WHO GUIDELINE

RECOMMENDATIONS ON DIGITAL INTERVENTIONS FOR HEALTH SYSTEM STRENGTHENING

EXECUTIVE SUMMARY

World Health Organization

WHO/RHR/19.8

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Background

Digital health, or the use of digital technologies for health, has become a salient field of practice for employing routine and innovative forms of information and communications technology (ICT) to address health needs. The term digital health is rooted in eHealth, which is defined as "the use of information and communications technology in support of health and health-related fields". Mobile health (mHealth) is a subset of eHealth and is defined as "the use of mobile wireless technologies for health". More recently, the term digital health was introduced as "a broad umbrella term encompassing eHealth (which includes mHealth), as well as emerging areas, such as the use of advanced computing sciences in 'big data', genomics and artificial intelligence".

The World Health Assembly Resolution on Digital Health unanimously approved by WHO Member States in May 2018 demonstrated a collective recognition of the value of digital technologies to contribute to advancing universal health coverage (UHC) and other health aims of the Sustainable Development Goals (SDGs). This resolution urged ministries of health "to assess their use of digital technologies for health [...] and to prioritize, as appropriate, the development, evaluation, implementation, scale-up and greater use of digital technologies..." Furthermore, it tasked WHO with providing normative guidance in digital health, including through the promotion of evidence-based digital health interventions.

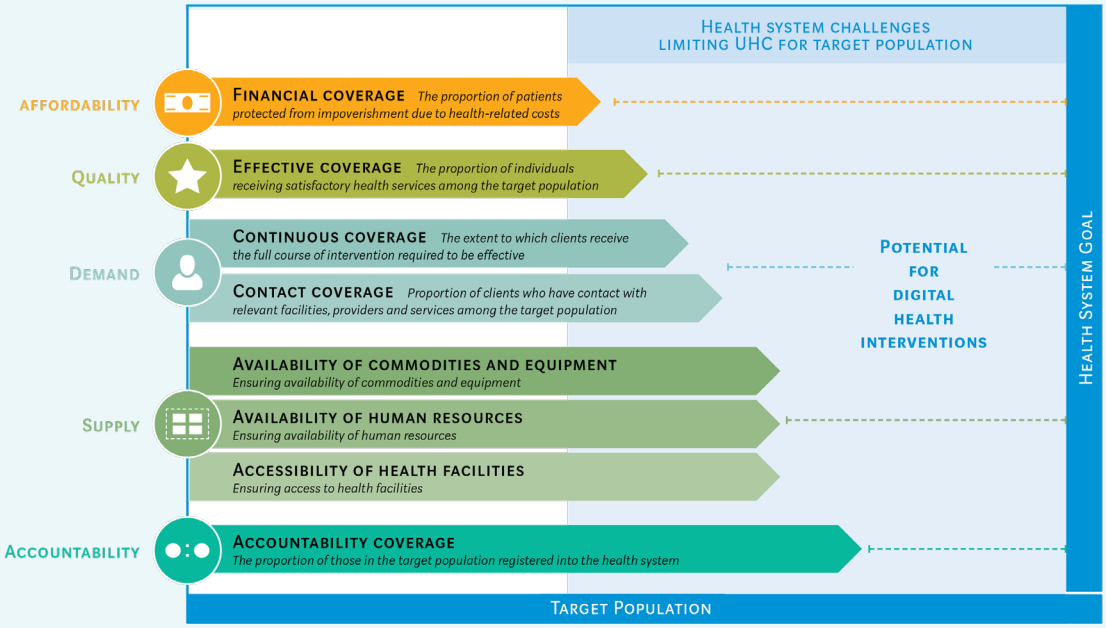
Amid the heightened interest, digital health has also been characterized by implementations rolled out in the absence of a careful examination of the evidence base on benefits and harms. The enthusiasm for digital health has also driven a proliferation of short-lived implementations and an overwhelming diversity of digital tools, with a limited understanding of their impact on health systems and people's well-being. This concern was highlighted most notably in the consensus statement of the WHO Bellagio eHealth Evaluation Group, which opened by stating: "To improve health and reduce health inequalities, rigorous evaluation of eHealth is necessary to generate evidence and promote the appropriate integration and use of technologies." While recognizing the innovative role that digital technologies can play in strengthening the health system, there is an equally important need to evaluate their contributing effects and ensure that such investments do not inappropriately divert resources from alternative, non-digital approaches.

Role of digital health in health system strengthening and Universal Health Coverage

The goal of UHC is to ensure the quality, accessibility and affordability of health services. However, shortfalls remain in ensuring access to all who need health services and in ensuring that they are delivered with the intended quality without causing financial hardship to the people accessing them. The Tanahashi framework published by WHO in 1978 provides a time-tested model for understanding health system performance gaps and how they prevent the intended coverage, quality and affordability of health services. This cascading model illustrates how health systems lose performance because of challenges at successive levels, each dependent on the previous level. Health system challenges – such as geographical inaccessibility, low demand for services, delayed provision of care, low adherence to clinical protocols and costs to individuals/patients – contribute to accumulated losses in health system performance. These shortfalls limit the ability to close the gaps in coverage, quality and affordability, and undermine the potential to achieve UHC.

This adapted Tanahashi model illustrates that each health system performance layer builds on the components below it but also falls short (dotted lines) of the optimal, desired level (Figure 1). Digital health interventions could contribute to efforts to address challenges that limit achievement of that health system goal.

Figure 1 Layers of UHC achievement affected by health system performance



Source: adapted from Tanahashi, 1978.

Digital technologies provide concrete opportunities to tackle health system challenges, and thereby offer the potential to enhance the coverage and quality of health practices and services. Digital health interventions may be used, for example, to facilitate targeted communications to individuals in order to generate demand and broaden contact coverage. Digital health interventions may also be targeted to health workers to give them more immediate access to clinical protocols through, for example, decision-support mechanisms or telemedicine consultations with other health workers. The range of ways digital technologies can be used to support the needs of health systems is wide, and these technologies continue to evolve due to the inherently dynamic nature of the field. A starting point for categorizing the different ways that digital technologies are being used to overcome defined health system challenges is provided by WHO's *Classification of digital health interventions v1.0*.

A digital health intervention is defined here as a discrete functionality of digital technology that is applied to achieve health objectives and is implemented within digital health applications and ICT systems, including communication channels such as text messages.

Objectives of the guideline

The key aim of this guideline is to present recommendations based on a critical evaluation of the evidence on emerging digital health interventions that are contributing to health system improvements, based on an assessment of the benefits, harms, acceptability, feasibility, resource use and equity considerations. For the purposes of this version of the guideline, the recommendations examine the extent to which digital health interventions, primarily available via mobile devices, are able to address health system challenges along the pathway to UHC. By reviewing the evidence of different digital interventions against comparative options, as well as assessing the risks, this guideline aims to equip health policy-makers and other stakeholders with recommendations and implementation considerations for making informed investments into digital health interventions.

This guideline urges readers to recognize that digital health interventions are not a substitute for functioning health systems, and that there are significant limitations to what digital health is able to address. Digital health interventions should complement and enhance health system functions through mechanisms such as accelerated exchange of information, but will not replace the fundamental components needed by health systems such as the health workforce, financing, leadership and governance, and access to essential medicines. An understanding of which health system challenges can realistically be addressed by digital technologies, along with an assessment of the ecosystem's ability to absorb such digital interventions, is thus needed to inform investments in digital health. Additionally, the adoption of the recommendations in this guideline should not exclude or jeopardize the provision of quality non-digital services in places where there is no access to the digital technologies or they are not acceptable or affordable for target communities.

The recommendations in this guideline represent a subset of prioritized digital health interventions accessible at a minimum via mobile devices, and this guideline will gradually include a broader set of emerging digital health interventions over subsequent versions. This includes recommendations on the following digital health interventions, accessible at a minimum via mobile devices

- **birth notification**
- **death notification**
- **stock notification and commodity management**
- **client[1]-to-provider telemedicine**
- **provider-to-provider telemedicine**
- **targeted client communication**
- **tracking of patients'/clients' health status and services**
- **health worker decision support**
- **provision of training and educational content to health workers**

The systematic reviews included accessibility via mobile devices to ensure that these digital interventions are applicable in low resource settings where extensive computerized systems may not be available or feasible. However, the recommended interventions can be deployed through any digital device, including stationary devices, such as desktop computers, and does not preclude them from being used on non-mobile digital devices.

Target audience

The primary target audiences for this guideline are decision-makers in ministries of health, public health practitioners and other stakeholders who will benefit from an understanding of which digital health interventions have an evidence base to address health system needs. This guideline may also prove beneficial to organizations that invest resources into digital health as implementation and development partners. This document aims to strengthen evidence-based decision-making on digital approaches by governments and partner institutions, encouraging the mainstreaming and institutionalization of effective digital interventions.

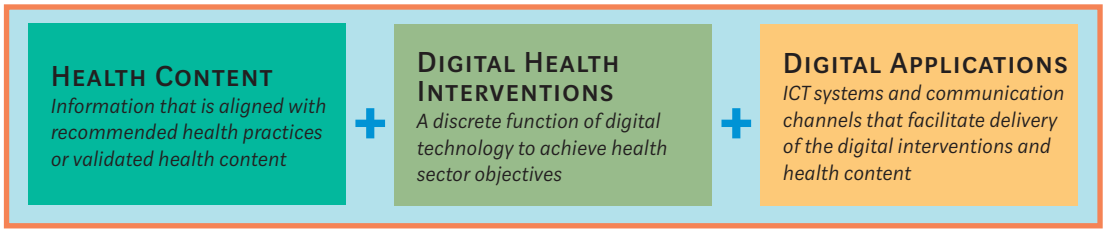
1 Although WHO's *Classification of digital health interventions v1.0* uses the term "client", the terms "individual" and "patient" may be used interchangeably, where appropriate.

Implementation context

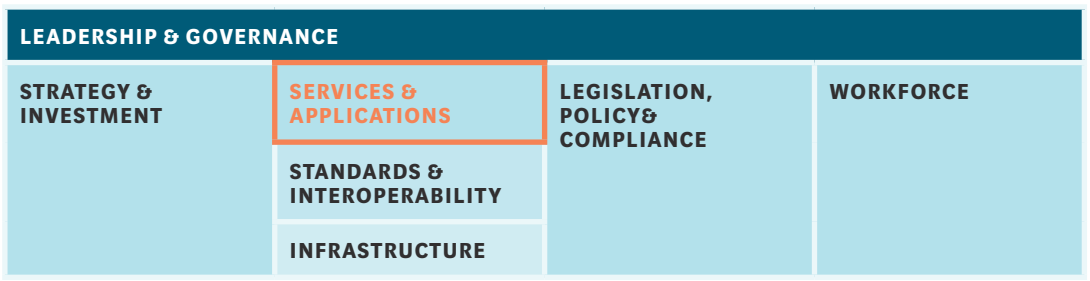
Digital health has the potential to help address problems such as distance and access, but still shares many of the underlying challenges faced by health system interventions in general, including poor management, insufficient training, infrastructural limitations, and poor access to equipment and supplies. These considerations need to be addressed in addition to the specific implementation requirements introduced by digital health.

Digital health interventions are applied within a country context and a health system, and their implementation is made possible by a number of factors including: (i) the health domain area and associated content; (ii) the digital intervention or functionality provided; (iii) the software and communication channels for delivering the digital health intervention; and mediated by (iv) a foundational layer of the ICT and the enabling environment (see Figure 2). Furthermore, these components need to be made appropriate to the local context and ensure effective implementation through reflection on the behaviour and organizational changes that would also be required. Lastly, digital health interventions are intended to fit into an overall digital health architecture. While the unit of analysis for this guideline focuses on the value of specific digital interventions, there is an equally important need to support a cohesive approach to implementation, in which different digital interventions can leverage one another, as opposed to operating as isolated initiatives.

FIGURE 2 COMPONENTS CONTRIBUTING TO DIGITAL HEALTH IMPLEMENTATIONS



FOUNDATIONAL LAYER: *ICT and Enabling Environment*



As the context may drive the eventual impact of the digital health interventions, the broader health system and enabling environment become especially critical. There is considerable value in assessing the ecosystem in a given context or country, in reviewing health system needs and tempering expectations based on the ICT and enabling environment available within a setting. In the absence of a robust enabling environment, there is the risk of a proliferation of unconnected systems and a severe impact on the effectiveness and sustainability of the health intervention.

Methods

The development of this guideline followed the methods described in the second edition of the *WHO handbook for guideline development*. This institution-wide process at WHO entailed the identification of critical questions and outcomes, retrieval of the evidence, assessment and synthesis of that evidence, the formulation of recommendations, and planning for the implementation, dissemination, impact evaluation and updating of the guideline.

The guideline development process also included two rounds of online surveys and three in-person consultations. These consultations included (i) an advisory meeting in February 2016 to establish the goal of the guideline in light of other WHO resources and to determine underlying framework; (ii) a scoping meeting in September 2016 to prioritize and draft the critical questions and outcomes; and (iii) a final meeting in June 2018 to review the synthesized evidence and formulate recommendations. Online surveys were used before and after the September scoping meeting to inform the refinement and prioritization of the questions.

Scope of interventions and outcomes

The scoping process resulted in priority questions across the following digital health interventions prioritized for evidence review within the guideline (included in Annex 2). The definitions of the interventions included in this guideline are provided in Table 1.