



Health Systems, Digital Health and COVID-19:

Insights from Bangladesh, Myanmar,
Pakistan, Benin, Nigeria and Rwanda



GSMA Mobile for Development

The GSMA represents the interests of mobile operators worldwide, uniting more than 750 operators and nearly 400 companies in the broader mobile ecosystem, including handset and device makers, software companies, equipment providers and internet companies, as well as organisations in adjacent industry sectors. The GSMA also produces the industry-leading MWC events held annually in Barcelona, Los Angeles and Shanghai, as well as the Mobile 360 Series of regional conferences.

For more information, please visit the GSMA corporate website at www.gsma.com

Follow the GSMA on Twitter: [@GSMA](https://twitter.com/GSMA)

For more information, visit our website at www.gsma.com/mobilefordevelopment

Twitter: [GSMAM4d](https://twitter.com/GSMAM4d)

Authors:

Sam Ajadi, GSMA

Peter Drury, Drury Consulting

Contributors

Akanksha Sharma, GSMA

Kinda Chebib, GSMA

Susanna Acland, GSMA

Simone Hinrichsen, GSMA

Mark Landry, WHO



This initiative has been funded by UK aid from the UK government and is supported by the GSMA and its members.

The views expressed do not necessarily reflect the UK government's official policies.

Contents

Executive summary	2
Research objectives	5
Bangladesh	6
Myanmar	14
Pakistan	20
Benin	28
Nigeria	34
Rwanda	40

Executive summary



This report lays out the potential impact of digital health in six developing countries and should be read in conjunction with the recent GSMA report, **Digital Health: A Health System Strengthening Tool for Developing Countries**. The six countries, together with some key indicators, are shown in Table 1 below.

Table 1

Health indicators

Indicator	Bangladesh	Myanmar	Pakistan	Benin	Nigeria	Rwanda
Population (million) ¹	164.7	54.4	220.9	12.1	206.4	13.0
Life expectancy ²	72.7	66.8	57.7	61.1	55.2	59.9
Under-five mortality rate ³	31	45	67	93	117	34
Maternal mortality ratio ⁴	173	250	140	397	917	248
Doctor to population ratio ⁵	5.8	6.8	9.8	0.8	3.8	1.3
Health spending per capita (\$) ⁶	42	59	43	31	84	58
Government spending per total health spend (%) ⁷	17	14.8	35.5	17.7	14.9	31.5
Out-of-pocket spending per total health spend (%) ⁸	73.9	76.4	56.2	44.5	76.6	10.5

One of the lessons from our research was that progress in each country must be measured in the context of the national health system. The different organisational structures of these health systems are summarised in the first part of each country section.

The next section details the state of play of digital health in each country, which varies quite considerably. Bangladesh and Rwanda treat digital health as part of a whole-of-government approach and seek to leverage government-wide infrastructure and standards. Pakistan and Nigeria, which have a strong federal tradition, have a more fragmented approach. In Myanmar and Benin, digital health is still in early stages and relies more heavily on contributions from development partners.

Several insights were gleaned from our key informant interviews (KIIs). A common theme was that broad stakeholder involvement in digital health ecosystems is

a growing trend that should be fostered, but how this is done varies from country to country. While some respondents want governments to create an enabling environment, others see start-ups and mobile operators playing a greater role. Another emerging theme was the lack of shared understanding among stakeholders of policy requirements and frameworks.

The COVID-19 pandemic is a challenge confronting all countries, and the report briefly reviews some of the digital health approaches each country has taken. While this is only a partial picture of the COVID-19 response, we discovered that the pandemic has amplified calls for digital health initiatives.

The final section features case studies from each country. Again, while these are just snapshots, taken together they illustrate some of the progress that is being made in strengthening health systems with digital health solutions.

1 United Nations Department of Economic and Social Affairs (2019), *World Population Prospects 2019*.

2 *Ibid.*

3 UNICEF, *Under-five mortality* (2020).

4 Trends in maternal mortality: 2000 to 2017: estimates by WHO, UNICEF, UNFPA, World Bank Group and the United Nations Population Division. Geneva: World Health Organization; 2019.

5 WHO World Health Statistics.

6 The World Bank Statistics.

7 *Ibid.*

8 WHO Global Health Expenditure Database.





Research objectives

Objectives

Our research unpacks the health systems and digital health solutions in six developing countries: Bangladesh, Myanmar, Pakistan, Benin, Nigeria and Rwanda. This report expands on another GSMA report published in June 2020, [Digital Health: A Health System Strengthening Tool for Developing Countries](#), which uncovered the challenges facing health systems

in these six countries and how these challenges have been exacerbated by the COVID-19 pandemic. It also examines digital health as a strengthening tool for health systems, featuring different private sector business models and the role of digital health in managing COVID-19.

Summary of methodology

The information collected, analysed and presented in our research came from two sources:

Thirty-five key informant interviews (KIIs) with governments/Ministries of Health (MoH), development partners and NGOs, investors, mobile operators and health technology start-ups from across Bangladesh, Myanmar, Pakistan, Benin, Nigeria and Rwanda. Respondents were asked several questions about the

state of healthcare and digital health in their country. KIIs were conducted between 20 January and 16 March 2020, which means most took place before the World Health Organization (WHO) officially declared COVID-19 a pandemic on 13 March 2020.

Desk-based research was also conducted on healthcare and digital health challenges and the COVID-19 response.

Bangladesh






Population

164.7 million



Doctor to patient ratio

5.8 doctors per 10,000 population



Life expectancy at birth

72.7 years




Health expenditure

\$42 per capita



Under-five mortality rate

31 deaths per 1,000 live births




Government health spending

41% per total health spending



Maternal mortality ratio

176 deaths per 100,000 live births



Out-of-pocket spending

73.9% per total health spending

The health system in Bangladesh

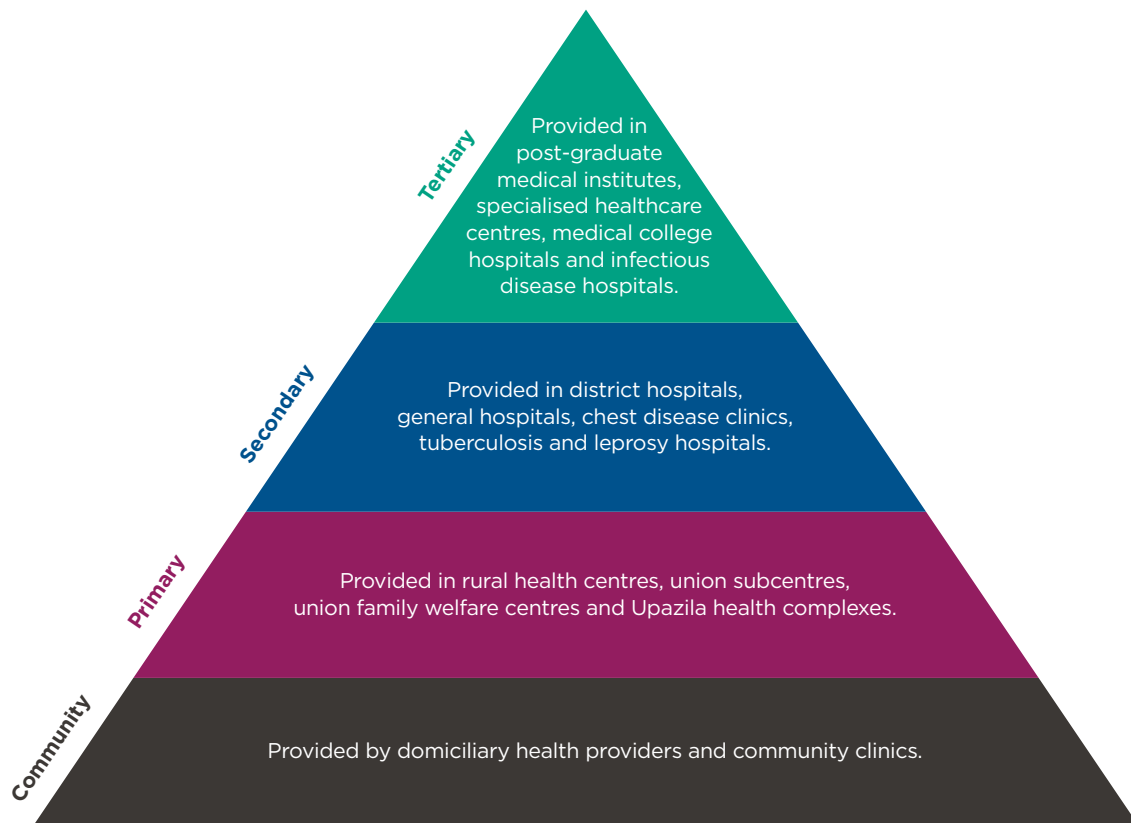
Bangladesh's public health system, established during the 1970s, mirrors the country's overall administrative structure. Public healthcare is directed by the Ministry of Health and Family Welfare (MoHFW) through different Directorate Generals: Health Services, Family Planning, Drug Administration, Nursing and Midwifery and the Health Economics Unit. While the MoHFW oversees primary healthcare facilities in rural areas, the

Ministry of Local Government, Rural Development and Cooperatives (MoLGRDC) is responsible for primary healthcare in urban areas.

Public healthcare services are organised into community, primary, secondary and tertiary levels, as shown in Figure 1 below.

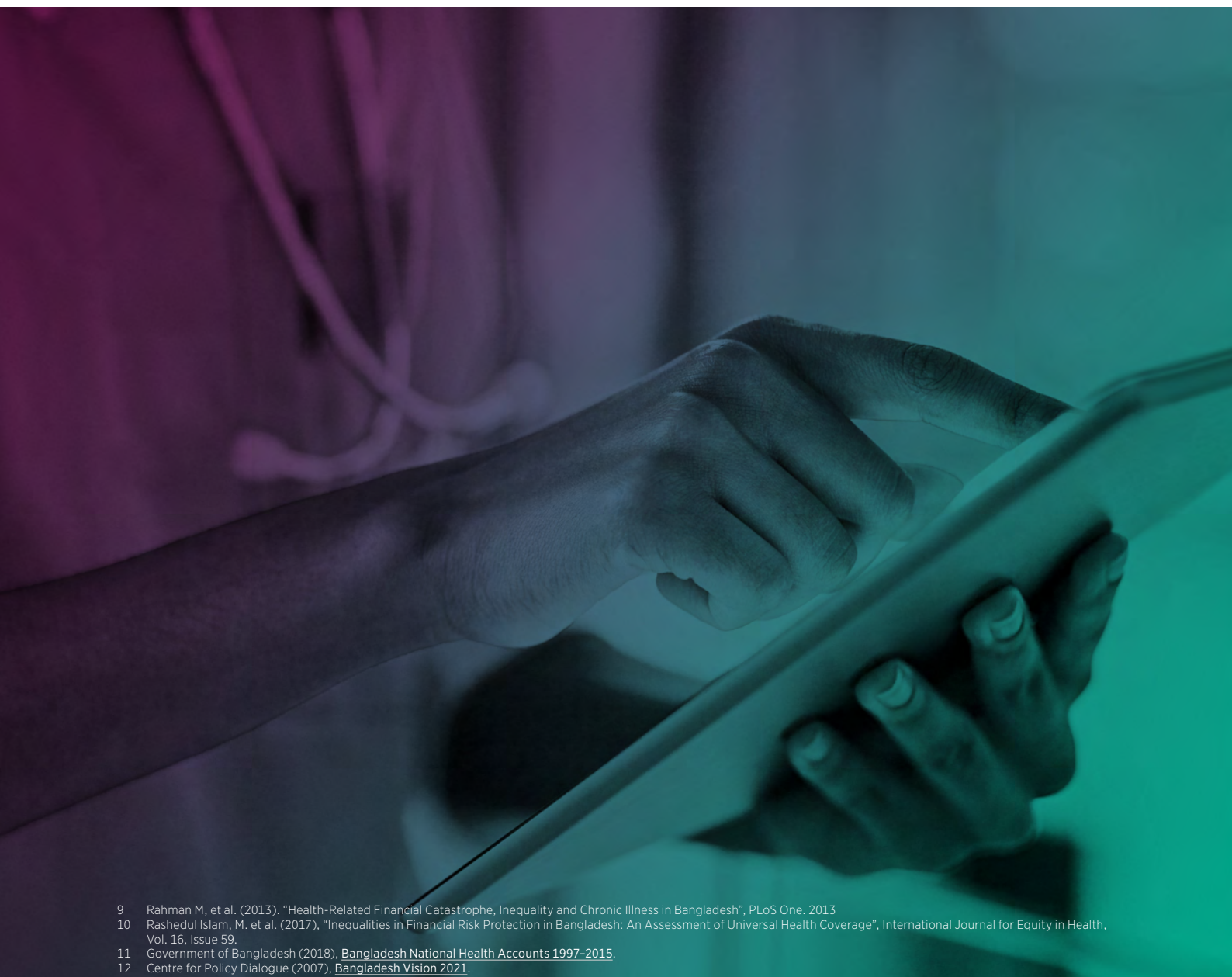
Figure 1

The health system in Bangladesh



Public healthcare is highly subsidised by the government with nominal payments made by patients, especially for outpatient care. Health insurance, both national and private, is practically non-existent and health financing is underfunded. One study has found that about 11 per cent of total household budgets are spent on healthcare, on average.⁹ As a result, there is a high incidence of financial hardship, with around one in 10 households facing financial catastrophe and one in 20 non-poor households falling into poverty due to healthcare costs.¹⁰ Out-of-pocket (OOP) contributions to health expenditure in Bangladesh are among the highest in the world at 67 per cent.¹¹

Since the late 1990s, the Government of Bangladesh and its development partners have pursued a sector-wide approach in the Health, Nutrition and Population sector. The MoHFW is currently implementing the fourth Health, Population and Nutrition Sector Programme 2017–2022 (HPNSP), which aims to improve equity, quality and efficiency; move towards universal health coverage (UHC) and achieve the UN Sustainable Development Goal (SDG) 3 of Good Health and Well-Being. The HPNSP is guided by Bangladesh's overarching Vision 2021, which aims to transform the country from a lower-middle-income economy to a middle-income nation.¹² A key strategy and policy focus of Vision 2021 is using information and communication technology (ICT) to help steer the country's development. As a result, significant work has been done to build a 'Digital Bangladesh'.



9 Rahman M, et al. (2013). "Health-Related Financial Catastrophe, Inequality and Chronic Illness in Bangladesh", PLoS One, 2013

10 Rashedul Islam, M, et al. (2017), "Inequalities in Financial Risk Protection in Bangladesh: An Assessment of Universal Health Coverage", International Journal for Equity in Health, Vol. 16, Issue 59.

11 Government of Bangladesh (2018). [Bangladesh National Health Accounts 1997–2015](#).

12 Centre for Policy Dialogue (2007). [Bangladesh Vision 2021](#).

Digital health: State of play

Public sector digital health initiatives in Bangladesh began over a decade ago. 2009 marked the start of a revolution in harmonising the country's complex array of health information systems (HIS). Like the country's pluralistic health service delivery, HIS were highly fragmented at the time. Data generated by private and public sector providers were not linked and, in the public sector, data from urban and rural areas and family planning programmes were handled separately.

The strategic priorities of Digital Bangladesh were set out in 2011. The Digital Bangladesh vision and implementation offered the country an opportunity to accelerate Bangladesh's journey to becoming a middle-income country. The approach was explicitly cross-sectoral and guided by the collaboration of the government, private sector and non-governmental stakeholders, development partners and citizens. Health was one of the key sectors, with a vision of "Quality health care services to doorsteps of all citizens".¹³ While progress has been made in improving digital infrastructure in Bangladesh, there is still a long way to go.

There has been a significant effort to improve the quality of health information management, particularly via the District Health Information System (DHIS2)¹⁴ and nurture innovative but affordable solutions. For example, the Shastho Batayon (16263) platform uses advanced interactive voice response (IVR) technology as part of a one-stop integrated national health call centre.¹⁵ Many open source technologies have been initiated in Bangladesh, including an Electronic Medical Record platform (BAHMNI),¹⁶ an integrated mother and child registry platform (OpenSRP)¹⁷ and a civil registration and vital statistics solution (OpenCRVS),¹⁸ in addition to DHIS2. Major efforts have also been made to establish an eHealth Standards and Interoperability Framework for Bangladesh.¹⁹ A 2018 assessment of the Global Digital Health Index²⁰ found that Bangladesh is in the scaling-up phase of development. Strengths included strategy, governance and in-service training. Most improvements are needed in the areas of investment, cross-border data security and pre-service training.

13 Access to Information Initiative (A2I) Programme, Prime Minister's Office (2011), *Strategic Priorities of Digital Bangladesh*.

14 Birdsall, K. (November 2014), *A Quiet Revolution: Strengthening the Health Information System in Bangladesh*. GIZ.

15 Khan, M.A.H., de Oliveira Cruz, V. and Azad, A.K. (2019), "Bangladesh's digital health journey: reflections on a decade of quiet revolution", *WHO South-East Asia Journal of Public Health*, Vol. 8, Issue 2, pp. 71–76.

16 www.bahmni.org

17 <https://smartregister.org>

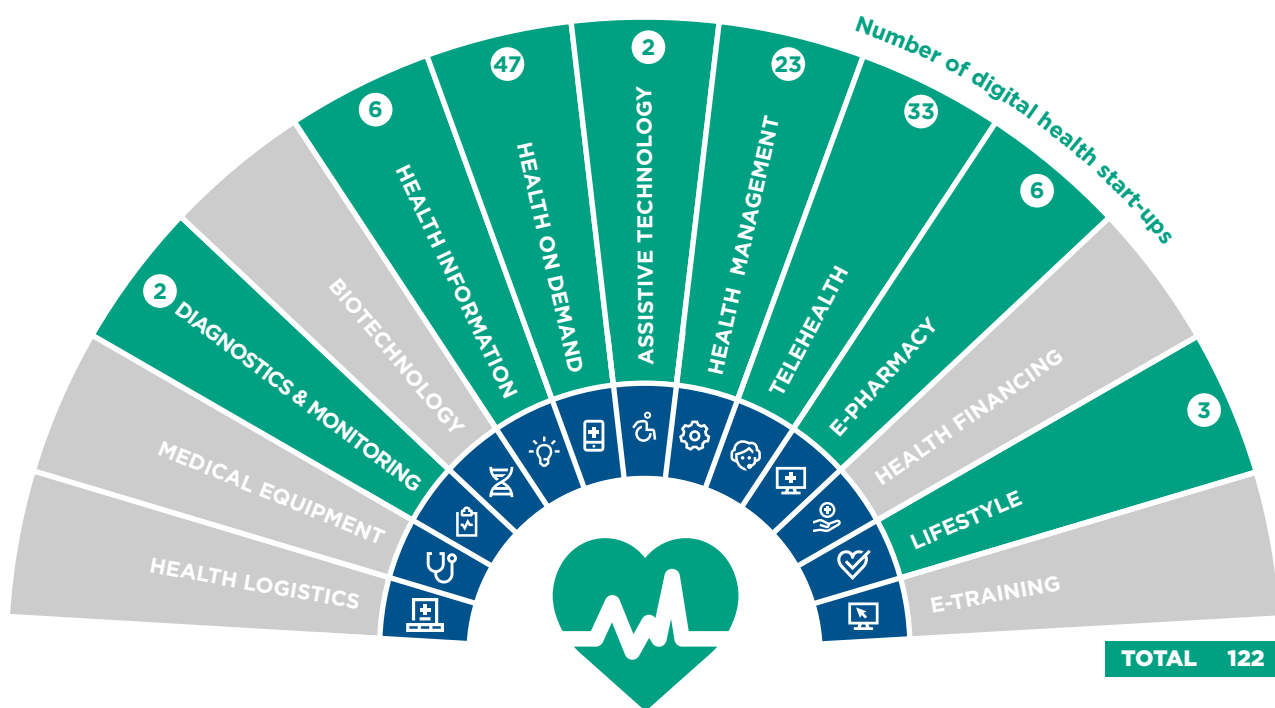
18 www.opencrvs.org

19 Bangladesh eHealth Standards & Interoperability Framework: <https://dghs.gov.bd/index.php/en/e-health/ehealth-standards>

20 Global Digital Health Index for Bangladesh: http://index.digitalhealthindex.org/country_profile/BGD

Figure 2

Digital health start-ups in Bangladesh



Source: Tracxn



Insights from expert interviews

Respondents expressed that Bangladesh's health system lacks effective policies, and OOP expenditure is extremely high.

Respondents also noted that the major mobile operators in the digital health market (Telenor, Robi and Bangalink) have focused on appointment booking, calls with doctors, health directories, medicine reminders and health tips. However, they have not had much success, in part because behaviour change has been a major challenge (e.g. getting people to book appointments online). Nevertheless, their distribution networks have provided an opportunity to deliver behaviour-changing information about health and health services (e.g. when people use the networks to recharge their phone or purchase bundle packs).

The overriding plea from respondents was to develop digital health policy in collaboration with key stakeholders. The government's role is to provide guidance and regulation in key enabling areas for start-ups, investors, MNOs and the private sector. Due to its potential, respondents said, digital health should be promoted as a priority area for policy development.

Respondents also indicated that digital health providers were not cooperating with one another, and expressed the need for a more collaborative culture in the digital health ecosystem. While the reach of donors and development partners was valued, particularly in remote areas, respondents encouraged them to work with start-ups to test and fine-tune the sustainability of their proposals. Development partners were also encouraged to improve coordination and work with the government to track their initiatives.

Digital health: COVID-19 response

Digital tools and digital health solutions have provided critical support to Bangladesh's COVID-19 response, enabling access to essential information and health services. The government's digital health strategy focuses on developing instant and quality healthcare services via mobile apps, and tapping into the country's large number of mobile subscribers to establish a countrywide digital health system.

The government has encouraged public-private partnerships (PPPs) since the beginning of the crisis, emphasising close collaboration with digital health start-ups. The surge in demand for telemedicine²¹ has led to the advent of 15 digital healthcare providers providing these services.²² The launch of virtual hospital HelloDoc²³ in April 2020, and the launch of the Daktarbhair²⁴ telemedicine platform, have both supported the development of a telehealth system during COVID-19. In May 2020, the government collaborated with ride-sharing platform Pathao,²⁵ digital health solution Maya²⁶ and Praava Health²⁷ to

provide instant healthcare services via the Pathao Health mobile app.²⁸ Pathao Health connects users to an online COVID-19 symptom checker and provides one-on-one medical services through phone and video consultations. Users can also obtain prescriptions and order medicines through the app. Bangladesh has also begun to use surveillance, reporting and contact tracing features in a COVID-19 module for DHIS2, as well as Go.Data for contact tracing in the Rohingya refugee camps in Cox's Bazar.

Data is a critical resource for supporting public health actions across the different phases of the COVID-19 pandemic. Mobile operators are working with key stakeholders, including a2i and the National Telecommunications Monitoring Centre, on a COVID-19 Collective Intelligence System. More details can be found in GSMA's report, [Keeping Bangladesh connected: The role of the mobile industry during the COVID-19 pandemic](#).

21 Hasan, M. (29 August 2020), "High demand for telemedicine in pandemic", Dhaka Tribune.
22 As of August 2020. See: www.dhakatribune.com/bangladesh/2020/08/29/high-demand-for-telemedicine-in-pandemic
23 www.hellodoctor.com.bd
24 www.daktarbhair.com
25 Tithila, K.K. (13 May 2020), "Pathao launches online healthcare service", Dhaka Tribune.
26 <https://maya.com.bd/>
27 <https://praavahealth.com/>
28 <https://pathao.com/health/>



Digital health: Case studies



CMED Health provides smart preventive care for regular health monitoring. The IoT-enabled, cloud-based healthcare platform monitors health parameters, predict health risks and aims to reduce healthcare costs.

The CMED Health Kit comes with a digital weigh scale, height scale, blood pressure monitor, blood glucose monitor, thermometer and blood oxygen monitor. These devices are Bluetooth compatible and can be connected to the CMED app on any smartphone or tablet. The devices measure important health vitals, such as blood pressure, pulse rate, oxygen saturation in blood, blood sugar, weight, height, body mass index and body temperature. The app then provides instant feedback, showing health data analytics and health

risk predictions. Users can monitor their vitals remotely by integrating a smart medical device with the app.

During COVID-19, the health kit has allowed CMED's team to identify and escalate emergencies. As of September 2020, over **1.5 million people** in Bangladesh have benefited from CMED Health's platform during the COVID-19 pandemic. CMED Health has developed a COVID-19 digital health services module for providing screening, education and awareness, triage for potential cases for sample collection, laboratory tests and patient management services. CMED health is working with different organisations within the Government of Bangladesh to support the country's pandemic response.



Maya

Maya: In Bangladesh there are many barriers to accessing reliable health advice, particularly for women, since discussing personal, health or psychosocial issues can be taboo. Maya provides an app that both men and women can use to ask health

questions in English and Bangla. Questions are routed to a vetted network of over 200 experts (doctors, therapists, etc.) anonymously through a real-time backend. Maya's knowledge sharing and messaging platform is available on Android and the web.

An aerial photograph of Yangon, Myanmar, showing a mix of traditional and modern architecture. In the foreground, a large, ornate pagoda with multiple tiers is prominent. To its right, a busy street curves around a corner, with several cars and a white van visible. In the background, a dense urban landscape is filled with various buildings, including a tall, modern skyscraper with a grid-like facade. The sky is overcast, and the overall scene is captured in a slightly desaturated, blue-toned aesthetic.

Myanmar



Population

54.4 million



Doctor to patient ratio

6.8 doctors per 10,000 population



Life expectancy at birth

66.8 years



Health expenditure

\$59 per capita

INDIA



LAOS


THAILAND

CAMBODIA




Under-five mortality rate

45 deaths per 1,000 live births




Government health spending

14.8% per total health spending



Maternal mortality ratio

250 deaths per 100,000 live births



Out-of-pocket spending

76.4% per total health spending

The health system in Myanmar

The Ministry of Health and Sports (MoHS) has ultimate responsibility for Myanmar’s health system. However, after years of isolation under the military regime, the country’s new civilian leadership is opening the door to the international community and NGOs, and deepening ties with community groups and religious societies that have often filled the gaps in healthcare provision. Within the MoHS, the Department of Public Health oversees basic healthcare and operates 1,132 hospitals nationwide. Facilities range in size from 2,000 bed hospitals in cities such as Yangon and Naypyidaw, to remote rural health clinics with 20 or fewer beds.²⁹

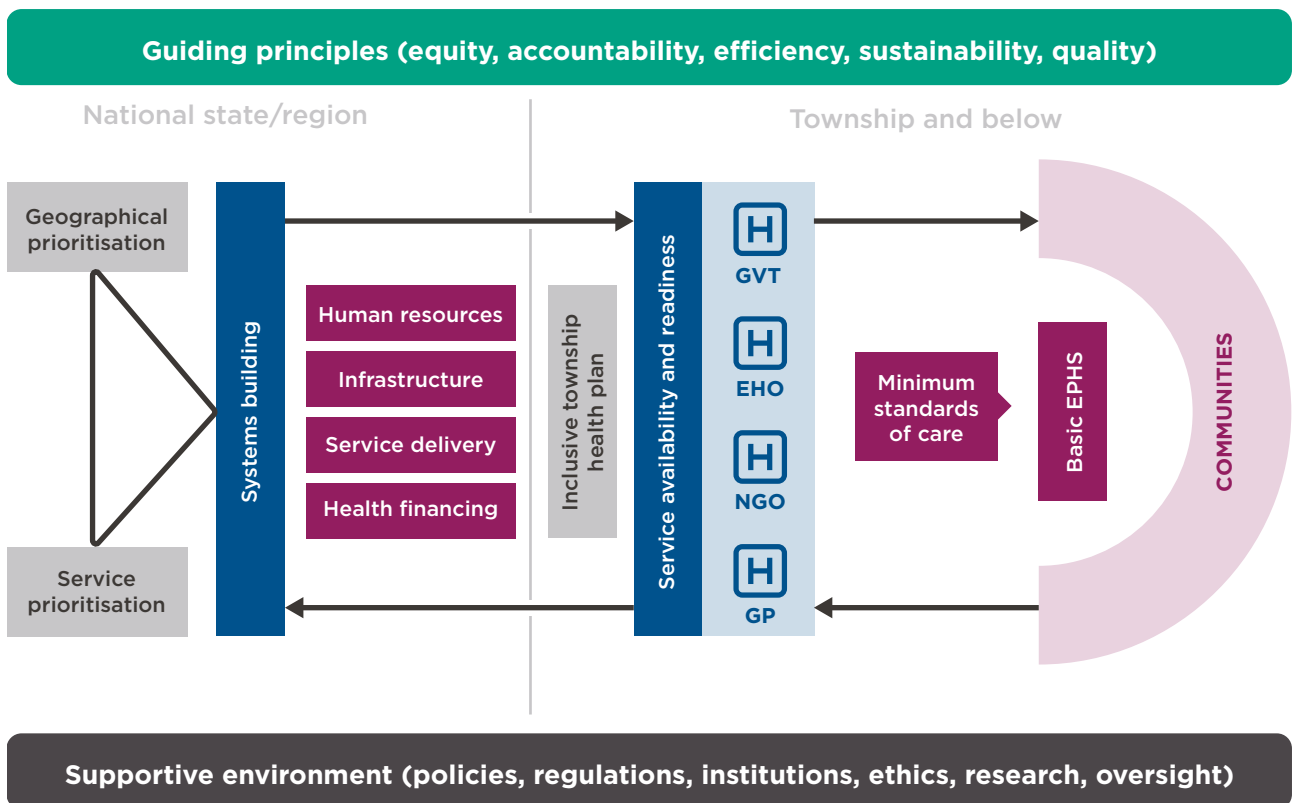
Myanmar’s health system faces several challenges, and limited oversight, leadership and accountability have exacerbated these challenges. OOP spending by households remains the dominant source of financing for health.

The National Health Plan (NHP) provides a framework for programme management within the broader health system, especially at the township level and below. As illustrated in Figure 3, it aims to more closely align:

- Programmes: By encouraging more integrated training, supportive joint supervision, referral mechanisms and a more streamlined health information system;
- Development partners: Through stronger oversight and coordination;
- Providers: Through the engagement of NGOs and private for-profits; and
- Implementing agencies: By ensuring that projects and initiatives help to achieve NHP goals.

Figure 3

Myanmar’s healthcare delivery system



29 Oxford Business Group (n.d.), “Myanmar’s government makes health care investment key policy”.

Myanmar’s essential package of health services (EPHS) highlights the critical role of primary healthcare and the delivery of essential services and interventions at the township level and below, starting with the community. From the township level, planning information (based

on who is doing what and where, which services and interventions reach which communities, where the gaps are and who could fill them) is fed into a national database to support planning and monitoring efforts at all levels of the system.

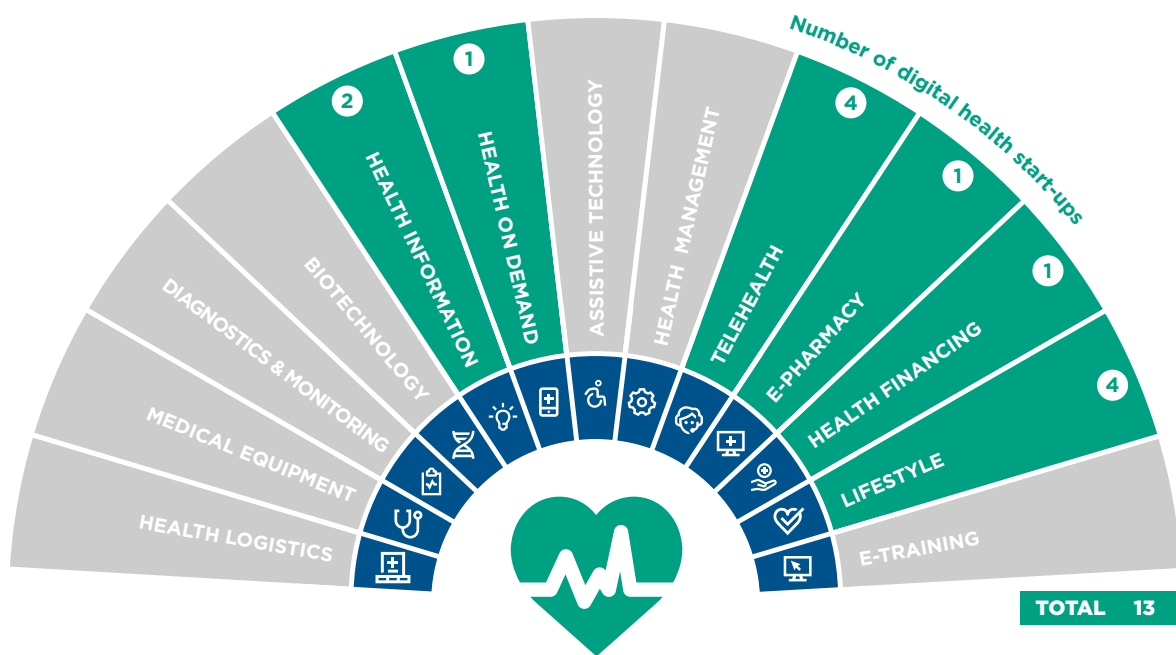
Digital health: State of play

Myanmar has policies that allow 100 per cent foreign ownership and has benefited from dynamic markets that are highly sensitive to consumer pressure.³⁰ A critical moment came in 2013 when the government liberalised the telecommunications sector. This led to a significant drop in SIM card prices, an increase in smartphone usage and a burgeoning start-up ecosystem.³¹ There are now four main mobile operators operating in Myanmar and providing good coverage (except in hilly regions and hard-to-reach areas). There has been a rapid growth in mobile technology³² and the use of Facebook. All this is creating new opportunities for digital health.

However, digital health information systems in Myanmar are still nascent or operate primarily in select areas or for certain programmes supported by development partners. Significantly, Myanmar has scaled DHIS2 as the HMIS platform across all health districts and townships, and 26,000 tablet PCs loaded with guidelines and procedures are being distributed to frontline health workers, who are also using them to track COVID-19. Apart from collating digital data for management purposes, interesting initiatives like the DHIS2 tracker and the development of unique identifiers, the main focus has been telemedicine, which has been key to making doctors in urban areas accessible to rural patients.

Figure 4

Digital health start-ups in Myanmar



Source: Tracxn

30 A4AI (2019), 2019 Affordability Report.

31 GSMA Ecosystem Accelerator (23 January 2019), "Myanmar: a burgeoning start-up ecosystem", Mobile for Development Blog.

32 Sandberg, B.T. (17 January 2020), "Five tech trends in Myanmar for 2020", Myanmar Times.



Insights from expert interviews

Respondents noted that while there is demand for tech-enabled health education, even in remote areas, usage is low because people cannot afford long phone calls to a doctor. Some noted that funding is becoming more available for digital health, with interest from local and international investors from in China, Singapore, Japan and the EU. However, return on investment (ROI) usually takes at least five years.

Those we spoke to confirmed there are many potential stakeholders in digital health, from the government, development partners and NGOs to start-ups and MNOs. However, there was little sense that a digital

health ecosystem is emerging. Given that the private sector in Myanmar still lacks influence, the introduction of all major digital health initiatives rests with the government.

Development partners and NGOs were credited with much good work, such as delivering training (although very little was digital). Respondents believed that the government needs tech-savvy individuals to assess what is on offer and identify potential synergies. They highlighted the risks of using digital health solutions and products developed outside the country, such as being overly complex or not meeting user needs.

Digital health: COVID-19 response

In April 2020, the Myanmar Computer Federation (MCF) developed the country's official contact tracing app Saw Saw Shar to help contain the spread of the virus. The app was developed in partnership with the COVID-19 Control and Emergency Response ICT team under the Ministry of Transport and Communication and the Ministry of Health and Sports. In addition

to monitoring symptoms, the app provides timely notifications of nearby areas that have positive cases and are potentially high risk, as well as official COVID-19 hotline contacts and the closest fever clinics and quarantine centres. The app also has a dashboard that visualises COVID-19 transmission and infections by region in Myanmar.



Digital health: Case studies



MyanCare: According to the WHO, Myanmar has one doctor for every 2,000 patients in urban areas, but only one health worker for every 5,000 patients in rural and remote areas. Telemedicine could be the answer to some of the challenges in Myanmar's healthcare sector.

To provide better healthcare coverage, Myanmar telemedicine start-up MyanCare runs two core businesses: the MyanCare app and the YinThway pediatric medical call service. The start-up's

platform connects doctors and patients through its telemedicine service. Doctors can search a patient's health records, treatment history and other important information. To maintain patient privacy, Electronic Medical Records are stored securely in the company's database. The MyanCare app allows users to book online appointments with general practitioners and specialists, and receive voice, video or chat consultations. MyanCare has over 200 doctors and 26 medical specialties on its platform.



Koe Koe Tech: Like many developing countries, Myanmar has relatively high infant and maternal mortality rates. Most of these deaths are preventable; some of the most common causes of death include anaemia and jaundice. Infant mortality accounts for 80 per cent of child mortality, and half of child deaths occur during the neonatal period.³³ Better access to health services would reduce this alarming death rate.

Koe Koe Tech runs Maymay, a maternal and child health app. Users receive daily messages timed to their stage of pregnancy and for the first three years of their baby's life. Maymay also features a doctor locator that allows users to look up thousands of doctors, including

Population Services International (PSI) clinic doctors by specialty and location. Users can also browse and order baby and maternal products, and communicate with doctors and nurses via Viber, Messenger and phone.

Maymay gives users access to 10,000 health specialists via telemedicine, an appointment calendar with notifications, a feedback form to rate physicians and midwives and health questionnaires for mothers and pregnant women. Users also have access to platforms for content on nutrition, financial education and other important health topics. The app has over 30,000 monthly active users, about 1,000 new users per day, and over 116,000 registered users.

33 Global Innovation Exchange (26 June 2020), "Koe Koe Tech".



Pakistan




Population

220.9 million



Doctor to patient ratio

9.8 doctors per 10,000 population



Life expectancy at birth

72.7 years




Health expenditure

\$43 per capita



Under-five mortality rate

67 deaths per 1,000 live births




Government health spending

35.5% per total health spending



Maternal mortality ratio

140 deaths per 100,000 live births



Out-of-pocket spending

56.2% per total health spending

The health system in Pakistan

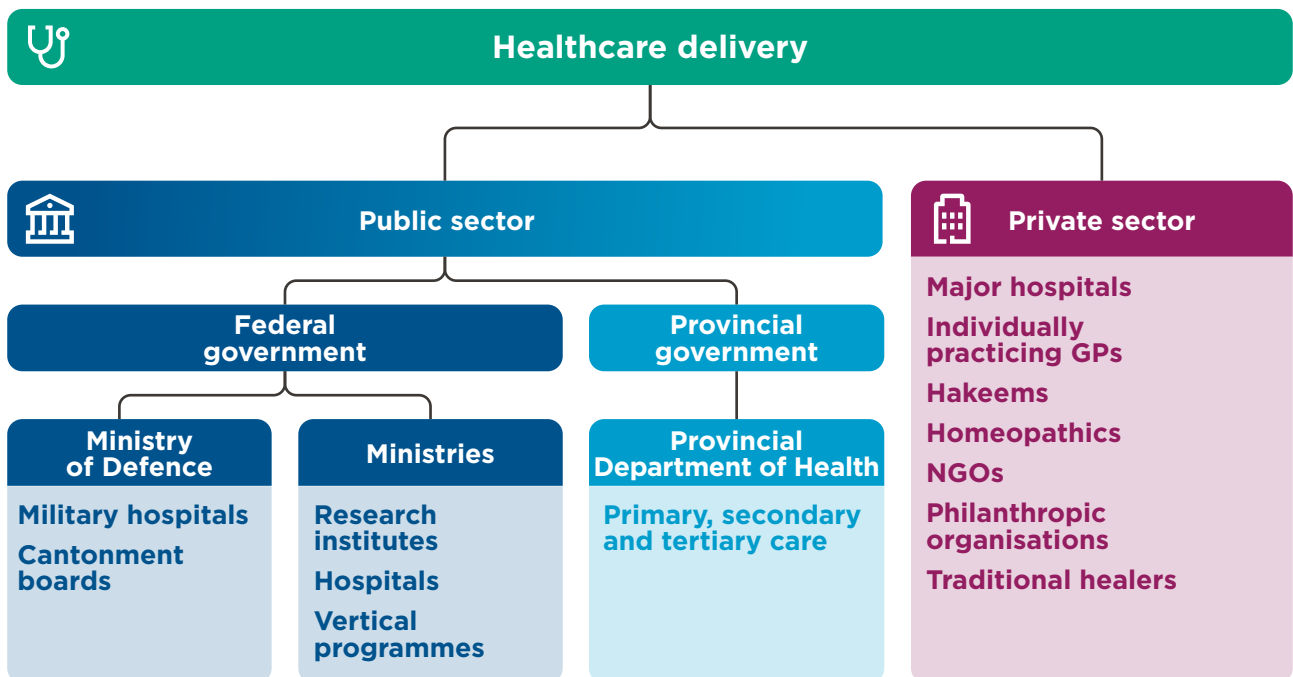
Pakistan’s health system is managed by both public and private sector players. Health is primarily the responsibility of the provincial government, except in the federally administered areas. The federal and provincial governments jointly administer healthcare delivery while districts are mainly responsible for implementation. Service delivery is organised through preventive, promotive, curative and rehabilitative services. The state provides healthcare through a three-tiered delivery system and a range of public health interventions. Curative and rehabilitative services

are provided mainly at secondary and tertiary care facilities while preventive and promotive services are delivered through various national programmes and by community health workers at primary healthcare facilities and outreach activities in local communities.

In 2011, the devolution of health to the provinces created both challenges and opportunities (see Figure 5)³⁴ as it was envisaged that federally supported health benefits could lead to more equitable health system coverage.

Figure 5

Pakistan’s healthcare delivery system



34 Kumar, S. and Bano, S. (2017), "Comparison and Analysis of Health Care Delivery Systems: Pakistan versus Bangladesh", Journal of Hospital & Medical Management, Vol. 3, Issue 1.

The government aims to encourage and support vertical programmes at the provincial level to optimise resources. It also aims to build synergies with the private sector in essential health services delivery (preventive and curative) and understand how it functions, its composition and potential reach. Finally, the government wants to make the healthcare system resilient to climate change, natural disasters and disease outbreaks.³⁵

Access to affordable essential medicines is low in Pakistan, and there are disparities in coverage between provinces and districts and rural and urban areas. Low-income groups are likely to have less health, nutrition, immunisation and family planning coverage. However, a major strength of Pakistan's healthcare system is

primary healthcare outreach. This has been delivered successfully at the community level by 100,000 Lady Health Workers (LHWs), an increasing number of community midwives (CMWs) and other community-based workers who have earned the trust of the population.

Pakistan's healthcare sector faces challenges, both on the supply side (availability of appropriate healthcare resources) and the demand side (perception and use of available healthcare resources). The country ranks 154th out of 195 countries in terms of quality and access to healthcare, behind Bangladesh, India and Sri Lanka.³⁶

Digital health: State of play

Digital health in Pakistan has become more established in recent decades with projects like the first paperless hospital, Indus Hospital. Both the federal and provincial health authorities have worked to digitise HIS at the primary, secondary and tertiary care levels, particularly with telehealth. The eHealth Association of Pakistan was established to provide a common knowledge and information-sharing and advocacy platform.

In recent years, more federal and provincial programmes and projects have been launched. These include the flagship Prime Minister's National Health Programme and the issuing of smart health cards. The health cards bear the individual's identification, medical history and data. eVaccs programmes have also been unveiled in the provinces of Punjab, Khyber Pakhtunkhwa and Balochistan, which aim to automate the entire process of immunisation, from ensuring in-the-field vaccinator attendance to expanding the geographical coverage of immunisation programmes.

Pakistan has been proactive in advancing digital health, and a recent focus on building digital capacity has supported these efforts. Digital Pakistan,³⁷ an initiative spearheaded by Jazz to accelerate digitisation in Pakistan, combined with growing mobile and internet penetration, are facilitating the introduction of digital health initiatives. The National Health Vision 2016–2025 envisages innovative technologies providing fast and reliable information to support evidence-based decision making at the district level through the DHIS.

Similarly, the 2018 Digital Health Policy of Pakistan aims to facilitate and assist in the use of telemedicine, build an online network of doctors and paramedical staff to improve access to qualified specialists, promote the digitisation and automation of hospitals, share information on preventive care with ICT tools and technologies and set accreditation and requisite protocols and standards for eHealth service providers. New digital health solutions, such as Sehat Kahani and Oladoc, have also emerged.

³⁵ National Health Vision Pakistan 2016–2025, pp. 3 and 10.

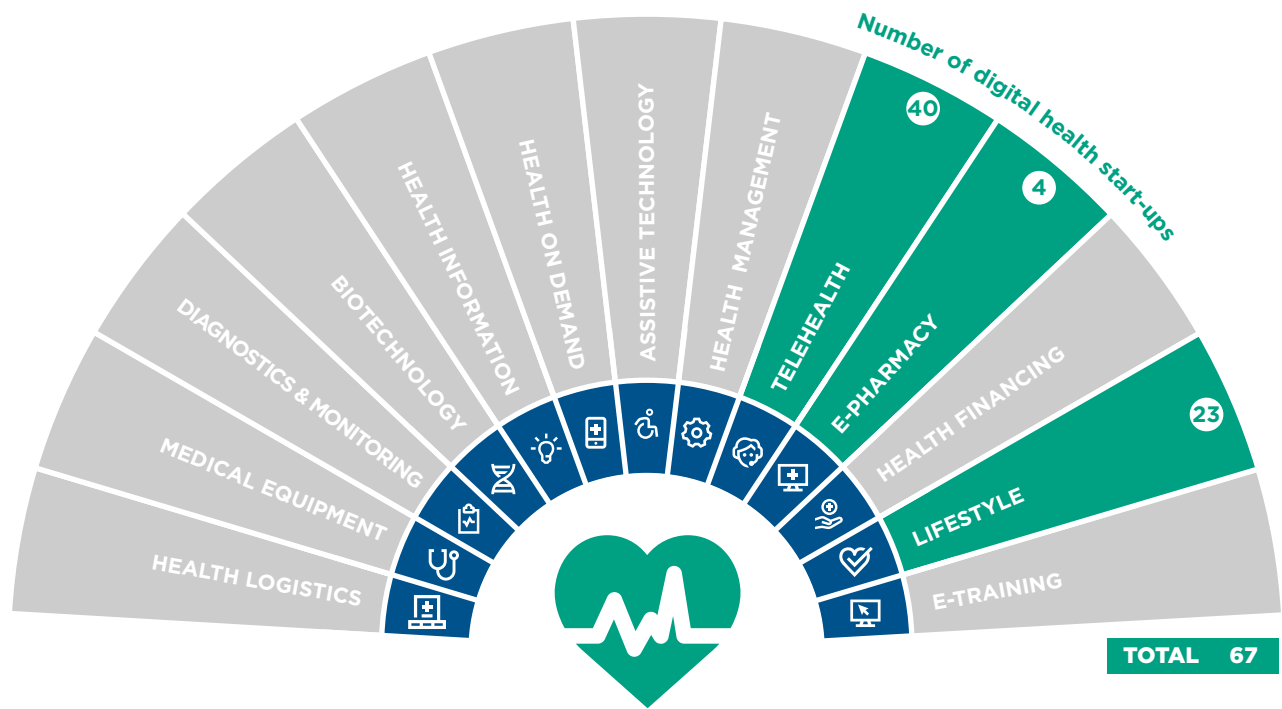
³⁶ The Lancet (2 June 2018), "Measuring Performance on the Healthcare Access and Quality Index for 195 Countries and Territories and Selected Subnational Locations: A Systematic Analysis from the Global Burden of Disease Study 2016", Vol. 391, Issue 10136.

³⁷ Digital Pakistan



Figure 6

Digital health start-ups in Pakistan



Source: Tracxn



Insights from expert interviews

According to respondents, quality healthcare and pricing are largely unregulated in Pakistan. There is also duplication of services by the private sector. Despite its potential, the private sector contributes the least towards preventive and promotive health services. However, the public sector is understaffed and job satisfaction and work environments need improvement. Overall, the health sector in Pakistan is imbalanced in terms of the number, mix of skills and deployment of healthcare workers, and inadequate resources are allocated across different levels of healthcare.

Respondents also stated that primary care is not accessible, and poor triage results in overreliance on tertiary healthcare. Some respondents held the view that good-quality healthcare is only available privately. However, this is costly and there is no unified view on medicine prices or doctor fees. Due to high OOP expenditure, low doctor to patient ratios and the high cost of private care, affordable traditional healing services

are popular. The poor often go to unqualified doctors or healers, which can number as many as qualified doctors. Respondents commented that the public lacks awareness of health issues, makes poor health decisions and makes limited use of technology (SMS or use apps) due to low literacy. Streaming video services with health content are being considered to supplement health content and advice. However, accessible and good-quality internet is a challenge in rural areas.

Respondents suggested that while digital health solutions are high on the political agenda, progress has only been made in the last three years. Some stated that coordinated efforts are needed to change policies, legislation and strategies and standardise guidelines, as this would help build a resilient, robust and long-term response system. Finally, respondents agreed that while it would take years to accumulate digital health data in Pakistan, this data would ultimately offer considerable opportunities in the use of frontier technologies.

Digital health: COVID-19 response

Technology has played a significant role in Pakistan's response to COVID-19, and the development of digital health platforms has been a priority for the government.³⁸ Pakistan's Ministry of National Health Services Regulations and Coordination (MoNHSRC) is working with software companies such as CIT Solutions, telemedicine companies such as Sehat Kahani and doctors247online and start-ups from the tech hub National Incubation Centre.

The mobile industry has been contributing to the digital health response to COVID-19. Mobile operators have provided free calls to emergency numbers, helped distribute information and alerts via SMS and expanded a polio hotline for COVID-19 enquiries. The government also worked with mobile operators to replace the standard call ringtone with COVID-19 messaging, and established a mobile track-and-trace system and dashboard that centralise COVID-19 data, both of which are active. Live data on hospital capacity is generated, and an app is available for citizens to identify nearby hospitals and their capacity. Data on index cases is mapped onto population centres using geotagging to identify hotspots and inform a smart lockdown strategy. Social media and traditional media

have also been used to raise awareness and distribute information on sanitisation techniques, handwashing and social distancing.

Provincial governments have set up phone helplines for COVID-19-related enquiries and advice. The Yaran-e-Watan³⁹ telehealth platform was launched in partnership with Sehat Kahani to harness the expertise of Pakistani health professionals living outside the country and to connect them with appropriate institutions in Pakistan. Health professionals can deliver teletraining sessions, provide consultations and triage assistance using telemedicine and participate in research collaborations. Telehealth and tele-education have been used extensively. The Government of Pakistan recently launched a COVID-19 telehealth portal on Twitter, as well as a website. Pakistani doctors and health professionals have been invited to register and volunteer to help COVID-19 patients.

The Sindh government developed the CoronaCheck⁴⁰ app that allows users to check their symptoms through a screening tool that utilises an AI-assisted chatbot. It also provides information from the World Health Organization (WHO) and lists relevant services.

38 Khan, K. (27 May 2020), "In Pakistan, digital platform offers a baseline to fight COVID-19", BioWorld.

39 <https://yaranewatan.gov.pk/>

40 CoronaCheck app



Digital health: Case studies



Sehat Kahani is a digital health start-up in Pakistan that democratises healthcare by connecting home-based female doctors with communities where access to quality healthcare is limited. Sehat Kahani works with intermediaries, such as nurses, community health workers and midwives, who provide services to community members and encourage good health practices. A mobile app allows users to access home-based female doctors on demand. Sehat Kahani employs women as mobilisers to promote and provide outreach in the communities where it operates. Mobilisers visit patients at home and support health drive camps and quarterly gatherings that cover topics from handwashing and sanitation to child psychology and pregnancy.

As of January 2020, Sehat Kahani's 26 eHealth centres have facilitated over 120,000 successful consultations. Sehat Kahani currently has a network of 14 eHealth hubs across Pakistan (Sindh, Punjab, KPK and Karachi)

that have served over 550,000 patients directly and indirectly with digital healthcare services.⁴¹

Sehat Kahani has partnered with Digital Pakistan to become a key enabler of digital health. By shifting its business-to-consumer (B2C) model from a paid to a free service, it now offers COVID-19 consultations and advice while allowing patients to comply with social distancing and isolation requirements. This has, in turn, established a larger pool of beneficiaries and led to more downloads. Sehat Kahani went from delivering 50 to 60 consultations a day to 500 to 600 a day, and added over 100 additional practitioners to its network of female doctors on the platform. Sehat Kahani's business-to-business (B2B) solution has jumped from nine corporations to 38 (June 2020). As of June 2020, Sehat Kahani doctors had conducted over 32,000 online consultations, 15 per cent of which were referred as suspected COVID-19 cases.



Oladoc is a healthcare app for booking doctor appointments, lab tests and online doctor consultations via video. Users can narrow the list of service providers to find the one best suited to their health needs. Through the portal, patients can book appointments online, get reminders for their appointments, provide feedback on the doctors or hospitals they visited and discover hospitals and clinics nearby, filtered by facilities, services and locations.

The app is being expanded to include features such as booking a lab test and ordering medicines online. The platform has over 25,000 doctors with over 120 specialisations practising in over 10 major cities across Pakistan.

41 <https://sehatkahani.com/>




Benin






Population

12.1 million



Doctor to patient ratio

0.8 doctors per 10,000 population



Life expectancy at birth

66.8 years




Health expenditure

\$31 per capita



Under-five mortality rate

93 deaths per 1,000 live births




Government health spending

17.7% per total health spending



Maternal mortality ratio

397 deaths per 100,000 live births



Out-of-pocket spending

44.5% per total health spending

The health system in Benin

Benin's health system has three levels: central, intermediary and peripheral. The central (or national) level is responsible for strategic guidelines, policies and decisions on health sector development and initiates health action plans. The Minister's Cabinet, the Secretariat General and the central departments coordinate and oversee health projects and programmes.

With 18 regional health delegations (RHDs), the intermediary level is responsible for programming and supporting the implementation and monitoring of government-defined health policy and coordinating all peripheral health service activities. There is one departmental directorate of health and one departmental general hospital for every two administrative departments. The health infrastructure at the intermediate level is the departmental general hospital (DGH), the referral structure for zonal hospitals. The national strategic guidelines, which control standards and provide technical assistance to zonal health management teams, are adapted to regional contexts.

The peripheral level implements national health development programmes and projects and basic healthcare provision. There are 34 health zones in the country, each covering an average population of 100,000 to 200,000 inhabitants. Each health zone has a network of first-contact health services and a referral hospital. First-contact services are made up of village

health units (VHUs), district health centres (DHCs), municipal health centres (MHCs) and private health units.

The vision of the Ministry of Health is that "by 2025 Benin has a functioning health system based on public and private initiatives, individual and collective, to offer permanent availability and quality of care, equitable and accessible populations in all categories, based on values of solidarity and risk-sharing to meet all the health needs of the people of Benin".⁴² To achieve this, the MoH is focusing on:

- Reducing maternal and infant mortality;
- Developing human resources;
- Strengthening partnerships and promoting ethics and medical ethics;
- Improving financial data mechanisms; and
- Strengthening the management of the health sector.

In Benin, 77 per cent of the population live less than five kilometres from a government health facility,⁴³ but only 44 per cent use these health services. The country has a shortage of specialists and an unequal distribution of health workers. With government health spending accounting for 22.3 per cent of total health spending and out-of-pocket (OOP) spending for 44.5 per cent, development partners and traditional medicine play important roles.

42 As stated in 2009. See: <http://benimoh.eu5.org/vision1.html>

43 WHO (2017), WHO country cooperation strategy at a glance: Benin.

Digital health: State of play

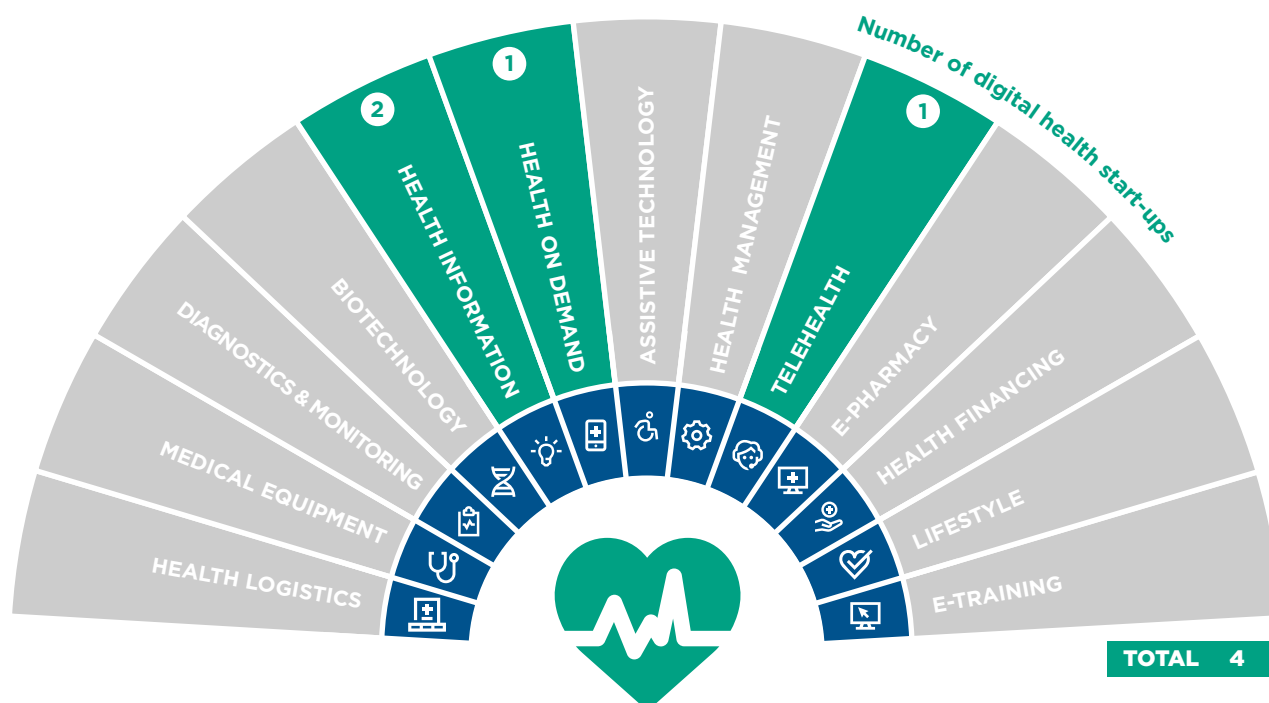
The Government of Benin believes technology will be the catalyst for Benin's economic modernisation and drive social inclusion over the next five years. Its medium-term objective is to establish Benin as a leader in digital services across West Africa, and this political will is evident in the establishment of Sèmè City,⁴⁴ which convenes training institutions, research and development centres and technology incubators to develop and test sustainable solutions to challenges in Benin.

District Health Information Software 2 is also playing a key role in developing a monitoring dashboard that is accessible to the Minister of Health, directors and development partners.

Benin's Stratégie Nationale de Cybersanté 2018–2022 envisions that by 2022, eHealth will have helped the health system serve all citizens better by removing barriers to quality, equitable, equal, accessible, available and prompt healthcare.⁴⁵ The national strategy was prepared by the Ministry of Health with significant support from the WHO, the International Telecommunication Union (ITU) and the Ministry of Digital Economy and Communication.

Figure 7

Digital health start-ups in Benin



Source: Tracxn

44 <https://semecity.bj/en/>

45 Ministère de la Santé, République du Bénin (November 2017), Stratégie Nationale de Cybersanté 2018–2022, p. 35.



Insights from expert interviews

According to respondents, there is political will and vision at the presidential level for digital health, but there were doubts that this was matched at the departmental or local levels. Respondents commented that the Stratégie Nationale de Cybersanté 2018–2022 is theoretical, developed by external experts and does not have the proper drivers or local buy-in to be implemented.

Respondents agreed there are encouraging signs that a digital health ecosystem is emerging, but it is still in a very early phase. USAID, UNFPA, UNICEF, Phillips SES and Etrilabs have all engaged in digital health efforts in Benin, but respondents commented that coordination between development partners could be improved. Some respondents stated the need for local ownership

in planning an enabling environment for digital health. The government should ensure there is digital health architecture, a blueprint or roadmap in place, and should also secure buy-in from mobile operators.

Some respondents suggested that high-level digital health officers are needed to ensure that NGOs, development partners and investors coordinate, share strategic documents and understand their respective roles in the healthcare value chain.

Frontier technologies were generally perceived as valuable for decision making and epidemiological analysis, but even though they were mentioned in the national strategy documents they do not yet feature in the operational plan.

Digital health: COVID-19 response

A centralised, government-led platform that provides frequent COVID-19 updates is freely available to all mobile subscribers in Benin, and there are a range of awareness-raising videos and press releases on various social networks. An interactive WhatsApp messaging system has been set up and helps the national COVID-19 response team to communicate directly with citizens.

Sèmè City, with support from UNFPA Benin, has created Taskforce Innov COVID-19 Benin to mitigate the challenges presented by COVID-19. This initiative aims to

develop local solutions that deliver healthcare services to women and strengthen the economic resilience of youth entrepreneurs. The task force is comprised of various players (start-ups, SMEs, large corporates, academics and scientists, government agencies and NGOs) that are developing innovative solutions adapted to Benin's social and economic context. Sèmè City is responsible for coordinating the task force's activities. Digital health start-ups, including KEA Medicals⁴⁶ and REMA,⁴⁷ are part of the task force, working closely with the government during the pandemic.

46 www.keamedicals.com
47 REMA app



Digital health: Case studies



REMA: Medical errors are costly in countries with fragile health systems. To reduce the probability of medical error, REMA has launched an app that connects medical students, general practitioners, specialists and physicians in Benin to enable collaboration and support better decision making. By democratising the delivery of medical knowledge, REMA's solution helps doctors and medical students in Africa learn and improve their skills.

Launched in 2017, REMA has a community of 6,000 health specialists based in West Africa who can discuss, resolve patient cases and collaborate in real time to save more lives. REMA is part of the Taskforce Innov COVID-19 Benin.



KEA Medicals: In Benin, less than 15 per cent of the population have access to health insurance.⁴⁸ KEA Medicals has developed a mobile-enabled digital health solution that allows patients to create a unique digital health identity (ID) that holds their emergency medical information and medical history. This is supplemented by an innovative mobile-scannable QR code that allows patients to control access to their medical records. The solution also enables hospitals to manage their financial, medical and administrative operations digitally.


During COVID-19, KEA Medicals has enabled over 25,000 remote, mobile-enabled doctor consultations per month on average.⁴⁹ Its platform has over 24,000 users and numerous health professionals in Benin, and there are plans to expand the solution to Côte d'Ivoire, Gabon and Mali. KEA Medicals is part of the Taskforce Innov COVID-19 Benin.

48 GSMA (2020), Ecosystem Accelerator Innovation Fund Start-up Portfolio.

49 GSMA (2020), Benin's Digital Health ID.

Nigeria

A vibrant street scene in Nigeria, featuring a large outdoor market with numerous stalls and people. In the background, there are modern, multi-story buildings with distinctive architectural features like balconies and grid-like window patterns. The foreground shows a busy pedestrian crossing with people in various attire, including a woman in a striped dress and a man in a suit. The overall atmosphere is one of a bustling, active urban environment.



Population

206.4 million



Doctor to patient ratio

0.8 doctors per 10,000 population



Life expectancy at birth

57.7 years




Health expenditure

\$84 per capita



Under-five mortality rate

117 deaths per 1,000 live births




Government health spending

15% per total health spending



Maternal mortality ratio

917 deaths per 100,000 live births



Out-of-pocket spending

76.6% per total health spending

The health system in Nigeria

Nigeria's health system has three tiers that correspond with the three tiers of government: primary (local government), secondary (state government) and tertiary (federal government). At the federal level, the Federal Ministry of Health (FMoH) is tasked with formulating policies and providing organisational and technical support to the health system. The federal government is also in charge of international relations in health, health information management and tertiary healthcare provision through federal teaching hospitals, medical centres and specialist hospitals.

Nigeria's 36 states, through the State Ministry of Health (SMoH), regulate and provide healthcare through state specialists and general hospitals, while local governments are mainly involved in primary healthcare delivery through comprehensive and basic health centres. State governments are also involved in providing tertiary healthcare through state

government-owned teaching hospitals and specialist hospitals.

The healthcare system also involves a variety of private and public sector health providers, with private facilities at the forefront of primary care delivery. The private sector provides close to 60 per cent of health service delivery, despite owning an estimated 30 per cent of health facilities.⁵⁰

The Nigerian Government is developing and implementing policies and programmes to strengthen the national health system and achieve universal healthcare. The initial focus is on primary healthcare. All three levels of government in Nigeria are involved in financing the primary healthcare system to varying degrees, but despite a seemingly clear delineation of roles, these functions have been poorly defined.

Digital health: State of play

The primary vision of the National Health ICT Strategic Framework 2015–2020 was that “by 2020, health ICT will help enable and deliver universal health coverage [UHC] in Nigeria,”⁵¹ which is well before the 2030 date for achieving UHC. The strategic framework also has a monitoring and evaluation plan with indicators for tracking progress. Although there are plans to

increase interoperability among health facilities and technologies, the framework does not acknowledge the role and importance of digital health start-ups in creating the enabling environment required to achieve the primary vision. According to a TechCabal study on digital health, there are an estimated 75 health technology start-ups in Nigeria.⁵²

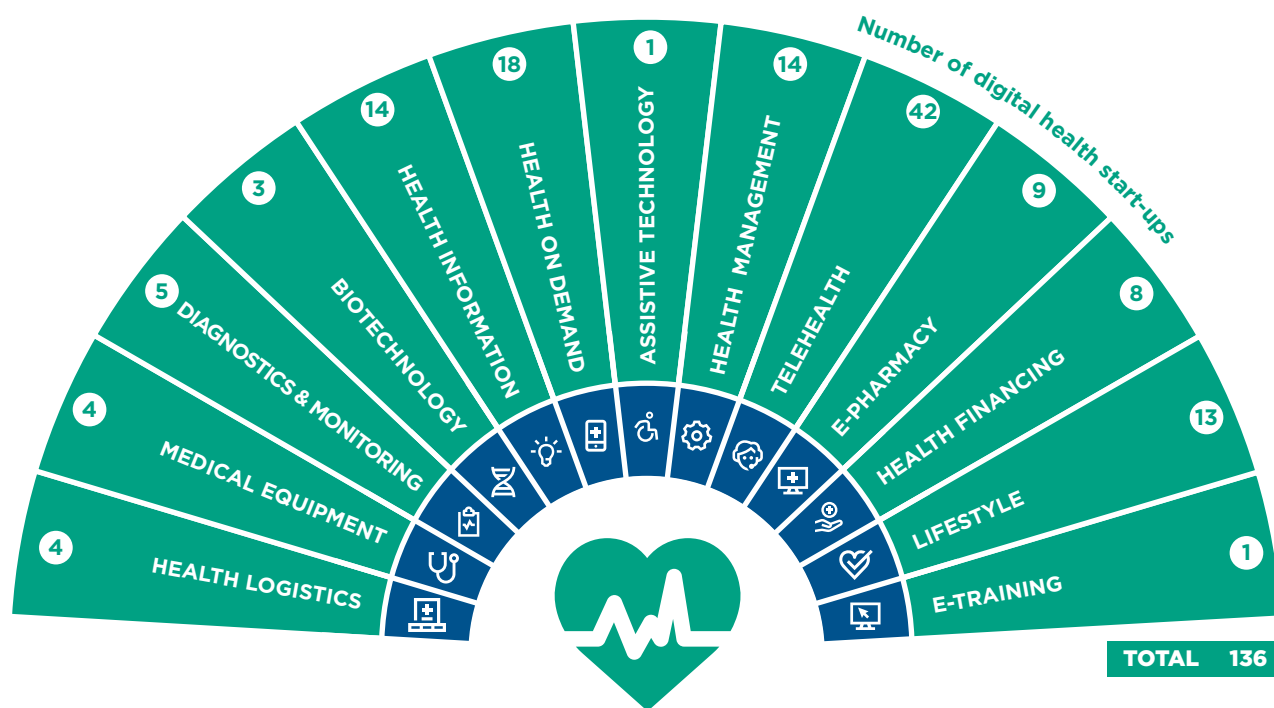
50 WHO (May 2018), *Country Cooperation Strategy at a Glance: Nigeria*.

51 Federal Ministry of Health (March 2016), *National Health ICT Strategic Framework 2015–2020*.

52 TechCabal (n.d.), *The State of Health Tech in Nigeria*.

Figure 8

Digital health start-ups in Nigeria



Source: Tracxn



Insights from expert interviews

The overall view of respondents is that digital health in Nigeria is in its infancy, and investing in digital health is a challenge at this early stage. The government has not given strong signals that it is open for digital business generally, let alone digital health. The same is true at the state level, although Lagos State was highlighted as an exception. Consequently, regulatory issues are not addressed and rules are unclear. Nevertheless, the private sector is pressing ahead with innovative start-ups and MNOs are also engaging.

According to respondents, the National Health ICT Strategic Framework 2015–2020 is robust, but has not been implemented wholeheartedly. They suggested that while many of the relevant supporting policies are in place, they are either not known or not enforced. There was also a view that digital health is not a priority for the government, especially at the local level, and accountability needs to be reviewed.

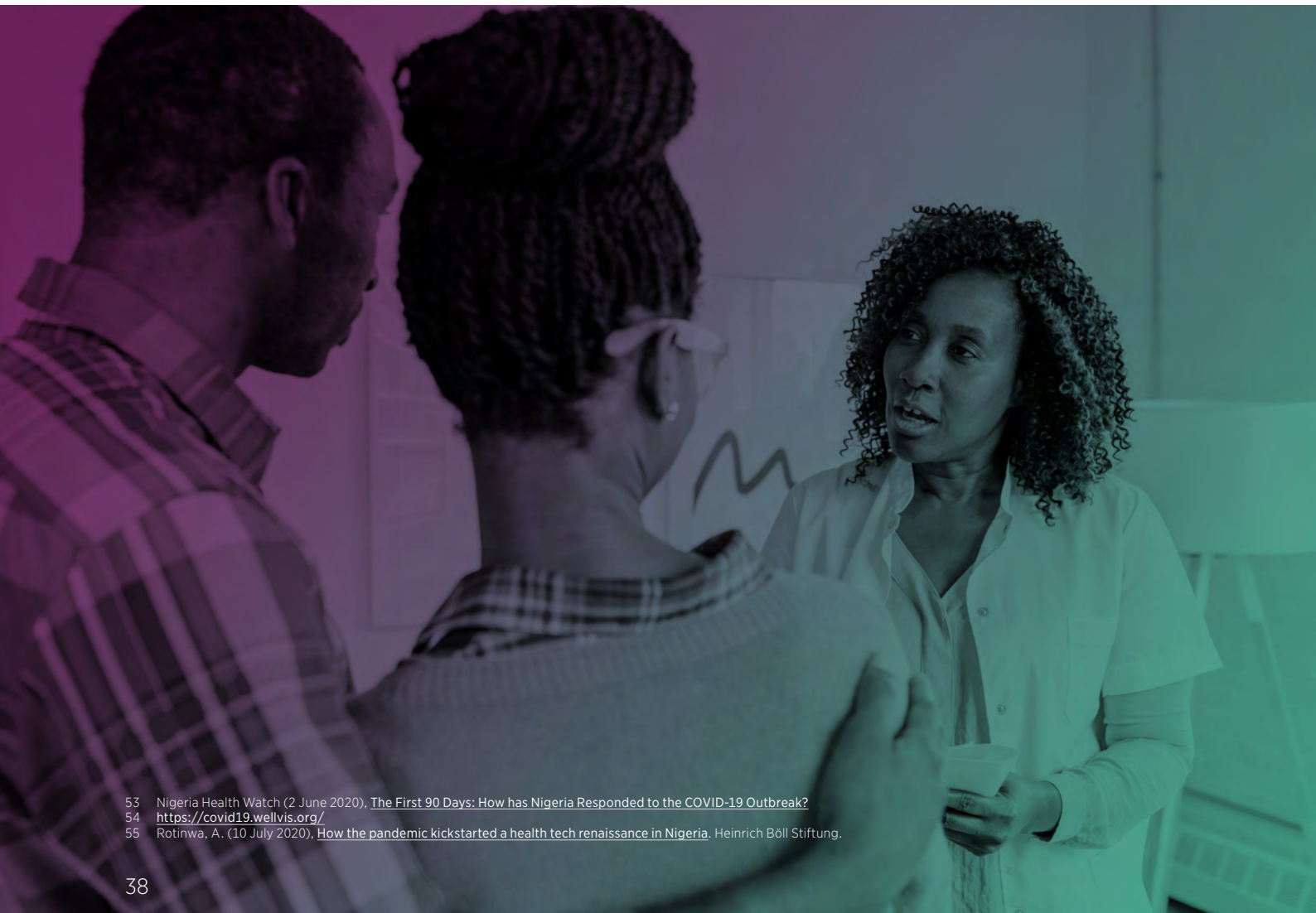
Digital health: COVID-19 response

The Nigeria Centre for Disease Control (NCDC) launched a COVID-19 eTraining course on Infection Prevention and Control. The online course is available to the public and is aimed at healthcare workers to reduce the risk of transmission of COVID-19 and other infectious diseases while administering healthcare in Nigeria.

Since the first COVID-19 case in Nigeria was confirmed in February 2020, the NCDC has supported the training of about 17,436 health workers in Infection Prevention and Control (IPC), and works in collaboration with the Department of Hospital Services and the Department of Food and Drugs under the FMoH.⁵³ Since February 2020, Nigeria has increased its molecular laboratory network for COVID-19 testing, from two laboratories to 28 in states across the country. To achieve this, the NCDC collaborated with private sector partners,

such as start-up 54Gene and eHealth Africa, which were instrumental in expanding testing capacity for COVID-19.

LifeBank, a blood delivery digital health start-up, has collaborated with the Nigerian Institute of Medical Research to develop rapid testing kits and create a shared database to track available medical equipment. Wellvis Health created COVID Triage,⁵⁴ a digital self-assessment tool that helps users test whether they have been exposed to the virus and take the next steps. In turn, the NCDC collects this data to see who might be at high risk of contracting COVID-19 and isolate them. GloEpid by Tech4Dev has developed a contact tracing tool that uses a smartphone, GPS and Bluetooth connection to trace the movements of those who have been potentially exposed to the virus.⁵⁵



⁵³ Nigeria Health Watch (2 June 2020), *The First 90 Days: How has Nigeria Responded to the COVID-19 Outbreak?*

⁵⁴ <https://covid19.wellvis.org/>

⁵⁵ Rotinwa, A. (10 July 2020), *How the pandemic kickstarted a health tech renaissance in Nigeria*. Heinrich Böll Stiftung.



Digital health: Case studies

lifebank

LifeBank (Nigeria, Ghana and Kenya) aims to fix a problem that has been linked to thousands of deaths across Africa: limited availability of essential medical products like blood and oxygen. The company facilitates the transmission of blood from laboratories to patients and doctors. LifeBank uses low-tech tools like feature phones and high-tech tools like blockchain to deliver essential medical products and save lives in health systems across Africa.

LifeBank's platform improves the supply of these essential medical products by gathering inventory information and deploying the most efficient tool to deliver these critical supplies quickly. The company has four main solutions. The first is SmartBag, a

blockchain-powered product that helps patients and health providers locate blood and blood product safety records. Information about the processes involved in blood supply is recorded on a blockchain to preserve its integrity. The second is BOAT (Blood and Oxygen Access Trust), a fund created to supply blood, oxygen, medications and other critical supplies to low-income patients who cannot afford it. The third is Home Kit – COVID-19 Test at Home, an easy-to-use system for individuals to collect nasal and oral swab samples used for the COVID-19 RT-PCR screening test. The samples are picked up and delivered through a contactless distribution network system. The fourth is DonorX, a web-based app that allows blood donors to locate and book appointments at blood banks closest to them.

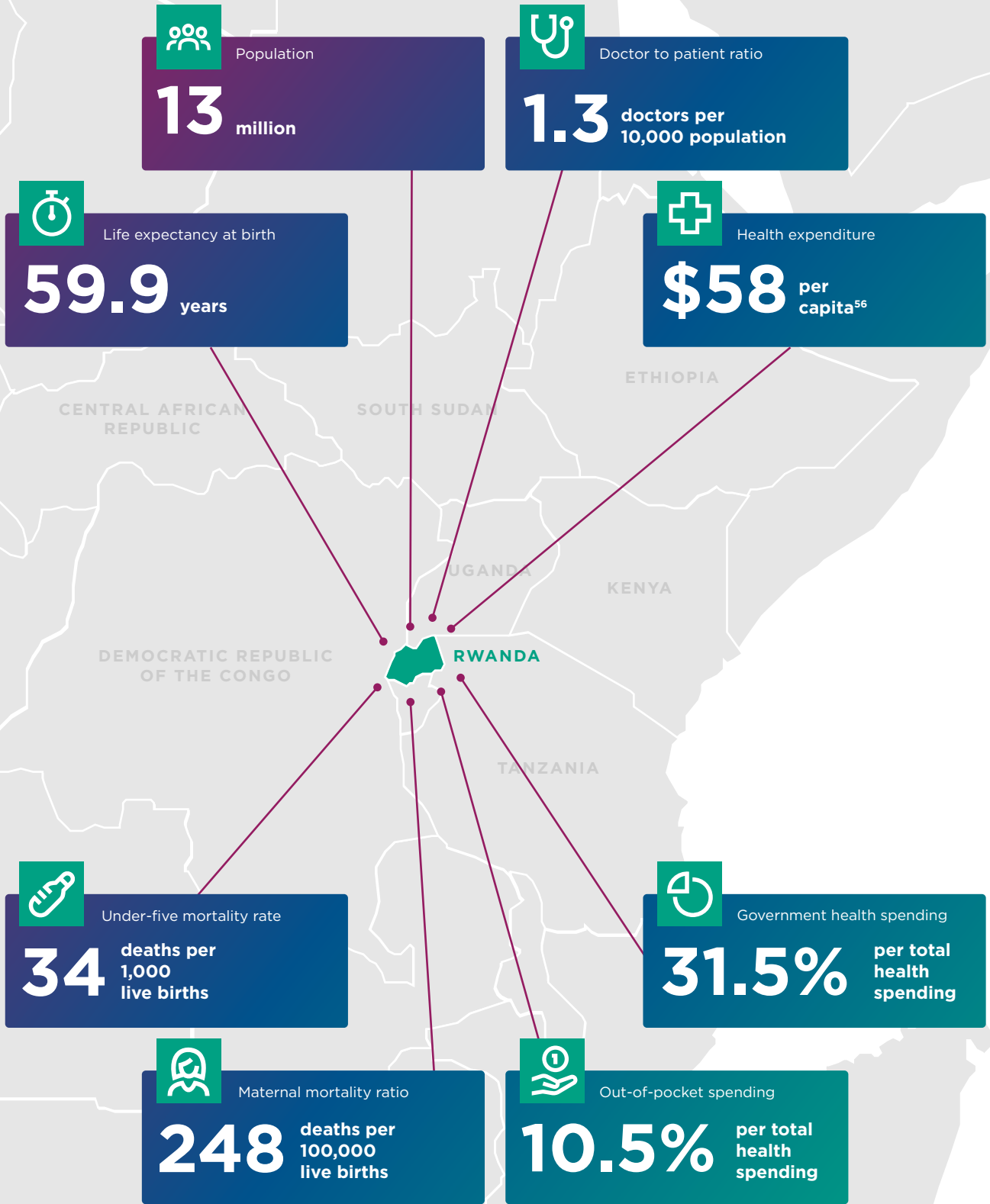
helium health

Helium Health (Africa) offers a cloud-based Electronic Medical Records/Hospital Management Information System (EMR/HMIS) that runs on any device, can be accessed offline and syncs to the cloud using minimal or no data. Helium Health has developed a digital solution to address a common record keeping issue: when hospitals record patient information manually, this can create huge data gaps, errors on records and longer wait times.

The platform enables healthcare facilities to deliver better care by streamlining records and record keeping processes. Since 2016, Helium Health has helped hospitals, clinics and other health facilities shift to digital almost instantly with EMR/HMIS. The system enables health providers to use telemedicine and receive additional financing. Payers can validate beneficiaries and process claims more quickly and patients are able to take control of their care. Other partners receive epidemiological insights and real-world evidence. As of March 2020, Helium Health has worked with over 300 providers and 5,000 health professionals who collectively manage over 165,000 patients a month.

Rwanda

An aerial photograph of a city in Rwanda, showing a dense urban landscape with a mix of modern high-rise buildings and older, lower-rise structures. A prominent tall skyscraper is under construction, with its steel framework visible against the sky. The city is surrounded by lush greenery and trees. The image is overlaid with a dark teal and purple gradient.



56 WHO Statistics 2019, Annex 2, part 1 (for 2016).

The health system in Rwanda

The Rwandan health system consists of three levels: central, intermediary and peripheral. The Ministry of Health focuses on developing and enforcing policy and regulations, while its implementing agency, the Rwanda Biomedical Centre, designs national disease prevention and oversees programmes.

Rwanda’s Fourth Health Sector Strategic Plan (HSSP IV 2018–2024) has four key priorities:






- Increasing coverage of health interventions along the life cycle;
- Scaling up coverage of essential services to combat communicable and non-communicable diseases;
- Strengthening support systems; and
- Building health security and resilient systems.⁵⁷

The HSSP IV shows how oversight structures at the ministerial level, management structures at the national and district level and service delivery structures at the national, intermediary and peripheral levels will be complemented by strong partnerships, community engagement and multi-sectoral collaboration to meet the ambitious UHC agenda and broader interventions enshrined in the SDGs.⁵⁸ These structures are depicted in Figure 9.⁵⁹ With the HSSP IV, Rwanda has adopted a health insurance system that ensures equitable healthcare coverage for over 90 per cent of the population.⁶⁰

There are currently several health insurance programmes in Rwanda targeting specific groups of the population. However, the biggest in terms of membership is the Mutuelles scheme, which is organised on a per household basis and makes annual payments of 1,000 Rwandan francs (\$2) per family member.⁶¹

Figure 9

Rwanda’s health system

	Healthcare delivery system	Type of service offered
 4 Provinces	8 Teaching/tertiary hospitals	<ul style="list-style-type: none"> • Specialised hospitals serving the entire country • Medical training
 30 Districts	4 Provincial hospitals	<ul style="list-style-type: none"> • Provide government-defined “complementary package of activities” and treatment of complicated cases • Provide care to patients referred by primary health centres • Carry out planning activities for the health district and supervise digital health personnel
	36 District hospitals	
 416 Sectors	499 Health centres	<ul style="list-style-type: none"> • Provide government-defined “minimum package of activities” at the peripheral level • Complete and integrated services (e.g. curative, rehabilitation) • Supervise health posts and community health workers in their catchment area
 2,148 Cells	408 Health posts	<ul style="list-style-type: none"> • Established in areas far from health centres, providing similar but reduced services • Services include curative out-patient care, some diagnostic tests, child immunisation, family planning and health education
 14,837 Villages	45,000 Community health workers	<ul style="list-style-type: none"> • Community-based: Prevention, screening and treatment of malnutrition, integrated management of child illness, family planning, maternal newborn health, HIV, TB and chronic illnesses

Rwanda’s healthcare system is innovative, but it has challenges. Nearly 85 per cent of the population seek health services at public health centres and the federal government reimburses a significant proportion of

the population for these services.⁶² Yet, health centres sometimes wait several months to be reimbursed for all the services they provide to patients.⁶³

57 www.moh.gov.rw

58 Ibid.

59 www.slideshare.net/TropicalHealthandEducationTrust/day-1-speaker-marie-aimee-muhimpundu/9

60 Makaka, A., Breen, S. and Binagwaho, A. (21 October 2012), “Universal health coverage in Rwanda: a report of innovations to increase enrolment in community-based health insurance”, *The Lancet*, Vol. 80, Special Issue 7.

61 WHO (November 2008), “Sharing the burden of sickness: mutual health insurance in Rwanda”, *Bulletin of the World Health Organization*, Vol. 86, No. 11.

62 Innovations in Healthcare (13 November 2020), *Universal Health Coverage: How Rwanda is moving forward with healthcare for all*.

63 Ibid.

Digital health: State of play

Progress is being made in digital health with a whole-of-government approach to building a ‘Smart Rwanda’.⁶⁴ The government has created a conducive climate for investment, and with Rwanda exporting successful solutions, investor confidence has improved. Examples include companies like Kasha (eCommerce for women’s health products), Babyl (comprehensive digital health services), Zipline (medical product delivery) and mTiba (doctor-patient facilitation platform).

Many NGOs are working with the government and supporting its Health Management Information Systems (HMIS). Development partners, including the WHO, UNICEF, GAVI, CHAI, the Packard Foundation, Bill & Melinda Gates Foundation, FCDO (e.g. Unilever Transform programme), Rockefeller and USAID, are supporting digital health as part of their broader programmes.

The Open Medical Record System (OpenMRS)⁶⁵ is an open source Electronic Medical Record (EMR) that is being implemented in various health facilities. The Rwanda Biomedical Centre has also implemented a Logistics Management Information System (eLMIS)⁶⁶ at the central level (MPDD warehouse) in 30 district pharmacies and in pharmacies in all public health facilities. Beginning with pilot testing in the Musanze District, RapidSMS⁶⁷ software was rolled out to all

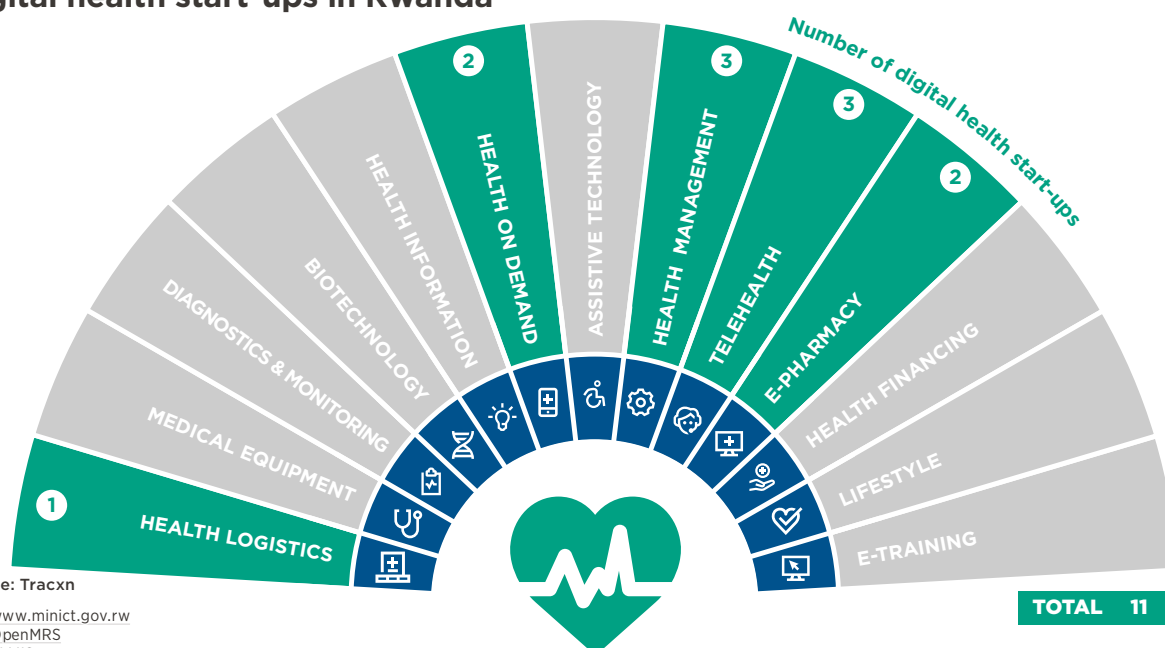
community health workers to enable reporting of vital events and certain health indicators for pregnant women and children up to two years of age. Then, most routine reporting systems were transitioned to the Rwanda Integrated Health Management Information System (RHMIS)⁶⁸ on the web-enabled DHIS2 platform.

The government has developed a medical equipment maintenance system (MEMS) that enables all hospitals to better manage medical equipment, including inventory control, service and repair. The Laboratory Information System (LIS) was introduced in Rwanda’s National Laboratory in 2012 to streamline the receiving and processing of laboratory samples. Rwanda’s National Blood Bank has implemented a web-based system at the national level and in each of the provincial blood banks that manage data on blood donations, testing and distribution across the country.

The Ministry of Health has designed and implemented the Rwanda Health Information Exchange. In 2010, in partnership with the Ministry of Health, the former Kigali Health Institute developed and introduced a Master’s degree programme in eHealth (Health Informatics) to develop the local human resources needed to support digital health initiatives in the future.

Figure 10

Digital health start-ups in Rwanda



Source: Tracxn

64 www.minict.gov.rw

65 OpenMRS

66 eLMIS

67 RapidSMS

68 RHMIS



Insights from expert interviews

According to respondents, the Government of Rwanda provides dynamic leadership in the health sector. Digital literacy and smartphone use are on the rise, and the government has played a major role in championing citizen-focused technology. However, the synergies between technology and UHC need to be developed further for low-income populations. Respondents noted that while there are several digital health initiatives underway in the capital Kigali, rural areas still have a long way to go. Many medical records are still paper-based, which makes it very difficult to share medical records and follow up with patients.

Respondents noted that by highlighting areas needing investment, the Rwanda Biomedical Centre makes it easier for development partners or investors to provide support. Respondents indicated that telemedicine was playing an increasing role in the healthcare system. They also indicated that since the government is largely trusted, finding different ways to influence behaviour change has been successful.

Respondents also mentioned that while there have been considerable investments in integrated supervision and data quality assessments, maintaining quality across all reporting systems remains a challenge. Some data is not used effectively at the local level where it is collected, and feedback from higher levels remains relatively ad hoc.

Digital health: COVID-19 response

Digital health has been a key enabler for Rwanda's COVID-19 response, particularly in terms of access to information and healthcare. The government has set up a toll-free national helpline and a USSD platform for self-triage. Information from the WHO was disseminated via SMS and drones, and AI-enabled drones operated by technology company Zipline have been used to deliver medical supplies to more remote areas of the country.⁶⁹ Mobile money transaction fees have been waived to increase uptake and encourage cashless payments.⁷⁰

The following digital solutions have helped the government respond effectively to the COVID-19 outbreak:⁷¹

- **Contact tracing:** Infections are being traced through the paperless Open Data Kit app that can be downloaded on a mobile device. Data is collected for analysis by outbreak investigation teams.
- **COVID-19 surveillance:** A digital reporting surveillance system for health facilities is being used to monitor influenza-like illnesses and severe acute respiratory infections in real time to provide early warnings of suspected COVID-19 cases.
- **Infection prevention:** Robots have been used in healthcare settings to perform simple tasks, such as checking temperatures and monitoring patients to reduce healthcare workers' exposure.
- **Data visualisation:** Geographic Information System (GIS) is being used to monitor COVID-19 cases at the household level to assess the need for lockdown measures, to focus public health interventions where there is evidence of community transmission and to monitor at-risk populations.

69 Lewis, N. (12 May 2020), "A tech company engineered drones to deliver vital COVID-19 medical supplies to rural Ghana and Rwanda in minutes", Business Insider.

70 DW (3 July 2020), Rwanda to start new cashless era after COVID-19.

71 IMF (6 August 2020), Rwanda Harnesses Technology to Fight COVID-19, Drive Recovery.



Digital health: Case studies



Babyl (Rwanda): In Rwanda, one doctor serves between 25,000 and 60,000 people and there is just one pharmacist per 138,398 people.⁷² To address these challenges, Babyl, a subsidiary of Babylon Health in the UK, launched a solution that enables registered users to use their mobile phones to book medical appointments, receive prescriptions and access their medical records. After a consultation, a patient receives a notification that their prescription is ready and can be collected using an unlocked code at a health centre or pharmacy.

Laboratory test codes are also sent by Babyl doctors via SMS and can be processed at any partner clinic, health centre or laboratory.

Babyl has agents that help patients identified as needing care to go to pharmacies and laboratories. Since its launch in 2016, over 1.2 million consultations have been conducted via Babyl Rwanda, with over 30 per cent of the adult population (two million users) now registered.



Kasha (Kenya and Rwanda): In Rwanda, the stigma around menstrual hygiene management and the use of contraceptives can make it challenging for women to obtain and use products like emergency contraceptives and sanitary pads. Making these products available at the right price and ensuring a positive purchasing experience for women and girls are key to improving access. This is particularly important with sanitary pads because when girls are not able to access them they might miss school, which can have a negative impact on their education.

Kasha is an eCommerce company offering low-income women direct access to low-cost, high-quality health and personal products. Customers can use the Kasha website, smartphone app or text to order, pay and have products delivered confidentially at pick-up points or via agents, all via a mobile phone with no internet connectivity required.

72 Himbara, D. (3 June 2019), "Kagame government admitted that in rural Rwanda, one doctor services between 25,000 to 60,000 people", The Rwandan.

gsma.com/mobilefordevelopment



GSMA Head Office

Floor 2

The Walbrook Building

25 Walbrook

London EC4N 8AF

United Kingdom

Tel: +44 (0)20 7356 0600

Fax: +44 (0)20 7356 0601

