digital health. Active strategies are now required to promote greater use of digital health[4]. A number of initiatives at the European level, such as the European Health Data Space[5], and the EU4Health programme[6], are further supporting the progress that has been made so far. This is the context in which this Digital Health and Health Data Strategy has been developed.

This strategy identifies priority goals in seven thematic areas:

7 thematic areas

- **Enabling citizens and patients to take increased ownership of their health with the support of digital solutions.**
- **Improving digital tools for health service providers in the public and private sectors.**
- **Connecting health service providers to achieve greater continuity of care.**
- **Enabling digital transformation of public health for improved efficiency and effectiveness.**
- **Investing in digital health for innovation.**
- **Promoting interoperability and ensuring data security in healthcare services.**
- **Strengthening governance in the digital health ecosystem.**

For these goals to be achieved, the right environment for investment, development and implementation has to be in place. The success of this strategy depends on key enablers related to legislation, digital health and health data literacy[7] of citizens and health professionals, development of highly skilled digital health professionals, having an adequate human capital for digital health development, upgrading and expansion of technical infrastructure, and the development and monitoring of key performance indicators to ensure that the direction of this strategy is pursued.

SITUATIONAL ANALYSIS

This strategy was drawn up after taking into account the interests of a wide range of stakeholders. Strengths, weaknesses, opportunities, and threats in the local digital health ecosystem were analysed, and a gap analysis was carried out, to identify where we are now and where we want to go and want to achieve with the strategy. Emerging factors, such as the EU Digital Decade policy programme[8], were also considered, and the roles of digital health and health data literacy were recognised.

Stakeholder Analysis

The following stakeholders play a role in facing and overcoming challenges and taking up opportunities in the digital health ecosystem:

There has been ongoing engagement with these stakeholders over the years, and the formulation of the National Health Systems Strategy provided a further opportunity for focused interaction.

Analysis of Strengths, Weaknesses, Opportunities and Threats

A SWOT analysis was carried out on the digitalisation potential of Malta's health ecosystem to identify strengths, weaknesses, opportunities, and threats which may impact the adoption and implementation of the actions set out in this strategy.

STRENGTHS

- In the last 20 years there has been a significant wave of Health IT system implementation, especially in the public sector
- Malta is a European leader in the provision of digital services, ranking 6th in the Digital Economy and Society Index (DESI) report[9] (2022) and 1st in the 2023 eGovernment benchmark[10]
- Strategies related to digital health are already in place, allowing for important synergies and alignment; these include the National Health Systems Strategy 2023-2033 and the National Digital Strategy 2022-2027

WEAKNESSES

- There is a relative lack of digital health literacy, i.e. literacy on the specific use of digital health tools, among health professionals and the general public
- There is fragmentation and lack of interoperability in Health IT system implementation across both public and private sectors
- Some specific aspects of digital health service delivery, for example, telemedicine services, are not sufficiently regulated yet

THREATS

- There may be resistance or inability to adopt digital health tools among persons with low digital health literacy
- There is a lack of specialised digital health professionals, limiting the rate at which health service digitalisation can be scaled up
- There is little human resource dedicated to digital health activities in relation to the size of the health economy
- There is an ever-present risk of data breaches and cyberattack

OPPORTUNITIES

- The COVID-19 pandemic prompted the urgent adoption of digital health tools in several areas and increased the appetite for further digital transformation in health service delivery
- Many patients and members of the general public are keen to be digitally empowered
- Health IT systems that have worked well in relative isolation can be integrated to achieve more comprehensive and safer data sharing, as well as greater continuity, efficiency and quality of care
- There are many EU initiatives supporting the use of digital technology in health, including the EU4Health[6], Digital Europe[11] and Horizon Europe[12] programmes

GAP ANALYSIS

This strategy aims to address gaps in the current Maltese digital health ecosystem that were identified following assessment of how digital technologies are presently being implemented in healthcare locally and the opportunities that lie ahead. The current practices were assessed in comparison to what is being proposed and implemented in other European countries and also what is being recommended as best practice at EU level. As a result, the strategic priorities presented in this document align with those at the European level and are congruent with the general trends observed in digital health strategies of other countries.

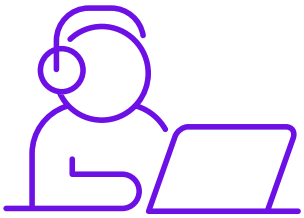
Common themes were observed in most strategies; these included a focus on governance, security, interoperability, innovation, stakeholder participation, accelerated deployment of digital core functions, and deployment of digital platforms. A greater emphasis was placed on integrating humanistic values into digital processes, enabling individuals to manage their own data, and maximizing inclusivity and accessibility for users. A number of challenges were also identified, particularly when it comes to encouraging citizen participation in digital implementation, implementing semantic and technical standards at a high level to facilitate data exchange, updating and enforcing existing legislation and regulations, and ensuring a more responsible and sustainable digital health system.

Countries in the European region showcased their different priorities for digital technology in healthcare via the wide range of action points presented in their digital health strategies. The context within which these are presented need to be taken into consideration, however some worthwhile considerations included the use of digital solutions to assess patient outcomes and experiences to improve the quality of services provided and ensure patient safety, reducing fragmentation of services such as by providing a centralised contact centre to provide comprehensive information to citizens, development of a user-oriented digital platform where citizens can access services, health-related information, and public health alerts, using mobile apps for identification and authentication processes, and visibility of access audit logs of health data.

Digital Decade Indicator for Digital Health

The ongoing EU Digital Decade policy programme[8] is a comprehensive framework which will help guide Europe's digital transformation and will empower citizens and businesses when it comes to all aspects of technology and innovation. One of the targets of this programme is the digitalisation of public services, including ensuring that all citizens have access to online health records. The first thematic area of the Digital Health and Health Data Strategy focuses on enabling citizens and patients to take increased ownership and control over their health with the support of digital solutions, in line with this key Digital Decade target. The National eSkills Strategy 2022-2025[13] reinforces the commitment towards this target, highlighting the importance of all members of society having the relevant digital skills to reap the benefits of participating fully in a global digital society.

Digital Health Literacy



Digitalisation is transforming our health systems and the way we acquire and share knowledge about health and illnesses. The internet has become a quick and inexpensive source of health-related information; however, knowledge derived from poor quality information and misinformation can cause harm to individuals. To this effect, access to and use of quality online information have become major public health priorities, with a growing responsibility of health authorities to tackle misinformation.

Digital health literacy is not the same as being digitally literate. It combines aspects of health literacy and digital literacy. With the increasing number of foreign residents in Malta, there needs to be specific focus on different cultures and attitudes to digital aspects of health services.

Data from the Eurobarometer on digital health literacy carried out in 2014 showed that 72% of European citizens had used the internet to search for health-related information in the 12 months prior. Among Maltese citizens, less than half (49%) reported using the internet for health purposes. The main reasons given for not searching for health-related information on the internet were not knowing where or how to look on the internet (28%) and not needing to do so (28%)[14].

Research in 2020 showed that women, younger individuals, and those with one or more long-standing illness(es) were more likely to use the internet for this purpose[15].

A Eurobarometer survey in 2021 showed that the majority of EU citizens perceive the future use of the internet and digital tools in a positive way. Around eight in ten European citizens feel that such tools will be important in their daily lives by 2030, despite concerns on cyber-attacks and cybercrime, safety and well-being of children in an online environment, and the use of personal data and information by companies or public administrations in around half of respondents. Such findings were similar among the Maltese citizens[16]. Further local research into digital health literacy and the use of digital health tools in our communities is encouraged to inform the way forward.

THEMATIC AREAS

Enabling citizens and patients to take increased ownership of their health with the support of digital solutions.

Improving digital tools for health service providers in the public and private sectors.

Connecting health service providers to achieve greater continuity of care.

Enabling digital transformation of public health for improved efficiency and effectiveness.

Investing in digital health for innovation.

Promoting interoperability and ensuring data security in healthcare services.

Strengthening governance in the digital health ecosystem.

Digital health tools for citizens and patients

ENABLING CITIZENS AND PATIENTS TO TAKE INCREASED OWNERSHIP OF THEIR HEALTH WITH THE SUPPORT OF DIGITAL SOLUTIONS

This thematic area focuses on the needs of citizens and patients. The myHealth portal has already been used by more than 200,000 Maltese residents and is a prime target for further development. Another key area is that of ePrescribing and eDispensing, given that most prescribing in the private sector is still paper based. The legal framework needs to be adapted to allow for this. Telemedicine and remote patient monitoring, especially of non-communicable diseases, will continue to be important growth areas.

ACTION 1: Develop the myHealth portal further into a comprehensive portal for interaction of citizens and patients with health services

Citizens will have more control over their personal health data, gain online access to more of their healthcare providers and interact with health services more easily

The national patient portal, myHealth, provides citizens and patients with secure online access to part of their personal health data, especially data generated by Government health services. The usage of the myHealth portal tripled during the COVID pandemic. Research indicates that citizens are keen to increase their online engagement with health services through this portal and wish to have a single and comprehensive patient-centric portal for all online interaction with Government health services and for access to their personal health data, both Government and private. The myHealth portal is evolving into the user interface for the National Electronic Health Records (NEHR) platform, which will host personal health data that needs to be shared among both public and private service providers. A comprehensive Product Roadmap has been developed to take the myHealth portal in these directions. This envisages that integration will be established with more data sources, in both in Government and private sectors. A Personal Health Records component will be implemented, allowing users to upload copies of their medical records and to contribute with their own data. Access will be enabled for all citizens (including children, elderly and disabled) through enhancement of the existing proxy facilities, in line with a key Europe Digital Decade target for 2030[17] . The consent model within myHealth will be widened to include linking with health professionals other than doctors, and the ability to allow access to a wider range of public and private healthcare providers. Users will also be given the facility to monitor who is contributing to their medical records. Chatbot functionality will be introduced, and the portal will be linked to other health websites to guide users to relevant health information, for example on the management of chronic health conditions and for promotion of health through provision of domain-specific information, such as on mental health, sexual health and prevention of non-communicable disease.

ACTION 2: Establish a national ePrescribing and eDispensing platform for use by both public and private health service providers.

ePrescription services already exist for medicines provided through the Pharmacy of your Choice (POYC) scheme. The use of computer-generated prescriptions within the Pharmacy of your Choice scheme has been long established, and the system became paperless during the COVID pandemic. After consultation with stakeholders in pharmacy services, these services will be widened to encompass all prescriptions for ambulatory patients, including those generated at the point of hospital discharge and those issued by private providers in the community and dispensed at retail pharmacies.

The establishment of a national ePrescribing and eDispensing platform, with access to a national catalogue of medical products, will be an important step forward in the digitalisation of the healthcare ecosystem.

Patients will have a faster and more efficient way to access a wider range of medicines, while the risk of medication errors will be minimised

ACTION 3: Expand the Government telemedicine service

Telemedicine services in Malta developed rapidly during the COVID-19 pandemic. A Primary HealthCare Telemedicine Centre was set up by Government, staffed by family doctors and specialist trainees. Virtual medical consultations became the everyday norm, mediated by a responsive Client Support Centre. These services will be sustained and enhanced in the coming years through a suite of digital services as an essential component of Government's primary care services.

Benefits of telemedicine to citizens and patients include cutting down on waiting time in health clinics, while virtual visits will be easier to fit into one's busy schedule. Furthermore, telemedicine offers health care providers with an opportunity to pre-screen patients for potential contagious diseases and enables triaging and appropriate referral of patients.

The delivery of telemedicine services in both the public and private sectors will be regulated through specific legislation.

More patients will be able to consult health professionals through simple video calls without travelling to health clinics. This saves them time and money, does not overburden health clinics unnecessarily, and reduces pollution generated by traffic

ACTION 4: Increase Government's Remote Patient Monitoring services across the community

The Remote Patient Monitoring programme piloted by the Government during the past years will be expanded further. The experience gained from this programme will support the development of wider public services for close monitoring of patients in the community, both by family doctors and by hospital specialists, using remote sensing devices, wearables, trackers, and other home-based measuring equipment. These are of particular benefit to elderly persons and those with mobility impairment, who often find it difficult and tiring to attend hospital-based outpatient consultations and can thus be monitored from the comfort of their own home.

In addition, remote sensing devices can also be used to advance research and prevention of healthcare to help in lowering cases of obesity and better management of chronic health conditions such as diabetes, amongst others. The increased application of Internet of Things (IoT) technologies to such use cases promises to make a real difference in the lives of people.

As for telemedicine, the delivery of remote patient monitoring services in both the public and private sectors will be regulated through specific legislation.

More patients will gain access to technology that allows their healthcare providers to monitor their health without the need to leave home

IMPROVING DIGITAL TOOLS FOR HEALTH SERVICE PROVIDERS IN THE PUBLIC AND PRIVATE SECTORS

This thematic area focuses on the needs of health professionals and organisations that provide health services. The provision of EPR functionality and linkage with the National Electronic Health Records is a key goal. In specific sectors, specialised functionality will be pursued and digital health tools will be improved.

Health professionals will be able to capture better records and share them with other professionals for the provision of seamless health services to their patients

ACTION 5: Provide all health professionals in Government health services with access to Electronic Patient Record (EPR) functionality

It is envisaged that all health professionals in Government health services will be provided with access to fully-fledged EPR functionality that matches the professionals' specialty, allowing them to capture and store detailed clinical records securely and in a way that is interoperable with the National Electronic Health Records platform.

Such functionality has already been implemented in Primary HealthCare and at SAMOC (Oncology and Haematology Centre). The aim is to ensure that all Government hospitals, including Mount Carmel Hospital, will transition into the use of Electronic Patient Records covering all medical specialties, including mental health and rehabilitation medicine. This action will lead to improvement in the quality of medical records and promote continuity of patient care.

Health professionals will have a wider range of up-to-date clinical information systems

ACTION 6: Create or enhance domain-specific systems needed to achieve a comprehensive portfolio of clinical information systems in the public sector

Gap analysis has revealed a number of information systems that need to be added, enhanced or replaced in the Government's portfolio of clinical information systems. These include a new Operating Theatre Management System at Mater Dei Hospital, and an enhanced Vaccination Registration System in Primary HealthCare.

Other systems under review are the core systems implemented in 2007 at Mater Dei Hospital and other Government hospitals and health centres (Laboratory Information System, Radiology Information System, Picture Archiving & Communication System, Order Communications System). Work on these systems will be prioritised during the term of this strategy.

ACTION 7: Introduce process management to facilitate electronic data submission

A consistent approach towards process management will be implemented to standardise as far as possible the submission of data through online forms, with alignment of user interfaces and underlying data models. This will facilitate access for health professionals in both public and private sectors to services outside their own healthcare provision area.

This includes referrals between healthcare organisations, investigation requests and specialist referrals. By facilitating electronic data submission in this regard, the process of transfer of care, such as referrals, will be made easier for both the healthcare provider and the patient.

Health professionals will have easier ways to capture and submit clinical data through online forms

ACTION 8: Create access to National Electronic Health Records (NEHR) for authorised health professionals and health service providers

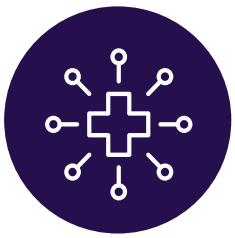
Doctors and other health professionals, such as pharmacists, will be given access through one or more clinical portals which will, after checking their identity, level of authorisation, and professional relationship with patients, provide them with access to the relevant parts of the National Electronic Health Records platform, both to view existing data about their patients and to add new records about them.

During the term of this strategy, the role of existing clinical portals, including the myHealth portal and the Mater Dei Hospital Patient Dashboard, will be reviewed to ensure alignment and prevent duplication.

Health professionals will gain access to more comprehensive information about their patients

CONNECTING HEALTH SERVICE PROVIDERS TO ACHIEVE GREATER CONTINUITY OF CARE

This thematic area focuses on bringing health data together from all parts of the Maltese health ecosystem in support of continuity of care, even cross-border, which in turn engenders greater quality and efficiency of care.



The government's National Electronic Health Records platform will improve continuity of care across the whole Maltese healthcare ecosystem

ACTION 9: Enable the two-way exchange of personal health data between public and private providers via the National Electronic Health Records platform.

The National Electronic Health Records (NEHR) platform has been designed to enable the exchange of data amongst all authorised health service providers, public and private, and collect essential personal health data in a single data repository, ensuring that continuity of care can be provided to Maltese citizens and residents, whichever healthcare provider they encounter. Core data categories in NEHRs include: Allergies & Alerts; Health Conditions; Procedures; Medications; Lab Results; Medical Image Reports; and Vaccinations.

An early action will be the migration of existing repositories of personal health data to the NEHR platform. Interfaces will be created to enable standards-based two-way exchange of data with EPR systems in both primary care (Health Centres and private family doctors) and secondary care (public and private hospitals).

A unique identifier for every person in contact with health services allows better linkage of records with improvement in care; more accurate reporting, review and analysis of health services; and reduction in administrative costs

ACTION 10: Ensure that all Maltese residents and visitors are provided with a unique identifier in health documentation.

Comprehensive and consistent identity provision for all Maltese residents and visitors using health services will be a crucial element for the success of linkage of health records through the NEHR platform and hence the achievement of greater continuity, quality, and efficiency of healthcare across the Maltese health ecosystem. Important lessons were learnt during the COVID-19 pandemic about the importance of efficiently identifying every single person who comes in contact with health services, even if briefly.

The practical implementation of the Government's new Person Register and the emergence of new electronic forms of national and cross-border identification, authentication and authorisation created the opportunity for the development of an enterprise-level Patient Master Index for efficient yet secure management of person demographics and contact details in the context of health service delivery. The development of this Electronic Patient Master Index (EPMI) is critical to ensure consistency and accuracy of the information on patients, including demographic data registered across the public healthcare sector.

The EPMI integrates with all the administrative and health information systems to aggregate patient data and applies the 'once only' principle for data to be updated across the public healthcare sector only once. The EPMI must ensure data integrity, security, and reliability across the public healthcare sector.

ACTION 11: Expand the scope of Malta's cross-border eHealth services

In 2019, Malta became one of the first EU Member States to successfully implement cross-border eHealth services. The myHealth@EU[18] services aim to support continuity of care when Maltese (and other EU) citizens travel in EU countries. If the need for healthcare arises while the traveller is in another EU country, health professionals in that country can retrieve essential health data from the Maltese digital health infrastructure.

Cross-border eHealth services will increasingly facilitate access to safe and high-quality care for Maltese citizens travelling in other EU countries

So far, the exchange of Patient Summaries has been implemented. This strategy aims for implementation of the following exchanges: Original Clinical Documents; ePrescriptions; Hospital Discharge Reports; Laboratory Test Results; Medical Imaging Reports; and upscaling of the Patient Summary to fully cover Rare Diseases. Malta will be an active participant in digital health components of the EU4Health programme[19].

ACTION 12: Strengthen Malta's participation in European Reference Networks and similar EU level platforms.

The European Reference Networks (ERNs)[20], launched by the European Commission in 2017, have progressed well and have proven to be important for cross-border exchange of health data, with centres of clinical excellence, on specific patients, such as those affected by rare and complex diseases. ERNs are virtual networks involving healthcare providers across Europe. They are not directly accessible to individual patients, but with patients' consent, their health information may be referred to the relevant ERN member, who may engage in discussion on diagnosis and treatment of rare and complex diseases or conditions that require highly specialised treatment with other members in the network. Consultations are carried out through a dedicated EU-level IT platform, the Clinical Patient Management System (CPMS); data protection is covered by EU and national legislation.

Thus, ERNs facilitate the exchange of information and sharing of knowledge and expertise across the EU and offer the potential of

Participation in European Reference Networks is particularly important for small populations like Malta whereby rare diseases are uncommonly encountered and their management most often requires discussion within multi-disciplinary teams, both locally and on the international level

mobility of knowledge rather than mobility of patients to seek and access treatment elsewhere. Apart from facilitating knowledge exchange, ERNs promote research, development of registries, and training abroad for healthcare professionals.

Similar platforms, requiring connectivity between Malta and other centres and/or European hubs, will increase in number, and the Maltese health system will need to cater for them. One such example is the Genomic Data Infrastructure (GDI)[21], which is connected to the European 1+Million Genomes initiative, in which Malta is already a participant. Other emerging possibilities are the EU Network of Comprehensive Cancer Centres[22] and Networks of Expertise in various cancer related themes. These are currently being developed in two separate and already active Joint Actions (CraNE[23] and JANE[24]). Through these networks, Malta may interconnect with platforms that will be established for the sharing of data, that may include clinical information of patients between hospitals in different Member States.

ACTION 13: Expand the Health Data Exchange and connect it to the National Electronic Health Records Platform

The Health Data Exchange is the technical platform that ensures that personal health data repositories in different Electronic Patient Record systems can be effectively exchanged. Many bilateral data exchanges already take place between pairs of clinical, service support and administrative systems.

The implementation of two-way exchange of data between datastores and the National Electronic Health Records platform via the Health Data Exchange will reduce the number of interfaces required and achieve greater consistency, as well as increased efficiency in the process of presenting personal health data to patients and health professionals according to healthcare needs.

The components of the Health Data Exchange include an HL7 interface engine and a series of Application Programming Interfaces (API's), which provide a way for disparate applications to communicate with each other by defining how data should be transmitted between them. The impact of expansion of the Health Data Exchange is elaborated under Action 23.

A wider range of up-to-date clinical information systems for health professionals

Scientist interacting with Laboratory Technology at the Department of Pathology at Mater Dei Hospital

ENABLING DIGITAL TRANSFORMATION OF PUBLIC HEALTH FOR IMPROVED EFFICIENCY AND EFFECTIVENESS

This thematic area focuses on using health data to improve the health of the Maltese population as a whole, by pooling and analysing high quality data and applying it to public health interventions and research.

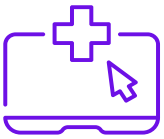
Widening the scope of public health registries will improve monitoring of patient needs and identification of health priorities, while also providing an opportunity for targeted health promotion and disease prevention interventions

ACTION 14: Widen the scope and role of Public Health Registries to include other elements of healthcare

In the past, public health registries have focused on collecting data on incidence and prevalence of specific diseases and health conditions, and the mortality caused by them, using a range of data sources. These are important; they will remain and be updated to ensure interoperability with clinical information systems and standardisation of the data collected. Most of them are curated by the Directorate of Health Information and Research (DHIR), e.g. Mortality Register, Cancer Register, Obstetrics Information System, Hospitals Information System, Congenital Anomalies Register, and Rare Diseases Register, among others.

The Infectious Diseases Prevention and Control Unit (IDCU) manages the collection of data on notifiable infectious diseases. A decision will be taken on the system to be used to notify and record these, to ensure consistency and improve efficiency and efficacy of the system. The IDCU also carries out syndromic surveillance of infectious disease, including severe acute respiratory tract infection (SARI). The IT capability for this surveillance needs to be developed. Automation can reduce the cost and staff needed for this.

It is envisaged that the scope of the registries managed by the Directorate for Health Information & Research will be widened to encompass other more health conditions (e.g. diabetes mellitus) and more elements of healthcare, such as risk factors, procedures, treatments, and medical devices, taking advantage of new technical facilities related to Geographic Information System (GIS) mapping, the Health Data Exchange and the National Electronic Health Records (NEHR) platform. These new technical facilities increase the potential for greater secondary use of personal health data and the further development of public health registries. In addition, concepts such as anonymised Open Data Sets will be further explored.



ACTION 15: Enable the greater use of anonymised personal health data in statistics, epidemiology, health service management, health economics and research

The secondary use of personal health data that was collected primarily for the treatment of individual patients has always played an important role in the generation of statistics about disease, the monitoring of epidemiological trends within populations, research on health services and their management, and the monitoring of health economic trends, as well as providing input for clinical research, ultimately enhancing health care experiences for citizens and supporting public health goals.

The development of a Health Data Warehouse is a key step towards the achievement of the benefits of secondary use of health data. The Directorate for Health Information & Research (DHIR) has long fulfilled the role of securely collecting identifiable personal health data and pseudonymising or anonymising it for secondary use, according to need. A Health Data Warehouse would form the basis for collation of data from various primary use data sources, including the NEHR platform, before further processing of identifiable data, where a legal basis exists for this (as in the case of infectious disease surveillance) or conversion to pseudonymised or anonymised data, according to the needs of secondary data users.

In line with the recently enacted European Health Data Space (EHDS) Regulation[5], the DHIR has been designated to fulfil the role of Health Data Access Body (HDAB) at national level, to issue data permits to persons or organisations that need to use anonymised personal health data.

The HDAB will interact with data holders, such as hospitals and health centres, to increase the range of data that can be made available to data users in the public and private sectors, first and foremost at national level but also eventually at EU level via a cross-border gateway.

Health data access bodies will improve access to health datasets for a wide range of stakeholders, leading to better healthcare delivery, and better research, innovation and policy making

The HealthData@EU infrastructure will facilitate the cross-border use of health data for secondary purposes like research, policy making, regulatory activities and innovation

ACTION 16: Equip the national Health Data Access Body with essential digital business capabilities

The European Health Data Space (EHDS) Regulation[5] envisages the designation of a 'national health data access body' (HDAB) to act as an intermediary between data holders and data users. In Malta, the Directorate for Health Information & Research (DHIR) within the Ministry for Health and Active Ageing, as the designated national HDAB, will be equipped with essential digital business capabilities, that will include a data access application management system (to handle requests for access to health datasets), a national health dataset catalogue (to describe what health data is available), a secure processing environment for personal health data (to ensure the integrity and protection of the data), and a cross-border digital gateway (to facilitate secondary use of health data across EU borders).

All will be needed for efficient, effective and secure secondary use of personal health data at both national and EU levels, working in close co-operation with other EU Member States. To this end, the DHIR will participate in specific EU level activities that will ensure the interoperability of HDABs across the EU by means of the emerging HealthData@EU infrastructure; this is a decentralised EU infrastructure composed of national contact points designated by EU Member States for secondary use of health data by certain EU institutions and bodies, certain research infrastructures, and (in some circumstances) third countries and international organisations.

ACTION 17: Establish a National Health Data Quality Unit

The effective use of personal health data for both primary and secondary use will depend on the achievement of high levels of data quality at every step in the processing of personal health data. This requires interventions such as the implementation of structured data capture within electronic patient records, the enforcement of health data standards (including the use of standard clinical terminologies and classifications), the efficient coding of specific data elements within health records, and the day-to-day governance of related activities. To this end, a National Health Data Quality Unit shall be established. The main aim of this unit will be to manage health data throughout its lifecycle and to create and maintain a robust health data infrastructure.

Better monitoring of public health

INVESTING IN DIGITAL HEALTH FOR INNOVATION

Digital health is characterised by rapid evolution and growth. This thematic area focuses on four specific areas of innovation which hold great potential for improvement in healthcare: artificial intelligence, robotics, predictive analytics and genomics.

ACTION 18: Use Artificial Intelligence and other emerging software tools for personalised care, in prevention services, and to optimise care

Artificial intelligence tools will be used in healthcare services to optimise the prevention, investigation and treatment of health conditions

Evidence shows that Artificial Intelligence (AI) improves the care of patients, from enhanced diagnostics and care planning, prevention measures, treatment, through to patient safety and risk management. It is anticipated that AI will feature prominently in many aspects of medical care and is the basis of increasing investment opportunities by many governments and companies. AI uses the aggregated data collected from data stores across the healthcare ecosystem to automate clinical and biomedical processes and to tailor make treatments and automate diagnosis with increasing precision[25]. In Malta, the first applications of AI are envisaged to be in medical imaging, to detect and grade lesions, and in the analysis of symptom data to identify possible diagnoses and offer triage information to guide patients to the most appropriate clinical pathway.

Malta is at the forefront of AI developments, having been ranked 33rd in the Global AI Index[26]. This ranking is based on the extent of investment, innovation and implementation of digital technologies across different sectors, including health. This is in part the result of the launch of Malta's AI Strategy in October 2019[27], which also placed a special focus on health. This strategy contends that "The increased availability of data and recent advancements in AI could present unprecedented opportunities in healthcare which create value for citizens, providers and regulators". It continues to claim that AI and its related disciplines such as "deep learning" and predictive analysis would transform medicine and provide the basis to improve care, gain greater efficiencies and improve performance across the board.

The national AI Strategy (2019) states that it seeks to prevent disease, optimise care for persons with chronic diseases and develop and apply precision therapies for complex illnesses. AI, like many other aspects of digital health, is intimately linked to a more radical innovative approach, whilst providing a paradigm shift towards greater value for care[28]. The AI Strategy is currently undergoing a re-alignment process which could potentially shift the existing health related targets[29].

ACTION 19: Expand the application of robotics in clinical care

Robotics is an important growth area in innovative digital health. Applications of robotics, such as robotic surgery for some specialties and robotic dispensing of drugs at hospital, have already been launched.

The existing services will be reviewed and a plan for their further development will be drawn up with the ultimate aim of streamlining clinical workflow and enhancing workplace and patient safety and care.

Using robotics in healthcare enables a high level of patient care, more efficient processes in clinical settings, and a safer environment for patients and healthcare workers

ACTION 20: Apply predictive analysis in healthcare for personalised care, early-warning systems, prevent unnecessary admissions, hospital scheduling, and equipment maintenance

Predictive analytics in healthcare uses historical data to generate predictive models, to personalise care to every individual. It is the prelude to widening the scope of personalised medicine and makes use of data mining, machine learning and Big Data analysis and AI. Predictive analysis also assists in predicting early signs of patient deterioration, to enable timely care; it assists in developing early warning systems using AI, preventing inappropriate hospital admissions, generating hospital scheduling systems, and maintaining equipment through automated preventative maintenance programmes. As an example, the University of Chicago Medical Center (UCMC) used real-time data to solve operating room delays that affected staff, patients, and families[30]. Malta is well placed to attract players developing tools in this regard, given its centralised healthcare system and consequent high population cover for health care records and registries, which are already coded in English.

ACTION 21: Collaborate with the University of Malta in areas of mutual interest, such as connection of genomic data with Electronic Patient Record data in support of precision medicine, tailored treatment, and safer prescribing

The field of genomics has progressed steadily in recent years. Genomic data is of increasing clinical relevance. The Government will seek collaboration with the University of Malta in areas of mutual interest, an important one of which is the connection of genomic data and electronic patient records.

Primarily, this should be for the benefit of the patients but it should also create more opportunities for academic research. Such collaboration is expected to attract international players in the field of precision medicine, with the benefits of tailored treatment and safer prescribing. This action cross-refers with others in this strategy, in particular Action 12.

Genomic data helps healthcare providers identify patients at risk of developing certain conditions and plan better treatment

PROMOTING INTEROPERABILITY AND ENSURING DATA SECURITY IN HEALTHCARE SERVICES

This thematic area emphasises the standards and architecture that need to be implemented to achieve the interoperability and security that are essential for the ecosystem-wide functionality envisaged in other parts of this strategy. It focuses on ensuring that standard IT infrastructure practices are in place to create a more seamless and secure platform for healthcare services.

The consistent application of health data standards improves patient outcomes by streamlining data exchange, reducing redundancy and rework, enabling better decision-making, and providing a stronger basis for clinical and health services research

ACTION 22: Define and apply standards for storage and sharing of health data

This strategy specifically defines the following as standards for health data storage and messaging in order to improve interoperability between health IT systems:

- Further introduction of use of the SNOMED CT as the reference clinical terminology[31] for appropriate use cases;
- Continued use of the WHO Family of International Classifications[32] for appropriate use cases;
- Continued use of HL7 v2 standards for data messaging[33] (where it is already in use);
- Continued use of HL7 CDA R2 (where it is already in use)
- Introduction of HL7 FHIR[34] standards for exchange of clinical data and documents[35];
- Implementation of Integrating the Healthcare Enterprise® (IHE) profiles, in particular the 27 IHE profiles endorsed by the European Commission, recognising them for referencing in public procurement throughout the EU[36], as they have the potential to increase interoperability of eHealth services and applications to the benefit of patients and the medical community.
- Use of OpenEHR archetypes[37] in the National Electronic Health Records platform.

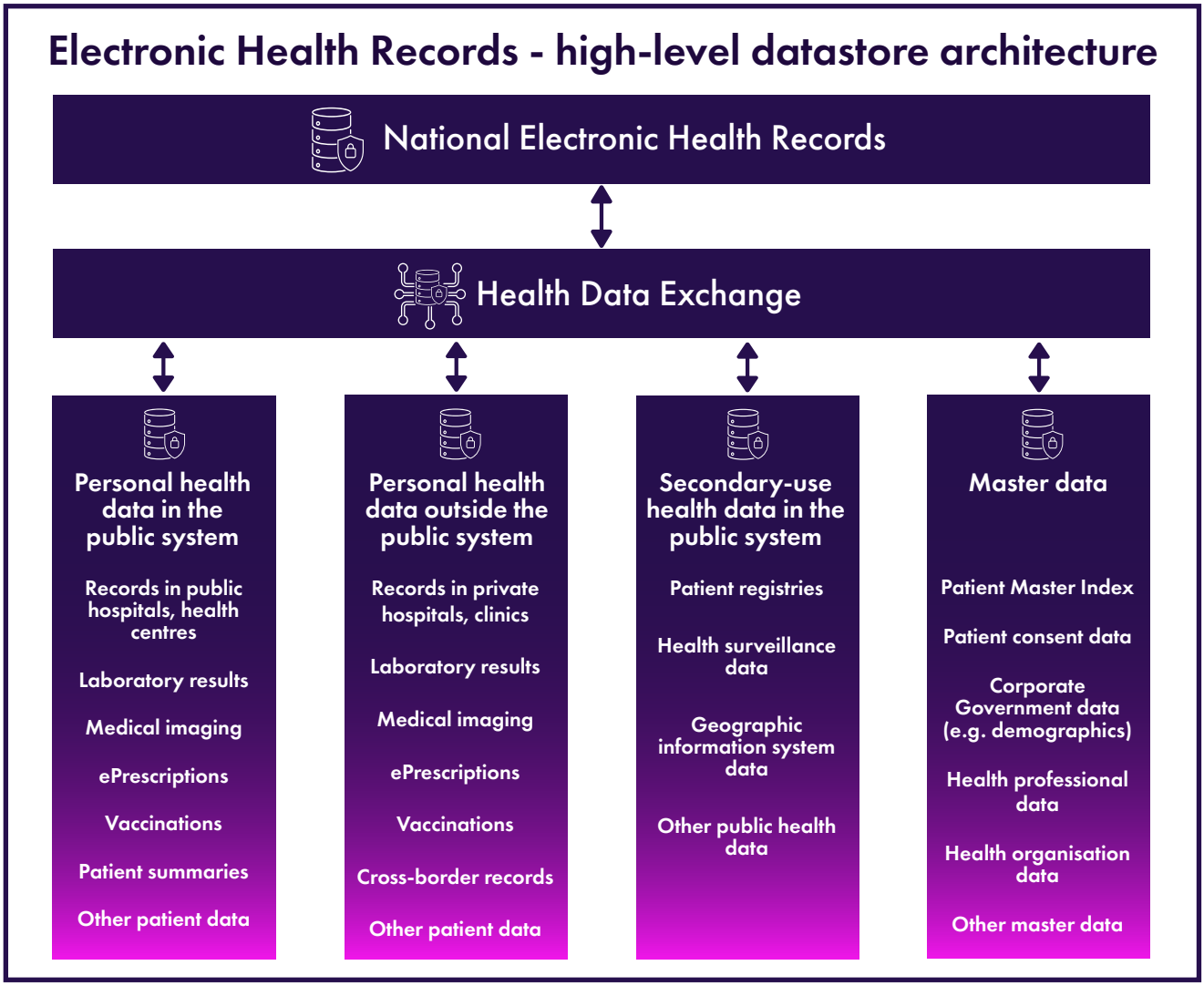
All these standards are to be designed into the Ministry for Health and Active Ageing's processes for the implementation and upgrading of clinical information systems, whether these are built or enhanced in-house or procured from the local or international IT market.

ACTION 23: Develop a corporate health data architecture for efficient data exchange

A corporate health data architecture will be developed to achieve greater efficiency in the exchange of data between different clinical and administrative IT systems across the healthcare sector. During the COVID-19 pandemic, the need was identified not only for real time capture of data but also for rapid and efficient data analysis, which depends greatly on a robust corporate data architecture.

In practice, this framework will outline the structure, storage, and retrieval of health-related data within the Maltese health ecosystem. It will encompass the design and implementation of systems, processes, and technologies that support the management of health data from various sources, including electronic health records and administrative data related to health service delivery. Such an architecture, that needs to be maintained and developed on an ongoing basis, will ensure that data is provided in a structured and consistent way to authorised health professionals for treatment of patients ("primary use"), while maintaining the confidentiality and privacy of individuals' health information. It will also provide a foundation for "secondary use" of personal health data, i.e. for disease surveillance, health promotion, epidemiology, health statistics, health service research and policy development.

The National Electronic Health Records platform plays an essential part in this corporate architecture (see Action 9). The schematic below illustrates how health datastores across the Maltese health ecosystem interact via the Health Data Exchange.



ACTION 24: Promote an integrated IT system architecture spanning the whole health service

At the technical level, it is envisaged that an integrated IT system architecture will span across the whole of the health service. This will bring together many of the interfacing and interoperability elements already described above. A standard three-tier approach is envisaged, with presentation, business logic and data layers.

A system architecture goes beyond a data architecture as it encompasses the health IT systems and their underlying processes. It is these processes that determine what interfaces are needed between systems. Clinical systems need to exchange data with corporate administrative systems on one hand and with biomedical devices on the other. Data captured in various systems may facilitate sharing of health data, even if "raw" personal health data is not stored within them.

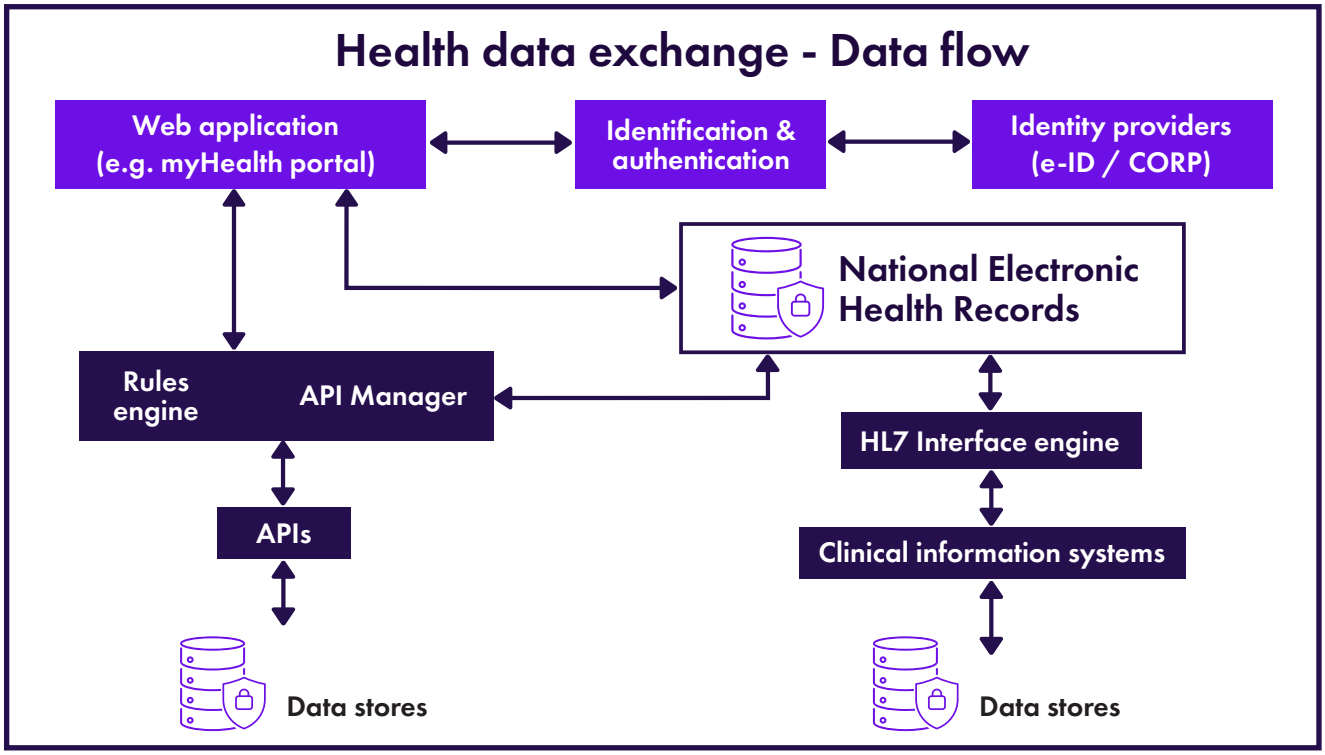
The schematic below illustrates in more detail how data will flow between datastores and the National Electronic Health Records, through components of the Health Data Exchange. These include an HL7 interface engine and a series of Application Programming Interfaces (APIs). APIs provide a way for disparate applications to communicate with each other by defining how data should be transmitted between them.

The schematic also indicates how web applications will exchange data with the datastores. Particularly important is the myHealth portal, which allows all citizens to gain access to their own personal health data. An API Manager allows myHealth and other web apps to access data on the basis of rules embedded in a Rules Engine.

ACTION 25: Sustain the security framework for prevention, detection, and response on all health IT systems

The security framework for prevention, detection, and response that has been established in the public sector for health information systems within the different digital health streams will be sustained. This will ensure that patient data is captured, processed, and stored securely, in line with the Government of Malta ICT (GMICT) policies and other relevant policies established in this domain.

Data security goes beyond technical measures. Accountability for health data should flow with the data. When accountability for data is assigned, each individual or institution endorses all related responsibilities, hence there is a cultural shift when this is fully acknowledged. While this is known, it takes time for everyone to understand the impact.



Security framework for all health IT systems

Technical personnel working at the MITA Data Centre at Mater Dei Hospital

STRENGTHENING GOVERNANCE IN THE DIGITAL HEALTH ECOSYSTEM

This thematic area looks at the organisational elements needed for the achievement of the objectives of this strategy, while demonstrating transparency and accountability for actions taken.

ACTION 26: Establish governing bodies to ensure strategy implementation

An essential element of this strategy is the establishment and functioning of the governing bodies needed to ensure its implementation.

A high-level Digital Health Steering Committee, known as **DigiComm**, has already been established under the chairmanship of the Chief Information Officer to oversee the digital health strategy and policy, take major decisions on financing and systems implementation, and enforce technical standards in systems and their interfaces. DigiComm will set up a **Technical Architecture Subcommittee** to advise it on technical and architectural aspects. The subcommittee will oversee the technical implementation of the systems envisaged under this strategy.

A new **Health Data Governance Board** will be formed under the chairmanship of the Director General Health Informatics and entrusted with policy making for corporate systems that enable sharing of personal health data, such as the National Electronic Heath Records platform, as well as consider data quality issues.

A National Digital Health Authority and a national Health Data Access Body will be officially designated as required by the European Health Data Space Regulation[5].

Other groups of a more technical or clinical nature will be established to manage the implementation of the information systems envisaged by this strategy.

ACTION 27: Set up a Digital Health Forum to improve interaction between stakeholders

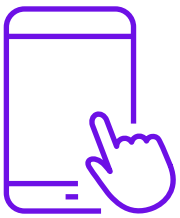
A Digital Health Forum will be set up to encourage interaction among Government, citizens, patients, health professionals and other stakeholders, including the University of Malta. The Forum will consider digital health in general as well as specific digital health services. This is in addition to continued wide-ranging consultation with key stakeholders, including private service providers and professional unions before the implementation of major digital health systems.

ACTION 28: Create a Digital Health Laboratory for collaboration and innovation in a sandbox environment.

A Digital Health Laboratory will be created to establish collaboration amongst the private and public stakeholders, non-governmental organisations and academia, in particular the University of Malta, to collaborate on innovative ideas in the early stages and pave way for the development of such solutions. A sandbox environment will be set up for this Laboratory, to serve as a safe space to test and learn more about new technologies within a mirrored, real-life environment.

Governance in the digital health ecosystem

ENABLERS FOR IMPLEMENTATION



Legal Framework

A robust and comprehensive legal framework is one of the principal enablers for successful delivery of the Actions described in this strategy.

The proposed National Electronic Health Record Regulations within the Public Health Care Act will provide the legal basis for the two-way flow of personal health data between the National Electronic Health Records platform and all its users, especially those in the private sector. This will ensure that each patient's history will be collated comprehensively, and the patient will be able to move safely within both the public and private healthcare systems.

The EU's European Health Data Space Regulation, which will apply directly to Malta without any transposition into national law, will have a profound impact on the further development of digital health services in Malta, as well as across the rest of the European Union, in respect of both primary and secondary use of health data.

Consideration will be given to whether these legal instruments need to be supplemented by a national Digital Health Act, to regulate specific aspects of digital health service delivery, such as telemedicine services. This includes the creation of a legal basis for reporting on a no-fault basis of incidents and near misses related to the use of digital health tools.

Compliance with other relevant EU legislation, such as the General Data Protection Regulation[38] and the second update of the Network and Information Security (NIS) Directive[39], will continue to influence the development and running of digital health services.

Ethical Principles

In June 2022, EU Member States formally signed up to four European Ethical Principles for Digital Health[40]:

1. Basing digital health on humanistic values
2. Enabling individuals to have access to and control over their digital health data
3. Ensuring that digital health is accessible to all
4. Implementing environmentally responsible digital health

These principles will be kept at the heart of further development of digital health services in Malta. One has to ensure that all patients are engaged, leaving no one behind such as migrants, people who are less tech-savvy, and elderly citizens. People who are not digitally literate cannot be left out or given less opportunities to access health services. People in lower socioeconomic groups and specific social groups need particular focus, as they risk being left behind.

Digital Health and Health Data Literacy

Successful uptake of digital health services depends to a great deal on the digital health and health data literacy of citizens and health professionals. Intersectoral collaboration between the Ministries responsible for health and education and the tertiary educational establishments in Malta will be promoted, with the aim of improving the digital literacy, data literacy and health literacy of all citizens, in support of greater citizen engagement and patient self-management through enhanced use of digital technologies, as well as to improve the digital skills of all health professionals.

Digital Health Professionals

The development of highly skilled digital health professionals is another key challenge that can be overcome through intersectoral collaboration. Academia has a leading role to play in this sphere; the challenge has already started to be addressed by the University of Malta through its Master of Science in Digital Health programme[41]. A role must be established within the Information Management Unit to engage consultants with experience, knowledge, and interest in digital health strategic and operational development. Such a role will assist the Chief Information Officer to further advance and accelerate digitalisation across the Government healthcare system. Within the Office of the Director General (Health Informatics), new roles of data scientists and data stewards will need to be created.

Human Capital for Digital Health Development

The speed at which the Actions described in this strategy are completed depends on many factors, the most important of which is the human capital devoted to the implementation of digital health. Apart from digital health professionals, human capital is needed for project management, service management and administration of national and EU funds.

Upgrading and Expansion of Technical Infrastructure

The digital facilities available within the public healthcare sector require constant upgrading and expansion to be able to accommodate the increasing digitalisation planned and required in several areas and especially those that are promoted for implementation by the different strategies connected or emanating from the National Health Systems Strategy 2023-2033.

Monitoring and Key Performance Indicators

One of the main objectives of the Digital Health Steering Committee (DigiComm) set up by the Ministry for Health and Active Ageing is to take ownership of this strategy, to consider and approve the actions needed to implement the strategy, and to monitor its implementation on an ongoing basis. The development and monitoring of key performance indicators for digital health will play an important part in ensuring that the direction established by this strategy is successfully pursued.

GLOSSARY

Application Programming Interface (API)

A set of defined rules that enable different applications to interact with each other, acting as an intermediary layer which processes data transfers between systems .

Artificial Intelligence (AI)

A field which combines computer science and robust datasets to enable problem-solving. It is concerned with building smart machines which can perform tasks that typically require human intelligence. It is increasingly becoming part of everyday life, for example through the development of smart assistants .

Clinical Information Systems (CIS)

CIS capture, store, process, and transfer information which facilitates clinical decision making. Such systems can import data from different instruments, such as vital signs monitors, ventilators, and infusion devices, store data safely, and display the data in specific tables and formats. A CIS may also interconnect with hospital sub-systems, for example laboratories, radiology, pharmacy, and different image processing storage solutions.

Digital public health:

1) A re-imagination of public health using new ways of working, blending established public health wisdom with new digital concepts and tools.
2) An asset to achieve existing public health goals.

Digitisation/Digitalisation/Digital transformation

Digitalisation of Public Health denotes the integration of digital technology into the operations of Public Health entities, whereas digitisation is a technical process whereby analogue data is converted to a digital format. On the other hand, digital transformation designates a cultural shift that pervasively integrates digital technologies and reorganises services on the basis of the health needs of the public.

- Digitisation is more of a technical process of converting analogue data to digital
- Digitisation is more of a technical process of converting analogue data to digital
- Digitalisation is the inclusion of technology in producing and delivering services. This is an organisatioal and cultural process that facilitates new ways of delivering health services. It supports, but does not change public health goals, and involves the ongoing establishment and maintenance of technology for health services.
- Digital transformation is a complex and multifaceted process. It is an ongoing process that involves a fundamental change in the culture and model of service delivery. It can be disruptive, requiring concerted effort as a meaningful integration of technology into health, and often extends beyond the health sector. It is very person-centred and can be considered a transition process.

Electronic Health Record (EHR)

A computer-assembled collection of health infomation about one person from a number of sources, linked by a unique person identifier. Ideally, it incorporates subsets of relevant data from all the electronic patient records known to exist for a patient, from birth to death, in summary form, to be used to achieve continuity of care throughout the healthcare ecosystem.

Electronic Patient Record (EPR)

Also known as electronic medical record (EMR). A patient record held in electronic form, whose data controller(s) or custodian(s) work within a single distinct healthcare organisation.

European Health Data Space Regulation (EHDS)

The EHDS Regulation aims to establish a common framework for the use and exchange of electronic health data across the EU. It enhances individuals' access to and control over their personal electronic health data, while also enabling certain data to be reused for public interest, policy support, and scientific research purposes. It fosters a health-specific data environment that supports a single market for digital health services and products. Additionally, the regulation establishes a harmonised legal and technical framework for electronic health record (EHR) systems, fostering interoperability, innovation, and the smooth functioning of the internal market.

Genomic data

The DNA data of an organism. They are used in bio-informatics for collecting, storing, and processing the genomes of living things.

Geographic Information Systems (GIS)

Computer-based tools used to store, visualise, analyse, and interpret geographic data (also called spatial or geospatial data). Geographic data include anything that can be associated with a location, or anything that can be mapped, and such data may be used for example for epidemiological purposes.

HL7 (Health Level Seven)

A set of international standards, formats, and definitions for exchanging, sharing, and retrieving electronic health information across different healthcare systems that supports clinical practice.

Internet of Things (IoT)

A distributed network connecting physical objects that are capable of sensing or acting on their environment and able to communicate with each other, other machines, or computers. Such 'smart' objects come in a wide range of sizes and capacities, including simple objects with embedded sensors, household appliances, industrial robots, cars, trains, and wearable objects such as watches, bracelets, or shirts. Their value lies in the vast quantities of data they can capture and their capacity for communication, supporting real-time control or data analysis that reveals new insights and prompts new actions.

Open Data Sets

Data sets which may be accessed, used, and shared by anyone. Open data becomes usable when made available in a common, machine-readable format.

Patient Master Index (PMI)

A database that maintains a definitive record of all patients within a healthcare system. Its purpose is to ensure that all patient data is accurately and consistently recorded and maintained, while preventing duplicate records or errors in patient identification, thus ensuring that each registered patient is represented in all IT systems only once. The PMI also facilitates the exchange of patient information between different healthcare providers.

Personal health record (PHR)

A collection of health-related information which is designed to be set up, accessed, and managed by the individuals themselves. The PHR provides a means by which patients can maintain and manage their health information in a private, secure, and confidential environment. This contrasts with electronic medical and health records which are usually maintained by the treating physician or hospital.

Remote patient monitoring (RPM)

A subset of telemedicine which involves the digital transfer of medical data from the comfort of the patient's own home to a healthcareprovider. Such medical data includes information on symptoms, objective physiological or disease-related data, as well as experience and outcomes measures. Remote patient monitoring improves patient engagement, management, and care and facilitates the provision of individualised patient care.

Telemedicine

The provision of healthcare services through the use of information and communication technology (ICT) in situations where the health professional and the patient (or two health professionals) are not in the same location. It involves the secure transmission of medical data and health information, through text, sound, images, or other forms needed for the prevention, diagnosis, treatment, and follow-up of patients.

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Still photo highlighting the Surgical Tools from a Robotic Surgery session at Mater Dei Hospital

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