

IFMSA Policy Proposal

Digital Transformation of Healthcare

Proposed by Team of Officials

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Policy Commission

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Policy Statement

Introduction

Over the past decades, the world has adopted digital technologies and innovations in all aspects of life, including healthcare. Digital health induces rapidly digitising health systems and services. It is defined as the field of knowledge and practice with the development and use of digital technologies to improve health. Digital transformation of healthcare contributes to achieving Universal Health Coverage (UHC) and Sustainable Development Goal (SDG) 3. To achieve health for all, digital health initiatives must be ethical, safe, secure, reliable, equitable and sustainable. This digital transformation highlights the need for international and intersectional collaboration to ensure equitable access to technological healthcare innovation.

IFMSA position

The International Federation of Medical Students' Associations (IFMSA) recognizes digital health's role in achieving UHC and SDG3. The IFMSA supports research and development of digital health initiatives which are ethical, safe, secure, reliable, equitable and sustainable. Therefore, the IFMSA encourages all stakeholders to follow the World Health Organization (WHO) recommendations in the Global Strategy on Digital Health 2020-2025. Furthermore, the IFMSA emphasises the need for digital health education for medical students worldwide, the current health workforce, patients and communities at risk of being left behind in the digital transformation of healthcare. Lastly, IFMSA believes that international and interprofessional collaboration is fundamental for effective and accessible digital health implementation.

Call to Action

Therefore, IFMSA calls on:

Governments to:

- Adopt and implement national laws that promote ethical, safe, secure, reliable, equitable and sustainable digital health initiatives together with the development of robust evaluation and monitoring systems
- Observe the WHO's Global Strategy on Digital Health 2020-2025 and its recommendations;
- Increase funding for the digital transformation of healthcare services and support the development of evidence-based digital health initiatives through investment in resources and infrastructure;
- Ensure that the digital transformation of healthcare benefits all members of society, reducing health inequity and structural discrimination;
- Facilitate interprofessional collaboration between Non-Governmental Organisations (NGOs), healthcare-providing institutions, research centres, universities and other entities in the digital transformation of healthcare.

The WHO to:

- Continue to disseminate knowledge, facilitate interprofessional collaboration and develop guidelines or other tools for the digital transformation of healthcare;
- Support governments in the development of strategies for the implementation of digital health initiatives and ensuring their equitable distribution between and within countries;
- Regularly report on the strategy, follow up on reported results and apply collected data to identify and support countries falling behind in the digital transformation of healthcare.

NGOs, including **patient organisations** and **human rights organisations**, to:

- Observe the WHO's Global Strategy on Digital Health 2020-2025 and its recommendations;
- Advocate for ethical, safe, secure, reliable, equitable and sustainable usage of digital health;
- Advocate for patient-centered development of digital health initiatives, with a particular focus on vulnerable groups;

- Collaborate with governments, healthcare-providing institutions, universities, and the digital health industry to ensure appropriate patient education.

Healthcare providing institutions to:

- Observe the WHO's Global Strategy on Digital Health 2020-2025 and its recommendations;
- Create an adequate workplace learning infrastructure, which allows dedicated time and flexible ways for up-skilling for the current health workforce.
- Involve staff in identifying how digital health can improve staff productivity and in the implementation of digital health initiatives;
- Adopt technologies that have regulatory clearance to improve patient outcomes.

Universities, education institutions, and medical faculties to:

- Observe the WHO's Global Strategy on Digital Health 2020-2025 and its recommendations;
- Adequately train healthcare professionals and university educators to ensure they are ready to use and efficiently teach health technologies;
- Include digital health skills and digital literacy in medical curricula and combine high-tech with high-touch strategies;
- Provide extra opportunities for students to expand their learning on digital health;
- Ensure that the health workforce has access to educational programs and training to accelerate their readiness for the digital transformation of healthcare;
- Establish educational programs for the elderly, the socioeconomically disadvantaged, and other vulnerable groups with an increased risk of being left behind in the digital transformation.

Scientific societies and researchers to:

- Contribute to the development of evidence-based strategies and frameworks that promote ethical, safe, secure, reliable, equitable, and sustainable digital health initiatives;
- Improve interprofessional and international collaboration and data sharing between institutions working in digital health;
- Minimize patient, citizens, and healthcare staff accessibility barriers to evidence-based health technology research and innovations;
- Ensure that patients, citizens, and healthcare staff are involved in developing digital health initiatives.

Digital health industry to:

- Observe the WHO's Global Strategy on Digital Health 2020-2025 and its recommendations;
- Partner with government, healthcare providing institutions, patient organizations and other relevant stakeholders to make digital health affordable, accessible, and available to all, without bias;
- Ensure that patients, citizens, and healthcare staff are involved in developing digital health initiatives.

IFMSA National Member Organisations, youth-led NGOs, and medical students to:

- Advocate for ethical, safe, secure, reliable, equitable, and sustainable digital health initiatives;
- Advocate for the inclusion of digital health education in medical curricula;
- Develop projects and activities that increase digital health literacy in the population;
- Initiate, support, and promote projects on digital health education for medical students.

Position Paper

Background information

The WHO Resolution on Digital Health, adopted in 2018, presses for the adoption of digital health services to achieve UHC (1). These services, such as AI, mHealth apps, and wearable devices, have the potential to change the way health conditions are managed and monitored (2). They can reduce inefficiencies, improve access to healthcare, reduce costs, increase the quality of care and make healthcare more personalized for patients (3). On the other hand, *The Lancet and Financial Times Commission on governing health futures 2030: growing up in a digital world* also stresses that, without precautionary and value-based governance, digital health can fall short of improving health for all (4).

Following requests of the 71st World Health Assembly in 2018 for guidance in developing digital health interventions, the WHO released *Recommendations on digital interventions for health system strengthening*, which provide evidence-based guidance (5). Moreover, in 2021, the WHO released its *Global Strategy on Digital Health 2020-2025*, intending to strengthen health systems through the application of digital health interventions, empower patients and achieve health for all (6). Implementing digital health in health systems worldwide contributes to SDG3: good health and wellbeing (7).

Discussion

1. Definitions

Many terms are used to describe digital health and technological innovations in healthcare. Throughout this policy, the following terms will be used:

Digital health is “the field of knowledge and practice with the development and use of digital technologies to improve health” (6).

Digital health literacy describes the intersection of health literacy and digital literacy. Digital literacy is “the ability to use information and communication technologies to find, evaluate, create, and communicate information, requiring both cognitive and technical skills” (8).

Digital therapeutics and **digital care tools** are “tools that use software to respectively treat or manage/prevent a specific disease or condition” (2).

mHealth (or **mobile health**) is defined as “medical and public health practice supported by mobile devices, such as mobile phones, patient monitoring devices, personal digital assistants, and other wireless devices” (9).

eHealth refers to “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” (10).

Artificial Intelligence (AI) is “the science and engineering of making intelligent machines, especially intelligent computer programs” (11).

2. Current progress in the digital transformation of healthcare

Currently, the healthcare sector is changing towards using digital health initiatives (12). The IQVIA Institute for Human Data Science published their study *Digital Health Trends 2021* (2), reporting an accelerating growth in regulatory approved and commercialized digital therapeutics and digital care tools, with around 150 commercially available devices. Furthermore, they reported a growing amount of studies on app effectiveness, especially over the past five years.

Moreover, in 2018, HealthEnabled and its partners launched the *Global Digital Health Index (GDHI)*, which tracks, monitors and evaluates the digital transformation of healthcare across the world (13). One year later, they launched their *State of Digital Health 2019 report* (14), which presents data from 22 countries across six regions.

The GDHI consists of seven key indicators (15):

- Leadership and governance
- Strategy and investment
- Legislation, policy and compliance
- Workforce
- Standards and interoperability
- Infrastructure
- Services and applications

The *State of Digital Health 2019 report* (14) shows that, on average, the maturity index of digital health systems is phase three out of five. Of the seven indicators, *Leadership and governance* have reached the highest maturity level (four out of five) meaning that governments have implemented digital health in their national health strategy or other relevant national strategies. The six other indicators remain major challenge areas. The GDHI also reported regional differences: South-East Asia, Europe and Western Pacific scored higher on the maturity index (phase four out of five) than Africa, the Americas and the Eastern Mediterranean (phase three out of five). However, regional trends will be more reliable when more countries participate in the DGHI.

3. Opportunities for the digital transformation of healthcare

3.1 Improving patient care and reducing health inequities

The digital transformation of healthcare offers numerous opportunities to improve patient care and outcomes. It can improve communication between physicians, reduce medication errors, analyse large amounts of data, improve the accessibility of adequate information to healthcare workers and increase the possibilities for remote patient-monitoring (16-18). Digital Transformation also provides innovative solutions to equity issues such as accessibility due to location and quality of experience. In particular, in low-to-middle income countries (LMICs), telemedicine helps bridge rural-urban divides by providing specialised health care services. It also reduces the cost of healthcare services, promotes early disease detection and improves the accessibility of primary health education and information. From the perspective of medical professionals, it provides global education and research opportunities to enhance their expertise and access to updated medical knowledge (19).

Moreover, digital health can assist in transforming disease-centred healthcare to patient-centred healthcare by moving away from the more traditional healthcare approach of 'one-size-fits-all', thus improving healthcare for individual patients (18, 20). It can improve the ability to accurately and early diagnose diseases and conditions, improve treatment and disease management, and facilitate prevention (20, 21). Moreover, digital health can increase access to healthcare for remote and underserved populations, especially in rural areas (17). It allows for the shift of healthcare services from the traditional clinical setting to other locations, such as homes and workplaces, improving the accessibility of healthcare (21).

Some evidence from in-patient settings shows that health information technology can make care safer (22), as it is associated with a decline in in-hospital mortality (23), medication errors, adverse drug reactions, and an improvement in compliance with practice guidelines (24). Research on premature death or adverse outcomes shows that the human factor often is the

most significant cause. To help, more automated processes are needed, namely systems that measure biological variability that impacts care (25).

3.2 Improving efficiency and efficacy

On average, health systems consume a tenth of the respective domestic incomes (GPD), with health expenditure growth outpacing economic growth for most of the past half-century (26). This trend will likely persist in the future, especially considering the impact of the current COVID-19 pandemic. More efficient spending, whilst improving the access and quality of health services, is a key policy challenge (27). In this context, digital transformation offers unique opportunities to strengthen health systems (6).

While the life expectancy of populations is improving, the number of people living with non-communicable diseases is consequently growing (28, 29). Moreover, the growing range of diagnosis and treatment options is making healthcare increasingly complex (30). Healthcare systems around the world are struggling with rising costs (31). This calls for an improvement in the efficiency and efficacy of healthcare systems. Digital health initiatives can reduce the administrative burden of physicians (32, 33) and be time-saving, leaving more time for physicians to care for their patients (34-36). For example, AI techniques can save a radiologist up to seven minutes per ultrasound scan (34), and using electronic health records on bedside terminals can reduce the documentation time of nurses by 24,5% (35). Other studies showed that clinical decision support tools could decrease the number of prescribed antibiotics from 63% to 22% (37).

Moreover, digital health can improve the efficiency of interprofessional collaboration and communication between physicians (38). Lastly, digital health has been proven to be cost-effective (39,40). Digital health interventions are associated with lower costs compared to no care or traditional care.

3.3 Patient involvement in healthcare

Patients are increasingly interested in using digital health technologies to manage and improve their health and to learn more about their symptoms, conditions, and treatments (17). An increasing number of patients using wearable devices and mobile applications to manage their health has been reported. In the United States (US), approximately 20% of adults own one or more wearable devices to track their health (41). Moreover, more than 100.000 mHealth apps are currently available (42). Through several such digital health initiatives, the digital transformation stimulates self-care and self-monitoring (43).

The digital transformation of healthcare also empowers patients to have more control over their health and to make evidence-based, informed decisions owing to a better understanding of their health situation (20). Lastly, it can protect the population and patients from misinformation, fraud, exploitation, racism, and the inappropriate use of health data (6).

3.4 Digital health in pandemics and epidemics

The digital transformation of healthcare was significantly evident during the COVID-19 pandemic, where digital services were mostly employed due to the urgent implementation of physical and social restrictions to curb the pandemic.

Before the COVID-19 pandemic, efforts were being put into establishing digital transformation platforms that integrate AI and other digital health initiatives to strengthen health systems and support the health workforce (44). The COVID-19 pandemic revealed the need for health systems to strengthen their digital health services response in times of crises or outbreaks of public health concern, such as pandemics and epidemics. These public health crises can negatively impact access to physical healthcare services, in addition to disruptions in the socioeconomic growth of affected populations (45).

The use of digital health initiatives during the pandemic minimized the adverse disruptions the pandemic caused to healthcare systems. It provided access to quality healthcare delivery services without physical interactions between healthcare professionals and patients while ensuring patients' confidentiality, data security, and user-friendly healthcare services (46). The provision of diagnostic, administrative, informative, and e-prescription digital health initiatives helped provide patients with essential healthcare, impact mitigation, and provided access to verified health and COVID-19 information during the pandemic (48). It also provided a means to identify suspected COVID-19 cases through symptom reports, contact tracing, and surveillance (47). Additionally, digital health provided immediate mental health support to help individuals whose mental health was negatively affected during the pandemic (48). The COVID-19 pandemic highlights the role of digital health in preventing and managing pandemics and epidemics.

3.5 Digital health and the SDGs

In May 2019, the WHO established its first digital health technical advisory group (49), building on the resolution adopted at the 71st World Health Assembly in 2018. This resolution highlighted the important role of digital health in achieving the health-related Sustainable Development Goals and the triple billion targets of WHO's Thirteenth General Programme of Work, 2019–2023 (50). Digital technologies and innovations can contribute to the achievement of all seventeen SDGs (50, 51), thus including SDG3: Good Health and Wellbeing (6, 37, 51). Digital innovations and improved connectivity can provide better patient interaction, improved health informatics, remote medical imaging, and telemedicine (51). The contribution of digital health to the achievement of SDG3 is also evident in conflict-affected areas: patients and citizens in these areas benefit from the fact that digital health can overcome physical barriers and thus improve accessibility (52).

4. Challenges in the digital transformation of healthcare

4.1 Education of the health workforce

Successful digital transformation in healthcare requires a complex adaptive change in human attitudes and skills (3). The effective implementation and responsible use of digital health technologies are contingent on building a health workforce with the knowledge and skills to maximize its potential (53). In its *Global Strategy on Digital Health 2020–2025*, the WHO proposes to “place people at the center of digital health through the appropriate adoption and use of digital health technologies and development of appropriate literacy” (6). However, according to the *State of Digital Health 2019 report* (14), 20 of the 22 participating countries either provide no digital health education to their health workforce or only offer this for less than 25% of health professionals. Digital technologies cannot transform the health sector on their own. Still, they are tools that can be put to productive use by including digital skills in the core content of health education and professional training and by combining high-tech with high-touch technologies.

4.1.1 Including digital skills in the core content of health education and professional training

Digital health courses reported in the literature are primarily elective and not of sufficient quality (54). This is not conducive to building a digital culture or perceiving digital technologies as an integral component of health services. Hence, there is a need to create modern and comprehensive digital health curricula. These curricula should not only focus on skills for merely operating digital tools but also on skills such as a critical appraisal of information and digital health ethics (3). To meet the current demand for fostering digital education, more systematic support should be set up to ensure that all categories of health workers are qualified, particularly through more flexible (self-)learning opportunities (55). The prevailing challenges of Continuous Professional Development (CPD), such as lack of dedicated time or effective educational methods, need to be addressed (56).

4.1.2 Combining high-tech with high-touch strategies

To balance the negative impact digital transformation can have on patient-provider communication (57), the development of specific interpersonal competencies needs to be further emphasised in health education and training. Moreover, sources of bias in AI may be present in most, if not all, stages of the algorithmic development process, for example the phenomenon of favouring suggestions made by automated systems while ignoring other sources of information (58). The health education sector needs to acknowledge this problem and invest in education devised to counter automation bias and move towards fairness (59).

4.2 Education of future healthcare professionals

Notably, the next generation of healthcare professionals is the most digitally literate to date, sometimes even referred to as digital natives, highlighting their potential as torchbearers for the digital health transformation of healthcare (60). In 2020, the WHO published a report titled *Youth-centred digital health interventions: a framework for planning, developing and implementing solutions with and for young people*, aimed at guiding future youth-focused and youth-led digital health solutions (61). As a result of the high digital engagement and literacy of youth, they are in prime positions to understand the fundamental needs to implement digital health successfully. Capacity building, opportunities for youth, and an ethics-driven approach are critical to realising the goal of the future health workforce being adept at navigating digital transformations in health and the goal of improving health for all, all of which aligns with global goals such as UHC (62).

Because of the effect of digital health on the health and wellbeing of this and future populations (1), it is evident that healthcare providers will have a prominent role in the sensitization of communities to digital health initiatives as well as their development and implementation. The WHO's Global Strategy on Digital Health 2020-2025 also outlines four strategic objectives that require collaboration with the health workforce (6). Therefore, modern medical curricula should prepare medical students for this role by including digital health as a compulsory part of the medical curriculum.

The IFMSA Digital Health Survey (63), conducted in 2021 and representing responses from 111 countries, reported that the majority of the respondents did not receive digital health education as part of their core curriculum (52,4%) or facilitated by their medical school outside their core curriculum (58,8%). More than 50% disagreed or strongly disagreed that they had received enough education on digital health to prepare them for the digital transformation of healthcare. Out of the respondents, 87,7% agreed or strongly agreed that future health care professionals should receive education on digital health as part of the core content of the medical curriculum. Thus, the survey results showed a global gap in digital health education, even though there is clear evidence of interest of future healthcare professionals in this education. The survey highlights the need to include digital health education as a compulsory part of the medical curriculum.

4.3 Reinforcing health inequities

Even though the digital transformation of healthcare can potentially reduce health inequities, it can also, without proper implementation and governance, reinforce health inequities. Most discourse raises concerns about the failure of digital health to address more inherent problems such as access to such technology and inequalities across income, education and age groups (64). Thus, the digital transformation must be incorporated into global and national systemic changes and not only available to those with resources. Furthermore, community engagement should be integrated into the development of digital healthcare to prevent these developments from reinforcing inequities.

On a broader scale, unions of countries developed strategies that reflect their regions' priorities. For example, the European Union has had a strategy since 2018 that aims to provide access to

safe and top-quality digital services in health and care (65). On the other hand, the Association of Southeast Asian Nations (ASEAN)'s Digital Master Plan 2025 was only developed in 2021 after the pandemic (66). In this document, increasing the supply of public e-services is one of the desired outcomes, with all actions under it rated as a high priority. This does not mean there were no prior efforts, but these mainly reflected individual efforts of countries with no collective regional goal. The African Union's Digital Transformation Strategy 2020-2030, incorporated the Africa Health Strategy 2016-2030 in their Digital Health Section (67). Before this, their Health Strategy emphasized strengthening health research and innovation. These strategies' goals and objectives are based on their socio-politico-cultural context. For LMICs in particular, it is crucial to set priorities given the limited resources.

4.4 Digital health, patient safety, and ethics: the double-edged weapon

Digital health can potentially improve our ability to diagnose, and treat diseases accurately and enhance the delivery of health care for the individual (68). However, it has been often associated with ethical implications, namely privacy and confidentiality issues while handling patients' data (69, 70), some of them being illegal (such as hacking), whereas others are legal or not yet regulated by law enforcement (71). For instance, the use of digital methods to trace COVID-19 cases raises policy-related questions regarding sovereignty and privacy, especially when a government is collecting data relating to travel history, credit card spending, movements, and contacts of a person. In some cases the measures also restrict the mobility of an individual, posing challenges to freedom and fundamental human rights (72). Furthermore, the information gathered from digital data sources is often:

- Immortal (data have no expiration date and are aggregated over time);
- Marketable (data have immense commercial value and are frequently bought and sold);
- Identifiable (individuals can be readily reidentified and anonymity is nearly impossible to achieve) (71).

This puts the personal data of individuals at risk of being accessible to a broad number of parties who are not intended and do not need this confidential information. As healthcare is expected to rely more on technological innovations in the future, it is necessary to reevaluate and regulate digital health confidentiality and privacy concerns (70,71). Privacy policy regulations should protect personal health information from unauthorized, discriminatory, deceptive, or harmful use. These policies should align with the principles of medical ethics, respect individual rights and support the culture of trust, as individuals are more likely to use mHealth apps that incorporate these privacy protections (73) and improve care delivery (74).

AI has been constructive in diagnosing, predicting disease spread, and customizing treatment paths (75). Some studies revealed that the usage of AI in healthcare has led to:

- Equal treatment of patients relative to race, gender, etcetera (through the digitalization of the consultation process or through tackling the bias towards white, healthy, male patients in clinical trials and eventually through non-discriminatory treatment);
- Less animal suffering (due to organ-on-a-chip and other in-silico applications related to the digital twin of cell cultivation);
- And less pain and suffering for patients through less invasive consultation processes (76).

This shows that AI enhances some ethical principles, namely nonmaleficence (do no harm) and justice (equal treatment of patients). Still, AI was often accused of exponentiating existing bias in healthcare. There is a risk that AI (or any) models based on historical data will have an integral bias (54, 55). This risks exacerbating health disparities, eroding public trust in healthcare and health systems, and potentially hindering the adoption of AI-based systems that could otherwise improve patient care (77).

Studies also show a lack of evidence proving the impact of health information technology on patient safety. Therefore, researchers suggest that more efforts should be provided on this matter (22, 24, 78).

According to the WHO's Global Strategy on Digital Health 2020-2025 (6), 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". Therefore, the WHO calls on the development of digital health initiatives with principles of transparency, accessibility, scalability, replicability, interoperability, privacy, security, and confidentiality. The WHO calls on countries to adopt legal and ethical frameworks for assuring patient safety, data security, appropriate use and ownership of health data, privacy data recoverability, and protection of intellectual property rights.

4.5 Digital Health Literacy

The abilities and traits of patients play a crucial role in the digital transformation of health care services and health systems. Patients are more than just responsible for using or applying their prescribed treatment. To achieve SDG3, patients face increasing requirements to identify their health care needs or make informed decisions about their treatments (7). The specific skill set patients need to meet these requirements is described by digital health literacy (79).

In a traditional sense, digital health literacy or eHealth literacy describes the intersection of health literacy and digital literacy. Digital literacy is defined as "the ability to use information and communication technologies to find, evaluate, create, and communicate information, requiring both cognitive and technical skills." (8). Its importance steadily increases with the expansion of the use of digital technologies (80), with wide implications for individual health (81). On the other hand, health literacy is "the degree to which individuals have the ability to find, understand, and use information and services to inform health-related decisions and actions for themselves and others" (82) thus being an essential part of empowering patients towards more self-responsibility.

Newer approaches expand the definition of digital health literacy by including civic literacy, meaning the knowledge and skills to make decisions in matters relevant to society, having the dispositions to act to implement those decisions and abilities politically and civically (83). Since digital tools have become increasingly crucial in societal participation and affecting people's health (84), digital civic literacy can be regarded as another dimension of digital health literacy (80).

According to the WHO's Global Strategy on Digital Health 2020-2025 (6), increasing digital health literacy can support the development of health care systems in:

- Developing a more people-centered health care;
- Shifting the health management on the populational level towards an active community-based model instead of a reactive-care model;
- Monitoring and evaluation;
- Strengthen health equity;
- More effective public participation;
- Public attention.

The primary method of increasing digital health literacy is communication between health professionals and patients, as the CDC focuses on in its training offers (85).

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