



**WORLD  
HEART  
FEDERATION**

# **THE CASE FOR THE DIGITAL TRANSFORMATION OF CIRCULATORY HEALTH**

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**A WORLD  
HEART FEDERATION  
POSITION PAPER**

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# 4 EXECUTIVE SUMMARY

**T**his paper explores the angles and opportunities of digital health, with a look at digital innovation and its potential to support patients with circulatory diseases.

In reviewing developments in the field, current applications as well as gaps, the paper aims to support policymakers in leveraging technology for better circulatory health and to capture the roles that various sectors have in making digital health a tool for everyone.

Worldwide, diseases affecting the circulatory system remain the main cause of mortality, morbidity and health expenditure. Diseases of the

circulatory system are heart disease, stroke, diabetes and chronic kidney disease. The COVID-19 pandemic exacerbated the health and economic vulnerabilities of people living with circulatory diseases and accelerated the need for digital health solutions and telemedicine. As the pandemic spread, so has governments' use of technology in healthcare, and digital solutions are now being used in almost every area of health.

Cardiology, with its history of innovation and medical firsts, is uniquely placed to be a leader in digital health if we can tackle the challenges and harness the opportunities ahead. From patchy funding to misalignment with the needs of health professionals and patients, much remains to be done to leverage technology for

circulatory health. Reaping the promise of digital health requires first understanding its full potential and ways of integrating it into health systems. At its heart, digital health involves patients and the health workforce in different ways, requires funding commitments, and the creation of suitable regulations to guide and monitor its use with a view to continual improvements.

This position paper reflects the World Heart Federation's belief in a world where heart health is a fundamental human right. The paper aims to assist governments in making the leap across the digital frontier through five recommendations:





**Digital healthcare is already happening at different scales globally. Keeping pace with digital innovations and their potential to finetune the quality and timeliness of care is key.**



With these recommendations, we are addressing policymakers in national governments, parliaments and other normative and executive institutions. Decision-makers and budget holders have the power to adapt and implement these recommendations. We also acknowledge the role of national and international civil society, academia and the private sector in providing support, offering partnerships, and progressing digital health programmes.

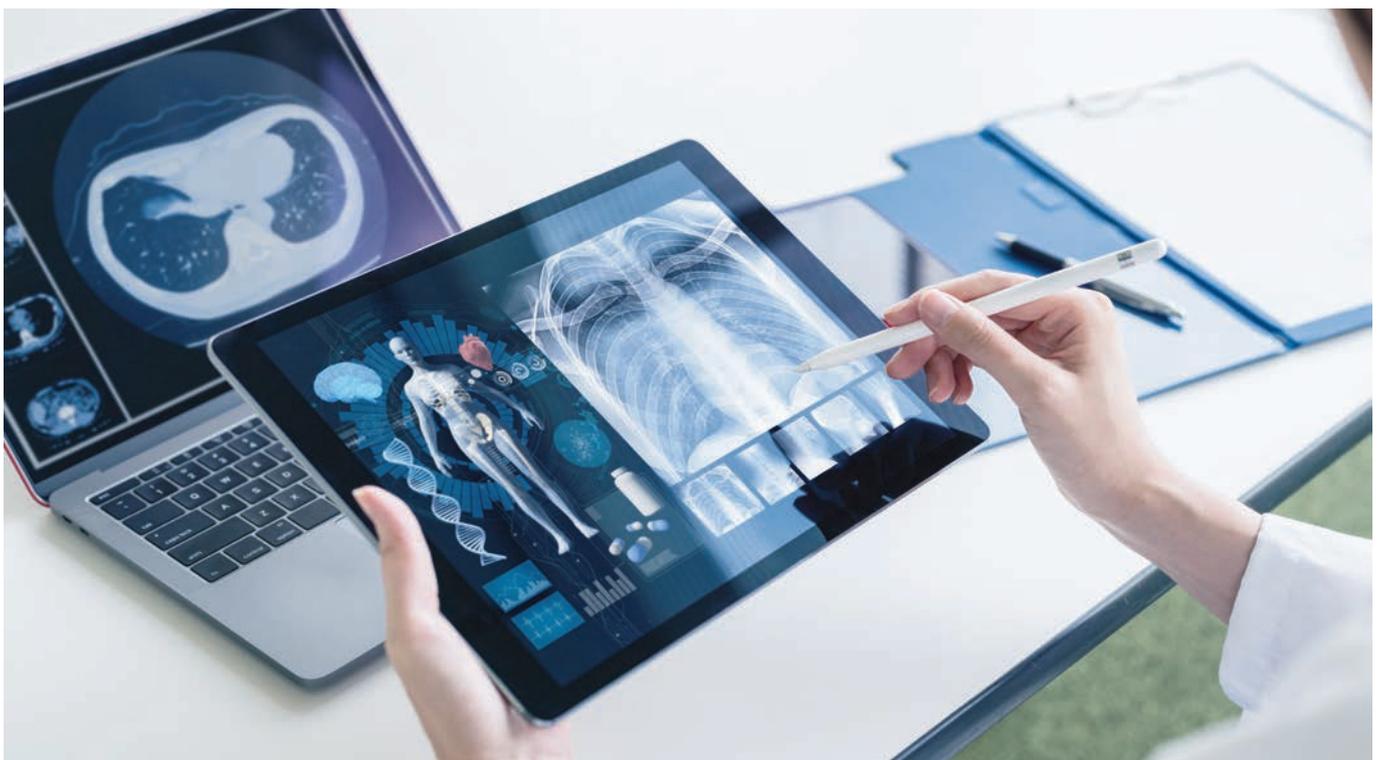
The five recommendations have been developed through reviewing the opportunities that digital health offers for better care and for targeted treatment of circulatory diseases; they capture some in-country practices and set out concrete steps to expand digital care. Implementing these recommendations will require a change in mindset and approach, the installation of infrastructure, training, adequate protection of privacy and regulation, as well as equity so that whole societies move together in the digital direction and draw the benefits, with no one locked out of its advantages.

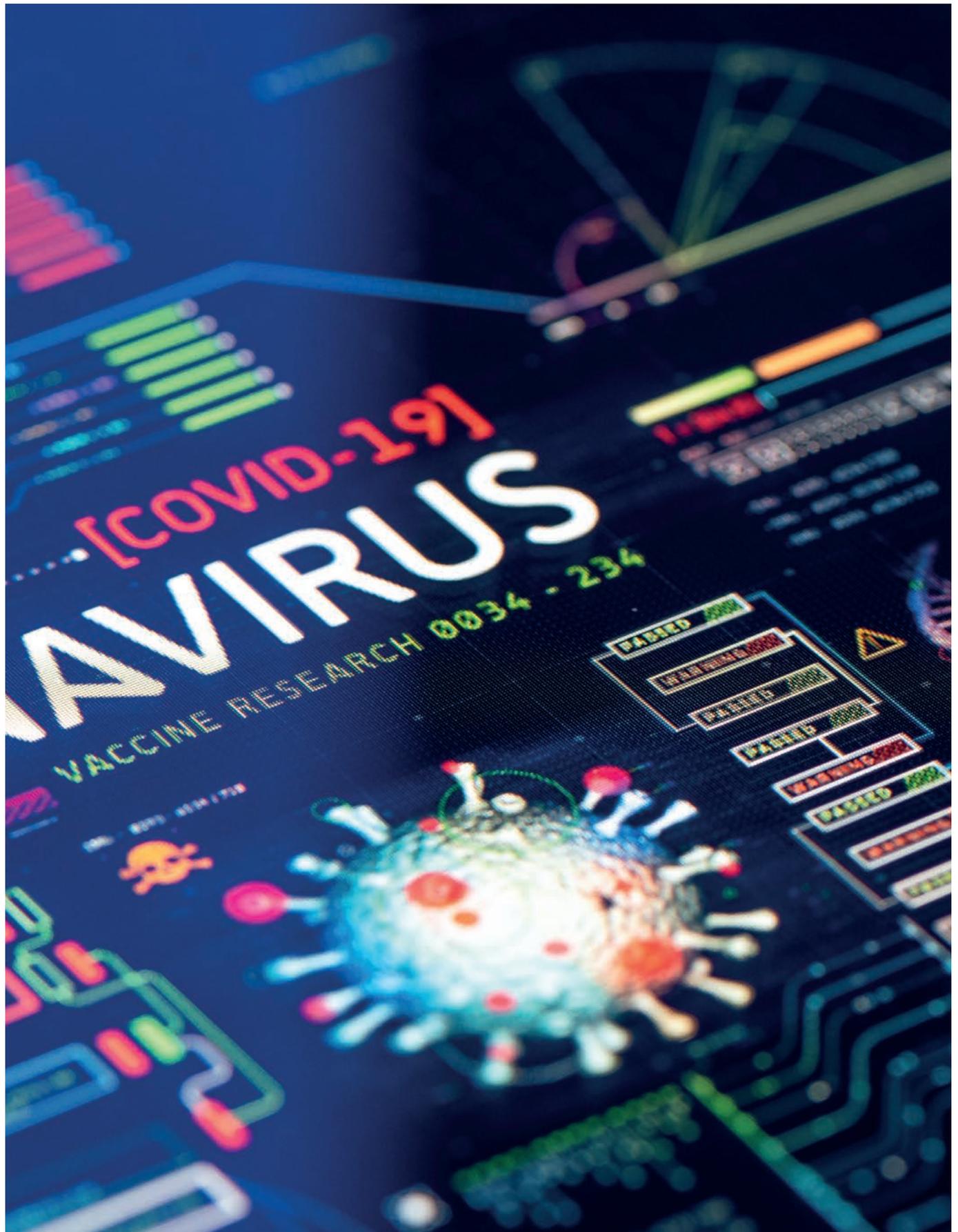
A single device, such as a smartphone, can become the platform through which doctors and patients connect with each other. In addition, data exchanged in this way lends itself to becoming part of electronic records and larger datasets. Such datasets are invaluable to methods used by artificial intelligence that determine patterns of disease and incidence in ways that can ultimately build understanding and influence development of treatments.

Telemedicine, already shown to be an effective monitoring approach, has expanded during pandemic times. It is helping build the trust of patients in the efficacy of digital care approaches. With specific regard to cardiovascular and circulatory health, digital care can assist comprehensively in prevention, diagnosis, monitoring, oversight of medication, and disease tracking. From wearable devices to voice-activated medical assistants, the digital sphere is teeming with breakthroughs that can make the difference for the world's growing incidence of noncommunicable diseases (NCDs).

The section on country perspectives provided in this paper look at a range of practices from frontrunners such as Denmark to new pioneers in Africa such as Rwanda with its universal health coverage system that covers almost 90% of the population. The potential of international partnerships to harness data across a range of medical situations is another example of digital tools advancing care and widening access to heart health. For example, South Africa's District Health Information System, now online, is being complemented by a tool for district-level health management.

Digital healthcare is already happening at different scales globally. Keeping pace with digital innovations and their potential to finetune the quality and timeliness of care is key – it also takes concerted planning, training, and resourcing. Improving the digital capacity of the caregiving workforce, increasing the digital literacy of patients, families and communities, addressing privacy and safety, and being creative about investment mechanisms are key intervention areas that can revolutionize healthcare access and delivery.





EXECUTIVE SUMMARY

**INTRODUCTION**

DIGITAL HEALTH:  
OPPORTUNITY FOR  
BETTER CARE

DIGITAL HEALTH FOR  
CARDIOVASCULAR  
& CIRCULATORY  
DISEASES

COUNTRY  
PERSPECTIVES  
ON DIGITAL HEALTH

ACTIONS FOR  
LEVERAGING DIGITAL  
SOLUTIONS



# INTRODUCTION

## INTRODUCTION

**A**fter overcoming a neurological disease, cardiologist Lucretia Burgos resumed work at the Cardiovascular Institute of Buenos Aires with a twist; instead of physically consulting at the Institute, she turned to telemedicine to treat

and monitor patients, participate remotely in clinical and academic meetings and support cardiology residents in their training.

As Lucretia admits, in the face of personal and professional adversity, embracing new opportunities is the best way forward.

“*Telemedicine is now a task that I know very well and an invaluable resource at this stage. We have remote access to the digital medical history of each patient. Prior to the teleconsultation, the studies are sent to us by email. At discharge, we ask them to record daily weight, blood pressure, and heart rate. We have our medical consultations by video call and many times family members ask to be added remotely to help their older relatives. In the case of the patient not being a friend of technology, we simply call them at home. It is important we continue communicating with our patients and identify those individuals that require an on-site medical evaluation or to attend the emergency department.*”<sup>1</sup>



The COVID-19 pandemic turned Lucretia's experience with telemedicine into a widespread practice in many parts of the world. Governments embraced eHealth, mobile applications, chatbots, big data models and artificial intelligence (AI) solutions in their efforts to respond to the combined pressure of COVID-19 and other pre-existing communicable and non-communicable diseases (NCDs).<sup>2</sup>

What COVID-19 accelerated in 2020 is a process that futurists have been imagining before they had names for it. For example, as far back as 1879, The Lancet imagined a future in which consultations by telephone would reduce the burden of “unnecessary office visits.”<sup>3</sup> And one which matches cardiology's track record of innovation, making it the ideal playground for the digital frontier.

Digital health is as rich in potential as it is in definitions. However, for the purpose of this position paper, we will follow the World Health Organization's (WHO)-endorsed definition of digital health as

**“the field of knowledge and practice associated with the development and use of digital technologies to improve health, [including] mobile health – the use of mobile wireless technologies for public health – [as well as] the use of advanced computing sciences in ‘big data’, genomics and artificial intelligence.”<sup>4</sup>**

This paper discusses what telehealth, mobile health – for example mobile applications, smart and wearable devices – as well as “big data” and artificial intelligence mean for people living with circulatory diseases and

makes recommendations to help national policymakers leverage technology for better circulatory health.

This position paper is part WHF's commitments to digital health, which also include an upcoming Roadmap on Digital Health in 2021.

**Hear from our 4th global summit thought leaders**

*“No field is better placed for digitalization than cardiology.”*

**PROFESSOR CALUM MACRAE, HARVARD**

The topic is important for several reasons. **Among NCDs, circulatory diseases<sup>5</sup> such as heart disease, stroke, diabetes and chronic kidney disease (CKD) remain the leading causes of mortality and disability globally.<sup>6</sup> Together, they claimed more than 26 million lives in 2016-2017.<sup>7</sup>** Their weight in the cluster of chronic diseases is even more worrying considering that **NCDs account for approximately 70% of global deaths.<sup>8</sup>** Changing these staggering statistics will require leveraging digital health tools to prevent, diagnose and manage cardiovascular and other circulatory diseases.

**Digital health can contribute to achieving universal health coverage (UHC) – a target of the third Sustainable Development Goal (SDG) and be a game changer for the more than 734 million people worldwide who do not have access to healthcare.<sup>9</sup>**

However, if mismanaged, it also threatens to deepen existing health inequalities. Global health justice, especially in a post-COVID world and in circulatory health, cannot be achieved without a critical understanding of digital health.

**Circulatory diseases<sup>5</sup> such as heart disease, stroke, diabetes and chronic kidney disease (CKD) remain the leading causes of mortality and disability globally.<sup>6</sup>**

**Claiming  
26 million  
lives in 2016/2017**



**Digital healthcare can contribute to achieving universal health coverage (UHC)**

8



**734  
million**

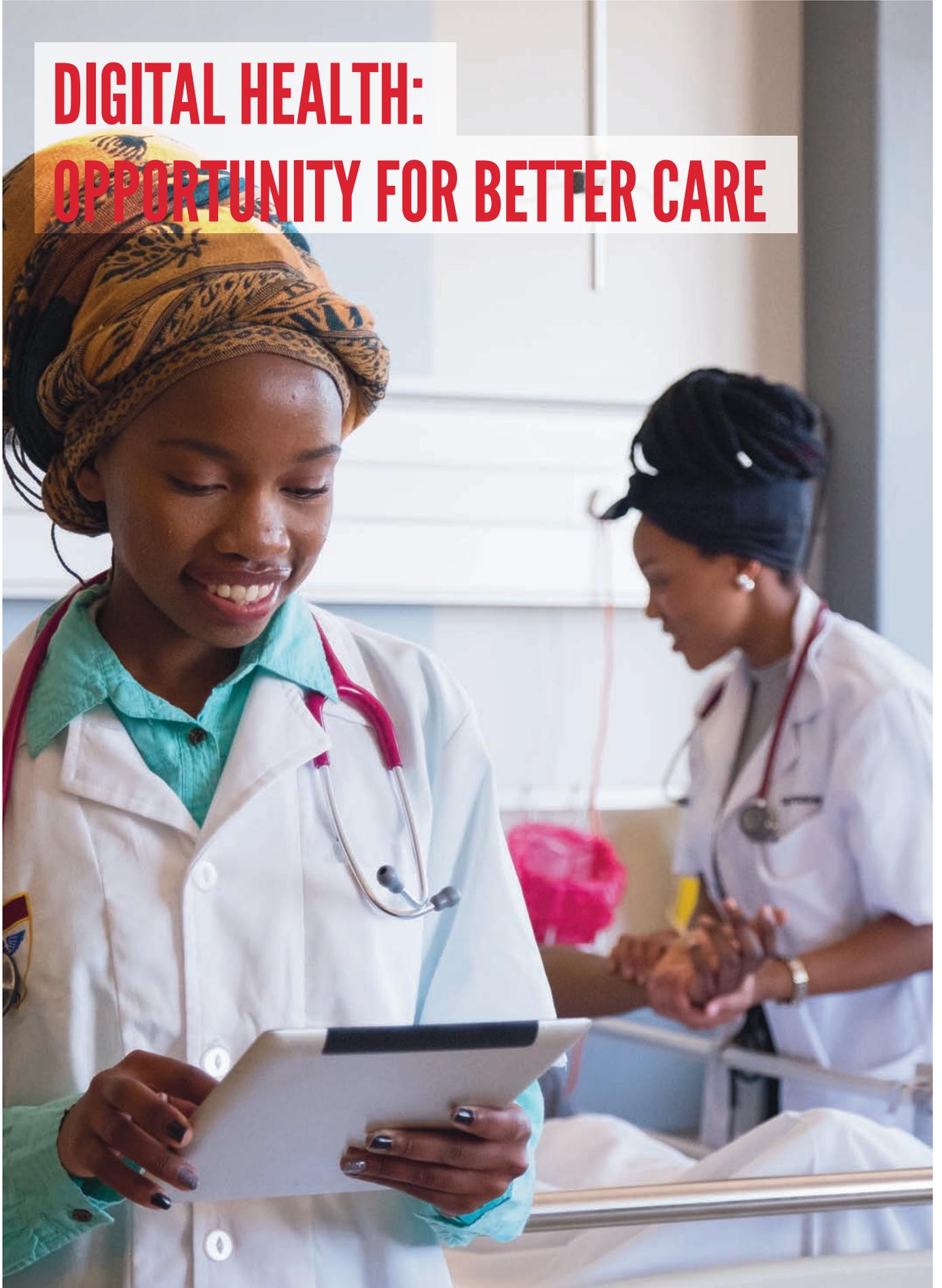
**people worldwide who do not have access to healthcare**



This position paper is grounded in evidence and is globally relevant while considering regional and national differences. It builds on the 4th Global Summit on Circulatory Health, convened in Paris in August 2019 on the theme of *Innovation in Circulatory Care and Technologies*. The event drew on the multidisciplinary strengths of clinicians, policymakers, researchers, advocates from civil society and private sector representatives who examined the impact of digital health platforms, mobile health (mHealth), and artificial intelligence on health systems and pharmaceutical discovery, challenging regulatory systems and re-shaping the nexus of health, technology, and the law. WHO’s Draft Strategy on Digital Health 2020-2024, the Future of AI and Digital Health Report by The Lancet and The Financial Times Commission *Governing Health Futures 2030*, as well as some of our members work on digital health<sup>10</sup> and literature reviews have also informed this position paper. There are, however, limitations to the paper. We acknowledge the importance of, but do not make specific recommendations on, technical issues related to interoperability and telecommunication infrastructure, such areas being outside our area of expertise.



# DIGITAL HEALTH: OPPORTUNITY FOR BETTER CARE



# DIGITAL HEALTH: OPPORTUNITY FOR BETTER CARE



**If Lucrecia’s patient has an Apple smart watch or a Fitbit-like device, they can monitor their heart and alert her to any irregularities.**

In the first pages of this position paper you met Lucrecia, the Argentinian cardiologist who uses telemedicine to treat and monitor patients.

Now imagine one of Lucrecia’s patients. They have either a basic mobile phone, which can make and receive calls and text messages, or a smartphone connected to the internet and equipped with audio-visual functionalities. That single device can connect them to a medical provider, a digital wallet

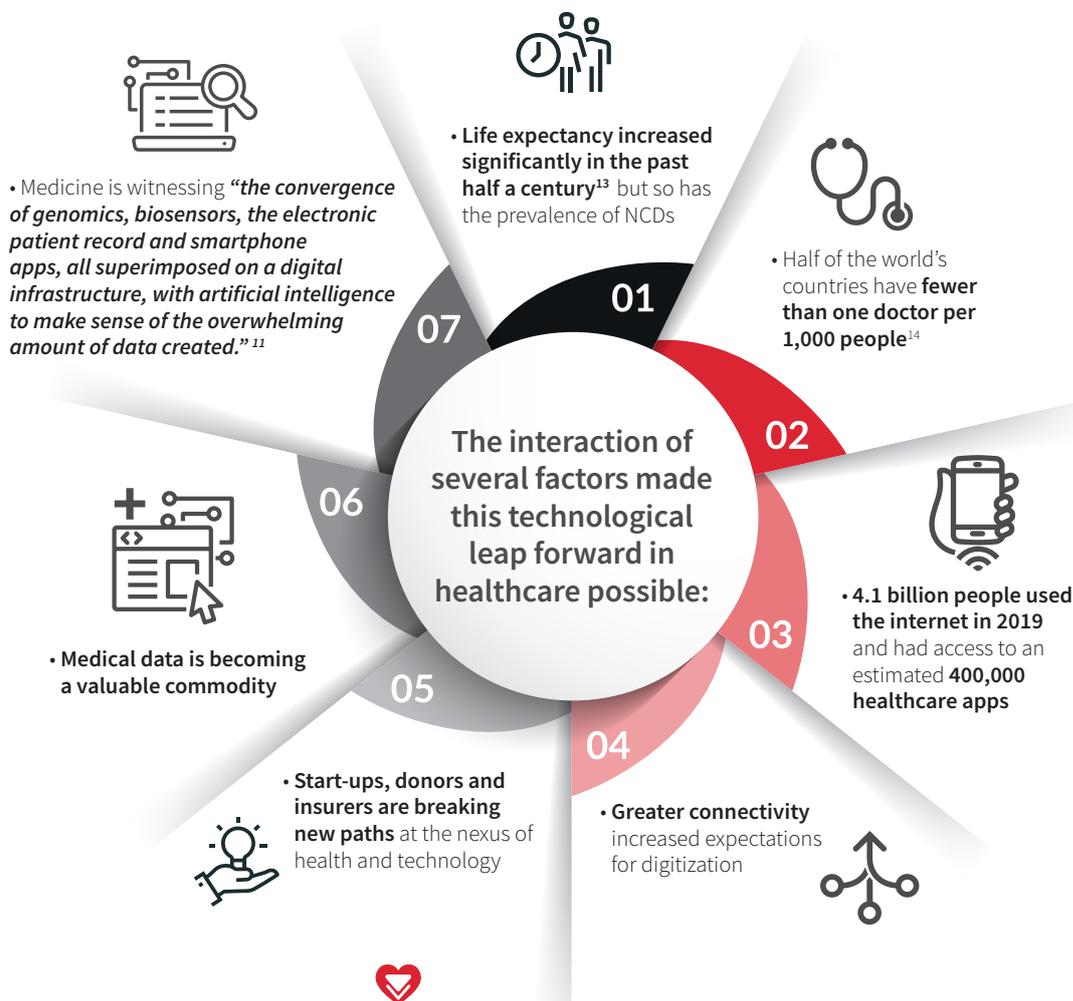
for payments, and to health applications (“apps”). Depending on where the patient lives, the connection is formal — through their local or national health system — or informal and contingent on the relationship of care they developed with their physician. Payments can be out-of-pocket, covered by insurance, subject to reimbursement, or not their concern at all.

The patient’s digitalized medical interactions can be captured in electronic records or absorbed into large datasets. Researchers can use artificial intelligence to search those large data sets for patterns of disease, among other things, while

clinicians can turn to AI as an aid to interpret medical images. Health administrators can use digital tools to make staffing, financial, and medical infrastructure decisions that impact the quality of patients’ care. And pharmaceutical companies can turn to AI and those big data sets to support their drug development process, for example by looking for genetic patterns or by data-mining of electronic patient records to improve recruitment of participants in clinical trials.<sup>11</sup> If Lucrecia’s patient has an Apple smart watch or a Fitbit-like device, they can monitor their heart and alert her to any irregularities<sup>12</sup>.



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WHO is heralding the tech revolution in healthcare “*an essential enabling factor towards ensuring that one billion more people benefit from universal health coverage, that one billion more people are better protected from health emergencies, and that one billion more people enjoy better health and well-being.*”<sup>16</sup>

But the promise of digital health comes with a caveat. For countries to implement it successfully, they need “*an appropriate enabling environment, sufficient resources, infrastructure, education, capacity, investment and connectivity, as well as issues related to technology ownership, setting standards and technology flows.*”<sup>17</sup>

All these factors can be daunting. Especially considering that connectivity — a basic requirement for digitalization — is not a given. In 2019, for example, 86,6 % of people with access to the internet were living in developed countries compared to only 19,1 % in developing countries.<sup>18</sup>

Countries have it within their power to affect change and the best field to make the biggest impact is circulatory health: technology to diagnose cardiovascular diseases (CVD) is not invasive and can lend itself to consultations and follow-up via digital means such as telemedicine and emerging platforms.



2019  
**86.6%**  
of people had access  
to the internet in  
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Compared with only  
**19.1%**  
in developing  
countries



# DIGITAL HEALTH

# DIGITAL HEALTH FOR CARDIOVASCULAR AND CIRCULATORY DISEASES

The rates of NCD mortality and disability and the likelihood of zoonotic pandemics such as COVID-19 are predicted to increase in the coming decades under the combined forces of rapid urbanization, changing diets, global economic insecurity, climate change and biodiversity losses.<sup>19</sup> Against this backdrop, there are several areas in which digital health is already making or could make a difference for the prevention and management of CVD and other circulatory diseases.



## PREVENTION

Digital health solutions harness insight into human behaviour, facilitating means of primary oversight and prevention. From the basic (SMS systems) to the more advanced (mobile apps, wearable devices and other smart applications), digital products help users monitor their blood pressure, sugar levels, keep a healthy diet, quit smoking and exercise regularly.<sup>20</sup> These are all important to keep risk factors for heart disease, stroke, and diabetes in check.

Going deeper into the prevention opportunities, Google has proved that scanning the retinas of patients can predict not only their age, gender,

systolic blood pressure and whether they smoke or not, but can also their risk of developing heart disease and stroke.<sup>21</sup> 284,335 patients participated in the study and their retinas, which can hold markers of cardiovascular disease, were scanned using deep learning.

## DIAGNOSIS

Access to specialized cardiology care is not a given in many parts of the world, and especially not in remote or low-income settings. This situation translates into patchy access to diagnosis. The point-of-care ultrasound (POCUS) could be a step in the right direction; it is a portable device that enables non-cardiology health workers to refer people suffering from

heart disease to a specialist as long as those health workers have access to a laptop or a smartphone and an internet connection to send images to a “cloud-base repository” for specialized interpretation and follow-up.<sup>22</sup>

Another solution, especially for low-income or under-served communities, is simple yet impactful: turning a mobile phone into a digital stethoscope. Putting a metal egg cup on the hands-free kit of a mobile phone turns a communication tool into an inexpensive medical device *capable of “collect(ing) diagnostically useful heart sound recordings for screening children for rheumatic heart disease.*

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|                                                           | Prevention | Diagnosis | Monitoring | Adherence | Epidemiology |
|-----------------------------------------------------------|------------|-----------|------------|-----------|--------------|
| Control and predict risk factors                          | ✓          |           |            |           |              |
| Point-of-care, digitally integrated diagnosis tools       |            | ✓         |            |           |              |
| Triaging chatbots                                         |            | ✓         |            |           |              |
| Wearable devices (to detect and control for risk factors) |            |           | ✓          |           |              |
| Mobile apps                                               |            |           | ✓          | ✓         |              |
| Telehealth                                                |            |           |            | ✓         |              |
| Digital pills                                             |            |           |            | ✓         |              |
| Voice-activated health assistants                         |            |           |            | ✓         |              |
| Mobile-enabled data collection                            |            |           |            |           | ✓            |



*The key to the success of the design was to include a signal quality metric for ensuring that a recording can be trusted and the medical worker collecting the data, who may only have a limited education, is not recording noise that an algorithm may read incorrectly, or may be useless at review time.*<sup>23</sup>

AliveCor's KardiaBand ECG reader is another innovation in support of diagnosis and a good integration into existing technology; when paired with the Apple Watch, KardiaBand's sensor is turned on to "provide a continuous ECH reading."<sup>24</sup>

Looking ahead, the use of artificial intelligence and machine-learning in diagnosis and patient triage could become commonplace in many parts of the world. Guided by the latest medical guidelines, chatbots could be the first line of triaging in primary care and machine-learning used to improve the accuracy of referrals to specialist care, including for circulatory diseases.<sup>25</sup>

## MONITORING AND MANAGEMENT OF DISEASE

Telehealth, as Lucrecia and her colleagues are proving successfully, can improve access to circulatory care by ensuring constant communication between patients and their health providers, and ensuring timely monitoring and remote counselling that support disease management.<sup>26</sup> Telemedicine is a game-changer for patients living with circulatory diseases, not only because it can potentially expand access to healthcare, but also because it can ease

the regular monitoring of chronic patients across medical disciplines; for example, even communities of patients with high degrees of "medical mistrust," such as people living with kidney disease and diabetes, have expressed higher levels of satisfaction and access to care when treated via telemedicine.<sup>27</sup>

Wearable devices can go beyond counting calories to measuring one's blood pressure and heart rate and "transmitting biophysical measurements and patient-generated data" to physicians, supporting potential detection of hypertension and atrial fibrillation, for example.<sup>28</sup>

And mobile applications are becoming more widespread as support for chronic disease management, especially for heart disease, diabetes and kidney disease. Take Baobab Circle, a UK-founded company present in seven countries in Africa that provides personalized care plans for people living with diabetes and / or hypertension, health tips, and telemedicine solutions to connect patients with their health professionals during COVID-19.<sup>29</sup> Among their solutions, Baobab Circle includes a glucometer and a blood pressure monitor which, together with the telemedicine solutions, provide patients with access to health checks and follow-up regardless of their geographical location in the seven countries of operation.

Baobab Circle is one of several eHealth companies whose mobile apps integrate multiple services and specialities that obviate the need for several patient visits while ensuring that patients still receive counselling for healthy lifestyle (nutrition, physical activity, intrinsic motivation), monitoring (tracking intake

of carbohydrates, calories, glucose levels), and follow-up (reminders in support of adherence to medication).<sup>30</sup>

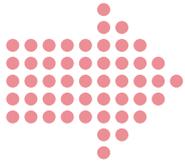
Perhaps the most under-served community is that of people living with chronic kidney disease (CDK); a 2019 systematic review found that only 15 mobile apps of 1464 applications claiming to support the self-management of CDK met the review's criteria, namely the evidence base that guided the development of the app, the number of times it was downloaded, its ranking by users, and any endorsement from medical or professional associations in kidney health.<sup>31</sup>

Just as artificial intelligence is expected to make a mark on triage and referrals, it will have a role to play in patients' self-management of their circulatory diseases, thus freeing resources in the primary and secondary care systems. For example, wearable devices could alert people living with heart failure and their health professionals of any unusual changes in their condition that may require medical follow-up.<sup>32</sup>

“

**Wearable devices can go beyond counting calories to measuring one's blood pressure and heart rate.**

”



## ADHERENCE TO MEDICATION

Adherence to medication for circulatory disease is multi-faceted and depends not only on patients' personal motivation and discipline, but also on access to, availability and affordability of medication, and on support from health providers, among other factors. Digital health can help with some of these issues; for example, AI is employed to improve drug supply chains and address shortages of medicines;<sup>33</sup> telehealth sessions and mobile apps can reinforce adherence to medication;<sup>34,35</sup> "voice-activated assistants that can act as useful reminders to take medications;" and a FDA-approved "digital pill" a sensor-laden chemotherapy drug that allows clinicians to monitor whether patients are following their prescribed drug regimen."<sup>36</sup>

## EPIDEMIOLOGY OF DISEASES

The very devices that enable digital health can act as data collectors as well, thus advancing our understanding of circulatory diseases. All the biophysical measurements and other type of data from large sets of people living with circulatory diseases, that are collected via mobile phones, smartphones and wearable devices, can become part of epidemiological studies and thus advance knowledge about specific diseases or risk factors.<sup>37</sup> For example, the Apple Heart Study, conducted over a period of eight months on a sample of 419,297 participants, proved that the Apple Watch could detect atrial fibrillation by using its optical sensors "to measure blood flow activity and detect subtle changes that might indicate an irregular heartbeat."<sup>38</sup>

there is some optimism about people living with circulatory diseases embracing digital tools and services to manage their conditions. For example, a study in the UK among patients with heart and circulatory diseases found that 85% of respondents were supportive of AI in diagnosis and treatment, and 86% of respondents would agree to sharing their "anonymized data."<sup>39</sup>

While moving in the right direction, we can pick up the pace as much remains to be done: digital solutions for circulatory diseases require better alignment of commercial interests with patient and clinical outcomes, integration into health systems and into the already busy work lives of health practitioners; and a regulatory balancing act is needed between encouraging innovation and protecting the privacy and safety rights of patients.

These digital developments are promising for patient outcomes and health systems. And

### Hear from our 4th global summit thought leaders

*"We have worked on an innovative way for patients to check each part if their medicine bears a unique identifier, thus ensuring its authenticity. We are turning the system on its head, fighting counterfeiting from the ground-up and turning consumers into advocates."*

**EUGENE BOADU, MPEDIGREE GHANA**





# DIGITAL HEALTH

# COUNTRY PERSPECTIVES ON DIGITAL HEALTH



## DENMARK

**Denmark’s digital health strategy is second to none. It relies on a nationally accessible patient portal – the gateway to a person’s medical journey from making appointments to accessing test results and ensuring coordination between different specialities and health providers.**

The portal makes extensive clinical data registries available to academics and health professionals, and a digital health hub called the Copenhagen Healthtech Cluster bridges collaboration between public and private stakeholders. Denmark dreams big and acts fast in genomics as well, setting its National Genome Center on target to “do at least 60,000 genome sequences” by 2024, a significant feat for improved prevention, diagnosis and treatment, especially for NCDs<sup>40</sup>

What sets apart the Danish precision medicine model is the emphasis on patient data privacy, and the state’s leadership in guaranteeing it. Strict rules are applied to the handling of patient data and approval from the National Scientific Ethics Committee is required to conduct research using the data from the National Genome Center.

## ESTONIA

**As one of the most digitally advanced countries in the world, Estonia is forging new paths in digital health as well.<sup>41</sup>**

Building on high rates of digital literacy, internet freedom, e-governance and trust in digital services, the country boasts a national telemedicine system, which has improved both access to healthcare in rural areas and to more specialized care such as that required for cardiovascular and other circulatory diseases, digital

prescriptions, and electronic patient records secured through blockchain and integrated with the national electronic ID card system.

Both public and private funds sustain digital health innovations and health care providers are reimbursed for the purchase of software and hardware necessary to run eHealth services. Despite its successes, Estonia’s digitally savvy young health professionals are asking for more up-to-date, user-friendly eHealth services. Stakeholders across the public and private sectors realize that they need to work together to merge needs with the business models of digital health.

To that end, the Estonian Connected Health Cluster brings together stakeholders from academia, the pharmaceutical industry, the biotechnology sector, health information and technology sector, and the health system to continue progressing in





digital health. Estonia's ambitious initiatives include nation-wide personalized medicine, genomics, and mental health.

## RWANDA

**The country is planting the seeds today for the promise of a digital transformation of its healthcare system in a decade's time.**<sup>42</sup>

As the first country in Africa on its way to achieving universal health coverage with its "Mutuelle de Santé programme," the country's "community-based insurance scheme" covering almost 90% of the population, Rwanda also has nationwide broadband infrastructure and 70% mobile penetration.

Not surprisingly, the country has embarked on several streams of digital health work. In 2005, Rwanda started electronic health records for all stages of HIV care,

from financing and administration to clinical information, which have since been extended to cover all clinical records. They also used an electronic logistics management system for medical and laboratory supplies as well as a platform for the country's community health workers to notify the central government of health trends requiring urgent action.

But Rwanda's most successful initiative to date has been its partnership with UK-based Babylon Health whose subsidiary Babyl has been providing more than one million telehealth consultations to its two million users since 2016 with support from the Bill and Melinda Gates Foundation. Building on this success, Rwanda and Babylon Health entered into a 10-year partnership to digitize the country's public primary care system by facilitating consultations with health professionals through mobile

phones (text, voice and video) for every citizen over the age of 12 years old.

In addition, under the partnership with Babylon, patients and doctors will manage laboratory tests, appointments and results, prescriptions, and expanded electronic patient records. Mutuelle de Santé will cover the costs of the eHealth services.

## SOUTH AFRICA

**South Africa is proving that, even with more than 40 health information systems nationwide, progress can be made in digitizing health.**

As early as 1996, the country created the District Health Information System — now online — in which health data from all provinces is consolidated for analysis and decision-making.<sup>43</sup> Another local-level innovation is the District Health Barometer,

which "strengthened district-level health planning, informing evidence-based and data-driven health plans."<sup>44</sup>

Moreover, the Health Patient Registration System, currently "[will be used] as a platform for collecting electronic medical records. Links to laboratory systems will be followed by connecting this data with radiology, pharmacological and clinical information."<sup>45</sup>

Challenges persist, from gaps in digital skills across the health workforce and compliance among districts to poor connectivity, and inter-operational issues.



# ACTIONS FOR LEVERAGING DIGITAL SOLUTIONS FOR CIRCULATORY HEALTH

**P**olicymakers need to build and maintain a host of regulations and policies to:

- enable sustainable digital health projects and initiatives that leverage existing infrastructure, and are easy to use and update; that
- meet the needs, preferences and digital literacy of end users in mind, that is, people living with circulatory diseases and busy health professionals — from concept note to prototyping, implementation, launch and evaluation; and that

- are integrated in national health systems.

With the above goal in mind, the World Heart Federation makes five equally important recommendations for policymakers. As a global actor connected to more than 200 national and regional members, we understand that these recommendations are not prescriptive but rather guide their implementation according to varying contexts, regionally, nationally and locally.

## Hear from our 4th global summit thought leaders

*“New technologies will not make us redundant, but ignorance of new technologies might.”*

**ROBERT MADELIN, FIPRA**

*“The next five years is crucial. Technology is developing rapidly – we need to address its impact on our health systems as a matter of urgency.”*

**MARTIN SEYCHELL, EUROPEAN COMMISSION**

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## 1. INVESTING IN END USERS: BUILDING THE DIGITAL CAPACITY OF THE HEALTH WORKFORCE

Users make or break digital health solutions. The adoption, endorsement and use of digital health tools begins with health professionals. But users are made, not born. Investing in the uptake of digital health means investing in physicians, nurses, community health workers and other members of the cardiovascular health workforce. Health professionals might not always find it easy to incorporate

digital health into their daily work, either because doing so requires time they lack and skills they have not been trained for, or because the solutions are cumbersome and unreliable.<sup>46</sup> Similarly, digital tools that are not integrated into health systems, that lack clear protocols or that require a complex infrastructure remain unutilized- or under-utilized.<sup>47</sup>

While there will continue to be differences between and within countries in terms of digital health skills, the time is now for governments to lay the groundwork for accelerating digital health commitments for the cardiovascular workforce. A good starting point for policymakers is to map the digital skills and roles within their country’s current workforce and identify the tasks that

technological innovations could render obsolete and those that would require shifting roles and responsibilities. This will prepare for a not-so-distant future in which technology and healthcare will be intertwined.<sup>48</sup>

As the COVID-19 pandemic proved, telemedicine can provide a lifeline for patients living with NCDs and for their health providers.

### WE CALL ON GOVERNMENTS TO:

- Encourage and support task-shifting to facilitate roles and responsibilities associated with the introduction of digital health solutions in cardiovascular and circulatory care, given their high potential for impact.
- Promote a digital-health-in-all policy across government, including medical education, and prioritize NCDs and circulatory health.
- Facilitate public-private capacity-building initiatives to enhance the digital skills of the health workforce.
- Involve cardiovascular and circulatory health professional associations in policy consultations on digital health.



### Hear from our 4th global summit thought leaders

*“We need to pay attention to the acceptance (of digital tools) among health workers. The tool needs to bring added value, not just be another gadget adopted to get money from an international NGO.”*

RICCARDO LAMPARIELLO, TERRE DES HOMMES

## 2. SERVING END USERS: BUILDING THE DIGITAL LITERACY OF PATIENTS, THEIR FAMILIES AND COMMUNITIES



An effective, digitally skilled health workforce requires buy-in and trust from patients and communities. Patients are often forced to navigate overstretched and fragmented health systems, leaving them little time to understand digital health solutions. They also have various degrees of digital literacy, depending on their age, socio-economic status, and access to the internet and geography, which may widen digital and health inequalities.<sup>49</sup>

Even if patients are comfortable with technology, they might distrust digital health tools and deem them impersonal and unreliable.<sup>50</sup>

Putting patients at the heart of digital health is a game-changer.<sup>51</sup> Governments must invest in both population-wide and targeted health literacy campaigns to raise awareness about basic digital health concepts and about their implications for care delivery, privacy and safety. These efforts will require policymakers to work not only across government – with all relevant institutions involved in the learning life of a person – but also with partners involved in cybersecurity, patients’ rights and health communication.

Moreover, investments in telecommunications infrastructure and in ensuring access to the internet as widely

as possible, including in remote or under-served communities, will need to complement any digital health awareness campaigns.

We acknowledge that having a digitally skilled population depends on broader issues that go beyond technical awareness or access to devices. Among other factors, it is contingent on socio-economic and digital determinants of health, trust in digital interactions with governments, the digitization of public administrations and a country’s level of, and openness to, innovation.

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### WE CALL ON GOVERNMENTS TO:

- Invest in evidence-based, population-wide digital health literacy campaigns, especially for cardiovascular and circulatory health as the field with the highest potential for impact.
- Engage circulatory health patient communities in the development of national strategies on digital health.
- Work across government sectors to build digital skills training from early education to life-long learning programmes.
- Invest in broad application of governmental digital platforms and services across all sectors that, in turn, foster public trust in digital services and telecommunications infrastructure in the field of medical care.



# 3. PROTECTING END USERS: ESTABLISHING REGULATIONS AND PROTOCOLS FOR PATIENT PRIVACY AND SAFETY

Making digital health tools effective for users means protecting their safety and the privacy of their data. AI, telemedicine and digital patient records have been gaining ground but they have to be matched against the realities in many low- and middle-income countries (LMICs) where complex data sets cannot be read because of patchy broadband access and weak computer power, and data is still being recorded on paper.<sup>52</sup>

Even when data is available and readable, it comes with a triad of issues: privacy, reliability and safety.<sup>53</sup> In a marketplace of digital health projects whose regulatory aspects are still in infancy, and with start-ups

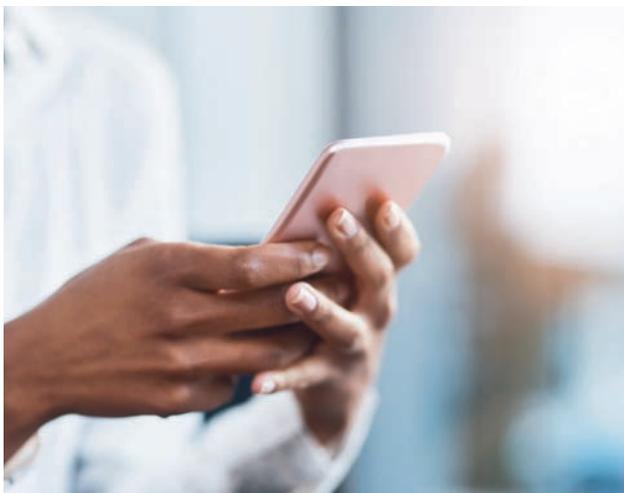
often driven by commercial concerns, protecting patients' confidentiality and privacy is neither guaranteed nor straightforward.<sup>54</sup> For example, a review conducted by the American Medical Association in 2017 on 271 diabetes Android apps found that 81% lacked privacy policies; and the majority of those that had privacy policies still "shared user information with a third party."<sup>55</sup>

Similarly, the way AI operates and interacts with the data does not happen in a vacuum: human bias influences the process and determines whether ethnicity, gender, geography and other population characteristics are reflected in data sets.<sup>56</sup>

We acknowledge that while no country or system is immune to data and privacy breaches, there are avenues — technological, institutional and regulatory — to minimize the risks. Likewise, there are opportunities for governments, industry and civil society to create together an ecosystem guided by privacy and safety principles.<sup>57</sup>

## WE CALL ON GOVERNMENTS TO:

- Implement national regulations, protocols and methodologies on end users' data protection and privacy for digital health, especially in the rapidly changing field of cardiovascular and circulatory health.
- Create or empower a nationwide monitoring system to review and help finetune the implementation of the regulations.
- Build partnerships with technology and civil society actors to ensure access to the latest knowledge about and tools for safety and privacy.



### Hear from our 4th global summit thought leaders

*“Many data sets are biased due to the unbalanced participation of mostly white mostly male populations. We absolutely need to be generating more data in low-resource settings, especially in the areas that are evolving rapidly, and precedents are being set.”*

**DR FRANCISCO LOPEZ-JIMENEZ, MAYO CLINIC**



# 4. ENSURING SUSTAINABLE FINANCING MECHANISMS FOR DIGITAL HEALTH: ESTABLISHING INFRASTRUCTURE AND PRIORITIZING FUNDING

Key to investments in people and systems is sustainable funding. In LMICs, for example, most digital health solutions are privately funded or funded short-term, raising questions both about their durability and about commercial interests potentially superceding clinical outcomes.

Financing also plays an important role in the uptake of digital health tools and services. It took the COVID-19 pandemic for telemedicine services to begin to be reimbursed, with examples of good practices emerging in the United States.<sup>58</sup>

However, in other countries, the patient costs may be reimbursed in some instances but not costs for care facilities or suppliers of digital solutions.<sup>59</sup> Even before reimbursement, financing is skewed more towards researching<sup>60</sup> and

piloting digital solutions rather than ensuring their sustainability through “financing models for all stages of the project lifecycle.”<sup>61</sup> While issues of financing affect countries at all levels of development, they have a disproportionate impact in LMICs, where digital health tools and services tend to be less “economically viable,” less replicable at a broad scale and less aligned with the local business and cultural landscape.<sup>62</sup>

For reasons of sustainability, governments should be lead coordinators of funding. This conveys to donors, investors and start-ups that countries are serious about their commitment to developing digital health initiatives, helping to make funding for this area an institutional priority.

Moreover, a central, public coordinator of funding would ensure that funds are not only prioritized for the development of products but also for training the health workforce, for digital awareness and literacy campaigns, telecommunication infrastructure and other enabling environmental factors.

**Governments have multiple options to choose from in terms of funding, the most common being:**<sup>63</sup>

- Public-private partnerships.
- Support in the public health system of, reimbursement of evidence-based, safe and reliable digital solutions by public insurance schemes.
- Schemes to support out-of-pocket payments for the use of digital tools and solutions.

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## WE CALL ON GOVERNMENTS TO:

- Prioritize funding for digital solutions for cardiovascular and circulatory health as the areas with the highest return on investment (ROI).
- Work across government, with Ministers of Finance and the Economy, to ensure sustainable funding for priority areas in the national digital health strategies.
- Tax unhealthy commodities and redirect a percentage of the proceeds to digital health programmes.
- Invest in both digital health products and in the enabling environment, including telecommunications infrastructure.





## 5. SUPPORTING RESEARCH FOR DIGITAL HEALTH: SETTING PRIORITIES THAT ADDRESS HEALTH INEQUITIES

As with ensuring sustainable funding, governments' leadership is needed to support a comprehensive and bold research agenda that advances national digital health strategies. Digital health holds great promise though requires robust evidence and a systemic investigation of its impact on the entire health ecosystem. Gathering evidence on patient and clinical outcomes is important, along with seeking answers to other key questions, such as: what are the implications of digital transformations for communities and the workforce? Are digital health solutions economically viable?<sup>64</sup> What is the impact of public-private partnerships in digital health? How can digital health solutions contribute to achieving the Sustainable Development Goals (SDGs)?

Sound evidence of digital health tools on patient and clinical outcomes and on economic impact must aim to match the hope put in e-health solutions.<sup>65</sup> Moreover, mHealth in particular raises concerns because patients become consumers in a marketplace of mostly untested mobile applications and wearable devices whose accuracy, reliability and safety are rarely independently verified.<sup>66</sup> Even when mobile apps and smart wearable devices are tested, the health information they generate may alert patients to alarming symptoms taken out of medical context and make them rush to already stretched care facilities.<sup>67</sup>

Private and public stakeholders working in digital health need to be transparent about the efficacy claims that they are making. An institutional framework needs to be created and enforced which requires developers of digital health solutions to have the proper evidence in place, to allow that evidence to be replicated and tested, and to become supporters and models of transparency balanced with commercial and intellectual property interests.

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### WE CALL ON GOVERNMENTS TO:

- Develop research priorities aligned with digital health strategies and ensure appropriate funding, including through public research grants.
- Prioritize research investments in cardiovascular and circulatory health, given that it is the field with the highest potential for impact and multi-stakeholder collaboration.
- Support research and discussion into broader societal questions related to digital health, for example, about the impact of digital transformation on communities, the impact of eHealth on achieving the Sustainable Development Goals (SDGs), and digital health inequities.
- Support the adoption of WHO's guidance for digital health research in all publicly funded research projects.

**Q** What are the implications of digital transformations for communities and the workforce?  
 Are digital health solutions economically viable?  
 What is the impact of public-private partnerships in digital health?  
 How can digital health solutions contribute to achieving the Sustainable Development Goals (SDGs)?



## ABOUT THE WORLD HEART FEDERATION

The World Heart Federation (WHF) is the only organization working on cardiovascular disease (CVD) that has official relations with the World Health Organization (WHO). Working with WHO, we lead the global advocacy effort to prevent, control and

reduce the global burden of cardiovascular disease.

WHF works at the international, regional and national levels to end needless deaths from exposure to tobacco, air pollution and other risk factors, improve access to treatment, and tackle neglected conditions such as rheumatic heart disease and Chagas disease. WHF works

to promote health equity and access to heart healthcare as a basic human right.

We strive to build global commitment to address cardiovascular health at the policy level, generate and exchange ideas, share best practice, advance scientific knowledge and promote knowledge transfer to tackle

CVD. We are at the heart of driving the CVD agenda and advocating for better heart health — enabling people to live longer, better and more heart-healthy lives, wherever and whenever they may be.

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### OUR MISSION IS TO:

- Connect and coordinate the diverse cardiovascular community by bringing together scientific cardiology societies, heart foundations, policymakers, governments, industry, health professionals, patients and the general public.
- Translate science into policy to reach decision-makers and promote awareness and understanding among the health community that includes patients and practitioners.
- Stimulate and catalyze the exchange of information, ideas, practices across all sectors and borders.

WHF is a Founding Member of the Noncommunicable Diseases Alliance (NCD) and the Global Coalition for Circulatory Health.

# ABOUT THE GLOBAL SUMMIT ON CIRCULATORY HEALTH



The Global Summit is an invitation-only event for leaders who are shaping the future of circulatory health. It aims to create a space where speakers and participants with diverse experiences — from governments, international organizations, academia, and the private sector — can network, debate, and place critical issues of circulatory health in a wider global health context while staying hungry for more ideas, conversation and exchanges.

**The 4th Global Summit (Paris, 29-30 August 2019) explored the issue of Innovations in Circulatory Care and Technologies.**

#### The objectives of the Summit are to:

1. **Convene** and mobilize advocates in circulatory health.
2. **Coordinate** stakeholders and policymakers around shared goals.
3. **Campaign** for circulatory health with a collective voice and a clear message.
4. **Catalyze** action for circulatory health through civil society and policy engagement.

#### These objectives lead directly to the intended outcomes of the Summit, namely to:

- Foster greater **connectedness** between participants.
- Issue a **collective call to action** in light of the urgent need.

- Discuss **concrete next steps** for programme implementation.

## ONE SUMMIT, THREE CONTINENTS

The first Global Summit, held in 2016 in Mexico City, resulted in the first Declaration on Circulatory Health — the Mexico Declaration — signed by 29 leading global organizations, including the World Health Organization.

Following the second Summit, held in 2017 in Singapore, the Global Coalition for Circulatory Health was launched as the only network of international, regional and national organizations advocating for increased prevention, control and treatment of all circulatory diseases.

The 3rd Global Summit explored the theme of *Access to Essential Medicines and Technologies* by bringing together influencers and leaders from circulatory health and policymaking to propose concrete Calls to Action to drive action on cardiovascular diseases.

The 4th Global Summit (Paris, 29-30 August 2019) explored the issue of *Innovations in Circulatory Care and Technologies*.



# MAPPING OF WHF'S RECOMMENDATIONS IN RELATION TO WHO'S DRAFT STRATEGY ON DIGITAL HEALTH RECOMMENDATIONS

| WHF's Recommendations                                                                       | WHO's draft recommendations (as proposed by WHO, Member States and partners)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
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| <p><b>Investing in end users: building the digital capacity of the health workforce</b></p> | <p>Facilitate joint learning through communities of practice and curriculum-based training initiatives to enhance country capacity on digital health.</p> <p>Develop capacity-building (methodologies, tools and training materials) to help Member States to identify, systematize and</p> <p>Review annually the global agenda for action to build the future of the digital health and information and communications technology workforce; and the digital capacity of the health workforce.</p> <p>Involve stakeholders in the planning and implementation of digital health, including professional associations and patient and family organizations. Promote engagement with communities, health-care workers and those in other sectors by identifying (1) champions to help take advantage of and promote digital initiatives, and (2) central and cross-sectoral governance mechanisms for health-related innovations.</p> <p>Expand the digital health workforce and promote capacity-building to develop, update and implement national strategies and investment plans for digital health.</p> <p>Promote national scientific, professional and patient associations as active participants in digital health development and the national digital health agenda.</p> <p>Ensure end-user communities and beneficiary populations are adequately engaged in the design, development, deployment, scale-up and sustainability phases.</p> <p>Develop norms and standards on digital competencies through WHO's programme on health workforce capacity-building. This will include using partnerships with collaborating centres and affiliated professional associations to strengthen the role of health workers in providing cost-effective, efficient and safe health services through digital means as appropriate.</p> <p>Ensure the capacity of training institutions to establish and/or expand digital health literacy, provide life-long learning opportunities for digital health, and to have such digital health programmes properly accredited by the relevant authorities.</p> <p>Invest in and maximize the opportunities made available by digital health technologies to strengthen capacity building of health workers.</p> <p>Review the different education and training programmes on digital health by institution, level of degree, specialty and cost, and analyse current trends at the national level.</p> <p>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.</p> <p>Disseminate best practices for engaging professional and patients' associations, which are active participants in digital health development and the implementation of the global strategy on digital health.</p> <p>Identify the core competences of digital health literacy that might be included in education and training curricula of health professionals and allied workers.</p> <p>Develop education and training programmes on digital health literacy.</p> <p>Support countries to adopt and effectively use person-centric digital systems for the health workforce, facilitating evidence-based decision-support, and health systems' accountability.</p> |

|                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|----------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Serving end users: building the digital literacy of patients, their families and communities</b></p>                       | <p>Facilitate dialogue and collaboration among the public sector and other stakeholders, including the private sector, to ensure digital health transformation is appropriate and sustainable, leaving no one behind.</p> <p>Involve stakeholders in the planning and implementation of digital health, including professional associations and patient and family organizations. Promote engagement with communities, health-care workers and those in other sectors by identifying (1) champions to help take advantage of and promote digital initiatives, and (2) central and cross-sectoral governance mechanisms for health-related innovations.</p> <p>Ensure end-user communities and beneficiary populations are adequately engaged in the design, development, deployment, scale-up and sustainability phases.</p> <p>Identify and engage with professional, patient associations and civil society that are active participants in digital health development and innovations.</p> <p>Forster population's digital health literacy and raise awareness of patients' rights and the concept of dynamic consent.</p> <p>Synthesize national research and disseminate evidence on the contributions of digital health interventions to the performance of health</p> <p>Develop and promote the use of tools that support digitalizing processes at health service centres with a focus on patients' rights, standardized processes and managed quality of service.</p> |
| <p><b>Protecting end users: establishing regulations and protocols for patient privacy and safety</b></p>                        | <p>Introduce the international health data regulation that will enshrine the value of health data as a global public health good and call for action by all digital health stakeholders to align with principles on issues of monetization of health data</p> <p>Address and develop strategies to incorporate lessons learned and to mitigate shared challenges in ethics, legal frameworks and governance in digital health including data privacy and sharing and ensuring safety and protection of individuals within the digital health environment.</p> <p>Implement management procedures for programmes, risks, change and compliance.</p> <p>Review, develop, and/or revise specific laws and policies, if necessary, with respect to data privacy, security, confidentiality, standardization, exchange, accessibility and interoperability</p> <p>Promote ethics, governance and security in handling and processing data for research or for other data sharing requirements.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <p><b>Ensuring sustainable financing mechanisms for digital health: establishing infrastructure and prioritizing funding</b></p> | <p>Establish or leverage on existing collaborative and coordination mechanisms driven by adherence to sound common principles to engage with stakeholders and private sector to develop, implement, and finance an appropriate and sustainable digital health ecosystem. share good practices and lessons learned on digital health.</p> <p>Establish a knowledge-management approach for sharing and emphasizing the role of digital health investments in catalysing the achievement of national health priorities, universal health coverage, Sustainable Development Goals and WHO's Thirteenth General Programme of Work, 2019-2023.</p> <p>Identify adequate funding to support the cost of acquisition or licensing, implementation and maintenance of necessary hardware infrastructure, software, workforce capacity and other technical and financial resources required.</p> <p>Establish and implement policies regarding practice, payment and accreditation for delivering digital health services.</p> <p>Improvise and promote sustainable financing models in support of digital health development, implementation, integration into health systems and maintenance.</p> <p>Facilitate the use of global technology registries for digital technologies and projects at country and global levels that support the unique registration, monitoring and coordination of digital investments (for example, WHO's Digital Health Atlas).</p>                     |

### Supporting research for digital health: setting priorities that address digital health inequities

Classify the different tools and technologies included in the digital health ecosystem, and develop ways to assess and monitor their efficacy.

Develop, promote and support the adoption of technical documents and guidelines, ethical and legal frameworks, and planning and implementation toolkits.

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.

Develop tools for impact assessment that can measure the effectiveness of the interventions using digital health.

Develop research and promote capacity-building for governments, policy-makers, practitioners and the public in general to take informed decisions, generate trust and support digital health investments.

Analyse digital health ecosystem and propose concrete policy actions to advance the achievement of the targets of universal health coverage, the Sustainable Development Goals and WHO's Thirteenth General Programme of Work, 2019-2023 using digital health technologies.

Establish criteria for assessing the relevance and impact of digital health solutions, for example including priority characteristics relevant to low-resource settings.

Develop evidence-based technical documents on different topics related to digital health, such as cost-effectiveness and affordability, ethical use, privacy and security, and safety.

Analyse digital health ecosystem and propose concrete policy actions to advance the achievement of the targets of universal health coverage, the Sustainable Development Goals and WHO's Thirteenth General Programme of Work, 2019-2023 using digital health technologies.

Develop guidance on new areas being enabled by digital health technologies such as virtual hospitals, digital therapeutics, personalized medicine and others.

Develop target-product profiles and priority characteristics for digital health applications especially relevant to the needs of low-resource settings; define challenges and draw a road map for increased access.

Develop research and promote capacity-building to enable Member States and other stakeholders to take informed decisions in order to support sound digital health investments.

Develop research on cutting-edge health technologies and share the evaluation results of the implementation of digital health interventions.

Synthesize national research and disseminate evidence on the contributions of digital health interventions to the performance of health systems and on the effect on overall people's health and wellbeing.

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# DIGITAL TRANSFORMATION

## THE CASE FOR THE DIGITAL TRANSFORMATION OF CIRCULATORY HEALTH



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