ANNEX I: Action Plan for the Global Strategy on Digital Health 2020-2024

LIST OF ACRONYMS

AI	Artificial intelligence
DHA	Digital Health Atlas
GDHI	Global Digital Health Index
GDHP	Global Digital Health Partnership
GOe	Global Observatory for eHealth
GPW13	WHO 13th General Programme of Work
ICT	Information and communications technology
IHE	Integrating the Health Enterprise
IoT	Internet of things
ISO	International Organization for Standardization
ITU	International Telecommunications Union
UHC	Universal Health Coverage
SDG	Sustainable Development Goals
WHA	World Health Assembly
WHO	World Health Organization

INTRODUCTION

This *Action Plan* for the *Global Strategy on Digital Health* (hereafter referred to as the "*Action Plan*") is meant to be a living document that allows for dynamic adaptation and continuous enhancements in sync with the rapidly changing world of digital health as well as approaches gained from practical implementation. This action plan will be reviewed periodically and updated as needed.

Implementing the *Global Strategy on Digital Health* strategic objectives flows through a framework for action guided by policy options and underpinned by multiple proposed actions. Working collectively towards shared strategic objectives, Member States, WHO, and local and global partners can accommodate diversity and consider concepts, tools, methods, roadmaps, financing, and other resources to help advance the global agenda and support countries in their digital health journey.

The *Action Plan* aims to facilitate Member States development and implementation of effective national strategies and policies on digital health. This includes a framework for action with impact targets, key policy options and a recommended set of actions by Member States, the WHO Secretariat (at the headquarters, regional and national level, and with WHO collaborating centres), and partners. The *Action Plan* also includes a monitoring and evaluation framework to enhance measurement and accountability for digital health.

The framework for action facilitates the implementation of the *Global Strategy* through a cycle that starts with minimum requirements and actions that Member States and stakeholders can **commit** to for digital health transformation. The next step is to **catalyse** greater collaboration for greater effective use while **measuring** progress and scientific evidence of success and risk management. Implementation shall benefit from an **enhance and iterate** approach to continuously improve upon the leveraged commitment in a more informed implementation cycle.

Commit Encourage Member States and stakeholders to initiate national dialogue to implement global, regional, and national strategies on digital health.	**Catalyse** Create, scale and sustain the collaborative environment with partners to deliver results.
Enhance & Iterate Take a new cycle of actions based on what has been experienced, measured and learned.	**Measure** Create and adopt processes for monitoring and evaluating the Strategy´s effectiveness.

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

The *Action Plan* outlines WHO directives for promoting the appropriate use of digital health technologies for supporting the achievement of the health-related SDGs and accelerating progress towards universal health coverage (UHC) at all levels, from primary health to specialized care. Without strategy and guidance, decision makers would allocate resources to fragmented projects and activities with no sustainable developmental impact.

GUIDING PRINCIPLES

The guiding principles outlined in the *Global Strategy* shall be applied and adopted as Member States, the WHO Secretariat, and partners implement the *Action Plan* to adopt and maximize appropriate and sustainable use of digital health:

- *Acknowledge that the digital health adoption process is a country's decision.*

- *Recognize that successful digital health initiatives require a unified strategy.*

- *Promote the appropriate use of digital technologies.*

- *Recognize that there is a pressing need to address the major impediments that least-developed countries face in engaging with and accessing digital health technologies.*

FRAMEWORK FOR ACTION FOR MEMBER STATES, THE WHO SECRETARIAT, AND PARTNERS

Target impacts, policy options and recommended key actions are presented in this section for each of the four *Global Strategy* strategic objectives (SO1 – SO4). The targets, policy options and actions are guided by a digital health enabling environment (Fig. 1) to help countries to leverage the *Global Strategy* for achievement of national priorities. Each of the functions in the enabling environment map to SO1 – SO4 and are reflected throughout the framework for action.
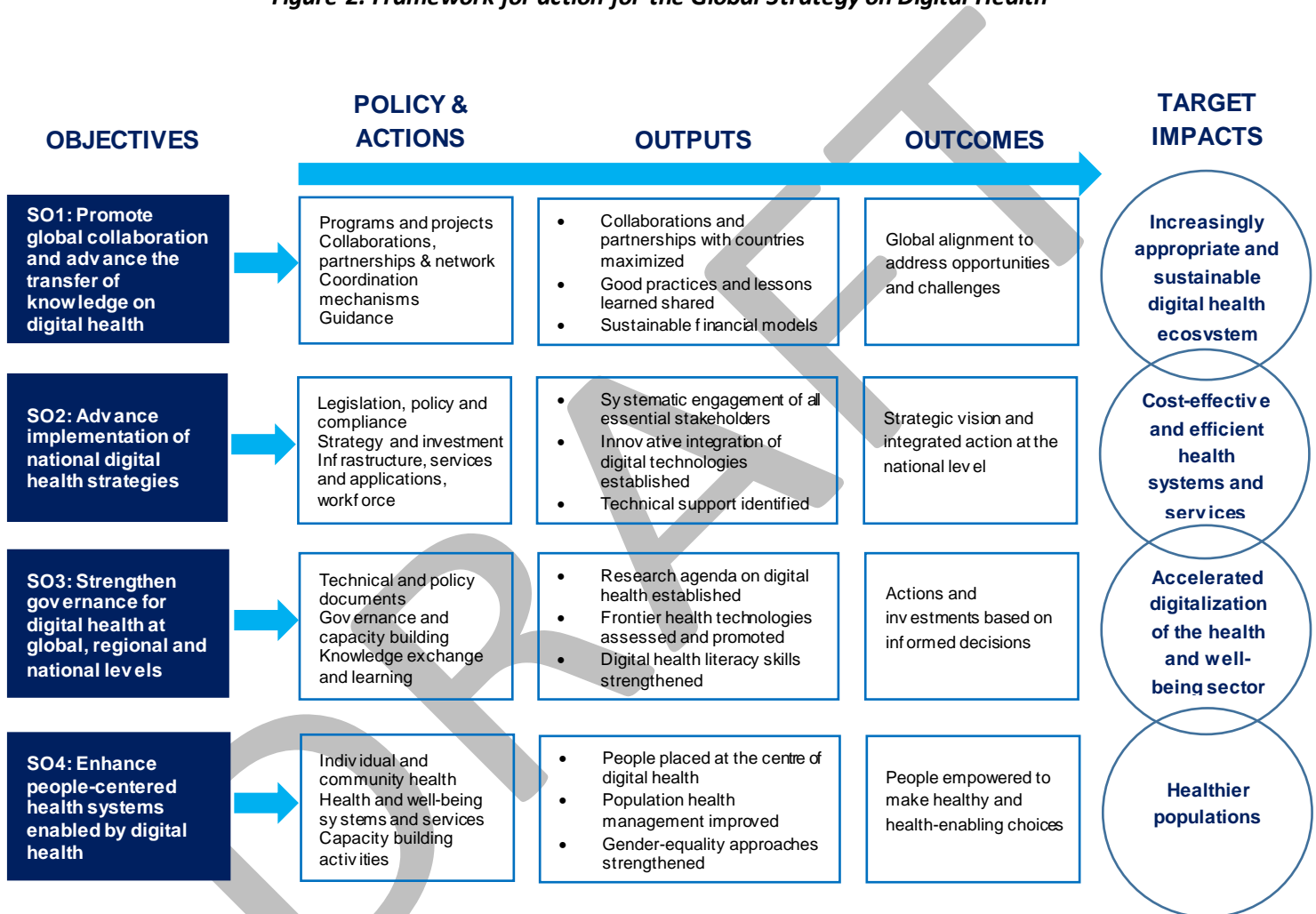
Figure 1. Enabling environment of the Global Strategy on Digital Health
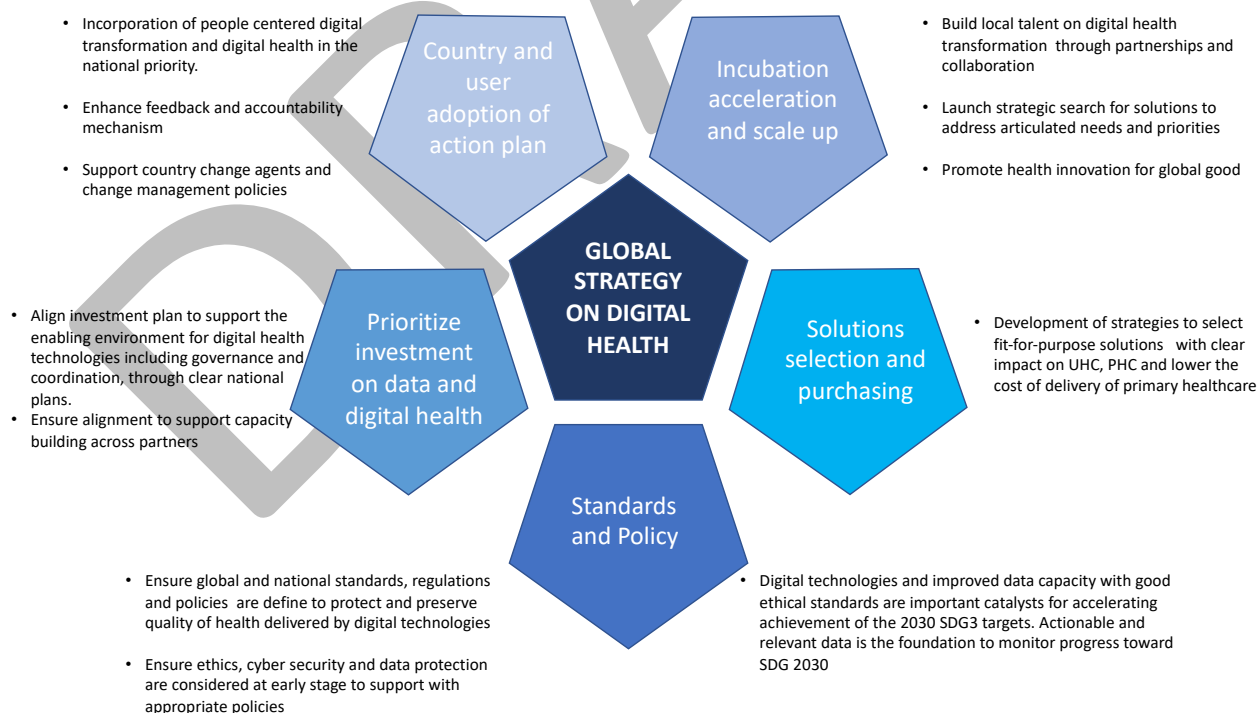
An overview of the relationship between each of the SO's with the policy options and actions leading to expected outputs and outcomes with the target impacts are presented below (Fig. 2). All policy options

and recommended actions outlined in the *Action Plan* may not be applicable in all country contexts for planning, development and implementation purposes. Member States are encouraged to review its local context and address the key policies and actions that are most suitable, strategic, meaningful, cost-effective, and optimal to have the greatest impact on improving health and achieving UHC, the SDGs, and other goals and national policy objectives. The WHO Secretariat and partners should continue to adapt and adjust its support to address the priorities of Member States.

Figure 2. Framework for action for the Global Strategy on Digital Health

OBJECTIVES	POLICY & ACTIONS	OUTPUTS	OUTCOMES	TARGET IMPACTS
SO1: Promote global collaboration and advance the transfer of knowledge on digital health	Programs and projects Collaborations, partnerships & network Coordination mechanisms Guidance	• Collaborations and partnerships with countries maximized • Good practices and lessons learned shared • Sustainable financial models	Global alignment to address opportunities and challenges	**Increasingly appropriate and sustainable digital health ecosystem**
SO2: Advance implementation of national digital health strategies	Legislation, policy and compliance Strategy and investment Infrastructure, services and applications, workforce	• Systematic engagement of all essential stakeholders • Innovative integration of digital technologies established • Technical support identified	Strategic vision and integrated action at the national level	**Cost-effective and efficient health systems and services**
SO3: Strengthen governance for digital health at global, regional and national levels	Technical and policy documents Governance and capacity building Knowledge exchange and learning	• Research agenda on digital health established • Frontier health technologies assessed and promoted • Digital health literacy skills strengthened	Actions and investments based on informed decisions	**Accelerated digitalization of the health and well-being sector**
SO4: Enhance people-centered health systems enabled by digital health	Individual and community health Health and well-being systems and services Capacity building activities	• People placed at the centre of digital health • Population health management improved • Gender-equality approaches strengthened	People empowered to make healthy and health-enabling choices	**Healthier populations**

Policy options and recommended actions outlined for each of the SO's are inter-related and every attempt has been made to minimize redundancy. Actions have been identified for short-term, medium-term and long-term implementation to help inform prioritization and planning by all stakeholders.

Short-term actions are those that can be started and executed in a 1-2 year period. These are the basic elements needed to achieve the four strategic objectives, and will underpin and allow stakeholders to implement medium-term and long-term actions and reach higher levels of digital health-enabled outcomes and impacts. **Medium-term** actions are those that can be started when short-term actions have been almost completed, and can be executed in a 2-5 year period. **Long-term** actions are those that may

be initiated later or when short-term and mid-term actions have been almost completed, and can be ongoing activities or may take 5 or more years to be fully implemented or achieved.

Planning timelines will vary while some policies and actions may not be time-limited or achievable by 2024 but are continuous actions that may warrant even longer-term considerations to achieve the desired outputs, outcomes, and target impact.

STRATEGIC OBJECTIVE 1: PROMOTE GLOBAL COLLABORATION AND ADVANCE THE TRANSFER OF KNOWLEDGE ON DIGITAL HEALTH	
Target impact:	*Increasingly appropriate and sustainable digital health ecosystem.*

Acknowledging that digital solutions can improve population's health, digital health transformation makes sense only within a framework of partnership and collaboration, while digital health in isolation should be avoided to prevent failure. Hence, alignment to support capacity building across partners and the diverse set of stakeholders plays an important role in successful implementation of any digital health agenda. Specifically, global collaboration and transfer of knowledge in digital health are key components for encouraging action on common opportunities and challenges that are relevant to all countries and stakeholders in order to promote an appropriate and sustainable digital health ecosystem.

Political commitment is essential to identify, analyse and share the progress and lessons learned on digital health at the national level, especially the challenges related to the financing models to scale and sustain effective digital health. In addition, mechanisms for promoting the dialogue and implementing collaborative key actions are required to fight against the digital divide and to fill the gap between countries on digital health. Collaboration can promote and facilitate innovations as global goods.

Policy options

- Endorse the global digital health strategy and **establish mechanisms for implementing collaborative key actions** on agreed upon appropriate use of digital technologies to achieve health and well-being goals.

- Establish a knowledge management approach **to identify and share good practices, evidence and lessons learned** on digital health across countries and international communities.

- Align countries and stakeholders to collectively **address 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 SDGs.

- Identify and promote **sustainable financing models** in support of digital health development, implementation, integration and maintenance.

Proposed actions by Member States

Short-term
- Scan the landscape of digital health networks and partnerships (participants, principles, goals, activity, etc.) at the national level to promote and participate in collaborations and partnerships for sustainability of digital health to accelerate adoption.
- Identify and share gaps, priorities and resources needed for research in digital health.
- Review annually in coordination with different partners the national and global agenda for action to build the future of the digital health and ICT workforce; and the digital capacity of the health workforce.

Medium-term
- Establish centres of excellence or innovation hubs to assess and promote digital health solutions that are aligned with country-defined needs.
- Establish collaboration and coordination mechanisms to engage with stakeholders and private sector to develop an appropriate and sustainable digital health ecosystem.

Long-term
- Facilitate joint learning through communities of practice and curriculum-based training initiatives to enhance country capacity on digital health.
- Document and share digital health inequalities (infrastructure, knowledge, technologies, use) and inequities and their impacts in progressing UHC, SDGs and GPW13.
- Fostering inter-sectoral engagement and support upscaling of digital health solutions within integrated systems, and across government portfolios.

Proposed actions by WHO Secretariat

Short-term
- Scan the landscape of digital health networks and partnerships (participants, principles, goals, activity, etc.) at the national, regional and global level to promote and participate in collaborations and partnerships for advancing the global digital health agenda.
- Develop capacity building (i.e., methodologies, tools, 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 frontier digital technologies such as the use of artificial intelligence (AI), blockchain, and big data analytics, and other emerging techniques and solutions in the health sector.
- Create a gold-standard to facilitate networking and partnerships that can be adapted at the national, regional and global level based on the different levels of the cooperation (level 1: exchange of knowledge; level 2: exchange of resources; level 3: exchange of data).
- Coordinate and define the different tools and technologies included in the digital health ecosystem, classify them to develop the different ways to assess, monitor, and optimize them.
- Develop, promote and support the adoption of technical documents and guidelines; ethical and legal frameworks; and planning and implementation toolkits on using digital for health systems strengthening to achieve UHC, SDG goals and the GPW13.

Medium-term
- Establish mechanisms for joint actions on agreed-upon appropriate use of digital health tools to achieve global, regional, and national health goals.

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- Establish the development of a global digital health research agenda, and support collective research and requirement to address identified gaps.
- Gather, map and share globally digital health business cases and facilitate exchange of lessons learned across countries and portfolio boundaries.
- Promote collaborations and partnership models for cross-programmatic or cross organizational digital health initiatives on the use of software global goods, open-standards, and common digital health architecture.
- Review annually the global agenda for action to build the future of the digital health and ICT workforce; and the digital capacity of the health workforce.
- Manage or engage partnerships that serve public health system objectives (including interoperability and standards, coordinated investment, health data monetization).
- Facilitate dialogue and collaboration among the public sector and other stakeholders, including the private sector to develop an appropriate and sustainable digital health ecosystem.

Long-term
- Establish a knowledge management approach for sharing and emphasizing the role of digital health investments on catalyzing the achievement of national health priorities, UHC, SDGs and the GPW13.
- Document and share digital health inequalities (infrastructure, knowledge, technologies, use) and inequities and their impacts in progressing UHC, the SDGs and GPW13.
- 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 ecosystem.

Proposed actions by Partners

Short-term
- Participate in collaborations and partnerships for sustainability of digital health to accelerate adoption.
- Develop capacity building (i.e., methodologies, tools, training materials) to help Member States to identify, systematize, and share good practices and lessons learned on digital health.

Medium-term
- Promote collaborations and partnership models for cross-programmatic or cross organizational digital health initiatives on the use of software global goods, open-standards, and common digital health architecture.
- Manage or engage in partnerships that serve public health system objectives (including interoperability and standards, coordinated investment, health data monetization).

Long-term
- Establish a knowledge management approach for sharing and emphasizing the role of digital health investments on catalyzing the achievement of national health priorities, UHC, the SDGs, and GPW13.
- Promote centres of excellence or innovation hubs to assess and implement digital health solutions that are aligned with country-defined needs.

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STRATEGIC OBJECTIVE 2: ADVANCE IMPLEMENTATION OF NATIONAL DIGITAL HEALTH STRATEGIES	
Target impact:	*Cost-effective and efficient health systems and services.*

Digital health is at different stages and being implemented in multiple ways in each country. Better coordination (Strategic objective 1) coupled with strategic and timely policies and actions to address and implement various components of digital health[1] can foster greater returns on investment and better health outcomes and impacts. Strategic searches for solutions that address articulated needs and priorities will be critical.

Advancing implementation of digital health strategies and solutions fit for purpose relies on many factors depending on the country context having clear impact on UHC and lower cost of delivery of primary healthcare. The policies and actions under this Strategic Objective 2 aims to build human and institutional capacity for the safe and appropriate use and scale-up of digital health. As part of the global digital health agenda, stakeholders should ensure ethics, cyber security and data protection are considered at early stage to support with appropriate policies. Careful consideration is necessary to prioritize, evaluate the associated costs and benefits, consider the financing[2] strategy and constraints, and implement activities rationally accordingly.

Policy options

- Stimulate and support every country **to adopt, own, evolve and strengthen its digital health strategy** in a way that best suits its vision, health and ICT situation, available resources and core values towards advancing implementation of the national digital health strategies.

- Ensure end **user communities and beneficiary populations are adequately engaged** in the design and development phases.

- Facilitate a **systematic engagement of all essential stakeholders** in the strategic vision and integrated action on digital health at the national level.

- Define a **architecture blueprint or roadmap, adopt open standards and aim for reusable systems or assets** including data exchange services for interoperability to establish an **innovative integration** of different digital technologies using shared services.

- Adopt **legal and ethical frameworks** for assuring patient safety, data security, confidentiality and privacy.

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[1] WHO/ITU National eHealth Strategy Toolkit (2012) (https://apps.who.int/iris/handle/10665/75211)

[2] Financing of digital health will require detailed analysis of inputs, use cases, costs and resource constraints, risk factors, return on investment (ROI), and consideration of the total cost of ownership of individual digital health interventions as well as the overall health sector-wide digital health ecosystem or enterprise architecture (EA). Two example tools for estimating the financing requirements of digital health include the Digital Health Impact Framework (http://sil-asia.org/digital-health-impact-framework-user-manual/) and the forthcoming *WHO guide to planning, investing, and implementing digital for health programmes*.

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Proposed actions by Member States

Short-term

- Conduct a stakeholder analysis by identifying different stakeholder groups, analyzing the contributions and influences of each group, and identifying suitable actions to engage each group.
- Establish well-informed and effective national governance coordination mechanism for digital health.
- Involve stakeholders in digital health planning and implementation, including professional associations and patient and family organizations. Promote engagement with communities, service providers and those in other sectors by identifying (1) champions to help leverage and promote digital initiatives, and (2) central and cross-sectoral governance mechanisms for health-related innovations.
- Expand the digital health workforce and promote capacity building to develop, update and implement national strategies and investment plans for digital health.
- Implement programme, risk, change, and compliance management procedures.[3]
- Review, develop, revise specific laws and policies with respect to data privacy, security, confidentiality, standardization, exchange, accessibility, and interoperability.
- Share good practices and lessons learned with other countries and international community, through development of, or leveraging WHO, bilateral, regional, cross-regional and global networks.

Medium-term

- Identify adequate funding to support the cost of acquisition, implementation, scaling up, and maintenance of necessary hardware infrastructure, software licensing and maintenance, workforce capacity, and other technical and financial resources required.
- Declare a set of open health data standards to be used in digital health interventions with a compliance and enforcement mechanism.[4]
- Maintain awareness of emerging or frontier digital health technologies and assess applicability and use where appropriate and feasible.[5]
- Promote national scientific, professional and patient associations as active participants in digital health development and the national digital health agenda.

Long-term

- Monitor the performance and progress of digital health by adapting or using available tools or maturity model[6], 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 an enterprise architecture (EA) framework or methodology.[7]

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[3] Examples of good programme management practices include PRINCE2 and PMI/PgMP.

[4] Examples of open health data standards to be considered may include but are not limited to those in the ISO/TC 215 health informatics catalogue, ICD-11, HL7 FHIR, IHE, DICOM, LOINC, and others. Member States should evaluate which open standards are the most optimal to use in the local context.

[5] The Internet of Things (IoT), Artificial Intelligence (AI) and machine learning, Big Data Analytics, Blockchain and other digital and frontier biotechnologies have the potential to enhance health significantly by improving efficiency, medical diagnostics, data-based treatment decisions, self-management of care, and strengthen routine care by increasing access and enabling leaders to take data-led action to improve care.

[6] The WHO Digital Health Atlas (DHA) is an example platform for monitoring progress of individual digital health interventions. The Global Digital Health Index (GDHI) is an example tool for monitoring national digital health progress across each of the seven dimensions of digital health according to the WHO-ITU national eHealth strategy framework.

[7] Three common EA methodologies that may be considered for digital health include TOGAF, Zackman, and Gartner.

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- Establish and implement policies regarding practice, payment and accreditation for delivering digital health services.

Proposed actions by WHO Secretariat

Short-term
- Scan the landscape of stakeholders and regulatory bodies and regional (non-UN) actors related to digital health per region and/or within Member States.
- Support capacity building to develop, update and implement national strategies and investment plans for digital health.
- Develop or adapt a maturity model, 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.

Medium-term
- Facilitate dialogue to engage Member States, stakeholders and other partners and obtain sustainable national political, social and economic commitment and mandate for digital health through appropriate national and sub-national policies, procedures, and legislation that governs digital health.
- Advocate for defining digital health architectural blueprints or roadmaps, adoption and use of open standards, use of good digital health programme management practices, and reuse of shared assets or services and systems including interoperability profiles and application layers.
- Facilitate the use of standards development organizations, and partner agencies, to advance the use of appropriate standards to ensure interoperability between systems, and across domains and use cases.

Long-term
- Share good practices and lessons learned with countries and international community, through development of, or leveraging WHO, bilateral, regional, cross-regional and global networks.[8]
- Support countries to establish trust for digital health solutions (provider-provider trust, public-technology use trust, healthcare provider-technology use trust).

Proposed actions by Partners

Short- to Medium-term
- Ensure end user communities and beneficiary populations are adequately engaged in the design, development, deployment, scale-up, and sustainability phases.
- Improvise and promote sustainable financing models in support of digital health development, implementation, integration, and maintenance.

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[8] Examples of global and regional networks, peer-learning groups, and communities of practice in digital health include but are not limited to GDHP, GDHN, AeHIN, AADHN.

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STRATEGIC OBJECTIVE 3: STRENGTHEN GOVERNANCE FOR DIGITAL HEALTH AT GLOBAL, REGIONAL AND NATIONAL LEVELS
Target impact:	*Accelerated digitalization of the health and well-being sector.*

The adoption of digital technologies play an increasing role as enabler of the transformation of the health and well-being sector due to the spread and uptake of innovation and of information and communication technologies (ICT). To make this revolution possible, a large amount of human, technological and financial resources are required.

Collaboration (Strategic objective 1) and leadership and coordination across stakeholders play a key function in the process of adoption and implementation of digital health (Strategic objective 2), but to accelerate and make sustainable the digitalization of the health and well-being sector, actions and investments need to be based on informed decisions.

To strengthen good governance for digital health a well-functioning coordination mechanism and a research agenda that aligns health priorities and digital solutions need to be established, as well as frontier health technologies that need to be assessed and promoted. Good governance with feedback and accountability mechanisms with change management policies is essential. Furthermore, a plan to strengthen digital health literacy skills needs to be in place.

Policy options

- To strengthen digital health governance at national and international levels by **creating sustainable and robust governance structures and capacity** for digital health at global as well as national levels.

- Asses and promote frontier health technologies to **facilitate actions and investments** based on informed decisions.

- Ensure **competencies on digital health** are included in the education and training curricula of all health professionals and allied workers.

- Promote capacity building for governing body leaders and policy makers to **take informed decisions** to support digital health investments.

Proposed actions by Member States

Short-term
- Scan the national market of startups working on disruptive and innovative solutions that can have an impact in the future of health and well-being area.
- Develop an implementation agenda around digital health technologies for health care delivery and public health.
- Ensure the capacity of training institutions to establish/expand digital health literacy, provide lifelong learning opportunities for digital health, and to have such digital health programmes properly accredited by the relevant authorities.

Medium-term
- Develop research and promote capacity building for governing body leaders and policy makers to take informed decisions trust and support digital health investments.

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- Analyze digital health ecosystem and propose concrete policy actions to advance in the achievement of UHC, the SDGs, and GPW13 targets using digital health.

Long-term

- Develop target product profiles and priority characteristics for digital health solutions especially relevant to the needs of low-resource settings define challenges and road map for increased access.
- Invest in and leverage the opportunities availed by digital technologies to strengthen the in proper accreditation certification, licensure, regulation, management and supervision of health workers.

Proposed actions by WHO Secretariat

Short-term
- Establish criteria for assessing digital health solutions relevance and health impact to defined criteria including priority characteristics or specifications, especially relevant to low-resource settings.
- Facilitate the use of global technology registries for digital technologies and projects at country and global level that support unique registration, monitoring, and coordination of digital investments (e.g., Digital Health Atlas).
- Develop evidence-based technical documents on different topics related to digital health including but not limited to cost-effectiveness and affordability, ethical use, privacy and security, and safety.
- Utilize inputs from experts (e.g., WHO digital health technical advisory group) to develop or update the pipeline of technical documents (handbooks, toolkits, guidelines, etc.) on digital health interventions to improve health and well-being.
- Scan the global market of startups working on disruptive and innovative solutions that can have an impact in the future of health and well-being.

Medium-term
- Develop WHO mechanism for assessing, regulating and implementing the use of different digital health technologies.
- Promote inter-country knowledge exchange that demonstrate good governance, architecture, programme management, and use of standards to promote interoperability for digital health.
- Utilize WHO collaborating centers on digital health to advise, support activities and facilitate knowledge exchange and learning within and across countries.

Long-term
- Track advancements across the global digital health ecosystem and propose concrete policy actions to advance in the achievement of the SDGs and the GPW13 targets using digital health.
- Develop research and promote capacity building for Member States and other stakeholders to take informed decisions to support sound digital health investments.

Proposed actions by Partners

Short-term
- Support and contribute to good governance of digital health, adherence to the national architecture, and compliance and use of standards required.

Medium-term
- Develop research on frontier health technologies and share the evaluation results of the implementation of digital health solutions.

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STRATEGIC OBJECTIVE 4: ENHANCE PEOPLE-CENTERED HEALTH SYSTEMS ENABLED BY DIGITAL HEALTH	
Target impact:	*Healthier populations.*

Well-coordinated (Strategic objective 1) digital health effectively implemented (Strategic objective 2) with good governance (Strategic objective 3) provides opportunities to accelerate progress to address national health priorities, in reaching UHC, attaining SDG3, and achieving the triple billion targets for 2023 as articulated in the GPW13. Digital technologies and improved data capacity with good ethical standards are important catalysts for accelerating achievement of the 2030 SDG3 targets. Actionable and relevant data at all levels of the health systems with the adoption of appropriate digital health technologies is the foundation to monitor these goals and objectives.

The actions under this section aim to incorporate people-centered digital health transformation and digital health in the national priority. Under SO4, policies and actions can help ensure global and national standards, regulations and policies are defined to protect and preserve quality of health delivered by digital technologies. This will also foster the conditions and enabling environment to ensure the tools, applications, and services function as intended.

Policy options

- Places **people at the center of digital health** by people-centric adoption and use of digital health technologies. This includes not only patients, families and communities but also the health workers.

- Develop **population health management approaches** through digital health solutions that move health and well-being from reactive care models to active community based models.

- Establish monitoring and evaluation models to facilitate **performance monitoring** of digital systems' contribution to health system processes, health workforce processes, and individual and community health needs.

- Strengthen **gender-equality approaches** to close digital health gaps in large scale.

Proposed actions by Member States

Short-term
- Scan the landscape of professional and patient associations that are active participants in digital health development and the national digital health agenda.
- Review the different education and training programs on digital health per institution, level of degree, specialty and cost, and analyze the current trends at the national level.
- Scan the landscape of national 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.

Medium-term
- 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.

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- Developing population health management approaches through digital health solutions that move health and well-being from reactive care models to active community based models.

Long-term
- Enable digitally health literate populations and raise awareness of patient rights and consent concepts.
- Using digital health solutions to address social determinants of health.
- Synthesize national research and disseminate evidence on digital health interventions contribution to health systems performance and effect on people-centered outcomes including UHC essential package of interventions.

Proposed actions by WHO Secretariat

Short-term
- Scan the landscape of professional and patient associations that are active participants in digital health development and the global digital health agenda.
- Identify the core digital health literacy competencies that might be included in education and training curricula of health professionals and allied workers.

Medium-term
- Promote digital health solutions to address social determinants of health.
- Support Member States and stakeholders to adopt and effectively use person-centric harmonized digital systems for the health workforce (digital client record systems), facilitating persistent health records, care pathways, evidence based decision-support, and health systems' accountability.
- 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.

Long-term
- Develop and promote the use of tools that support digitalizing processes at health service centres to focus on patient's rights, standardized process and managed quality of service.
- Synthesize international research and disseminate evidence on digital health interventions contribution to health systems performance and effect on people-centered outcomes including UHC of essential package of interventions.

Proposed actions by Partners

Short- to Medium-term
- Develop education and training programs on digital health literacy.
- Support countries to adopt and effectively use person-centric harmonized digital systems for the health workforce (digital client record systems), facilitating persistent health records, care pathways, evidence based decision-support, and health systems' accountability.
- Support countries 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.

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Long-term
- Develop and promote the use of tools that support digitalizing processes at health service centres to focus on patient's rights, standardized process and managed quality of service.

MONITORING AND EVALUATION

The action plan calls for Member States and WHO to dynamically monitor the maturity of digital health and implementation of digital health strategies through standard agreed upon metrics. This should include both the status and performance of digital health interventions and establish monitoring and evaluation models to facilitate performance monitoring of digital systems' contribution to health system processes, health workforce processes, and individual health needs.

Steps should be taken to leverage a consistent monitoring framework and set of indicators, combined with national centers or observatories to report on progress of digital systems to contribute to UHC, SDGs and the GPW13 goals.[9] Establishing a monitoring and evaluation framework that promotes a constant cycle of improvement of digital health services and feeds into public health initiatives is also warranted.

Consideration should be made to align the digital health performance monitoring indicators with a national and/or global framework for action (See Fig. 2) for linking the Global Strategy on Digital Health and Action Plan with policy an actions (inputs and processes), outputs, outcomes, and target impacts. The WHO Secretariat shall continue to develop and refine a monitoring and evaluation framework for implementation of the overall *Global Strategy* considering the need to use readily available information and minimize any additional data collection burden 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. The Digital Health Atlas and Global Digital Health Index (GDHI) and Maturity Model[10] are examples and have been developed and are being used by many countries to track, monitor, and evaluate the use of digital technologies for health. For monitoring overall digital health progress, the GDHI contains 19 indicators aligned with the seven components of digital health (eHealth) outlined in the WHO-ITU National eHealth Strategy Toolkit[1], namely the areas of (1) leadership and governance; (2) strategy and investment; (3) infrastructure; (4) standards and interoperability; (5) services and applications; (6) legislation, policy and compliance; and (7) workforce.

Initially, 4 of the 19 of GDHI indicators have been mapped to each of the four Strategic Objectives of the *Global Strategy* as tracer indicators using its maturity model approach to monitor progress with digital health. This is a starting point only with the intent initially to avoid or minimize burdening stakeholders with additional data collection and reporting while utilizing existing tools and techniques. It is

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[9] The WHO Global Observatory of eHealth (GOe) is an example platform for assessing the situation and trends in digital health among those countries reporting periodically.

[10] The WHO Digital Health Atlas (DHA) is an example platform for monitoring progress of individual digital health interventions. The Global Digital Health Index (GDHI) is an example tool for monitoring national digital health progress across multiple dimensions.

recommended that Member States consider the GDHI and other measures or indicators for monitoring and evaluating progress for adoption and regular use.

STRATEGIC OBJECTIVE 1: PROMOTE GLOBAL COLLABORATION AND ADVANCE THE TRANSFER OF KNOWLEDGE ON DIGITAL HEALTH	
Indicator: *(GDHI Indicator 1)*	**Digital health prioritized at the national level through dedicated bodies / mechanisms for governance**

Does the country have a separate department / agency / national working group for digital health? The focus of this indicator is on the coordination and oversight of stakeholder collaboration of digital health.

LOW ⟵   ⟶ HIGH

1	2	3	4	5
No coordination body exists and/or nascent governance structure for digital health is constituted on a case-by-case basis.	Governance structure is formally constituted though not fully-functional or meeting regularly.	Governance structure and any related working groups have a scope of work (SOW) and conduct regular meetings with stakeholder participation and/or consultation.	Governance structure is fully-functional, government-led, consults with other ministries, and monitors implementation of digital health based on a work plan.	The digital health governance structure is institutionalized, consults with other ministries, and monitors digital health. It is relatively protected from interference or organizational changes. It is nationally recognized as the lead for digital health. The governance structure and its technical working groups emphasize gender balance in membership.

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STRATEGIC OBJECTIVE 2: ADVANCE IMPLEMENTATION OF NATIONAL DIGITAL HEALTH STRATEGIES	
Indicator: *(GDHI Indicator 3)*	***National digital health / eHealth strategy or framework***

Does the country have a digital health or eHealth strategy or framework and a costed digital health plan?

LOW ◀——▶ HIGH

1	2	3	4	5
There is no digital health strategy or framework. Draft digital health strategy or framework developed, but not officially reviewed.	National digital health strategy or framework approved.	National digital health costed plan developed and approved.	National digital health strategy and costed plan partially implemented with resources to ensure full implementation.	National digital health strategy and costed plan fully implemented with planning underway for next 3-5 year cycle.

STRATEGIC OBJECTIVE 3: STRENGTHEN GOVERNANCE FOR DIGITAL HEALTH AT GLOBAL, REGIONAL AND NATIONAL LEVELS	
Indicator: *(GDHI Indicator 7)*	***Protocol for regulating or certifying devices and/or digital health services***

Are there protocols, policies, frameworks or accepted processes governing the clinical and patient care use of connected medical devices and digital health services (e.g. telemedicine, applications), particularly in relation to safety, data integrity and quality of care?

LOW ◀——▶ HIGH

1	2	3	4	5
There are no protocols, policies, frameworks or accepted processes governing the clinical and patient care use of connected medical devices and digital health services (e.g. telemedicine, applications), particularly in relation to safety, data integrity and quality of care.	Protocols, policies, frameworks or accepted processes governing the clinical and patient care use of connected medical devices and digital health services (e.g. telemedicine, applications), particularly in relation to safety, data integrity and quality of care have been proposed and are under review.	Protocols, policies, frameworks or accepted processes governing the clinical and patient care use of connected medical devices and digital health services (e.g. telemedicine, applications), particularly in relation to safety, data integrity and quality of care have been passed, but are not fully implemented.	Protocols, policies, frameworks or accepted processes governing the clinical and patient care use of connected medical devices and digital health services (e.g. telemedicine, applications), particularly in relation to safety, data integrity and quality of care have been implemented, but not consistently enforced.	Protocols, policies, frameworks or accepted processes governing the clinical and patient care use of connected medical devices and digital health services (e.g. telemedicine, applications), particularly in relation to safety, data integrity and quality of care have been implemented and are enforced consistently.

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STRATEGIC OBJECTIVE 4: ENHANCE PEOPLE-CENTERED HEALTH SYSTEMS ENABLED BY DIGITAL HEALTH
Indicator: *(GDHI Indicator 17)*   ***Nationally scaled digital health systems***

Public sector priorities (e.g. 14 domains included in ISO TR 14639) are supported by nationally-scaled digital health systems.

LOW ⟵   ⟶ HIGH

1	2	3	4	5
National priority areas are not supported by digital health at any scale.	Few national priority areas are supported by digital health, and implementation initiated (< 25% priority areas).	Some national priority areas supported by scaled digital health systems (25-50% of priority areas).	The majority, but not all national priority areas (50-75% of priority areas) supported by scaled digital health systems.	All nationally prioritized areas supported by national-scale digital health systems (>75%) with monitoring and evaluation systems and results.

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GLOSSARY

Artificial intelligence (AI): An area of computer science that emphasizes the creation of intelligent machines that work and react like humans.

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.

Big data[11]: The emerging use of rapidly collected, complex data in such unprecedented quantities that terabytes (1012 bytes), petabytes (1015 bytes) or even zettabytes (1021 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.

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

Digital health[12]: The field of knowledge and practice associated with the development and use of digital technologies to improve health.

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

Telehealth: Telehealth involves the use of telecommunications and virtual technology to deliver health care outside of traditional health-care facilities. Telehealth, which requires access only to telecommunications, is the most basic element of "e-health", which uses a wider range of information and communications technologies (ICTs).

Telemedicine[13]: 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 for the continuing education of health-care providers, for advancing the health of individuals and communities.

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[11] World Health Organization. Big data in global health: improving health in low-and middle-income countries (http://www.who.int/bulletin/volumes/93/3/14-139022/en/ , accessed 26 July 2019)

[12] This definition encompasses eHealth, in line with WHO's Executive Board report (WHO EB142/20) of 2017, 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)". Digital health 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.

[13] World Health Organization. Telemedicine: Opportunities and Developments in Member States. Global Observatory for eHealth series – Volume 2 (http://www.who.int/goe/publications/goe_telemedicine_2010.pdf , accessed 26 July 2019)

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