World Health Organization
European Region

Data and digital health policy brief series

Accelerating the uptake of digital solutions by the health and care workforce in the WHO European Region

Executive summary

Digital health technologies (DHTs) are becoming an integral part of successful and sustainable health service delivery in every Member State of the WHO European Region. Despite increasing evidence of their impact in optimizing the capability of the health and care workforce, enabling access to health services, and improving patient empowerment and quality of care, the adoption of DHTs by the workforce has been slow and faces significant challenges. Research indicates that multifaceted barriers to increasing DHT use by the workforce are related to infrastructure, training, time, workload, ethics, and legal and technical factors. These barriers were consistently identified, irrespective of the level of care or type of technology employed.

Accelerating DHT uptake by the health and care workforce requires addressing systemic and institutional barriers, as well as human factors. All of these barriers are well known, yet often neglected or overlooked. Recent findings indicate that policies governing the adoption of DHTs in Member States of the Region primarily address technological factors, with far less consideration of operational management, organizational and human aspects that are critical to success.

This policy brief provides a synthesis of recent findings on how the deployment of various digital health innovations can impact the health and care workforce and highlights the progress made by countries in addressing the non-technological barriers. It also provides practical policy-level suggestions to help governments to create enabling environments and incentives to increase the use of DHTs by the health and care workforce.

Main findings

The evidence was derived from systematic reviews of recent peer-reviewed academic literature and the 2022 Survey on Digital Health in the WHO European Region. The main findings are as follows.

Successful digital transformation involves complex organizational change

Collaborative approaches build trust in technology and encourage the long-term engagement of the health and care workforce.

Having a strong and visible leadership culture that fosters innovation is instrumental in driving successful digital transformation

Key challenges include understanding how to reorganize health services and identifying the roles and functions that will be most impacted by the implementation of DHTs, determining new skills and competencies to respond to the changes brought about by DHTs, and identifying which mechanisms are best suited to strengthening the overall capability of the health and care workforce. One-size-fits-all strategies inevitably translate into suboptimal user engagement. As such, tailored approaches are required to meet the needs of different groups within the health and care workforce, taking the varying service delivery contexts into account.

Improving the uptake of digital solutions by the health and care workforce is closely linked to efforts to enhance its digital literacy

The evidence suggests that people with better digital literacy have more positive attitudes and behaviours towards adopting new technologies. Digital literacy is a well-established catalyst for generating trust in DHT use and, therefore, a cornerstone of the utilization of digital health resources.

Factors that restrict the wide use of DHTs by the health and care workforce include inadequate inclusion of both workforce and patient groups in the design, testing and implementation of DHTs

Equally, most projects that aim to increase DHT use do not include an evaluation of the actual benefits. Persistent limiting factors include psychological and personal factors, lack of supervisory support, ownership issues, and cultural, social and financial barriers.

Digital health strategies are proven drivers of coherent policies to prevent the misalignment of incentives and provide a firm foundation for digital transformation

Actions to improve digital literacy and health and care workforce capabilities should be key components of such strategies. Such actions should include regular monitoring to understand the nuanced impacts of DHTs on individuals and organizations and, more broadly, on the effectiveness of health care.

Current evidence is limited on the potential barriers and facilitators for educating the health and care workforce

Evidence on potential barriers and facilitators for educating the workforce in the use of artificial intelligence models, machine learning algorithms and platforms utilizing features such as augmented reality is limited; however, the core barriers and facilitators are similar to those for other types of DHT.

Policy options

Based on the main findings, key policy actions for accelerating the uptake of digital solutions by the health and care workforce in the WHO European Region are suggested.

1 Assess digitals skills

Conduct an assessment of the current status of the digital skills and competencies of the health and care workforce in order to develop the most meaningful initiatives and effective mechanisms for digital upskilling.

2 Develop effective policies

Develop policies that address all identified barriers to DHT use by the health and care workforce and ensure sufficient ongoing opportunities to become more digitally literate and enabled in using different technology platforms, in recognition that meaningful digital upskilling is a gradual and continuous process.

3 Improve digital literacy

Institutionalize mechanisms for improving digital literacy in the entire health and care workforce by incorporating digital health training into undergraduate curricula and continuing professional development.

4 Incentivize DHT use

Provide incentives for the health and care workforce to become actively involved in the development and implementation of DHTs. Ensure with input from clinicians, carers and patients in early design phases that the tools align with real-world needs and workflows.

5 Provide tailored training

Consider how DHT training can best be delivered (residential, distance, virtual learning) to the health and care workforce, taking local contexts into account.

6 Monitor DHT impact

Evaluate the effectiveness and operational impact of DHTs, with user input to help to identify issues, refine features and ensure that the technology adds value without introducing unwanted complexities or new risks.

Introduction

While the coronavirus disease (COVID-19) pandemic necessitated the rapid deployment of digital health technologies (DHTs) in health systems, multiple factors still impede their uptake and use by the health and care workforce *(1)*. Studies conducted since the early 2000s have examined the experiences of health professionals confronted with the rapid digital transformation of health-care environments. Findings of these studies indicate that investments in reliable and sustainable infrastructure are important to catalyse the uptake of DHTs, but that connectivity and technology alone do not guarantee the seamless integration of digital pathways into clinical practice. Furthermore, systematic reviews of academic literature highlight that building a digitally enabled workforce also requires health authorities to proactively address sociological and technical barriers to change user attitudes and perceptions *(2)*.

Factors that contribute to the successful uptake of DHTs by the health and care workforce include user design and usability;changing roles and responsibilities, digital literacy and perceptions of value (benefits, utility and effectiveness); and the prevailing policy context (for example, necessitating changes in funding models) *(2,3)*. However, despite strong evidence of their importance, these factors are often ignored or overlooked when developing national approaches to increase the use of DHTs.

Objectives

This policy brief aims to provide evidence-informed considerations for policy-makers in the WHO European Region to guide national approaches for accelerating the uptake of DHTs. As a minimum, these approaches should:

include tailored digital health policies and implementation strategies to meet the varied needs of the health and care workforce in different care delivery. They should also monitor the impact on workflows, clinical interactions, and the effectiveness of care;

provide opportunities for the health and care workforce to actively contribute to the development of approaches for adopting and scaling up DHTs and for improving their digital skills, capabilities and competencies;

recognize that the factors influencing the uptake of DHTs extend well beyond a technology-centric view of implementation to encompass operational management, organizational and human aspects that are critical for success; and

carefully consider the degree of expected organizational changes across the various medical professions and specialties and the main differences in the impacts on and needs of each group of health care professionals.

Key findings and analysis

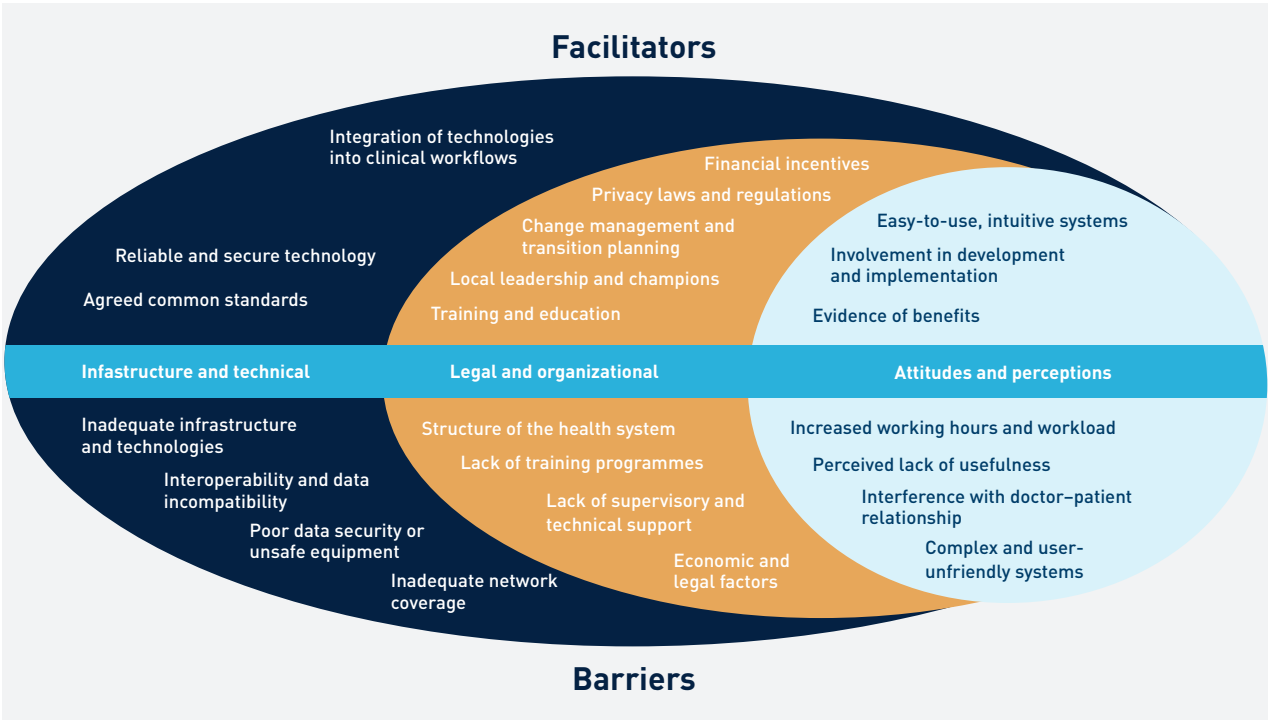
Despite challenges in adopting DHTs, benefits of their use are valued by the health and care workforce

The introduction of DHTs such as electronic health records, mobile devices, telehealth, wearable technologies, advanced analytics and artificial intelligence is changing the daily practice of the health and care workforce and how health care is delivered. Understanding these changes and how they are perceived by the workforce is of critical importance to their adoption *(4)*.

A recent systematic review found that health and care workers appreciate the benefits of digital health to care delivery, despite encountering challenges in its use *(5)*. It highlighted several factors that restrict the wide use of DHTs by the workforce, including psychological and personal factors, lack of supervisory support, ownership issues, and the cultural, social and financial features of the health system. Additionally, ensuring that implemention includes systematic feedback loops and performance metrics is critical to achieving impact *(6)*.

Fig. 1 shows the barriers and facilitators to use of DHTs by the health and care workforce. For example, the benefits of telehealth and mobile health technologies include improved access to care, diagnostic accuracy and quality of care, as well as enhanced interprofessional communication, information and knowledge-sharing. Electronic health records can enhance the collection and documentation of patient data, expedite patient registration, decrease documentation errors and improve the clinical management of patients, while also being a valuable source of information for secondary purposes such as performance enhancement, resource planning and policy-making. Digital support systems for clinical decision-making can considerably improve the performance of health care providers, enhance their professional knowledge, increase adherence to guidelines and clinical protocols, and improve care delivery.

Fig. 1. Barriers and facilitators to DHT use for the health and care workforce



Source: adapted from Borges do Nascimento et al. *(2)*.

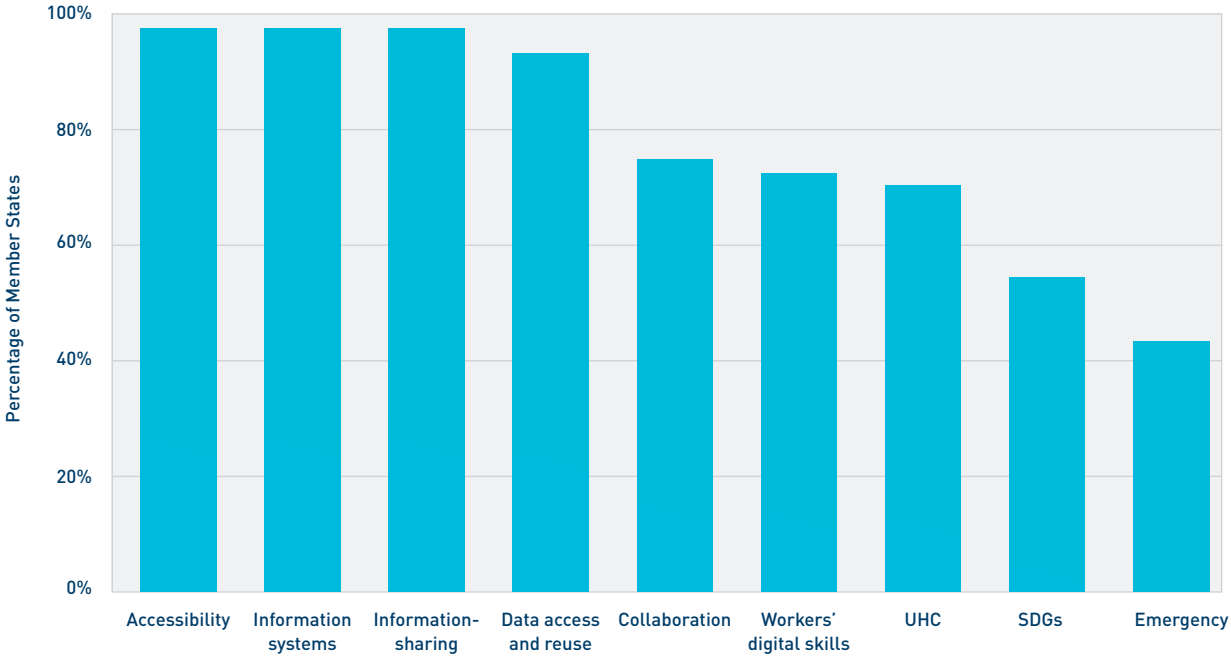
The findings also highlighted a range of impacts and challenges that vary depending on the health and care workforce group and setting. For example, general internal medicine physicians tend to give the usability of electronic health records a higher rating compared with family medicine physicians, radiologists and surgeons. Although technological advances offer many benefits, members of the workforce felt that decision-makers need to think carefully about the degree of expected organizational changes across various professions and consider differences in the impacts on and needs of the various types of health care provider. Currently, limited evidence is available on addressing the potential barriers to and facilitators for educating the workforce in frontier digital technologies such as the use of artificial intelligence models, machine learning algorithms and platforms utilizing features such as augmented reality; however, the core barriers and facilitators are similar to those for other types of DHT.

Strengthening digital skills in the health and care workforce is an emerging priority for Member States of the WHO European Region

Improving the uptake of digital solutions by the health and care workforce is closely linked to efforts to enhance digital literacy levels. Despite the widespread introduction of electronic health records and other digital health tools in both acute and primary care practice, many health professionals still feel that they are not sufficiently competent in digital health overall *(7)* and often do not have the upskilling opportunities required to make full use of DHTs.

Therefore, a priority for Member States of the WHO European Region has been to put training and education in digital health on the policy agenda and identify the needs of the health and care workforce. The 2022 Survey on Digital Health in the WHO European Region revealed that 72% of responding Member States (32/44) recognize strengthening the digital health skills of the workforce as a major strategic priority (Fig. 2) *(8)*. Addressing this challenge requires designing education and training programmes at both undergraduate level and for continuing professional development of the current health and care workforce.

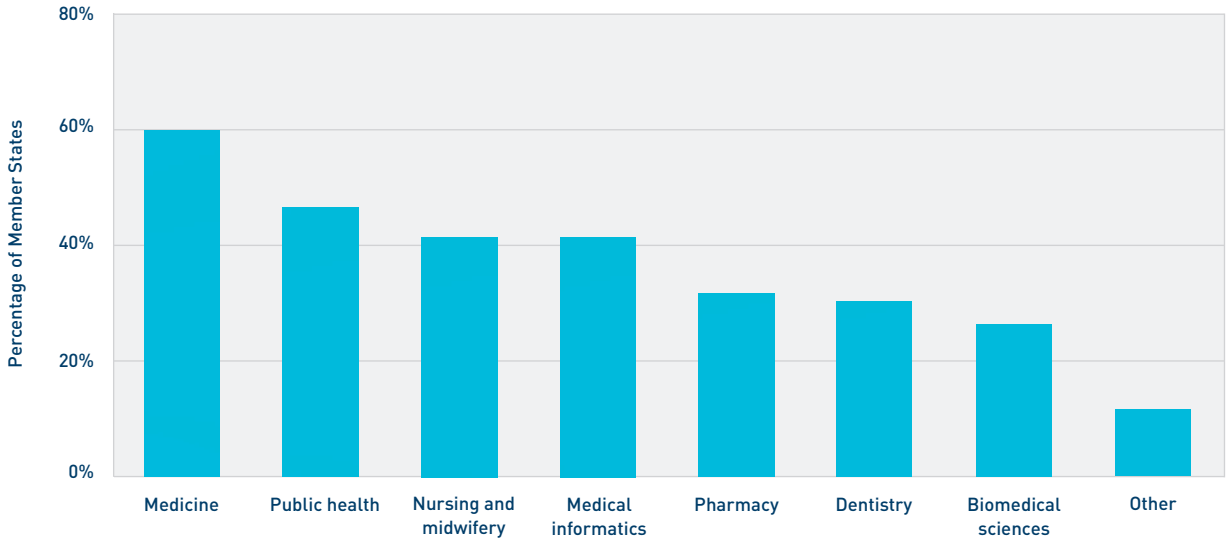
Fig. 2. Strategic prioritization of strengthening digital skills of the health and care workforce in Member States of the WHO European Region



Note: SDGs: Sustainable Development Goals; UHC: universal health coverage.
Source: WHO Regional Office for Europe *(8)*.

In 2022 over two thirds of responding Member States (70%) had established continuing education programmes in the form of in-service digital health training, with the majority of efforts directed towards medical professionals, followed by public health specialists (Fig. 3). However, fewer Member States had made this training available to nursing professionals (42%) and even fewer to pharmacists (32%) or mandatory (10%).

Fig. 3. Availability of in-service DHT training for medical professionals in Member States of the WHO European Region



Source: WHO Regional Office for Europe *(8)*.

These results indicate that gaps exist in the way that digital health training is currently offered and in the type of training that Member States need to provide to build a workforce capable of providing the appropriate type and context of health care needed in the future. Projected shortages of physicians in both primary care and non-primary care specialties, particularly in rural areas, combined with ageing populations and the growth of mental and behavioural health conditions, will increase the demand for nurses and DHTs to support remote care delivery *(9,10)*.

Tailored training strategies are an integral part of digital transformation initiatives

One-size-fits-all strategies for adopting DHTs inevitably risk suboptimal user engagement. Digital transformation initiatives in health care are rarely linear and typically require complex organizational change to achieve the intended benefits. The successful integration of new digital health services (e.g. telemedicine) often requires significant change at the organizational and practice levels *(11)*. Such change needs to be well planned and communicated and to incorporate training for health professionals. The low-risk approach of not changing processes at all can mean that efficiency gains are not achieved. At the other extreme, the radical redesign of processes and practice runs the risk of rejection by the health and care workforce. Additionally, institutions, professions and individuals may be at different stages of the pathway towards digital transformation. Understanding the fit between individuals, their tasks, DHTs and the environment in which they are introduced is critical for successful implementation *(12)*.

Need for a strategic approach to improving, monitoring and evaluating digital literacy and skills in the health and care workforce

Actions to accelerate the uptake of DHTs by the health and care workforce should be anchored in digital health strategies that guide digital transformation of the health system as an adaptive change process. Such strategies are needed to set directions that build upon existing investments and that solicit the input of all relevant stakeholders, including patients and health professionals as part of their development. Actions to improve the digital literacy and capabilities of the health and care workforce should be a key component of these strategies. Digital health strategies also need to catalyse mechanisms for regular monitoring and re-examination of existing systems and processes, as well as of health providers' priorities, needs and beliefs *(13)*.

The action plan of the WHO *Global Strategy on Digital Health 2020–2025* calls for Member States to dynamically monitor the contribution of digital health to health system processes, health and care workforce processes, and individual health needs *(14)*. It also acknowledges that approaches for implementing the global strategy on digital health will depend on the national context, national priorities for health and well-being, and the workforce's needs and capacity in each country.

The WHO Framework for Action on the Health and Care Workforce in the WHO European Region 2023–2030, which was unanimously adopted at the 73rd session of the WHO Regional Committee for Europe, also recognizes the critical importance of building the digital health competencies of the health and care workforce *(15)*. It specifically recognizes the critical importance of using DHT and artificial intelligence to optimize performance and guarantee a more sustainable workforce in the mid and long terms to meet the increasing demand for health services *(16)*.

The 2022 Survey on Digital Health in the WHO European Region found that although 77% of Member States (39/51) have established a national government agency or organization responsible for monitoring digital health interventions, evaluation is still not being conducted systematically *(8)*. Additionally, only 19 of the 39 Member States had developed guidance for evaluating digital health interventions.

Implementation considerations

The introduction of DHTs should fully align with the objectives of the health system and provide added value for patients and health professionals. The health and care workforce should be closely involved in the co-design and development of DHTs.

Avoid developing policies for strengthening the digital literacy and skills of the health and care workforce that are tied to limited or time-bound funding. A well-developed and consistent approach to incorporating digital health training into undergraduate and continuing professional development of the workforce is needed to achieve broadscale acceleration in DHT uptake.

The introduction of DHTs requires addressing substantial changes in the roles and routines of the health and care workforce and in organization of the health system. Health systems are complex and introducing a digital solution can impact other parts of care pathways and the groups who deliver them.

Increasing digital skills and competencies in the health and care workforce improves trust in DHT use and should be accompanied by other trust-building actions to facilitate the acceptance of digital transformation initiatives such as adopting standards, privacy legislation and clinical and operational guidelines *(17)*. The uptake of frontier technologies by health professionals also requires improved data and media literacy *(18)*.

Efforts to improve digital health literacy in health professionals should include training to recognize and address societal biases and stigma that may affect how digital health solutions are offered to specific population groups, for example, women, older adults *(19)*, and people with lower education levels or disabilities. This includes understanding and respecting social and cultural contexts to prevent widening of the digital divide.

Conclusions

The COVID-19 pandemic highlighted opportunities for DHTs, with many countries accelerating the rollout of technology-enabled health services, particularly to overcome access and delivery issues. However, increased support for digital health among policy-makers and health officials has not always been matched by efforts to ensure digital literacy and skills in the health and care workforce. This policy brief provides recent evidence on barriers and facilitators to the uptake of DHTs by health professionals and indicates a need to address a range of factors beyond those of a technological nature if countries are to accelerate the uptake of digital solutions and derive the best value for both health professionals and patients through investment in digital transformation.

Incorporating digital health skills and literacy into undergraduate training across all medical disciplines and into continued professional development programmes for the health and care workforce is needed as part of a consistent, strategic approach to accelerating DHT uptake. This should include incentives to use DHTs alongside learning opportunities to improve digital skills that meet local implementation contexts and openly address the concerns and uncertainties of health professionals.

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