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Global strategy on digital health 2020-2025

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The development of the global strategy on digital health underwent a two-year co-creation journey before its adoption at the Seventy-third World Health Assembly (WHA). The initial draft of the strategy document was drafted and disseminated for comments through an internal consultation in early 2019. An outline of scheduled consultations was then communicated to Member States at an information session held in Geneva in March 2019, followed by a global public consultation from March to May of the same year. Various consultations with Member States were held between June and October 2019, including a global consultation convened in Geneva and a series of discussions during the regional committee meetings.

The strategy was presented as part of the agenda item (EB146/26) in the Executive Board in February 2020. Having considered the report on the draft global strategy on digital health, the board decided to recommend an adoption of the document to the Seventy-third WHA. In responding to the recommendation by the Executive Board, the secretariat conducted another two rounds of Member States consultation in February and July 2020 to further refine the language in the strategy document.

Under the leadership of Soumya Swaminathan, Chief Scientist, and Bernardo Mariano, Director of Department of Digital Health and Innovation, Sameer Pujari and Yu Zhao oversaw the development, coordination and consultation of the strategy document. The technical coordination was provided by (In Alphabetical order) Housseynou Ba, Patricia Codyre, Marcelo D' Agostino, Jun Gao, Clayton Hamilton, Mark Landry, Ahmed Mandil, Mohamed Nour and Diana Zandi. Additional inputs were received from Flavio Aggio, Onyema Ajuebor, Virginia Arnold, Ayman Badr, Navneet Bahl, Maryam Bigdeli, Philippe Boucher, Marie-Charlotte Bouesseau, Craig Burgess, Kenneth Carswell, Giorgio Cometto, Valeria De Oliveira Cruz, Joan Dzenowagis, Gaya Gamhewage, Sebastian García Saisó, John Grove, Biswamber Gurubacharya, Celine Hazbun, Robert Jakob, Christopher Jones, Maki Kajiwara, Edward Kelley, Tarek Khorshed, Hans Kluge, Rameshe Krishnamurthy, Veerabhadra Kuchimanchi, Aleksandra

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INTRODUCTION

In 2005 the World Health Assembly through its resolution WHA58.28 on eHealth urged Member States "to consider drawing up a long-term strategic plan for developing and implementing eHealth services… to develop the infrastructure for information and communication technologies for health…to promote equitable, affordable and universal access to their benefits." Countries and stakeholders were urged to direct their efforts towards creating a consistent eHealth vision in line with a country' s health priorities and resources, developing an action plan to deliver the proposed vision, and creating a framework for monitoring and evaluating eHealth implementation and progress. More than 120 Member States – including low- and middle-income countries – have developed such strategies and policies.

In 2013, the Health Assembly adopted resolution WHA66.24 on eHealth standardization and interoperability, which urged Member States "to consider developing … policies and legislative mechanisms linked to an overall national eHealth strategy".

Drawing on these resolutions and recognizing the need to strengthen digital health implementation, in May 2018 the Health Assembly adopted resolution WHA71.7 on digital health, in which it requested the Director-General "to develop … in close consultation with Member States and with inputs from relevant stakeholders … a global strategy on digital health, identifying priority areas including where WHO should focus its efforts". The strategy was developed through a consultative process launched in March 2019 that included discussions in online public forums, technical consultations, meetings of the WHO regional committees and the Executive Board at its 146th session[1]. The global strategy on digital health 2020–2025 was endorsed by the Seventy-third World Health Assembly in decision WHA73(28) (2020).

The global strategy on digital health builds on resolutions adopted by the United Nations General Assembly[2] and the World Health Assembly,[3] related WHO global and regional

1
See documents EB146/26 and EB146/REC/2, summary records of the thirteenth meeting, section 2.

2
United Nations General Assembly resolutions 73/218 (2019) and 70/125 (2016).

3
Resolutions WHA58.28 (2005), WHA66.24 (2013), WHA69.24 (2016) and WHA71.7 (2018); various resolutions of the regional committees include EM/RC53/R.10 (2006), AFR/RC56/R8 (2006), AFR/RC60/R3 (2010), CD51.R5 (2011), AFR/RC63/R5 (2013) and WPR/RC69/8 (2018).

reports,[4] regional strategies, the two-part report of the ISO Technical Committee on Health Informatics on eHealth architecture,[5] the resolution on ICD-11 and the WHO Family of international classifications and terminologies, the three-part National eHealth strategy toolkit,[6] Member States' current digital health situation and status, actions, strategies, policies and investments, and recommendations of various United Nations panels on digital and innovation topics.

4
WHO Regional Office for South-East Asia. Regional strategy for strengthening ehealth in the South-East Asia Region, WHO (2014-2020). Manila: Regional Office for South-East Asia; 2015 (https://apps.who.int/iris/handle/10665/160760); World Health Organization. Regional Office for Europe. From innovation to implementation: eHealth in the WHO European Region. Copenhagen: WHO Regional Office for Europe; 2016 (https://apps.who.int/iris/handle/10665/326317); PAHO. Strategy and plan of action on eHealth: final report. Document CD56/INF/17 (2018) (https://www.paho.org/hq/index.php?option=com_docman&view=download&-category_slug=56-directing-council-english-9964&alias=45846-cd56-inf-17-e-strategy-poa-ehealth-846&Itemid=270&lang=en, accessed 17 December 2019).

5
ISO. Part 1 - Health informatics: capacity-based eHealth architecture roadmap. Part 2 – architectural components and maturity model. TR 14639-1. Geneva: International Organization for Standardization; 2014.

6
WHO, ITU. National eHealth strategy toolkit. Geneva: World Health Organization and International Telecommunication Union; 2012 (https://apps.who.int/iris/handle/10665/75211) (https://apps.who.int/iris/handle/10665/752119, accessed 17 December 2019).

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DIGITAL TECHNOLOGIES – SHAPING THE FUTURE OF GLOBAL HEALTH

The 2030 Agenda for Sustainable Development[1] highlights that the spread of information and communications technology and global interconnectedness has great potential to accelerate human progress, to bridge the digital divide and to develop knowledge societies.

The outcome document of the high-level meeting of the United Nations General Assembly on the overall review of the implementation of the outcomes of the World Summit on Information Society (New York, 15–16 December 2015) highlighted the technology-enabled breakthroughs in government in the provision of health care, with greater numbers of people having access to services and data that might previously have been out of reach or unaffordable.[2] The participating ministers and heads of delegation committed themselves to harnessing the potential of information and communications technologies to achieve the 2030 Agenda for Sustainable Development, noting that they could accelerate progress across the health- related Sustainable Development Goals.

Stressing the critical role played by the private sector,[3] civil society and technical communities in information and communication technologies, the United Nations General Assembly in resolution 73/218 (2019) "encourages strengthened and continuing cooperation between and among stakeholders from both developed and developing countries", and encourages WHO, within its respective mandate and strategic plan, to contribute to the outcomes of the World Summit on the Information Society and emphasize the importance of allocating adequate resources in this regard.

With the recognition that information and communications technologies present new opportunities and challenges for the achievement of all 17 Sustainable Development Goals, there is a growing consensus in the global health community that the strategic and innovative use of digital and cutting-edge information and communications technologies will be an essential enabling factor towards ensuring that 1 billion more people benefit from universal

1 Adopted in United Nations General Assembly resolution 70/1 (2015).

2 United Nations General Assembly resolution 70/125 (2015).

3 Engagement with non State actors to follow resolution WHA 69.10 (2016), Framework of engagement with non-State actors.

health coverage, that 1 billion more people are better protected from health emergencies, and that 1 billion more people enjoy better health and well-being (WHO' s triple billion targets included in its Thirteenth General Programme of Work, 2019–2023).

Digital transformation of health care can be disruptive; however, technologies such as the Internet of things, virtual care, remote monitoring, artificial intelligence, big data analytics, blockchain, smart wearables, platforms, tools enabling data exchange and storage and tools enabling remote data capture and the exchange of data and sharing of relevant information across the health ecosystem creating a continuum of care have proven potential to enhance health outcomes by improving medical diagnosis, data-based treatment decisions, digital therapeutics, clinical trials, self-management of care and person-centred care as well as creating more evidence-based knowledge, skills and competence for professionals to support health care.

Despite the considerable progress made by some countries, many countries still require institutional support for the development and consolidation of national eHealth and/or digital health strategies and the implementation of their action plans, which usually requires more resources and capabilities. The global strategy on digital health will enhance and complement the work of existing and newly created digital health networks. The Health Assembly in resolution WHA71.7 also requested the Director-General to provide normative guidance in digital health, including "through the promotion of evidence-based digital health interventions". WHO subsequently issued its guideline with 10 evidence-based recommendations on digital interventions for health system strengthening.[4]

Digital health should be an integral part of health priorities and benefit people in a way that is ethical, safe, secure, reliable, equitable and sustainable. It should be developed with principles of transparency, accessibility, scalability, replicability, interoperability, privacy, security and confidentiality.

4 WHO guideline recommendations on digital interventions for health system strengthening: evidence and recommendations. Geneva: World Health Organization; 2019 (https://apps.who.int/iris/handle/10665/311980, accessed 17 December 2019).

Photo credit: WHO / Blink Media - Juliana Tan

VISION

The vision of the global strategy is to improve health for everyone, everywhere by accelerating the development and adoption of appropriate, accessible, affordable, scalable and sustainable person-centric digital health solutions to prevent, detect and respond to epidemics and pandemics, developing infrastructure and applications that enable countries to use health data to promote health and well-being, and to achieve the health-related Sustainable Development Goals and the triple billion targets of WHO' s Thirteenth General Programme of Work, 2019–2023.

Digital health will be valued and adopted if it: is accessible and supports equitable and universal access to quality health services; enhances the efficiency and sustainability of health systems in delivering quality, affordable and equitable care; and strengthens and scales up health promotion, disease prevention, diagnosis, management, rehabilitation and palliative care including before, during and after an epidemic or pandemic, in a system that respects the privacy and security of patient health information. The vision further seeks to enhance research and development, innovation and collaboration across sectors. It recognizes that digital health can radically change health outcomes if it is supported by sufficient investment in governance, institutional and workforce capacity to enable the changes in digital systems and data use training, planning, and management that are required as health systems and services are increasingly digitized. With this essential investment in people and processes, in line with national strategies that lay out a vision for the digitalization of the health sector, digital health can improve the efficiency and cost-effectiveness of care, allowing for new business models in the delivery of services.

The implementation of appropriate digital health technologies is a key component of a national strategy but may be difficult to accomplish especially in low- and middle-income countries. Exploring the potential of global solutions and shared services should be considered as part of the national health strategy of Member States, at the same time as generating evidence on the implications for access, cost, quality, safety and sustainability of applying these global solutions in health systems within vastly different country contexts.

PURPOSE

The purpose of this global strategy is to strengthen health systems through the application of digital health technologies for consumers, health professionals, health care providers and industry towards empowering patients and achieving the vision of health for all. The strategy is designed to be fit for purpose and for use by all Member States including those with limited access to digital technologies, goods and services. In the context of this global strategy, digital health is understood to mean "the field of knowledge and practice associated with the development and use of digital technologies to improve health". This definition encompasses eHealth, in line with that used in the report by the Director-General noted by the Executive Board.[1] Digital health expands the concept of eHealth to include digital consumers, with a wider range of smart and connected devices. It also encompasses other uses of digital technologies for health such as the Internet of Things, advanced computing, big data analytics, artificial intelligence including machine learning, and robotics.

The global digital strategy emphasizes that health data are to be classified as sensitive personal data, or personally identifiable information, that require a high safety and security standard. Therefore, it stresses the need for a strong legal and regulatory base to protect privacy, confidentiality, integrity and availability of data and the processing of personal health data, and to deal with cybersecurity, trust building, accountability and governance, ethics, equity, capacity building and literacy, ensuring that good quality data are collected and subsequently shared to support planning, commissioning and transformation of services. It is important to maintain transparency and effectively communicate about the data security strategies.

The global strategy aims to create a shared understanding among all Member States regarding the importance of digital health solutions, and an approach towards creating an interoperable digital health ecosystem which is to be understood as a digital interoperable information technology infrastructure that is primarily used by the health care community across all care settings, in particular by health

1 Document EB142/20 on mHealth, noted by the Executive Board at its 142nd session (see document EB142/2017/REC/2, summary records of thirteenth meeting, section 2), stated that "Today the term 'digital health' is often used as a broad umbrella term encompassing eHealth as well as developing areas such as the use of advanced computing sciences (in the fields of "big data", genomics and artificial intelligence, for example)".

care providers, health service providers and patients as well as by public health authorities, universities and research institutions. An interoperable digital health ecosystem should enable the seamless and secure exchange of health data by and between users, health care providers, health systems managers, and health data services. Health data are predominantly generated by and processed between health care providers and the health care community.

Sharing health data in the context of a person-centric digital health ecosystem and for the purpose of public interest should be encouraged with the patient' s consent, when undertaken in a manner that is built on trust, protects patient privacy, secures digital systems, and protects against malign or inappropriate use. Such sharing is vital as it can contribute to the enhancement of quality of processes, the outcomes of health services and the continuity of care for patients (primary use of health data). It may also lead to the building of a knowledge base, which should be able to interact with other data systems including for example data on social determinants of health and registries. The secondary use of health data is important to improve the quality of health care and research effectiveness. It could enable testing, validating and benchmarking artificial intelligence solutions and big data analyses across various parameters and settings, the continuity of care of patients (primary use of health data). It also leads to the building of a knowledge base, which should be able to interact with other data systems, registries, etc. The secondary use of health data with appropriate de-anonymization of datasets would enable ethically managed testing, validating and benchmarking artificial intelligence solutions and big data analyses across various parameters and settings.

The further work resulting from the global strategy of WHO as a normative institution will give guidance and orientation to the public policy makers in Member States for their populations and health care providers, the health care industry and manufacturers, investors and procurement authorities when it comes to digitalization in health care.

This global strategy sets out a vision, strategic objectives, a framework for action and implementation principles to advance digital health,

globally and within countries at national and subnational levels, that will contribute to building an internationally connected digital health system with consideration of potential risks. It aims to encourage international collaboration and to support countries in their national programmes towards improved health care service delivery, implementing national health strategies, promoting research and development and working towards achieving universal health coverage and the health-related Sustainable Development Goals.

The global strategy will lead to concrete actions and results within the time frame from 2020 to 2025.

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GUIDING PRINCIPLES

The four guiding principles aim to orient the global strategy towards the appropriate and sustainable adoption of digital health technologies within the context of national health sector and health strategies.

1 Acknowledge that institutionalization of digital health in the national health system requires a decision and commitment by countries

The global strategy acknowledges that each country owns its digital health action plan built on the strategy, within its own national context. Along their path towards the health-related Sustainable Development Goals, countries will adopt digital health in a way that is sustainable, respects their sovereignty, and best suits their culture and values, national health policy, vision, goals, health and well-being needs, and available resources.

2 Recognize that successful digital health initiatives require an integrated strategy

Digital technologies are an essential component and an enabler of sustainable health systems and universal health coverage. To realize their potential, digital health initiatives must be part of the wider health needs and the digital health ecosystem and guided by a robust strategy that integrates leadership, financial, organizational, human and technological resources and is used as the basis for a costed action plan which enables coordination among multiple stakeholders. These initiatives should be led through strong governance structures. The strategy should address an approach that will work across multiple health priorities underpinned by standards and an architecture that enables this integration.

Historical review shows that ill-coordinated or disjoined digital health initiatives lead to vertical or stand- alone information and communications technology solutions that, although well-intended, often result in information fragmentation and, consequently, poor delivery of services.

3

Promote the appropriate use of digital technologies for health

The global strategy promotes the appropriate use of digital technologies as digital public goods which are adaptable to different countries and contexts to help address key health system challenges to support equity in access to digital resources so that no one is left behind. It promotes the protection of people, populations, health care professionals and systems against misinformation and the misuse of information, malicious cyber activities, fraud and exploitation, inappropriate use of health data, racism and human rights violations within the framework established by international treaties binding the Member States.

The "digital determinants of health", such as literacy in information and communication technologies and access to equipment, broadband and the internet, become more important as digital health becomes more prevalent. The global strategy underscores the need to ground digital foundations within national strategies and emphasizes the need to work with different sectors and stakeholders at all levels.

The global strategy promotes syntactic and semantic interoperability with WHO norms and standards as a cornerstone of health information to enable sharing of information in a connected world.

The appropriate use of digital health takes the following dimensions into consideration: health promotion and disease prevention, patient safety, ethics, interoperability, intellectual property, data security (confidentiality, integrity, and availability), privacy, cost-effectiveness, patient engagement, and affordability. It should be people-centred, trust-based, evidence-based, effective, efficient, sustainable, inclusive, equitable and contextualized. The growing global challenge of digital waste on health and the environment must also be appropriately managed.

4

Recognize the urgent need to address the major impediments faced by least-developed countries implementing digital health technologies

There is a pressing need to invest in efforts to overcome the major impediments that developing countries face in engaging with and accessing new digital health technologies, such as an appropriate enabling environment, sufficient resources, infrastructure to support the digital transformation, education, human capacity, financial investment and internet connectivity, as well as issues related to legacy infrastructure, technology ownership, privacy, security, and adapting and implementing global standards and technology flows.

Photo credit: Getty Images / miriam-doerr

STRATEGIC OBJECTIVES

The four strategic objectives are intended to provide guidance and coordination on global digital health transformation and to strengthen synergies between initiatives and stakeholders to improve health outcomes and mitigate associated risks at all levels.

1 Promote global collaboration and advance the transfer of knowledge on digital health

This strategic objective aims to align countries and stakeholders to collectively act upon global opportunities to improve health and work towards universal health coverage, while meeting challenges, identifying and communicating risks, and focusing on threats associated with the use of digital technologies both to improve health and to enable universal health coverage, the core of the health-related Sustainable Development Goals. This objective encourages action on common opportunities and challenges that are relevant to all countries and stakeholders, regardless of their situation.

Maximize the impact of both new and existing collaborations and partnerships in the wider digital health ecosystem. Knowledge of and investments in digital health design and implementation are shared across domains; hence this strategic objective aims to maximize collaborations and partnerships with other agencies within the United Nations system, countries and other stakeholders and to help to build new ones.

Assess and promote the latest, appropriate and innovative health technologies. Pioneering health technologies are creating new and advanced health care services and solutions. This sub-objective helps to ensure that the quality and outcome of the new health technologies are assessed in order to enable their timely adoption and promotion. Norms, standards, policies and regulations are needed to ensure the investment, sustainability, quality, security and safety of both digital health products and cutting-edge health technologies that not only are used in health care but that may also be directly marketed to individuals. Global guidance, coordination

and implementation of tools are required for their adoption and integration into existing systems and services at the national level.

Policy options and actions

The following policy options and actions are proposed:

1) co-create the global strategy on digital health and establish mechanisms for strengthening national digital health strategies and implementing key collaborations on agreed-upon appropriate use of digital technologies to achieve national health and well-being goals;

2) establish a knowledge management approach to identify and share good practices, knowledge about implementation of new methods and techniques, evidence and lessons learned on digital health across countries and international communities;

3) support countries in establishing information centres for disease surveillance to manage and implement timely decisions during epidemics and other public health emergencies;

4) align countries and stakeholders to address collectively global, regional and national challenges and opportunities; identify, manage and communicate risks; and mitigate threats associated with the use of digital technologies to improve health and enable universal health coverage, the core of the health- related Sustainable Development Goals.

Outputs

The following outputs are envisaged:

1) digital health is prioritized and integrated into health systems at global, regional and national levels through dedicated bodies and mechanisms for governance;

2) multistakeholder groups are convened on a regular basis to support the appropriate use and scaling up of digital health and innovation in order to accelerate progress towards the health-related Sustainable Development Goals;

3) information centres for disease surveillance are established or strengthened at national, regional and global levels.

2 Advance the implementation of national digital health strategies

Strategic objective 2 aims to stimulate and support every country to own, adapt and strengthen its strategy on digital health in a way that best suits its vision, national context, health situation and trends, available resources and core values.

Strategic objective 2 encourages the development of a national strategy on digital health through an all- inclusive multistakeholder approach including actors collaborating within communities of practice and with consideration to the following core components: (1) leadership and governance; (2) investment and operations; (3) services and applications for scaling up (4) integration and sustainability, while (5) standards and interoperability are respected; (6) a flexible digital infrastructure; (7) an adaptable health workforce and (8) legislation, ethics policies and compliance; and (9) a people-centred approach. These should all be developed while the necessary alignment of country stakeholders is ensured in order that the needs and expectations with given resources be met.

The strategic objective aims to develop cross-sectoral partnerships at national level to align resources and investments to ensure the sustainability and growth of digital health. The objective also seeks to work with existing digital health partnerships to advance global digital health efforts. Developing national partnerships for the sustainability of digital health advances would accelerate their adoption by Member States.

Although each country is expected to review or develop and own its strategy from inception to implementation, this strategic objective aims to build human and institutional capacity for the safe and appropriate use and scale-up of digital health by strengthening the commitment and systematic engagement of all stakeholders in every country. The objective underpins the promotion of innovative integration of digital technologies into health systems.

To strengthen health systems by introducing digital technologies, a key objective is to find ways to build capacity and create a digitally-capable health workforce. Needs will vary from country to country, but they often include basic capacities, such as leadership and governance, and the development of a skilled health and technological workforce.

Policy options and actions

The following policy options and actions are proposed:

1) stimulate and support every country to adopt or review, own, and strengthen its national digital health strategy in a way that enhances the level of country maturity regarding digital health to achieve positive health outcomes in line with the national health plans, updated norms and standards recommendations, and universal health coverage;

2) ensure that institutions, decision-makers and personnel involved in the provision of health care services and all end-user communities and beneficiary populations are adequately engaged in the design and development phases;

3) facilitate a systematic engagement of all relevant stakeholders in the realization of the vision and its strategic objectives as part of an integrated digital health ecosystem at the national level;

4) define a national digital health architecture blueprint or road map, adopt open-source health data standards and aim for reusable systems or assets including interoperability of health information systems both at national and international levels in order to establish an innovative integration of different digital technologies using shared services, ensuring data are of good and comparable quality;

5) adopt legal and ethical frameworks for assuring patient safety, data security, appropriate use and ownership of health data, privacy data recoverability, as well as protection of intellectual property rights;

6) identify and promote sustainable financing models in support of digital health development and sharing of learning to inform future products and services. This is especially important in artificial intelligence including machine learning, implementation, integration and maintenance, including economic incentives; and

7) design, implement and monitor a change management plan, to support conducive organizational behaviour surrounding newly digitized health processes and practices.

Outputs

The following outputs are envisaged:

1) a national digital health strategy or equivalent strategic framework exists, is integrated in the national health strategy and is actively used to guide development and accelerate progress towards the health-related targets of the Sustainable Development Goals and in the context of digital transformation of health systems; and

2) a dynamic digital health maturity model assessment to guide prioritization of national investment in digital health is made in support of primary health care and universal health coverage.

3 Strengthen governance for digital health at global, regional and national levels

This strategic objective focuses on strengthening the governance of digital health at national and international levels through the creation of sustainable and robust governance structures and building the capacity for digital health at global and national levels. Governance for digital health aims to strengthen the capabilities and skills needed for countries to promote, innovate and scale up digital health technologies.

The strategic objective promotes standards for safety, security, privacy, interoperability, and the ethical use of data within and outside the health sector. Actions to strengthen governance

should include defining principles and reaching cross-sectoral and international agreements for data sharing, quality and accuracy of health data and prioritization of investment plans and policy. It should also include principles for the ethical use of health data in technologies such as artificial intelligence and big data analytics.

It also aims to improve measurement and monitoring of and research on the application of digital health in the health sector. The research agenda should meet the need to improve and disseminate evidence and information on the use of digital health at all levels. Research on and evaluation of digital health outcomes and impact are essential to support its safe implementation, to establish and promote accountability and to justify the financial investment. The agenda should also address the need to stimulate the development and testing of technologies, methods and infrastructures that overcome obstacles to the application of digital health to health priorities. This agenda is closely linked to capacity-building of research teams and the improvement and sharing of methods and data analytics.

Policy options and actions

The following policy options and actions are proposed:

1) strengthen governance of digital health at national and international levels by leveraging existing structures and as appropriate creating sustainable and robust governance structures, including regulatory frameworks, and the capacity for the implementation of evidence-based and proven digital health solutions at global and national levels;

2) coordinate investments in evidence-based approaches to assess promote and disseminate new and innovative health technologies for national scaled digital health programmes using a person-centred approach to facilitate actions and investments based on informed decisions;

3) promote and facilitate digital health competencies in the education and training curricula of all health professionals and allied workers; and

4) promote capacity-building for leaders of public health authorities, affiliated agencies and policy-makers to take informed decisions to support digital health investments.

Outputs

The following outputs are envisaged:

1) governance exists, in accordance with Secretariat-led development of regulatory framework, to agree on global appropriate use of health data and on concepts such as health data as a global public good and to outline principles of equitable data-sharing principles for research, consistent metadata and definitions, artificial intelligence and data analytics, and primary and secondary use of data;

2) a voluntary guideline on global interoperability standards for digital health is developed in collaboration with stakeholders and adopted, that a) tries to build upon results already broadly achieved, b) includes a list of commonly agreed use cases for the public health care sector, its functional requirements and a set of functional and technical specifications, standards, semantics and profiles derived thereof, c) defines requirements for a sound legal and regulatory framework with clearly defined roles for data governance and d) encompasses political leadership regarding public investment, procurement and standardization to create an interoperable digital health ecosystem at the national and international levels;

3) global guidance on planning, development and use of digital hospitals, digital clinical trials and digital therapeutics is developed; and

4) a set of recommendations is developed for pseudonymization and anonymization of health data.

4

Advocate people-centred health systems that are enabled by digital health

This strategic objective advances digital health literacy, gender equality and women' s empowerment and inclusive approaches to adoption and management of digital health technologies.

The strategic objective places people at the centre of digital health through the adoption and use of digital health technologies in scaling up and strengthening health service delivery. The individual is an essential component in the delivery of trust-based, people-centred care. This focus covers not only patients, families and communities but also the health workers who need to be prepared to deploy or use digital health technologies in their work. Planning for capacity-building includes workforce assessment, ranging from professionals in information and communication technologies to health workers providing care services. Being intrinsically multidisciplinary and interdisciplinary, capacity-building entails instilling capabilities, attitudes and skills which may range from computer sciences, strategic planning, finance and management to health sciences and care delivery, depending on the digital health application and its context. Assessment of the workforce should also consider the implications for the health labour market of introducing digital technologies and their management. This objective would call for countries to move away from the current disease focused systems to an integrated approach with the patient at the centre.

Attitudes to, practices in and public awareness of digital health should also be addressed. Possible actions include improving digital health literacy at the population level, engagement of patients, families and communities, and education of patients about health. Better responding to the social and commercial determinants of health to improve digital health-enabled health systems will need the engagement of civil society but also non-health sectors and actors. Increasing awareness of evidence based self-management tools and increasing access to these is a further action to consider.

Policy options and actions

The following policy options and actions are proposed:

1) place people at the centre of digital health through the appropriate health data ownership, adoption and use of digital health technologies and development of appropriate literacy; the focus will cover not only patients, families and communities but also health workers;

2) develop approaches to the management of health at the population level through digital health applications that move health and well-being from reactive-care models to active community-based models, and reduce the burden of data collection from front-line workers by reorienting reporting-based tools into service delivery tools;

3) establish monitoring and evaluation models to facilitate monitoring the contribution of digital systems to health system processes, health workforce processes, and individual and community health needs;

4) strengthen gender equality and health equity approaches and accessibility for people with disabilities to promote inclusive digital society with enhanced digital health skills. When planning and prioritizing digital health interventions, relevant factors of inequality should be assessed in order to ensure that the introduction of digital health technologies does not aggravate these ("do no harm") and that access for specific population groups is guaranteed. In addition, the specific potential of digital technologies to promote health equity should be leveraged. Designed properly, digital solutions can propel inclusiveness as digital connectivity can transcend physical barriers;

5) implement mechanisms for more effective public participation and transparency in national and international digital health decision-making processes, such as through international consultation processes or a stakeholder forum;

6) develop digital health training or Massive Open Online Courses to improve digital health literacy; and

7) create an international communication campaign to sensitize people to the benefits of digital health solutions and the use of their data for public interest research, and thereby promote the vision of people being actors of innovation.

Outputs

The following outputs are envisaged:

1) Improved digital health literacy in using and understanding digital health technologies and systems as well as health data is prioritized, and the validated tools are accessible by all populations;

2) a framework allowing individual feedback in validating the performance of digital health tools and services, diffusion of increasing digital health demand is implemented and used;

3) global minimum health data standards for prioritized digital health technologies and processes are established, adopted and applied at national level; and

4) global guidance on personalized medicine is developed.

Photo credit: WHO / Blink Media - Ethiram Jabi

FRAMEWORK FOR ACTION

The framework for action aims to facilitate the implementation of the global strategy by providing a structure and tools for collaboration. Working collectively towards shared strategic objectives, local and global partners can accommodate diversity and jointly consider concepts, road maps, methods, tools, funding and other factors to help implementation and support countries in various development contexts to make optimal use of digital health technologies.

The framework for action is guided by four major components: commit, catalyse, measure, and enhance and iterate. The framework for action is accompanied by an action plan, which outlines impact, outputs, policy options and actions for each strategic objective.

1 Commit

Encourage countries and stakeholders to commit themselves to the implementation of the global strategy on digital health. In order to reach the strategic objectives of the global strategy, the Secretariat, Member States and stakeholders shall maintain their voluntary commitment and contributions, respecting national priorities, capabilities and resources.

2 Catalyse

Generate and sustain a conducive environment to create, scale up and maintain processes that will facilitate collaboration towards implementing the global strategy. This component envisages the generation of a cooperative environment that is conducive to the creation, introduction and scaling up of appropriate digital health technologies and enabling processes that will facilitate and accelerate the implementation of the global strategy and its objectives.

The Secretariat will promote collaboration among stakeholders to ensure progress by building synergies, facilitating technical

collaboration, and developing digital global public goods that can be shared and used globally. The collaboration will include building on synergies, facilitating technical collaboration, and developing quality assured and evidence based global digital health public goods that can be shared and used globally.

3 Measure

Create and adopt processes and metrics for monitoring and evaluating the effectiveness of the global strategy. This component calls for the continuous assessment of whether the global strategy on digital health has been true to its purpose and effective in supporting countries.

The Secretariat will measure the effectiveness of the global strategy from data collected globally and will report findings to Member States.

4 Enhance and iterate

Undertake a new cycle of actions based on what has been experienced, measured and learned. This component will respond to feedback on the progress of global strategy in adapting to emerging digital health technologies. The action plan will be reviewed annually to determine whether a new cycle of new actions is needed to deliver on the strategic objectives.

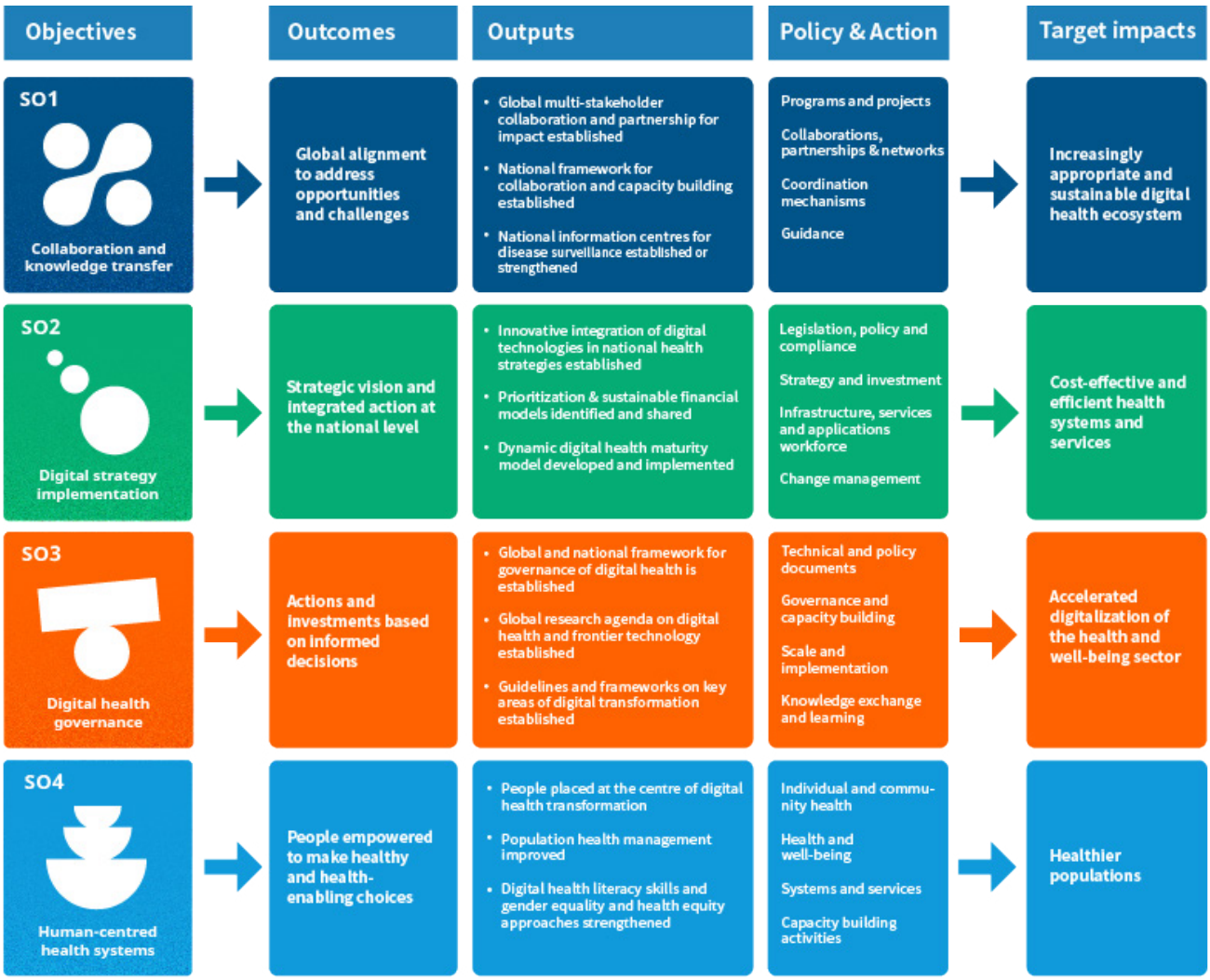
The Secretariat and its partners will propose, exercise and continuously refine the global strategy as well as its iterative assessment and decision-making processes.

IMPLEMENTATION OF THE STRATEGY AND ACTION PLAN

General implementation principles

The global strategy on digital health aims to support and respond to the growing needs of countries to implement appropriate digital technologies in accordance with their health priorities and to make progress towards universal health coverage and the health-related Sustainable Development Goals. It also responds to the objectives of WHO' s Thirteenth General Programme of Work, 2019–2023. Figure 1 below summarizes the action plan.

Fig. 1. Summary implementation of the action plan



The Secretariat will work closely with Member States, other bodies in the United Nations system, international partners and other stakeholders to implement the global strategy. It is intended that various stakeholders will take the strategic objectives forward at national, regional and global levels. These stakeholders mainly include, but are not limited to, intergovernmental and international organizations; non-State actors such as nongovernmental and civil society organizations, donors and aid agencies, foundations and development banks; universities and research institutions; faith-based organizations, health insurance groups and other health care funders; the private sector; technology developers; and the health care community in particular health care providers and health care professionals, patients and the public.

The specific actions for the period 2020–2025 require a timetable with milestones. The milestones should identify activities where Member States, the Secretariat and stakeholders can jointly agree to support national priorities for digital health development. One of the first milestones will be the development of a core set of quantifiable process indicators related to the objectives of the action plan. These will be used to measure subsequent progress and contribute to accountability. They would mostly focus on action taken by Member States and the Secretariat.

Financing for implementation of the global strategy will require specific resource mobilization. For Member States, this implies developing investment strategies to allow for new capital expenditures, focusing on national measures for governance of digital health, adaptation of clinical and public health norms, guidelines and standards, health information systems architecture, capacity-building and determining the best way of satisfying requirements, in addition to reprogramming existing funds for maintenance and periodic updating of operating environments. It will be crucial to prioritize the policy elements required and implement proposed actions to deliver results and expected health outcomes, all depending on the resources available and existing constraints. The Secretariat will seek to secure funding to initiate support for the activities outlined within the global strategy, including establishment of a dedicated department for digital health and innovation and coordination of digital health across all departments and the three

levels of the Organization. At the same time new donor contributions will be sought to support Member States in their implementation of the global strategy.

The approaches for implementing the global strategy on digital health will depend on the national context, national priorities for health and well-being as well as digital infrastructure and workforce needs and capacity in each country. Not all policy options and actions may be relevant, necessary or require immediate attention. Each Member State should consider its own health priorities, its current digital health situation, the planned or aspirational future state of digital health, resource constraints, capacity limitations, risks and other influential factors.

All proposed policy options and proposed actions outlined in the action plan may vary depending on the level of digital health maturity a country envisages for planning, development and implementation purposes. Member States are encouraged to review their health development context and determine the most suitable, strategic, cost-effective and optimal policies and actions that will have the greatest impact on improving health and achieving universal health coverage, the Sustainable Development Goals, and other goals and national policy objectives. The Secretariat and WHO' s partners will continue to adapt and adjust their support to meeting the priorities of Member States and seek to ensure requirements for digital health in the design of norms and standards products.

The timeline to deliver the outcome, output and the policy options and actions will vary according to country context. The Secretariat will report the progress of the implementation of the global strategy to the World Health Assembly in 2023. The annex describes the proposed short-term (1–2 years), medium-term (2–4 years) and long-term (more than 4 years) actions needed from Member States, the Secretariat and stakeholders to implement the global strategy on digital health.

Specific implementation principles

A national interoperable digital health ecosystem should be set up in such a way that the information technology health infrastructures are both interoperable among each other and, allowing for differences in

national legislation and policies, capable of sharing health data with infrastructures of other countries.

The information technology health infrastructure to be applied within an interoperable digital health ecosystem will be based on commonly agreed use cases in the public health-care sector, its functional requirements and a set of functional and technical specifications, standards and profiles derived thereof needs to be established on a sound legal and regulatory framework that guarantees data protection, confidentiality and integrity of personal health data and system availability. Due to their sensitivity, health data are to be classified as sensitive personal data that require a high safety and security standard. A common set of general legal requirements will be approved by the Member States as part of the WHO guideline on global interoperability standards for digital health serving as the basis for orientation for a national legal and regulatory framework.

The access of people to their health data and the processing thereof should be ensured by establishing a suitable legal basis that covers the right to access health data, the right to transparent information and the consent of people for the processing of their health data including accountability and effective audit and control mechanisms. Appropriate measures based on national or regional data protection policies should be taken against unauthorized or unlawful processing of health data, accidental loss, malicious or inadvertent alteration, or destruction of data.

From a legal and organizational perspective, all health care providers, health service providers, patients and any other involved parties participating in an interoperable digital health ecosystem undergo a strong and reliable digital identification, authentication and authorization mechanism that guarantees trust in the exchange of health data and aligns with nationally appropriate means. Notified national electronic identifications will be taken into account.

Member States will join forces on a global coordinated approach regarding the economics of health data use, particularly regarding the health data that are generated and shared by the public sector or by the people.

Photo credit: Getty Images / Gajic

MONITORING AND EVALUATION

The action plan calls for Member States and the Secretariat to dynamically monitor the maturity level of digital health in countries and institutions and to assess the implementation of digital health strategies through standard agreed-upon metrics. These measures should include both the status and performance of digital health interventions and include established monitoring and evaluation models to facilitate monitoring of the contribution of digital health to health system processes, health workforce processes and individual health needs.

Steps will be taken to implement a value measurement model to evaluate the action plan and the set of outputs, in collaboration with national centres or observatories to report on the contribution of digital systems to progress towards attainment of universal health coverage, the Sustainable Development Goals and the goals of WHO' s Thirteenth General Programme of Work, 2019–2023. Establishing a monitoring and evaluation framework that promotes a biennial enhancement of the global digital health strategy is also warranted.

Consideration should be given to aligning the digital health performance monitoring indicators with a national and/or global action plan for linking the global strategy on digital health and action plan with policy options and actions, outputs, outcomes and impacts. The Secretariat would continue to develop and refine a monitoring and evaluation framework for implementation of the global strategy, taking into consideration the need to use readily available information and to minimize any additional burden of data collection on Member States.

For Member States, tools, platforms and a maturity model for systematically tracking individual digital health interventions through national monitoring and evaluation of digital health are emerging rapidly. For monitoring overall progress in adoption and use of digital health technologies, a set of internationally recognized indicators and measures for digital health should be identified and formally adopted by Member States. These could, for example, be applied in the context of measuring progress in achieving each of the four strategic objectives identified by this global strategy.

Photo credit: WHO / Blink Media – Saiyna Bashir

GLOSSARY

Appropriate use of digital technologies: Information and communications technology that takes into account safety, ethical use, cost-effectiveness and affordability and is people-centred, evidence-based, effective, efficient, sustainable, inclusive, equitable and contextualized.

Artificial intelligence: An area of computer science that emphasizes the simulation of human intelligence processes by machines that work and react like human beings.

Big data:[1] The emerging use of rapidly-collected, complex data in such unprecedented quantities that terabytes (10^{12} bytes), petabytes (10^{15} bytes) or even zettabytes (10^{21} bytes) of storage may be required. The unique properties of big data are defined by four dimensions: volume, velocity, variety and veracity. As more information is accruing at an accelerating pace, both volume and velocity are increasing.

Blockchain: A digital database containing information (such as records of financial transactions) that can be simultaneously used and shared within a large decentralized, publicly accessible network.

Digital divide: Refers to the gap between demographics and regions that have access to modern information and communications technology and those that do not or have restricted access. This technology can include the telephone, television, personal computers and the Internet.

Digital health:[2] The field of knowledge and practice associated with the development and use of digital technologies to improve health. Digital health

1
Wyber R, Vaillancourt S, Perry W, Mannava P, Folaranmi T, Celi LA. Big data in global health: improving health in low-and middle-income countries. Bulletin of the World Health Organization 2015; 93:203-208 (doi: http://dx.doi.org/10.2471/BLT.14.139022, accessed 7 October 2020).

2
This definition encompasses eHealth, in line with that in document EB142/20 on mHealth, noted by the Executive Board at its 142nd session (see document EB142/2017/REC/2, summary records of thirteenth meeting, section 2), which stated that "Today the term 'digital health' is often used as a broad umbrella term encompassing eHealth as well as developing areas such as the use of advanced computing sciences (in the fields of "big data", genomics and artificial intelligence, for example)".

expands the concept of eHealth to include digital consumers, with a wider range of smart-devices and connected equipment. It also encompasses other uses of digital technologies for health such as the Internet of things, artificial intelligence, big data and robotics.

Digital hospital: The digital hospital provides services within and outside the hospital walls shifting away from the facility-based delivery of care to a smart virtual network of care centred on the patient, embedded in the health continuum.

Digital public goods: They can be defined as open-source software, open data, open artificial intelligence models, open standards and open content that adhere to privacy and other applicable international and domestic laws, standards and best practices and do no harm.[3]

Digital trial: Supply chain technology enables organizational value via a technology vision of digital trials: centring the trial around the patient experience and focused on treatment outcomes. Digital trials are siteless, virtual, remote and home-based.

eHealth: The cost-effective and secure use of information and communications technologies in support of health and health-related fields, including health care services, health surveillance, health literature, and health education, knowledge and research.

Enterprise architecture: A blueprint of business processes, data, systems and technologies used to help implementers design increasingly complex systems to support the workflow and roles of people in a large enterprise, such as a health system.

3 United Nations General Assembly. Road map for digital cooperation: Implementation of the recommendations of the High-level Panel on Digital Cooperation. Report of the Secretary-General. 29 May 2020. https://undocs.org/en/A/74/821, accessed 7 October 2020.

Health data:[4] The systematic application of information and communications technologies, computer science, and data to support informed decision-making by individuals, the health workforce, and health systems, to strengthen resilience to disease and improve health and wellness. It includes all data pertaining to the health status of a data subject which reveal information relating to the past, current or future physical or mental health status of the data subject. This includes information about the natural person collected in the course of the registration for, or the provision of, health care services to that natural person; a number, symbol or particular assigned to a natural person to uniquely identify the natural person for health purposes.

Health information system: A system that integrates data collection, processing, reporting, and use of the information necessary for improving health service effectiveness and efficiency through better management at all levels of health services.

ICD-11: The International Classification of Diseases 11th Revision, together with the other members of the WHO Family of Classifications and Terminologies (WHOFIC) serves semantic interoperability in all relevant areas of health information for clinical documentation as well as for statistics, at an individual level, for research and public health, across time and settings. The content coverage includes diseases, injuries, drugs, tumours, incidents, safety, devices, anatomy, infectious agents, interventions, functioning, and more. The digital structure and level of granularity enable big data and processing for decision support, in addition to traditional statistics.

4 Proposal for a Regulation of the European Parliament and of the Council on the protection of individuals with regard to the processing of personal data and on the free movement of such data (General Data Protection Regulation), COM(2012) 11 final, 25 January 2012, 2012/0011 (COD) (https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52012PC0011&from=en, accessed 7 October 2020).

Infodemic: An infodemic is an acute outpouring of information, including potentially misleading or inaccurate information that, in a digital, hyper-connected society such as the present one, is likely bound to accompany every epidemic or acute health crisis.[5]

Internet of things: A system of interrelated computing devices, mechanical and digital machines, objects, animals or people that are provided with unique identifiers and the ability to transfer data over a network without requiring human-to-human or human-to computer interaction.

Interoperability: The ability of different applications to access, exchange, integrate and cooperatively use data in a coordinated manner through the use of shared application interfaces and standards, within and across organizational, regional and national boundaries, to provide timely and seamless portability of information and optimize health outcomes.

Multistakeholder groups: These include, but are not limited to, intergovernmental and international organizations; non-State actors such as nongovernmental and civil society organizations, donors and aid agencies, foundations and development banks; universities and research institutions; faith-based organizations, health insurance groups and other health-care funders; the private sector; technology developers; and the health care community in particular health care providers and health care professionals, patients and the public.

National interoperable digital health ecosystem: All kinds of digital information technology infrastructure established on the national level of a country that is interoperable and primarily used by the health care community, in

5 World Health Organization. Joint call for papers - Special issues on Infodemiology. 18 August 2020 (https://www.who.int/news-room/articles-detail/joint-call-for-papers-special-issues-on-infodemiology, accessed 7 October 2020).

particular by the health care providers, health service providers and patients but also by the public health authorities, universities and research institutions. It enables the seamless exchange (Health Information Exchange -- IHE) and processing of health data – which is predominantly generated by the health care providers – between them and the health care community.

Telemedicine: [6] The delivery of health care services, where distance is a critical factor, by all health-care professionals using information and communications technologies for the exchange of valid information for diagnosis, treatment and prevention of disease and injuries, research and evaluation, and the continuing education of health care workers, with the aim of advancing the health of individuals and communities.

6 Telemedicine: opportunities and developments in Member States – report on the second global survey on eHealth. Global Observatory for eHealth series – Volume 2. Geneva: World Health Organization; 2010 (http://www.who.int/goe/publications/goe_telemedicine_2010.pdf, accessed 7 October 2020).

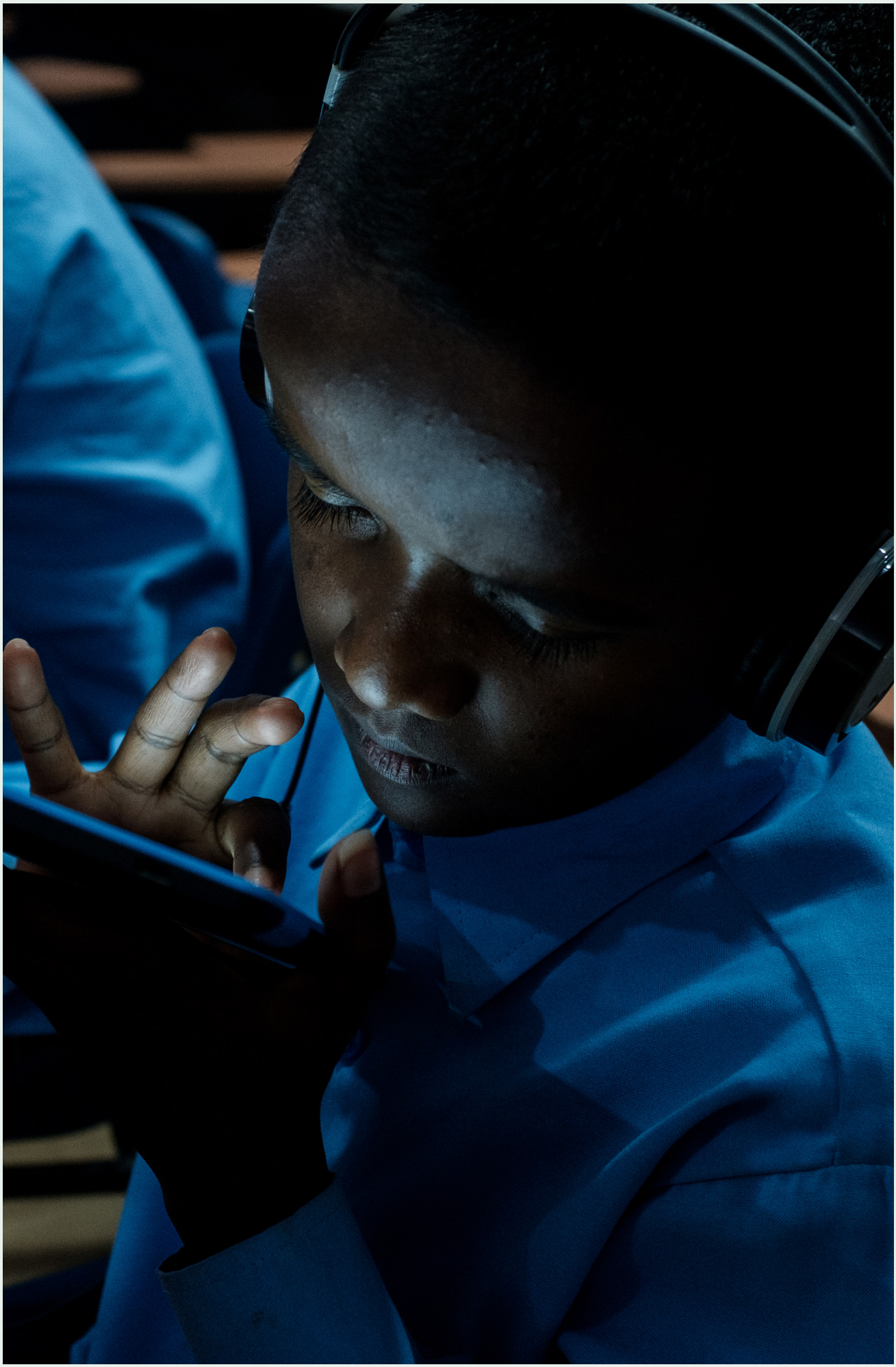


Photo credit: WHO / NOOR / Arko Datto

ANNEX

PROPOSED ACTIONS FOR MEMBER STATES, THE SECRETARIAT AND PARTNERS FOR IMPLEMENTING THE GLOBAL STRATEGY ON DIGITAL HEALTH

STRATEGIC OBJECTIVE 1: PROMOTE GLOBAL COLLABORATION AND ADVANCE THE TRANSFER OF KNOWLEDGE ON DIGITAL HEALTH

Proposed Actions	Short-term (1-2 years)	Medium-term (2-4 years)	Long-term (4-6 years)
Proposed actions by Member States	• Promote and participate in collaborations and partnerships for sustainability of digital health to accelerate adoption. • Identify and share information about gaps, priorities and resources needed for research in digital health. • Establish dedicated bodies and governance mechanisms to prioritize and implement digital health at national level including in times of emergency. • Participate in multistakeholder groups convened by the WHO Secretariat to support scaling up of digital health and innovation at national level. • Conduct a stakeholder analysis and identify suitable actions to engage each group contextualized to different public health situations including preparedness and response.	• Establish centres of excellence or innovation hubs to assess and promote digital health solutions that are aligned with country-defined needs. • Participate in regional and global dedicated bodies and governance mechanisms to contribute to the efforts in prioritizing digital health. • Establish an appropriate and sustainable digital health ecosystem driven by sound common principles contextualized to public health priorities and needs including with reference to emergencies. • Ensure information sharing for measuring national digital health maturity level (including information on digital health infrastructure, knowledge, technologies and use, etc.) in progress towards universal health coverage, healthier populations and emergencies targets of the Sustainable Development Goals and WHO's Thirteenth General Programme of Work, 2019–2023.	• Facilitate joint learning through communities of practice and curriculum-based training initiatives to enhance country capacity on digital health. • Foster intersectoral and integrated engagement in digital health development across government, and expand support on adopting and managing digital health solutions.
Proposed actions by the Secretariat	• Analyse the landscape of digital health networks and partnerships (including participants, principles, goals and activities) at national, regional and global levels to promote and participate in collaborations and partnerships to promote successful global digital health transformation.	• Establish mechanisms for joint action on agreed-upon appropriate use of digital health tools to achieve global, regional and national health goals. • Support the development of a global digital health research agenda.	• Establish a knowledge management approach for sharing and emphasizing the role of digital health investments on catalysing the achievement of national health priorities, universal health coverage, Sustainable Development Goals and WHO's Thirteenth General Programme of Work, 2019–2023.

STRATEGIC OBJECTIVE 1: PROMOTE GLOBAL COLLABORATION AND ADVANCE THE TRANSFER OF KNOWLEDGE ON DIGITAL HEALTH

Proposed Actions	Short-term (1-2 years)	Medium-term (2-4 years)	Long-term (4-6 years)
	• Provide policy dialogue platform and technical support to countries to enable prioritization of digital health at national level. • Convene or participate in multistakeholder groups to support scaling up of digital health and innovation contextualized to public health priorities and needs including being prepared in times of emergency. • Participate in the multistakeholder digital inclusion coalition convened by the UN Secretary General. • Develop a knowledge repository of stakeholders and digital health solutions to support Member States. • Develop capacity-building methodologies, tools and training materials to help Member States to identify, systematize and share good practices and lessons learned on digital health. • Promote health innovations where appropriate including cutting-edge digital technologies, such as the use of artificial intelligence, blockchain and big data analytics, and other emerging techniques and solutions in the health sector. • Establish standards to facilitate networking and partnerships that can be adapted at national, regional and global levels based	• Gather, map and share globally digital health business cases and facilitate exchange of lessons learned between countries and portfolios. • Promote digital health collaborations and partnership models within and across organizations on the use of software global goods, open-standards, and common digital health architecture. • Provide policy dialogue platforms and technical support to countries to enable prioritization of digital health at regional and global levels. • Convene multistakeholder groups and explore new modes of cooperation to support the scaling up of digital health and innovation. • Review annually the global agenda for action to build the future of the digital health and information and communications technology workforce; and the digital capacity of the health workforce. • Manage or engage in partnerships that serve public health system objectives.	• Document and share digital health global repository of knowledge and propose interventions to enhance the impact of digital health technologies towards universal health coverage, Sustainable Development Goals and WHO's Thirteenth General Programme of Work, 2019–2023. • Define comparative metrics and develop benchmarking tools and assessment frameworks for digital health solutions, goods and innovations, and the health content specific to program areas and use cases. • Address and develop strategies to incorporate lessons learned and to mitigate shared challenges in ethics, legal frameworks and governance in digital health including data privacy and sharing and ensuring safety and protection of individuals within the digital health environment.

STRATEGIC OBJECTIVE 1: PROMOTE GLOBAL COLLABORATION AND ADVANCE THE TRANSFER OF KNOWLEDGE ON DIGITAL HEALTH			
Proposed Actions	**Short-term (1-2 years)**	**Medium-term (2-4 years)**	**Long-term (4-6 years)**
	on different levels of cooperation (level 1:exchange of knowledge; level 2: exchange of resources; level 3: exchange of data). • Classify the different tools and technologies included in the digital health ecosystem, and develop ways to assess and monitor their efficacy. • Develop, promote and support the adoption of technical documents and guidelines, ethical and legal frameworks, and planning and implementation toolkits.		
Proposed actions by partners	• Collaborate with countries and the Secretariat to support digital health transformation being prioritized at national, regional and global levels. • Participate in collaborations and partnerships for sustainability and acceleration of digital health transformation. • Develop capacity-building to help Member States to identify, systematize and share good practices and lessons learned on digital health. • Promote collaborations and partnership models within and across organizations on digital health initiatives including on the use of software global goods, open-source standards and common architecture for digital health.	• Manage or engage in partnerships that serve public health system objectives (including interoperability and standards, coordinated investment, and secondary use of health data). • Establish a knowledge-management approach for sharing and emphasizing the role of digital health investments in catalysing the achievement of national health priorities, universal health coverage, Sustainable Development Goals and WHO's Thirteenth General Programme of Work, 2019–2023.	• Promote centres of excellence or innovation hubs to assess and implement digital health solutions that are aligned with country-defined needs and health related Sustainable Development Goals.

STRATEGIC OBJECTIVE 2: ADVANCE IMPLEMENTATION OF NATIONAL DIGITAL HEALTH STRATEGIES

Proposed Actions	Short-term (1-2 years)	Medium-term (2-4 years)	Long-term (4-6 years)
Proposed actions by Member States	• Conduct a stakeholder analysis and identifying suitable actions to engage each group contextualised to different public health situations including preparedness and response. • Conduct a comprehensive assessment of the existing hardware and connectivity landscape in order to identify infrastructural needs and solutions to drive digitalization. • Establish well-informed and effective national coordination mechanisms for governance of digital health. • Develop (or ensure in place) a national digital health strategy or equivalent strategic framework. • Prioritize national investment in digital health in support of primary health care and universal health coverage. • Involve stakeholders in the planning and implementation of digital health, including professional associations, patient and family organizations. Promote engagement with communities, health-care workers and those in other sectors by identifying (1) champions to help take advantage of and promote digital initiatives, and (2) central and cross-sectoral governance mechanisms for health-related innovations. • Expand the digital health workforce and	• Mobilize adequate funding to support the cost of acquisition or licensing, implementation and maintenance of necessary hardware infrastructure, software, workforce capacity building and other technical resources required. • Develop and/or adapt a set of open health data standards to be used in digital health interventions, with a compliance and enforcement mechanism. • Enhance awareness of emerging or cutting-edge digital health technologies and assess applicability and use of these technologies. • Promote national scientific, professional and patient associations as active participants in the national digital health development.	• Monitor the performance and progress of digital health by adapting or using available tools or maturity model, including tools and training materials, on the status of development and implementation progress of the digital health strategy. Support the development and implementation of a resilient national digital health architecture blueprint, using known enterprise architecture framework or methodology. • Establish and implement policies regarding practice, payment and accreditation for delivering integrated health services powered by digital solutions.

STRATEGIC OBJECTIVE 2: ADVANCE IMPLEMENTATION OF NATIONAL DIGITAL HEALTH STRATEGIES

Proposed Actions	Short-term (1-2 years)	Medium-term (2-4 years)	Long-term (4-6 years)
	promote capacity-building to develop, update and implement national strategies and investment plans for digital health. • Implement management procedures for programmes, risks and change management. • Review, develop, and/or revise specific laws and policies, if necessary, with respect to data privacy, security, confidentiality, standardization, exchange, accessibility and interoperability. • Share good practices and lessons learned with other countries and the international community, through existing or new regional and global networks.		
Proposed actions by the Secretariat	• Provide support to countries in developing (or ensuring) a national digital health strategy or equivalent strategic framework. • Provide support to countries for prioritizing national investment in digital health in support of primary health care and universal health coverage. • Identify and engage with relevant stakeholders, regulatory bodies and regional eHealth/digital health networks to support the implementation of digital health transformation at national or regional level.	• Facilitate dialogue to engage Member States and stakeholders to obtain sustainable national political, social and economic commitment and mandate for digital health through appropriate national and subnational policies, procedures, and legislation that governs digital health. • Advocate digital health architectural blueprints or road maps, adoption and use of open-source standards and reuse of shared assets or services and systems including interoperability standards. • Facilitate the use of organizations involved in standards development and partner agencies to advance the use of appropriate	• Share good practices and lessons learned with countries and international community, through WHO regional offices, existing and existing regional and global digital health networks. • Support countries to build trust in the use of emerging and existing digital health technologies by ensuring placing importance on quality, safety and ethical considerations. • Establish a digital platform that allows ministries of health to review and access digital health solutions that can best support public health interventions in the context of health system strengthening,

STRATEGIC OBJECTIVE 2: ADVANCE IMPLEMENTATION OF NATIONAL DIGITAL HEALTH STRATEGIES

Proposed Actions	Short-term (1-2 years)	Medium-term (2-4 years)	Long-term (4-6 years)
	• Support capacity-building to develop, update and implement national strategies and investment plans for digital health. • Develop or adapt a maturity model, investment prioritization including tools and training materials, on the status of development and implementation progress of digital health strategies that can be adapted at local, regional and national levels. • Develop tools for impact assessment that can measure the effectiveness of the interventions using digital health.	standards to ensure interoperability between systems and across domains. • Develop a template business case for investments in digital health for Member States. • Develop a library of proven digital health solutions. • Develop relevant norms and standards on digital competencies through WHO's programme on health workforce capacity-building. This will include using partnerships with collaborating centres and affiliated professional associations to strengthen the role of health workers in providing cost-effective, efficient and safe health services through digital means as appropriate.	health emergency response and healthy populations. • Integrate the template business case in the Dynamic Digital Maturity Model.
Proposed actions by partners	• Collaborate with WHO to provide support to countries in developing (or ensure in place) a national digital health strategy or equivalent strategic framework. • Collaborate with WHO to provide support to countries to enabling prioritizing national investment in digital health in support of primary health care and universal health coverage. • Ensure end-user communities and beneficiary populations are adequately engaged in the design, development, deployment, scale-up and sustainability phases. • Promote sustainable financing models in support of digital health development, implementation, integration into health systems and maintenance. • Collaborate with WHO to develop innovative technical tools to effectively monitor and accelerate implementation of national and global strategy on digital health. • Collaborate with WHO to ensure digital health transformation happening in various development context and at various levels, accelerating the achievement of health-related Sustainable Development Goals.		

STRATEGIC OBJECTIVE 3: STRENGTHEN GOVERNANCE OF DIGITAL HEALTH AT GLOBAL, REGIONAL AND NATIONAL LEVELS

Proposed Actions	Short-term (1-2 years)	Medium-term (2-4 years)	Long-term (4-6 years)
Proposed actions by Member States	• Analyse and document national start-ups working on innovative solutions to identify those that may have a sustainable impact on health and well-being. • Develop an implementation plan for digital health technologies in the context of health system strengthening, health emergency response and healthy populations. • Ensure the capacity of training institutions to establish and/or expand digital health literacy, provide life-long learning opportunities for digital health, and to have such digital health programmes properly accredited by the relevant authorities.	• Develop research and promote capacity-building for governments, policy-makers, practitioners and the public in general to take informed decisions, generate trust and support digital health investments. • Establish and develop capacity in using artificial intelligence and digital health medical devices under WHO's regulating, benchmarking or certifying frameworks. • Establish national data governance mechanisms, in accordance with the development of regulatory framework at global level. • Develop capacity, according to country-specific contexts, in planning for and using digital hospitals and digital therapeutics, location-based services, infodemic management during routine and emergency health service delivery. • Participate in global interoperability standards-setting processes for digital health led by WHO and comply with these standards. • Analyse digital health ecosystem and propose concrete policy actions to advance the achievement of the targets of universal health coverage, the Sustainable Development Goals and WHO's Thirteenth General Programme of Work, 2019–2023 using digital health technologies.	• Develop target-product profiles and priority characteristics for digital health applications especially relevant to the needs of low-resource settings; define challenges and draw a road map for increased access to those products. • Invest in and maximize the opportunities made available by digital health technologies to strengthen capacity building of health workers in primary health care and public health emergency response.

STRATEGIC OBJECTIVE 3: STRENGTHEN GOVERNANCE OF DIGITAL HEALTH AT GLOBAL, REGIONAL AND NATIONAL LEVELS

Proposed Actions	Short-term (1-2 years)	Medium-term (2-4 years)	Long-term (4-6 years)
Proposed actions by the Secretariat	• Establish criteria for assessing the relevance and impact of digital health solutions, for example including priority characteristics relevant to low-resource settings. • Facilitate the use of global technology registries for digital technologies and projects at country and global levels that support the unique registration, monitoring and coordination of digital investments (for example, WHO's Digital Health Atlas). • Develop evidence-based technical documents on different topics related to digital health, such as cost-effectiveness, sustainability and affordability, ethical use, privacy and security, and safety in the context of health system strengthening, health emergency response and healthy wellbeing. • Use inputs from experts (for example, the members of WHO's technical advisory group on digital health) to develop or update the pipeline of technical documents (for instance, handbooks, toolkits and guidelines) on digital health interventions to improve health and well-being. • Assess and promote innovative solutions that can have an effective impact in the future of health and well-being.	• Develop a WHO framework for assessing and regulating digital health technologies. • Develop regulatory framework on international health data, to agree on global appropriate use of health data, and to outline principles of equitable data-sharing principles for research, consistent metadata and definitions, artificial intelligence and data analytics; primary and secondary use of data. • Promote exchange of best practices, good governance, infrastructure architecture, programme management, and use of standards to promote interoperability for digital health. • Develop guidance on new areas being enabled by digital health technologies such as digital hospitals, digital therapeutics, personalized medicine, location-based services, infodemic management. • Designate and use WHO collaborating centres on digital health to advise, support activities and facilitate knowledge exchange and learning within and between countries. • Produce guidance on ground breaking health system processes and practices supported by digital technologies. • Identify mechanisms to ensure the rapid	• Track advancements across the global digital health ecosystem and propose concrete policy actions to advance progress towards the achievement of the targets of the Sustainable Development Goals using digital health. • Develop research and promote capacity-building to enable Member States and other stakeholders to take informed decisions in order to support sound digital health investments for health system strengthening and emergency response. • Translate collected information into actionable knowledge tailored to countries and partners to support acceleration of systematic and transparent translation of evidence to inform policy and national decision-making. • Develop a framework for regulating, benchmarking or certifying artificial intelligence and digital health medical devices, and support countries to develop capacities to use such frameworks.

STRATEGIC OBJECTIVE 3: STRENGTHEN GOVERNANCE OF DIGITAL HEALTH AT GLOBAL, REGIONAL AND NATIONAL LEVELS

Proposed Actions	Short-term (1-2 years)	Medium-term (2-4 years)	Long-term (4-6 years)
		deployment of surge capacity in response to an acute public health event. • Develop a guideline on global interoperability standards for digital health.	
Proposed actions by partners	• Support and contribute to good governance of digital health, adherence to national policies and programmes, and compliance and use of standards required. • Support the Secretariat in establishing international health data regulation, a framework for regulating, benchmarking or certifying artificial intelligence and digital health medical devices. • Support the Secretariat in the development of a guideline on global interoperability standards for digital health. • Support the Secretariat to provide surge training capacity in response to acute public health events.	• Develop research on cutting-edge health technologies and share the evaluation results of the implementation of digital health interventions. • Support the Secretariat in the development of global guidance on planning, development and use of digital hospitals and digital therapeutics, with partners' expertise during routine and emergency health service delivery.	• Support practices and innovations that deliver positive health outcomes and enhance overall quality of health care delivery aligned with the Sustainable Development Goals.

STRATEGIC OBJECTIVE 4: ADVOCATE PEOPLE-CENTRED HEALTH SYSTEMS THAT ARE ENABLED BY DIGITAL HEALTH

Proposed Actions	Short-term (1-2 years)	Medium-term (2-4 years)	Long-term (4-6 years)
Proposed actions by Member States	• Prioritize literacy through an accessible tool that enables understanding digital health technologies and systems. • Engage with professional organizations, patient associations and civil society organizations as active participants in digital health development and innovations. • Strengthen public trust in digital health technologies and review the different education and training programmes on digital health by institution, level of degree, specialty and cost, and analyse current trends at the national level. • Promote the use of population health management and gender-equality approaches through digital health applications to move health and well-being from reactive care models to active community-based models.	• Develop a digitally capable and gender-balanced health workforce. • Ensure competencies on digital health are included in the education and training curricula of all health professionals and allied workers, and at all levels of formal education and informal training. • Developing population health management approaches through digital health solutions that move health and well-being from reactive care models to active community-based models.	• Develop capacity to allow individual feedback for validating the performance of digital health tools and services under a framework led by WHO. • Ensure electronic patient health records are established. • Foster digital health literacy at population level and raise awareness of patients' rights and the concept of dynamic consent. • Ensure digital health solutions are informed by the social determinants of health. • Develop capacity in personalized medicine. • Synthesize national research and disseminate evidence on the contributions of digital health interventions to the performance of health systems and their impact on people's health and well-being.
Proposed actions by the Secretariat	• Disseminate best practices for engaging professional and patients' associations, which are active participants in digital health development and the implementation of the global strategy on digital health. • Provide support to countries for accessible tools to enable literacy in digital health technologies and systems. • Develop a framework allowing individual	• Promote digital health interventions while addressing social determinants of health. • Support Member States and stakeholders to use person-centric, digital health devices and systems to enhance health workforce performance and facilitate evidence-based decision to improve public trust in using digital health technologies inside or outside the context of a public health emergency.	• Provide support to countries to enable countries meeting global minimum standards for electronic patient health records. • Provide support to countries in capacity-building in utilizing personalized medicine. • Develop and promote the use of tools that support the digitalization of integrated

STRATEGIC OBJECTIVE 4: ADVOCATE PEOPLE-CENTRED HEALTH SYSTEMS THAT ARE ENABLED BY DIGITAL HEALTH

Proposed Actions	Short-term (1-2 years)	Medium-term (2-4 years)	Long-term (4-6 years)
	feedback for validating the performance of digital health tools and services. • Develop global minimum standards for electronic health records. • Develop global guidance on personalized medicine. • Develop an ethics framework for technologies for health, to support countries in strengthening public trust in digital health inside or outside the context of a public health emergency. • Promote ethics, governance and security in handling and processing data for research or for other data-sharing requirements for the public good. • Identify the core competencies of digital health literacy that might be included in education and training curricula of health professionals and allied workers.	• Support Member States to identify and implement appropriate digital health interventions combined with appropriate health and data content across interoperating digital systems to address quality, coverage and equity goals within the health system. • Scan the landscape of projects and initiatives that use population health management and gender-equality approaches through digital health solutions to move health and well-being from reactive care models to active community- based models.	health service with a focus on patient's managed quality of service. • Synthesize international research results and disseminate evidence on the contribution of digital health interventions to performance of health systems and their impact on people- centred outcomes, including universal health coverage, with an essential package of interventions.
Proposed actions by partners	• Collaborate with the Secretariat in supporting countries in prioritizing an accessible tool for literacy in digital health technologies, digitization, digitalization and change management. • Collaborate with the Secretariat in developing a framework allowing individual feedback in validating the performance of digital health tools and services, with partners' expertise. • Support the Secretariat in developing global minimum standards for electronic patient health records and their implementation.		• Develop and promote the use of tools that support digitalizing processes at health service centres or relevant occasions with a focus on patients' empowerment, standardized processes and managed quality of service.

STRATEGIC OBJECTIVE 4: ADVOCATE PEOPLE-CENTRED HEALTH SYSTEMS THAT ARE ENABLED BY DIGITAL HEALTH

Proposed Actions	Short-term (1-2 years)	Medium-term (2-4 years)	Long-term (4-6 years)
	• Support the Secretariat in developing global guidance on personalized medicine and its implementation. • Support the Secretariat in developing ethics frameworks for technologies for health, and supporting countries in strengthening public trust in digital health including in the context of a public health emergency. • Support countries to adopt and effectively use person-centric digital technologies for the health workforce to facilitate evidence-based decision-making and strengthen health systems' accountability. • Support countries to identify and implement appropriate digital health interventions, including in the context of a public health emergency combined with appropriate health data across interoperating digital health systems to achieve increased quality, coverage and accessibility of health care.		

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