
UNDP Insurance
and Risk Finance
Facility
UNDP
INSURANCE AND
TELEMEDICINE IN AFRICA:
A moonshot in response to COVID-19

Contents

List of figures

List of tables

List of boxes

Acknowledgements

This report is authored by Percept Actuaries and Consultants, and Cenfri under the guidance of UNDP's Insurance and Risk Finance Facility (IRFF).

Authors
Percept Actuaries and Consultants, and Cenfri

Percept is a South African multi-disciplinary consultancy driven by heart and curiosity; forging enduring relationships with clients who are also working towards a healthier, more financially resilient world.

Cenfri is an independent African economic impact agency. They work to boost economic growth and increase sustainable development in emerging markets.

Percept Actuaries & Consultants acknowledges Microinsurance Network (MiN) for their considerable contribution to the development of the concept note and background material which informed this report. We extend our gratitude to the following organizations for taking the time to speak to us, and providing invaluable insights for this study as well as reviewing our work: A2ii, Allegra, All Purpose Medical Information System (APMIS), Britam Insurance, Babyl (Rwanda), Finance Sector Deepening Africa, Healthforce™, Jacqui Watson, Senior Strategist and Experience Designer at 5wise, LaFiya Telehealth, MicroInsurance Company, and Stone Three.

Supported by the

Federal Ministry
for Economic Cooperation
and Development

UNDP Insurance & Risk Finance Facility

The Insurance and Risk Finance Facility (IRFF) is part of the Sustainable Finance Hub (SFH) of the United Nations Development Programme (UNDP), and it is a flagship initiative dedicated to insurance and risk finance. The IRFF manages UNDP's global representation in the insurance space. It is a one-stop shop for innovative solutions for UNDP Country Offices, programme countries and partners. This includes issues related to insurance and risk finance, networking, partnership development, policy and guidelines, technical assistance, project implementation, capacity-building, and financing opportunities. More information available at – irff.undp.org

UNDP Sustainable Finance Hub

SDG financing is one of the four elements of UNDP's SDG integrator role, and it is a cross-cutting enabler for the success of all UNDP's thematic areas of work. UNDP, having a long track record of working in public finance and private sector development, through the Sustainable Finance Hub, in collaboration with partners, supports governments, the private sector, civil society and philanthropy to mobilize and align public and private flows of finance with the SDGs and national priorities across different development contexts, including fragile and conflict-affected countries and Small Island Developing States.

Disclaimer

This commissioned report "The Role of Telemedicine in Health Insurance – A Post-COVID Moonshot for sub-Saharan Africa" presents an estimation of number of people that can access healthcare services if telemedicine is leveraged in the region. It also talks about how telemedicine potentially can help people afford health insurance. The views expressed in this report are those of the author(s) and do not necessarily represent those of the United Nations, including the United Nations Development Programme (UNDP), or the Member States of the United Nations. Furthermore, the designations employed herein, their completeness and presentation of information are the sole responsibility of the author(s) and do not necessarily reflect the opinion of UNDP.

Peer Reviewers

Mandeep Dhaliwal (Director: HIV, Health & Development Group), Shivani Nayyar (Policy Specialist), Manish Pant (Policy Specialist – Digital Health), Katharine Pulvermacher (Executive Director, MicroInsurance Network), Mohamed Ramy (Policy and Programme Analyst), Amitrajit Saha (Team Leader, HIV, Health and Development Team for Africa), Thomas Wiechers (Assistant Director, Risk & Resilience Finance, Finance Sector Deepening Africa)

Editor

Jan Kellett

Project Manager

Lauren Carter

Copyeditor

Justine Doody

Acronyms and abbreviations

AI	Artificial intelligence
APMIS	All Purpose Medical Information System
CHW	Community health worker
D2P	Direct to patient
HIV	Human immunodeficiency virus
HRH	Human resources for health
IAIS	International Association of Insurance Supervisors
ICT	Information and communications technology
LMICs	Low- and middle-income countries
MNO	Mobile network operator
NHI	National health insurance
NHIF	National health insurance fund
NHIS	National health insurance scheme
OOP	Out-of-pocket
P2P	Provider to provider
PPP	Public-private partnership
SSA	Sub-Saharan Africa
TCC	Telecommunications centre
THE	Total health expenditure
TSP	Telemedicine service provider
UHC	Universal health coverage
UNDP	United Nations Development Programme
WHO	World Health Organization

Executive summary

Executive summary

An estimated 400 million people in Africa lack universal health coverage (UHC) access.[1] Health care in most sub-Saharan African (SSA) countries is not free at the point of use and household income levels are generally low. As a result, an estimated 11 million Africans fall into poverty annually due to high out-of-pocket (OOP) health payments.[2] The ongoing COVID-19 pandemic has made the need for UHC even more salient.

Insurance can play an important role in preventing financial hardship stemming from health care costs. By pooling risk and providing a finance stream to group and consolidate private health service providers, health insurance reduces the risk of financial hardship from health care expenses. This may also increase health service usage and, ultimately, improve health outcomes. Yet, despite the potential benefits, access to health insurance in SSA is low (7.9 percent) and skewed towards the wealthy.[3]

The COVID-19 pandemic has provided a unique opportunity to reimagine the ways in which health care can be delivered.[4] It has generated an increased willingness to adopt telemedicine innovations that remove or reduce the need for face-to-face contact and has given momentum to the digitalization of business models in the insurance sector.[5]

---

1 World Health Organization (WHO), *Tracking Universal Health Coverage: 2017 Global Monitoring Report* (Geneva, World Health Organization, 2017).

2 WHO, "The impact of COVID-19 on global health goals", Newsroom, 20 May 2021.

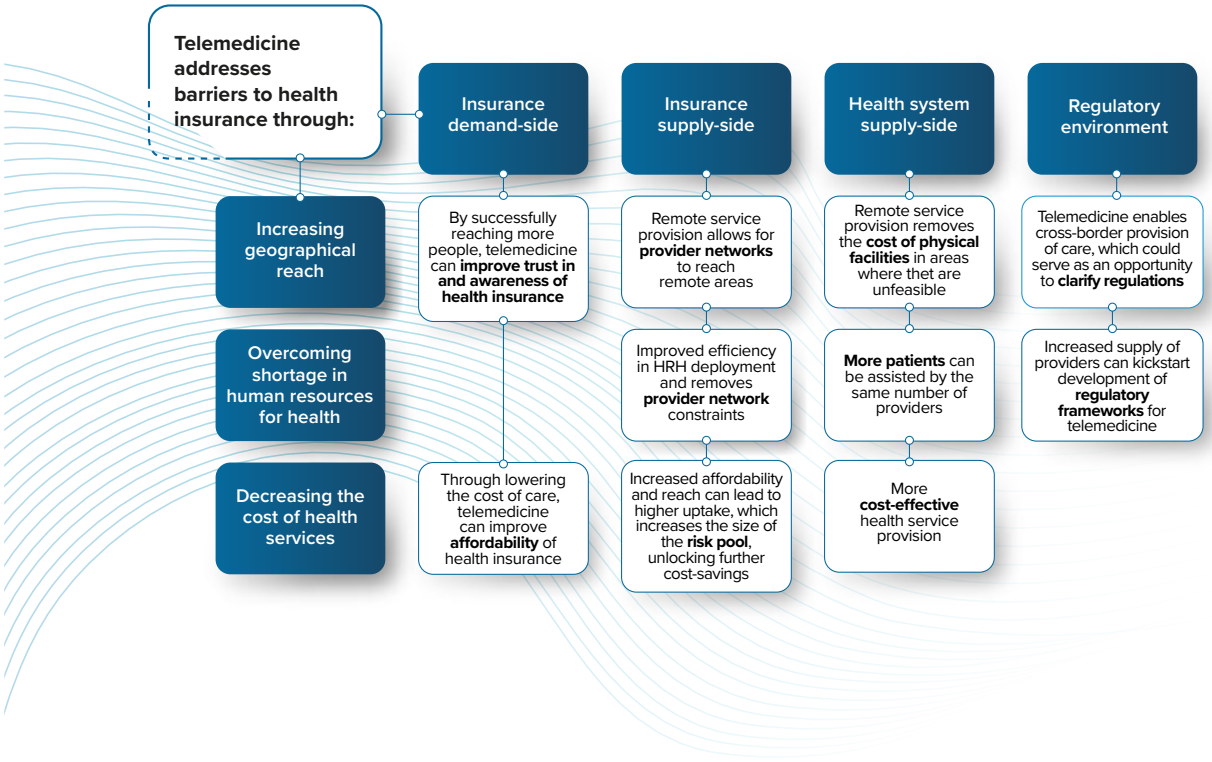
3 World Bank, *UHC in Africa: A Framework for Action* (Washington D.C., World Bank, 2016).

4 Jedrek Wosik and others, "Telehealth transformation: COVID-19 and the rise of virtual care", *Journal of the American Medical Informatics Association*, vol. 27, No. 6 (2020), pp. 957–962.

5 Faine Greenwood, "Assessing the impact of drones in the global COVID response", Brookings Institute (2021).

Telemedicine is defined as the remote delivery of health care services by physicians, where distance is a defining factor, using information and communication technology (ICT) for the exchange of information.[6] If effectively leveraged, it can help overcome the biggest challenges to scale health insurance and health care delivery in SSA, as summarized in Figure 1. Telemedicine reduces the cost of health insurance by enabling the provision of quality health services at a lower cost (i.e., reduces the cost of care). Since care can be provided remotely, telemedicine reduces the overhead costs required for health facilities. Telemedicine also facilitates task shifting onto lower cadres of health staff, who can be remotely supported by higher skilled staff. It allows health worker capacity to be more efficiently managed, thus enabling providers to see more patients, unlocking further cost savings which can enable the provision of more affordable insurance products. Task shifting and increased patient throughput also mean that telemedicine helps to overcome shortages in human resources for health (HRH). Telemedicine increases the geographic reach of health services without the need to expand physical infrastructure: anyone with an internet connection or a mobile phone can receive care, regardless of their location. This can extend the reach of quality health care to remote populations, in turn increasing the size of the risk pool, thereby reducing costs and creating a virtuous cycle in which increased affordability allows more people to access insurance (further increasing the size of the risk pool).

Figure 1: Summary of how telemedicine addresses barriers to health insurance access in SSA



6 Wosik and others, "Telehealth transformation"; WHO, "Telemedicine: Opportunities and Developments in Member States: Report on the Second Global Survey on eHealth 2009", *Healthcare Informatics Research*, vol.18, No. 2 (2012), p. 153.

However, increasing the adoption and scale of telemedicine in SSA is a demanding task. One major challenge is user acceptance. Patients and doctors are used to engaging with and providing health services a certain way (i.e., in person and at health facilities). This status quo bias can be difficult to shift. Other challenges include absent or inadequate regulation; infrastructural challenges, such as unstable electricity supplies, patchy mobile network connectivity and low internet and mobile network coverage; and organizational limitations related to industry-specific reliance on partnerships. Rising to the opportunity presented by telemedicine requires bold thinking and innovation to overcome these obstacles.

This document presents a moonshot estimate of how many more people could be reached if telemedicine were fully leveraged to change the parameters of health insurance and health service delivery in the SSA region. Through desk-based research, insights were drawn from available literature and case studies of telemedicine and health insurance in SSA. These learnings were validated and supplemented through key informant interviews with service providers and industry experts from the SSA health insurance and telemedicine space. Using data from publicly available databases along with these key informant interviews, a modelling exercise was conducted to provide a preliminary estimate of ***what could be*** – a necessary prerequisite for considering ***what is needed*** to get to such a future.

The Moonshot

In 2020, as the first and second waves of COVID-19 struck many developing countries, the UNDP Insurance and Risk Finance Facility team asked: what could be done through telemedicine and the insurance industry, especially in a region like sub-Saharan Africa where health care is in some areas weak, to increase health care for all?

This note examines some of the fundamentals of that argument and estimates that as many as 285 million more people (71 percent of those who do not currently have access to health care) could have access to health insurance, and therefore to health care, if telemedicine were fully leveraged to change the parameters of health insurance and health service delivery in the SSA region. The moonshot also shows that telemedicine could help 186 million more people in SSA (47 percent of those who do not currently have access to health care) to afford a basic or entry level health insurance product.

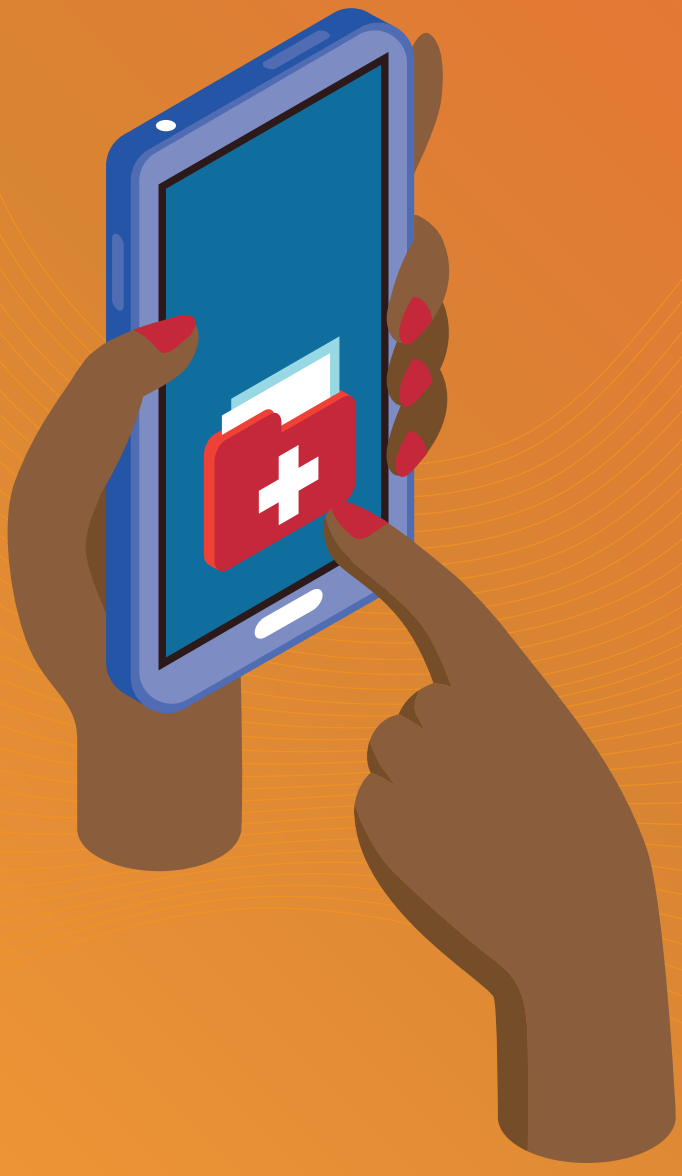
The moonshot estimates the extent to which access to health care in SSA could be improved through increasing access to health insurance via telemedicine, if the three constraints of geographic reach, HRH shortages and high insurance costs could be overcome. The estimations from the three approaches are not mutually exclusive, but rather show **the maximum additional population** that could gain access to health insurance through leveraging telemedicine when each constraint is considered in isolation. The three approaches all show similar scope of increased access to health insurance, regardless of the barrier that telemedicine addresses.

The view across the three approaches shows that **as many as 285 million more people could have access to health insurance**, and therefore to health care more broadly, should the full potential of telemedicine be unlocked. The estimates show that scaling up **telemedicine could help 186 million more people in SSA to afford a basic or entry level health insurance** product that could provide them with both inpatient and outpatient cover, especially if greater outpatient care availability were to generate later hospitalization savings (and therefore greater insurance savings).

However, for this value to be unlocked, barriers need to be overcome. To do this, several factors need to be considered:

- Any insurance and telemedicine products offered must **take local context into account** and **understand the target market** in each context. Each country is unique and no solution will work in every context. Therefore, each country's needs, culture, level of technological adoption, HRH availability, health financing regimes, infrastructure and other specific conditions must be understood to determine which solutions will work best.
- In SSA, where insurance penetration is low and telemedicine is not yet embedded in health system design, **product simplicity** is crucial for successful roll-out at scale. This will also keep costs down so that access can be increased at a large scale.
- The case studies in this report show that **partnerships are crucial**, both in the private sector and with public sector and donors, in expanding the reach of telemedicine services and making business models work.
- Since telemedicine in SSA is relatively new, regulators need to consider a collaborative, test-and-learn approach to regulating for innovation that incorporates market engagement tools alongside regulatory and supervisory tools – that is, regulators need to **regulate for innovation**. Given the nature of partnerships required, both between sectors and potentially across jurisdictions, regulatory harmonization and intersectoral regulatory collaboration are needed to create an enabling ecosystem for innovation.

1. Introduction



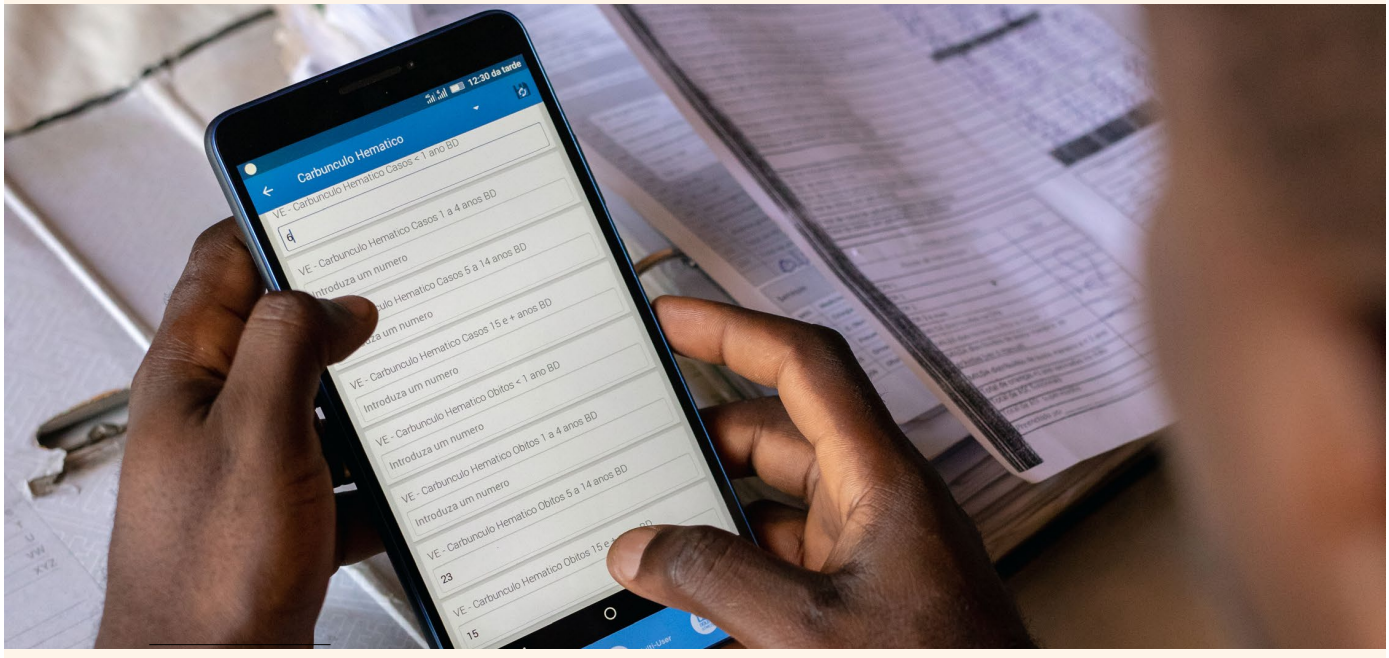
1. Introduction

According to the 2017 UHC Global Monitoring Report, half the world's population is still without access to essential health services. [7]

> The effects are staggering: **the report estimates that about 800 million people spend more than 10 percent of their household income on health care, while 100 million people are pushed into financial catastrophe every year due to health-related out-of-pocket (OOP) expenditure.[8]**

Sub-Saharan Africa (SSA) is home to many of these people. An estimated 400 million people in the region lack UHC access.[9] Health care in most SSA countries is not free at the point of use and household income levels are generally low, resulting in an estimated 11 million Africans falling into poverty due to high OOP health payments every year.[10]

The ongoing COVID-19 pandemic has made the need for UHC more salient. In addition to the direct effect that the pandemic has had on people's health, national lockdown measures



7 Universal health coverage (UHC) is defined by the WHO as the ability of all individuals and communities to receive the health services they need without suffering financial hardship. This is inclusive of all "essential, quality health services, from health promotion to prevention, treatment, rehabilitation, and palliative care across the life course." WHO, *Tracking Universal Health Coverage: 2017 Global Monitoring Report*.

8 Ibid.

9 Ibid.

10 WHO, "The impact of COVID-19 on global health goals".

have impacted people's ability to earn an income and access health services. Many of the health gains made in recent decades are at risk due to the challenges and fears associated with accessing health services during the pandemic.[11]

Preventing financial hardship caused by health care costs is a central ambition of the drive towards UHC.[12] Insurance can play an important role in helping to achieve this objective. It can act as a catalyst to improve health care access by pooling risk and providing a finance stream to group and consolidate private health service providers. By doing so, it can reduce the risk of financial hardship resulting from health care expenses. It may also help to increase health service usage, and, as a result, improve health outcomes.

However, access to health insurance remains constrained in the region. A study examining health insurance coverage in 36 SSA countries showed that average coverage was low (7.9 percent) and was skewed towards the wealthy.[13] Only four countries in the study had health insurance coverage rates of over 20 percent (Rwanda with 79 percent, Ghana with 58 percent, Gabon with 41 percent and Burundi with 22 percent), mostly as a result of national health insurance schemes.[14] A 2018 landscaping study of microinsurance in SSA found only 2 percent of low-income households had any kind of microinsurance.[15] Health microinsurance accounts for 28 percent of microinsurance coverage, but often involves very limited cover ("freemium")[16] policies offered on the back of mobile phone subscriptions.

While COVID-19 has presented tremendous challenges, it has also provided a unique opportunity to reimagine the ways in which health care can be delivered.[17] The fight against COVID-19 has triggered a range of innovations; it even led to drone delivery of serum samples and vaccines.[18] Importantly, it has also generated an increased willingness to adopt telemedicine innovations (a term defined in depth in the following section) that remove or reduce the need for in-person contact with health workers and facilities.

In the insurance sector, likewise, the pandemic has given momentum to the trend towards digitalization of business models.[19] Telemedicine represents an opportunity to lower the cost of delivering and accessing health care services, since it allows care to be provided and accessed remotely, enabling patients to save the time and money they would otherwise spend on travelling to health

11 For instance, it is estimated that in sub-Saharan Africa in 2020 almost 12 million diphtheria-tetanus-pertussis (DTP3) vaccine doses and 11 million doses of the first-dose measles-containing vaccine (MCV1) were missed due to COVID-19. See Kate Causey and others, "Estimating global and regional disruptions to routine childhood vaccine coverage during the COVID-19 pandemic in 2020: a modelling study", The Lancet, vol. 398, No. 10299 (2021), pp. 522–534; WHO, "COVID-19 widens routine immunization gaps in Africa", 29 July 2021.

12 WHO, "The impact of COVID-19 on global health goals".

13 World Bank, UHC in Africa.

14 Ibid.

15 Edwine Barasa and others, "Examining the level and inequality in health insurance coverage in 36 sub-Saharan African countries", *BMJ Global Health*, vol. 6, No. 4 (2021).

16 Freemium health insurance policies are those which are offered for free as an add-on for purchasing another stand-alone product, such as a mobile phone subscription or an insurance policy. Although these policies are technically free, they usually have very low claims rates as customer awareness of the service and/or how it is used tends to be limited, and the policies provide people with limited value.

17 Wosik and others, "Telehealth transformation".

18 Greenwood, "Assessing the impact of drones in the global COVID response".

19 Kate Rinehart-Smit and Janse van Vuuren, "COVID-19 catalyses insurance innovation", Cenfri, 29 April 2021.

facilities, and because it makes more efficient use of limited human resources for health (HRH).[20] It also helps to reduce the impact of geographic distance. By so doing, it can help to overcome some of the key barriers to health insurance success, thereby helping to substantially increase health care access.

These COVID-19 inspired innovations in health care delivery and in the insurance sector motivated the Insurance and Risk Finance Facility (IRFF) team of the United Nations Development Programme (UNDP) to consider how health care provision could be reimagined in the future.[21]

Making good on this innovation requires bold and radical thinking – a revolution rather than a momentary pause from business as usual. There is no lack of innovation in sub-Saharan Africa, but the scale of such innovation is often stymied by foundational challenges related to infrastructure, partnerships, payment streams, seed funding and behavioural barriers to adoption.

If it were possible to set aside these challenges, what could be achieved? This document presents a moonshot estimate of how many more people could be reached if telemedicine were fully leveraged to change the parameters of health insurance and health service delivery in the SSA region. Through desk-based research, insights were drawn from the available literature and case studies of telemedicine and health insurance in SSA. These learnings were validated and supplemented through key informant interviews with service providers and industry experts in the SSA health insurance and telemedicine space. Using data from publicly available databases along with these key informant interviews, a modelling exercise was then conducted to provide a preliminary estimate of the potential impact of telemedicine on health insurance reach in SSA. This estimate provides a vision of *what could be* – a necessary prerequisite for considering *what is needed* to get to such a future.

The rest of this report proceeds as follows:

- It starts by providing an overview of telemedicine in sub-Saharan Africa in order to show its potential and the challenges that it faces.

- Next, it considers how insurance could leverage telemedicine to extend access to health care, and discusses which of the challenges to scaling health insurance telemedicine can help to address.

- Working from this basis, the methodology and modelling of the moonshot are established. Different scenarios are explored for removing the main constraints to health insurance reach to estimate the size of the potential market that could be enabled by telemedicine.

- The report concludes with a discussion of the conditions and actions needed, as well as the levers of change available, if the moonshot is to be made a reality.

---

20 Yasser El-Miedany, "Telehealth and telemedicine: how the digital era is changing standard health care", *Smart Homecare Technology and TeleHealth*, vol. 4, pp. 43–51 (2017).

21 Jan Kellet, "A chance for universal healthcare in sub-Saharan Africa", United Nations Development Programme, 13 May 2020.

2. Telemedicine in sub-Saharan Africa

2. Telemedicine in sub-Saharan Africa

Telemedicine services are not totally new to countries in SSA, but they are generally used on a small scale. This section considers the definition of telemedicine and describes the different types of telemedicine in SSA. Broad trends in the telemedicine sector in SSA are also explored and the sector's reach is mapped.

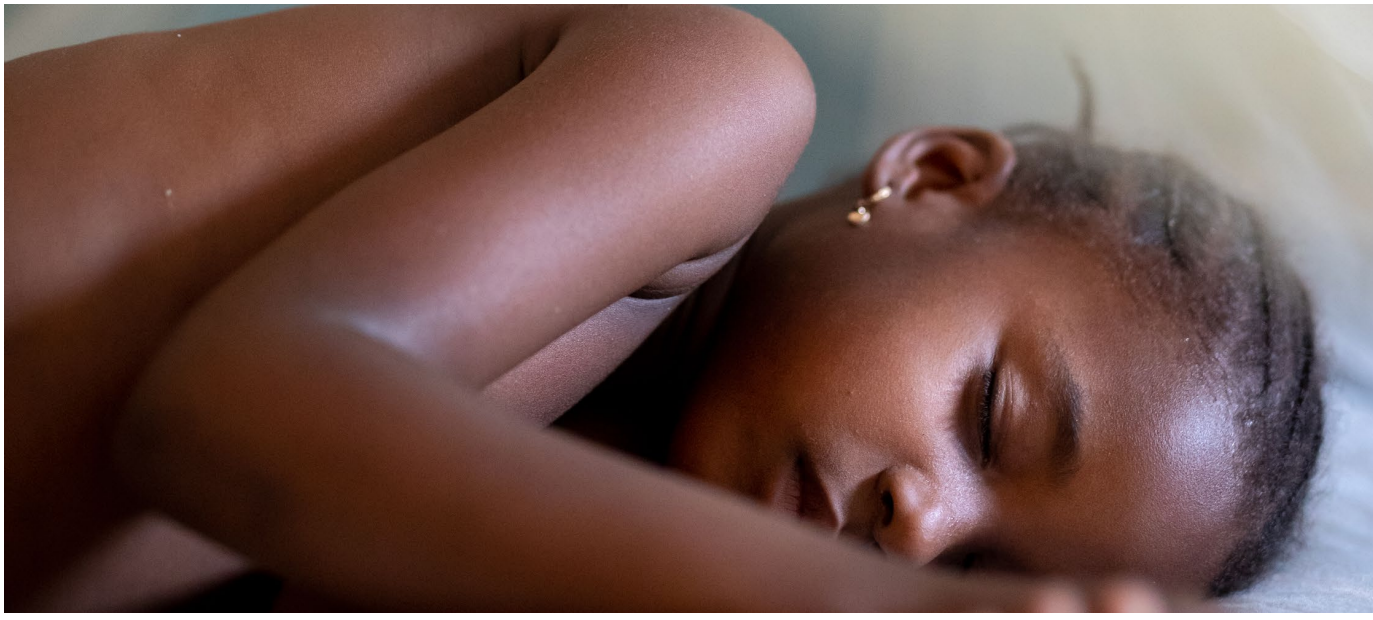
Core messages

- The World Health Organization (WHO) defines telehealth as the remote delivery of health care services by all health care professionals, where distance is a defining factor, using ICT for the exchange of information.
- Telemedicine solutions have successfully been used to improve health care in SSA by increasing access to, speed and quality of care. However, many of these solutions are pilot interventions or start-ups and have not managed to achieve scale.
- Challenges to scaling telemedicine solutions in SSA include restrictive regulation, limited infrastructure, organizational and market-related factors that hinder integration, and low levels of user acceptance.
- The need for remote health services caused by the COVID-19 pandemic has helped to reduce some of these barriers. Notably, the pandemic has made both patients and health care providers more willing to use telemedicine services, and has even created an impetus to reduce some regulatory barriers.
- The most widespread roll-out and usage of telemedicine in SSA has taken place in Ghana and Rwanda, where telemedicine has been incorporated into how care is delivered in the public health system, to extend the reach of health services to remote areas.

2.1 What is telemedicine?

Remote delivery of healthcare using information and communication technology (ICT). The WHO defines telehealth as the remote delivery of health care services by all health care professionals, where distance is a defining factor, using ICT for the exchange of information.[22] Some definitions characterize telemedicine as referring only to telehealth services provided by physicians, but the terms *telemedicine* and *telehealth* are often used interchangeably.[23]

Part of digital health. By contrast, digital health is a much broader term and is defined as the use of ICT in medicine and other health professions to manage illnesses and health risks, as well as to promote wellness.[24] It includes telehealth and telemedicine,



along with the use of wearable devices, mobile health (defined as any use of mobile and wireless technologies to aid the achievement of health objectives)[25] and health information technology.

Focus of report

This report focuses specifically on telemedicine and telehealth, in the broader context of digital health. While the digitalization of insurance (with regard to distribution, administration and claims processing, for example) is certainly relevant to the core question unpacked in this report, the report does not assess the impact of digital technology in insurance in general, but rather anchors the analysis in the potential impact of telemedicine as part of the broader innovation landscape in the insurance market.

22 Wosik and others, "Telehealth transformation".
23 WHO, "Telemedicine: Opportunities and Developments in Member States".
24 Ibid.
25 Yasser El-Miedany, "Telehealth and telemedicine: how the digital era is changing standard health care".

Table 1 illustrates different categories of telemedicine providers either based in Africa or providing services in Africa.[26]

Table 1: Categories of telemedicine providers in Africa

Telemedicine category		Case study	Additional examples of providers in Africa
Synchronous (real-time, two-way remote interaction)	**Direct to Patient**	LaFiya (Nigeria) gives its clients access to teleconsultations with nurses, doctors and specialists, 24 hours a day seven days a week. Both client and provider membership is subscription-based.	**Curative care[27]:** Allegra, Babyl, CLICKDOC, Counselling Hub, CribMD, DrConnect, Healthbridge, Mobihealth, Stone Three, Thalamus, Tobba, Hello Doctor **Non-curative care:** APMIS, Doctors on Call, Doctor 4 Africa
	Provider to Provider	Healthforce (South Africa) is a nurse-led telemedicine platform that licenses its platform to pharmacies to set up nurse-run primary health care facilities. Nurses consult with patients, and if they require the advice of a physician or if medication needs to be prescribed, they can dial in a doctor for a real-time video consultation. Nurses can physically examine patients and share patients' vital data and photographs securely on Healthforce's platform to aid in the physician's diagnosis. These consultations are approximately 25% to 50% the cost of the average in-person consultation with a private general practitioner.	**Curative care:** eHealth Group, Stone Three, Allegra **Non-curative care:** Vula, Signapps, Phulukisa
Asynchronous (non-real-time transmission of health information)	**Direct to Patient**	Tobba (Tunisia-based) provides a platform where patient information can be stored and accessed by patients and providers. Patients and providers can communicate via direct messages.	**Non-curative care:** Doctor 4 Africa, Get Tested, Healthbridge, SystemOne, Thalamus
	Provider to Provider	Signapps (South Africa-based) is a digital communication tool used by health care providers. Health workers can share, store and discuss patient information on the platform and can send direct and group messages to work collaboratively on patient cases.	**Non-curative care:** DrConnect, Vula

26 To provide a wide range of examples and use cases, North African providers are also included in this table.

27 Definitions of curative and non-curative care are provided later in this section

Telemedicine category		Case study	Additional examples of providers in Africa
Remote patient monitoring (collection of electronic health data which is transmitted for review by a remote provider)		Quro Medical (South Africa) is a telemedicine service provider that enables 24-hour patient monitoring at home, while vital patient information is securely shared with attending doctors remotely. This allows patients to recuperate safely at home, freeing up beds in hospitals and reducing the cost of inpatient care.	**Curative care:** Mobihealth, e-Mutakalo
Care navigation (tools that provide appropriate support in navigating health services based on symptoms/ conditions as well as price and quality of providers)	**Patient self-directed care**	BYON8 (Kenya) is an AI-based digital physician that uses medical diagnostic software to analyse information from patients. The platform provides feedback and advice to the user based on medical history and current symptoms inputted by the user.	**Non-curative care:** DrConnect, THINKMD
	E-triage	Babyl (Rwanda) has a call line answered by nurses who triage patients telephonically and, based on that, book appointments (both virtual and face-to-face) for the user.	**Non-curative care:** DrConnect, Hello Doctor, Kimi from Momentum, Mobihealth, THINKMD

Source: Framework and definitions adapted from McKinsey & Company to contextualize African market. See Fowkes and others (2020).

The main telemedicine categories outlined in Table 1 are:

Synchronous and asynchronous. Synchronous telemedicine happens when patients and health workers communicate in real time with one another. Information on the patient's health status is shared in real time and, likewise, the health worker provides medical advice in real time. An example of this would be a live video consultation between a patient at home and a doctor in a health facility or another location. Asynchronous telemedicine, on the other hand, does not happen in real time. Patients share information on their health status and health workers receive this information at a later stage and then provide medical advice. For example, patients may send questions about their health condition via WhatsApp or other messaging app to health workers who respond to their query at a later time.

Direct to Patient (D2P) and Provider to Provider (P2P). D2P telemedicine refers to direct communication between patients and health workers. The teleconsultation between a doctor and a patient described above is an example of D2P telemedicine. P2P telemedicine happens when health workers consult with one another. For instance, nurse-led telemedicine models can be examples of P2P telemedicine; here, nurses carry out in-person consultations with patients, but may dial in a doctor to seek advice or to write prescriptions.

Remote patient monitoring is a category of asynchronous telemedicine which relies on the collection of patient data in one location, which is then shared with a clinician in another location. This is often used as an alternative to face-to-face outpatient or in-hospital monitoring and is

supported by portable or wearable medical devices which collect and transmit patients' vital data to their attending health worker, who can then interpret and monitor the patients' health status.

Care navigation is a category of telehealth which assists patients in navigating the health care system. Care navigation can refer either to patient self-directed care or to e-triage/tele-triage. Patient self-directed care involves patients accessing information on their own, helping them to navigate the health system. With e-triage/tele-triage, digital tools help patients find care, schedule appointments, or receive upward or downward referrals. E-triage/tele-triage can also be provided as a D2P or P2P service.

Curative vs. non-curative care. Telemedicine service providers (TSPs) are classified as either curative or non-curative. For the purposes of this report, TSPs are classified as curative if they facilitate consultations aimed at resolving a patient's health complaint – for instance, remote consultations with a clinician that enable diagnosis, treatment or management of a clinical condition. TSPs which primarily support care navigation, health information sharing, disease prevention or patient self-management are classified as non-curative.

2.2 Telemedicine trends in sub-Saharan Africa

2.2.1 Barriers

Telemedicine solutions have successfully been used to improve health care in SSA by increasing access to speed and quality of care,[28] but there is limited available data quantifying the current levels of usage and reach of telemedicine. Many studies report that telemedicine technology is used in a variety of settings and use cases, including to empower lower cadres of health workers to provide health care in more cost-effective ways (a phenomenon known as task shifting), for educational purposes, or to deliver specialized health care (such as ophthalmology) remotely. However, these are often pilot interventions or start-ups, and many have not managed to achieve scale. The next sub-section estimates the reach of existing telemedicine initiatives and illustrates which models have been able to reach scale.

Challenges to scale. According to key informant interviews conducted for this study along with literature on telemedicine,[29] TSPs face the following key barriers:

- **Regulation**. In many SSA countries, no telemedicine regulation exists.[30] Lack of regulation creates a grey area in which TSPs and health providers can develop new models and methods, but at the risk that future regulatory changes may impact these business models. The absence of regulation, particularly in financial services, is often seen to provide an

28 Joana Eva Dodoo and others, "Telemedicine use in Sub-Saharan Africa: Barriers and policy recommendations for Covid-19 and beyond", *International Journal of Medical Informatics*, vol. 151 (March 2021).

29 WHO, *mHealth: New Horizons for Health through Mobile Technologies* (Geneva, World Health Organization, 2011).

30 Ibid.

opportunity to freely innovate without the shackles of legislation. However, this is not always the case in the health sector, since health care providers are under oath to do no harm and may be vulnerable to legal action if they are found to render services that do not meet what is defined as the appropriate standard of care to their patients. Therefore, in the health sector, more caution is needed when providing novel ways of delivering care in the absence of clear regulatory guidance.

Poorly drafted regulations can also be a barrier. For instance, South Africa has a telemedicine regulatory framework, which was drafted by the country's Health Professions Council (HPCSA).[31] However, these guidelines have inhibited the development of the South African telemedicine market because they were not designed using an appropriate risk-based approach. TSPs consider them to be overly onerous and often impractical to apply.[32]

For the most part, telemedicine regulations are likely to be drafted by health and medical authorities. However, due to the nature of telemedicine and the partnerships required to deliver services in this sector, some regulations that are the responsibility of non-medical oversight authorities also need to be considered. For instance, TSPs that partner with mobile network operators (MNOs) and/or insurers also need to comply with telecommunications, insurance and/or payments regulatory requirements. This means that TSPs often operate in environments where significant regulatory coordination is required. Therefore, in drafting regulations for telemedicine, collaborative, multi-sectoral approaches are needed to ensure all parties understand how new and existing regulations from different sectors impact the telemedicine industry, and to provide a platform where regulatory coordination is possible.

- **Infrastructure**. Telemedicine requires appropriate ICT and electricity infrastructure. According to World Bank data, SSA is home to 75 percent of the population of the world that has no access to electricity.[33] Lack of access to electricity, or an unstable electricity supply, makes it challenging to access or deliver services that rely on technology. Moreover, many SSA countries have patchy mobile network connectivity and poor internet connectivity, which also create barriers to extending reach. These challenges are particularly prevalent in rural and remote areas. Given that one of the advantages of telemedicine is the ability to provide care to people in remote, potentially difficult to access locations, overcoming these barriers is core to the success of many TSPs; indeed, for some, this forms part of their value proposition. As described in box A below, TSPs have used technology innovatively to overcome some typical infrastructural barriers.

31 Fowkes and others, "Virtual Health: The next frontier of care delivery".

32 Dodoo and others, "Telemedicine use in Sub-Saharan Africa".

33 Mary Blankenship and Christina Golubski, "Figure of the week: Increasing access to electricity in sub-Saharan Africa", Brookings, 18 June 2021.

BOX A Phulukisa – Overcoming ICT infrastructure challenges in South Africa[34]

Phulukisa, a South African TSP, has developed a "clinic in a backpack", which enables community health workers (CHWs) to travel around their communities to provide health education, treatment and health screening in people's homes. Data collected from screenings and vital readings are stored on a centralized cloud and can automatically update a patient's electronic health record, which can also be shared with the patient. Algorithms which use artificial intelligence (AI) are used to risk stratify patients and identify those who are high risk and need to be referred to health facilities for in-person consultations. Because this technology is targeted at people in rural communities who are far away from health facilities and may have limited connectivity, Phulikisa leverages TV white space, which makes use of the unused channels between those on the VFS and UHS radio frequency spectrum, to maintain connectivity in areas that may not have mobile network or internet access.

- **Organizational or market-related**. Delivering telemedicine services often requires partnerships, and partners' data and information systems need to be integrated if services are to be provided optimally and seamlessly. However, markets for these services have often developed in a siloed way and, as a result, data and information systems are not always compatible or easy to integrate with other systems. In health facility settings (especially in the public sector), data is often stored in paper-based systems and/or outdated legacy health information systems which cannot be easily integrated with those of the TSPs. And health providers and funders are often unwilling to integrate their data systems with third parties, as their ownership of patient data provides a competitive advantage.

  Establishing partnerships between TSPs, health provider networks and client aggregators in which all parties' incentives align can also be a challenge. In some instances, provider competence in dealing with telemedicine and new technology has been flagged as a concern.

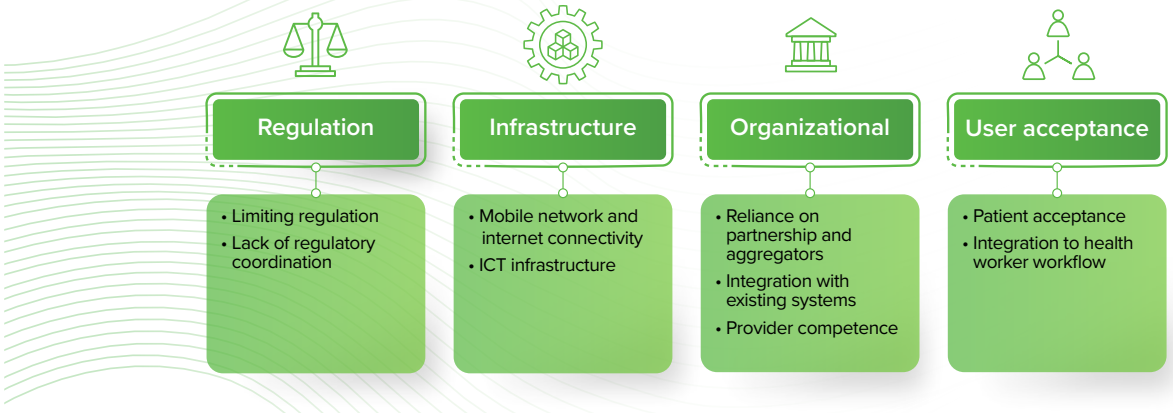
- **User acceptance**. One ongoing challenge is the fact that both patients and providers often remain hesitant about using telemedicine. Telemedicine entails a completely new way of looking at care provision, and status quo mindsets can be a formidable hurdle to overcome. Patients' acceptance is often hampered by a lack of awareness or understanding of telemedicine services and their value. Since telemedicine services are new, patients have limited trust in them. Trust and lack of understanding also play a role in holding back adoption among providers, particularly health care workers, who may believe that quality health care can only be provided in person. Although many health concerns can indeed only be resolved with an in-person consultation, health care providers need to understand that telemedicine is not meant to completely replace in-person consultations. Telemedicine works best as part of a continuum of care and can be used to provide health services more efficiently.

34 Percept Actuaries & Consultants, *Case Notes from the Frontier: Five Case Studies of South African Telemedicine Providers* (Capetown, Percept, 2021).

- Ultimately, to create a viable business case for telemedicine, TSPs need an ecosystem of enabling infrastructure, regulation and partnerships that can be leveraged to scale their offerings.

Figure 2 summarizes the barriers to the adoption of telemedicine in SSA described above.[35,36]

Figure 2: Key barriers to telemedicine in sub-Saharan Africa



2.2.2 Opportunities

COVID-induced pivot. The need for remote health services brought about by the COVID-19 pandemic has helped to reduce some of the barriers faced by the telemedicine industry.[37] Notably, the pandemic increased both patients' and health care providers' willingness to use telemedicine services, and even created an impetus to reduce some regulatory barriers. In response to the outbreak of COVID-19, many countries around the world accelerated their adoption of telemedicine as a means of keeping people in touch with the health system while trying to decongest health facilities.[38] Some, such as South Africa, relaxed regulations on the provision of telehealth services to allow for increased uptake.[39] Due to the pandemic, the use of telemedicine has stabilized at an estimated 38 times higher than the start of 2020[40] (see Table 2 below for an overview of current

35 Liezl van Dyk, "A review of telehealth service implementation frameworks", *International Journal of Environmental Research and Public Health*, vol. 11, No. 2 (2014), pp. 1279–1298.

36 Lorenz Harst and others, "Identifying barriers in telemedicine-supported integrated care research: scoping reviews and qualitative content analysis", *Journal of Public Health (Germany)*, vol. 28, No. 5 (2020), pp. 583–594.

37 The ability to provide health services remotely, as opposed to at health facilities, has been invaluable in restricting transmission of the virus (protecting both patients and providers) as well as keeping health facilities less congested to better cope with large volumes of COVID-19 patients. The use of telemedicine also helped alleviate the shortage of health care workers (through increased time-efficiency and task shifting), an acute challenge faced by health systems around the world and in SSA particularly, given the large influx of COVID-19 patients.[16]

38 Wosik and others, "Telehealth transformation".

39 Percept Actuaries & Consultants, *The nurse can see you now: Reflections from the South African telemedicine market in light of Covid-19* (Capetown, Percept, 2020); Rashid Bashshur and others, "Telemedicine and the COVID-19 pandemic, lessons for the future", *Telemedicine and e-Health*, vol. 26, No. 5 (2020), pp. 571–573.

40 Oleg Bestsennyy and others, "Telehealth: A quarter-trillion-dollar post-COVID-19 reality?", McKinsey & Company, 9 July 2021.

reach in SSA). Although beginning from a low base, this growth has showcased the potential of telemedicine as an effective and affordable method of health service provision. Box B below describes how telemedicine was used to protect high-risk diabetic patients at the height of the COVID-19 pandemic in South Africa.

BOX B Western Cape Department of Health uses telemedicine to provide lifesaving care during COVID-19 pandemic

In South Africa, data from the Western Cape Province showed that 52 percent of deaths due to COVID-19 were among diabetic patients.[41] Using telemedicine, the Western Cape Department of Health reached out to high-risk diabetic patients who were COVID-19 positive to check the progression of their symptoms and changes in their blood glucose levels. Based on these teleconsultations, certain patients were pre-emptively admitted to hospital for closer monitoring.

Mortality rates for diabetics who were part of this intervention were significantly lower than for those of the same risk profile who were not part of the intervention. Diabetics at highest risk had a 21 percent lower mortality rate; those at moderate risk had a 26 percent lower rate; and low-risk diabetics had a 54 percent lower mortality rate.[42] The intervention not only saved lives, but also prevented the progression of complications among patients that would have resulted in longer hospital stays and admission to scarce and costly intensive care units. Most impressively, a dedicated team of only eight doctors were able to manage almost 11,000 patients over the duration of the intervention.[43]

Overcoming physical barriers. Geographic distance from health care facilities is associated with lower levels of health care use, particularly in rural areas.[44] Low population density in these areas makes it difficult to provide high-quality, accessible physical infrastructure for the whole population. There is also often a trade-off between physical access and quality of health care. For instance, rural facilities close to patient populations may not have the resources to provide quality service, since lower patient numbers can mean the necessary clinical resources and skills are not maintained.[45] Even where physical infrastructure is available, financial constraints may mean facilities are not staffed at required levels. In SSA, 59 percent of the population (667 million people) live in rural areas[46] and between 11 and 30 percent of the population have to

41 Neal J. David, Zameer Brey and Muzzammil Ismail, "Telemedicine in the Western Cape Department of Health during the first peak of the COVID-19 pandemic: Leveraging data to save lives by activating a telemedicine response", *African Journal of Primary Health Care & Family Medicine*, vol. 13, No. 1 (2021), pp. 1–4.

42 Ibid.

43 Ibid.

44 Kerry L.M. Wong, Lenka Benova and Oona M R Campbell, "A look back on how far to walk: Systematic review and meta-analysis of physical access to skilled care for childbirth in Sub-Saharan Africa", *PLOS ONE*, vol. 12, No. 9 (2017), pp. 1–20.

45 Nele Jensen, *The Health Worker Crisis: an analysis of the issues and main international responses* (London, Health Poverty Action, 2013).

46 World Bank, "World Bank Development Indicators". Available at https://databank.worldbank.org/source/world-development-indicators.

travel more than 60 minutes to reach health care.[47] Therefore, providing remote care through telemedicine has the potential to greatly increase access to health care.

User satisfaction. Although telemedicine disrupts the traditional way in which health care is provided, user satisfaction among the current user base points to additional opportunities for telemedicine. Data from TSPs shows that, of clients who have engaged with telemedicine services, over 80 percent report being satisfied that the consultation addressed their medical needs and did not feel that a face-to-face consultation with their physician was necessary, while 90 percent report that they would use the service again.[48]

For the purposes of the moonshot estimate, the barriers as outlined above will be assumed to have been overcome in order to leverage the full potential of telemedicine in expanding the reach of health insurance.

BOX C Telemedicine brings high quality health care to rural communities in Ghana

The rollout of telemedicine in Ghana was initiated and funded by the Novartis Foundation in collaboration with Ghana Health Services in 2011.[49] The project uses ICT to connect local community health care workers to more experienced medical practitioners in order to increase health care access in rural communities. These medical professionals, primarily qualified nurses and midwives, are on standby 24 hours a day for calls via a telecommunications centre (TCC).[50] Teleconsultations which cannot be resolved by a call to the TCC are then forwarded to a relevant doctor or hospital, and those that are not resolved by the call to the doctor or hospital are referred for a face-to-face consultation.[51]

The project started with a pilot that reached over 30 communities and 35,000 people. It has since been implemented in various districts across the country.[52] In 2018, there were a total of six centres across Ghana, reaching an estimated population of 7 million people.[53] Most of these people did not previously have access to quality health care, as many live in rural areas where health care infrastructure is poor and public transport to health care facilities is not available.

The project enabled access to high quality health care without the need for transportation, dramatically reducing associated monetary and time costs. In 2016, 31 percent of referrals

47 D. J. Weiss and others, "Global maps of travel time to healthcare facilities", *Nature Medicine*, vol. 26, No. 12 (2020), pp. 1835–1838.

48 Percept, *Case Notes From the Frontier*.

49 Novartis Foundation, "Ghana Telemedicine", 2018. Available at https://www.novartisfoundation.org/past-programs/digital-health/ghana-telemedicine.

50 Manufacturing Chemist, "Novartis and Ghana Health Service scale-up telemedicine programme", 17 January 2018.

51 Novartis Foundation, "Telemedicine toolkit fact sheet", August 2018. Available at https://www.novartisfoundation.org/sites/arctic_novartisfoundation/files/2020-12/telemedicine-toolkit-fact-sheet.pdf.

52 Novartis Foundation, "Ghana Telemedicine".

53 Novartis Foundation, "Telemedicine toolkit fact sheet".

were avoided, and GHS110 ($31) was saved per avoided referral.[54] The majority of cases (around 54 percent) were handled by the community health care worker, in telephonic contact with more experienced medical professionals within the community clinics.[55]

Health care workers thought the telemedicine facility had a positive impact on the quality of health care provided at the community clinics.[56] The facility brought the experience and knowledge of well-qualified health care workers to rural populations in Ghana through the TCCs, thereby improving the quality of health care received in those communities.

How were partnerships leveraged for improved access to health care?

A varied collection of companies, government institutions and non-governmental organizations worked together to create the successful telemedicine collaboration in Ghana. Partnerships were formed with telecommunications companies Ericsson and Airtel.[57] In 2018, Airtel and Ericsson even collaborated to consolidate and upgrade their network infrastructure in Ghana to provide fast mobile networks in rural areas.[58] Funding for the project was initially provided by the Novartis Foundation, and has been continued by the Ghanaian government.[59] Leadership and intellectual support was given by Millennium Promise Alliance and the Earth Institute at Columbia University.[60] In addition, the implementation and maintenance of the project was enabled by public and private organizations and bodies such as the Ministry of Health, the Ghana Health Service, the Ministry of Communications, the National Health Insurance Agency (NHIA), the National Ambulance Service, the Mental Health Authority, St. Martin's Hospital and MedGate.[61]

Given that the field of telemedicine is relatively new, Ghana's National Health Insurance Scheme (NHIS), overseen by the NHIA, does not currently cover telemedicine claims. However, this is under review and could change in the future.[62] A 2021 report indicated that the majority of NHIS stakeholders agree that telemedicine should be included in their list of services covered.[63]

---

54 Novartis Foundation, "Ghana Telemedicine"

55 Y. Kazeem, "Ghana is betting on telemedicine to help plug gaps in its rural healthcare system", Quartz Africa, 7 June 2016.

56 Daniel Opoku, Penelope Scott and Wilm Quentin, "Healthcare Professionals' Perceptions of the Benefits and Challenges of a Teleconsultation Service in the Amansie-West District of Ghana", Telemedicine and e-Health, vol. 21, No. 9 (2015), pp. 748–755.

57 Novartis Foundation, "Ghana Telemedicine".

58 Ericsson, "AirtelTigo partners Ericsson to consolidate and upgrade its network in Ghana", 23 May 2019.

59 Kazeem, "Ghana is betting on telemedicine".

60 Novartis Foundation. "Telemedicine Toolkit: High level overview", 2018. Available at https://www.novartisfoundation.org/past-programs/digital-health/telemedicine-toolkit.

61 Ibid.

62 Novartis Foundation, "Ghana Telemedicine".

63 M. Aikins and others, "Positioning the National Health Insurance for financial sustainability and Universal Health Coverage in Ghana: A qualitative study among key stakeholders", PLOS ONE, vol. 16, No. 6 (2021).

2.3 Estimating the reach of telemedicine

Niche to mass market range: Table 2 shows the reach of telemedicine in SSA in terms of numbers of users, based on documented examples of TSPs. In Ghana and Rwanda, telemedicine is widespread, because these countries have incorporated telemedicine into how care is delivered in the public health system in order to extend the reach of health services to remote areas. In Rwanda, 2.5 million people are registered users of telehealth through Babyl, a subsidiary of United Kingdom-based digital health care provider Babylon.[64] In Ghana, a P2P telemedicine model (see Box C) has reached an estimated 7 million people in six out of the country's ten regions.[65]

In other large-scale examples, telemedicine call centre services are a value-added benefit linked to insurance offered to mobile network subscribers, such as BIMA Doctor in Ghana, Senegal and the United Republic of Tanzania and Safaricom Dial-a-doc in Kenya. This model will be discussed in section 3 below. Apart from these, most examples have relatively limited reach.

Table 2: Reach of telemedicine in SSA

Provider	Country	Reach
Safaricom Dial-a-doc	Kenya	18 million
Public provider (Ghana National Health Insurance Authority)	Ghana	7 million
MomConnect	South Africa	3 million
Discovery Connected Care	South Africa	2.8 million
Babyl	Rwanda	2.5 million
mPharma	Ghana	2 million
Bonitas Virtual Care	South Africa	719,000
BIMA Doctor	Ghana, U.R. Tanzania, Senegal	330,000
Momentum Hello Doctor	South Africa	299,000
TeleAfya	Kenya and U.R. Tanzania	47,000
LaFiya	Nigeria	5,000

Source: LeapFrog Investments (2016); The Partnership for Maternal Newborn and Child Health (2021); Discovery (2021); Momentum Health Solutions (2021); Bonitas (2021); A. Njanja (2021).

64 Percept, *Telehealth innovation in Rwanda Lessons and insights from the babyl experience* (Capetown, Percept, 2021). Available at https://percept.co.za/wp-content/uploads/2021/05/Brief-3-babyl.pdf.

65 Novartis Foundation, "Ghana Telemedicine Toolkit: Interactive Implementation Guide", 2018. Available at https://www.novartisfoundation.org/sites/arctic_novartisfoundation/files/2020-11/interactive-implementation-guide.pdf.

3. How insurance can leverage telemedicine to extend access to health care

3. How insurance can leverage telemedicine to extend access to health care

This section explores how health insurers can use telemedicine, and in turn, how access to health care can be expanded through leveraging telemedicine.

Core messages

- Telemedicine solutions are currently used by health insurers (to enhance benefits for existing clients and expand reach to new clients) in three ways:
  - As a reimbursed service as part of a broader fee-for-service linked health insurance product;
  - As an add-on to a simple, mass-market offering; and
  - As an insurance offering designed around a standalone telemedicine model.

- SSA faces demand-side, insurance supply-side, health system supply-side and regulatory barriers to health insurance uptake.

- While telemedicine will not address all barriers to health insurance, it has a role to play in mitigating some of the barriers that restrict access to health insurance in SSA, thereby unlocking potential for increased access to health services.

- Telemedicine enables health care to be delivered to patients remotely, meaning that many health care needs can be met in patients' own homes, which:
  - Overcomes geographic barriers to access to health services;
  - Allows for more efficient use of human resources for health (which are severely limited in SSA); and
  - Reduces the cost of cover for health services.

- Telemedicine can also help health insurers provide access to new types of health services and allow patients to receive new or additional types of care, enhancing value from insurance products and increasing access to care.

3.1 The relevance of telemedicine for health insurance

Telemedicine is currently used by health insurers in at least three ways:

- **A reimbursed service as part of a broader fee-for-service linked health insurance product**. Existing health insurance offerings, such as medical schemes, can include pay-outs for telemedicine consultations, in the same way that face-to-face consultations are reimbursed and subject to the limits of the health insurance package. One example is the DrConnect telemedicine offering from Discovery, the largest open medical scheme in South Africa. Telemedicine's greatest impact on insurance access is likely to lie within this category of insurance. If existing health insurance products indemnifying medical expenses

can successfully incorporate telemedicine as a cheaper but still high-quality alternative form of consultation, these products could provide a greater focus on preventative care. This is likely to generate down-the-line cost savings through early prevention of chronic illnesses and their related complications, thereby reducing hospitalizations.

- **An add-on to a simple, mass-market offering**. In lower-income markets with no access to indemnity health insurance, business-to-business models have been identified as a successful way to achieve scale. In these models, insurers partner with corporations that have large customer bases and high client trust (for example banks, MNOs and e-hailing services). The aggregator's existing payment mechanisms can be used to collect insurance premiums; for example, in partnerships with MNOs, airtime balance deductions can be used to pay for premiums.[66] Such models increasingly employ telemedicine as an add-on to existing insurance products. For example, MicroInsurance Company, with a client base of

66 Interview with representatives from MicroInsurance Company, Cape Town, 2021.

tens of millions of individuals across SSA, has included access to teleconsultations as part of their basic hospital cash product as a value-add outpatient service.[67] This is intended to differentiate the product from that offered by competitors, but does not provide access to comprehensive health care.

- **An insurance offering designed around a standalone telemedicine model**. Standalone telehealth insurance products, where the insurance is centred on digital consultations, are also available. Telemedicine initiatives such as LaFiya in Nigeria partner with insurers to secure a payment stream for the telemedicine service offering, and the insurer develops cover tailored to the telemedicine offering. Given that telemedicine is still a relatively novel, albeit disruptive, way of delivering care, these types of models are still in their early stages of development, but they do show promise.

Telemedicine can help to decrease cost and increase functionality for existing insurance clients, such as those who have national or social health insurance or those, typically in the formally employed market, who have medical scheme membership or health insurance. It can extend the reach of insurance to new, currently excluded target market segments, notably the lower-income and informally employed population. The appropriate type of telemedicine model depends on the realities of the target market segment. This is explored in greater detail later in the report.

The moonshot estimate (Section 4) specifically emphasizes the additional people who could be served by leveraging telemedicine.

3.2 The value of leveraging telemedicine for health insurance

This section analyses telemedicine's potential to address key barriers to health insurance access in order to assess the potential of telemedicine to transform and scale the provision of insurance to provide meaningful access to health care services.

3.2.1 Barriers to health insurance access

Interplay with telemedicine barriers. Section 2.2.1 outlined the barriers to adoption and growth in the telemedicine market. This section does the same for health insurance. Although telemedicine and health insurance each face distinct barriers, the barriers faced by the two sectors have some overlap.

Both sectors have similar demand-side challenges, in the form of a lack of awareness of and trust in the services offered. Their regulatory challenges are also similar, in that telemedicine and health insurance both straddle health and other sectors: in the case of telemedicine, the health and ICT sectors interact, whereas health insurance involves both the health and financial services sectors. Barriers diverge more in supply-side challenges, which relate to the specific nature of telemedicine and insurance services.

67 Hospital cash plans are a type of insurance product that provide a cash payout in the event of hospitalization.

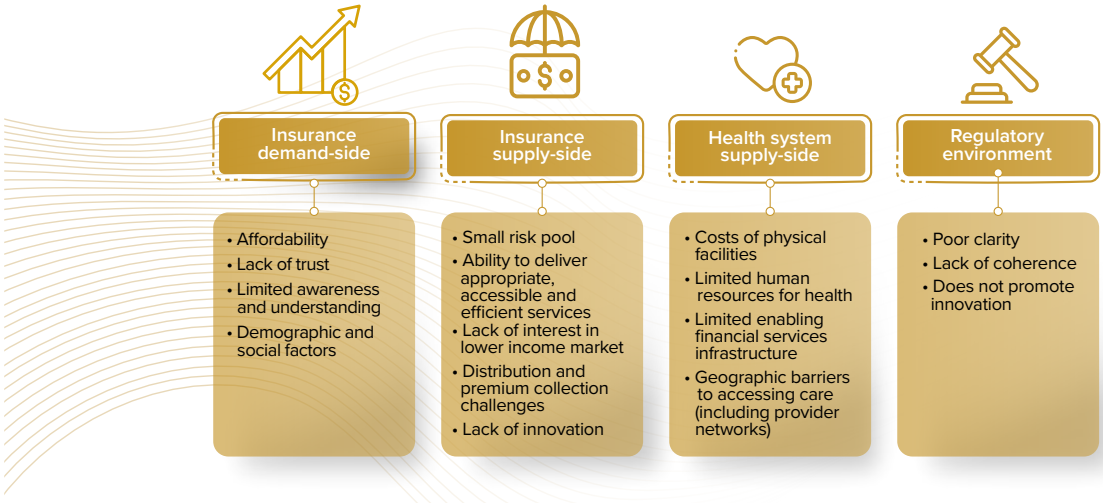
Convergence of insurance and health systems. Health insurance access is determined both by the nature of the insurance system and its specific barriers to expansion and by the nature of health system access. Ultimately, the interaction between specific barriers in the two systems is what shapes the nature of health insurance access.

Figure 3 summarizes key barriers to health insurance in SSA, each of which will be briefly outlined below. These barriers are not common to all countries in SSA, but represent common themes observed in literature, case studies and key informant interviews.

3.2.1.1. Insurance demand-side

Affordability. In SSA, where 40 percent of the population lives below the poverty line,[68] a well-documented barrier to health insurance access is that the cost is prohibitive, especially for informal workers who do not receive a regular income.

Figure 3: Barriers to health insurance access in SSA



3.2.2 How telemedicine can unlock increased health insurance access

Trust and awareness. Formal insurance, particularly private insurance, has low levels of trust among the SSA population. Research shows that most individuals have little belief in the ability and willingness of insurers to pay claims.[69] This can be explained, in part, by a lack of familiarity with formal insurance products in SSA.[70] As a result, demand for insurance, including health insurance, is low in SSA. Lack of trust in insurers also influences people's poor awareness and understanding of health insurance, the type of products available and their benefits.

---

68 M. Schoch and C. Lakner, "The number of poor people continues to rise in Sub-Saharan Africa, despite a slow decline in the poverty rate", *World Bank Blogs*,16 December 2020.

69 L. Signé and C. Johnson. "Africa's Insurance Potential: Trends, Drivers, Opportunities and Strategies", Policy Centre for the New South, 23 November 2020. Available at https://www.policycenter.ma/publications/africa-s-insurance-potential-trends-drivers-opportunities-and-strategies?page=8.

70 Ibid.

Demographic and social factors. Research has shown that insurance uptake varies by gender and age group; men are more likely to have health insurance, and uptake of insurance decreases with age initially until a threshold is crossed and uptake begins to increase with age.[71] Other social factors include education (higher levels of education are associated with higher health insurance uptake) and household size (as household size increases, health insurance uptake decreases).[72]

3.2.2.1 Insurance supply-side

Small risk pools and distribution challenges. Given the low levels of insurance coverage in the region, health insurers in SSA cater to a very small risk pool. A small risk pool makes it difficult for insurers to diversify risk, resulting in high premiums. To increase the size of the risk pool, insurers will need to expand to lower-income markets, especially since most of the population in SSA falls into this income group. However, only limited success in expanding to such markets has so far been achieved, due to the demand-side barriers outlined above, as well as to supply-side factors such as challenges in premium collection and distribution.

Small risk pools also enhance the effects of anti-selection (that is, those who are more likely to require health care are more likely to take out insurance), which increases the overall risk of the risk pool and ultimately increases premiums.

Ability to deliver appropriate, accessible and efficient services. Complexities around taking out and renewing private health insurance act as a barrier to uptake.[73] Additionally, inefficiencies in health insurance services (such as long wait-times to get appointments with designated service providers, delayed payments etc.) also reduce uptake.[74]

3.2.2.2 Health system supply-side

Costly infrastructure and patchy networks. Health insurance relies on the availability and provision of health care services. However, health care facilities are costly to develop and maintain, which drives premiums up. Shortages in human resources for health restrict the number of clients that can be serviced, limit competition and drive prices upward. Provider networks also pose a challenge: health insurers often rely on aggregated health service delivery systems, such as hospital and doctor networks, to onboard health service providers whom they include in their reimbursement network.[75] The wider the network, the better the service coverage, in terms of geography and the variety of health services offered to clients. When doctors, hospitals

---

71 A. Alesane and B.T. Anang, "Uptake of health insurance by the rural poor in Ghana: determinants and implications for policy", *Pan African Medical Journal,* vol. 31 (2018), p. 124.

72 Ibid.

73 E. Nsiah-Boateng, J. Nonvignon, G.C. Aryeetey, P. Salari, F. Tediosi, P. Akweongo and M. Aikins, "Sociodemographic determinants of health insurance enrolment and dropout in urban district of Ghana: a cross-sectional study", *Health Economics Review*, vol. 9.

74 E Nsiah-Boateng and others, "Sociodemographic determinants of health insurance enrolment and dropout in urban district of Ghana".

75 Competition Commission South Africa, *Health Market Inquiry: Final findings and recommendations report. Final Findings and Recommendations Report* (Pretoria, Competition Commission South Africa, 2019). Available at http://www.compcom.co.za/wp-content/uploads/2020/01/Final-Findings-and-recommendations-report-Health-Market-Inquiry.pdf.

and other health service providers are not networked or aggregated, the cost of finding and onboarding new providers is higher, because insurers are forced to approach each provider individually as opposed to one group of providers at a time. A limited provider network may also inconvenience clients and serve as a disincentive to sign up for a health insurance product.

Data system gaps. Finally, lack of digital data systems may also pose a challenge. For claims/reimbursement to be processed efficiently, insurer and provider data and information systems need to be digitized and ideally made interoperable. At the very least, information systems need to be enabled for integration so that utilization, claims and patient data can be shared easily and securely.

3.2.2.3 Regulatory environment

Insurance, and financial services in general, require supporting regulatory environments to operate effectively. Appropriate regulatory oversight and clear regulations are needed.

Specific bottlenecks where jurisdictions overlap. Particularly in new and innovative models of health insurance where partnerships with aggregators such as MNOs are common, challenges arise when regulations are not harmonized across sectors (such as insurance, banking, telecommunications and health). For instance, in the mobile insurance market, airtime deductions account for 63 percent of premiums collected through MNOs. Yet in some jurisdictions, this is prohibited by central bank regulations, as airtime is not considered legal tender for making payment and purchases.[76] In instances like these, regulation may be seen as a barrier to innovation, because it does not support the development of products that rely on partnerships

76 M. Wiedmaier-Pfister and others, *Regulating Mobile Insurance – Insurance Business via Mobile Phones: Regulatory Challenges and Emerging Approaches* (Eschborn, Access to Insurance Initiative, 2018). Available at https://a2ii.org/sites/default/files/reports/2018_05_02_mobile_insurance_regulation_web.pdf

and alternative payment methods.[77] Similarly, where regulation is not consistent across insurers and health maintenance organizations, regulatory grey areas may arise, resulting in an unlevel playing field.[78]

Indirect damper. Even where explicit barriers are not created, regulation may generally just not be conducive to innovation. Legacy licence categories may not allow for new types of players and roles, such as insurtechs[79] and technical service providers, leading to regulatory uncertainty in structuring partnerships. Product approval or licensing processes may be time-consuming or complex to navigate and hence serve as an indirect barrier to innovation.[80]

Where entry barriers or compliance requirements are not proportionate, or where regulation does not explicitly provide for new types of roles, players and technology, the result can be a regulatory framework that, at best, does not proactively promote innovation and, at worst, stifles it. To prevent this situation from arising, regulators should be adaptive and responsive to changing market needs while fulfilling their risk mitigation mandate. This is discussed in more depth in Section 5.1.

Telemedicine is not a panacea and will not address all the barriers to health insurance outlined above. Nevertheless, it does have a role to play in mitigating at least some of the barriers that restrict access to health insurance in SSA, thereby unlocking potential for increased access to health services.

Three main effects. Telemedicine enables health care to be delivered to patients remotely, meaning that many health care needs can be catered to in patients' own homes. This overcomes geographic barriers to access to health services; allows for more efficient use of human resources for health (which are severely limited in SSA); and reduces the cost of cover for health services. The discussion below considers how these three benefits of telemedicine could increase access to health insurance.

3.2.2.4 Increasing geographic reach by leveraging existing physical infrastructure

Removing distance from the equation. Telemedicine increases the geographic reach of health services without the need to expand physical infrastructure: anyone with either an internet connection or a mobile phone can receive care, regardless of their location. In this way, telemedicine approaches can improve the reach of rural health care, increase access to scarce specialists and decongest overloaded facilities. Telemedicine can also overcome the shortage of doctors in remote areas by facilitating task shifting and remote mentoring.[81] By extending access to health services to more of the population, telemedicine can increase the

77 Ibid.

78 Christine Hougaard and others, *The role of insurance for development* (Bellville, Cenfri, 2019).

79 Insurtech refers to technology innovations used in the insurance industry to increase efficiencies, and companies that exist to operationalize these innovations.

80 This was, for example, found in an insurance innovation diagnostic conducted in Uganda. Cenfri, "Opportunities and challenges to innovation in the Ugandan insurance market", 15 June 2021.

81 Wosik and others, "Telehealth Transformation".

size of insurance risk pools, reducing costs and creating a virtuous cycle in which increased affordability allows more people to access insurance, which further increases the size of the risk pool.

Cost and network benefits. Interviews conducted for this study suggest that reducing dependence on physical facilities greatly reduces the cost of providing outpatient services. Creating an online provider network to which health workers in varying locations can sign up to provide telemedicine services may reduce the cost associated with operating in locations with non-network providers, as well as expand providers' networks beyond the geographic locations of their clients.

Indirectly improving quality of physical care. Wider availability of teleconsultations could decongest physical health care facilities, contributing to better quality of care for patients who require an in-person consultation.

3.2.2.5 Overcoming shortages in human resources for health

More patient throughput. By maximizing time-efficiency, since patients and doctors do not have to move around facilities, telemedicine enables health practitioners to fit in more consultations than they could in an in-person model. In this way, telemedicine can help to overcome human resources barriers. Interviews with Healthforce, a South African nurse-led telemedicine provider, showed that on average their doctors were able to see up to 50 percent more patients per day using teleconsultations compared to traditional face-to-face consultations.[82]

More flexible HRH deployment. Telemedicine also means that capacity can be more flexibly deployed across doctors and other cadres of health workers in various locations, without patients in one location being restricted to the specific provider in that location. This is particularly relevant for rural areas, where the HRH shortage is greatest.[83]

Task shifting. Furthermore, telemedicine enables task shifting to lower level or lower skilled health cadres, such as nurses and CHWs, which can help to alleviate the shortage of specialists and higher cadres of health care workers. For example, using their Virtual Care telemedicine platform, Allegra greatly reduced the number of doctor consultations needed, since 80 percent of client problems could be solved telephonically.[84]

Telemedicine has the potential to increase the quality of health services across SSA, by addressing the shortage of human resources for health and decreasing the high burden that severe shortages place on health workers.

---

82 Percept, *Case Notes From the Frontier*.

83 K. Johnston and others, "Training a Fit-For-Purpose Rural Health Workforce for Low- and Middle-Income Countries (LMICs): How Do Drivers and Enablers of Rural Practice Intention Differ Between Learners From LMICs and High Income Countries?" *Frontiers in Public Health*, vol. 8 (2020), pp. 1–11.

84 Percept, *Case Notes From the Frontier*. Allegra is a South African digital technology provider that supports health-care management through backend systems integration.

3.2.2.6 Reducing the cost of health insurance

Lower consultation fees. Teleconsultations are typically reimbursed at a lower rate than standard face-to-face consultations, since providing care remotely creates cost savings by removing the overhead costs associated with physical premises. Task shifting further reduces the cost of human resources for health per consultation. For example, teleconsultations with private general practitioners through Healthforce, a South African nurse-led telemedicine provider, were 50 percent cheaper than in-person consultations on average, since consultations were facilitated by a nurse (see Table 2).[85] By reducing the costs of health service delivery, telemedicine can drive health insurance premiums to a more affordable level for more patients.

Time-efficiency gains. As discussed above, telemedicine allows for health worker capacity to be more efficiently managed. This increased time-efficiency means that providers can see more patients, creating further cost savings. Telemedicine also presents an opportunity for health workers as they can provide teleconsultations at times that are convenient for them. In the United Republic of Tanzania, MicroInsurance Company was able to hire public sector doctors to work part-time on their telemedicine product, SMS-A-Doc, where patients send an SMS, and a doctor calls them back for a consultation. This meant that the company did not have to hire a cadre of full-time health workers to provide the service and the doctors who worked for them were able to supplement their income.

Lower-risk behaviour. Telemedicine can be used to promote behaviour change and preventative care, through coaching services or helplines for clients to access medical advice. Preventing high-risk behaviour and giving clients access to preventative information can reduce the expected risk of ill health and claims, which could decrease premiums.

85 Fowkes and others, "Virtual Health: The next frontier of care delivery".

MomConnect, a South African National Department of Health initiative, is an example of health promotion through telemedicine. It uses mobile phone technology to support maternal and child health by providing important information to pregnant mothers and health workers. Using a free USSD number, mothers can subscribe to a messaging service which provides information on antenatal and newborn care, diet and nutrition, breastfeeding and immunization, and encourages mothers to register their pregnancy at an antenatal clinic.[86] Women using MomConnect were found to be three times more likely to attend the recommended number of antenatal care visits and complete comprehensive care compared to women who were not registered with the programme.[87] The programme was also found to be a cost-effective way of improving antenatal care and raising childhood immunization rates, even though the margins for improvement are small as child immunization rates are already high.[88]

More recently, during the ongoing COVID-19 pandemic, chatbots such as WHO Health Alert have been used to communicate health information, counter misinformation and support self-screening through WhatsApp.[89] Mobile health insurer BIMA provides a useful case study (in Box D below) of how telemedicine and health insurance can be leveraged to expand access to health care.

BOX D BIMA used telemedicine to transform health care and insurance in low- and middle-income countries (LMICs)

BIMA Mobile is a mobile health insurer operating in 15 markets across Africa, Asia, and Latin America.[90] Originating in Ghana in 2010, BIMA started offering its telemedicine service in 2015 via the app BIMA Doctor.[91] The service is provided as a complementary benefit as part of an insurance policy. In this bundle, the policyholder has unlimited access to consultations with qualified doctors 24 hours a day, seven days a week. It offers policyholders hospital insurance should they require hospitalization, and provides access to personal medical records, health programmes and medication support. These services can be accessed through the BIMA Doctor app or by WhatsApp or SMS.[92] Premium payments are made through MTN's Mobile Money wallet, or using an AirtelTigo

86 South Africa, National Department of Health, "MomConnect Technical Solution", 2021.

87 Amnesty LeFevre and others, "Forecasting the value for money of mobile maternal health information messages on improving utilization of maternal and child health services in Gauteng, South Africa: cost-effectiveness analysis", *JMIR mHealth and uHealth,* vol. 6, No. 7 (2018).

88 Ibid.

89 European Investment Bank, *Africa's Digital Solutions to Tackle COVID-19* (Luxembourg, European Investment Bank, 202).

90 BIMA Ghana, "AirtelTigo partners BIMA". Available at https://bima.com.gh/project/news-airteltigo-partners-bim/ (accessed on 16 November 2021).

91 BIMA Ghana, "BIMA wins best mobile innovation for health", 2019. Available at https://bima.com.gh/project/news-mobile-innovation/.

92 Bima Mobile, "Products". Available at https://bimamobile.com/products (accessed on 16 November 2021).

Money wallet.[93] Clients can choose a pay-as-you-go model, paying monthly or in daily instalments, or can choose to buy a 3-, 6- or 12-month pre-paid membership.[94]

How did this telemedicine product improve access to health care?

Around 26 million people across 15 countries are covered by BIMA's insurance services[95] and about 2.2 million people in total currently use the BIMA Doctor app, in Bangladesh, Cambodia, Ghana, Pakistan, and Paraguay.[96]

BIMA's telehealth bundle allows people to receive medical advice immediately, reducing the need for travel to and waiting in medical facilities. This allows policyholders to save on the cost of travelling to medical centres, as well as the opportunity cost of lost work. If a hospital visit is necessary, patients receive discounts when they visit hospitals and laboratories with which BIMA is partnered.[97] At the end of a given year, if a policyholder has not claimed during the year, they receive a cash-back bonus, which can be used to help cover medical costs.[98]

BIMA's telemedicine services have given many people in LMICs access to health care advice and insurance that they could not access in the past.[99] Quality medical advice facilitated by the BIMA Doctor app is likely to have reduced unnecessary visits to hospitals, lowered travelling costs and provided more efficient, better quality care.

How were partnerships leveraged for improved access to health care?

Partnerships have been key to the success of this model. In Ghana, BIMA has partnered with AirtelTigo Money and MTN Mobile Money to facilitate premium payments. More than 60 laboratories and hospitals have partnered with BIMA to provide discounted health care services to policyholders. BIMA's underwriting needs are met by their partner Allianz Insurance.[100]

Globally, BIMA has partnered with many more entities to provide its telehealth and telemedicine services efficiently. These partners include mobile money providers and mobile operators, such as Tigo, AirtelTigo, Smart Communications, Jazz, MTN, Axiata, Apigate, Pi Pay, bKash and Wing. In addition, underwriters such as Allianz Insurance, Prudential, Mo Assurance, Softlogic Life, Resolution Insurance and Fairfirst Insurance provide underwriting services to BIMA.[101]

---

93 BIMA Ghana, "BIMA disrupts the insurance industry". Available at https://bima.com.gh/project/news-example-2-2/ (accessed on 16 November 2021).

94 R. Peverelli and R. de Feniks, "BIMA: reaching the unreachable with micro-insurance", Digital Insurance Agenda, 6 April 2016.

95 BIMA Ghana, "AirterlTigo partners BIMA".

96 BIMA Ghana, "BIMA wins best mobile innovation for health".

97 BIMA Ghana, "BIMA disrupts the insurance industry".

98 Ibid.

99 Ibid.

100 Ibid.

101 BIMA Mobile, "The BIMA Model", 2020. Available at https://bimamobile.com/the-bima-model.

Providers like BIMA that partner with MNOs can tap into the MNO subscriber base, thereby leveraging a large risk pool. Using MNOs' existing mobile wallet offerings helps to overcome some of the challenges of premium collection. Solving the risk pool, distribution and premium collection challenges significantly improves the business case for mass market health insurance.

3.2.2.7 Delivering new types of health services

Telemedicine can help health insurers provide access to new types of health services, or allow patients to engage in new or additional types of care. These new service types or ways of engaging with patients remotely not only afford clients privacy, but also enable them to receive more value from insurance products while increasing access to care.

Providing health services associated with stigma. Telemedicine can help health insurers to provide services that clients may have previously avoided accessing in person, due to the stigma associated with them in specific cultural contexts. These services include mental, reproductive and sexual health services.

Providing preventative care services. Telemedicine can help patients with chronic conditions to prevent disease progression. For instance, it has been successfully used to help diabetic patients manage their illness and maintain blood sugar control, as well as to assist them in navigating the health system. Many patients with chronic conditions struggle to manage their health because of the cost, in terms of time and/or money, of maintaining contact with the health system. Insurers also find it costly to pay for these patients to engage with the system as much as is needed. This often leads to delayed treatment, which then results in poorly managed illness and ultimately even more costly complications. Telemedicine provides a cost-effective way to enable these patients to access timely and, where needed, frequent health care. This translates to savings for health insurers, patients and the health system more broadly.

4. Modelling the moonshot

4. Modelling the moonshot

The moonshot is an estimate of the extent to which access to health care in SSA could be improved through increasing access to health insurance via telemedicine, if certain constraints could be overcome. This section details the methodology in calculating the moonshot estimate and outlines its findings.

Core messages

- The moonshot estimates were produced using three different approaches, each relating to constraints that telemedicine could help overcome:
  - Increasing geographic reach;
  - Overcoming shortages in Human Resources for Health; and
  - Reducing the cost of health insurance.

- The estimates from the three approaches are not mutually exclusive, but rather show the maximum additional population that could gain access to health insurance through leveraging telemedicine when considering each constraint in isolation.

- The moonshot approach that considers insurance cost savings is viewed as the anchor scenario, given that affordability of premiums is a binding constraint.

- **The moonshot estimate indicates that leveraging telemedicine could make health insurance affordable for an additional 186.1 million individuals across SSA (17 percent of the total population and 47 percent of the estimated 400 million individuals who do not currently have access to health care).**

- **In total, the moonshot estimates that 342.7 million individuals could, in principle, have access to insurance based on the affordability threshold assumptions. Providing health insurance to 342.7 million individuals across SSA through leveraging telemedicine would amount to an annual cost of approximately $25.2 billion.**

- The moonshot estimates group countries by level of UHC: high, middle and low-UHC index countries. The absolute gains in low and middle UHC countries are highest. Support to help scale telemedicine, therefore, should first be implemented in these countries.

- Given telemedicine's transformative potential, it should be considered not a superficial add-on or nice-to-have, but rather an integral tool in optimally leveraging scarce financial and human resources to change the health trajectories, and the lives, of some of the most vulnerable individuals in the world.

BOX E Limitations of the moonshot

The moonshot estimates the extent of increased access to health care that can be achieved through leveraging telemedicine to improve access to health insurance, **when various constraints are ignored**. Therefore, the moonshot represents a hypothetical scenario laying out the possibilities of telemedicine under ideal circumstances.

Constraints ignored for the purposes of the moonshot include:

- Gaps in the technological infrastructure required for telemedicine;
- Poor cellular and internet connectivity in rural areas;
- Inhibitive costs associated with mobile technology and mobile data;
- Data privacy and security concerns, including secure data transmission and storage and sharing;
- Ethical considerations related to data and telemedicine provision, including the monetization of patient data; and
- Legal considerations, including licensing and regulation, particularly where cross-border service delivery is possible.

Ignoring these very real constraints naturally creates various limitations for the moonshot. To achieve telemedicine's full potential, stakeholders including market players like insurers and telemedicine providers, public providers of health and insurance services, regulatory bodies and civil society must actively work towards finding and implementing solutions to these constraints.

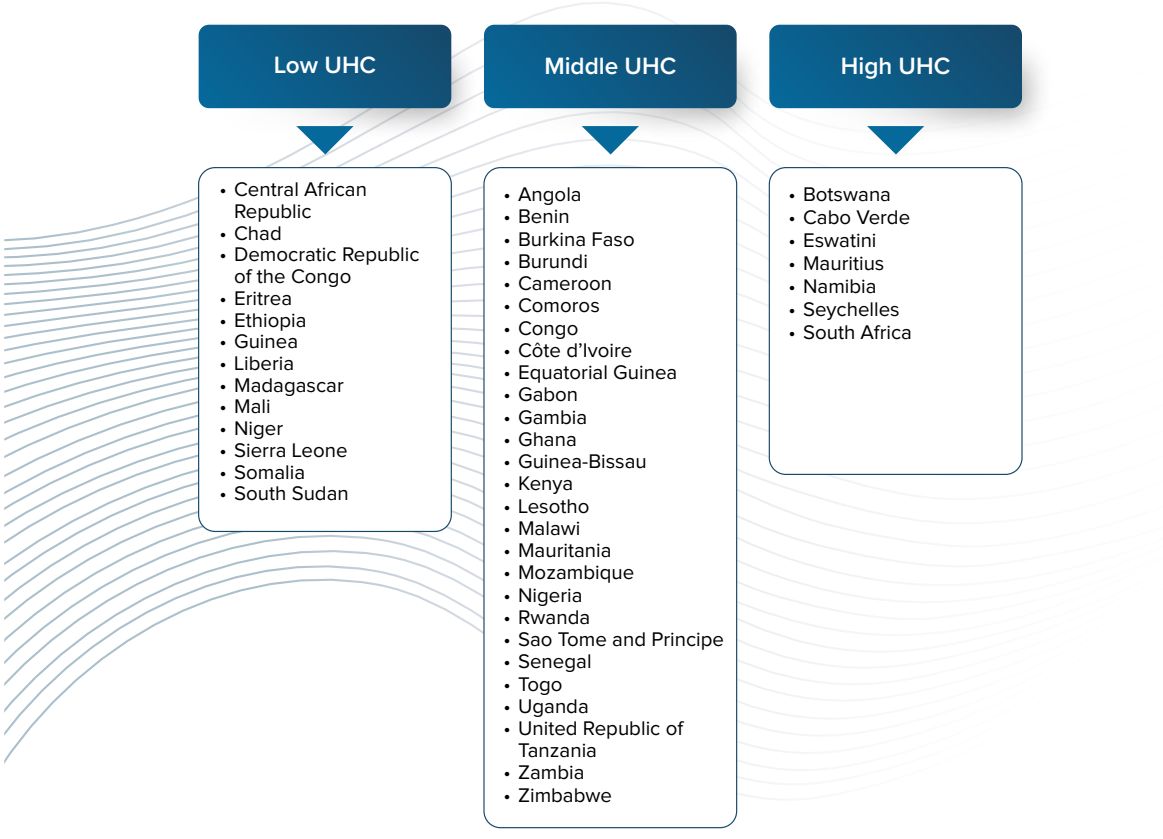
Three country clusters. The moonshot looks at expanding reach in SSA overall by categorizing countries in SSA into three groups (Figure 4), based on the level of UHC in each country. The World Bank UHC service coverage index was used to group countries.[102] This index estimates

102 Coverage index for essential health services (based on tracer interventions that include reproductive, maternal, newborn and child health, infectious diseases, noncommunicable diseases and service capacity and access). It is presented on a scale of 0 to 100. The indicator is an index reported on a unitless scale of 0 to 100, which is computed as the geometric mean of 14 tracer indicators of health service coverage. The tracer indicators are as follows, organized by four components of service coverage: 1) Reproductive, maternal, newborn and child health; 2) Infectious diseases; 3) Noncommunicable diseases; 4) Service capacity and access. The index is computed using geometric means of the tracer indicators. Method of estimation of global and regional aggregates: A population-weighted average of UHC service coverage index values across countries. Relates to SDG Target 3.8: Achieve universal health coverage (UHC) including financial risk protection. See World Bank, UHC Service Coverage Index. Available at https://data.worldbank.org/indicator/SH.UHC.SRVS.CV.XD.

the extent to which UHC has been achieved in each country by combining 14 tracer indicators. The index was used to determine the grouping in the following way:

- Countries with an index score lower than 40 fall into the low-UHC category (28 percent);
- Countries with an index score between 40 and 60 fall into the middle-UHC category (57 percent); and
- Countries with an index score of 60 and above fall into the high-UHC category (15 percent).

Figure 4: SSA countries by UHC group



Source: Based on World Bank, UHC Service Coverage Index.

The sub-sections that follow set out the moonshot estimation for how telemedicine can overcome each of the key barriers to health insurance discussed in Section 3.

4.1 Increasing geographic reach

One of the moonshot's assumptions is that telemedicine can expand the potential reach of health insurance by removing geographic distance from health facilities as a barrier to accessing health care.

> Research has found that 30 percent of the population in SSA is more than 60 minutes' walking distance from a health facility, and 11 percent is more than 60 minutes away using motorized transport.[103]

These metrics are useful estimations to quantify the number of individuals who have poor access to health services owing to geographic barriers. Providing health care services remotely through telemedicine would expand access to health care to an estimated 80 percent of these individuals. [104]

The moonshot estimation assumes that geographic distance from health facilities is a barrier to accessing care for individuals who must travel more than 60 minutes to reach a facility. The population that must travel more than 60 minutes using motorized transport and walking serve as the lower and upper limits, respectively, for the first step of the moonshot estimate. It is then assumed that remote health services through telemedicine can be accessed by the proportion of this population that has access to mobile phones (74 percent), i.e. the population that has **cellular connectivity** (as opposed to internet connectivity).[105] The proportion of individuals who have theoretical access to mobile phones is then adjusted downwards by 10 percent to account for people having lent out their phones (thus temporarily not having access to a phone), not having a charged phone battery at a given point in time, not having a functional phone or not having airtime. This leaves 66 percent of the population with likely functional access to a mobile phone. The upper and lower limits of individuals who do not have access to health services because of geographic barriers are then multiplied by 66 percent to find the upper and lower limit of the population that could gain access to health services through the provision of remote care (made possible through telemedicine).

> Eliminating geographical barriers to health care by leveraging telemedicine could expand access to health services to an estimated additional 87–226 million individuals across SSA (22–57 percent of the estimated 400 million individuals who do not currently have access to health care[106]).

---

103 D.J. Weiss and others, "Global maps of travel time to healthcare facilities".

104 During interviews, Allegra noted that 80 percent of their client problems were resolved through telemedicine consultations.

105 It is assumed that individuals with mobile subscriptions can access telemedicine services. This proportion of the population is estimated by multiplying the number of mobile subscriptions per 100 of the population in SSA (94) by a factor that controls for the majority of the individuals who live greater than 60 minutes from a health facility likely to live in rural areas (since mobile penetration is lower in rural compared to urban areas). This factor is estimated as the average ratio of mobile penetration in rural populations compared to urban populations in seven SSA countries (0.78). Jeremy Gray and others, *Regulating for responsible data innovation: The role of insurance regulators in dealing with risks relating to consumer data protection and privacy* (Eschborn, Access to Insurance Initiative, 2018).

106 WHO, *Tracking Universal Health Coverage: 2017 Global Monitoring Report*.

Figure 5: Increase in population that can access health services in SSA by removing geographic barriers to care through telemedicine

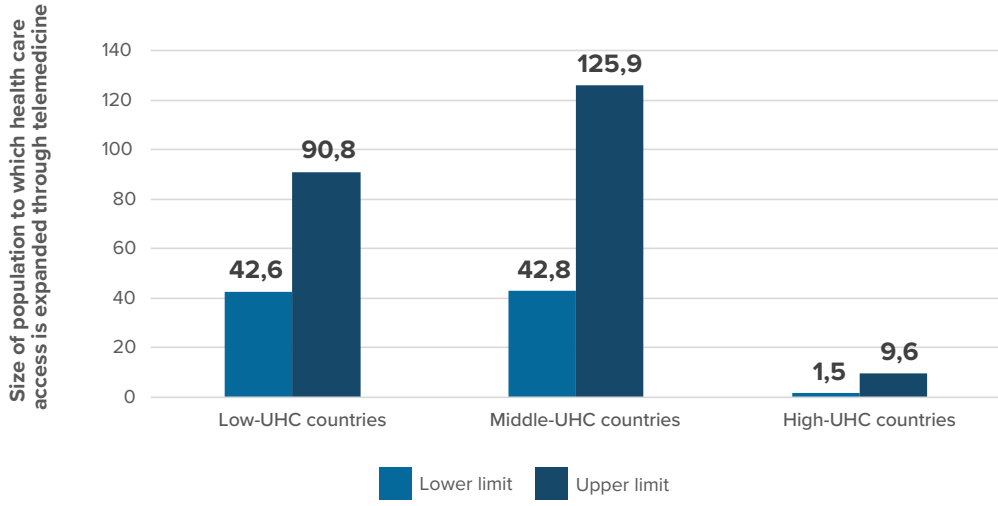
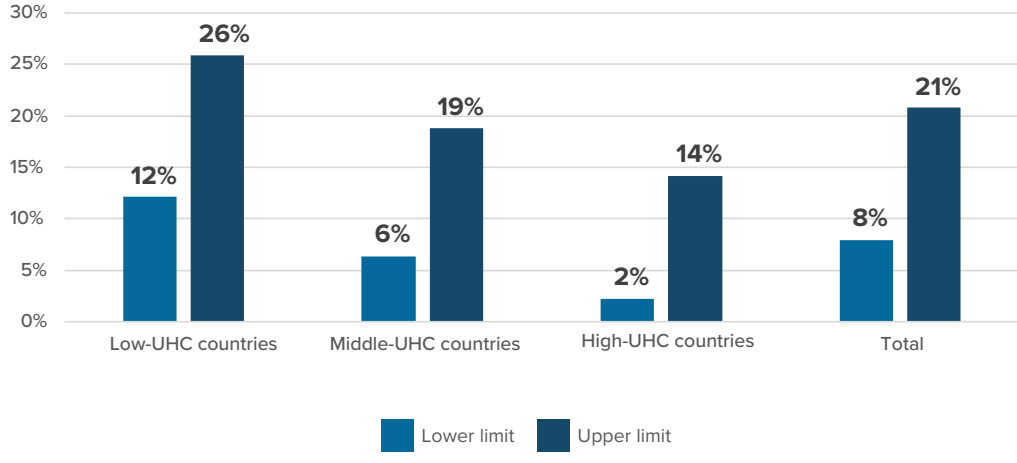


Figure 6: Proportion of population in SSA to which health services access is extended by removing geographic barriers to care through telemedicine



The additional share of the population that could access insurance if geographic barriers were overcome by leveraging telemedicine (Figure 5 and Figure 6) is highest in countries that fall into the low-UHC group (12–26 percent), followed by countries in the middle-UHC group (6–19 percent), and finally, by countries with high-UHC (2–14 percent). However, countries in the middle-UHC group account for the highest absolute number of additional people that could be reached (42.8–125.9 million).

4.2 Overcoming shortages in human resources for health

As discussed, telemedicine can be leveraged to overcome HRH shortages and reduce related costs, which may also translate to lower insurance premiums. To estimate the potential expanded reach of health insurance if these HRH constraints were overcome, the level of health service utilization for SSA is needed. However, this data is not readily available for all SSA countries. So, a health service utilization indicator was constructed to represent the proportion of the population that currently uses health services in the various SSA countries. This was done using eight health service utilization measures:[107]

- Births attended by professional health personnel (%);
- Pregnant women attending all four antenatal visits (%);
- Demand for family planning satisfied – modern and traditional methods (%);
- HIV-positive patients on antiretroviral treatment (ART) (%);
- Effective tuberculosis (TB) treatment coverage (%);
- Diphtheria tetanus toxoid and pertussis (DTP3) immunization coverage (%) in 1-year-olds;
- Population using at least basic drinking water services (%); and
- Population using at least basic sanitation (%).

The health service utilization indicator was constructed by calculating a weighted average of the eight indicators, with each indicator assigned an equal weight. Ten countries had missing data points for at least one indicator. For these cases, imputed data were used based on UHC

107 The indicators used to develop the service utilization indicator are aligned to utilization indicators used in the 2017 WHO *Tracking Universal Health Coverage Report*.

groups.[108] This indicator is not a perfect estimate for utilization. The measures for the indicators were chosen based on the best available data and are used as a proxy for health utilization for the whole population.

The health service utilization indicator was then used to estimate the number of individuals in each country that use health services and are therefore being seen by health care workers (i.e., HRH). The current level of utilization (based on the indicator) is assumed to have the potential to increase by 50 percent (capped at 90 percent)[109] when telemedicine is leveraged, based on the assumption that health care providers can provide care to 50 percent more patients when using telemedicine.[110] That is, it is assumed that if telemedicine is leveraged, health care workers can service higher patient volumes, which will result in higher levels of health service utilization. Table 3 shows the estimated potential increase in access to health services that could be achieved by alleviating HRH shortages.

Alleviating shortages in human resources for health by leveraging telemedicine could expand access to health services to an estimated additional 285 million individuals across SSA (71 percent of the estimated 400 million individuals who do not currently have access to health care[111]).

Table 3: Estimated increase in population with access to health services by alleviating human resource for health shortages through use of telemedicine

UHC Group	Population currently accessing services	Population with access to services by leveraging telemedicine to overcome shortages in HRH	Increase in population with access to health services
Low	172.5 million (49%)	258.7 million (74%)	86.2 million (25%)
Middle	380.7 million (57%)	571.1 million (85%)	190.4 million (28%)
High	52.0 million (77%)	60.6 million (90%)	8.6 million (13%)
Total	**605.2 million (56%)**	**890.4 million (82%)**	**285.2 million (26%)**

The estimated additional share of the population that could access insurance through overcoming HRH shortages by leveraging telemedicine (Table 3) is highest in countries that fall into the middle-UHC group (28 percent), followed by countries in the low-UHC group (25 percent), and finally, countries with high UHC (13 percent). However, countries in the middle-UHC group account for the highest absolute number of additional people that could be reached (190.4 million).

108 For each UHC group, the population-weighted average data point for a particular group was calculated and applied to all countries without a data point in the specific UHC group.

109 Despite increased access and quality, it is assumed that a proportion of the population (10 percent) will still choose not to engage with the health system.

110 Interviews with Healthforce, a South African nurse-led telemedicine provider, showed that on average their doctors were able to see up to 50 percent more patients per day using teleconsultations compared to traditional face-to-face consultations.

111 WHO, *Tracking Universal Health Coverage: 2017 Global Monitoring Report*.

4.3 Decreasing the cost of insurance

SSA experiences high levels of out-of-pocket (OOP) expenditure on health. **OOP expenditure as a percentage of total health care expenditure ranges from 3 percent (in Botswana) to 77 percent (in Nigeria), with an average of 37 percent across the region.**

One quarter of SSA countries have OOP expenditure greater than 50 percent of total health care expenditure. One way in which OOP expenditure could be reduced and the burden of household health care expenditure relieved is through increasing access to affordable health insurance.

The moonshot estimates above demonstrate that telemedicine could successfully expand access to health services to between 125 million and 325 million individuals across SSA. Insurance could be used as a finance stream to unlock this access. However, for insurance to fulfil its full potential, health insurance must be accessible and affordable for the population it serves. As described in Section 3.2.2, telemedicine can lower the cost of health insurance by reducing the cost of providing health services and increasing the risk pool.

In modelling the moonshot, an East African insurer which operates across multiple countries in SSA was consulted, and its three-tiered health insurance offering is used as an indicative standard for affordable health insurance packages.[112] These health insurance packages all include inpatient and outpatient cover, as well as some add-on benefits. Key differences across the packages are highlighted in Table 4.

Table 4: Differences in cover provided as part of standard insurance packages considered in the moonshot

Insurance package	Entry level	Basic	Premium
Cover for pre-existing chronic conditions	No	No	Yes
Free health check-ups on principal member and spouse	No	Yes	Yes
Access to all service providers	No (limited provider network)	Yes	Yes
Personal accident cover	No	Yes	Yes
Critical illness cover	No	Yes	Yes

112 Interview with East African insurer, Cape Town (via video call), 21 September 2021.

The insurer suggested that the use of **a telemedicine solution could reduce the average cost of outpatient claims by 50 percent.** Claims savings of this magnitude **could result in a 15 percent decrease in premiums.**

This calculation assumes that 30 percent of claims costs are outpatient-related,[113] which could be reduced by 50 percent on average through leveraging telemedicine. This would make health insurance affordable for a wider range of individuals. Table 5 demonstrates the potential premium reduction across insurance plans in SSA, using the interviewed insurer's rates as a proxy.

Table 5: Annual premium savings per person owing to telemedicine

Insurance package	Original premium (per person per annum, $)	Reduced premium as a result of telemedicine (per person per annum, $)	Premium savings (per person per annum, $ and %)
Entry level	75	64	11 (15%)
Basic	100	85	15 (15%)
Premium	150	128	23 (15%)

Moreover, evidence has shown that telemedicine can be used effectively for chronic disease management and preventative care (such as screening), both of which reduce the risk of hospitalization over time.[114] Increased access to outpatient services through the use of telemedicine could therefore lead to improved disease management and access to preventative care, which would, in turn, translate into cost savings for insurers, further lowering premium costs down the line. If this were to increase health insurance coverage, it would result in a larger risk pool, allowing for further cost savings (including by reducing the impact of anti-selection). The premium savings in Table 5 are therefore a lower-bound estimate of the reduction in premiums through leveraging telemedicine, implying that the associated moonshot estimate of increased access to health insurance as outlined below is also a lower-bound estimate.

Health insurance affordability is considered by investigating annual premiums as a proportion of annual income. Table 6 calculates the premiums across the three sample insurance packages as a proportion of annual income at WHO poverty thresholds. Insurance is assumed to be affordable if total annual premiums amount to less than or equal to 5 percent of annual income. Numbers shown in green are at or below this affordability threshold, while numbers in red are above this threshold. Table 6 shows that the original entry level insurance package (without telemedicine) is affordable only to individuals who earn more than the $5.50 per day threshold. Reduced premiums as a result of leveraging telemedicine could expand affordability to individuals who earn between $3.20 and $5.50 per day: individuals with income above $5.50 per day could

113 This is based on the ratio of out-of-hospital to in-hospital claims in the 2018/19 National Health Accounts for South Africa. WHO, "NHA Indicators" (2019), available at https://apps.who.int/nha/database/ViewData/Indicators/en.

114 M.A. Hoffer-Hawlik and others, "Leveraging telemedicine for chronic disease management in low- And middle-income countries during Covid-19", *Global Heart*, vol.15, No. 1 (2020), pp. 1–5; M.J. Stotts and others, "Improving cirrhosis care: The potential for telemedicine and mobile health technologies", *World Journal of Gastroenterology*, vol. 25, No. 29 (2019), pp. 3849–3856.

afford entry level and basic insurance packages and individuals with an income above $3.20 per day could afford entry level insurance packages. Insurance would remain unaffordable for individuals with income less than $3.20 per day.

Table 6: Annual premiums as a percentage of annual income at poverty cut-off thresholds

Insurance package	Original premiums			Reduced premiums through leveraging telemedicine		
	$1.90 per day poverty line	**$3.20 per day poverty line**	**$5.50 per day poverty line**	**$1.90 per day poverty line**	**$3.20 per day poverty line**	**$5.50 per day poverty line**
Entry level	11%	6%	**4%**	9%	**5%**	**3%**
Basic	14%	9%	**5%**	12%	7%	**4%**
Premium	22%	13%	7%	18%	11%	6%

To estimate the number of individuals across SSA that could afford reduced-premium health insurance, the number of individuals earning income above the different poverty thresholds was calculated. World Bank data was available for 18 of 47 countries; for countries where no data was available, the figure was imputed based on World Bank income group definitions.[115] In this way, it was estimated that 186.1 million individuals earn between $3.20 and $5.50 per day (and could therefore afford an entry level insurance package if premiums were reduced through telemedicine use), and 156.6 million individuals earn more than $5.50 per day (and could therefore afford a basic insurance package). This means that telemedicine could give access to meaningful health insurance to an additional 186.1 million people.

The additional share of the population that could afford insurance if premiums were reduced through the use of telemedicine (Table 7) is highest in countries that fall into the middle-UHC group (19 percent), followed by countries with high-UHC (17 percent), and finally, countries in the low-UHC group (14 percent). Countries with low-UHC account for the second highest number of additional people that could be reached (48.7 million).

Table 7: Estimated additional reach and cost of health insurance in SSA, by UHC grouping

UHC group	Additional potential reach through premium reductions (population in millions)	Total annual cost of premiums (in billion $)
Low	48.7 (14%)	3.1
Middle	125.9 (19%)	8.0
High	11.5 (17%)	0.7
Total	**186.1 (17%)**	**11.9**

115 For each World Bank income group, the population-weighted average data point was found and applied to all countries without a data point in that income group.

The moonshot estimate indicates that leveraging telemedicine could make health insurance affordable to an additional 186.1 million individuals across SSA (17 percent of the total population and 47 percent of the estimated 400 million individuals who do not currently have access to health care.[116]) In total, 342.7 million individuals would have in-principle access to insurance based on affordability threshold assumptions.

Table 8 shows the potential reach and estimated total costs of expanding access to insurance to these populations across SSA.

Table 8: Estimated potential coverage and cost of health insurance in SSA

Insurance package type	Total potential reach (population in millions)	Total annual cost of premiums (in billion $)
Entry level	186.1	11.9
Basic	156.6	13.3
Total	**342.7**	**25.2**

Providing health insurance to 342.7 million individuals across SSA through leveraging telemedicine would cost approximately $25.2 billion per year.

4.4 Interpreting the moonshot

This section outlines and interprets the main findings of the moonshot estimate and highlights the value of telemedicine in expanding access to health care in SSA.

Significant scale across moonshot scenarios. In Section 4, the moonshot estimate is considered using three different approaches, with each approach relating to one of the constraints that telemedicine could help overcome: overcoming geographic reach constraints and helping to better leverage existing health care facilities; better use of existing HRH; and cost reductions in health insurance. The three approaches' estimations are not mutually exclusive but rather show the maximum additional population that could gain access to health insurance through leveraging telemedicine when each constraint is considered in isolation. The three approaches all show similar scope of increased access to health insurance, regardless of the barrier that telemedicine addresses. The view across the three approaches shows that, should the full potential of telemedicine be unlocked, as many as 285 million more people could have access to health insurance (71 percent of the estimated 400 million individuals who do not currently have access to health care[117]), and therefore to health care more broadly.

116 WHO, *Tracking Universal Health Coverage: 2017 Global Monitoring Report.*
117 Ibid.

Cost approach moonshot as anchor scenario. A relaxation of the limits of distance and physical facility constraints, as well as HRH constraints, should ultimately result in cost reductions. Since health care risks are best managed in a pooled way, loosening distance and HRH constraints could result in health insurance cost savings. Moreover, premium affordability would be a binding constraint, even should the distance and HRH barriers be removed. The moonshot approach that considers insurance cost savings is therefore viewed as the anchor scenario.

Filling a large chunk of the gap in the most vulnerable countries. Estimates show that it is not unreasonable to conclude that telemedicine could help 186 million more people in SSA to afford a basic or entry level health insurance product that would provide both inpatient and outpatient cover, especially if greater outpatient care availability generates later hospitalization savings, and therefore greater insurance savings overall. The World Bank/WHO estimates that 400 million people in SSA do not have UHC.[118] **If telemedicine could provide access to appropriate quality health care for 186 million people through insurance, it could potentially radically alter the lives and later life outcomes of close to half (47 percent) of those who do not currently have access to UHC.**

The moonshot estimates were developed for three different groups of countries: high-UHC index countries, middle-UHC index countries and low-UHC index countries. The absolute gains in low and middle-UHC countries are highest. Even using the low-bound scenario, close to 49 million more individuals in low-UHC index countries and 126 million more individuals in middle-UHC index countries could be given cover. Support to help scale telemedicine, therefore, should first be implemented in these countries.

Integral role. Given telemedicine's transformative potential, it should be considered not only a superficial add-on or nice-to-have, but rather an integral tool in optimally leveraging scarce financial and human resources to change the health trajectories, and even the lives, of some of the most vulnerable individuals in the world. The COVID-19 pandemic has shown that telemedicine can improve health service provision while keeping patients out of health facilities, thus reducing the burden on hospitals and protecting vulnerable patients and health workers.[119] Scaling health care delivery through telemedicine to the degree envisaged in the cost scenario moonshot could unlock further long-term benefits, bringing even more people into the health insurance and the formal health care sectors. Through early preventative care, the pressure on hospitals could ease, generating even greater cost savings.

118 Ibid.

119 E Monaghesh and A Hajizadeh, "The role of telehealth during COVID-19 outbreak: A systematic review based on current evidence", BMC Public Health, vol. 20, No. 1 (2020), pp. 1–9.

5. What needs to be in place to leverage telemedicine to expand access to health insurance?

5. What needs to be in place to leverage telemedicine to expand access to health insurance?

Making the moonshot a reality requires telemedicine to be adopted in a sustainable and scalable way. To do this, the core challenges to telemedicine as discussed in Section 2.2.1 must be overcome. This section outlines five key telemedicine enablers.

Core messages

- A regulatory environment conducive to supporting innovative health insurance models to fully leverage the potential of telemedicine requires:
  - Protection of data rights;
  - Risk-based regulation for telemedicine;
  - Coordination and alignment across relevant sectors; and
  - Promotion of responsible innovation.

- Communicating the value of insurance and telemedicine to users and providers is central to achieving scalable solutions.

- Wide-scale adoption of telemedicine will require effective aggregators and partnerships, including public-private partnerships and potential subsidies.

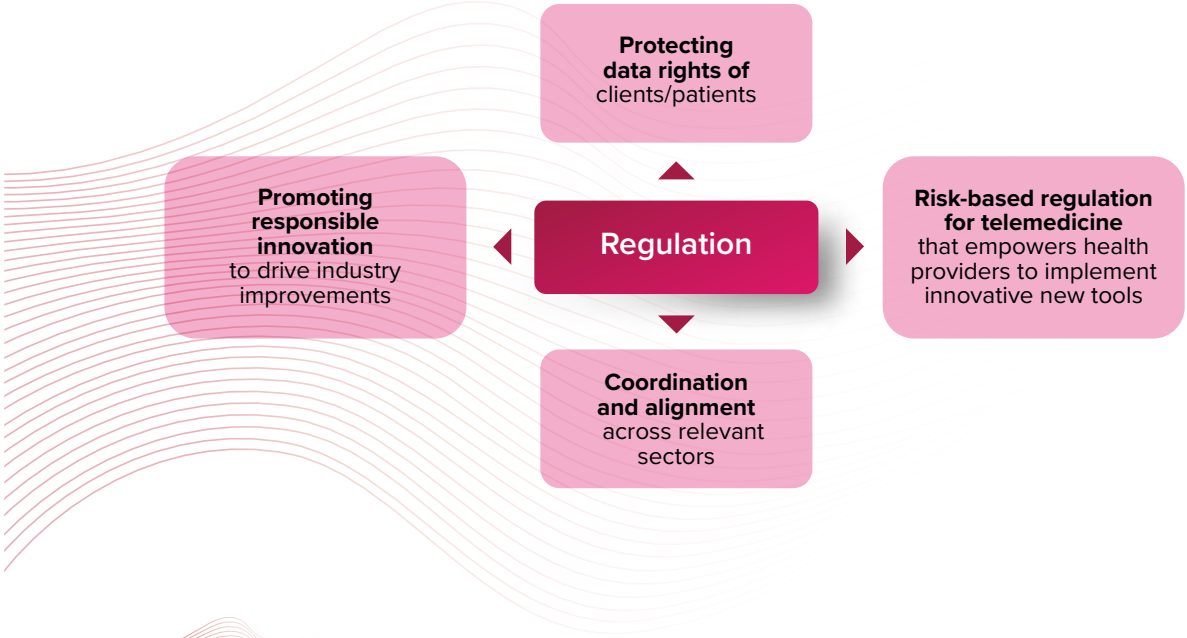
- Although health insurance solutions that leverage telemedicine may require complex partnership arrangements, the solutions themselves should be kept simple, taking into consideration the needs of users and keeping local context in mind.

- The types of telemedicine services used to support effective access to health care via insurance mechanisms will require tailoring for different client groups. Understanding which telemedicine-insurance-pairings are best suited to which client groups will be important in making the moonshot feasible.

5.1 Enabling regulatory environment

Innovative health insurance models that can fully leverage the potential of telemedicine to expand reach and reduce the cost of health insurance require a conducive regulatory environment, both in the health and insurance sectors. Figure 7 illustrates the components of an enabling regulatory environment in the nexus of insurance and health.

Figure 7: Components of enabling regulatory environment



Protecting data rights. Regulation needs to protect the rights of the clients or users of both the health insurers and TSPs. Given that telemedicine often leverages digital technologies, regulation must be in place to protect user data so that sensitive medical or financial information is not compromised. This can be an issue when telemedicine services are provided using video or messaging applications (such as Zoom or WhatsApp) that are not specifically designed for telemedicine services. Where applicable, TSPs interviewed for this study explained that their platforms are compliant with POPIA[120] (South African law) and HIPAA[121] (US law) to ensure that user data, such as diagnostic images and prescriptions, are transmitted and stored safely. However, most countries in SSA do not yet have a foundational data protection framework in place. Developing such a framework, and implementing it in a way that will not distort the market, is a long-term undertaking that requires substantial work (and technical assistance) at central government level. In creating such frameworks, it is important that African countries do not copy existing legal frameworks but create frameworks appropriate for their contexts in a way that balances user data protection and the need for innovation.[122]

Risk-based regulation for telemedicine vs. in-person consultations. Since telemedicine regulation does not exist in many African countries, regulations or guidelines are needed to outline the scope of practice. Although telemedicine presents an opportunity to extend access to health care to those who were previously hard to reach, it is not a replacement for in-person consultations, but rather only one part of the continuum of care. Therefore, guidelines should be clear on what telemedicine may cover and on the types of patients or health conditions that should require referrals for in-person consultations.[123] This would create a clearly demarcated space within which telemedicine innovation could take place and would adhere to the principles of delivering health care in a functional, risk-based way – meaning that telemedicine services should be regulated based on the potential risk to patients. For instance, non-curative interventions which assist with navigating the health system need not be regulated as heavily as telemedicine services which aim to provide diagnostic or curative care.

Coordination and alignment. Insurance and telemedicine services straddle a number of different sectors and regulators, particularly when partnerships with MNOs are involved. Health insurance in African countries is often overseen by the financial sector regulator while the health system regulator(s) governs telemedicine and the telecommunications ministry governs MNOs. Regulatory coordination is needed to ensure that the regulatory environment enables business models that can operate effectively across multiple sectors.

Promoting responsible innovation. Lastly, regulation needs to support innovation. Regulation should be drafted in consultation with service providers so that regulators understand how new or existing legislation may impact the industry. Several regulators globally have started to

120 POPIA stands for the Protection of Personal Information Act: the South African data protection and privacy legislation that regulates how businesses can collect and process data.

121 HIPAA stands for the Health Insurance Portability and Accountability Act: a United States federal law which requires the development of standards that protect sensitive patient data from being made public without the patient's prior consent.

122 Gray and others, "Regulating for responsible data innovation".

123 For example, providers such as Healthforce (see description in Table 2) do not examine children below the age of two, recognizing that children have special health needs and need to be seen in-person by children-specific doctors.

experiment with regulatory sandboxes, which create the space for new ideas to be tested in the market within specified parameters, without being required to meet full regulatory compliance requirements. Regulatory sandboxes have been used extensively in financial services, and the approach has been applied to telemedicine innovations with success in Singapore.[124] However, research has shown the need to look beyond the sandbox to a broader approach to facilitating innovation that is based on the principles of *proportionality* and *test-and-learn*.[125] Alongside regulatory change, this kind of approach incorporates in the regulator's toolbox supervisory tools, such as streamlining approval processes, as well as proactive communication with both current and potential market players. Guidance by the International Association of Insurance Supervisors (IAIS), the international standard-setting body for insurance, confirms the need for a proportionate and risk-based approach when dealing with the role of technology in inclusive insurance.[126]

5.2 Communicating the value of insurance and telemedicine to users

The maxim that "Insurance is sold, not bought" holds true for telemedicine too. In the same way that the value of insurance must be communicated to clients, the value of telemedicine needs to be communicated to its users. Users, in this context, include both patients and health workers.

Establishing the value proposition for health workers is crucial. Health workers need to see the value in offering telemedicine services, and the service must fit seamlessly into their workflow. For this to happen, a continuous onboarding process and active support for health workers is needed to encourage and maintain utilization. For instance, when South African TSP Stone Three partnered with Intercare, a South African hospital group, to deliver telemedicine services to private general practitioner practices, they cited their deliberate onboarding of doctors and the seamless integration of their platform into the doctors' workflow as the reason for the successful adoption of the telemedicine service.[127] Intercare created a designated technical support team tasked with familiarizing doctors with the platform, encouraging behaviour change and providing real-time technical support to both doctors and patients where needed. This ensured that doctor and patient user experience was positive, which in turn encouraged initial uptake and continued usage of the service.

Figure 8 below illustrates how uptake of Stone Three/Intercare telemedicine services increased between April and July 2020. This coincided with the most stringent lockdown period in South Africa, which made clear the value proposition for using telemedicine services for both doctors and their patients. In addition to this, increasing numbers of doctors in the Intercare network took up telemedicine services due to Intercare's deliberate onboarding and support strategy. As lockdown restrictions in South Africa eased, patients and clinicians began to revert to in-person

---

124 Percept, *The nurse can see you now*.

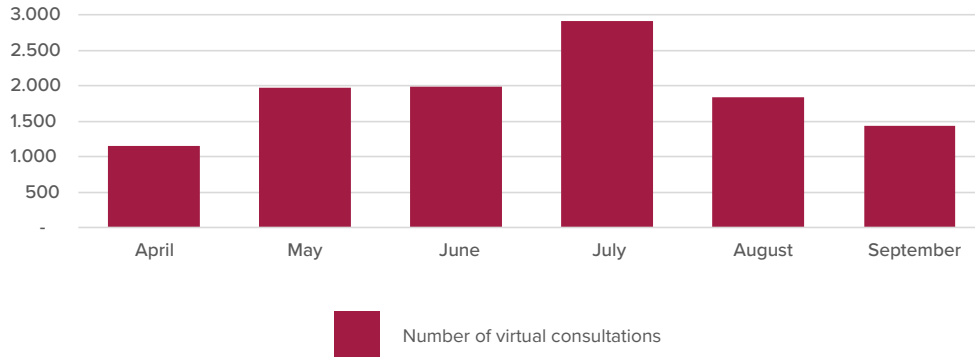
125 Cenfri, Regulating for Innovation: An Evolving Framework (Bellville, Cenfri, 2019) Available at **https://cenfri.org/wp-content/uploads/Regulating-for-innovation-framework-focus-note-2019.pdf**; Jeremy Gray and others, "Regulating for innovation: A supervisory toolkit" (Bellville, Cenfri, 2021); World Bank, *Global Experiences from Regulatory Sandboxes* (Washington D.C., World Bank, 2020).

126 International Association of Insurance Supervisors, *Application Paper on the Use of Digital Technology in Inclusive Insurance* (Basel, International Association of Insurance Supervisors, 2018).

127 Percept, *Case Notes from the Frontier*.

consultations, but although teleconsultations declined as lockdown eased, on average 10–15 percent of consultations continued to be conducted virtually. By the end of October 2020, only 10 percent of Intercare doctors were not registered for telemedicine consultations and over 12,000 consultations had been conducted virtually. This highlights the effectiveness of communicating the value of telemedicine to health care workers and deliberately getting buy-in for the platform.

Figure 8: Virtual consultations conducted by Intercare doctors from April to September 2020



Source: Percept, *Case Notes from the Frontier*

Targeted communication campaign. Familiarity with and adoption of telemedicine is needed among the general population as well as among health care workers. To achieve this, targeted communication campaigns should be carried out using established and impactful mass market channels, such as social media. Advertising in, for example, the waiting areas of health facilities would help communicate the convenience of telemedicine. Where TSPs partner with MNOs, bulk SMS marketing could be leveraged. Health care networks such as clinics, as well as insurance distribution channels such as agents and MNOs, could also play a core role in educating patients about telemedicine and assisting them in accessing it. Telemedicine advocacy is typically done as part of individual market players' marketing efforts, but there could also be a role for a broader, industry-wide campaign facilitated by an industry association and/or supported by public health sector authorities and the development or donor community.

5.3 Effective aggregators and partnerships

Reliance on aggregators. TSPs often rely on volume-based licensing arrangements with their clients, which are usually hospital groups or doctor networks rather than end users. Volume-based arrangements may relate to the volume of health workers with access to the teleconsultation platform (where users pay for a set number of health workers to use the service) or to the volume of teleconsultations conducted (where TSPs receive a percentage of the consultation fee for each consultation using their platform). Therefore, like insurers, TSPs often rely on aggregators to sign up clients.

Currently, the most common aggregators leveraged by TSPs in SSA are insurers and MNOs. Insurers already have access to networks of doctors and may act both as aggregators of

potential patients (end users) and as mass distributors of telemedicine as an add-on benefit paid for by insurance cover. MNOs have a large pool of mobile phone users who are potential patients. Partnerships between TSPs and hospital groups and doctor networks do exist but are rarer. Either way, partnerships are crucial to getting this business model right, and it is essential that all parties involved share an understanding of the end user of these services.

Funding partners. The moonshot outlined in Section 4 shows that telemedicine could make health insurance affordable to an additional 186 million people. To extend this reach even further, donors and governments may need to step in to subsidize these health insurance policies. The case study on how telemedicine was leveraged in Ghana (see Box C) illustrates the potential opportunity. Government, universities and private sector technology and pharmaceutical companies worked together to develop, scale and sustain the initiative. Successful partnerships across sectors were crucial to extending quality health care to rural Ghanaian communities.

Public-private partnerships (PPPs). Access to basic health care is a right in most countries and a healthy and productive population is a public good. Therefore, the public sector has an important role to play in the funding and provision of basic health services. As described further in Section 5.5, it may not be feasible or appropriate for the private sector to service the whole population in most SSA countries. However, with the right mix of partnerships and aggregators, private health insurance providers can increase their reach beyond the small, higher-income market that they currently tend to service. Private insurers may also be able to partner with the public sector in different aspects of the value chain, for instance underwriting, providing telemedicine technology solutions, insurance marketing and distribution, among others.

Potential for subsidies. Even with the enhanced affordability brought by telemedicine, annual premiums of $25.2 billion are needed to make this potential a reality. To help overcome further affordability and adoption barriers, the public sector or donors could step in, in partnership with aggregators, to help subsidize health insurance access. The ask for such a subsidy would be very low compared with the total estimated cost of ill health on the continent, which the WHO estimated to be $2.4 trillion in 2019.[128]

5.4 Simple solutions

Telemedicine health insurance solutions require complex partnership arrangements, but the solutions themselves should be kept simple, taking account of user needs and local context (see section 5.5 below). Interviewees for this study confirmed that simple solutions worked best; for example, Britam and MicroInsurance Company have found that simple hospital cash plans have been most successful in meeting clients' needs for income replacement due to hospitalization. Britam report that, although their more complex insurance products account for a higher percentage of premiums, their simpler hospital cash products account for a larger percentage

128 WHO, "Diseases cost the African Region $2.4 trillion a year, says WHO", WHO Africa, 27 March 2019. Available at https://www.afro.who.int/news/diseases-cost-african-region-24-trillion-year-says-who.

of their clients. Other considerations driving simplicity include infrastructure limitations and the levels of technological adoption by clients in markets of interest.

5.5 Differentiated approaches for different client groups

The types of telemedicine services used to support access to health care via insurance mechanisms will need to be tailored to different client groups. Understanding which telemedicine-insurance pairings are best suited to which client groups will be important in making the moonshot feasible. To do this, detailed data will be needed, together with a nuanced understanding of the various client groups at a country level.[129] While client groups will differ across countries, four main potential insurance client groups are described below.

- **Top-end segment**. The smallest and potentially least risky pool for health insurers is made up of formally employed individuals who receive regular incomes and have access to formal, traditional health insurance products. These people are also most likely to seek health care at private health facilities with private health practitioners. In most SSA markets, this segment is likely to comprise no more than 15 percent of the labour force.[130]

- **National/social insurance clients.** The second group refers to the population targeted by publicly administered national health insurance funds. This group also includes those who are unemployed but active in the informal economy or employed in the informal sector,

129 Such an exercise was not possible using the continent-wide data that formed the basis of the moonshot estimate, but it will be important to guide the telemedicine implementation efforts needed at a country level to help make the moonshot a reality. This analysis was limited by the lack of available granular, country-specific health access, income, financial access, and mobile penetration data.

130 International Labour Organization, *Report on Employment in Africa (Re-Africa): Tackling the Youth Employment Challenge* (Geneva, ILO, 2020). Available at https://www.ilo.org/wcmsp5/groups/public/---africa/---ro-abidjan/documents/publication/wcms_753300.pdf.

who do not receive regular income and may not be able to afford private health insurance. Individuals served by public health insurance schemes are often provided access to health care by a combination of public and private providers. Few countries in SSA have national health insurance schemes covering the whole population, with Rwanda and Ghana being two examples. Ghana and Rwanda have established national health insurance schemes aimed at covering the whole population, but Ghana's scheme has only partial population coverage. Kenya's National Hospital Insurance Scheme covers the formally employed, as do Nigeria's National Health Insurance Scheme and the United Republic of Tanzania's Social Health Insurance Benefit .[131] In practice, therefore, there is often an overlap between the top-end segment and national insurance clients.

- **Community-based insurance scheme members**. The third category represents individuals covered by community-based health insurance schemes, which are common in West Africa and are also found in Ethiopia, Rwanda and the United Republic of Tanzania, among others.[132]

- **Frontier clients.** The final category is termed "frontier" clients, because they represent the population currently unserved by either national health insurance or private insurance, which are the frontier for insurance market expansion. This category is mainly comprised of those who are informally employed or self-employed and hence do not have access to insurance as an employee benefit – in most SSA markets, the bulk of the adult population. Many do not receive a regular income, or their income may not be high enough to afford private health insurance. They would normally be served in public health facilities but may also be able to consult with private practitioners if they were more affordable and may be interested in an offering that provides them with some protection against the direct and indirect financial implications of hospitalization.

The most appropriate type of telemedicine model will depend on the realities of the target market segment. For example, for the top-end segment, telemedicine could be leveraged for fee-for-service-linked health insurance, and the cost reductions associated with telemedicine could enable this type of insurance to reach further into the frontier segment. However, for lower-income groups, insurance premiums for fee-for-service health care may still be unaffordable; for these groups, a simple add-on mass market telemedicine offering may be the only viable model. In all instances, new ways to reach clients will be needed, with an emphasis on aggregators through which insurance can be distributed. This, in turn, will require effective partnerships. National/social or community-based health insurance schemes could be a ready-to-go aggregator or channel to which telemedicine could be added. In these cases, the successful deployment of telemedicine will require buy-in from public authorities (for national insurance) and/or donors (for example, those supporting community-based schemes).

---

131 A. Dutta and C. Hongoro, *Scaling up National Health Insurance in Nigeria: Learning from Case Studies of India, Colombia, and Thailand* (Washington, D.C., Futures Group, Health Policy Project, 2013). Available at **https://www.healthpolicyproject.com/pubs/96_NigeriaInsuranceFinal.pdf**; Health Policy Project, *Health Financing Profile: Tanzania* (Washington, D.C., Futures Group, Health Policy Project, 2016). Available at **https://www.healthpolicyproject.com/pubs/7887/Tanzania_HFP.pdf**.

132 A. Shimeles, *Community based health insurance schemes in Africa : The case of Rwanda*, Working Papers Series, No. 120 (Tunis, African Development Bank, 2010).

6. Conclusion and recommendations

This study examines the interplay between telemedicine and health insurance in order to ask: What if the use of ICT to facilitate remote delivery of health services could dramatically alter the landscape of health service delivery in SSA and, by so doing, reshape the parameters and cost for health insurance? How could that help to radically extend access to UHC in the region?

The moonshot estimate shows that, by making entry level comprehensive health insurance more affordable, telemedicine could extend care to **more than 186 million people in SSA (47 percent of those who do not currently have access to health care)**, creating direct sustainable development benefit. If affordability considerations were not an issue, that number could increase to **over 285 million (71 percent of those who do not currently have access to health care)** by reducing distance and human resource barriers.

The moonshot estimate may not be immediately achievable, but it does show that the potential for scale is real. This is an opportunity that cannot be ignored. But to make it happen, more is needed to overcome the regulatory, adoption and supply-side barriers to telemedicine. Development organization, such as UNDP, have an important role to play in facilitating dialogue

among stakeholders, backing pilot schemes, brokering partnerships and helping to build the enabling environment necessary to unlock the moonshot potential.

Based on the findings of the moonshot and the key enablers of telemedicine discussed in the previous sections, the following recommendations summarize what needs to be done to turn the moonshot into a reality:

Create context-specific solutions. The moonshot approximates the impact of leveraging telemedicine to expand the reach of health insurance, and thus health care access, across SSA. However, each country is unique and no one solution will work in every context. Therefore, each country's needs, culture, level of technological adoption, HRH resources, health financing regimes, infrastructure and context must be taken into account in determining which solutions will work best.

Understand the target market. Even within each country context, different sub-populations will require different telemedicine and health insurance solutions. Products that meet the needs of different market segments need to be designed. To understand each market context and target market, better data must be collected and studied.

Foster strong partnerships. This report's case studies on the use of telemedicine provide useful illustrations of the key role of partnerships in making appropriate business models work. Partnerships should not be limited to the private sector, but must extend to the public sector and donors as well.

Actively onboard of health workers and patients. The value of telemedicine needs to be clearly communicated to all users of the service: both to health workers and to patients. For health workers to see the value of telemedicine, the technology needs to seamlessly fit into their workflow and not increase their workload. Health workers also need to be adequately reimbursed so they have an incentive to provide the service. Targeted marketing campaigns are needed to create user awareness of the benefits of telemedicine.

Keep things simple. In SSA, where insurance penetration is low and telemedicine is not yet embedded in health system design, product simplicity will be crucial for successful roll-out at scale. Simplicity in product design will also keep costs down so that access can be increased at a large scale.

Consider the risks. Telemedicine presents a new way for most clinicians and patients to engage with health care. In the design of these services, telemedicine needs to be integrated into existing health worker workflow in a way which does not increase the burden on overstretched workers. In the same way, patient data privacy and confidentiality need to be protected and pragmatically accounted for in how telemedicine is regulated.

Regulate for innovation. Since telemedicine in SSA is relatively new, regulators need to consider a collaborative, test-and-learn approach to regulating for innovation, incorporating market engagement tools alongside regulatory and supervisory tools. Given the nature of the

partnerships involved, both between sectors and potentially across jurisdictions, regulatory harmonization and intersectoral regulatory collaboration will be needed to create an enabling ecosystem for innovation.

Conduct further research and investigation. While the moonshot acts as a foundational demonstration of the potential value of telemedicine, it does not comprehensively address all aspects of the proposition. Future research could help to better understand the potential impact of telemedicine, to optimize the ways in which telemedicine is used, to explore which technologies are most appropriate to deliver telemedicine (for example, open-source or proprietary software) and under what conditions, and to ensure and measure quality of care where telemedicine is the mode of delivery. There is also scope for future research on solutions to expand access to those who are not reached through telemedicine and health insurance (owing to affordability, access to technology etc.).

Document success stories. Learnings from the implementation of telemedicine services across the globe should be used to guide health insurance product development in a way that most efficiently leverages the various benefits of telemedicine. Documentation of successful telemedicine innovations could also serve as case studies to guide regulation in this new field.

Act now. To realize the moonshot's vision, development organizations, civil society partners and governments need to focus on telemedicine as a strategic enabler for health care delivery and, ultimately, better health for the most marginalized populations in SSA.

References

Aikins, M., P.T.N. Tabong, P. Salari, F. Tediosi, F.M. Asenso-Boad and P. Akweongo (2021). Positioning the National Health Insurance for financial sustainability and Universal Health Coverage in Ghana: A qualitative study among key stakeholders. *PLOS ONE*, vol. 16, No. 6. DOI:10.1371/JOURNAL.PONE.0253109.

Alesane, A. and B.T. Anang (2018). Uptake of health insurance by the rural poor in Ghana: determinants and implications for policy. *Pan African Medical Journal*, vol. 31, p. 124. DOI:10.11604/pamj.2018.31.124.16265.

Barasa, E., J. Kazungu, P. Nguhiu and N. Ravishankar (2021). Examining the level and inequality in health insurance coverage in 36 sub-Saharan African countries. *BMJ Global Health*, vol. 6, No. 4. DOI:10.1136/BMJGH-2020-004712.

Bashshur, R., C.R. Doarn, J.M. Frenk, J.C. Kvedar and J.O. Woolliscroft (2020). Telemedicine and the COVID-19 pandemic, lessons for the future. *Telemedicine and e-Health*, vol. 26, No. 5, pp. 571–573. DOI:10.1089/tmj.2020.29040.rb.

Bestsennyy, O., G. Gilbert, A. Harris and J. Rost (2021). Telehealth: A quarter-trillion-dollar post-COVID-19 reality? McKinsey & Company, 9 July. Available at **https://www.mckinsey.com/industries/healthcare-systems-and-services/our-insights/telehealth-a-quarter-trillion-dollar-post-covid-19-reality**. Accessed on 9 March 2022.

BIMA Ghana. AirtelTigo partners BIMA. Available at https://bima.com.gh/project/news-airteltigo-partners-bim/. Accessed on 16 November 2021.

_____. BIMA disrupts the insurance industry. Available at **https://bima.com.gh/project/news-example-2-2/**. Accessed on 16 November 2021.

_____ (2019). BIMA wins best mobile innovation for health. Available at **https://bima.com.gh/project/news-mobile-innovation/**. Accessed on 16 November 2021.

BIMA Mobile. Products. Available at https://bimamobile.com/products. Accessed on 16 November 2021.

_____ (2020). The BIMA Model. Available at **https://bimamobile.com/the-bima-model**. Accessed on 16 November 2021.

Blankenship, M. and C. Golubski (2021). Figure of the week: Increasing access to electricity in sub-Saharan Africa. Brookings, 18 June. Available at **https://www.brookings.edu/blog/africa-in-focus/2021/06/18/figure-of-the-week-increasing-access-to-electricity-in-sub-saharan-africa/**. Accessed on 11 March 2022.

Bonitas (2021). Bonitas App. Available at **https://www.bonitas.co.za/mobile-app**. Accessed on 27 October 2021.

Causey K., N. Fullman, R.J.D. Sorensen and others (2021). Estimating global and regional disruptions to routine childhood vaccine coverage during the COVID-19 pandemic in 2020: a modelling study. *The Lancet*, vol. 398, No. 10299, pp. 522–534. DOI:10.1016/S0140-6736(21)01337-4/ATTACHMENT/E2A80C09-5727-4E6E-864E-1D8F7F0DDD15/MMC1.PDF.

Cenfri (2019). *Regulating for Innovation: An Evolving Framework*. Bellville: Cenfri. Available at **https://cenfri.org/wp-content/uploads/Regulating-for-innovation-framework-focus-note-2019.pdf**. Accessed on 9 March 2022.

_____ (2021). Opportunities and challenges to innovation in the Ugandan insurance market. 15 June. Available at **https://cenfri.org/articles/opportunities-and-challenges-to-innovation-in-the-ugandan-insurance-market/**. Accessed on 9 March 2022.

Centres for Disease Control and Prevention (2018). Health Insurance Portability and Accountability Act of 1996 (HIPAA). Atlanta: CDC. Available at **https://www.cdc.gov/phlp/publications/topic/hipaa.html**. Accessed on 27 October 2021.

Competition Commission South Africa (2019). *Health Market Inquiry: Final findings and recommendations report*. Pretoria: Competition Commission South Africa. Available at **http://www.compcom.co.za/wp-content/uploads/2020/01/Final-Findings-and-recommendations-report-Health-Market-Inquiry.pdf**. Accessed on 9 March 2022.

David, N.J., Z. Brey and M. Ismail (2021). Telemedicine in the Western Cape Department of Health during the first peak of the COVID-19 pandemic: Leveraging data to save lives by activating a telemedicine response. *African Journal of Primary Health Care & Family Medicine*, vol. 13, No. 1, pp. 1–4. DOI:10.4102/PHCFM.V13I1.2954.

Discovery (2021). Stay connected through Connected Care platform. 19 April. Available at **https://www.discovery.co.za/corporate/health-stay-connected-through-connected-care**. Accessed on 27 October 2021.

Dodoo, J.E., H. Al-Samarraie and A.I. Alzahrani (2021). Telemedicine use in Sub-Saharan Africa: Barriers and policy recommendations for Covid-19 and beyond. *International Journal of Medical Informatics*, vol. 151, March. DOI:10.1016/j.ijmedinf.2021.104467.

Dutta, A. and C. Hongoro (2013). *Scaling up National Health Insurance in Nigeria: Learning from Case Studies of India, Colombia, and Thailand*. Washington, D.C.: Futures Group, Health Policy Project. Available at **https://www.healthpolicyproject.com/pubs/96_NigeriaInsuranceFinal.pdf.** Accessed on 27 October2021.

El-Miedany, Y. (2017). Telehealth and telemedicine: how the digital era is changing standard health care. *Smart Homecare Technology and TeleHealth*, vol. 4, pp. 43–51. DOI:10.2147/shtt.s116009.

Ericsson (2019). AirtelTigo partners Ericsson to consolidate and upgrade its network in Ghana. 23 May. Available at **https://www.ericsson.com/en/news/1/2018/airteltigo-partners-ericsson-to-consolidate-and-upgrade-its-network-in-ghana**. Accessed on 27 October 2021.

European Investment Bank (2020). *Africa's Digital Solutions to Tackle COVID-19*. Luxembourg: European Investment Bank. Available at **https://www.eib.org/en/publications/african-digital-best-practice-to-tackle-covid-19**. Accessed on 9 March 2022.

Fowkes, J., C. Fross, G. Gilbert and A. Harris (2020). Virtual health: The next frontier of care delivery. McKinsey & Company, 11 June. Available at **https://www.mckinsey.com/industries/healthcare-systems-and-services/our-insights/virtual-health-a-look-at-the-next-frontier-of-care-delivery**. Accessed on 27 October 2021.

Gray, J., N. Beyers, J. de Waal and M. Thom (2018). *Regulating for responsible data innovation: The role of insurance regulators in dealing with risks relating to consumer data protection and privacy*. Eschborn: Access to Insurance Initiative. Available at **https://www.a2ii.org/en/media/117/download**. Accessed on 9 March 2022.

Gray, J., J. de Waal, C. Hougaard and N. Beyers (2021). *Regulating for innovation: A supervisory toolkit*. Bellville: Cenfri. Available at **https://cenfri.org/publications/regulating-for-innovation-a-supervisory-toolkit/**. Accessed on 9 March 2022.

Greenwood, F. (2021). Assessing the impact of drones in the global COVID response. Brookings Institute, 30 July. Available at **https://www.brookings.edu/techstream/assessing-the-impact-of-drones-in-the-global-covid-response/**. Accessed on 9 March 2022.

Harst, L., P. Timpel, L. Otto and others (2020). Identifying barriers in telemedicine-supported integrated care research: scoping reviews and qualitative content analysis. *Journal of Public Health (Germany)*, vol. 28, No. 5, pp. 583–594. DOI:10.1007/s10389-019-01065-5.

Health Policy Project (2016). *Health Financing Profile: Tanzania*. Washington, D.C.: Futures Group, Health Policy Project. Available at **https://www.healthpolicyproject.com/pubs/7887/Tanzania_HFP.pdf**. Accessed on 27 October 2021.

Hoffer-Hawlik, M.A., A.E. Moran, D. Burka and others (2020). Leveraging telemedicine for chronic disease management in low- and middle-income countries during Covid-19. *Global Heart*, vol.15, No. 1, pp. 1–5. DOI:10.5334/GH.852.

Hougaard, C., M. Thom, J. Gray, A. van der Linden and K. Rinehart-Smit (2019). *The role of insurance for development*. Bellville: Cenfri.

International Association of Insurance Supervisors (2018). *Application Paper on the Use of Digital Technology in Inclusive Insurance*. Basel: International Association of Insurance Supervisors.

International Labour Organization (2020). *Report on Employment in Africa (Re-Africa): Tackling the Youth Employment Challenge*. Geneva: International Labour Organization. Available at **https://www.ilo.org/wcmsp5/groups/public/---africa/---ro-abidjan/documents/publication/wcms_753300.pdf**. Accessed on 27 October 2021.

Jensen, N. (2013). *The Health Worker Crisis: an analysis of the issues and main international responses*. London: Health Poverty Action.

Johnston, K., M. Guingona, S. Elsanousi and others (2020). Training a Fit-For-Purpose Rural Health Workforce for Low- and Middle-Income Countries (LMICs): How Do Drivers and Enablers of Rural Practice Intention Differ Between Learners From LMICs and High Income Countries? *Frontiers in Public Health*, vol. 8, October, pp.1–11. DOI:10.3389/fpubh.2020.582464.

Kazeem, Y. (2016). Ghana is betting on telemedicine to help plug gaps in its rural healthcare system. *Quartz Africa*, 7 June. Available at https://qz.com/africa/697667/ghana-is-betting-on-telemedicine-to-help-plug-gaps-in-its-rural-healthcare-system/ Accessed on 27 October 2021.

Kellet, J. (2020). A chance for universal healthcare in sub-Saharan Africa. United Nations Development Programme, 13 May. Available at **https://www.undp.org/blog/chance-universal-healthcare-sub-saharan-africa**. Accessed on 9 March 2022.

LeapFrog Investments (2016). Making healthcare easier in Africa, with tele-medicine: BIMA. 12 October. Available at **https://leapfroginvest.com/case-studies/making-healthcare-easier-in-africa-with-tele-medicine-bima/**. Accessed on 27 October 2021.

LeFevre, A., M.A. Cabrera-Escobar, D. Mohan, J. Eriksen, D. Rogers, A.N. Parsons, I. Barre, Y. Jo, A. Labrique and J. Coleman (2018). Forecasting the value for money of mobile maternal health information messages on improving utilization of maternal and child health services in Gauteng, South Africa: cost-effectiveness analysis. *JMIR mHealth and uHealth*, vol. 6, No. 7, p.153.

Manufacturing Chemist (2018). Novartis and Ghana Health Service scale-up telemedicine programme. 17 January. Available at **https://www.manufacturingchemist.com/news/article_page/Novartis_and_Ghana_Health_Service_scale-up_telemedicine_programme/138475**. Accessed on 27 October 2021.

Microinsurance Network (2018). *Landscape of Microinsurance in Africa 2018*. Luxembourg: Microinsurance Network.

Momentum Health Solutions (2018). Hello Doctor free to all South Africans. Available at **https://www.momentum.co.za/momentum/campaigns/general/hello-doctor-open-24-7-during-lockdown**. Accessed on 27 October 2021.

Monaghesh, E. and A. Hajizadeh (2020). The role of telehealth during COVID-19 outbreak: A systematic review based on current evidence. *BMC Public Health*, vol. 20, No. 1, pp. 1–9. DOI:10.1186/S12889-020-09301-4/TABLES/1.

Njanja, A. (2021). mPharma, a telehealth pioneer out of Ghana, gets physical with 100 virtual centers across Africa. *TechCrunch*, 11 October. Available at **https://techcrunch.com/2021/10/11/mpharma-a-telehealth-pioneer-out-of-ghana-gets-physical-with-100-virtual-centers-across-africa/**. Accessed on 27 October 2021.

Novartis Foundation (2018). Ghana Telemedicine. Available at **https://www.novartisfoundation.org/past-programs/digital-health/ghana-telemedicine**. Accessed on 27 October 2021.

_____ (2018). Ghana Telemedicine Toolkit: Interactive Implementation Guide. Available at **https://www.novartisfoundation.org/sites/arctic_novartisfoundation/files/2020-11/interactive-implementation-guide.pdf**. Accessed on 27 October 2021.

_____ (2018). Telemedicine toolkit fact sheet. Available at **https://www.novartisfoundation.org/sites/arctic_novartisfoundation/files/2020-12/telemedicine-toolkit-fact-sheet.pdf**. Accessed on 27 October 2021.

_____ (2018) Telemedicine Toolkit: High level overview. Available at **https://www.novartisfoundation.org/past-programs/digital-health/telemedicine-toolkit**. Accessed on 27 October 2021.

Nsiah-Boateng, E. J. Nonvignon, G.C. Aryeetey, P. Salari, F. Tediosi, P. Akweongo and M. Aikins (2019). Sociodemographic determinants of health insurance enrolment and dropout in urban district of Ghana: a cross-sectional study. *Health Economics Review*, vol. 9. DOI: 10.1186/s13561-019-0241-y.

Opoku, D., P. Scott and W. Quentin (2015). Healthcare Professionals' Perceptions of the Benefits and Challenges of a Teleconsultation Service in the Amansie-West District of Ghana. *Telemedicine and e-Health*, vol. 21, No. 9, pp. 748–755. DOI: 10.1089/TMJ.2014.0210.

Percept Actuaries & Consultants (2020). *The nurse can see you now: Reflections from the South African telemedicine market in light of Covid-19*. Capetown: Percept. Available at **https://percept.co.za/wp-content/uploads/2021/02/Percept-Telehealth-Report-Revisions.pdf**. Accessed on 10 March 2022.

_____ (2021). *Case Notes From the Frontier: Five case studies of South African telemedicine providers*. Capetown: Percept. Available at **https://percept.co.za/wp-content/uploads/2021/03/Telemedicine-Providers-Case-Study-Report.pdf**. Accessed on 27 October 2021.

_____ (2021). *Telehealth innovation in Rwanda Lessons and insights from the babyl experience*. Capetown: Percept. Available at **https://percept.co.za/wp-content/uploads/2021/05/Brief-3-babyl.pdf**. Accessed on 27 October 2021.

Peverelli, R. and R. de Feniks (2016). BIMA: reaching the unreachable with micro-insurance. *Digital Insurance Agenda*, 6 April. Available at **https://www.digitalinsuranceagenda.com/featured-insurtechs/bima-reaching-the-unreachable-with-micro-insurance/**. Accessed on 16 November 2021.

Rinehart-Smit, K. and P. Janse van Vuuren (2021). COVID-19 catalyses insurance innovation. Cenfri, 29 April. Available at **https://cenfri.org/articles/covid-19-catalyses-insurance-innovation/**. Accessed on 10 March 2022.

Schoch, M. and C. Lakner (2020). The number of poor people continues to rise in Sub-Saharan Africa, despite a slow decline in the poverty rate. *World Bank Blogs*, 16 December. Available at **https://blogs.worldbank.org/opendata/number-poor-people-continues-rise-sub-saharan-africa-despite-slow-decline-poverty-rate**. Accessed on 10 March 2022.

Shimeles, A. (2010). *Community based health insurance schemes in Africa : The case of Rwanda Community based health insurance schemes in Africa: the case*. Working Papers Series, No. 120. Tunis: African Development Bank.

Signé, L. and C. Johnson (2020). Africa's Insurance Potential: Trends, Drivers, Opportunities and Strategies. Policy Centre for the New South, 23 November. Available at **https://www.africaportal.org/publications/africas-insurance-potential-trends-drivers-opportunities-and-strategies/**. Accessed on 16 November 2021.

South Africa, National Department of Health (2021). MomConnect Technical Solution. Available at **https://ndohwebsite.azurewebsites.net/momconnect-technical-solution/**. Accessed on 16 November 2021.

South Africa, Presidency (2013). Protection of Personal Information Act 4 of 2013. Cape Town: Presidency of South Africa.

Stotts, M.J., J.A. Grischkan and V. Khungar (2019). Improving cirrhosis care: The potential for telemedicine and mobile health technologies. *World Journal of Gastroenterology*, vol. 25, No. 29, pp. 3849–3856. DOI:10.3748/wjg.v25.i29.3849.

The Partnership for Maternal, Newborn and Child Health (2021). Safaricom Limited. Available at **https://www.who.int/pmnch/about/members/database/safaricom/en/**. Accessed on 27 October 2021.

Van Dyk, L. (2014). A review of telehealth service implementation frameworks. *International Journal of Environmental Research and Public Health*, vol. 11, No. 2, pp. 1279–1298. DOI: 10.3390/ijerph110201279.

Weiss, D.J., A. Nelson, C.A. Vargas-Ruiz and others (2020). Global maps of travel time to healthcare facilities. *Nature Medicine*, vol. 26, No. 12, pp. 1835–1838. DOI:10.1038/s41591-020-1059-1.

Wiedmaier-Pfister, M., S. Ncube, H. Chiew and S. Zinsmeyer (2018). *Regulating Mobile Insurance – Insurance Business via Mobile Phones: Regulatory Challenges and Emerging Approaches*. Eschborn: Access to Insurance Initiative. Available at **https://a2ii.org/sites/default/files/reports/2018_05_02_mobile_insurance_regulation_web.pdf.** Accessed on 27 October 2021.

Wong, K.L.M., L. Benova and O.M.R. Campbell (2017). A look back on how far to walk: Systematic review and meta-analysis of physical access to skilled care for childbirth in Sub-Saharan Africa. *PLOS ONE*, vol. 12, No. 9, pp. 1–20. DOI: 10.1371/journal.pone.0184432.

World Bank (2016). *UHC in Africa: A Framework for Action*. Washington D.C.: World Bank.

_____ (2020). *Global Experiences from Regulatory Sandboxes*. Washington D.C.: World Bank. DOI:10.1596/34789.

_____ UHC Service Coverage Index. Available at **https://data.worldbank.org/indicator/SH.UHC.SRVS.CV.XD**. Accessed on 11 March 2022.

_____ World Development Indicators. Available at **https://databank.worldbank.org/source/world-development-indicators**. Accessed on 10 March 2022.

World Health Organization (2011). *MHealth: New Horizons for Health through Mobile Technologies*. Geneva: World Health Organization.

_____ (2012). Telemedicine: Opportunities and Developments in Member States: Report on the Second Global Survey on eHealth 2009. *Healthcare Informatics Research*, vol. 18, No. 2, p.153. DOI:10.4258/hir.2012.18.2.153.

_____ (2017). *Tracking Universal Health Coverage: 2017 Global Monitoring Report*. Geneva: World Health Organization. DOI:10.1596/978-92-4-151355-5.

_____ (2019). Diseases cost the African Region $2.4 trillion a year, says WHO. WHO Africa, 27 March. Available at **https://www.afro.who.int/news/diseases-cost-african-region-24-trillion-year-says-who**. Accessed on 11 March 2022.

_____ (2019). NHA Indicators. Available at **https://apps.who.int/nha/database/ViewData/Indicators/en**. Accessed on 25 March 2022.

_____ (2021). COVID-19 widens routine immunization gaps in Africa. WHO Africa, 29 July. Available at **https://www.afro.who.int/news/covid-19-widens-routine-immunization-gaps-africa**. Accessed on 11 March 2022.

_____ (2021). The impact of COVID-19 on global health goals. WHO Newsroom, 20 May. Available at **https://www.who.int/news-room/spotlight/the-impact-of-covid-19-on-global-health-goals**. Accessed on 17 September 2021.

_____ (2021). Universal health coverage (UHC). World Health Organization, 1 April 1. Available at **https://www.who.int/news-room/fact-sheets/detail/universal-health-coverage-(uhc)**. Accessed on 15 November 2021.

Wosik, J., M. Fudim, B. Cameron and others (2020). Telehealth Transformation: COVID-19 and the rise of Virtual Care. *Journal of the American Medical Informatics Association*, vol. 27, No. 6, pp. 957–962.