

# The Future of Virtual Health and Care

Driving access and equity  
through inclusive policies

June 2022





Working Group Report on Virtual Health and Care

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through inclusive policies

The Broadband Commission for Sustainable Development Working Group on Virtual Health and Care was co-chaired by the Novartis Foundation and the World Health Organization.

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Dr. Tedros Adhanom Ghebreyesus, Director-General, World Health Organization; and  
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**Dr. Ann Aerts**  
Head, Novartis Foundation  
Co-chair, Broadband  
Commission Working Group  
on Virtual Health and Care

For over a decade, the Novartis Foundation has embraced digital technologies to improve the health of low-income populations – powering initiatives that are people-centered, needs-driven, integrated in local health systems, scalable, and sustainable. An integral part of these efforts during the past five years has been co-chairing four successive Broadband Commission for Sustainable Development working groups on health and care.

I am amazed at the progress we have witnessed globally between the first working group report five years ago and today. It is now clearer than ever that data, digital, and AI-enabled health services are an integral part of health service delivery across the globe.

But the most dramatic change occurred in the past two years. COVID-19 drove an unprecedented surge in virtual services in all aspects of our lives, including health. As countries looked to solutions to reduce disruptions to critical services – while also respecting social distancing – virtual health and care suddenly became mainstream in most parts of the world.

We examine countries' response to this challenge in this report from the Broadband Commission Working Group on Virtual Health and Care. We examine how, during these past two years, the pandemic changed health service delivery from mainly in-person care to embracing virtual services as an integral part of health systems. We detail how many unnecessary restrictions on virtual health and care were swept away in the face of burgeoning needs, and how health services rapidly incorporated alternative delivery routes.

Perhaps the best news is that the great majority of health users are embracing this new world of virtual health and care and would like it to stay.

As we emerge from the pandemic, there is a clear opportunity for policymakers around the globe to maximize the opportunities offered by virtual health and care. But they need to ensure this is done in a way that builds equitable access to health and care. For instance, some populations who have high care needs, such as older people or those with disabilities, often have lower levels of digital literacy or access to internet. This means that without carefully considered policies, virtual health and care risks entrenching the existing digital divide and further exacerbating health inequities.

In response, our new report proposes a roadmap and the detailed policy steps necessary to ensure virtual health and care helps countries address health equity and access challenges.

I believe that now is truly the time for all country decision makers to embrace hybrid health systems that combine in-person and virtual service delivery in a fully integrated way. These hybrid health systems offer our best chance to truly achieve health for all.

My thanks go out to all members and external experts of the Broadband Commission Working Group on Virtual Health and Care for their strong engagement, generous sharing of expertise and insights, and fantastic collaboration. Their contribution has made this report a comprehensive overview of the enabling policies for countries to transform their existing health systems into hybrid systems. It has been an honor and pleasure to work together on the promising future of virtual health and care.



**Dr. Tedros Adhanom Ghebreyesus**  
Director-General, World Health Organization  
Co-chair, Broadband Commission Working Group on Virtual Health and Care

At the World Health Organization (WHO), we are committed to harnessing the power of digital technologies for global health. This commitment extends to virtual health and care, which is the delivery of health and care services remotely through digital means and technologies.

The new Broadband Commission for Sustainable Development report, *The Future of Virtual Health and Care: Driving access and equity through inclusive policies*, is a welcome build on the WHO's Global Strategy on Digital Health (GSDH), which was adopted by the United Nations Member States in 2020. The purpose of the GSDH is to ensure global collaboration and advancement of digital transformation at the global, regional, and national level. Guided by the GSDH, the WHO is now leveraging digital technologies to achieve health for all through four pillars of work: promoting global collaboration and knowledge transfer; supporting implementation of national digital health strategies; strengthening digital health governance at the global, regional, and national level; and advocating for people-centered health systems enabled by digital health.

*The Future of Virtual Health and Care* contributes to all four pillars. It advocates for virtual health and care to be an integral part of health priorities and benefit people in ways that are ethical, safe, secure, reliable, equitable and sustainable.

*The Future of Virtual Health and Care* is a comprehensive reference for policymakers aiming to develop inclusive, sustainable policies for utilizing the benefits of virtual health and care.

It supports decision makers by identifying six key areas of policy intervention to improve access to health and care through virtual delivery:

1. Governance and regulatory: Providing the necessary administrative and regulatory structure through strategies, plans, and guidelines.
2. Data and technology: Ensuring a flow of quality, ethically sourced data by blending hardware with evolving software and delivery standards.
3. People and workforce: Equipping various stakeholders with the required know-how through training, continuing education, skill upgrades, and competency building.
4. Design and processes: Encouraging user-friendly solutions by focusing on the individual through research and development and effective use of data in decision-making.
5. Business models: Supplying financing and coverage through different funding sources, sustainable investments, and innovative pricing models.
6. Partners and stakeholders: Bringing together different players in the ecosystem through partnerships and teamwork.

Within the scope of our GDHS priorities, the WHO will continue working alongside our Broadband Commission partners and other stakeholders to help Member States use people-centric, data-driven virtual health solutions to enhance the performance of existing health workforces. We also remain committed to supporting data-driven decision-making that improves public trust in virtual health and care and helps build the resilient and sustainable health systems necessary to respond to existing and emerging threats and achieve health for all.

Virtual health and care is a fundamental part of the future of health and an opportunity we must embrace if we are to build resilient and sustainable health systems. I encourage policymakers to take on board these new recommendations to help ensure that virtual health and care drives access to health and health equity in their populations at large.

# Table of Contents

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Acknowledgments .....	4
Disclaimer .....	5
Executive Summary .....	9
1   Introduction .....	26
2   What is Virtual Health and Care .....	30
3   Why Virtual Health and Care Policy Matters Today .....	34
4   Roadmap for Maturity .....	56
Introducing the roadmap for policy maturity in virtual health and care .....	57
Maturity framework .....	58
The roadmap for policy maturity in virtual health and care .....	62
Governance and regulatory .....	62
Design and processes .....	66
Data and technology .....	68
Business models .....	71
People and workforce .....	72
Partners and stakeholders .....	73
5   Actionable Recommendations and Calls to Action .....	74
Recommendations for policymakers .....	76
6   Conclusion .....	84
Broadband Commission Working Group on Virtual Health and Care .....	87
External Expert Stakeholders Interviewed and Consulted .....	89
Abbreviations .....	90
Appendix I: Landscape Review .....	92
Deep dives .....	93
Overviews .....	157
Appendix II: Actions for Key Stakeholders .....	177
Policy References .....	180
References .....	185



# Executive Summary

The COVID-19 pandemic has changed the way health and care are delivered. The past two years in particular have seen a boom in connecting patients and users with health and care providers remotely. **The delivery of health and care services remotely through digital means and technologies, commonly known as virtual health and care**, has enabled:

- proactive and preventive health management for individuals and populations through real-time notifications and reminders to prevent and manage health challenges,
- care navigation and support to ensure that patients are able to locate and access appropriate care,
- telehealth to streamline patient and provider communication and enable continuous remote monitoring, and
- smart diagnostics and digital therapeutics for data-led, evidence-based clinical decisions and actions.

**The result:** Patients and providers are complementing in-person face-to-face interactions with virtual delivery to increase access and take better-informed decisions about health and care.

**The increasing trend of delivering several aspects of health and care virtually presents a clear opportunity for policymakers globally to act now and reap the benefits of digitization to achieve health and care equity and access for all.**

The Broadband Commission's 2021 Working Group on Virtual Health and Care encourages inclusive policymaking that puts the individual at the center of care delivery and planning. The Working Group's report examines virtual health and care in context of the COVID-19 pandemic: the trends, forecasts, key role of policy in influencing adoption, challenges, and ways of overcoming them. Through a comprehensive analysis of global developments, the report charts a roadmap for countries to integrate virtual delivery in their national health and care systems. It recommends policies as well as key stakeholder actions to ensure virtual health and care solutions increase equitable access and outcomes for those facing the greatest barriers to obtaining services, resulting in improved health and care equity and faster achievement of universal health coverage.



## Virtual delivery of health and care has gained importance since COVID-19 began



Virtual engagement has become common practice today in several walks of life, especially in health and care. Noticeable growth in several public as well as private sector **virtual health solutions – which integrate medical, social, and environmental factors to enable holistic well-being** – has empowered individuals and societies to efficiently manage health issues. For instance:

### France:

*COVIDTracker*, a data visualization tool for public health decision-making, gained more than 700,000 users within a span of six months ending January 2021.<sup>1</sup>

### India:

*Aarogya Setu*, a contact tracing app, had 190 million downloads within a year, making it one of the most-downloaded COVID-19 tracing apps in the world as of June 2021.<sup>2</sup>

### China:

*Health Code*, a color-code based tracking system for monitoring access to places, was used in more than 300 cities covering over 900 million people starting February 2020.<sup>3</sup>



Similarly, **virtual care – which focuses heavily on remotely managing medical conditions** – has seen impressive growth around the world. For instance:

### 150+ countries:

*Ada Health*, an algorithm-enabled, clinical literature-driven symptom checker, had 6 million users join in 2020, compared to 5 million in the previous eight years.<sup>4,5</sup>

### Germany:

*Hello Better*, a digital therapeutic for stress, exhaustion, insomnia, and depression, had more users in the first quarter of 2021 than in 2015–2019 combined.<sup>6</sup>

### Indonesia:

*HaloDoc*, a teleconsultation platform, saw a 101% gain in average daily active users between 2019 and March 2020.<sup>7</sup>

### UAE:

*vHealth*, an international telehealth provider, reported a 500% increase in the usage of its app in the UAE between March–September 2020 and the same period in 2021.<sup>8</sup>

### UK:

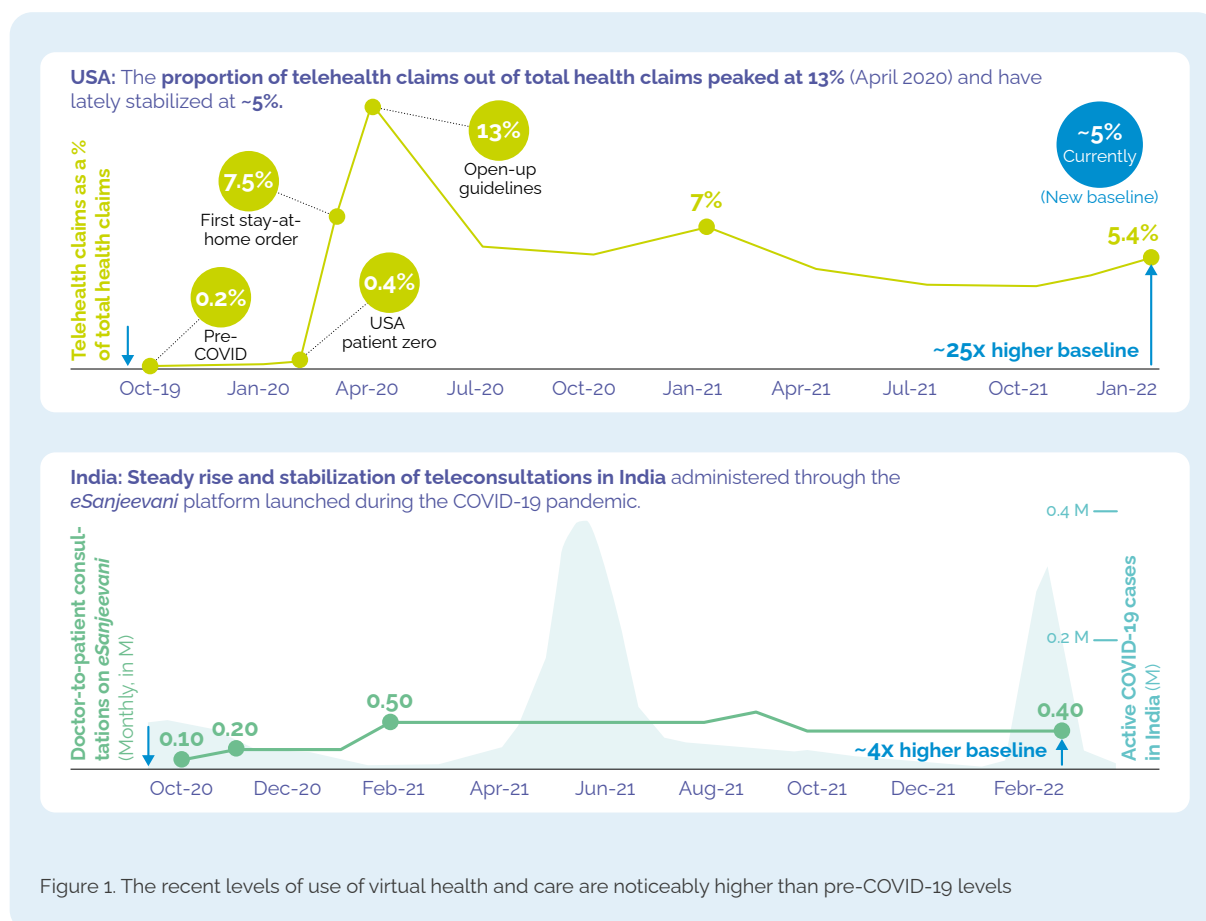
*NHS Pathways*, a triage and clinical decision support system, saw a surge of 1 million weekly appointments being attended to by general practitioners between 2020 and 2021.<sup>9</sup>

This increase in the use of virtual health and care during the early phases of the COVID-19 pandemic was in part driven by national actions to stop the virus' transmission through physical distancing measures. In its 2021 Global Pulse Survey, the World Health Organization reports that more than 50% of the 95 surveyed countries used telemedicine or home-based care to overcome essential service disruptions and recover quality services.<sup>10</sup>

As the world begins to reopen, a hybrid mode of life has become the norm. Virtual and in-person events are complementing each other in several walks of life. Thus, it is not surprising that the new levels of virtual health and care use are several times higher than what they were prior to the COVID-19 pandemic.

The percentage of telehealth claims out of total health claims in the **USA** were around 25 times higher in January 2022 compared to the pre-COVID-19 situation in October 2019.<sup>11</sup>

The numbers of synchronous teleconsultations on **India's** national teleconsultation and e-outpatient service *eSanjeevani* were roughly 4 times higher in February 2022 than in October 2020.<sup>12</sup>



Although the increase and higher levels of use of virtual health and care are encouraging, **services are not reaching all in an equitable way**. Several forms of digital divides exist:

**Gender:**

Women and men have different levels of adoption of the internet and digital technologies. A 2019 global estimate shows this gender gap – only 48% of women use the internet as compared to 55% of men globally.<sup>13</sup>

**Age:**

Older people are less likely to use digital tools and the internet. A 2021 survey of adults in the USA shows that 25% of people older than 65 years do not use the internet, the highest among all adult age groups.<sup>14</sup>

**Location:**

Rural areas have less communication connectivity as compared to urban regions. 2020 data from India shows that rural internet access is roughly half that in urban localities.<sup>15</sup>

**Income:**

Low-income groups have lower internet access and speeds than high-income groups. 2021 data from Colombia shows a positive correlation between income levels and internet connectivity. High-income groups have almost 1.5 times better access and 4 times faster speeds than low-income groups.<sup>16</sup>

**Social group:**

Minority and tribal groups have lower access to internet and digital technologies. Recent data shows that the rate of premature excess deaths per 100,000 people in the USA for American Indians, African Americans, and Hispanics is three times that of Caucasians or Asians.<sup>17</sup> Also, the number of African Americans that lack internet in the USA is almost twice the national average.<sup>18</sup>

**Disability:**

Over one billion people have some form of disability worldwide and a large proportion of them are left out of the digital society.<sup>19</sup> A 2021 Swedish survey shows that people with disabilities have less access to digital devices and are less comfortable with using the internet to pay bills or shop online.<sup>20</sup>

However, there is a silver lining. Specific recent use cases of virtual health and care have shown that it can be **effective in reducing the different types of health and care digital divides and advancing efforts towards equity for all.**

**Gender:**

Special programs and outreach for women covering all levels of health and care digitization can overcome exclusion by gender. For instance, in Uganda, *FamilyConnect*, an SMS-based service by the Ministry of Health's Community Health Suite of Tools, sends targeted messages to expecting and new mothers, male partners, and caregivers for ensuring optimal child and maternal health.<sup>21</sup>

**Income:**

Targeted services and direct outreach to low-income groups can increase access and overcome the income socio-economic divide. For instance, in Chile, telehealth providers *TytoCare* and *Vitaltec* use artificial intelligence-enabled handheld devices to provide primary care to underserved communities and low-income groups. This has increased the coverage and patient meeting frequency with only 30% of the total budget.<sup>24</sup>

**Age:**

Training for older health and care workers can overcome exclusion by age. For example, in the UK, the National Health Service and Doctor Care Anywhere organized webinars, e-learning packages, and virtual drop-in clinics to train older doctors in new virtual health and care delivery models.<sup>22</sup>

**Social group:**

Delivery mechanisms that consider the specific situation and needs of different sections of the society can overcome exclusion by social group. As an illustration, in the USA, *Heart Safe Motherhood* is an evidence-based program that uses text messaging to improve health outcomes and experiences of postpartum women with hypertension across all social groups. The program's approach to preventive care works to mitigate racial disparity, to the extent that white or black women are equally likely to engage with and benefit from the service.<sup>25</sup>

**Location:**

Virtual delivery solutions based on basic digital communication protocols can reduce exclusion due to rural-urban socio-economic divides. For example, *My Teledoc*, a telemedicine service used by health and care workers in India, remotely connects to clinicians over low bandwidth connections to increase health and care services in remote rural areas.<sup>23</sup>

**Disability:**

Targeted initiatives and improved accessibility features in virtual health and care solutions based on universal design principles can serve the unique needs of people with disabilities and facilitate their integration into the digital mainstream. For instance, in the UAE, *Sanad Card*, a governmental digital service, helps people with disabilities access specialized services such as electronic

nursing surveillance and home medical consultation.<sup>26</sup> Israel's OrCam offers *MyEye 2.0*, a wearable assistive technology that gives independence to the visually impaired and the blind by providing hands-free access to visual information on health and care via audio. It enables instant reading of text from any surface like a screen, which is essential for using virtual solutions such as care navigation and digital therapies.<sup>27</sup>

These encouraging examples of trends and bridging the digital divides show that virtual health and care is gaining acceptance and trust. However, its future evolution and sustained use will be dependent on generating proof of its effect on equitable health and care outcomes.<sup>28</sup> Stakeholders are more likely to embrace virtual delivery if there is consensus on its efficacy in improving therapies, reducing treatment and associated costs, optimizing resource utilization under different use cases, and assuring similar quality of service to all.

Reproducible evidence generated using real-world data is required to establish the efficacy of virtual health and care in improving the quality of patients' lives.

Fortunately, this has become an area of focus for many solution developers and countries, and evidence is starting to become available. Recent studies have shown that population- and individual-level disease prevention, patient monitoring and treatment adherence, treatment optimization, behavioral and mental health, and user education can benefit from the virtual delivery of health and care.<sup>29, 30, 31, 32</sup>

Going forward, **users as well as providers have shown clear intent** to continue using virtual health and care. 2021 surveys in the USA show that:

**76% of patients** want virtual care visits to be a standard part of their regimen.<sup>33</sup>

**83% of health and care providers** intend to continue using virtual delivery of health and care after the COVID-19 pandemic.<sup>34</sup>

Expectedly, the projected average compound annual growth rate of the global telemedicine market for 2019–2025 has risen by seven percentage points to 21.8% compared to what it was pre-COVID-19.<sup>35</sup>

All these developments indicate that virtual delivery of health and care is here to stay, and we are headed towards a hybrid continuum of care in which virtual and in-person delivery complement each other to achieve better health outcomes for all.

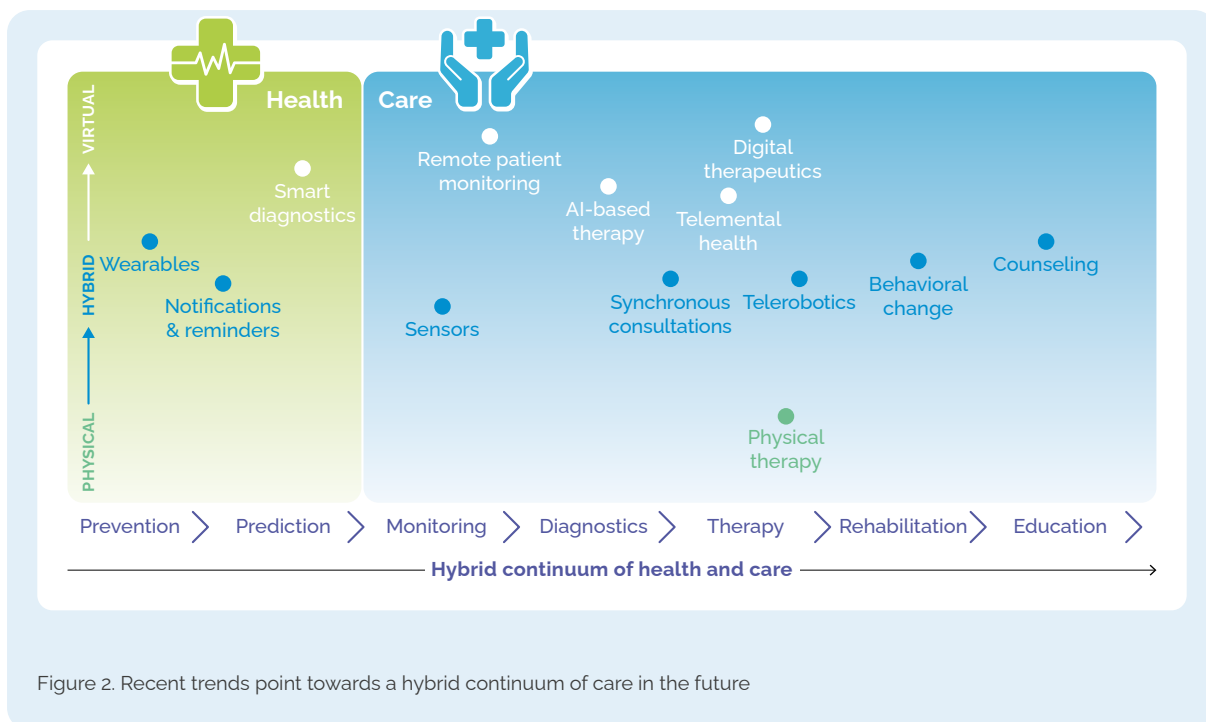


Figure 2. Recent trends point towards a hybrid continuum of care in the future

Recent policy developments in several countries have shown that when combined judiciously, in-person and virtual health and care together promise to be an effective solution for current and future health and care challenges.

## Virtual health and care policymaking is gaining importance

Governments and policymakers recognize the changing situation and demands arising from the shift to a virtual mode of health and care delivery. Some countries were quick to realize the potential of virtual health and care and responded by enacting regulations to ensure continuity in the continuum of care, especially during the initial stages of the COVID-19 pandemic. Major policy changes included:

- allowing reimbursements for virtual delivery of health and care under existing insurance plans,
- permitting health and care providers to provide virtual services across borders, and
- improving virtual health and care data governance by strengthening user privacy.

Other countries are following suit. Policymaking is becoming an effective instrument to drive growth of virtual health and care and ensure that benefits reach all.

**The global landscape of virtual health and care policy is rapidly evolving with countries eager to capture the benefits of virtual delivery of health and care.**

Through a comprehensive analysis of the virtual health and care-related policies of 23 countries spread across geographies and income levels, several novel developments, best practices, and areas of regulation were uncovered.

Key policy developments across the examined countries include:

Policy element	Virtual health and care key policy development
<b>Governance</b>	Creation of local leadership teams for integrating digital health and virtual health and care in hospitals, clinics, communities, and households.
<b>Regulation</b>	Specification of virtual delivery use cases for various medical scenarios such as primary care, specialties, and outpatient care.
<b>Licensing</b>	Development of national health and care provider licensing mechanisms linked to reimbursements for virtual delivery of health and care.
<b>Liability</b>	Provisions for establishing liability in several use cases such as device malfunction, patient non-compliance, and misdiagnosis.
<b>Quality assurance</b>	Specification of requirements and conditions of quality for offering virtual delivery services.
<b>Human- and equity-centric</b>	Provisions and initiatives for inclusive representation of minority and tribal groups as well as remote, inaccessible regions.
<b>Innovation</b>	Emphasis on developing and demonstrating evidence-based virtual health and care solutions.
<b>Health outcomes</b>	Provisions for generating evidence using virtual health and care solutions within a specific time frame.
<b>Infrastructure</b>	Development of a uniform and distributed infrastructure for virtual health and care data.
<b>Data governance</b>	Specification of minimum data compliance requirements for protection of user health and care data.
<b>Interoperability</b>	Specification of standards for virtual health and care data management and governance.
<b>Financing</b>	Investment programs for delivering health and care virtually in rural and underserved communities.
<b>Reimbursement</b>	Payment mechanisms for virtual delivery of health and care based on an individual's socio-economic status.
<b>Digital skills building</b>	Special financial packages for workforce transformation in virtual delivery of health and care.
<b>Collaboration</b>	Creation of a virtual health and care maturity assessment toolkit aligned with national health and care goals.



Opinions of Broadband Commissioners, Working Group members, health and care policymakers, experts, innovators, industry, payers, think tanks, and the civil society have helped discover key recent developments and challenges and shape the findings and recommendations of this report. The result is a comprehensive reference for policymakers aiming to develop inclusive, sustainable policies for utilizing the benefits of virtual health and care. Key areas of policy intervention to improve access to health and care through virtual delivery include:

- Developing a person-centric, technology-agnostic, and inclusive policy vision to drive virtual health and care integration into the mainstream.
- Making policies based on inclusive principles through meaningful engagement of all sections of the society to ensure availability and achieve equity for all.
- Generating and using real-world data-based evidence to enable robust decisions.
- Addressing data privacy at each stage of delivery to gain user trust and drive adoption.
- Shifting from seeing virtual delivery as a supplement to an essential component of a comprehensive health and care strategy.

Together, the research and the conversations highlight several policy areas that are emerging as especially relevant for closing the gaps and increasing the adoption of virtual health and care.





## A roadmap for maturity can ensure inclusive integration of virtual delivery

The landscape of global virtual health and care policies, when translated into a maturity roadmap, reflects a clear pathway for policymakers to follow as they strive to develop policies that both advance the uptake of virtual health and care, but also

its inclusivity. The roadmap contains fifteen policy elements across six policy pillars that build upon the maturity framework in the Broadband Commission's 2020 *Reimagining Global Health through Artificial Intelligence: The Roadmap to AI Maturity* report.<sup>36</sup>

This framework for policy maturity in virtual health and care consists of six policy pillars containing fifteen policy elements. Three maturity levels per policy element aid countries in evaluating their progress on integrating virtual delivery into the mainstream.

### Governance and regulatory

Provide essential administrative and regulatory structure through strategies, plans, and guidelines.

**Policy elements:** governance, regulation, licensing, liability, quality assurance

### Design and processes

Encourage user-friendly solutions by focusing on the individual through research and development and effective use of data in decision-making.

**Policy elements:** human- and equity-centric, innovation, health outcomes

### Data and technology

Ensure the flow of data by blending hardware with evolving software and delivery standards.

**Policy elements:** infrastructure, data governance, interoperability

### Business models

Supply financing and coverage through different funding sources, sustainable investments, and innovative pricing models.

**Policy elements:** financing, reimbursement

### People and workforce

Equip different stakeholders with the required know-how through trainings, continuing education, skill upgrades, and competency building.

**Policy element:** digital skills building

### Partners and stakeholders

Bring together different players in the ecosystem through partnerships and teamwork.

**Policy element:** collaboration



Figure 3. A framework for policy maturity in virtual health and care



## Governance and regulatory

This pillar provides the necessary administrative and regulatory structure that formulates and implements strategies, plans, and guidelines for virtual health and care.

Policy element	Maturity vision
<b>Governance</b>	People-centric, technology-agnostic, and inclusive policy frameworks to overcome existing and long-term health and care challenges.
<b>Regulation</b>	Clear and flexible rules that consider feedback from all stakeholders regularly to ensure balanced and equitable distribution of virtual health and care services.
<b>Licensing</b>	Efficient and periodically revised health and care provider and system authorization to ensure proficient and equitable distribution and availability of medical expertise.
<b>Liability</b>	Clearly defined responsibilities for all stakeholders (health and care providers and organizations; payers, financiers, and insurers; private sector and startups; advocacy groups; INGOs, civil society, and implementers) under different use scenarios to establish accountability.
<b>Quality assurance</b>	Progressive standards of health and care that are integrated into health and care delivery to simultaneously guarantee availability and quality.



## Design and processes

This pillar encourages user-friendly solutions by laying focus on the individual through research and development and effective use of data in decision-making for virtual health and care.

Policy element	Maturity vision
<b>Human- and equity-centric</b>	A human-first approach that utilizes the right virtual health and care solution at the right place and time to increase access and ensure equitable distribution of health and care services.
<b>Innovation</b>	Continuing improvements in all aspects of virtual health and care solution design to promote the well-being of all.
<b>Health outcomes</b>	Reproducible, real-world evidence that guides decision-making at all levels to improve care, provision the right health and care solutions, and increase access.



## Data and technology

This pillar makes available the right architecture that ensures optimal flow of virtual health and care data by blending hardware with evolving software and delivery standards.

Policy element	Maturity vision
<b>Infrastructure</b>	Robust, periodically upgraded architecture and hardware to ensure health and care delivery.
<b>Data governance</b>	Clear data governance structures and standards driven by a core set of equity and rights-based principles for data use, access, and authorization throughout the delivery chain to secure individual privacy and establish trust.
<b>Interoperability</b>	Privacy-driven data transfer mechanisms based on technical standards like FHIR and patient data standards, such as the WHO's classification of health interventions to open health and care data silos by systematically developing, deploying, and continuously improving virtual health and care solutions for allowing data-led decision-making in health and care, and creating additional value for all stakeholders.



## Business models

This pillar supplies financing and coverage through different funding sources, sustainable investments, and innovative pricing models to ensure that virtual health and care reaches all sections of the society.

Policy element	Maturity vision
<b>Financing</b>	A strategic investment roadmap driven by investment from multiple sectors and stakeholders (public and private) to support an overall health strategy that includes clear provisions for developing and promoting virtual health and care solutions.
<b>Reimbursement</b>	Fair payment mechanisms based on the service being delivered to increase adoption and promote access.

## People and workforce

This pillar equips different stakeholders with the required know-how through trainings, continuing education, skill upgrades, and competency building to build a competent workforce able to expand the reach of virtual health and care.

Policy element	Maturity vision
<b>Digital skills building</b>	Regular trainings and upgrades of workforce skills to utilize new technologies and delivery modes such as virtual delivery for achieving health and care goals efficiently.

## Partners and stakeholders

This pillar brings together different players and stakeholders in the ecosystem through partnerships and teamwork to increase the adoption of virtual health and care.

Policy element	Maturity vision
<b>Collaboration</b>	Health and care for the people, by the people, and from the people to cultivate ownership, establish trust, and ensure widespread adoption and uptake of virtual health and care solutions.

Having originated from a study of actual policies, the roadmap provides a practical way to assess progress on all policy elements essential for integrating virtual delivery into mainstream health and care. Its flexible and modular nature means that countries can adapt it to their national health and care goals.

## Actionable recommendations can ensure inclusive policies

Policymakers across the globe have an opportunity to advance maturity in virtual health and care. By taking practical steps to achieve the maturity vision for each policy element, policymakers can ensure a seamless integration of virtual delivery into mainstream health and care. Developed for each policy pillar of the maturity framework, the policy recommendations promise a robust set of policies built upon inclusive principles. In general, they apply to other digital health solutions as well. As each country is in its own stage of its journey, it should use the recommendations most suitable

for its context to ensure overall progress towards a health and care system built upon complementary ways of using in-person and virtual delivery to ensure access for all.

**Practical recommendations and calls to action equip policymakers with the required know-how to take advantage of leading practices and create inclusive policies that advance virtual health and care. Specific actions for stakeholders ensure that the efforts of all actors reinforce one another.**



### Governance and regulatory

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- Outline a **strategic integration roadmap** for virtual health and care linked to the national digital health strategy to achieve health and care equity.
- Establish **intersectoral policymaking** mechanisms such as between health, IT, finance, and education ministries for efficient, timely development and implementation of policies.
- Develop a hierarchical policy development framework across health and supporting sectors to **reduce overlapping policies** and establish legal clarity in delivering services virtually.
- Adopt a **data-led, outcomes-based policymaking approach** to evaluate and integrate new health and care technologies in line with national health and care goals.
- Establish mechanisms for **assessing returns on investments** – population and individual health indicators, quality of life, community health metrics, etc. – made to integrate virtual delivery into mainstream health and care.



### Design and processes

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- Ensure **inclusive representation** (gender, social groups, persons with disabilities, and other marginalized sections of the society) **and meaningful engagement** at every stage of policy development, implementation, and feedback to encourage ownership, promote adoption, and ensure that policies are aligned with population needs.
- Create **knowledge-sharing frameworks** that can ensure transfer of best practices between the private sector and the public system to promote innovation and research and development in virtual health and care.
- Promote **innovation to achieve better health and care outcomes** using virtual delivery.

## Data and technology

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- Establish a **national health and care information system** – if one does not exist already – that acts as a single source of information to reduce uncertainty over data ownership.
- Develop a **comprehensive health and care data strategy** based on respecting privacy and preventing misuse to build user trust and maximize the public benefits of health data for all.
- Align virtual health and care data security and privacy policies with the **national cybersecurity strategy** to ensure all-round security considering the changing nature and sources of data generation.
- Encourage **interoperable standards in the design and implementation** of virtual health and care solutions to simplify the user experience through novel insights generated by health and care sector players and policymakers.
- Create **frameworks for data sharing**, so that relevant health data is securely accessible for authorized stakeholders while ensuring individual privacy and security.
- Build **infrastructure based on open standards** that can be reused to facilitate adoption of new technologies and optimize resource utilization (onsite or cloud).

## Business models

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- Encourage **innovative modes of financing** such as collaborations and partnerships with the private sector and donors to reduce dependency on a singular funding source (usually public financing).
- Provide **incentives** like tax rebates and subsidies to innovators and virtual solution providers who address public and community health priorities identified by country leadership and communities themselves.
- Develop a **strategic funding program** to integrate virtual delivery into the mainstream through an intersectoral (finance, reimbursement, health and care, ICT, etc.) authority.

## People and workforce

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- Strengthen **national capabilities** for virtual delivery of health and care across primary, secondary, tertiary, and community care levels through pre- and in-service trainings and upskilling to ensure that the complete health and care delivery structure is connected to the virtual mode.
- Create a **diverse, inclusive, and competent workforce** through special training and integration initiatives to ensure equitable representation and adoption of virtual health and care across all sections of the society.
- Increase **digital literacy** across all sections of society with special emphasis on older people and underserved segments to promote acceptance and utilize the full potential of virtual delivery.
- Encourage meaningful engagement of the **younger population** to develop future-ready, sustainable, and impactful policies for integrating virtual health and care.

## Partners and stakeholders

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- Collect **periodic, multi-stakeholder feedback** on different aspects of policy development and implementation as a principle for effective policymaking to streamline the policymaking process, promote acceptance of policies, and increase adoption of virtual delivery.
- Explore **co-creation** as a mechanism for long-term, strategic policies to ensure ownership, increase trust, and secure policy continuity.

Policymakers alone cannot advance virtual health and care in an inclusive way. It takes the collective actions of health and care providers, payers, the private sector, advocacy groups, civil society, and researchers to complement policymaker actions and ensure effective policy development and implementation.



## Health and care providers and organizations

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- Engage with **users** to familiarize them with virtual delivery of health and care solutions and promote acceptance.
- Develop ways to **continuously improve** the process, techniques, and integration of virtual delivery of health and care to increase the quality of care delivered.
- Align the organization's **health data strategy with national data governance** policies to uphold the rights and privacy of users.
- Offer **expert guidance** to policymakers to periodically refine and improve virtual health and care policies.
- Implement **workforce training** to increase technology adoption and operationalize the new modes of health and care delivery.



## Payers, financiers, and insurers

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- Integrate **virtual and in-person payment mechanisms** to enable continuity in the delivery of health and care and to simplify the experience for users.
- Participate in **policymaking** to enable strategies that ensure virtual delivery of health and care and quality of service through fair pricing strategies and regular provider assessments.
- Consider adjusting **insurance premium payments** based on the socio-economic status of users to achieve health and care equity.
- Revise the **coverage plans periodically** based on evidence of the effectiveness of virtual or in-person delivery for different medical conditions when such evidence becomes available to ensure best possible user experience.



## Private sector and startups

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- Design and develop **interoperable solutions** and products based on open standards to uncover health and care data silos for integration with national health information exchanges and the possibility to develop better virtual health and care solutions.
- Adapt and innovate considering **immediate and future national and global health and care priorities** to improve the likelihood of adoption and uptake by governments, health and care providers, and payers.
- Collaborate with **other stakeholders** such as health and care providers, payers, communities, and policymakers to ensure that innovation is inclusive and in sync with their requirements.
- Make available **data repositories** for public health benefits to expand the potential of virtual delivery for achieving better health outcomes and improving health systems.
- Consider developing products based on **familiarity and relevance** principles – users are more likely to use a new product or solution that has some elements (e.g., look, feel, etc.) of what they are already familiar with and what they actually need – to ensure faster acceptance.



## Advocacy groups

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- Bring together different stakeholders and interest groups to support the **integration of virtual delivery** of health and care solutions into the mainstream.
- Aid the transfer of **global best practices** and novel health and care delivery solutions aligned with a country's health and care priorities to achieve national goals speedily and efficiently.
- Promote **inclusive policymaking** by highlighting digital divides (existing or potential), identifying gaps in policy aims and actual results, and suggesting appropriate solutions.
- Establish **observer groups** to enable third-party, independent monitoring of governance and regulatory compliance and to highlight responsibility for ensuring policies and innovations respond to the health needs of all communities, especially those still left behind.
- Work together with **local and regional stakeholders** to promote virtual delivery of health and care, especially for cases where countries are lagging.





## INGOs, civil society, and implementers

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- Highlight digital divides and **work with policymakers** to efficiently utilize virtual delivery of health and care for bridging these inequities.
- Promote virtual delivery of health and care by **educating citizens** about its benefits, safe use, and complementarity to traditional, in-person service delivery.
- Act as a **channel between communities and all other stakeholders** to highlight areas of need and improvement in policy, solution, pricing, and implementation.
- Advocate to ensure equitable availability and access, same quality, and free at the point of use health and care to all sections of the society, especially when strategic use of virtual delivery can overcome several equity gaps.
- Encourage adoption by actively engaging with **local and regional stakeholders** to customize virtual health and care solutions to local needs and preferences.



## Academia and researchers

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- Work together with other stakeholders to **identify gap areas for evidence generation** for clinical and policy decisions.
- Generate and **make available evidence** required for assessing the efficacy of virtual health and care in different clinical and non-clinical use cases.
- Offer cutting-edge, **expert advice and support** to other stakeholders to improve the virtual health and care delivery chain and establish a hybrid continuum of care.
- Create **scientifically robust solutions** for improving the delivery of health and care virtually.
- Develop periodically revised **curricula, training programs, certifications, and competency models** to update the skills of the workforce in using new technologies in virtual health and care.

The undercurrent running through these recommendations and calls to action is the critical need to recognize the ongoing change in the delivery of health and care to a virtual mode. User experiences, on-the-ground developments, and recent policy actions strongly suggest that virtual delivery is going to become an integral part of health and care in the coming years. It promises to permanently reshape today's systems by enabling delivery of quality health and care as close as possible to where people live and work.

Thus, the future of virtual health and care depends upon how we use virtual delivery to ensure that all can benefit from it. As the report shows, inclusive policymaking can be the glue that binds and takes forward everyone together to close equity gaps in health and care access and outcomes and achieve universal health coverage.

# 1

## Introduction



# Background and purpose of the report

The world is witnessing a global health and care crisis like never before. The COVID-19 pandemic has affected the daily lives of individuals and families as well as national health, economic, environmental, and social priorities around the world. It has caused a tragic loss of human life and threatens to slow down the progress towards achieving sustainable development goals.

This period has also seen the emergence of a new way of delivering health and care. Countries around the globe are using digital technologies to provide safe and secure access to health and care services and close gaps in the continuum of care remotely. Either through remote consultations, e-triage, or data-driven tracking of COVID-19 hotspots, remote management is helping overcome individual- and population-level health and care challenges efficiently. As shown in Figure 4, the period has seen multiple years'

worth of development happening over just a few months. With this, remote delivery of health and care has emerged as an essential aspect of health and care digitization.

**The 2021 Broadband Commission Working Group on Virtual Health and Care, co-chaired by the World Health Organization (WHO) and the Novartis Foundation,** recognizes the ongoing change in health and care delivery owing to the COVID-19 pandemic. This report combines insights from previous thought capital and prepares stakeholders for future actions considering these current developments in health and care globally.

*In its State of Broadband 2021, the Broadband Commission acknowledges the need to cement the progress on remote health services.<sup>13</sup>*

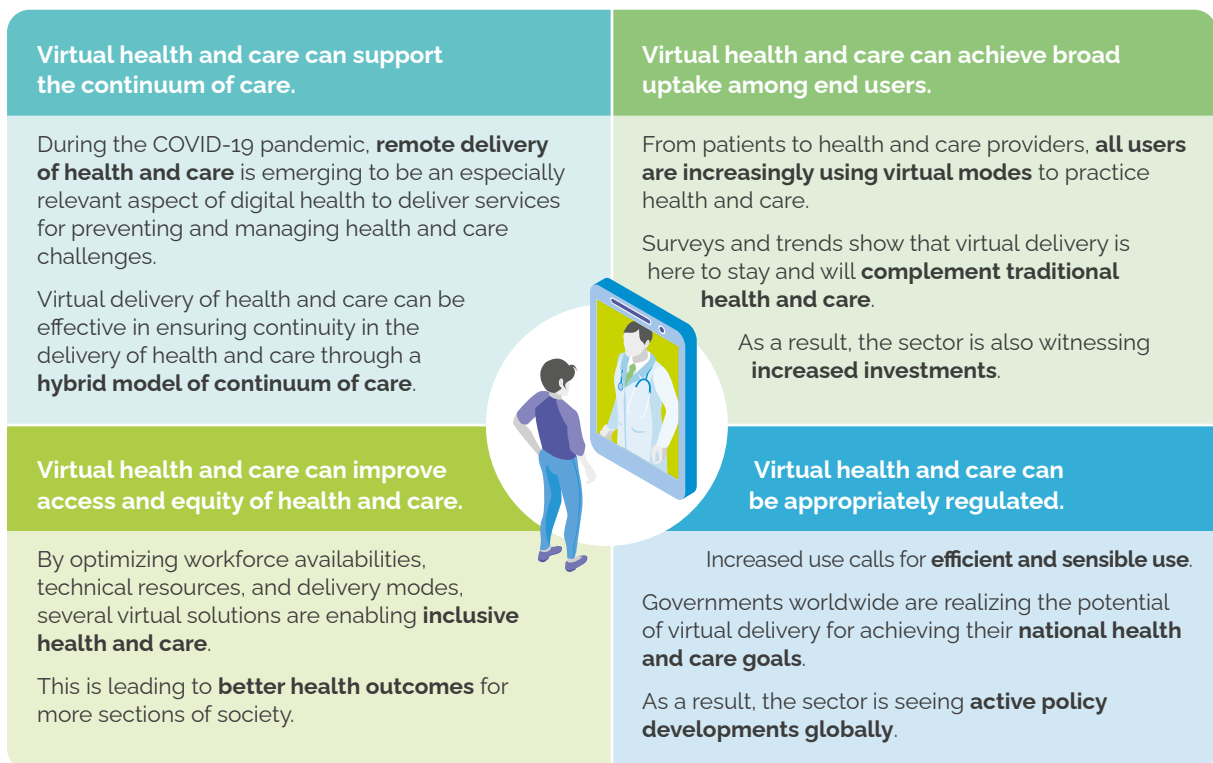


Figure 4. Current global developments in health and care show increased delivery through virtual means

## Our methodology

As with previous reports, this year's report combines qualitative and quantitative research and the integration of expert opinions. Its findings are based on

**discussions** with 75 experts, policymakers, and stakeholders in countries across income groups, the **review** of 272 publications, articles, and reports relevant to the theme, and the **study** of 148 global policy documents.

(References provided in Appendices)

Accenture led the report development under the aegis of the Broadband Commission and guidance of the co-chairs.

### The ITU-UNESCO Broadband Commission for Sustainable Development

The International Telecommunication Union (ITU) and the United Nations Educational, Scientific and Cultural Organization (UNESCO) established the UN Broadband Commission in 2010 to advance the broadband agenda globally. As the world transitioned from the Millennium Development Goals to Sustainable Development Goals (SDGs) in 2015, the Commission was renamed the Broadband Commission for Sustainable Development to accurately reflect the importance of developing sustainable solutions to overcome global challenges. The Broadband Commission brings together policymakers, industry leaders, academics, and civil society representatives to achieve the SDGs through the amplification and use of information and communication technologies (ICTs) to advocate for universal connectivity and its 2025 Broadband Advocacy Targets. The Commission conducts research, identifies best practices, and recommends policy actions through the outcomes of its Working Groups – which leverage partnerships among different stakeholders to holistically address issues affecting broadband access, affordability, and use. For SDG 3 – *ensure healthy lives and promote well-being for all at all ages* – the Commission encourages the effective use of ICTs in health and care, with digital health as one of the core focus areas. The Broadband Commission launched its first Digital Health Working Group in 2016, which

published the report *Digital Health: A Call for Government Leadership and Cooperation between ICT and Health*. This report called for government leadership and intersectoral collaboration in digital health. In 2018, the Working Group released its second report, *The Promise of Digital Health: Addressing Non-communicable Diseases to Accelerate Universal Health Coverage in LMICs*, at the UN General Assembly. More recently, the Working Group on Digital AI & Health published a 2020 report, *Reimagining Global Health through Artificial Intelligence: The Roadmap to AI Maturity*, which provides guidance on evolving the use of AI globally through a maturity framework that supports policymakers in understanding where to make investments today to take advantage of AI advancements in the future. Working Group reports of the Commission analyze factors influencing various aspects of digital health with an aim to promote its equitable use. Through engagements with leading thought leaders and change makers and investigations of actual case studies and market trends, they synthesize a wealth of relevant information, which forms the basis of practical guidelines and recommendations for all stakeholders. Recommendations of the Working Groups on health underline that achieving the enormous potential of digital health requires resonance between political, social, and industry leadership.

**BROADBAND COMMISSION**  
FOR SUSTAINABLE DEVELOPMENT



## Purpose of the report

Rather than focus on specific technology innovations, the report aims to develop policy recommendations to promote the global use and integration of virtual health and care. In alignment with the Broadband Commission's vision of *People-Centred Approaches for*

*Universal Broadband* outlined in the *State of Broadband 2021*<sup>13</sup>, the report places special emphasis on policy actions that promote access and enhance health and care equity through virtual means.

The report is organized into six chapters that build upon each other.

1

**Chapter One** outlines the report's relevance and objectives.

2

**Chapter Two** explains key concepts and terminologies on the virtual delivery of health and care; it also clarifies its relation to digital health.

3

**Chapter Three** describes trends and effects of virtual delivery on health and care access, equity and outcomes, and highlights the impact of policy actions on them.

4

**Chapter Four** presents a roadmap for policy maturity in virtual health and care to ensure equity in access.

5

**Chapter Five** details the policy recommendations and actions for various stakeholders to collectively advance the enabling environment in which virtual health and care solutions can be developed, scaled, sustained, and benefit all.

6

**Chapter Six** concludes the report by highlighting opportunities to increase the equitable adoption of virtual health and care.

# 2

## What is Virtual Health and Care



## Defining the concept and terms of virtual health and care



A variety of terms and concepts exist in health and care today. For example, “eHealth”, “mHealth”, “telehealth”, and “health and care artificial intelligence” indicate the type of technology being used to solve health and care challenges. Recognizing the digital nature of these technologies, the World Health Organization (WHO) places them within “Digital Health” and defines it to be *the field of knowledge and practice associated with the development and use of digital technologies to improve health*.<sup>37</sup>

Digital health supports traditional health and care, which typically requires physical contact or in-person visits, in various ways. Through proactive health management, better treatments, or real-time monitoring and tracking of public health emergencies, digital health is constantly improving health and care administration and delivery, and ultimately the

experience. This reflects the dynamic nature of the relationship between patients and health and care providers and the ongoing cultural transformation of traditional health and care.<sup>38</sup>

The COVID-19 pandemic played an important role in speeding up the digitization of traditional health and care. As countries adopted measures such as social distancing and phased lockdowns, we saw an acceleration of certain aspects of digital health that do not require physical contact for health and care to be delivered, meaning the virtual delivery of digital health services.

*Virtual* denotes the way a digital health and care solution is delivered, which is remotely. It shows the mode of interaction between involved stakeholders for solving a given health and care challenge digitally.



This means that the patient and health and care provider can be anywhere and engage at any time, at least in principle. Thus, virtual delivery not only expands the reach of traditional health and care by enabling last-mile delivery but is also essential for completing the continuum of care. Today, it is proving to be especially relevant for managing the pandemic along with other health and care challenges such as inequity and inaccessibility of many brick-and-mortar health facilities.

**The removal of space-time barriers through virtual delivery has put the focus back on the individual, where it should belong.**

Facilitated by virtual and digital means, patients and health and care providers are now better informed because they can communicate in real time with each other. Due to its continuous nature, this communication reflects the patient's environmental and societal contexts more realistically. Likewise, health and care providers can also give patients relevant

information through faster collaboration with other specialists as needed. Thus, patients as well as health and care providers can ask the right questions quickly and efficiently. As a result, they can take better, more personalized decisions for preventing and managing acute and chronic care needs. Driven by virtual delivery, this parallel revolution is improving the health and care experiences of patients and empowering them towards their overall well-being.

**Virtual health and care is the delivery of health and care services remotely through digital means and technologies.**

It is the way in which a major portion of health and care is being managed, administered, and delivered in the digital age. Understandably, it is seeing prioritized investments since the COVID-19 pandemic began. Given its importance for population and individual health, virtual health and care requires system-wide integration through relevant actions by all stakeholders.





# The scope of virtual health and care

Virtual delivery of health and care can be for existing or potential medical conditions, both either at the individual or the population level. These factors lead to two interrelated aspects:



Figure 6. The scope of virtual health and care

# 3

## Why Virtual Health and Care Policy Matters Today



# COVID-19 and virtual health and care

## Looking back: The effects of COVID-19 on virtual health and care

Health and care management and delivery is ever changing. Constant innovation has resulted in newer technologies that improve therapies and patient experiences, with digitization driving the current wave of transformation.<sup>36, 39, 40</sup> Interestingly, the rate of health and care digitization has increased exponentially since the first known global outbreak of the COVID-19 pandemic in Wuhan, China in December 2019, and its subsequent classification as a Public Health Emergency of International Concern by the WHO in January 2020.<sup>41</sup>

The WHO's Q4'2021 Global Pulse Survey shows that virtual health and care has been an essential component of mitigation and recovery strategies being deployed by countries to overcome essential service disruptions because of the COVID-19 pandemic and recover quality services.<sup>10</sup>

Out of the 95 countries surveyed:

**59%** provisioned home-based care where appropriate, and

**51%** deployed telemedicine.

The following instances and Figure 7 further illustrate that individuals and countries across the globe are increasingly using virtual health and care to make decisions and overcome health and care challenges.

### Proactive and preventive health management

The current pandemic has led to a growth in COVID-19 tracking and monitoring solutions which have helped countries proactively manage the situation and prevent further outbreaks.

**France:** *COVIDTracker*, a data visualization tool for public health decision-making, gained 700 K+ users within a span of six months.<sup>1</sup>

**India:** *Aarogya Setu*, a contact tracing app that had 190 million downloads within a year, making it one of the most downloaded COVID-19 tracing apps in the world in June 2021.<sup>2</sup>

**China:** *Health Code*, a color-code based tracking system for determining individual access to places and activities, was used in more than 300 Chinese cities covering 900 million+ people.<sup>3</sup>

An elegant example of epidemic management is the *Surveillance Outbreak Response Management and Analysis System (SORMAS)*, an open-source mobile digital business management system for epidemic control. Its modular nature enabled expansion across **Germany, Ghana, Fiji, France, Nigeria, Switzerland**, and other countries during the COVID-19 pandemic, reflecting a cross-fertilization of ideas.<sup>42</sup>

At the individual health level, several solutions for prevention and management of diseases through effective notifications and reminders emerged and saw growth during this period.

**Brazil, Hong Kong SAR, Israel, Italy, USA:** *Encephalog*, a digital platform for improving care in brain disorders that integrates clinical data from various sources, saw rapid expansion to multiple countries within six months.<sup>43</sup>

**USA:**

- *Apollo Neuro*, a wearable for touch and vibration therapy for stress prevention and relief, had a 94% acceptance rate within a year of launch.<sup>44</sup>
- *Ochsner*, a hypertension management solution for health coaching and medication adjustments that works with electronic health records to wirelessly transmit

measurements, helped 71% of patients achieve target blood pressure compared to 31% under usual care.<sup>45</sup>

- *Rosy*, a female sexual health and wellness digital solution, enabled and trained 97% of health and care workers on its platform to discuss sexual health issues with patients within two years starting 2019.<sup>46</sup>

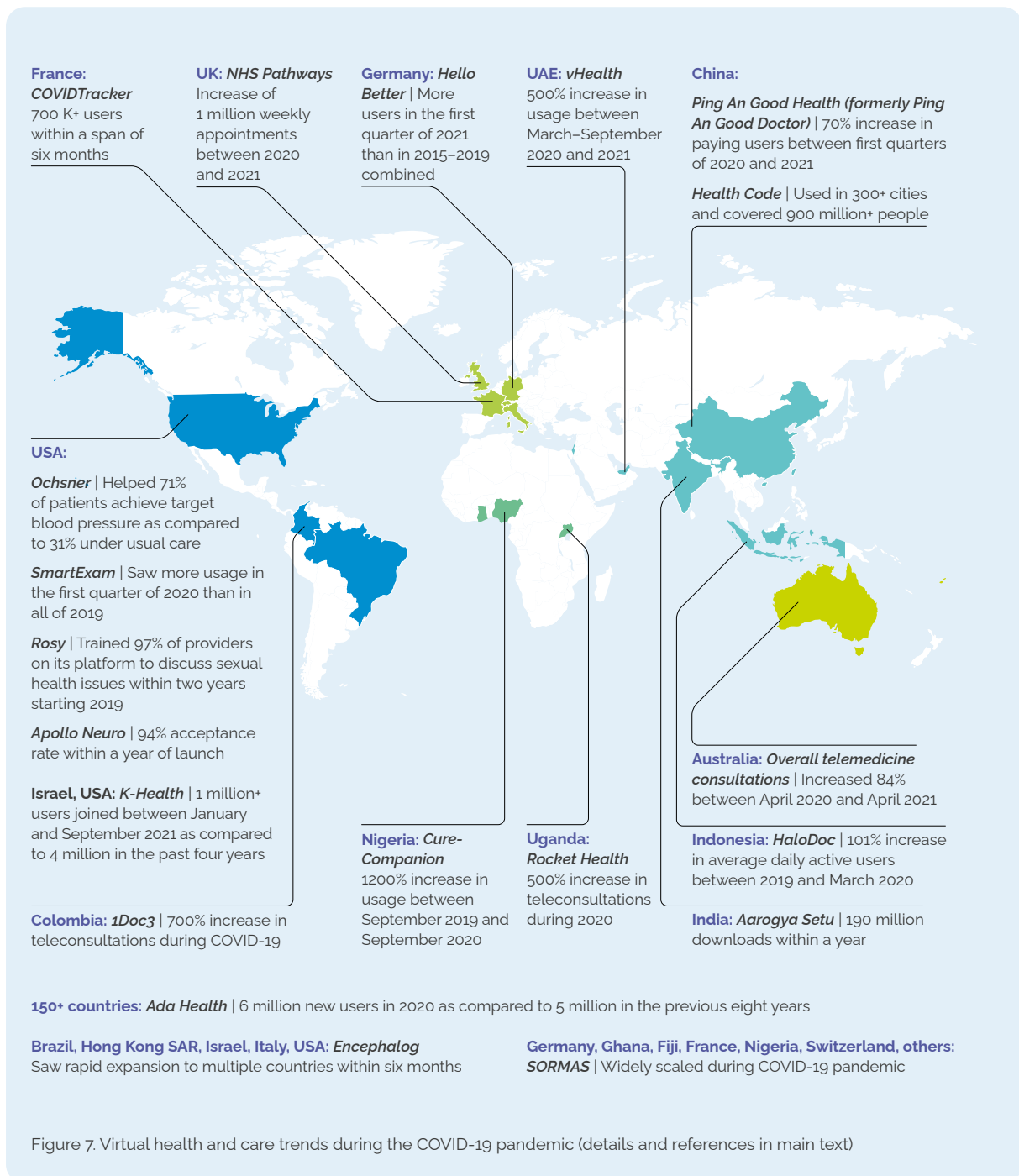


Figure 7. Virtual health and care trends during the COVID-19 pandemic (details and references in main text)

## Care navigation

With health and care systems stretched to their limits due to the COVID-19 pandemic, triaging solutions saw a noticeable increase in use and helped to optimize resources and prioritize clinical emergencies.

**UK:** *NHS Pathways*, a triage and clinical decision support system, saw an increase of 1 million weekly appointments being attended to by general practitioners between 2020 and 2021.<sup>9</sup>

**USA:** Bright MD's *SmartExam*, an automated asynchronous patient navigation system, saw more usage in the first quarter of 2020 than in all of 2019.<sup>47</sup>

## Telehealth

Through the COVID-19 pandemic-induced lockdowns, synchronous and asynchronous consultations enabled communication between patients as well as health and care providers and saw a remarkable growth.

**China:** *Ping An Good Health (formerly Ping An Good Doctor)*, a teleconsultation platform, climbed 70% in paying users between the first quarters of 2020 and 2021.<sup>48</sup>

**Indonesia:** *HaloDoc*, a teleconsultation platform, saw a 101% increase in average daily active users between 2019 and March 2020.<sup>7</sup>

**Australia:** Overall telemedicine consultations, rose 84% between April 2020 and April 2021.<sup>49</sup>

**UAE:** *vHealth*, an international telehealth provider, reported a 500% increase in usage of its app in the UAE between March–September 2020 and the same period in 2021.<sup>8</sup>

**Uganda:** *Rocket Health*, a teleconsultation platform, went up 500% in teleconsultations during 2020.<sup>50</sup>

**Nigeria:** *CureCompanion*, a telemedicine platform, saw a 1200% boost in usage between September 2019 and September 2020.<sup>51</sup>

**Colombia:** *1Doc3*, a teleconsultation platform, enjoyed a 700% increase in teleconsultations between December 2019 and June 2020.<sup>52</sup>

## Smart diagnostics and digital therapeutics

Digital solutions that utilize big data and machine learning to provide care also recorded impressive increases in use.

**Germany:** *Hello Better*, a digital therapeutic for stress, exhaustion, insomnia, and depression, had more users in the first quarter of 2021 than in 2015–2019 combined.<sup>6</sup>

**150+ countries:** *Ada Health*, an algorithm-enabled, clinical literature-driven symptom checker, had 6 million users join in 2020, compared to 5 million in the previous eight years.<sup>4, 5</sup>

**Israel, USA:** *K-Health*, an AI-enabled platform that uses anonymized clinical data for diagnostics, had 1 million+ users join between January and September 2021, compared with 4 million in the past four years.<sup>53, 54</sup>

## Looking ahead: Forecasts for virtual health and care

The increased use of virtual health and care during the COVID-19 pandemic is helping users realize the potential of this new mode of health and care delivery. Apart from ensuring vital patient-doctor communication, it practically removes travel and saves time as well as associated costs. In the words of a patient accessing telehealth services for the first time in 2021: *"As soon as I saw my doctor's face and heard his voice, it was wonderful. He was able to see where I lived and see my dog, getting a better sense of who I am."*<sup>55</sup> Similarly, a doctor describing the recent use of telehealth stated, *"Before the pandemic, I would have definitely said: 'Yeah, there are some specialties that won't be able to do video visits at all, I was surprised how well our doctors and staff figured out how to get patient history and information.'"*<sup>56</sup>


Several recent surveys also suggest that users want to take advantage of virtual health and care solutions going forward.<sup>57, 58</sup>


The global virtual health and care market is also rising to the occasion. Pre-COVID-19 pandemic, the expected average compound annual growth rate of the global telemedicine market for 2019–2025 was 14.5%. This has now increased by seven percentage points to 21.8%.<sup>35</sup>

In line with these developments, the regulatory sector has demonstrated recognition, intent, and action to support the growth of virtual health and care.


*"As the COVID-19 pandemic continues, maintaining the expansion of telehealth remains critical to providing access to care."*  
USA CDC, 2021<sup>59</sup>


### Patients are willing to continue using virtual health and care

 60% of patients want to use technology more for communicating with health and care providers and managing their conditions

 76% of patients want virtual care visits to be a standard part of their care regimen

### Providers want to integrate virtual health and care sustainably into new care models

 83% of health and care providers intend to continue the use of telehealth post-COVID-19 pandemic

 68% of physicians believe that telemedicine will have a lasting impact on the doctor-patient relationship


 71% of health and care providers plan to integrate telehealth payments in their reimbursements

Figure 8. Recent surveys indicating that users want to continue using virtual health and care<sup>33, 34, 57, 58</sup>

*"Relative to its ability to improve access in high-income countries ..., the ability of virtual healthcare to increase access to healthcare is potentially even greater in LMICs, where there can be severe geographical barriers to access to in-person healthcare."*  
Nature Medicine, 2021<sup>60</sup>

As we now learn to live with COVID-19, a hybrid mode of life is increasingly becoming the norm. Virtual and in-person events are happening together and being accepted in different areas of daily life, including in health and care. Expectedly, the highs of virtual health and care observed during initial COVID-19 waves have now come down. However, the new baseline is noticeably higher than pre-COVID-19 pandemic levels. This can be seen in the cases of the USA and India as shown in Figure 9.

In the USA, the levels of telehealth out of total health claims peaked at 13% in May 2020, coinciding with the release of “gating criteria” for reopening the economy. Conservative estimates show that these levels were around 5% in January 2022 – 25-fold higher than the pre-COVID-19 level of 0.2%.<sup>11, 61</sup> In India, synchronous teleconsultations on the national teleconsultation and e-outpatient service *eSanjeevani* were four-fold higher in February 2022 as compared to October 2020.<sup>12, 62</sup>

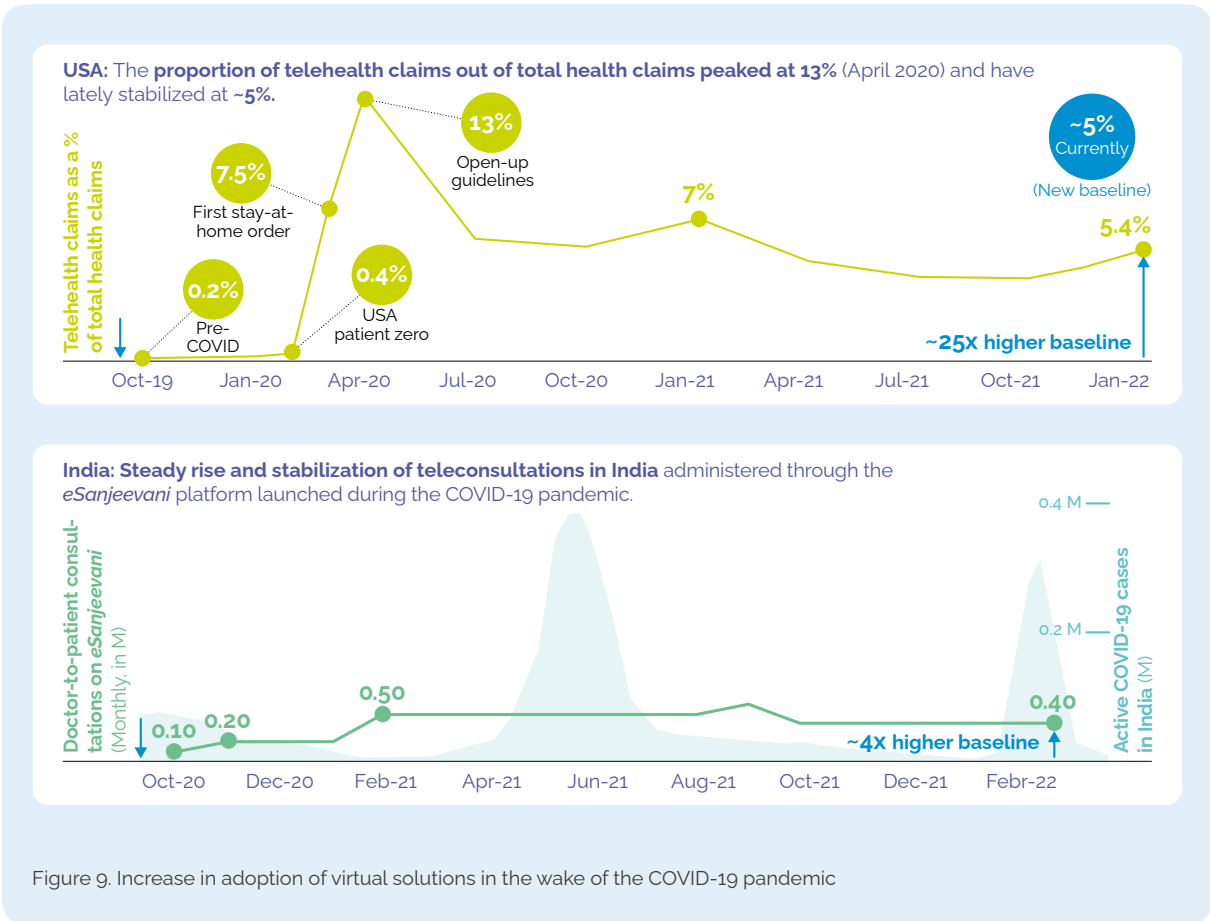


Figure 9. Increase in adoption of virtual solutions in the wake of the COVID-19 pandemic





Thus, there is a clear intent from users as well as regulators to continue using virtual health and care, which is slowly but surely shaping the evolution of health and care delivery. As Figure 10 shows, a hybrid continuum of

care – in which virtual and in-person delivery complement each other to achieve better health outcomes – has taken shape and will become the way we experience health and care.

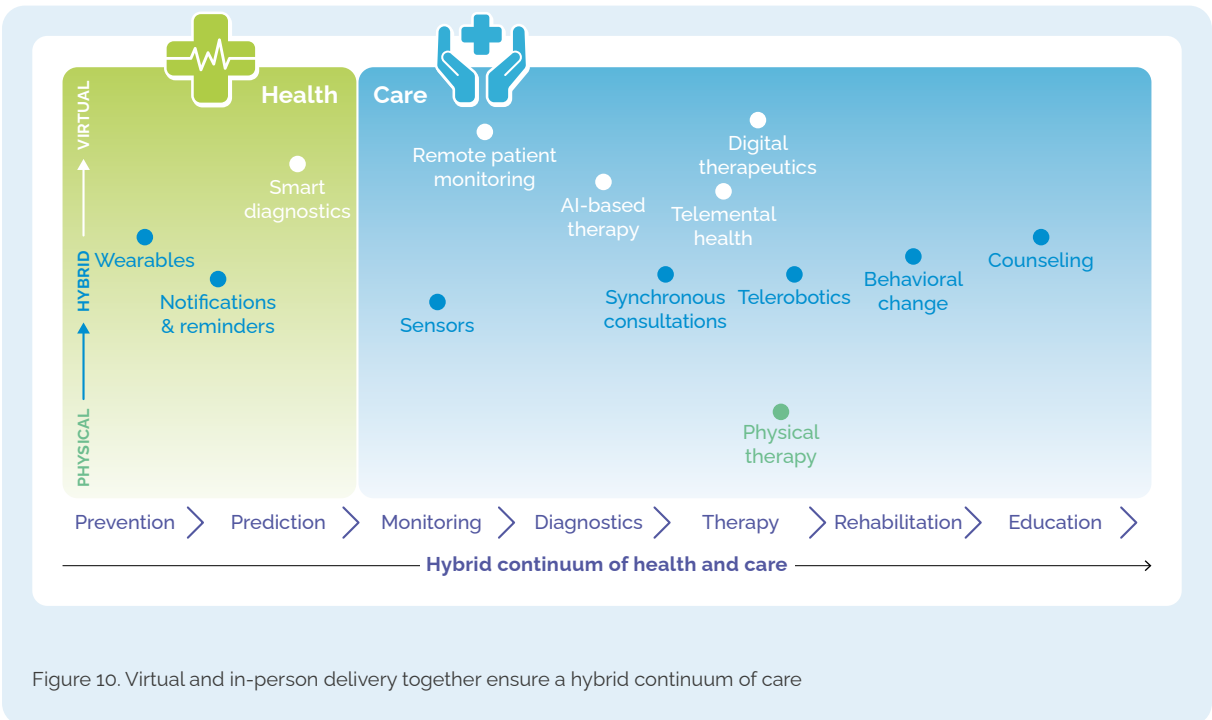


Figure 10. Virtual and in-person delivery together ensure a hybrid continuum of care



# Bridging equity divides through virtual health and care

While there has been an exponential uptake in virtual health and care solutions, this has not translated into equitable access to care or equitable outcomes. In fact, virtual delivery has at times reinforced existing barriers to health and care or even worsened inequities. The findings in this section elaborate on those divides and reinforce the importance of digital tools as an important determinant of health.

**Digital transformations are new determinants of health and weak governance of digital technologies is causing health inequities and compromising human rights.**

**The Lancet and Financial Times Commission on Governing Health Futures 2030<sup>63</sup>**

The United Nations Economic and Social Council declares that *health is a fundamental human right indispensable for the exercise of other human rights*. Further, *every human being is entitled to the enjoyment of the highest attainable standard of health conducive to living a life in dignity*.<sup>64</sup> The concept of a “dignified life” reflects societal standards of morality and justice. It considers the social and environmental determinants of each individual’s life while allocating resources to achieve an equal result for all.

An individual’s health could be the most important factor in one’s life, as it determines to a large extent one’s ability to participate in the workforce and contribute to society. Thus, fair access to quality health and care is essential for exercising the fundamental right to health.

**Health and care equity is the absence of unfair, avoidable or remediable differences among groups of people, whether those groups are defined socially, economically, demographically, or geographically or by other dimensions of inequality (e.g., sex, gender, ethnicity, disability, or sexual orientation). It is achieved when everyone can attain their full potential for health and well-being.**

**World Health Organization<sup>65</sup>**

Realizing the value and importance of this fundamental right and the need to ensure equitable access to health and care, SDG 3 sets several targets to help member countries on the road to health and care equity. These include reducing maternal mortality, ending preventable child deaths, eradicating or reducing AIDS and other diseases, and achieving universal health coverage through access to quality essential health and care services and access to safe, effective, quality, and affordable essential medicines and vaccines for all.<sup>66</sup>

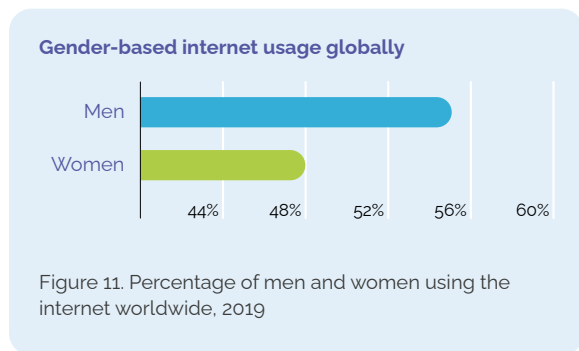
The multiple dimensions of inequity described above are currently faced with health and care digitalization. In addition to historical factors, the unequal availability of digital technologies and unfamiliarity with their use has introduced digital divides in health and care. The WHO’s global strategy on digital health refers to these divides as *the gap between demographics and regions that have access to modern information and communications technology and those that do not or have restricted access. This technology can include the telephone, television, personal computers, and the internet*.<sup>67</sup>

Virtual health and care relies on information and communication technologies. So, there is a possibility that digital divides and other forms of inequity could reduce its potential. However, it can also be an efficient way to address the inequities. The World Economic Forum's Edison Alliance notes that *using digital tools to provide connected care creates an unprecedented opportunity to bridge gaps and reduce health disparities* and provides key principles for digital health inclusion.<sup>68</sup> In fact, several examples show that when used with the aim of achieving health and care equity, virtual health and care can bridge these divides through focused actions at the individual or policy level.

### Overcoming exclusion by gender

**Barrier:** In general, women have lower levels of adoption of the internet and digital technologies as compared to men.

The ITU estimates that in 2019, 55% of males used the internet worldwide as compared to 48% of females. Also, women in low- and medium-income countries are still 20% less likely than men to use mobile internet, meaning around 300 million fewer adult women than men use mobile internet globally.<sup>13</sup>



**Solution:** Special initiatives and outreach for women that cover all levels of health and care digitization. For example, public maternal health programs that do not require smartphones or special knowledge of digital tools.

**Uganda:** *FamilyConnect*, an SMS-based service by the Ministry of Health's Community Health Suite of Tools, sends targeted messages to expecting and new mothers, male partners, and caregivers for ensuring optimal child and maternal health.<sup>21</sup>

**South Africa:** *MomConnect*, a mobile health initiative by the National Department of Health, improved maternal health and antenatal services in more than 60% of cases nationally.<sup>69, 70</sup>

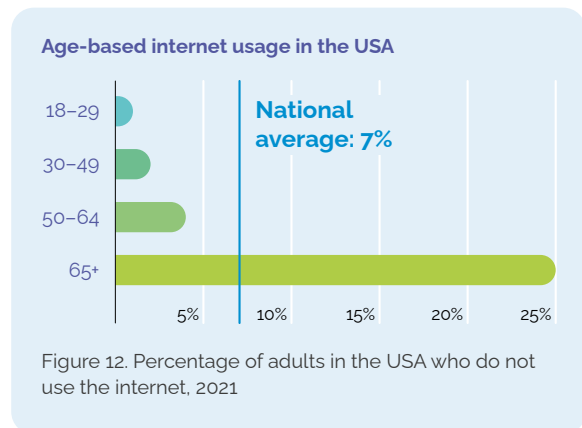
**Bangladesh:** *Maya*, a digital health and care platform with approximately 10 million unique users, helps women address sensitive issues like reproductive and mental health.<sup>71</sup>

**Ghana:** *Massira*, a health and care services aggregator for women, provides sexual, reproductive, and mental health counseling and education.<sup>72</sup>

### Overcoming exclusion by age

**Barrier:** In general, older people are less likely to use digital media, including the internet.

A 2021 survey of adults in the USA shows that 25% of people older than 65 years do not use the internet, the highest among all adult age groups.<sup>14</sup>



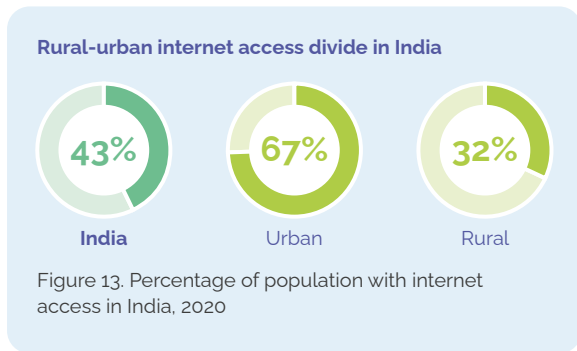
**Solution:** Specific training and outreach programs for older health and care doctors and workers.

**UK:** Webinars, e-learning packages, and virtual drop-in clinics organized in collaboration between the National Health Service (NHS) and Doctor Care Anywhere trained older doctors in new health and care delivery models.<sup>22</sup>

**Overcoming exclusion by rural-urban socio-economic divide**

**Barrier:** In general, rural areas have less communication connectivity in comparison to urban regions.

2020 data from India shows rural internet access is roughly half of that in urban localities.<sup>15</sup>



**Solution:** Delivery solutions based on elementary digital communication protocols.

**Kenya and Uganda:** *Smart Health*, an application created by Living Goods and Medic Mobile that runs on government-provided, low-cost basic smartphones, enables real-time on-site data collection in rural households to improve diagnosis and standardize treatment protocols. Community health workers can use Bluetooth to upload data in areas that lack internet.<sup>73, 74</sup>

**Sri Lanka:** *oDoc*, an application that also runs on feature phones, expanded outreach channels using SMS and calls to increase the

rural coverage of health and care services during the COVID-19 pandemic.<sup>75</sup>

**India:** *My Teledoc*, a telemedicine service used by health and care workers, remotely connects to clinicians over low-bandwidth connections to increase health and care services for people in remote rural areas.<sup>23</sup>

**Overcoming exclusion by income socio-economic divide**

**Barrier:** Usually, low-income groups have lower internet access rates and speeds as compared to high-income groups.

2021 data from Colombia shows a positive correlation between income levels and internet connectivity. High-income groups have almost 1.5 times better access and 4 times faster speeds than low-income groups.<sup>16</sup>

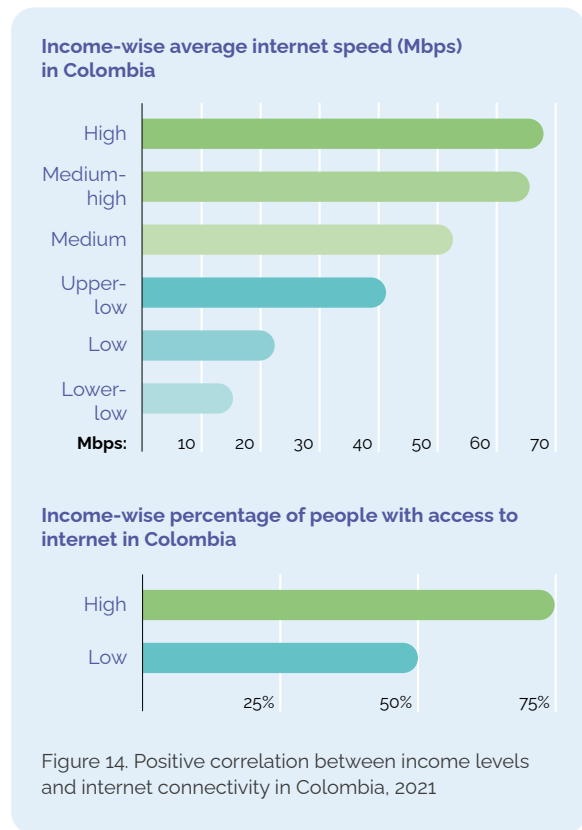


Figure 14. Positive correlation between income levels and internet connectivity in Colombia, 2021

**Solution:** Targeted services and direct outreach to low-income groups.

**Chile:** *TytoCare* and *Vitaltec*, telehealth providers, use artificial intelligence (AI)-enabled handheld devices to provide primary care to underserved communities and low-income groups, resulting in increased coverage and patient meeting frequency with only 30% of the total budget.<sup>24</sup> These devices can collect health and care data and can forward it instantly to a remote clinician for consultation or store it for later reference in the absence of an internet connection.

**India:** *My Healthline*, an interactive voice-response helpline, provided marginalized sections, such as migrant workers and urban and rural poor, accessibility to quality general and mental health services during the initial phases of the COVID-19 pandemic.<sup>76</sup> It enabled teleconsultations through phone calls from a case manager without requiring internet connectivity; the case manager connected to a remote doctor using Ayu, an evidence-based digital assistant.

### Overcoming exclusion by social group

**Barrier:** In general, minority groups have lower access to internet and virtual health and care.

The rate of premature excess deaths per 100,000 people in the USA for American Indians, African Americans, and Hispanics is three times that of Caucasians or Asians.<sup>17</sup> Further, the number of African Americans that lack internet in the USA is twice the national average.<sup>18</sup>

**Solution:** Solutions and communications implemented considering all sections of society.

**USA:** *Heart Safe Motherhood*, an evidence-based program that uses text messaging to improve the health outcomes and experiences of postpartum women with hypertension, finds that white or black women are equally likely to engage and benefit.<sup>25</sup>

### Overcoming exclusion by language

**Barrier:** The use of language differs noticeably in the physical and digital worlds.

Roughly 90% of the top 10 million websites use only 10 languages spoken around the world. Almost 60% of the websites are in English, while the global English-speaking population is only 16%.<sup>77</sup> Only 1.4% of the websites are in simplified Chinese, despite the global simplified Chinese-speaking population being 14%.

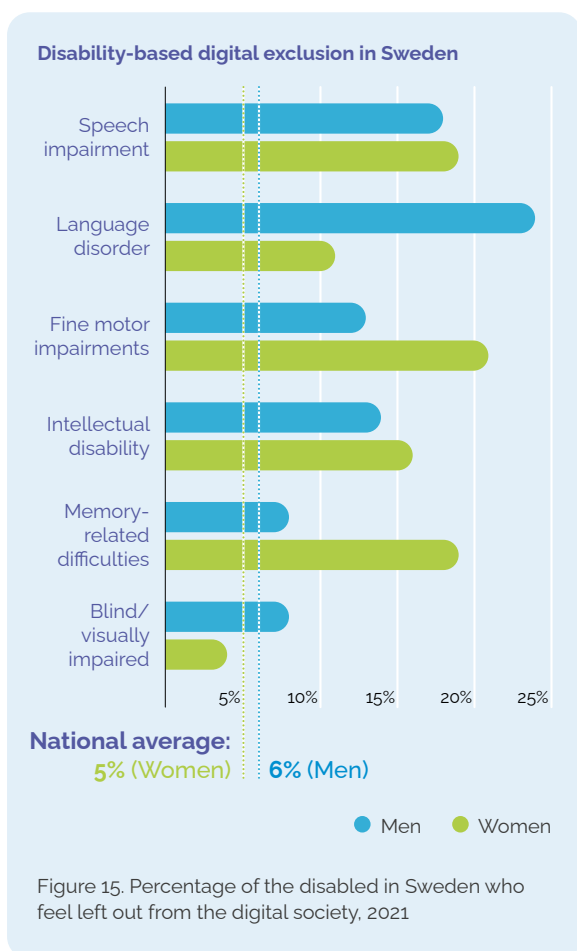
**Solution:** Content generated in multiple languages.

**UK:** The NHS developed COVID-19 vaccination awareness videos in several languages (Slovakian, Punjabi, Urdu, etc.) to build trust among the different linguistic segments.<sup>78</sup>

### Overcoming exclusion by disability

**Barrier:** Over one billion people experience some form of disability worldwide.<sup>19</sup> Many people with disabilities are left out from the digital society due to lack of accessible digital solutions based on universal design principles, such as those recommended by the Web Content Accessibility Guidelines.<sup>79</sup> The upcoming WHO-ITU global standard on accessibility of telehealth services outlines requirements for concrete accessibility features that solution and service providers need to ensure when delivering health and care virtually.<sup>80</sup>

A 2021 survey shows that disabilities worsen the digital divides: People across several types of disability lag in accepting and using digital technologies – even in Sweden, one of the most digitized countries in the world. For instance, they have less access to digital devices and are less comfortable with using the internet to pay bills or shop online. Also, in many groups of people with disabilities, a higher number of men report digital exclusion than women.<sup>20</sup>



**Solution:** Focused solutions based on universal design principles for people with disabilities considering the type of disability.

**Austria:** *Blitab*, an affordable smart Android tablet, enables digital inclusion of the visually-impaired and the blind through a Braille surface that creates tactile text and real-time graphics.<sup>81, 82</sup>

**Israel:**

- *Voiceitt*, a speech recognition technology innovator, developed an application that aids better communication in people with speech difficulties, which is especially relevant during audio-only teleconsultations.<sup>83</sup>
- *OrCam's MyEye 2.0*, a wearable assistive technology, gives independence to the visually impaired and the blind by providing hands-free access to visual information communicated by audio.<sup>27</sup> The technology enables users to read text instantly and discreetly from any surface, which is essential for using virtual solutions such as care navigation and digital therapies.

**UAE:** *Sanad Card*, a governmental digital service, helps provide specialized services such as electronic nursing surveillance, home medical consultation, etc. to persons with disabilities.<sup>26</sup>

**USA:**

- *iFitness*, a fitness application, offers a closed-captioning feature as an alternative to audio.<sup>84</sup>
- *Partners Health Plan*, a managed care plan, developed a telehealth program for people with intellectual disabilities and helped them avoid unnecessary hospital visits in more than 90% of cases.<sup>85</sup>
- *LanguageLine* integrates American Sign Language interpreters into major telehealth platforms and video services and conducts more than 40 million interpretations annually.<sup>86</sup>
- *IrisVision* application enables patients with macular degeneration to use telemedicine.<sup>87</sup>
- Drug retail chains *Rite Aid*, *Hy-Vee*, *Kroger*, and *Meijer* ensure vaccination appointment registrations for the visually challenged through websites developed as per the Web Content Accessibility Guidelines.<sup>88</sup>

## Virtual health and care outcomes

The medical community has long stressed the need for evidence-based medicine that promotes objective decision-making with regards to solutions that lead to the best health outcomes. The British Medical Journal describes evidence-based medicine as *the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients. The practice of evidence-based medicine means integrating individual clinical expertise with the best available external clinical evidence from systematic research.*<sup>89</sup>

Any medical technology needs to be systematically evaluated to ensure better patient outcomes. Previous years have seen a rapid increase in the numbers and types of digital applications aiming to improve user health and care. However, with little proof of their efficacy, coupled with a lack of clinical guidelines on their use case scenarios, physicians find it extremely difficult to decide and prescribe such digital solutions to patients. Evidence-based medicine requires evaluations to result in reproducible and robust proof showing the efficacy of the technology in improving the health and care of patients. Such evaluations are underway for various virtual health and care solutions, and initial results demonstrate their ability to achieve similar or better outcomes versus in-person delivery.

Evidence shows that population and individual-level disease prevention, patient monitoring and treatment adherence, treatment optimization, behavioral and mental health, and user education can benefit from the virtual delivery of health and care.

### **Virtual health outcomes**

Recent studies show that virtual delivery can be an effective support mechanism for managing the spread of diseases in communities as well as for providing relevant health-related information.

#### **Prevention, diagnosis, treatment, and management of diseases during the COVID-19 pandemic (2020)<sup>29</sup>**

A systematic review of studies clearly defining any use of telehealth services in all aspects of health and care finds that:

- Telehealth is appropriate in minimizing the risk of COVID-19 transmission for health and care providers and patients who are self-isolating.
- Telehealth has the potential to prevent any sort of direct physical contact, provide continuous care to the community, and reduce morbidity and mortality in COVID-19 outbreaks.

#### **Interventions on health literacy among parents of children with a health condition (2021)<sup>90</sup>**

Parental health literacy is associated with child health outcomes. Health and care providers are using digital interventions to share information and assist parents in managing their child's health conditions. A systematic review of studies on parents' engagement with digital health interventions, the effect of these interventions on parental health knowledge and health behavior, and the subsequent impact on child health outcomes in 2021 shows improvement in parental health literacy as either an increase in disease-specific knowledge or changes in health behavior.



## Virtual care outcomes

Several studies exhibit that virtual care can be an effective alternative to in-person care for improving delivery in a variety of care situations ranging from prevention to management.

### Virtual diabetes reversal program (2017, 2021)<sup>91, 92</sup>

Virta Health is an online diabetes reversal clinic that helps lower blood sugar while reducing or eliminating medications through continuous, remote care. A non-randomized outpatient intervention involving 238 type 2 diabetes patients over 10 weeks, providing intensive nutrition and behavioral counseling, a digital coaching and education platform, and physician-guided medication management, exhibits that:

- An individualized program delivered and supported remotely that incorporates nutritional ketosis is highly effective in improving glycemic control and weight loss while significantly decreasing medication use.
- It prevents progression to type 2 diabetes in 97% of pre-diabetic patients and achieves pre-diabetes reversal in more than 50% of cases.



### Telehealth consultations for prevention, assessment, diagnosis, and clinical management of acute or chronic conditions (2019)<sup>93</sup>

A systematic review of studies published on Ovid MEDLINE®, the Cochrane Central Register of Controlled Trials, and the Cumulative Index to Nursing and Allied Health Literature exhibits that:

- Virtual intensive care unit (ICU) consultations likely reduce ICU and total hospital mortality.
- Specialty telehealth consultations likely reduce the time patients spend in emergency units.
- Virtual consultations presumably improve access and clinical outcomes for outpatient care in wound care, psychiatry, and chronic conditions like diabetes.

### Virtual management of HIV (2020<sup>94</sup>, 2021<sup>95</sup>)

The HIV care continuum includes regular visits to the clinic. These are being replaced by telehealth consultations, especially during the COVID-19 pandemic. A systematic review of studies on HIV care provided through telemedicine demonstrates that:

- Telemedicine leads to better or at least similar suppression of viral loads in HIV patients.
- Virtual management has an increased potential for HIV prevention as well as for closing specific equity gaps. It is seeing an increased uptake of pre-exposure prophylaxis among the most at-risk young black and Hispanic segments by combining virtual solutions (telephone, mobile applications, websites, video conference calls) with laboratory testing in brick-and-mortar sites or at-home test kits.

### **Telemental health medication management using a collaborative care model (2021)<sup>96</sup>**

An experimental trial of 212 individuals over 17 months (in addition to therapy) finds that:

- A collaborative-care telemedicine medication management program is better than traditional care in reducing anxiety and depression symptoms.
- Widespread implementation of such virtual solutions could improve access to evidence-based mental health medication management.

### **Telemental health care in intensive-treatment-seeking adults (2021)<sup>30</sup>**

A comparative study of self-assessed depressive symptoms and quality of life in patients who received in-person, intensive psychological treatment prior to the COVID-19 pandemic to symptoms in patients who received telehealth treatment during the COVID-19 pandemic shows that:

- Telehealth is a viable care alternative with no significant differences between in-person and telehealth groups in depressive symptom reduction and increases in self-reported quality of life.

### **Virtual tumor boards (2021)<sup>31, 97</sup>**

Tumor board discussions improve pretreatment evaluation, proper staging, adequate treatment, quality of survivorship, and overall survival. A study assessing case discussion times between virtual and in-person tumor boards finds that:

- Virtual tumor board meetings are quicker and achieve similar results to in-person meetings for all the evaluated cancer types (breast; gastrointestinal; ear, nose, and throat; and hematopathology). This can improve efficiency through standardized case discussions based on uniform case presentations and data access.

A systematic review of studies defining the process of lung cancer-specific tumor boards and the transition process from face-to-face tumor boards to virtual ones shows that:

- Virtualization improves patient management in settings where funding and resources may be limited.

### **Digital counseling for improving anxiety, depression, and adherence to treatment among the chronically ill (2022)<sup>32</sup>**

A systematic review of studies on patients with chronic diseases for effectiveness of digital (mobile or web-based) counseling interventions shows that:

- Digital or web-based counseling environments for patients who are chronically ill are more effective than – or at least comparable to – standard counseling methods.

**Such real-world data-led evidence is essential for building user trust and ensuring objective and robust clinical and regulatory decisions.**



## Virtual health and care policy effects

Relevant policies are aiding the ongoing digitization of health and care as several countries have developed and implemented national digital health plans. The WHO's recent global strategy on digital health is a guide for countries to further shape their policies and increase the rate of digitization.<sup>67</sup>

During the COVID-19 pandemic, proper and timely policy changes in several countries increased the adoption of virtual health and care.

### Argentina: Law 27553, 2020<sup>98, 99</sup>

The legislation validates electronic prescriptions and licensing and promotes the 2007 national telehealth program developed in collaboration with the Pan American Health Organization (PAHO).

**Impact:** A six-fold overall increase in teleconsultations with noticeable participation from female users (54% increase), individuals over 60 years of age (5.7% rise) and people living with chronic noncommunicable diseases (70% upturn) between 2019 and 2020.

### China: National Telemedicine and Internet Medical Center guidelines, 2020<sup>100, 101, 102, 103</sup>

The guidelines regulate telemedicine practices and reimbursement mechanisms in alignment with high-level national health goals and public-private partnerships.

**Impact:**

- *Ping An Good Doctor* changed its name to *Ping An Good Health* to reflect the government's strategic focus on overall well-being through the Healthy China 2030 strategy.
- *Haodf*, a virtual health and care platform, saw a 75% increase in total service volumes for texts and phone calls in March 2020 compared to January 2020.
- Hangzhou in eastern China plans to adopt *Health Code* permanently following its success in several parts of the country.

### France: Ministry of Health Regulation, 2020<sup>104, 105, 106</sup>

The policy allows reimbursement of telehealth/virtual consultations.

**Impact:**

- A 50-fold increase in weekly virtual consultation reimbursements from roughly 10,000 prior to the COVID-19 pandemic to almost 500,000 in November 2020.
- A 25–40% increase in the use of telehealth platforms such as *Doctolib*, *Livi*, and *Qare*.

**Germany:** *Digitale-Versorgung-Gesetz, 2019*<sup>107, 108</sup>

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The policy regulates virtual health and care reimbursements and recognizes Digital Health Applications (DiGA) as therapeutics that can be prescribed.

**Impact:** 30 DiGAs preliminarily approved for prescription till March 2022.

**India:** *Ministry of Health Regulations, 2020*<sup>109</sup>

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The policies regulate data governance and implementation.

**Impact:** The private sector and residential societies made *Aarogya Setu*, the government's COVID-19 tracing application, compulsory to enable large-scale adoption – necessary for managing the pandemic – and helped it become the most downloaded COVID-19 tracing application in the world.

**Indonesia:** *Regulation of The Indonesian Medical Council Number 74 of 2020 on Clinical Privilege and Medical Practices through Telemedicine during Coronavirus Disease 2019 (COVID-19) Pandemic in Indonesia, 2020*<sup>7, 110</sup>

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The policy allows doctors and dentists to provide health and care services through telemedicine.

**Impact:** Increase in teleconsultations on several platforms such as *HaloDoc* (101%) and *Alodokter* (39%).

**United Arab Emirates:** *Health ICT Law, 2019*<sup>111, 112</sup>

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The policy enables the collection, processing, and transfer of health and care data among providers, insurers, and ICT infrastructure firms.

**Impact:** All 16 hospitals belonging to the Ministry of Health and Prevention started virtual outpatient clinic consultations in May 2020.

**United Kingdom:** *Using Online Consultations in Primary Care, 2020*<sup>9, 113, 114, 115, 116</sup>

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The policies promote capacity building and change management and regulate telehealth, triage infrastructure procurement, and data privacy in the COVID-19 tracing mobile application.

**Impact:**

- Health and care staff is equipped with a template for enabling non-digital users through the *NHS Pathways* triage process to overcome the digital divides.
- The revised *NHS COVID-19 Contact Tracing Application*, with improved data privacy features, was downloaded almost 19 million times, representing roughly 40% of European adults with smartphone access, until September 2020.

### United States of America: Federal and State regulations, 2020<sup>34, 117, 118, 119</sup>

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The temporary policies improve telehealth coverage, allow telehealth reimbursements for public and private players, and permit interstate virtual delivery.

**Impact:** A nearly 30-fold increase in telehealth visits\* between the year preceding March 2021 and March 2020, with close to 50% being first-time users.

**However, in several other countries, more suitable policy initiatives are required to promote virtual health and care.**

### Brazil<sup>120</sup>

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There is policy unclarity on data governance for a monitoring and tracing system (*SIMI-SP*) developed through public-private partnership for collecting cell phone positioning data to create an isolation index to detect disease hotspots, decide where authorities need to enhance patrols, and recommend social isolation.

**Current development:** The *SIMI-SP* project was abandoned initially because of data privacy concerns. After addressing some aspects, it is now being used to monitor adherence to COVID-19 guidelines.

### Japan<sup>121, 122</sup>

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Revised telehealth policies following the start of the COVID-19 pandemic addressed only some aspects regarding remote delivery, permitting first consultations through telemedicine, and providing a slight improvement in reimbursement parity.

**Current development:** Government regulations introduced in June 2021 permanently allowed telemedicine to be used for first consultations and online prescription counseling by a pharmacist.

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\**Medicare* differentiates between three kinds of virtual visits – telehealth consultation, e-visits, and virtual check-ins. Telehealth consultation occurs when the provider uses an interactive audio-video telecommunication system that permits real-time communication between the distant site and the patient at home. E-visits are non-face-to-face patient-initiated communications through an online patient portal while virtual check-ins are short patient-initiated communications with a health and care provider.

## Republic of Korea<sup>123, 124, 125</sup>

There are no specific provisions for telemedicine, and it is allowed temporarily under the emergency COVID-19 measures since February 2020. There is policy unclarity on the role of virtual health and care in national health and care strategy.

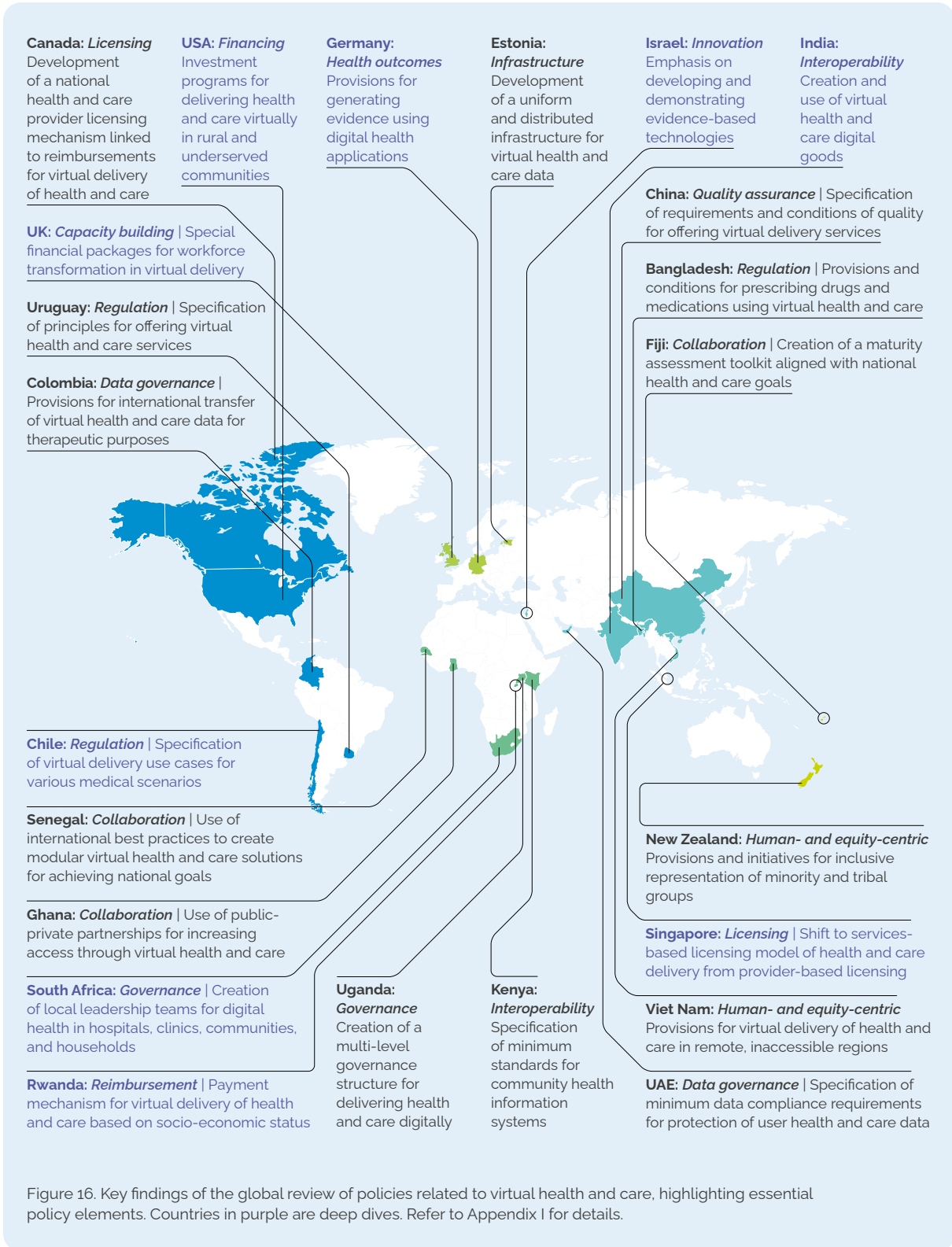
### Current developments:

- The local telemedicine player Doctor Now gained nearly a million patients in February 2022 (out of its cumulative 2.3 million users since December 2020).
- There is a call for policy-level actions to enable telemedicine after a change in attitude during the pandemic. For instance, the Federation of Korean Industries called for a need to pursue deregulatory actions for telemedicine in February 2021.

**Appendix I details the global landscape of policy developments related to virtual health and care over the past two years.** It shows **several interesting policy actions and initiatives** that are influencing the adoption of virtual health and care. Some of the key findings are:

- Enabling **cross-border health and care provider licensing** ensures continuity in the continuum of health and care delivery.
- Clarifying the **scope and the nature of teleconsultation** simplifies liability decisions.
- Demonstrating a positive health and care effect is the basis for **licensing and further prescription** of digital health applications.
- Considering specific **requirements of people with disabilities and minority groups** improves access to care and achieves equity.
- Establishing a **multi-stakeholder data registry based on interoperable standards** creates a single source of truth for virtual health and care data and reduces legal complexity.
- Passing **regular technology audits** determines if a virtual health and care provider receives reimbursement from the public health system.
- Developing **insurance models linked to individuals' socio-economic status** results in improved coverage.
- Using incentives and special **funding to promote solutions for people with disabilities and minority groups** achieves equity.
- Involving the **private sector for developing workforce trainings** enables transfer of best practices.
- Linking continuous education with the **authority to provide services** improves workforce skills and drives change management.
- Co-creating **policies and frameworks along with associated stakeholders** promotes adoption and ensures relevance.
- Encouraging **grassroots-level leadership** builds trust and ensures sustainable adoption.

Figure 16 summarizes these key findings of the landscape review.



The landscape review also identifies **several policymaking challenges** that still need to be overcome for increasing the adoption of virtual health and care.

**A person-centric, technology-agnostic and inclusive policy vision is not yet the key driver of virtual health and care policymaking.**

Policies are mostly being developed for the technology that is available – mobile, artificial intelligence, tele, etc. Solving health and care challenges by putting the person at the center and provisioning the right technology at the right place and time is needed for avoiding redundancies, achieving the full potential of each technology, and optimizing resource use.

**Licensing mechanisms remain uncertain for many aspects.**

Virtual health and care is based on remote delivery. Clarifying health and care provider licensing mechanisms including cross-territorial licensing – providers in one country offering services to customers in another – is needed for ensuring payment parities, establishing liability, and safeguarding equitable distribution of clinical expertise.

**Health and care equity remains an afterthought.**

A large proportion of the population cannot access virtual health and care solutions due to digital divides. Promoting digitally inclusive health and care that recognizes the level of access to devices and internet and supports technology use is needed for achieving health and care equity.

**Evidence-based decision-making is not the norm for policy decisions.**

Virtual health and care data exists in silos. Generating evidence by opening this data through appropriate data governance measures, standards, and interoperability is required to exhibit health outcomes that ensure robust decision-making.

**Data security and individual privacy continue to be areas of concern.**

Virtual health and care delivery solutions rely on data – individual, clinical, transactional, operational, etc. Developing user trust by demonstrating that their data is not misused at any stage of the delivery chain, either within the country or outside, is essential.

**Reimbursements for virtual delivery exist in parallel with those for traditional health and care.**

Paying for health and care is a necessary expense for any individual or family. Creating a unified payment mechanism based on complementary use cases for both delivery modes is required for increasing the grassroot-level adoption of virtual health and care.

**New business models are seldom inspired by better health outcomes.**

The longevity of any health and care technology depends on its utility in improving patient lives. Making better health outcomes the core driver for new business initiatives is important for ensuring a robust bottom line through evidence-based solutions.

**Virtual delivery training is seen as an add-on.**

Health and care is rapidly changing through virtual delivery. Developing integrated curricula based on complementary in-person and virtual delivery of health and care is essential for building a competent workforce that provides continuous improvements in service delivery.

**Policy development and implementation often skips key partnerships.**

Stakeholders give life to policies. Identifying and continuously working together with relevant partners is essential for ensuring development of relevant policies, especially when user behavioral change is crucial for accepting and adopting new modes of health and care delivery.

Altogether, these developments show that policies enacted to date remain more technology-specific and that there is a need for a more comprehensive policy framework to enable a holistic approach to scale up the adoption of virtual health and care.





# 4

## Roadmap for Maturity





# Introducing the roadmap for policy maturity in virtual health and care

## What is a maturity roadmap?

A virtual health and care policy maturity roadmap is a practical guide to realize clearly defined goals for scaling and integrating virtual technologies in mainstream health and care delivery through inclusive policy actions.

The maturity roadmap is derived from the review of the global landscape of virtual health and care policies detailed in Appendix I.

Findings from the 23 selected countries showed varying levels of adoption of virtual health and care. These findings have been assessed to define maturity levels for various policy elements which are relevant for virtual health and care. The levels reflect a continuous journey that aims to make quality health and care available to all. Along the journey, three different levels indicate progress, with each building upon the previous one.

## Are the maturity levels applicable to every country?

The landscape review includes countries that have made progress in integrating virtual delivery across all levels. Country examples within the maturity levels help in describing that level and highlight best practices; they are not an objective evaluation of maturities. Thus, countries are free to assess and choose maturities for different policy elements in alignment with their national health and care goals.

## Why is a roadmap needed?

The roadmap for maturity in virtual health and care guides the integration of virtual delivery in mainstream health and care for achieving health and care equity efficiently. It encourages policymakers to continuously improve different areas of virtual health and care policymaking to achieve accessibility and universal health coverage and overcome health and care challenges.

Given the renewed interest and increasing use of virtual delivery of health and care worldwide, this roadmap for maturity can speed up its integration into the mainstream. Being based on experiences across country income groups, it promises efficient utilization of available resources across all economic scenarios to achieve national health and care goals.

# Maturity framework

The landscape review points to 15 policy elements essential for a virtual health and care policy framework. These fit organically into the six maturity pillars of the AI maturity roadmap from the Broadband Commission's 2020 report on *Reimagining Global Health*

*through Artificial Intelligence: The Roadmap to AI Maturity.*<sup>36</sup> These pillars are natural groupings of the respective policy elements. They enable developing and implementing mutually exclusive but collectively exhaustive policies.

## Governance and regulatory

Provide essential administrative and regulatory structure through strategies, plans, and guidelines.

**Policy elements:** governance, regulation, licensing, liability, quality assurance

## Design and processes

Encourage user-friendly solutions by focusing on the individual through research and development and effective use of data in decision-making.

**Policy elements:** human- and equity-centric, innovation, health outcomes

## Data and technology

Ensure the flow of data by blending hardware with evolving software and delivery standards.

**Policy elements:** infrastructure, data governance, interoperability

## Business models

Supply financing and coverage through different funding sources, sustainable investments, and innovative pricing models.

**Policy elements:** financing, reimbursement

## People and workforce

Equip different stakeholders with the required know-how through trainings, continuing education, skill upgrades, and competency building.

**Policy element:** digital skills building

## Partners and stakeholders

Bring together different players in the ecosystem through partnerships and teamwork.

**Policy element:** collaboration



Figure 17. Virtual health and care policy maturity framework



## Governance and regulatory

This pillar provides the necessary administrative and regulatory structure through strategies, plans, and guidelines. It has five policy elements.

**Governance:** Overall strategic direction and guidance that improves systemic efficiency for identifying and achieving national health and care goals.

**Regulation:** Process by which institutional actors define, monitor, modify, or shape activities associated with virtual delivery of health and care.

**Licensing:** Service delivery authorization that enables health and care providers to offer virtual delivery services.

**Liability:** Criteria that establish accountability of various stakeholders under different virtual delivery use cases.

**Quality assurance:** Systemic checks and balances that ensure a minimum standard of virtual delivery built upon reliability, accuracy, and safety.



## Design and processes

This pillar encourages user-friendly solutions by laying focus on the individual through research and development and effective use of data in decision-making. It contains three policy elements.

**Human- and equity-centric:** Principles that guide inclusive policymaking for ensuring a balanced use of available technologies to solve problems with patient-centric solutions.

**Innovation:** Processes that improve existing technologies or create new ones for improved access and better therapies.

**Health outcomes:** Evidence-based results that aid in the evaluation and selection of technologies for clinical use and policy decisions.

## Data and technology

This pillar ensures the flow of data by blending hardware with evolving software and delivery standards. It contains three policy elements.

**Infrastructure:** Hardware and service standards that enable virtual delivery operations.

**Data governance:** Mechanisms that govern virtual health and care data collection, storage, processing, transfer, security, and management.

**Interoperability:** Mechanisms that enable the use of virtual health and care data among different systems.

## Business models

This pillar supplies financing and coverage through different funding sources, sustainable investments, and innovative pricing models. It has two policy elements.

**Financing:** Approaches that make funds available for offering, improving, and integrating virtual delivery.

**Reimbursement:** Financing mechanisms through which the public or private sector provides coverage for virtual delivery to reduce out-of-pocket spending.

## People and workforce

This pillar equips different stakeholders with the required know-how through trainings, continuing education, skill upgrades, and competency building. It has one policy element.

**Digital skills building:** Initiatives to equip different stakeholders with the know-how to practice and use virtual health and care.

## Partners and stakeholders

This pillar brings together different players in the ecosystem through partnerships and teamwork. It has one policy element.

**Collaboration:** Cooperative methods for sharing knowledge, encouraging ownership, and improving trust to increase the adoption and integration of virtual delivery.

Maturity in virtual health and care depends on the maturity of these policy elements, either individually or in combination, depending on the goal. For instance, health and care provider licensing is deeply linked with reimbursement, liability, digital skills building,

health outcomes, and quality assurance. Thus, it is essential to consider aspects of the other linked policy elements – including the affected stakeholders – while developing licensing mechanisms.

**Identifying inter-linkages and dependencies among individual policy elements is essential for developing holistic policies that simplify the governance structure, strengthen the individual policy elements, and drive maturity.**

The following section identifies several enablers for achieving continuous growth in all policy elements across different levels of maturity.



# The roadmap for policy maturity in virtual health and care



## Governance and regulatory

### Governance

#### Maturity vision

People-centric, technology-agnostic, and inclusive policy frameworks for overcoming existing and long-term health and care challenges.

#### Enablers

- Developing people-centric health and care governance structures driven by aims of increasing access and achieving equity.
- Considering and integrating dependencies on external sectors such as ICT to reduce redundancies and introduce efficiency.

#### Maturity levels

##### Level 1

- **National health policies recognize the importance of virtual delivery of health and care.**
- Governance mechanisms for virtual health and care are in place since the COVID-19 pandemic began or are being considered.

##### Level 2

- **A strategic (short-/mid-term) virtual health and care policy framework is in place, institutionalized and administered through a dedicated body.**
- Virtual delivery use cases are identified, and their practice is managed through notifications, strategies, plans, and guidelines.  
**Example:** India's National Digital Health Blueprint is the country's architecture for creating a national digital health ecosystem and is being implemented through the National Health Authority.

##### Level 3

- **There is one cohesive health and care policy framework for achieving the country's long-term health and care goals that connects all policies, guidelines, and recommendations (as compared to separate telehealth policy/digital health policy/eHealth policy/artificial intelligence policy, etc.).**
- Increasing access and achieving equity are the drivers of policy formulation.  
**Example:** New Zealand's Our Health and Disability System outlines its strategy for integrating the needs of people with disabilities while formulating national health and care policies and explains how the country plans to strengthen its health systems to ensure equity and consistency considering the population segment with disabilities.
- Virtual health and care is an essential component of the continuum of care.
- The governance structure allows integrating new technological developments into the existing policy framework through mechanisms such as **sandbox regulation**, in which new products and services can be tested within controlled environments.

## Regulation

### Maturity vision

Clear and flexible rules that allow periodic feedback to ensure balanced distribution of virtual health and care services.

### Enablers

- Aiming for equitable distribution of health and care services.
- Ensuring guidance updates in alignment with existing health and care challenges and societal concerns.
- Implementing circular feedback principles throughout the regulatory value chain for increasing trust by assuring that the feedback is correctly addressed: action (e.g., a new regulation) > reaction (e.g., response of stakeholders) > action (e.g., implementing change as per the response) > reaction (e.g., revised regulation).

### Maturity levels

#### Level 1

- Regulatory landscape is reactive to new situations (e.g., the COVID-19 pandemic) and technologies (e.g., mHealth, digital health).

#### Level 2

- The importance of virtual delivery of health and care is recognized in national health goals.
- **Essential policy elements for enabling virtual health and care are identified and directives are issued for their practice.**
- Patient and user rights are considered during every stage of policymaking and implementation including, for instance, in feedback response mechanisms.  
**Example:** Singapore's launch of a *TraceTogether* token was in response to the privacy and security concerns arising out of its *TraceTogether* mobile application.

#### Level 3

- **Regulations governing virtual delivery of health and care complement in-person services to ensure equitable access to health and care through a hybrid model of the continuum of care.**
- Focus is on solving national health challenges through innovation enabled by a proactive and permissive regulatory environment.
- Regulations on various virtual health and care use cases specific to various medical specialties are in place.
- Flexibility by design allows relaxation of guidelines to manage unforeseen circumstances for ensuring availability of health and care virtually.  
**Example:** The USA's temporary relaxation of HIPAA compliance allowed providers and patients to maintain continuum of care during the COVID-19 pandemic.

## Licensing

### Maturity vision

Efficient and periodically revised health and care provider and system authorization for ensuring proficient and equitable distribution of medical expertise.

### Enablers

- Assessing if existing authorizations are sufficient to ensure the delivery of a minimum-accepted standard of care.
- Developing additional authorization mechanisms through required trainings and continuing education for specific use cases.
- Realizing the essential remote nature of virtual delivery and provisioning cross-border delivery with necessary checks and balances.



## Maturity levels

### Level 1

- A general medical practice license is sufficient for offering virtual health and care services.
- Licensing provisions are temporary and contingent upon the prevailing situation.

### Level 2

- **Accreditation is based on international standards, including those for digital practice in virtual health and care, for guiding training curricula and is overseen by a designated accreditation body.**
- Specific trainings for offering virtual delivery of health and care are offered and required at primary, secondary, and tertiary care levels for building and upskilling workforce capacity.
- There is a distinction between virtual health and care provider licensing modes.

**Example:** Singapore's doctors need a license, but software platforms and alternate medicine providers do not.

### Level 3

- Cross-border (inter-/intra-state) virtual delivery of health and care is integrated in the health and care system through appropriate provisions for liability, reimbursement, and quality assurance.
- Inspirations:** The ITU's policy framework for the European Union on cross-border adoption and assessment of innovation in mHealth for moving towards a "Single Healthcare Digital Market" in Europe.<sup>126</sup> Smart Africa's Blueprint for Digital Identity advocates for a governance structure and technical framework based on aligned decision-making processes and mutual recognition of country ID systems (including health IDs) based on common standards and rules across Africa.<sup>127</sup>

- The delivery of quality health and care drives the licensing model.
- Example:** Singapore's upcoming shift from premises-based to services-based licensing attempts to increase the delivery by reducing space and time restrictions.
  - Providers require one regularly assessed license, with assessments based on competencies required to achieve current and long-term health and care goals through optimal use of available technologies.

## Liability

### Maturity vision

Clearly defined responsibilities for all stakeholders under different use scenarios for establishing accountability.

### Enablers

- Acknowledging virtual as a delivery mechanism and health and care as the service being delivered.
- Integrating individual rights-based approaches in liability assessment mechanisms.
- Defining clear application scenarios for the virtual delivery of health and care.
- Specifying best practices and minimum standards of practice for all involved stakeholders.

## Maturity levels

### Level 1

- Stakeholder responsibilities are similar for in-person and virtual delivery.
- The health and care provider is free to deliver health and care virtually at its discretion.

### Level 2

- **Differences between in-person and virtual delivery are recognized and differing stakeholder responsibilities under possible scenarios such as device malfunction are defined.**  
**Example:** Germany's accountability provisions for doctors, patients, and device manufacturers differentiate liability for various stakeholders.
- Links to other policy elements are established and guide determining liability of various stakeholders under different scenarios.

### Level 3

- **Use cases of in-person and virtual delivery are assessed together to define expectations and norms of conduct in the hybrid model of the continuum of care.**  
**Example:** Chile's recommendation to consider the nature of telehealth consultation (synchronous, asynchronous, through an intermediary, etc.) for determining legal norms, normative use, and standards of conduct.
- Legal complexity for all stakeholders is minimized through a transparent process evolved through multi-stakeholder consultations and complementary initiatives, such as establishing a single source of truth for health and care data, instituting designated national/international agencies for resolving disputes (e.g., cross-border delivery and standards of care), and promoting health outcome-driven decisions.

## Quality assurance

### Maturity vision

Progressive standards of health and care that are integrated into health and care delivery for simultaneously guaranteeing availability and quality.

### Enablers

- Regarding patients as users who are entitled to quality health and care.
- Integrating minimum standards – treatment and services that are safe and of an assured quality and that serve as benchmarks for the level of care to be attained – to assure ethical and equitable delivery of health and care.
- Establishing monitoring mechanisms at critical stages of the delivery chain and an agile response machinery.

### Maturity levels

#### Level 1

- Quality in the delivery of health and care is assured to a select few (usually the high-income segments) or only at select locations (e.g., urban centers).
- Assessments of minimum standards of care are subjective and optional.

#### Level 2

- **Minimum standards of care include standards for digital practice in virtual health and care and are assured through a monitoring mechanism.**  
**Example:** India's upcoming Digital Health Accreditation Standards provide a minimum promise of quality through defined care protocols.
- Quality standards are formulated considering inter-linkages with other policy elements and interests of relevant stakeholders.

#### Level 3

- **The hybrid model of the continuum of care integrates minimum standards of care and assures quality to all at every step of the delivery.**
- The minimum standards of care baselines adapt and evolve regularly, considering current and long-term health and care goals through optimal use of available technologies.



## Design and processes

### Human- and equity-centric

#### Maturity vision

A human-first approach that utilizes the right virtual health and care solution at the right place and time for increasing access and ensuring equitable distribution of health and care services.

#### Enablers

- Achieving health and care equity through a right mix of traditional and new technologies for maintaining and constantly improving the continuum of care.
- Cultivating a human-centric policymaking approach for solving health and care challenges instead of technological challenges.
- Identifying and addressing potential biases that could be generated by new technologies and their impact on existing inequities.

#### Maturity levels

##### Level 1

- New technologies compete with traditional health and care delivery to solve similar health and care challenges, resulting in parallel delivery structures.
- Adoption of a new technology drives policy formation instead of objectives assessments of the suitability of the technology for achieving health and care objectives.
- Specific dimensions of inequity are addressed through singular initiatives.

##### Level 2

- Policies envision health and care equity and inclusivity and the interests of all stakeholders – however marginalized they might be – are considered while developing and implementing policies through co-creation and collaboration.
- **Perspectives of the patient's peripheral network – family, friends, caregivers, etc. – are considered in the policymaking and implementation process.**

##### Level 3

- **All dimensions of health and care equity (e.g., gender, income, location, race, digital skills, etc.) drive policy development as well as implementation and are embedded in the policymaking process.**
- Patient/user satisfaction is constantly monitored to improve quality and promote well-being.
- Technologies are evaluated for potential biases before systemic adoption.  
**Example:** Germany's digital health applications are required to demonstrate ease of use with operating aids for people with disabilities.

### Innovation

#### Maturity vision

Continuing improvements in all aspects of virtual health and care solution design for promoting the well-being of all.

## Enablers

- Creating knowledge-sharing frameworks to improve efficiency and reduce redundancy.
- Improving multi-sectoral availability of health and care data through privacy-ensuring mechanisms.
- Promoting result-oriented research and development for improving each stage of the health and care delivery chain.
- Involving all stakeholders in the innovation cycle, depending on their objectives and expertise.

## Maturity levels

### Level 1

- Novel solutions of health and care delivery are adopted or adapted from others and indigenous innovations appear rarely.

### Level 2

- Innovative digital solutions are encouraged in principle for achieving national health and care goals.

**Inspiration:** Smart Africa's Blueprint on Artificial Intelligence for Africa aims to use AI in health for challenges which are proving to be difficult to overcome using traditional methods.<sup>128</sup>

- **Multi-partner initiatives are in place for improving the virtual delivery of health and care through novel solutions.**

**Example:** Rwanda's HealthTech Hub Africa promotes innovation by providing financial support to African virtual health and care startups.

### Level 3

- **Patient/user experience – the journey of a patient/user/patient's peripheral network as they navigate through the health and care system – is a strategic innovation area.**
- Innovation is the driver to develop better solutions for improving access and quality in health and care.

**Example:** Israel's Digital Health as a National Growth Engine policy actively promotes new virtual health and care technologies.

## Health outcomes

### Maturity vision

Reproducible, real-world evidence that guides decision-making at all levels for improving care, provisioning the right virtual health and care solutions, and increasing access.

### Enablers

- Promoting reproducible evidence generation using real-world data for robust decisions at individual, clinical, and policy levels for all modes of delivery.
- Demonstrating that a new technology is better at solving a given health and care challenge than the existing ones.

## Maturity levels

### Level 1

- Technologies and new modes of health and care delivery, such as virtual delivery, are used depending upon availability and immediate requirements.

### Level 2

- A new technology or mode of health and care delivery needs to show its suitability for solving a given health and care challenge.  
**Example:** The USA's guidance for clinical investigators to explain why a virtual technology is fit for purpose encourages outcome- and purpose-driven development of technology.
- A scientific monitoring and evaluation mechanism is in place to assess health outcomes of new technologies and solutions.

### Level 3

- Health outcomes direct the acceptance or rejection of a new technology or health and care delivery mode.  
**Example:** Germany's directives for digital health application developers to demonstrate positive care effects for patients before they can be permanently licensed ensures scientifically robust solutions.
- Policy and clinical decisions for adopting a new technology or health and care delivery mode are based on reproducible and verified health outcomes.



## Data and technology

### Infrastructure

#### Maturity vision

Robust, periodically upgraded architecture and hardware to ensure health and care delivery.

#### Enablers

- Establishing periodically upgraded minimum standards and accreditations for virtual health and care architecture that merges hardware and software for enabling functionalities such as databases, exchanges, communication, and connectivity.
- Increasing delivery of health and care virtually by provisioning alternate types of standards-compliant infrastructure depending on geography and other variables.

### Maturity levels

#### Level 1

- Health and care is delivered through non-standard infrastructure and platforms.

#### Level 2

- Infrastructural standards (e.g., physical security and patient/user data protection) for health and care as well as supporting fields (e.g., information and communication technology) are clearly defined and their implementation is regularly assessed through intersectoral initiatives.  
**Example:** India's *eSanjeevani* platform integrates hardware and data standards for efficient delivery of virtual health and care.

### Level 3

- **Uniform and distributed health and care infrastructure – based on software and service delivery standards – is created for flexible and effective health and care services.**  
**Example:** Estonia's provisions for creating data warehouses and exchanges aims to develop distributed infrastructure for quick and flexible service delivery.
- Infrastructure can be adapted quickly to new technological requirements as it is built modularly.
- Business models that increase efficiencies and long-term sustainability of infrastructure are encouraged.

## Data governance

### Maturity vision

Clear data governance structures and standards driven by a core set of equity and rights-based principles for data use, access, and authorization throughout the delivery chain to secure individual privacy and establish trust.

### Enablers

- Identifying the origins, journey, possible diversions, and endpoints of the different types of health and care data. This includes data on social determinants of health to ensure equitable consideration of all factors of well-being.
- Mapping and plugging sources of data leakage in the delivery chain to prevent misuse.
- Establishing clear data ownership rules for all stakeholders to generate clarity on purpose and usage.

## Maturity levels

### Level 1

- Health and care data management – acquisition, processing, storage, etc. – is a combination of analog and digital solutions, and there is a strategic emphasis on digitization of health and care data in the future.
- Data security and individual privacy issues emerge after implementation.

### Level 2

- Data standards for generating, processing, storing, and sharing health and care data are in place and are enforced.
- **User rights and inclusivity govern security and privacy provisions for health data including virtual health and care data.**  
**Inspiration:** Transform Health's Health Data Governance Principles – a global set of principles based on equity to guide the use of data in health systems.<sup>129</sup>
- A clear consent collection mechanism is in place.

### Level 3

- **Data frameworks operate on the principle of circularity – structured and shareable health and care data – that allows authorized availability of virtual health and care data for other value creation aspects such as evidence generation for decision-making.**
- There are clear provisions for cross-border and cross-organizational transfer of health and care data.  
**Example:** The UAE's guidelines allow international transfer of citizens' health and care data for therapeutic purposes if consent and security regulations are followed.
- Transparency in health and care data is ensured by tracking its complete history during primary, secondary, or tertiary use.

## Interoperability

### Maturity vision

Privacy-driven data transfer mechanisms based on technical standards like FHIR and patient data standards, such as the WHO's classification of health interventions, to open health and care data silos by systematically developing, deploying, and continuously improving virtual health and care solutions for allowing data-led decision-making in health and care and creating additional value for all stakeholders.

### Enablers

- Demonstrating that opening health and care data silos including data on social determinants of health can optimize delivery, ensure access, and create additional value for all.
- Adopting international standards for generating, transmitting, and assessing data.
- Enabling cross-sectoral use of health and care data with privacy as an essential design element for fostering innovation.

### Maturity levels

#### Level 1

- Traditional as well as virtual health and care data exists in silos as either it is not secure to transmit or the mode of transmission is unclear.
- Providers and platforms are free to use interoperable standards in their services and products.

#### Level 2

- **Health and care interoperability standards are identified, and interoperability is an essential component of the data governance and health and care delivery framework.**

**Inspiration:** The WHO's International Classification of Health Interventions to report and analyze health interventions for clinical and statistical purposes.<sup>130</sup>

- Virtual health and care data is transmitted to authorized stakeholders through defined modes and agencies for bridging the data silos through open-source application programming interfaces, adequate authorization protocols, and standardized digital solutions.

**Example:** Rwanda's Citizen's Health Portal (Irembo) links the National Identity Database and the Ubudehe database (citizen register based on socio-economic status) with community-based health insurance for ease of verification and reimbursements.

#### Level 3

- **Cross-sectoral data availability is assured by integrating privacy into the design of transmission mechanisms (e.g., through anonymization) for unlocking the potential of health and care data to increase systemic efficiencies (e.g., reduced reimbursement times) and to generate novel therapies.**

- Additional use cases of health and care data (e.g., research, insurance, law) are clearly identified and interoperable standards for enabling these use cases are developed.

**Example:** Israel's directives on the secondary use of health and care data for research and development promote innovation.



## Business models

### Financing

#### Maturity vision

A strategic investment roadmap driven by investment from multiple sectors and stakeholders (public and private) to support an overall digital health strategy that includes clear provisions for developing and promoting virtual health and care solutions.

#### Enablers

- Providing a core level of support through public funds.
- Encouraging other stakeholders to leverage the core support for developing novel, sustainable business models and creating value.
- Developing mutually beneficial partnerships through joint objectives to ensure ownership and accountability.
- Promoting value-based care to encourage the development of health outcome-driven delivery models.

#### Maturity levels

##### Level 1

- Health and care services are primarily funded through public funds or donors.
- Financing is multi-step process for ensuring correct and judicious spending.

##### Level 2

- **Strategic public funding initiatives are instituted and operationalized for integrating virtual delivery into the national health and care system.**  
**Example:** Germany's Hospital Futures Act provides funding to public hospitals for digitizing services.
- Early adopters and ecosystem enablers from the private as well as the public sectors are incentivized through public funds.

##### Level 3

- **Virtual delivery is financed through a combination of public funds, sustainable business models, and public-private partnerships as well as through donor countries.**  
**Example:** Rwanda provides funding to citizen-centric health and care business models that combine data from siloed systems.
- Novel modes of generating funds and financing projects for achieving health and care goals are developed through multi-sectoral stakeholder partnerships.
- Financing is used as a lever to support growth of other policy elements such as collaboration and infrastructure.

### Reimbursement

#### Maturity vision

Fair payment mechanisms based on the service being delivered for increasing adoption and promoting access.

#### Enablers

- Specifying the scope and operational requirements of virtual delivery.
- Focusing on the delivery mechanism, as compared to the technology, and on the nature of health outcome achieved for determining pricing.
- Integrating virtual and in-person delivery in complementary ways to identify correct pricing for each use case.

## Maturity levels

### Level 1

- Changes in payment mechanisms are either absent or are reactive to emerging situations.

### Level 2

- Parallel reimbursement structures for virtual and in-person delivery of health and care are in place.
- Several use cases are identified and reimbursed for virtual delivery.

**Example:** Chile's classification of telemedicine services eligible for reimbursements identifies various use cases of telemedicine in different medical specialties.

### Level 3

- **One reimbursement scheme exists that is developed based on complementary use of in-person and virtual delivery for ensuring optimal utilization of resources and expertise.**
- Payments are based on value-based care that is based on the service being delivered and the health outcome being achieved, irrespective of the mode or the technology being used.
- Reimbursement is linked to other policy elements for increasing adoption.  
**Example:** Rwanda's Pay-for-Performance Scheme for Health Services enables community health workers to receive compensation based on their performance.

## People and workforce

## Digital skills building

### Maturity vision

Regular trainings and upgrades of workforce skills to utilize new technologies and delivery modes such as virtual delivery for achieving health and care goals efficiently.

### Enablers

- Nurturing a competent workforce to fulfill current and future health and care needs by matching technological requirements with long-term health and care goals.
- Training and educating the workforce to accept the new mode of delivery by providing the required digital skills.
- Driving behavioral change through awareness and appropriate change management campaigns.
- Encouraging involvement of the younger population – most active users of digital technology and digital media – to develop future-ready, sustainable policies.

## Maturity levels

### Level 1

- Policy recognizes the importance of building a competent and capable health and care workforce.
- Separate funding is available for upgrading workforce skills.

### Level 2

- Upgrading skills and change management is an active component of the national health and care framework and is offered to all stakeholders at different care levels.  
**Example:** Rwanda's Health Professions Councils can certify virtual health and care trainings for continuous professional development.
- **Partnerships are in place for dispensing the required trainings.**

### Level 3

- **Virtual delivery education is integrated with regular professional curricula and continuing professional development (e.g., practice license renewals) for different stakeholders.**
- Linkages with other policy elements are utilized to ensure skill development.  
**Example:** Singapore's doctors are required to complete the government's training program to be covered by the public health system, which links digital skills building with reimbursement.



## Partners and stakeholders

### Collaboration

#### Maturity vision

Health and care for the people, by the people, and from the people for cultivating ownership, establishing trust, and ensuring widespread adoption and uptake of virtual health and care solutions.

#### Enablers

Involving stakeholders at every stage of policymaking and implementation through practical and realistic engagement methods.

#### Maturity levels

##### Level 1

- Policies are formed based on available technologies and global trends.
- Stakeholder participation is voluntary and sought after the policy formulation process.

##### Level 2

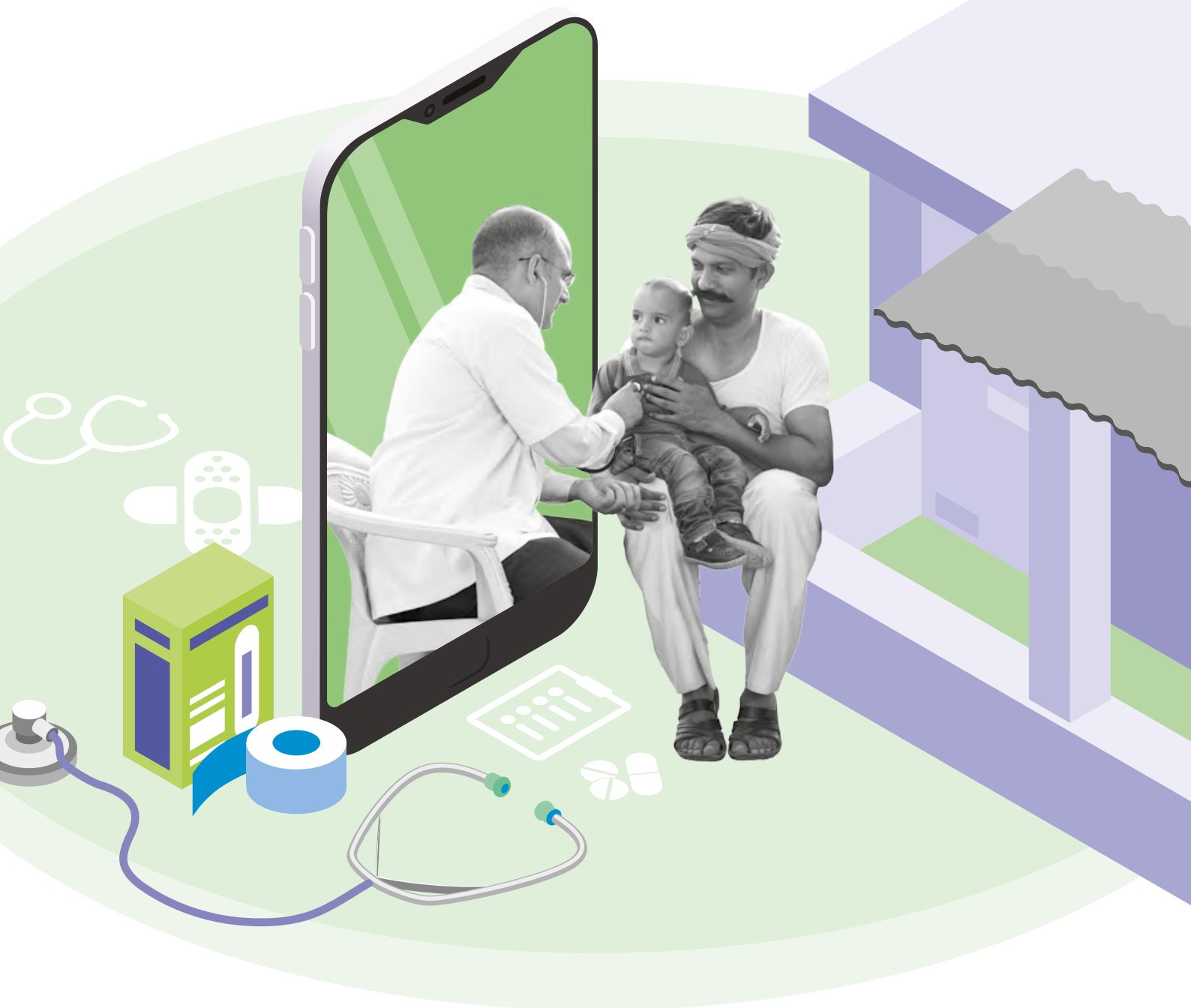
- **Marginalized and excluded sections of the society are involved in different stages of policy development and implementation.**
- Multi-sectoral partnerships are formed on a need-to basis for solving current challenges.
- **Inspiration:** *Combat COVID-19 Africa* – a pan-African collaborative platform that connects software developers, data scientists, network engineers, governments, non-profit organizations, the private sector, and health professionals to develop solutions for combating the COVID-19 pandemic. It offers free access to cloud computing resources to help build and scale solutions.<sup>131</sup>

##### Level 3

- Continuous, real-time stakeholder engagements are the basis for developing relevant and effective solutions.
- **Co-creation is used to address concerns of all stakeholders at each stage of policy development for charting a realistic evolutionary path.**
- **Example:** Fiji and the WHO's co-creation of a maturity framework enabled harnessing digital tools to achieve national health and care goals more realistically.

# 5

## Actionable Recommendations and Calls to Action



Policy development and implementation are inter-linked, and effective policymaking requires understanding the intimate connections between the two to achieve the desired goals efficiently. Thus, clarity on the current situation, objectives, and resources are of utmost importance to action policy recommendations.

This report analyzes global policies influencing the uptake of virtual health and care in order to call for a worldwide movement for integrating virtual delivery into mainstream health and care through meaningful, judicious, and equitable policies. Actionable recommendations provide policymakers across the globe with essential steps for increasing maturity in virtual health and care. As each country is

in its own stage of its journey, it should use the recommendations most suitable in its context while ensuring overall progress.

**Thus, these recommendations are non-sequential, combinable, and non-binding, yet instructive.**

Success of any policy depends upon the acceptance and response of the stakeholders whom the policy addresses. Health and care involves almost all participants in societies, ranging from individuals to public and private organizations. Thus, their active participation is essential for actualizing the policy vision.

The policy landscape review indicates that virtual health and care policymakers should consider perspectives of the following stakeholders while drafting policies:



**Health and care providers and organizations:**

Public or private, small-, medium-, and large-sized hospitals and clinics at primary, secondary, and tertiary levels including nurse practitioners, community health workers, and pharmacies.



**Payers, financiers and insurers:**

Public or private institutions and systems that provide financial coverage to health and care users.



**Private sector and startups:**

Firms and companies providing and innovating in health and care and other allied sectors such as data and telecommunications.



**Advocacy groups:**

National or international interest groups in health and care that influence public opinion and policy.



**INGOs, civil society, and implementers:**

Non-governmental groups that facilitate ground-level implementation and change.



**Academia and researchers:**

Public and private institutions and individuals engaged in developing novel solutions in virtual health and care through evidence-based research.

Additionally, Appendix II lists key actions for these stakeholders to complement policymaking initiatives for holistic integration of virtual health and care into the mainstream.

# Recommendations for policymakers

This section details actionable recommendations and calls to action for policymakers to increase the adoption of virtual health

and care. These are organized along the six maturity pillars of the virtual health and care policy framework described in Chapter 4.



## Governance and regulatory

### Actionable recommendations

- 1. Outline a **strategic integration roadmap** for virtual health and care linked to the national digital health strategy to achieve health and care equity.**  
Equitable distribution of health and care requires combining in-person and remote delivery in complementary ways. Charting out a common path together with relevant stakeholders for developing coordinated short- and long-term goals would harmonize these two delivery modes and result in an inclusive hybrid model of the continuum of care.
- 2. Establish **intersectoral policymaking mechanisms** for efficient, timely development and implementation of policies.**  
Virtual delivery of health and care relies on active coordination between health, finance, IT, law, infrastructure, education, and other sectors. Creating governance structures that span sectors such as inter-ministerial policy development groups, committees, task forces, and panels would ensure optimal utilization of resources and expedite the integration.
- 3. Develop a hierarchical policy framework across health and supporting sectors to **reduce overlapping policies** and establish legal clarity in delivering services virtually.** Sporadic, reactive issuance of guidelines, whitepapers, and other policy-related documents creates confusion and gives rise to legal complexity. Defining the scope of such directions by linking them to the overall strategic goals would reduce redundancies and simplify delivery.
- 4. Adopt a **data-led, outcomes-based policymaking approach** to evaluate and integrate new health and care technologies in line with national health and care goals.** All new technological advances might or might not be suited for a country's specific health and care challenges. Recognizing that technology is a medium and promoting inclusivity and equity is the aim of every policymaking action would encourage assessments of each technology for effectiveness through evidence generated using real-world data to strengthen policies and develop stakeholder trust for accepting the virtual mode of delivery.

5. Establish mechanisms for **assessing returns on investments** – population and individual health indicators, quality of life, community health metrics, etc. – made to integrate virtual delivery into mainstream health and care.  
As with all public governance and regulatory initiatives, efforts and

investments for virtual health and care need to be audited regularly. Creating mechanisms for evaluating the different aspects of integration and publishing the results periodically would indicate areas of improvement and increase trust in the system, both of which would increase the adoption.

### Calls to action for policymakers for different stakeholders

	<b>Health and care providers and organizations</b>	Institute a framework or authority that regularly defines and assesses use cases of in-person and virtual delivery to develop clarity on delivery modes.
	<b>Payers, financiers and insurers</b>	Establish intersectoral (health and care provider ↔ insurer) authority that sets norms and periodically fixes and evaluates payment criteria for different use cases.
	<b>Private sector and startups</b>	Create incentives to utilize private sector virtual delivery solutions for public health and care.
	<b>Advocacy groups</b>	Leverage advocacy to build strategic health and care goals through knowledge sharing and transfer of global best practices.
	<b>INGOs, civil society, and implementers</b>	Promote cooperation with local or regional organizations to increase access to services and enable behavioral change for the new mode of health and care delivery.
	<b>Academia and researchers</b>	Encourage generation of evidence on data-driven technologies and virtual health and care outcomes that could form the basis of clinical and policy decisions.

## Design and processes

### Actionable recommendations

1. Ensure **inclusive representation** (gender, social groups, persons with disabilities, and other marginalized sections of the society) and **meaningful engagement** at every stage of policy development, implementation, and feedback to encourage ownership, promote adoption, and ensure that policies are aligned with population needs.  
In several cases, key interest groups are unintentionally left out of the policymaking process. Involving all groups during the

whole process would address the multiple dimensions of inequity – age, gender, income level, geography, language, literacy, race, socio-economic status, etc. – and enable equitable distribution of health and care services.



2. Create **knowledge-sharing frameworks** that can ensure transfer of best practices between the private sector and the public system to promote innovation and research and development in virtual health and care.



Achieving national health and care goals requires the availability of appropriate technological solutions. Encouraging innovation that aligns with public health priorities would result in solutions that are cost-effective and better suited for achieving specific strategic objectives.

3. Promote **innovation to achieve better health and care outcomes** using virtual delivery. Technological advancements should translate into better lives. Providing an enabling policy environment for innovators to develop virtual delivery products and solutions that improve health and care outcomes would improve the adoption of services by all.

### Calls to action for policymakers for different stakeholders

	<b>Health and care providers and organizations</b>	Define and implement key indicators to regularly determine that services being offered are based on positive health outcomes.
	<b>Payers, financiers and insurers</b>	Evolve mechanisms and business models in which health and care availability and delivery to all sections of the society takes precedence over payments.
	<b>Private sector and startups</b>	Design, develop, and innovate auditable and explainable solutions and models based on user experience and familiarity criteria as acceptance correlates positively with reliability.
	<b>Advocacy groups</b>	Share global best practices on successful linkages between innovation and positive health outcomes for promoting human-centric policymaking.
	<b>INGOs, civil society, and implementers</b>	Encourage local, small-scale innovation for developing solutions that fulfill specific needs of marginalized sections based on an inclusive policy framework that allows flexibility within the scope of main principles.
	<b>Academia and researchers</b>	Promote the use of diverse datasets (different social groups, ethnicities, disabilities, etc.) to generate evidence for evaluating the efficacy of virtual health and care solutions.

## Data and technology

### Actionable recommendations

1. If not existing yet, establish a **national health and care information system** that acts as a single source of information to reduce uncertainty over data ownership. Fragmented information gives rise to confusion and complexity. Creating a unified, reliable repository of health and care data powered by appropriate hosting (within-country, cloud-based, air-gapped, etc.) measures would enable availability of the right information at the right time to make strategic, policy, clinical, and legal decisions.
2. Develop a **comprehensive health and care data strategy** based on respecting privacy and preventing misuse to build user trust and maximize the public benefits of health data for all. Given the high sensitivity of health data, ensuring its integrity at each stage of the delivery chain would help strengthen privacy, security, and human rights, as well as generate trust in the system.

3. Align virtual health and care data security and privacy policies with the **national cybersecurity strategy** to ensure all-round security considering the changing nature and sources of data generation.

Cybersecurity involves securing the digital architecture and systems that power data, including health and care data. Developing virtual health and care data security measures in alignment with an overall, periodically reviewed cybersecurity strategy would prevent data leakage and unauthorized use.

4. Encourage **interoperable standards in the design and implementation** of virtual health and care solutions to simplify the user experience through novel insights generated by health and care sector players and policymakers.

Multiple and parallel health and care solutions give rise to distinct data types that are difficult to convert or interpret in different settings. Adopting interoperable data generation, processing, exchange, and storage standards in technical or structural or semantic or organizational domains would streamline the delivery process and generate additional value for all stakeholders.

5. Create **frameworks for data sharing** so that relevant health data is securely accessible for authorized stakeholders while ensuring individual privacy and security.

Bringing circularity through data sharing is crucial to unlocking the potential of virtual health and care to reduce efforts, costs, and redundancies.

Ensuring diversity and representation of all societal groups in data sets used for innovation would ensure development of equitable solutions.

6. Build **infrastructure based on open standards** that can be reused to facilitate adoption of new technologies and optimize resource utilization (onsite or cloud).

Infrastructure development is a long-term goal and a resource-intensive task that requires involvement of multiple stakeholders. Developing infrastructure by simultaneously considering national health and care objectives, current and anticipated technological developments, and the interests of different stakeholders would lead to efficient returns on this strategic investment.

## Calls to action for policymakers for different stakeholders

	<b>Health and care providers and organizations</b>	Adopt interoperable data governance for enabling national information exchanges and insights dashboards with integrated clinical, social, and claims data to improve the accessibility and quality of care.
	<b>Payers, financiers and insurers</b>	Rely on verified, evidence-based data for developing pricing and reimbursement strategies.
	<b>Private sector and startups</b>	Embrace data privacy, model transparency, and interoperability as essential design elements while developing or improving any solution.
	<b>Advocacy groups</b>	Share best practices on simplifying liability, licensing, and reimbursement mechanisms.
	<b>INGOs, civil society, and implementers</b>	Create awareness among existing and potential users about the importance and use of health and care data to develop confidence for using the new mode of delivery.
	<b>Academia and researchers</b>	Advocate for the development of interoperable data standards and transfer mechanisms that consider variables such as language and literacy levels.

## Business models

### Actionable recommendations

1. Encourage **innovative modes of financing** such as collaborations and partnerships with the private sector and donors to reduce dependency on a singular funding source (usually public financing).

Public financing is usually the main mode of providing funds for developing and integrating virtual delivery. Cultivating alternate channels of funding such as through public-private partnerships and donors would reduce dependency on a singular funding source.







2. Provide **incentives like tax rebates and subsidies** to innovators and virtual solution providers who address public and community health priorities identified by country leadership and communities themselves.

Technology is a medium for achieving health and care goals. Incentivizing innovators in the form of tax benefits, grants, and subsidies would promote the creation of indigenous solutions and integration of virtual delivery while simultaneously achieving national health and care objectives.

3. Develop a **strategic funding program** to integrate virtual delivery into the mainstream through an intersectoral (finance, reimbursement, health and care, ICT, etc.) authority.

Isolated initiatives for using virtual delivery might lead to suboptimal resource utilization and even discourage uptake. Creating a dedicated strategic program for systematically integrating virtual delivery through consensus with all supporting sectors would lead to faster results and achievement of objectives.

### Calls to action for policymakers for different stakeholders

	<b>Health and care providers and organizations</b>	Promote uptake of virtual delivery by traditional health and care providers and organizations through incentives and special grants.
	<b>Payers, financiers and insurers</b>	Develop virtual delivery reimbursement mechanisms based on demonstrated, reproducible health outcomes.
	<b>Private sector and startups</b>	Partner with mobile network operators and use mechanisms such as universal service obligation funds to increase coverage of the telecommunications infrastructure required to enable virtual delivery.
	<b>Advocacy groups</b>	Facilitate partnerships with donor organizations based on alignment of objectives between the involved parties.
	<b>INGOs, civil society, and implementers</b>	Explore innovative solutions such as cooperatives for pooling funds to make available virtual delivery at the community level.
	<b>Academia and researchers</b>	Aggregate funds for generating reproducible evidence required for assessing the utility and outcomes of virtual health and care for different clinical and non-clinical use cases.









## People and workforce

### Actionable recommendations

1. Strengthen **national capabilities for virtual delivery of health and care** across primary, secondary, tertiary, and community care levels through pre- and in-service trainings and upskilling to ensure that the complete health and care delivery structure is connected to the virtual mode. An integrated approach is needed to ensure that the complete health and care delivery structure is connected to the virtual mode. Developing a competent workforce that is also future-ready through training, education, skill upgrades, and intersectoral transfer of talent would ensure quality and help achieve equity.
2. Create a **diverse, inclusive, and competent workforce** through special training and integration initiatives to ensure equitable representation and adoption of virtual health and care across all sections of the society. Several social groups are still not able to realize the benefits of virtual delivery. Recognizing societal diversity and making strategic efforts to continuously improve the capacities and skills of all by ensuring proper representation throughout the delivery chain would reduce digital divides, build trust, and promote equity through virtual health and care.
3. Increase **digital literacy** across all sections of the society with special emphasis on older people and underserved segments to promote acceptance and utilize the full potential of virtual delivery. Several aspects of digital health and virtual delivery require a basic understanding of technology. Promoting digital skills through education in local languages as well as monitoring them through appropriate metrics would accelerate societal digitization and aid in the uptake of virtual delivery.
4. Encourage **meaningful engagement of the younger population** to develop future-ready, sustainable, and impactful policies for integrating virtual health and care. The younger population are the most active users of digital technology and digital media across the globe. Involving them in the policymaking process would result in policies that more accurately capture the needs and aspirations of today's and tomorrow's users and provide the needed boost for permanently integrating virtual delivery to evolve a true hybrid model of the continuum of care.

## Calls to action for policymakers for different stakeholders

	<b>Health and care providers and organizations</b>	Integrate digital and virtual education in regular and continuing professional education.
	<b>Payers, financiers and insurers</b>	Link virtual delivery training with reimbursements for virtual delivery to promote training and quality.
	<b>Private sector and startups</b>	Work with other stakeholders to develop educational programs for health professionals to enable the use of existing and upcoming solutions.
	<b>Advocacy groups</b>	Share global change management and competency-building practices for different stakeholders.
	<b>INGOs, civil society, and implementers</b>	Drive change management through public campaigns by working with regional and local health and care societies to highlight and encourage dialogue on the benefits and risks of virtual delivery.
	<b>Academia and researchers</b>	Identify critical areas of change through scientific analysis to develop change management programs for increasing the use of virtual health and care.




## Partners and stakeholders

### Actionable recommendations

1. Collect **periodic, multi-stakeholder feedback** on different aspects of policy development and implementation as a principle for effective policymaking to streamline the policymaking process, promote acceptance of policies, and increase adoption of virtual delivery. In several cases, feedback is either gained at later stages or is assessed subjectively. Integrating regular input collection and objective addressal mechanisms in the policy development and implementation stages would streamline the process, promote acceptance, and increase adoption of virtual delivery.
2. Explore **co-creation** as a mechanism for long-term, strategic policies to ensure ownership, increase trust, and secure policy continuity. The unpredictable nature of future technology developments requires agile policy frameworks that can adapt quickly. Co-creating such frameworks with all stakeholders would ensure ownership, increase trust, and secure policy continuity resulting in faster acceptance of virtual delivery.

### Calls to action for policymakers for different stakeholders

	<b>Health and care providers and organizations</b>	Work together to simplify all aspects of a user's health and care experience.
	<b>Payers, financiers and insurers</b>	Develop ways to enable a seamless transition to hybrid models of delivery for realizing all aspects of the continuum of care.
	<b>Private sector and startups</b>	Cultivate partnerships to adapt and innovate need-based solutions across the different policy elements.
	<b>Advocacy groups</b>	Promote integration of virtual delivery by facilitating cross-fertilization of ideas.
	<b>INGOs, civil society, and implementers</b>	Encourage acceptance of virtual delivery by highlighting benefits, promoting outreach, and working with regional digital health networks and local workforce training institutes.
	<b>Academia and researchers</b>	Co-develop evidence-based feedback collection and redressal mechanisms and ways of integrating them into the virtual health and care delivery chain.



# 6

## Conclusion





Traditional views of health and care are fast being changed by virtual delivery, which is increasing access, achieving equity, and promoting better outcomes. The report shows that virtual modes are slowly, but surely, integrating into the mainstream, speeded up in the last two years by the COVID-19 pandemic – and are here to stay. Realizing this change, countries are either already taking effective policy measures or are planning likewise to develop a hybrid model of the continuum of care. The report provides

detailed, actionable guidance for inclusive policies necessary for sustaining this change. The virtual mode is the way a large part of tomorrow’s health and care will be delivered.

The report describes six pillars of a holistic, person-centric policymaking framework to increase adoption of virtual health and care. These interdependent pillars comprising 15 policy elements drive maturity in virtual delivery and help achieve national health and care goals.

**The pillars and their policy elements are:**

**Governance and regulatory**

Governance, regulation, licensing, liability, and quality assurance

**Data and technology**

Infrastructure, data governance, and interoperability

**People and workforce**

Digital skills building

**Design and processes**

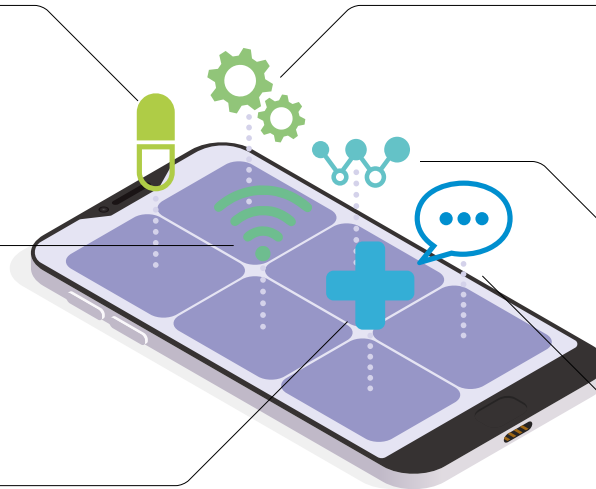
Human- and equity-centric, innovation, and health outcomes

**Business models**

Financing and reimbursement

**Partners and stakeholders**

Collaboration



Since the policy elements originate from a global review, they are equally valid for virtual health and care maturity across country income groups. Thus, the insights hold true for all countries. For each policy element, actionable recommendations are provided to progress from one benchmark to the next during the virtual health and care journey. These recommendations consider inter-linkages among different policy elements as well as effects of actions among stakeholders. This encourages harmonious action on all fronts.

## Policy actions can bring together stakeholders to maintain the continuum of care.

Maintaining a leak-proof continuum of care requires focus on the individual through effective disease prevention and management. Virtual delivery makes available relevant patient data given that *interoperable* methods are built into *data governance*. Thus, health and care providers can stay in continuous communication with patients as well as consult other providers as needed without space-time limitations. This needs a robust *infrastructural* framework that merges hardware with service delivery standards. Clarity on the scope of virtual delivery and cross-border *licensing* ensures that patients receive care when they want and how they want it.

## Policy actions can increase access and achieve equity through virtual delivery.

Digital divides add to historical causes of low accessibility of health and care. However, virtual delivery is a practical way to overcome these, especially when used with the clear goal of increasing access and achieving equity. Inclusive policies that are *human- and equity-centric* in their design and implementation can enable virtual delivery. This requires encouraging new *financing* models that identify and channel funds for solutions which promote inclusion. Lastly, creating health and care *reimbursement* mechanisms that consider an individual's socio-economic status help achieve universal health coverage and promote equity.

## Policy actions can strengthen trust in the new mode of delivery.

Trust is essential for adoption. With virtual delivery of health and care now becoming an everyday activity, it is critical that policy measures translate its potential into a permanent reality. This requires enabling mechanisms that help evaluate the efficacy of virtual delivery for *health outcomes* under different use cases. Wherever effective, its integration into the mainstream needs to comply with minimum standards of care through appropriate *quality assurance* mechanisms. These actions can help evolve standards of professional conduct in virtual delivery, which are essential for establishing *liability* and promoting acceptance of the new mode of health and care delivery among all users.

## Policy actions can take advantage of global best practices.

Several countries around the globe are proactively creating *governance* frameworks for integrating virtual delivery into mainstream health and care. By promoting *innovation* in alignment with national health and care goals, they show that *regulation* can act as an enabler. Exchanging these global best practices is needed to encourage inclusive policymaking that puts the individual at the center of all policy actions.

Given the wide potential and scope of virtual delivery and the vast number of ground-level activities, this report focuses on the major global developments since the start of the COVID-19 pandemic. Through this focused approach, it shows that inclusive policies can drive access and achieve equity to shape the future of virtual health and care.

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## Abbreviations

<b>AB-PMJAY</b>	Ayushman Bharat – Pradhan Mantri Jan Arogya Yojana
<b>AI</b>	Artificial Intelligence
<b>API</b>	Application Programming Interface
<b>ASSE</b>	Administración de Los Servicios de Salud del Estado
<b>BDSG</b>	Bundesdatenschutzgesetz
<b>BfArm</b>	Bundesinstitut für Arzneimittel und Medizinprodukte
<b>BGB</b>	Bürgerliches Gesetzbuch
<b>CBHI</b>	Community-Based Health Insurance
<b>CENS</b>	Centro Nacional en Sistemas de Información en Salud
<b>CMS</b>	Centers for Medicare & Medicaid Services
<b>DALY</b>	Disability-Adjusted Life Years
<b>DHA</b>	Dubai Health Authority
<b>DHB</b>	District Health Board
<b>DHCR</b>	Dubai Healthcare City Authority-Regulatory
<b>DiGA</b>	Digitale Gesundheitsanwendungen
<b>DiGAV</b>	Digitale-Gesundheitsanwendungen-Verordnung
<b>DOH</b>	Department of Health – Abu Dhabi
<b>DVG</b>	Digitale-Versorgung-Gesetz
<b>eCHIS</b>	electronic Community Health Information System
<b>ePA</b>	elektronische Patientenakte
<b>EPS</b>	Entidades Promotoras de Salud
<b>EHR</b>	Electronic Health Record
<b>EHS</b>	Emirates Health Service
<b>EU</b>	European Union
<b>FDA</b>	Food and Drug Administration
<b>FDT</b>	Fondo de Desarrollo de las Telecomunicaciones
<b>FOA</b>	Fibra Óptica Austral
<b>FON</b>	Fibra Óptica Nacional
<b>FONASA</b>	Fondo Nacional de Salud
<b>GDPR</b>	General Data Protection Regulation
<b>GP</b>	General Practitioner

## Abbreviations

<b>Health NZ</b>	Health New Zealand
<b>HFR</b>	Health Facility Registry
<b>HIPAA</b>	Health Insurance Portability and Accountability Act
<b>HL7 FHIR</b>	Health Level 7 Fast Healthcare Interoperability Resources
<b>HPCSA</b>	Health Professions Council of South Africa
<b>HPR</b>	Health Professionals Registry
<b>HPCSA</b>	Health Professions Council of South Africa
<b>ICT</b>	Information and Communication Technology
<b>ISAPRE</b>	Instituciones de Salud Previsional
<b>KBV</b>	Kassenärztliche Bundesvereinigung
<b>KHZG</b>	Krankenhauszukunftsgesetz
<b>LHCR</b>	Local Health and Care Record
<b>MINSAL</b>	Ministerio de Salud
<b>MoHAP</b>	Ministry of Health and Prevention
<b>MPG</b>	Medizinproduktegesetz
<b>MNO</b>	Mobile Network Operator
<b>NASHIP</b>	National Association of Statutory Health Insurance Physicians
<b>NHS</b>	National Health Service
<b>P4P</b>	Pay-for-Performance
<b>PAHO</b>	Pan American Health Organization
<b>PATH</b>	Program for Appropriate Technology in Health
<b>PPP</b>	Public-Private Partnership
<b>pVE</b>	positive Versorgungseffekte
<b>SAR</b>	Special Administrative Region of the People's Republic of China
<b>SDG</b>	Sustainable Development Goal
<b>SIDRA</b>	Sistemas de Información de la Red Asistencial
<b>SISBEN</b>	Sistema de Selección de Beneficiarios de Programas Sociales
<b>S+D</b>	Salud + Desarrollo
<b>TDRA</b>	Telecommunications and Digital Government Regulatory Authority
<b>UHC</b>	Universal Health Coverage
<b>UHI</b>	Unified Health Interface
<b>WGLL</b>	What Good Looks Like
<b>WHO ICTRP</b>	World Health Organization International Clinical Trials Registry Platform





# Appendix I: Landscape Review

The landscape review is a study of global developments in policies related to virtual health and care. It comprises 23 countries (listed below) selected based on:

- Policy developments since the start of the COVID-19 pandemic.
- Geographical location as per the five UN regional groups – African, Asian, Eastern European, Latin American and Caribbean, and Western European and other States\*\*.
- Income levels as per the four World Bank income groups – high, upper-middle, lower-middle, and low. All levels are represented.<sup>132</sup>
- Discussions with the Working Group and Consultative Group members and external experts.<sup>133</sup>

SN	Country	Region (UN)	Coverage
<b>High-income countries</b>			
1	 Canada	Western European and other States	Overview
2	 Chile	Latin American and Caribbean States	Deep dive
3	 Estonia	Eastern European States	Overview
4	 Germany	Western European and other States	Deep dive
5	 Israel	Western European and other States	Deep dive
6	 New Zealand	Western European and other States	Deep dive
7	 Singapore	Asia-Pacific States	Deep dive
8	 UAE	Asia-Pacific States	Overview
9	 UK	Western European and other States	Deep dive
10	 USA**	Western European and other States	Deep dive
11	 Uruguay	Latin American and Caribbean States	Overview
<b>Upper-middle income countries</b>			
12	 China	Asia-Pacific States	Overview
13	 Colombia	Latin American and Caribbean States	Overview
14	 Fiji	Asia-Pacific States	Overview
15	 South Africa	African States	Deep dive
<b>Lower-middle income countries</b>			
16	 Bangladesh	Asia-Pacific States	Overview
17	 Ghana	African States	Overview
18	 India	Asia-Pacific States	Deep dive
19	 Kenya	African States	Overview
20	 Senegal	African States	Overview
21	 Viet Nam	Asia-Pacific States	Overview

\*\*The United States of America is not a member of any regional group but attends meetings of the Group of Western European and other States as an observer and is considered to be a member of that group for electoral purposes.

SN	Country	Region (UN)	Coverage
Low-income countries			
22	 Rwanda	African States	Deep dive
23	 Uganda	African States	Overview

The country-wise policy developments are organized in two ways for each geographic and income group.

## Deep dives

An in-depth analysis of the virtual health and care landscape, including virtual health and care policies, supporting policies, the private sector, and recent trends.

Each deep dive begins with a summary of the country's health and care system and highlights trends in virtual delivery since the start of the COVID-19 pandemic. It then lists several health and care metrics – data showing the status of the country's health and care and the potential and relevance of virtual delivery for achieving national health and care goals.

- **Progress on achieving SDG 3, 2021.**<sup>134</sup>
- **Universal Health Coverage (UHC) service coverage index, 2017:** index on a scale of 0 (worst) – 100 (best) that indicates average coverage of essential services that include reproductive, maternal, newborn and child health, infectious diseases, noncommunicable diseases and service capacity and access among the general and the most disadvantaged populations.<sup>135</sup>
- **Global burden of disease (Disability-adjusted life years – DALY), 2019:** a time-based measure that combines years of life lost due to premature mortality and years of life lost due to time lived in states of less than full health or years of healthy life lost

due to disability. One DALY represents the loss of the equivalent of one year of full health.<sup>136</sup>

- **Health expenditure as a percentage of general government expenditure, 2019:** indicates national health priority.<sup>137</sup>
- **Out-of-pocket expenditure as a percentage of current health expenditure, 2019:** reflects personal expenses on health and care.<sup>137</sup>
- **Percentage of individuals using the internet, 2019 or 2020:** internet coverage.<sup>138</sup>
- **Doctor density per 10,000 population, 2020:** includes certified and licensed providers (generalists, specialists, and other doctors) but does not cover caregivers such as nurses, midwives, and community health workers.<sup>139</sup>
- **Cost (US\$) of 1.5 GB mobile broadband data, 2020.**<sup>140</sup>
- **Digital skills among population, 2019:** results of the response to the survey question, "In your country, to what extent does the active population possess sufficient digital skills (e.g., computer skills, basic coding, digital reading)?"<sup>141</sup>

Next, a timeline summarizes notable virtual health and care-related policies followed by a detailed analysis of them to identify the focus areas (elements) and their specific regulatory aspects. The deep dive then examines supporting policies, which are non-health and care policies indirectly or directly influencing the adoption of virtual health and care.

Then, it outlines initiatives of the private sector influencing the uptake of virtual health and care given that:

- New policies rely on the private sector to increase adoption of virtual delivery.
- Initial user experiences play a decisive role in long-term acceptance.
- The entry of technology and retail giants into the virtual health and care market in several countries is likely to increase innovation, produce new solutions, and drive adoption of virtual health and care.

The deep dive concludes with a summary of key findings and presents a country-wise outlook on virtual health and care.





Chile has a dual health and care system in which citizens can opt for coverage by either the publicly funded national health fund (Fondo Nacional de Salud – FONASA) or by private health insurance institutions (Instituciones de Salud Previsional – ISAPRE). Nearly 77% of the population is covered by FONASA, 16% by private insurers, and the remainder by other not-for-profit agencies or no specific coverage.<sup>142</sup>

The Ministry of Health (Ministerio de Salud – MINSAL) is the governing and regulatory body that formulates and executes health policies and carries out its functions through FONASA, Undersecretariat of Healthcare Networks, Undersecretariat of Public Health, Regional Ministerial Secretariats, and other organizations.

#### Chile health and care key metrics

Metric	Status
Progress on achieving SDG3	Significant challenges remain. Score moderately improving, insufficient to attain goal
UHC service coverage index	<b>70</b> (global median value – 68)
Global burden of disease: DALY (per 100,000)	<b>24,821</b> (global mean value – 32,801)
Health expenditure as % of general government expenditure	<b>18.1%</b>
Out of pocket expenditure as % of current health expenditure	<b>32.8%</b>
% of individuals using the internet	<b>82%</b>
Doctor density (per 10,000)	<b>28.35</b> (WHO recommendation – 10)
Cost of data (1.5 GB mobile broadband, US\$)	<b>US\$7.48</b> (global mean – US\$8.70)
Digital skills among population	<b>4.26</b> (global median – 4.21)

## Virtual health and care developments

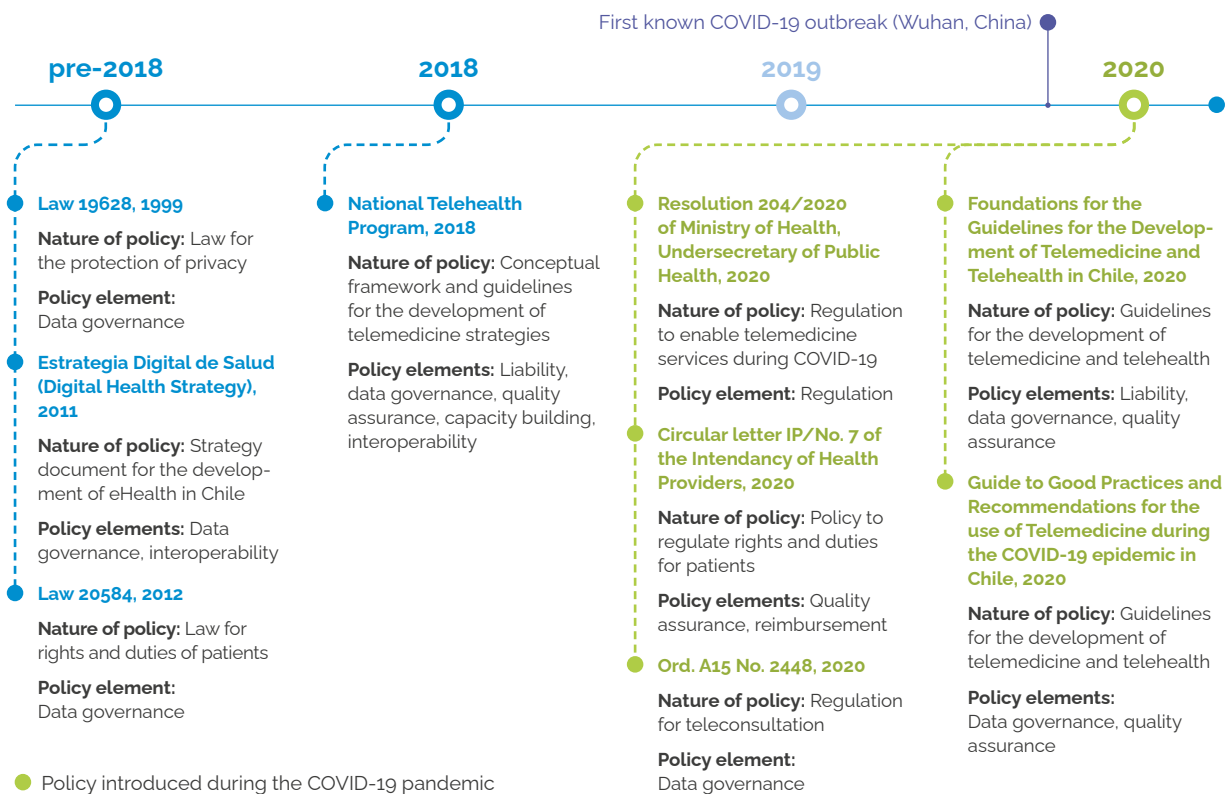
The development of virtual health and care in Chile has been driven by teleconsultations offered by hospitals within the public health system. Some of the key highlights surrounding virtual health and care in Chile are:

- Las Higueras Hospital, one of the largest in Chile, has an active telemedicine program since 2008.

- Nearly 70% of all telemedicine consultations are in dermatology, ophthalmology, and cardiology.<sup>143</sup>
- Telemedicine consultations increased 1000-fold between March and August 2020.<sup>144</sup>
- Private sector telemedicine initiatives include diabetic retinopathic detection services and in-home detection of pathologies in patients with chronic diseases.

## Policy landscape

Chile recognized the role of virtual solutions in the delivery of health and care services with the release of its National Telehealth Program in 2018. Since the start of the COVID-19 pandemic, several other guidelines and policies are encouraging virtual delivery of health and care. The timeline shows some of the notable policies related to virtual health and care in Chile.



## Policy elements and policies

Digital skills building	
<p>Tele-education for digital skills building is being introduced with formal and informal training in academia and practice to allow assimilation of solid technical knowledge and strengthening of communication and health management.</p>	<p><i>National Telehealth Program, 2018</i></p>
Data governance	
<p>Consent and confidentiality are to be maintained and the virtual health and care provider should ensure that all protocols for security in communication are maintained.</p> <p>All virtual health and care sessions and delivery are to be recorded in a comprehensive and chronological manner.</p>	<p><i>National Telehealth Program, 2018; Circular letter IP/No. 7 of the Intendancy of Health Providers, 2020; Foundations for the Guidelines for the Development of Telemedicine and Telehealth in Chile, 2020</i></p>
<p>Personal devices such as smartphones are not permitted for taking images for medical purposes.</p>	<p><i>National Telehealth Program, 2018</i></p>
Human- and equity-centric	
<p>Older people and the disabled are to be treated preferentially and in a timely manner.</p>	<p><i>Law 20584, 2012</i></p>
Interoperability	
<p>Telehealth systems are to be designed on interoperability standards based on Health Sector Information Assets Core, which has software products such as a pension certifier, a database of people, clinical records, etc.</p>	<p><i>National Telehealth Program, 2018</i></p>
Licensing	
<p>The physician practicing telemedicine must be authorized to practice medicine in the residing state as well as the state of the patient.</p>	<p><i>National Telehealth Program, 2018</i></p>
<p>The provider must possess a title from the University of Chile or another state-recognized university.</p>	<p><i>Article 112, Health Code, 1968</i></p>
Liability	
<p>The doctor is free to decide whether to use or recommend telemedicine for a patient and must assume responsibility for the case in question.</p> <p>It is essential that the doctor who performs telemedicine can participate in follow-up procedures, if necessary.</p>	<p><i>National Telehealth Program, 2018</i></p>
<p>Doctors and health professionals are subject to similar civic laws and liabilities in telemedicine as with in-person consultations.</p> <p>The type of telehealth consultation (synchronous, asynchronous, involvement of an intermediary, etc.) is also to be considered in determining legal norms, normative use, and standards of conduct.</p>	<p><i>Foundations for the Guidelines for the Development of Telemedicine and Telehealth in Chile, 2020</i></p>

## Quality assurance

The doctor is required to give medical opinions or make medical decisions only if the quality and quantity of information received is sufficient and relevant. *National Telehealth Program, 2018*

Applications such as Apple FaceTime, Facebook Messenger, Google Hangouts, WhatsApp, Zoom, and Skype, which do not comply with security standards, may only be used during the COVID-19 pandemic; this provision is to be revoked once the exceptional situation has passed. *Guide to Good Practices and Recommendations for the Use of Telemedicine during the COVID-19 Epidemic in Chile, 2020*

Identification, authentication, and authorization of patient, doctor, and health professionals is mandatory before the start of telemedicine service. *Foundations for the Guidelines for the Development of Telemedicine and Telehealth in Chile, 2020*

## Regulation

Telemedicine use cases for various medical scenarios such as primary care, specialties, outpatient care, emergency process, surgical process, drug dispensing, etc. are clarified. *National Telehealth Program, 2018*

Several synchronous teleconsultations are allowed during the Health Alert declared because of the COVID-19 pandemic. *Resolution 204, 2020*

The types of teleconsultations – first-time or follow-up – are also specified with guidelines for access to patient history as required.

## Reimbursement

Telemedicine services delivered through public health facilities such as clinics, rehabilitation centers, and hospitals are recognized by FONASA. *Exempt Resolution 49, 2019*  
Patients can be reimbursed for telemedicine Benefit Codes specified by FONASA through the Free Choice Modality scheme.

Benefit Codes are recognized in telemedicine for specific consultations in the Free Choice Modality. *Exempt Resolution 54, 2020*

Telemedicine services for general medicine, 29 specialties, psychotherapy, speech therapy, and nutrition are reimbursed by FONASA. *Notification by FONASA, 2020*

If the remote care is suspended for a reason not attributable to the patient, the service is considered as failed and the patient has the right to claim a refund for any payment made. *Circular Letter IP/No. 7 of the Intendancy of Health Providers, 2020*

Insurers are required to establish an online claims system which is permanently available to patients and functions similarly to the established internal claims system. *Circular Letter IP/No. 7 of the Intendancy of Health Providers, 2020*



## Supporting policies

Chile's efforts to increase nationwide broadband coverage are key for enabling the virtual delivery of health and care. It is providing governmental support as well as encouraging fair market conditions for expanding broadband connectivity throughout the country.

### Telecommunication Development Fund (Fondo de Desarrollo de las Telecomunicaciones – FDT), 1994

#### Nature of policy:

A financial scheme to increase telecommunication (broadband, mobile connectivity, public call centers, etc.) coverage in rural and low-income urban areas.

#### Policy impact:

As of March 2021, 14 FDT-financed projects aim to lay out the broadband infrastructure (fiber optic cables) required to enable high-speed telecommunication across the country; this is expected to increase adoption of virtual health and care.<sup>145</sup>

Mobile broadband penetration rates in Chile have risen from 3.5% in 2009 to 95% in 2019.<sup>146</sup>

### National Roaming Obligations, 2020

#### Nature of policy:

Guidelines to allow new operators to enter the telecommunications market on fair terms and be able to compete with existing players.

#### Policy impact:

The policy aims to reduce connectivity gaps for users in remote regions or isolated locations by incentivizing new operators, as they can use the infrastructure of existing operators. Moreover, users are not charged additional fees for roaming services and such costs are settled between the operators.

## Outlook

The strategy roadmap for increasing the use of virtual health and care in Chile is already beginning to take shape with notable initiatives:

- **Digital Hospital (2019):** The governmental initiative for early detection of lethal diseases in rural populations is enabling radiological examinations and access to specialty health services through the virtual exchange of medical information.
- **Healthcare Network Information System (Sistemas de Información de la Red Asistencial – SIDRA, 2008):** Chile has made progress in EHRs through SIDRA, which maintains updated patient information and enables sharing among health and care providers in the public health system with the patient's authorization. Notably, private health and care providers are excluded from the program.<sup>147</sup>
- **Health + Development Program (Salud + Desarrollo – S+D, 2015):** The governmental program is promoting competition and innovation through collaboration and the adoption of health and care standards. The first project under this program was the National Centre for Health Information System (Centro Nacional en Sistemas de Información en Salud – CENS), which is working to create a national health information system.

Data governance is one of the key focus areas of upcoming Chilean policies that address interoperable ecosystems and international data transfer.

- **Interoperable Medical Account:** Private health and care providers and FONASA are implementing a health and care information exchange based on international standards for achieving interoperability.<sup>148</sup>
- **Agency for Personal Data Protection:** A draft law for personal data is currently under development for ensuring privacy in international transfer of virtual health and care data through an agency for personal data protection.

Going forward, virtual health and care adoption in Chile could benefit from increased policy focus on:

- **Licensing, reimbursements, and liability:** Cross-border delivery of virtual health and care is allowed for licensed providers but there is a need for further clarity on reimbursements and liability.
- **Interoperability:** Although almost 70% of all primary health clinics have some form of EHRs, lack of interoperable standards means that each of them is operating as an information silo unable to exchange actionable patient information.





Germany has one of the most restriction-free and patient-oriented health and care systems in Europe. Patients can seek almost any type of care and through any provider they want, although the quality of services differs among providers. As a result, the proportion of the population with an unmet need for medical care\*\*\* is among the lowest in European Union (EU) at 0.1% (2020).<sup>149</sup>

The Federal Ministry of Health has primary responsibility for health and care policy at the national level; it supervises several institutions that deal with overarching policy aspects. Individual states are responsible for implementing federal legislation as well as for planning and financing inpatient care.

#### Germany health and care key metrics

Metric	Status
Progress on achieving SDG3	Challenges remain. Score moderately improving, insufficient to attain goal
UHC service coverage index	<b>83</b> (global median value – 68)
Global burden of disease: DALY (per 100,000)	<b>32,162</b> (global mean value – 32,801)
Health expenditure as % of general government expenditure	<b>20.1%</b>
Out of pocket expenditure as % of current health expenditure	<b>12.8%</b>
% of individuals using the internet	<b>90%</b>
Doctor density (per 10,000)	<b>44.35</b> (WHO recommendation – 10)
Cost of data (1.5 GB mobile broadband, US\$)	<b>US\$17.00</b> (global mean – US\$8.70)
Digital skills among population	<b>5.07</b> (global median – 4.21)

\*\*\*Unmet need for medical care is an index used by the WHO defined as the total self-reported unmet need for medical care for the following three reasons: financial barriers + waiting times + too far to travel.

Some of the salient features of the German health and care system are:

- **Mandatory insurance:** Every citizen is required to have either public or private insurance. Roughly 90% of the population is insured through the public system and 10% via private players.<sup>150</sup>
- **Parity financing:** Premiums are determined based on income and shared between the employee and employer.
- **Solidarity:** Every person has an equal right to access to care regardless of income and premium levels.
- **Self-governance:** The state sets the conditions for medical care and legally designated self-governing bodies within the health and care system's standard financing and organization of individual medical services.<sup>151</sup>

## Virtual health and care developments

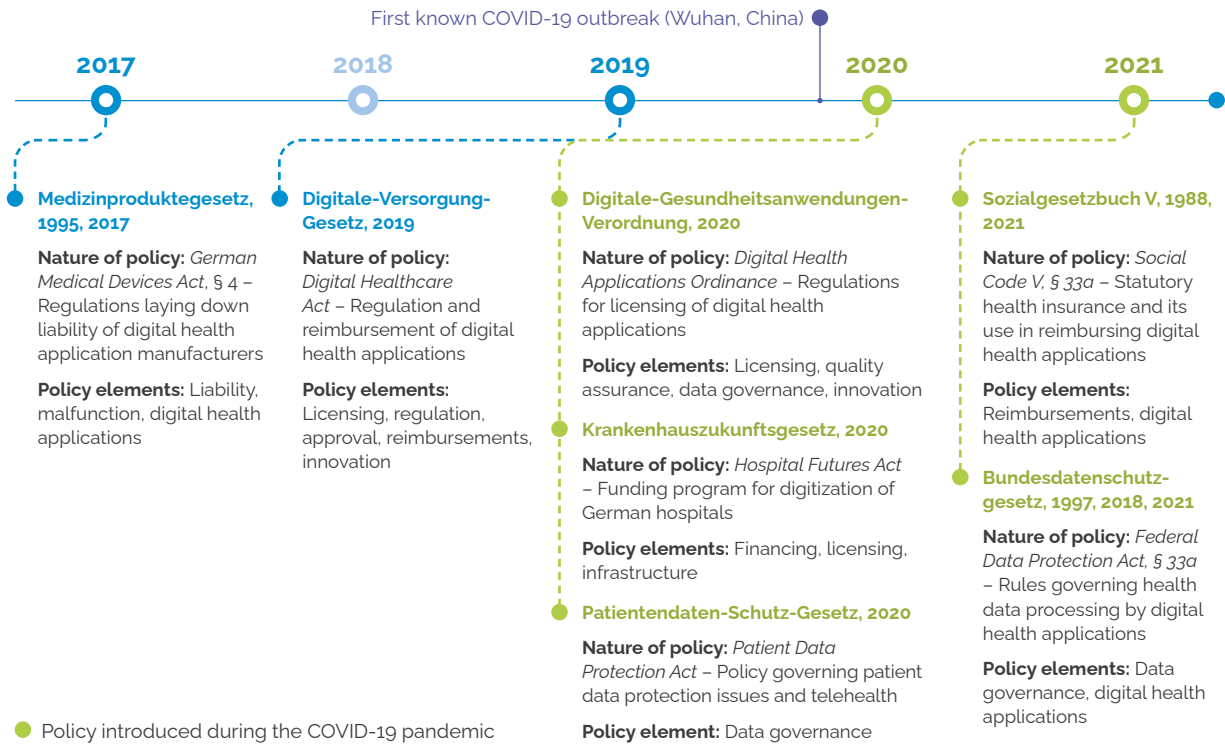
Germany's policies on virtual health and care provided a conducive environment for increased adoption of virtual health and care solutions in light of the COVID-19 pandemic. The government also provided financial stimulus for the creation of infrastructure within the health system to enable virtual delivery. The key highlights surrounding virtual health and care in Germany are provided below:

- Actions by the Federal Ministry of Health:
  - The Ministry obtained the majority share in Gematik, the national agency for telehealth infrastructure, with an aim to consolidate its offerings. It then initiated the Health Innovation Hub that functioned as an interdisciplinary expert think tank for health and care digitization between 2019 and 2021.<sup>152, 153</sup>
  - It also earmarked €4.3 billion for hospital digitization and modernization of emergency services between 2020 and 2025.<sup>154</sup>

- Telemedicine platforms (Kry, Teleclinic, Ada Health) reported up to a 200-fold increase in use, with more than 20,000 medical doctors and psychotherapists offering appointments through video consultations between April 2020 and April 2021.<sup>155</sup>
- Virtual consultations are paid by the insurer, provided that the platform used is certified by the National Association of Statutory Health Insurance Physicians (NASHIP/ Kassenärztliche Bundesvereinigung – KBV).<sup>104</sup>
- 30 digital health applications (Digitale Gesundheitsanwendungen – DiGA) have been approved for preliminary use and prescription till March 2022.<sup>108</sup>

## Policy landscape

The Digital Healthcare Act, 2019 (Digitale-Versorgung-Gesetz – DVG) marks the beginning of a new era of virtual health and care in Germany. This timeline shows several other notable policies related to virtual health and care in Germany.



### Assessment of positive health and care effects of Digital Health Applications (DiGAs)

**A positive health and care effect is defined as**

- a *medical benefit* – patient-relevant effect regarding improvement of the state of health, reduction in the duration of disease, prolongation of survival, or improvement in quality of life; or
- a *patient-relevant improvement* of the structure and processes for supporting the health behavior of patients or integrating processes between patients and providers.

**The areas of application of DiGAs include:**

- Coordination of treatment procedures
- Alignment of treatment with guidelines and recognized standards
- Treatment adherence as per guidelines or to agreed-upon terms between patient and provider
- Facilitating access to care
- Patient safety
- Health literacy
- Patient autonomy
- Coping with illness-related difficulties in everyday life
- Reduction of therapy-related efforts and burdens for patients and their relatives

**The methodology for showing a positive effect:**

- The manufacturer must present the results of a comparative study showing that the use of the DiGA is better than not using it.

- The comparison must be between a group using the DiGA with another group that could be
  - treatment without the use of a DiGA, or
  - non-treatment, or
  - treatment with another, comparable DiGA that is already listed in the DiGA directory.
- The studies should be
  - quantitative and comparative in nature with adequate methodology for the chosen subject of investigation,
  - conducted in Germany, and
  - registered in a public study registry that is a primary registry or a partner registry of the World Health Organization International Clinical Trials Registry Platform (WHO ICTRP) or a data provider of the WHO ICTRP.
- Results must be submitted within 12 months of completion of the study.

**Other considerations:**

- Economic factors are not included in the assessments.
- Systematic data analyses from the DiGA including real-world data should be submitted when applying for provisional listing for prescription.
- Publication in a peer-reviewed journal can be advantageous in terms of professional reputation and acceptance, but is not necessary.

## Policy elements and policies

### Data governance

Digital health applications must comply with provisions in the Federal Data Protection Act (Bundesdatenschutzgesetz – BDSG) and General Data Protection Regulation (GDPR).

*Digital Healthcare Act, 2019; Federal Data Protection Act, 1977, 2021*

These provisions govern the processing of special categories of personal data.

- A voluntary and informed, explicit consent of the person concerned must be obtained, either in writing or electronically.
- GDPR standards, particularly data minimization and data protection-friendly technology design through “Privacy by Design” and “Privacy by Default”, apply without restriction.
- Personal data, including virtual health and care data – collected during assessments for measuring health outcomes – can be processed with the consent of the users.
- Data processing within the EU is allowed. Processing outside the EU is permissible when a comparable level of data protection exists in the third country (adequacy decision according to Article 45 of GDPR – e.g., the USA does not satisfy the criteria currently).
- A DiGA can transfer data to other DiGA, to platform services such as Apple Health, or to third-party software if it complies with the GDPR.
- The DiGA must adhere to an information security management system as per ISO-27001, BSI 200-1, 200-2, and 200-3 for providing security while ensuring high market dynamics and fast release cycles.

Health insurance providers are required to offer clients electronic patient records (elektronische Patientenakte – ePA) from 2021.

*Digital Healthcare Act, 2019*

- ePAs are to include sensitive information that has only been documented in hardcopy until now, such as maternity logs, pediatric health records, and vaccination cards from 2022.
- Patients can decide what is stored on their ePAs and who will have access to them.
- Patients will be able to voluntarily make data on their ePAs available to researchers as part of data donation from 2023.

The use of e-prescriptions by physicians is possible:

- Prescriptions will be generated electronically and added to the German digital health and care system's telehealth infrastructure that supports data communication between all stakeholders, including patients and health and care providers.
- Doctors will create e-prescriptions in their practice management system, sign them electronically, and add them to the central telehealth system.
- Patients will be able to access the e-prescription from their phone using an app and assign it to a pharmacy of their choice.

### Financing

All hospitals included in a German state's hospital plan can apply for government funding for:

*Hospital Future Act, 2020*

- Modernization of hospital emergency room technical/IT equipment.
- Development of patient portals for digital admission, computerized physician order entry, and discharge management.
- Introduction of electronic documentation of care and treatment services.
- Establishment of partially or fully automated clinical decision support systems.
- Digital medication management systems.
- Introduction of in-hospital digital processes for requesting services.
- Implementation of cloud computing systems and coordination of services offered by several hospitals through joint service structures.
- Digital bed management systems to improve collaboration between hospitals and other care facilities.



- Procurement, expansion or development of information and communication technology (ICT) equipment, systems, or methods to avoid disruptions to availability, integrity, and confidentiality of technology systems, components or processes.
- Procurement, expansion or development of ICT and robotics-based facilities, systems, or processes needed for treating patients and establishing telemedical network structures.
- Adaptation of patient rooms to special treatment requirements in the event of an epidemic.

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Health insurance companies are required to cover the necessary costs for equipping the practices and for ongoing virtual health and care operations.

*National Association of Statutory Health Insurance Physicians (NASHIP) guidelines, 2020, 2021*

### Health outcomes

Digital health applications must demonstrate positive care effects in terms of:

*Digital Healthcare Act, 2019*

- Medical benefits: improvement of the state of health, reduction of the duration of a disease, prolongation of survival, or an improvement in the quality of life.
- Patient-relevant improvement of structures and processes: coordination of treatment procedures, alignment of treatment with guidelines and recognized standards, adherence, facilitating access to care, patient safety, health literacy, patient autonomy, coping with illness-related difficulties in everyday life, or reduction of therapy-related efforts and strains for patients and their relatives.

The procedure for demonstrating these positive care effects through research and studies, including real-world evidence, has been specified.

### Human- and equity-centric

The health and care system is based on choice and self-determination: all citizens can choose their health and care provider as per their own criteria. This enables transformation through digital tools by putting the patient at the center – as a key driver of the overall change.

*Social Code V, 2021; Digital Healthcare Act, 2019*

A positive care effect must be demonstrated by digital health applications before they are permanently approved: this enables shared decision-making through self-reporting of data.

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Since 2000, health disparities are implicitly mentioned in the national health goals.

*Digital Healthcare Act, 2019*

- The selection, formulation, evaluation, and update of national health goals is required to consider equal health opportunities and gender mainstreaming.
- *Gesellschaft für Versicherungswissenschaft und -gestaltung*, a network of more than 120 health-related institutions, promotes the health of the socially deprived through guidelines and calls for action.
- Digital health applications must demonstrate ease of use with operating aids for people with disabilities.

## Innovation

Provisions for making demographic data from health insurers more usable for research purposes are defined.

*Digital Healthcare Act, 2019*

- Specified beneficiaries such as universities and publicly funded research institutions can process certain demographic data from health insurers for specific research purposes, especially for analysis of treatment or care processes or longitudinal analysis over longer periods.
- Data may include information on patient gender, age, place of residence, vital status, date of death, and billing data like hospital treatment invoices.

Data should be transmitted in an anonymized and aggregated format.

## Interoperability

Transparency about existing standards and profiles is to be created and the targeted development of required profiles across all stakeholders is to be promoted. The following measures are recommended:

*Digital Healthcare Act, 2019*

- Providers of electronic applications in the health and care system must adhere to the vesta standards, the central and independent directory for IT standards in the German health and care system.
- The personal health record (ePA) should be developed as the central data hub for exchanging medical documents between health and care providers. ePA will be interoperable and can be authorized for use only by the insured person.
- Interoperability formats are to be defined and administered by the NASHIP.
- The interoperability formats are to be based on open, internationally recognized interfaces and semantics standards such as HL7, ISO, NEMA, LOINC, SNOMED.
- Standards that have undergone a proper consensus procedure at a national standards developing organization (e.g., German FHIR) are also allowed.

Emphasis is on "interoperability before completeness": a standard that is recommended in the vesta directory is to be used if it covers 80% of the content that is exported.

Digital health applications must prove interoperability by allowing the insured person to export therapy-relevant extracts of the data collected by the app in

- human-readable and printable form, and
- in a machine-readable, interoperable format.

Patient referrals by physicians are being digitized, and patients will be able to receive a referral from doctors and medical specialists digitally.

## Liability

Liability issues arising due to incorrect or incomplete information, or malfunction, are to be resolved through appropriate provisions.

*Digital Healthcare Act, 2019; Digital Health Application Ordinance, 2020*

Liability of the prescribing doctor:

- The prescribing doctor is generally liable under the treatment contract with the patient in accordance with the German Civil Code (Bürgerliches Gesetzbuch – BGB) and under tort law.
- Under the treatment contract, the doctor owes the patient the so-called "specialist standard": If the doctor chooses to use a new and not yet generally introduced method which bears risks that have not yet been conclusively clarified, the doctor must provide the patient with comprehensive information.
- In case of unforeseeable malfunctions of the app with negative health effects for the patient, the doctor will rarely be blamed if they did not know – or did not have to know – the risk in question.
- Regarding contractual medical liability, the burden of proof concerning the causal relationship between the treatment error and the health damage suffered by the patient lies, in principle, with the patient.



Liability of the app's manufacturer:

- The manufacturer can also be liable under contract and tort law. As per the German Medical Devices Act (Medizinproduktegesetz – MPG), the manufacturer must follow strict safety requirements for the protection of patients when placing medical products on the market due to the potential risk.
- In the event of incorrect use of the app by the patient, the manufacturer may also be liable for a possible breach of duty to provide adequate instructions.

## Licensing

Specific procedures for DiGA accreditation and guidelines for pricing are provided:

*Digital Health Applications Ordinance, 2020*

- The manufacturer must apply to the Federal Institute for Drugs and Medical Devices (Bundesinstitut für Arzneimittel und Medizinprodukte – BfArM).
- BfArM will assess the app for safety, functionality, quality, data security, and data protection.
- After the first check, the app will be provisionally reimbursed by the statutory health insurance at the manufacturer's price for one year.
- During this 12-month period, manufacturers must prove that the app has a medical benefit – a positive care effect that significantly improves patient's health. In case prior evidence is available, the 12-month period is not required.
- If, after the second test, the application is permanently approved, the manufacturer can then negotiate the price it will receive for the following years with the Central Federal Association of the Statutory Health Insurance Funds (GKV-Spitzenverband).
- If an app does not get approved, it will not be reimbursed under the new legislation, not even through individual contracts with health insurance companies.

## Quality assurance

Digital health apps must meet the following quality and operational requirements:

*Digital Health Applications Ordinance, 2020*

- Robustness against external events such as power failures (offline usability is not compulsory) and operating errors and malfunctions.
- User protection in terms of transparency regarding purpose, functionality, and in-app purchases for additional functions and advertisement-free functionality.

## Regulation

Provisions related to telehealth consultations are defined:

*Digital Healthcare Act, 2019; Patient Data Protection Act, 2020*

- A patient must be informed about circumstances that are essential for consent to a medical measure, including its nature, scope, implementation, expected risks, and consequences.
- Physicians can advertise video consultations if proper treatment and advice, based on the recognized state of medical knowledge, are possible.

## Reimbursement

Digital health apps can be prescribed by doctors and psychotherapists. Reimbursements are specified for different cases:

*Digital Healthcare Act, 2019; Social Code V, 2021*

- Smartphone apps that, for instance, support diabetics, pregnant women, or patients with high blood pressure, etc. can be reimbursed.
- Lifestyle applications such as pedometers, calorie counters, and work-out trackers are not reimbursable.

## Supporting policies

Germany recognized digital transformation as one of the fundamental pillars for the future development of social and economic sectors including health and care. The country's cross-sectoral policies on development using digital technologies and expansion of high-speed network coverage are playing a key role in the adoption of virtual health and care.

### 2030 Reform Strategy, 2020

#### **Nature of policy:**

A cross-sectoral development policy for overcoming challenges such as increased consumption of resources, climate change, growing inequalities, environmental degradation, and precarious working conditions. Health and care digitization is one of the major focus areas.

#### **Policy impact:**

The policy has led to increased governmental focus on digital by default: if no digital elements are used in a project, it must be justified. A few noticeable inter-ministerial virtual health and care initiatives under this strategy include the modernization of public health service through digital patient and health information portals.

### DigiNetz Act, 2016 and Telecommunications Modernization Act, 2021

#### **Nature of policy:**

An overarching policy to expand digital high-speed networks for ensuring the availability of virtual health and care services.

#### **Policy impact:**

The policy has enabled several governmental initiatives in mobile communications (nationwide supply of mobile voice and data services), broadband (expansion of gigabit networks), 5G (network roll-out), and regulation of instant messaging, among others.

As of 2019, roughly 99% of the population is covered by at least a 4G connection and almost 95% of households have broadband connections.<sup>156</sup>

### Role of the private sector

The private sector in Germany is developing demand-based solutions for virtual health and care. For example:

- In 2020, almost 80% of doctors still communicated with hospitals on paper: DOCYET and *Ada Health's* solutions enable digitization of routine medical communications.<sup>155, 157</sup>
- As of 2020, only 20% of clinics offer online appointment bookings: services from *Doctolib*, *Jameda*, and *Arzttermine* are simplifying medical scheduling.<sup>157, 158, 159</sup>

## Outlook

Coordinated policy developments and focus with a mix of interrelated measures is positively influencing the adoption of virtual health and care in Germany.

- **Social health insurance:** Since 2009, all citizens and permanent residents are required to have health insurance – a major step towards ensuring universal coverage of health and care. The recent addition of virtual health and care reimbursements within social health insurance payment mechanisms is an important step in ensuring integration.
- **Data governance:** Influenced by the GDPR, the German policy on data privacy and governance (including virtual health and care data) is helping build user trust and driving adoption.
- **Health outcomes:** A participatory approach to decision-making is enabling personalized medicine and helps policymakers develop policies based on real-world evidence which leads to:
  - **Enhanced trust:** When patients are involved in taking their own health and care decisions based on their own – and thus directly relevant – data and evidence, they are more likely to develop trust in the technology and the new way of health and care delivery.
  - **Increased adoption:** Once established, trust translates into increased use of virtual health and care solutions as users develop confidence in the ability of such solutions to solve their health and care issues.
  - **Evidence-based decision-making:** Data-led real-world evidence enables robust and equitable decision-making at the clinical, financial, and policy levels.

A regulatory framework for digital health applications will ensure effective integration of virtual health and care.

- **Digital health apps:** The ability to develop and offer digital health and care solutions is providing the right motivation to innovators to bring demand-oriented virtual health and care solutions to the market. Simultaneously, clarity in licensing and quality assurance is ensuring that user interests are safeguarded, thus giving them confidence in using these solutions.

Going forward, virtual health and care adoption in Germany could benefit from increased policy focus on:

- **Liability management:** Since an app is not a physical object, its use requires consideration of several other safety aspects. As of now, digital health apps are categorized as "medical devices", which are physical objects. Stakeholders could benefit from policy clarity and relevant liability mechanisms on this categorization.
- **Pricing:** Present policies recommend a negotiation-based route for pricing digital health applications. In the absence of negotiation guidelines, this process could become non-transparent. When coupled with the necessity of including health outcomes as a pricing factor, it requires clarity to ensure fair pricing.
- **Data privacy:** There is unclarity whether an individual can opt out of data sharing by health insurers for research purposes. Furthermore, reidentification – which poses the risk of leaking sensitive personal information to unauthorized parties – also requires due consideration.



India's health and care system comprises public and private service providers, with private providers being relatively more popular among middle- and upper-income segments.

A national health and care insurance scheme, *Ayushman Bharat – Pradhan Mantri Jan Arogya Yojana (AB-PMJAY)*, aims to achieve universal health coverage by providing affordable health and care to low-income sections; it covers roughly 650 million citizens, slightly less than half of the country's population.<sup>160</sup> The scheme also covers empaneled private hospitals for reimbursements.

Health and care spending in India is largely through out-of-pocket expenditure, which makes private health and care delivery inaccessible for low-income groups despite being of high quality. However, being relatively cheaper than that in developed countries, the private health and care sector in India attracts many foreign patients, driving medical tourism.

#### India health and care key metrics

Metric	Status
Progress on achieving SDG3	Major challenges remain. Overall score moderately improving, insufficient to attain goal
UHC service coverage index	<b>55</b> (global median value – 68)
Global burden of disease: DALY (per 100,000)	<b>33,643</b> (global mean value – 32,801)
Health expenditure as % of general government expenditure	<b>3.4%</b>
Out of pocket expenditure as % of current health expenditure	<b>54.8%</b>
% of individuals using the internet	<b>41%</b>
Doctor density (per 10,000)	<b>7.35</b> (WHO recommendation – 10)
Cost of data (1.5 GB mobile broadband, US\$)	<b>US\$2.65</b> (global mean – US\$8.70)
Digital skills among population	<b>4.43</b> (global median – 4.21)

## Virtual health and care developments

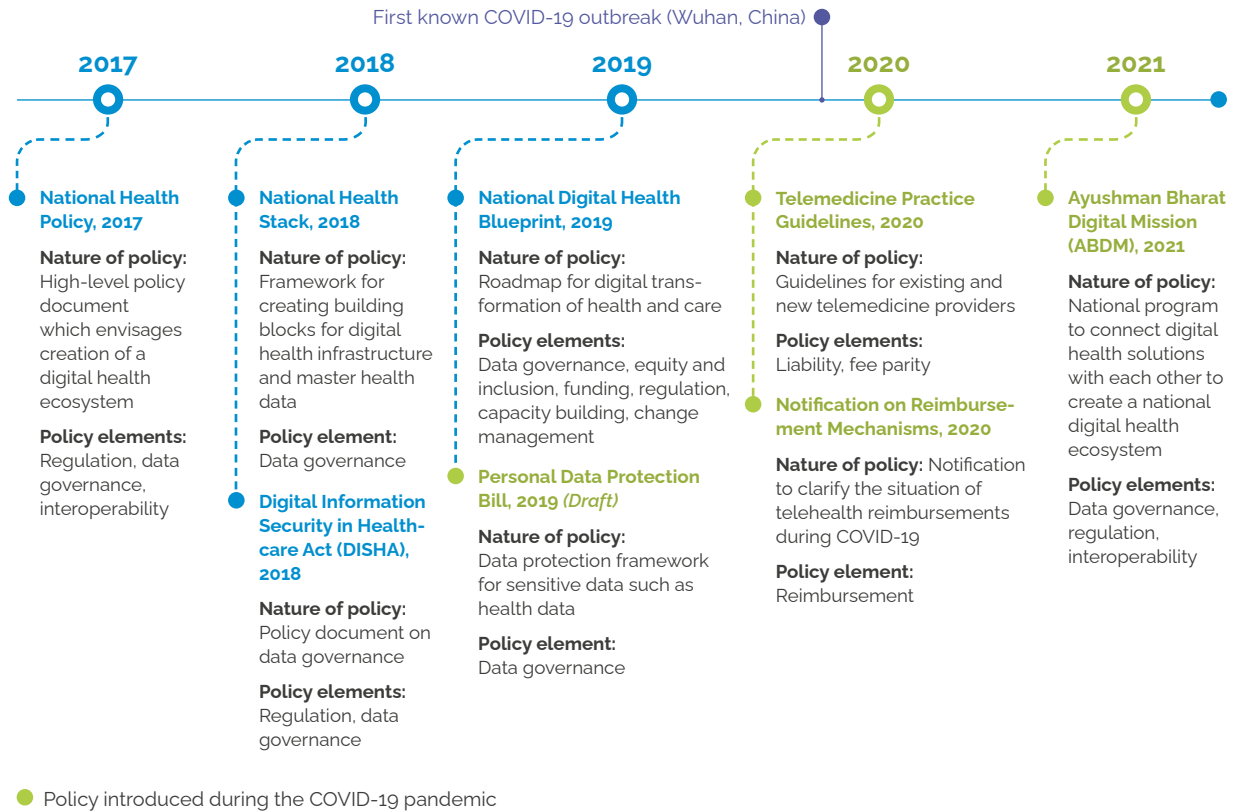
India saw virtual delivery of health and care long before the COVID-19 pandemic as several private players entered the market. The uptake had a significant boost as the pandemic resulted in nationwide lockdowns and health and care needed to be delivered virtually. Some of the key highlights surrounding virtual health and care development in India are provided below:

- Virtual health and care services in India began more than a decade ago when private teleconsultation players such as *Practo* (2008) and *Lybrate* (2013) entered the market.
- The government is also driving the adoption of virtual health and care solutions through solutions such as *Indradhanush Immunization* (2016), *National Health Portal Swasth Bharat* (2016) and *eSanjeevani* (2019). Presently, the market is comprised of several private players such as *1mg* (2015), *NetMeds* (2015), *DocsApp* (2015), *mFine* (2017) and *DocPrime* (2018).
- The period between March and May 2020, corresponding to the national lockdown due to the COVID-19 pandemic, saw a 300% boost in teleconsultations and a 200% increase in the number of users ordering medicines online.<sup>161, 162</sup>
- *Aarogya Setu*, the public COVID-19 tracing app, is one of the most widely adopted in the world with nearly 200 million users in 2021.<sup>163</sup>
- In January 2021, the government launched *CoWIN*, a vaccine management platform being used to run the world's largest vaccination drive.<sup>164</sup>
- In June 2020, the Insurance Regulatory and Development Authority of India (IRDAI) issued a circular to insurers to allow telemedicine as part of claim settlement of policy of insurers wherever consultation with a medical practitioner is allowed in the terms and conditions of policy contract.



## Policy landscape

India's *National Digital Health Blueprint, 2019* provides a framework for integrating virtual delivery into the country's health and care system. The timeline lists key policies related to virtual health and care in India.



## Policy elements and policies

### Digital skills building

Providers, platforms, and government bodies were apprised of the importance of digital skills building and training was imparted by the states to facilitate change management.

As a result, the Telemedicine Society of India conducted educational campaigns to train doctors for remote delivery of health and care in the wake of the COVID-19 pandemic.<sup>165</sup>

*National Digital Health Blueprint, 2019 and Telemedicine Practice Guidelines, 2020*

### Collaboration

A participatory approach to policymaking is being used to develop forward-thinking and inclusive policies aligned with global standards. For instance, consultation papers on Unified Health Interface, Health Facility Registry, and Healthcare Professionals Registry seek opinions on different aspects from all stakeholders.

*Various consultation papers on Unified Health Interface, Health Facility Registry, Healthcare Professionals Registry and Proposed Health Data Retention Policy, 2021*

## Data governance

Data consent is required at every stage of collection by the collecting agency. A new proposal seeks to change this to the first stage of collection before processing of data. Commercial use of health and care data is banned.

*Ayushman Bharat Digital Mission, 2021 – Health Data Management Policy (Draft)*

Virtual health and care data ownership, consent, and storage are enabled through a Health Information Exchange that has an in-built Consent Manager, a system that interacts with the data owner and obtains their consent for any intended access.

*National Health Stack, 2018 and National Digital Health Blueprint, 2019*

## Financing

Budgetary support from government and other models for involving market players such as MedTech, non-governmental organizations, foundations, and others is identified as a key source of funding for infrastructure development.

*National Digital Health Blueprint, 2019*

## Human- and equity-centric

Providers, platforms, and government are advised to use telemedicine to reach the "unconnected", digitally illiterate, and remote and tribal area populations using omni-channels such as the web, mobile apps, call centers, and social media.

*National Health Policy, 2017 and National Digital Health Blueprint, 2019*

## Interoperability

A federated architecture for data storage is to be implemented for personal health records.

*Ayushman Bharat Digital Mission, 2021*

- The data will remain with the health and care provider and there will be no central database.
- Users will choose the storage location (HIP) of their data.
- Users will access their data through the Ayushman Bharat Health Account Number, which will enable linking of records across systems and health and care providers.
- Any use of this data for the benefit of the user or for public good will be anonymized and made available with the consent of the user.

Interoperability is being addressed through a sandbox mechanism – a controlled, regulated environment to test new products and services.

Public and private health and care providers are advised to roll out and link systems at the state and national levels consistent with defined standards such as *Metadata and Data Standards and Electronic Health Records*.

*National Health Policy, 2017*

Public and private health and care providers are advised to adopt open standards such as *FHIR Release 4, SNOMED CT, and LOINC*, etc.

*National Digital Health Blueprint, 2019*

Unified Health Interface is an interoperable pipeline that connects end users with different providers using building blocks such as:

- Horizontal digital artifacts and cross-functional digital solutions that can be used across sectors. For example, the Digital Signature on Demand for e-verification/ e-signature using Aadhaar (national health ID) is now used for e-prescriptions (along with tax filings, etc.).
- Registries such as the Health Facility Registry, Healthcare Professionals Registry, and the Drug Registry will consequently provide a single source of truth for virtual health and care data for all authorized stakeholders.
- Personal health records that will be stored in the National Health Stack and accessible for users through Ayushman Bharat Health Accounts, making the health stack one of the largest virtual health and care databases in the world. This data can be used for analytics, insight generation, and preventive and proactive health and care management.

*National Health Stack, 2018; National Digital Health Blueprint, 2019; Various consultation papers on UHI, Health Facility Registry, Healthcare Professionals Registry and Proposed Health Data Retention Policy, 2021*



Liability	
Licensed doctors are advised to use their professional judgement for deciding the suitability of virtual health and care solutions in therapy.	<i>Telemedicine Practice Guidelines, 2020</i>
Regulation	
The National Health Authority functions as an autonomous regulatory body for managing health and care data including making it available for policymaking through analytics, etc.	<i>National Health Policy, 2017 and National Digital Health Blueprint, 2019</i>
Use of a citizen health identity card is currently optional; providers are required to provide services to all irrespective of the availability of a health identity card.	<i>Ayushman Bharat Digital Mission, 2021 – Health Data Management Policy (Draft)</i>
Reimbursement	
Insurers are required to reimburse telemedicine claims so that out-of-pocket expenses remain manageable.	<i>Notification on Reimbursement Mechanism, 2020</i>
Providers are advised to maintain fee parity for in-person consultations.	<i>Telemedicine Practice Guidelines, 2020</i>

## Supporting policies

India's cumulative telecommunication policies and recent initiatives for providing insurance to low-income segments are supporting the adoption of virtual health and care in the country.

### Broadband Policy, 2004

#### Nature of policy:

A long-term overarching policy that aimed to enhance the quality of life through access to information using programs for web-based education, health and care, e-governance, entertainment, and others, to generate employment.

#### Policy impact:

Internet penetration in India increased several times in the last two decades: the number of internet users grew from 6 million in 2005 to 622 million in 2020 and is expected to reach 900 million by 2025.<sup>15</sup>

## National Digital Communications Policy, 2018

#### Nature of policy:

A successor to the National Telecom Policy, 2012 that expands the scope of telecommunication to include data-intensive digital applications.

#### Policy impact:

The policy recognizes that communications is now a data-driven sector and aims to create a robust communication infrastructure; enable next-generation technologies and services; and ensure digital sovereignty, safety, and security of digital communications.

### Ayushman Bharat – Pradhan Mantri Jan Arogya Yojana, 2018

#### Nature of policy:

A health and care insurance scheme for economically weaker sections.



### Policy impact:

The policy ensures cashless and paperless access to health and care services for almost 135 million families (~650 million individuals) through an annual coverage of US\$6500 (IN₹500,000) per year for each family. It has covered more than 32 million hospital admissions until March 2022.<sup>160</sup>

### Role of private sector

Reliance Jio, an Indian telecommunication company, launched a nationwide 4G network coverage program in 2015 after securing the 1800 MHz band through an auction made available by the National Telecom Policy, 2012.

- Prior to the launch of Jio, most regions had 2G coverage and rural mobile internet penetration was 9%.<sup>166</sup>
- Jio's launch gave 4G network access at market-disrupting cheap prices, resulting in rural area internet access tripling and an annual growth rate of 35%.<sup>15</sup>

### Outlook

The government in India is pushing the adoption of virtual health and care through various initiatives and platforms.

- **iGoT (April 2020):** A governmental training platform for change management and handling the COVID-19 pandemic trained 16 million+ doctors, paramedics, nurses, and other health and care workers in digital technologies, including virtual delivery of health and care.
- **eSanjeevani (April 2020):** A synchronous (doctor-to-patient) and asynchronous (doctor-to-doctor) telemedicine service which saw consultations rising from 0.1 million in October 2020 to 3 million in September 2021.
- **Ayushman Bharat Digital Mission (August 2020 – pilot/September 2021 – nationwide):** The government's main health and care digitization initiative launched to support integrated digital health and care infrastructure and allow siloed health systems to connect with each other. It has four core building blocks – Ayushman Bharat Health Account (ABHA), ABHA Application, Healthcare Professional Registry, and the Health Facility Registry.
- **CoWIN (January 2021):** A COVID-19 vaccine management platform now extended for conventional immunization.
- **Telemental Health Assistance and Nationally Actionable Plan through States (February 2022):** A national telehealth program to enable holistic psychological well-being and to sensitize citizens about counseling. It is to be implemented through 23 national telemental health centers of excellence being coordinated by one national nodal institute.

Policy is enabling ecosystem maturity through quality and risk management, data governance and standardization.

- **Quality and risk management:** Apollo TeleHealth, India's largest telemedicine provider, became the first-ever organization in the world to attain "ISO 13131:2021 Health informatics – Telehealth services – Quality planning guidelines" certification in December 2021.<sup>167</sup>
- **Federal registries:** Several registries such as the Health Facility Registry were brought under Ayushman Bharat Digital Mission to provide a single source of truth for health and care data for authorized stakeholders.
- **Digital Health Accreditation Standards:** India began drafting digital health accreditation standards in 2020 for addressing quality of care, patient data safety, confidentiality, etc. These also include guidelines for legal obligations, interoperability and communication standards, data security, remote monitoring, and mobile apps.

Going forward, virtual health and care adoption in India could benefit from increased policy focus on:

- **Liability management:** The present policy recommends the professional judgement of a licensed doctor for appropriate use of virtual health and care solutions. However, there could be further specification on the standards of conduct, specifications for hardware, software, connectivity, data exchange, interoperability, and a multidisciplinary oversight mechanism to address liability and grievances. These are especially relevant for medico-legal issues that could arise among multiple actors involved during the use of virtual health and care solutions.
- **Cross-border regulations:** Policies could also clarify cross-border use of virtual health and care solutions, which could provide access to global clinical expertise as well as export the country's proficiency.
- **Equity-linked implementation:** Present policies provide principles for promoting equity and delivering health and care to all without biases. However, they do not describe their implementation, which could be further enhanced.



Israel provides universal coverage to citizens and permanent residents through a compulsory insurance system, funded by a national income tax and an income-related health tax. Most providers are contracted with one of the four competing non-profit national health plans – Clalit, Maccabi, Meuhedet, and Leumit, which have played a major role in improving adoption of digital health and care. Each of these offer an EHR system that links all community-based providers. Additionally, each citizen has a unique patient ID.

The national government, through the Ministry of Health, is mainly responsible for population health and the overall functioning of the health and care system.<sup>168</sup> The health and care system undergoes regular audits, especially on the quality of care delivered, through key indicators to ensure minimum standards of care for constantly improving public health outcomes.

Israel is known globally for its innovation landscape and ranks 5<sup>th</sup> in the 2021 FREOPP World Index of Healthcare Innovation.<sup>169</sup>

#### Israel health and care key metrics

Metric	Status
Progress on achieving SDG3	SDG achieved. On track or maintaining SDG achievement
UHC service coverage index	<b>82</b> (global median value – 68)
Global burden of disease: DALY (per 100,000)	<b>19,702</b> (global mean value – 32,801)
Health expenditure as % of general government expenditure	<b>12.1%</b>
Out of pocket expenditure as % of current health expenditure	<b>21.0%</b>
% of individuals using the internet	<b>87%</b>
Doctor density (per 10,000)	<b>36.26</b> (WHO recommendation – 10)
Cost of data (1.5 GB mobile broadband, US\$)	<b>US\$11.51</b> (global mean – US\$8.70)
Digital skills among population	<b>5.50</b> (global median – 4.21)

## Virtual health and care developments

Israel is one of the key innovators in the global virtual health and care landscape. The country witnessed integration of new technologies within the health and care system prior to the COVID-19 pandemic as explained in the virtual health and care highlights below:

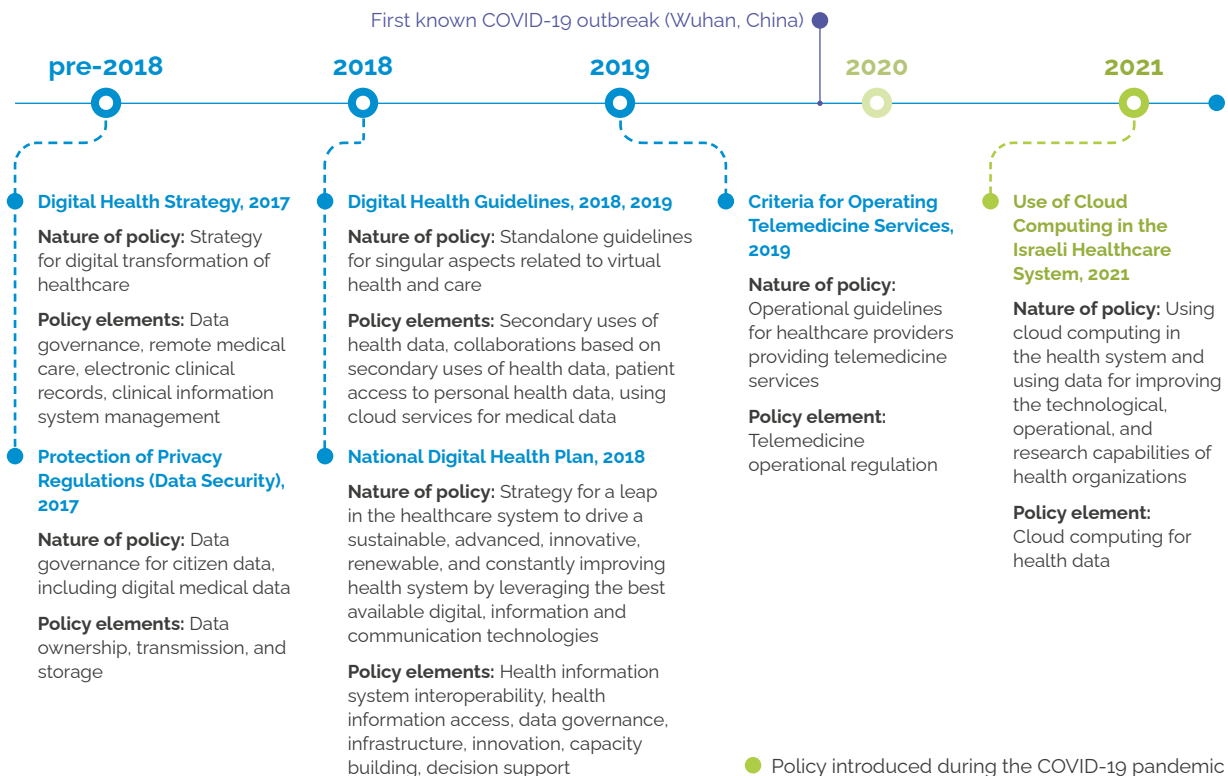
- Israel launched a five-year national digital Big Data Program in 2018 with a budget of US\$280 million to establish the country as a world leader in the field of digital health innovation based on big data, artificial intelligence, and connectivity.<sup>170</sup>
- The use of virtual health and care increased seven-fold during the COVID-19 lockdown

between March 2020 and May 2020; after lockdown, the new baseline was three-fold higher than pre-COVID.<sup>171</sup>

- Sheba Beyond, Israel's first virtual hospital, was created in partnership with InTouch Health Uniper, Datos Health, *EarlySense*, *TytoCare*, and BioBeat for remote hospitalization, rehabilitation, and outpatient clinics in 2020.<sup>172</sup>
- In 2021, The Heart Institute at Sheba Medical Center partnered with technology startup Datos Health to offer remote home monitoring of pediatric cardiac patients in underserved regions such as Israel's ultra-orthodox sector, the Palestinian Authority, the West Bank, Gaza, Iraq, Kurdistan, and Cyprus.<sup>173</sup>

## Policy landscape

In 2018, Israel developed a National Digital Health Plan for promoting *digital as an engine of growth*. Since then, it has built upon this plan to improve virtual delivery and the timeline shows some of the important virtual health and care-related policies.



## Policy elements and policies

### Digital skills building

Human capital and supporting infrastructure for the digital health and care industry are being developed through:

*National Digital Health Plan, 2018*

- Graduate and higher-level institutional programs in data science, content analysis, and health and care software development.
- Personnel adaptation programs to enable data scientists from other fields to migrate to digital health.
- Non-academic industry internships.

### Collaboration

Collaborations are being promoted between

*National Digital Health Plan, 2018*

- the digital health and care industry, the health and care system, and academia, while leveraging the capabilities of the health system, and
- the digital health and care industry, corporations, and leading international investment bodies.

Digital health user associations such as the *BeWell.il* digital health community are formed to enable joint activities to expand the knowledge and experience of a group of companies with common needs and the development of a common infrastructure.

*National Digital Health Plan, 2018*

The Innovation Laboratories track of the Innovation Authority is working to encourage industrial corporations to cooperate with startup companies.

### Data governance

Medical data documentation is being expanded so that computerized documentation will cover maximum areas of medical expertise and types of treatment.

*National Digital Health Plan, 2018*

It will deepen the capabilities in computerized medical records, and complete deployment at all endpoints of the medical staffs.

Secondary use of health and care data is allowed under certain circumstances:

*Circular no. 1/2018: Secondary Uses of Health Information, 2018*

- Secondary use of health and care data is for a purpose other than medical treatment to derive value through insights, big data models, decision support systems, research, and policymaking.
- The patient provides consent with a selection mechanism regarding the use of data and has the option to opt out.
- Complementary protection mechanisms for patient privacy are defined.
- Transparency mechanisms are in place for the public and researchers on the approved uses of medical information.
- A public information and participation process is encouraged through Decision Transparency Mechanism Approval Committees.

Guidelines for using cloud computing in health and care have been established.

*Use of Cloud Computing in the Israeli Healthcare System, 2021*

- The health and care provider must have an enterprise cloud policy including selection of cloud computing providers, roles of functionaries, and risk assessment and management criteria.
- The health and care organization has full ownership of the transmitted information as well as the ability to restrict how it is used.

## Financing

Incentives are provided for

- health organizations for collaborations with industry and academia,
- technological infrastructure in health organizations, especially for data governance, and
- knowledge infrastructure for commercialization, which will address process, technical, and legal or contractual issues.

*National Digital Health Plan, 2018*

## Human- and equity-centric

The health and care strategy envisions transformation through digital tools by putting the patient at the center as a key driver for overall change.

*National Digital Health Plan, 2018*

All policies are to be formulated without any ethnic or religious boundaries.

*National Health Insurance Law, 1995*

All policies are to be formulated to ensure accessibility for the disabled in terms of geographic availability, physical accessibility, assistive technologies, human assistance, and accessible information.

*Equal Rights of Persons with Disabilities, 5758, 1998*

## Innovation

Clinical and academic research in digital health is being promoted.

*National Digital Health Plan, 2018*

The National Information Infrastructure for Health Research in the Field of Genetics and Medical Information (Mosaic initiative) operates on the scientific, medical, and industrial levels.

- It is implemented through three main components: a community of volunteers that contributes clinical, genomic, and other types of information; the research community and information infrastructure; and research tools.

The TIMNA project is a big-data-driven project that combines anonymized clinical, administrative, and supplementary information from various and diverse sources in the health system and makes the information accessible to researchers through dedicated and secure research environments.

Digital health and care businesses are being developed through a four-stage approach: prototype, clinical validation, large-scale pilot, and market assimilation.

*National Digital Health Plan, 2018*

Institutional and governmental support is being provided for

- assessing target markets,
- marketing activities abroad, and
- promoting the sales of Israeli companies.

## Interoperability

A quality and standard medical information infrastructure that is based on uniform medical terminologies is being developed. It includes:

*National Digital Health Plan, 2018*

- An advanced clinical file for accessing data to ensure quality treatment and producing research insights that will advance medical care.
- Transitioning information systems, including endpoints in the entire health system, to ICD-10 and SNOMED terminologies.
- Training of work teams in new classification methods.
- Development of the Eitan health information exchange, based on the FHIR standard.
- *Easy Clinic* – a national initiative for establishing a unified electronic medical record and health information exchange solution for small- and medium-sized clinics.

## Regulation

Principles relating to the provision of telemedicine services are specified:

- The provision of telemedicine services need not be approved by the Ministry of Health or any other body.
- The management of the health organization or medical institution operating the telemedicine services must prescribe conditions facilitating their operation, after determining that the quality and safety of the telemedicine services align with those provided in face-to-face consultations with patients.
- Telemedicine services are not intended to replace the corresponding face-to-face consultations.
- Both types of consultation services should be available for patients to choose at their discretion.

*Criteria for Operating Telemedicine Services (Circular 6/2019), 2019*

## Supporting policies

Israel's digitization and innovation policies are supporting the adoption of virtual health and care. An active private sector is also contributing to the development of new solutions.

### Digital Israel, 2014 and National Digital Program, 2017–2022

#### Nature of policy:

A strategic vision and plan for using the promise of digital revolution to overcome social and geographic disparities, achieve accelerated economic growth, and promote a friendly, world-leading Smart Government. Key areas include economy, health, housing, education, and social services.

#### Policy impact:

These policies are enabling digital transformation of the society including health and care.

- In 2019 (compared to 2015):
  - 49% (35%) of the population was using the internet to interact with public authorities.<sup>174</sup>
  - 80% (66%) of individuals aged 55–74 were using the internet.<sup>175</sup>
- As of 2020, 100% of national health and care datasets are shareable with health and care providers and 87.5% with universities and non-profit research centers.<sup>176</sup>

### The Law for the Encouragement of Industrial Research and Development, 1984, amended 2015

#### Nature of policy:

Policy for encouraging research and development in industry with the aim of creating local infrastructure and employment, and establishment of the Israeli Innovation Authority, an independent publicly funded agency that provides practical tools and funding platforms for innovation.

#### Policy impact:

The policy promotes innovation in all sectors, including virtual health and care. Investments in Israeli Digital Health companies till the third quarter of 2021 are a record US\$1.4 billion, already 71% more than 2020.<sup>177</sup>

### Role of the private sector

As of October 2021, Israel has roughly 700 virtual health and care companies that are developing virtual health and care solutions ranging from digital therapeutics, smart diagnostics, care navigation, and remote monitoring to clinical workflows and decision support systems.<sup>178</sup>



## Outlook

Israel's national strategies on digitization and innovation are increasing the adoption of virtual health and care.

- **Digitization of the society:** National policy initiatives for digitizing all spheres of the society are providing the required strategic and financial support for integrating digital solutions in the daily lives of citizens, including in health and care.
- **Digital health as a growth engine:** A policy-driven, export-oriented innovation strategy for digital health is strengthening the economy as well as integrating virtual health and care in the national health system.
- **Innovation:** Policy emphasis on developing and demonstrating evidence-based technologies is ensuring robust and reproducible solutions that help develop trust.

Policy initiatives on realizing the potential of big data in health and care promise to promote innovation.

- **Big data in health and care:** Provisions and guidelines for secondary use of health and care data and cloud computing are poised to help innovators extract value from big datasets in health and care and develop better virtual health and care solutions.

Going forward, virtual health and care adoption in Israel could benefit from increased policy focus on:

- **Telehealth implementation:** Current guidelines leave it to the discretion of the health and care provider to introduce telehealth services. If implemented, there are no recommendations for liability, use, scope, etc. and the provider must develop its own best practices and regulations. Implementation guidelines could enable more uniformity in quality and services.
- **Interoperability:** Current policy recommends a transition to new data standards and terminologies but provides no timeframe or support mechanisms. Introducing these would be essential for ensuring therapeutic continuity, especially if a patient chooses to change their health and care provider.
- **Digital skills building:** Current policy suggests different ways of developing skilled manpower in virtual health and care, but could also provide structure or implementation modes along with specific measures for training the existing workforce.


**New Zealand**

The national Ministry of Health administers health and care in New Zealand through 20 district health boards (DHBs), which have service agreements with health and care providers. In 2021, the government announced it would replace DHBs with a single organization, Health New Zealand (Health NZ), which will be responsible for hospitals across the country.<sup>179</sup>

**New Zealand health and care key metrics**

Metric	Status
Progress on achieving SDG3	Challenges remain. Score moderately improving, insufficient to attain goal
UHC service coverage index	<b>87</b> (global median value – 68)
Global burden of disease: DALY (per 100,000)	<b>27,043</b> (global mean value – 32,801)
Health expenditure as % of general government expenditure	<b>18.7%</b>
Out of pocket expenditure as % of current health expenditure	<b>12.2%</b>
% of individuals using the internet	<b>91%</b>
Doctor density (per 10,000)	<b>36.18</b> (WHO recommendation – 10)
Cost of data (1.5 GB mobile broadband, US\$)	<b>12.13</b> (global mean – US\$8.70)
Digital skills among population	<b>4.93</b> (global median – 4.21)



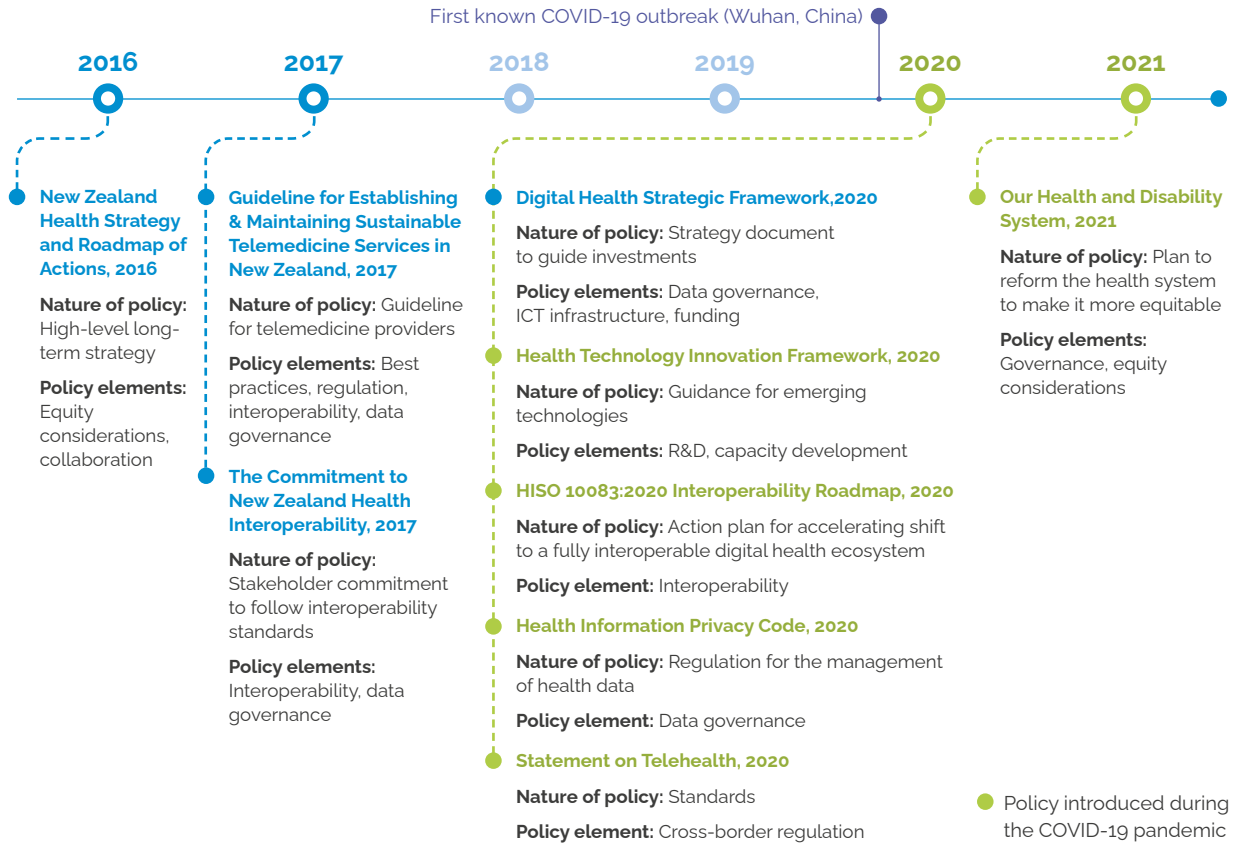
### Virtual health and care developments

Health and care in New Zealand is primarily driven by the public health system. The virtual health and care landscape in the country has been supported with recognition from the public health system long before the COVID-19 pandemic. The key highlights on virtual health and care in New Zealand are:

- In 2012, the Ministry of Health formed an advisory group – the New Zealand Telehealth Leadership Group – to promote telehealth after recognizing it as an important component of an integrated model of health and care.
- In 2015, the government launched the New Zealand Telehealth Resource Centre website and the National Telehealth Service to bring together several Ministry-funded telehealth hotlines and provide a clinical and technology platform for service integration and innovation in virtual services.
- In 2018, four Northern district health boards in New Zealand implemented a cloud-based telehealth service to enable real-time consultations between patients and their care providers, including specialists.<sup>180</sup>
- New Zealand saw a 10-fold increase in weekly teleconsultations in 17 DHBs (for which data is available) between November 2019 and April 2020.<sup>181</sup>
- *Hira*, the national health information platform, is set to be launched in 2022 and will provide citizens access to patient information through smartphones, tablets, and computers as well as provide options for people who have no access to technology or prefer not to use it.

## Policy landscape

New Zealand is providing a strong push for the integration of virtual solutions within health and care systems through policy and strategic guidance for investment into the sector. The Digital Health Strategic Framework was released in 2020 and focused on various policy elements such as data governance, ICT infrastructure, and funding of virtual health and care health systems. The following timeline lists key policies related to virtual health and care in New Zealand.



## Policy elements and policies

### Digital skills building

The workforce is to be developed by

- adapting health and professionals to newer technologies, and
- investing in the development of health informatics specialists to enable more effective initiatives.

*The Future of Virtual Health Care in New Zealand, 2020*

### Collaboration

Extensive consultation process is to help set the future direction of health and care.

*New Zealand Health Strategy, 2016*

Innovators in the health sector are encouraged to include a service provider (through DHB) as an active partner.

*Health Technology Innovation Framework, 2020*

Data governance	
Data is to be secured using standards such as HISO Standard 10029 and the Health Information Security Framework and shared through the Connected Health Network, which is a standards-based commercial model for connectivity across the health sector.	<i>Guideline for Establishing and Maintaining Sustainable Telemedicine Services in New Zealand, 2017</i>
Financing	
ICT investment decisions are reviewed by the Ministry of Health for health informatics investments exceeding NZ\$1 million whole-of-life costs.	<i>Digital Health Strategic Framework, 2020</i>
Human- and equity-centric	
People with disabilities and minority groups such as the Māori are served through special initiatives. There are specific provisions for them and the Pacific people in the broader health and care strategy to ensure equitable health and care.	<i>New Zealand Health Strategy, 2016</i>
Innovation	
Health technology innovation is enabled by forming sustainable collaborations between DHBs and commercial and research partners.	<i>Health Technology Innovation Framework, 2020</i>
Interoperability	
<i>Hira</i> , the national health information platform, is being built as a powerful platform for data integration and interoperability across the health system; it is based on unifying themes: connecting and identifying, using the same languages, unblocking access to information, and enabling bundled services that deliver health and wider social services in a coherent ecosystem.	<i>HISO 10083:2020 Interoperability Roadmap, 2020</i>

## Supporting policies

The policy-driven increase in rural and urban broadband coverage is also supporting the adoption of virtual health and care in New Zealand.

### Policy impact:

- In 2020, New Zealand had roughly 93% internet penetration.<sup>182</sup>
- As of 2021, the UFB build is 85% complete and fiber connectivity is 66%.<sup>183</sup>

### New Zealand Government Ultrafast Broadband (UFB) Initiative, 2011

#### Nature of policy:

A US\$1.0 billion (NZ\$1.5 billion) public-private partnership (PPP) with four private sector companies to increase broadband access across the country. The overall target is to improve access to broadband for 99.8% of the population by 2023.

### Rural Broadband Initiative (RBI), 2010

#### Nature of project:

A ~US\$300 million (NZ\$430 million) governmental program to improve broadband coverage in rural communities and remote areas funded through industrial taxes. The overall target (revised in 2015) is to make at least 50 Mbps peak speed available for 99% of the population by 2025.

### Policy impact:

After RBI Phase 1 (August 2016), broadband access for over 300,000 rural homes and businesses increased to 90% versus only 20% in 2011.<sup>184</sup>

### Outlook

New Zealand's health policies strongly focus on collaboration and equity, a strong foundation for driving inclusive care.

- **Promotion of collaboration between innovators and health and care providers:** Innovators in the health sector are encouraged to include a service provider (such as a DHB) as an active partner in their work to enable co-creation. This helps virtual solutions become more patient- and user-focused and efficient.
- **Reformation of health system to bring Māori representation:** Policies enabled the formation of a Māori Health Authority that has flexibility in governing specific aspects. Policies also strengthened the Iwi-Māori partnership boards to improve access and outcomes and increase accountability and decisive representation of these groups.
- **National plan for the Pacific population:** The Pacific Health and Wellbeing Action Plan 2020–2025 enables health and well-being of the Pacific population by setting priority outcomes and accompanying actions for the health and disability system with an allocated budget of NZ\$16 million.
- **Improved access to care for rural communities:** DHBs (e.g., Bay of Plenty) used telehealth in 2013 to enable clinical consultations in remote areas using video conferencing, saving hours of travel and reducing no-shows at the clinic.

Virtual health and care policies have evolved from general guidance to addressing specific aspects in different clinical specialties such as dentistry, pathology, etc.

- Telehealth Guidelines in Dentistry, 2020
- Position Statement on Telepathology, 2018
- Guidelines on the Use of Telemedicine in the ICU, 2013, etc.

Going forward, virtual health and care adoption in New Zealand could benefit from increased policy focus on:

- **Private sector collaboration:** Policy can encourage private participation in the sector, especially in the areas of financing and innovation as well as equity-linked implementations, which can help in creating a sustainable virtual health and care ecosystem.
- **Scalability:** The benefits of virtual health and care could be scaled across the country through a clear and cohesive virtual health and care policy framework.



Rwanda's decentralized, tiered health and care system comprises health posts, health centers, hospitals, and referral centers, and is served by more than 60,000 Community Health Workers (CHWs).<sup>185</sup> This decentralized, inclusive approach has helped Rwanda achieve the highest level of public trust of any health system in the world.<sup>186</sup>

The country is making great progress towards universal health coverage with the community-based health insurance program (CBHI), *Mutuelles de Sante*. CBHI is a program based on solidarity and inclusivity in which citizens pay health premiums based on their socio-economic status. Its aim is that all people have access to the health and care services they need, when and where they need them, without financial hardship, and it covers victims of gender-based violence.

Another success for Rwanda is vaccination: with a greater than 99.5% overall national coverage, it has near-universal childhood vaccination rates.<sup>187</sup> Rwanda stands out among the African nations in its management of the COVID-19 pandemic and vaccination coverage and is ranked 7<sup>th</sup> in the COVID-19 performance index globally.<sup>188, 189</sup>

#### Rwanda health and care key metrics

Metric	Status
Progress on achieving SDG3	Major challenges remain. Overall score moderately improving, insufficient to attain goal
UHC service coverage index	<b>57</b> (global median value – 68)
Global burden of disease: DALY (per 100,000)	<b>33,856</b> (global mean value – 32,801)
Health expenditure as % of general government expenditure	<b>8.9%</b>
Out of pocket expenditure as % of current health expenditure	<b>11.7%</b>
% of individuals using the internet	<b>26%</b>
Doctor density (per 10,000)	<b>1.18</b> (WHO recommendation – 10)
Cost of data (1.5 GB mobile broadband, US\$)	<b>US\$4.26</b> (global mean – US\$8.70)
Digital skills among population	<b>3.96</b> (global median – 4.21)



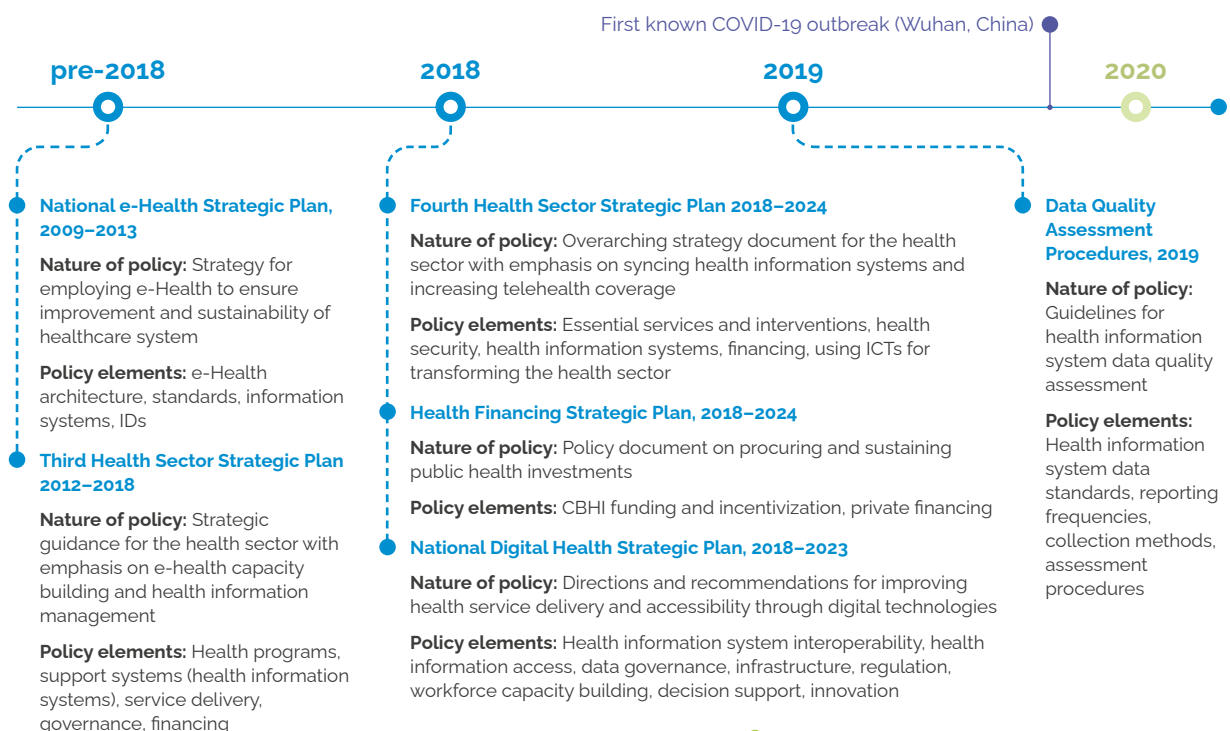
## Virtual health and care developments

Rwanda's virtual health and care landscape is largely dominated by Babyl Health, the key private player in the sector in the country. The country saw several remote delivery applications of technology during the COVID-19 pandemic to aid overall health and care delivery.

- *Zipline* (launched 2016), a drone delivery service launched in Rwanda, enables remote delivery of medical supplies including COVID-19 vaccines and has expanded to multiple markets including Ghana, Nigeria, Japan, and the US.<sup>190, 191</sup>
  - As of year-end 2021, it has delivered more than 4.5 million routine vaccines and over 222,000 COVID-19 vaccines.<sup>192</sup>
- *Babyl* (launched 2016), a virtual health and care platform, serves over 2 million users (roughly 30% of the adult population) and handles 5000 virtual consultations daily.<sup>193</sup>
  - In 2020, Rwanda's Ministry of Health entered into a 10-year partnership with *Babyl* to develop and implement a digital-first integrated care delivery model.<sup>194</sup>
  - In 2022, The Centre for the Fourth Industrial Revolution (C4IR) developed a framework based on a pilot study with *Babyl* – Chatbots RESET – to promote responsible health AI chatbots driven by ethical principles of safety, transparency, and accountability.<sup>195</sup>
- Telerobots were used during the COVID-19 pandemic to measure vital parameters, deliver video messages, and detect people not wearing masks.<sup>196</sup>
- A five-fold increase was observed in virtual health and care use between 2020 and 2021.<sup>197</sup>

## Policy landscape

Rwanda's National Digital Health Strategic Plan, 2018–2023 builds upon its earlier policies for digitally transforming health and care. The timeline lists key policies related to virtual health and care in Rwanda.



## Policy elements and policies

### Digital skills building

Pre-service professional education: all health-related schools that train professionals working in the health system are required to develop courses on generic or standard eHealth technologies.

*National Digital Health Strategic Plan, 2018–2023*

Health Professions Councils can identify, prioritize, and certify digital health-related e-learning courses for continuous professional development.

### Financing

Selected data from *RapidSMS* was used in the Community Health Worker performance-based financing system, giving them additional incentives to use the system.

*National Digital Health Strategic Plan, 2018–2023*

Citizen-centric health and care business models that combine data from fragmented health systems are promoted.

### Governance

A decentralized mode of governance is enabled. Significant decision-making authority and resources (including financial) are transferred to health facilities at the district (hospital and pharmacy) and administrative sector (health center) levels.

*National Health Policy, 2015*

### Human- and equity-centric

A Citizen's Health Portal is being established that will provide

- access to health-related information and services including diagnostic information through the web or smartphones, and
- connectivity to shared health records, registries, health observatory, and patient scheduling systems.

*National Digital Health Strategic Plan, 2018–2023*

All policies are formulated to

- ensure universal demand and access to affordable quality services,
- encourage and value community input,
- focus on the well-being of individuals and communities, specifically women and children, and
- promote equity and inclusion and integrate marginalized groups.

*National Health Policy, 2015*

To ensure gender equity, the "Make Each Pregnancy Everyone's Business" campaign was launched. It used multiple reporting channels – SMS, IVR, USSD, Twitter, Facebook Messenger, Telegram, WhatsApp (beta) and the Android Surveyor App – for offline data collection to ensure timely check-ups of pregnant women.

### Interoperability

The Rwanda Health Enterprise Architecture framework is being integrated with the government's multi-sectoral initiative to develop an enterprise-integrated service bus.

*National Digital Health Strategic Plan, 2018–2023*

The National Health Service Bus (a health information exchange) would be established for uniquely identifying citizens across the health and care system and to protect and securely share individual data. This will enable cross-exchange of data with the Ubudehe database, a citizen register based on socio-economic status.

The CBHI is integrated with the national identity and Ubudehe databases via the Irembo portal, permitting a single source of truth for identity verification and simplifying virtual health and care reimbursements.

Shared health records are being made available nationally and are accessible at all points of care and by patients who wish to see their records through the open-source, open standard OpenMRS platform.

*National Digital Health Strategic Plan, 2018–2023*

## Quality assurance

A comprehensive Hospital Accreditation data management platform is being developed through standardized tablet-based data collection.

*National Digital Health Strategic Plan, 2018–2023*

Citizen feedback and grievance redressal mechanisms are being established; mHealth and the Citizen's Health Portal will facilitate reporting of quality-of-care issues during interactions with health and care facilities.

## Supporting policies

Rwanda's long-term policies on societal transformation via digitization and its community-based model for ensuring health and care coverage to all economic sections of the society are supporting the adoption of virtual health and care in the country. The country has also strongly leveraged strategic private sector partnerships for improving the virtual delivery of health and care.

### Community-Based Health Insurance (CBHI), 1999, amended 2007

#### Nature of policy:

Health and care financing mechanism for all to access medical care at an affordable cost.

#### Policy impact:

The policy is improving access and achieving equity in health and care:

- CBHI membership enables affordable medical treatment at local medical facilities like health posts or health centers by paying only RWF200 (US\$0.2) or just 10% of the total bill at all district hospitals as well as referral and teaching hospitals.
- Premiums depend on one's socio-economic status (Ubudehe category) and cover virtual health and care.
- The scheme is subsidized through taxes on telecommunications sector and fuel trade, reaching 88% coverage in 2020.<sup>198</sup>

## Smart Rwanda, 2015–2020

#### Nature of policy:

Master plan for delivering better services, creating jobs, and transforming the Rwandan society and economy using information and communication technologies.

#### Policy impact:

The policy aimed to enable a Service-oriented, Modern, Accountable, and Real-Time (SMART) government that drives Rwanda's global competitiveness.

- Health and care was one of the seven pillars of the policy, with a focus on increasing access to medical information and services and providing digitalized health information.
- In 2021, internet penetration increased to 31% and more than 73% of the population obtained cell phone connectivity (2021).<sup>199</sup>

## Role of the private sector

- *Babyl*, Rwanda's largest virtual health and care provider in partnership with the Government of Rwanda, is expanding virtual health and care capacity.
- *HealthTech Hub Africa*, an initiative of the Novartis Foundation in collaboration with the Norrsken Foundation, is supported by the Ministry of Health and Ministry of Information and Communication Technology and Innovation of Rwanda.<sup>200</sup>

- It aims to foster innovation by providing financial support to African virtual health and care startups.
- It will support a health and technology network for bringing policymakers and entrepreneurs together so that innovations can be scaled up rapidly.
- Insightiv Technologies, a Rwandan company and recent receiver of funding, is developing an innovative Teleradiology and AI platform for increasing access to medical imaging diagnostics.

## Outlook

Rwanda is pursuing a sustained strategy for the digitization of its society, including health and care.

- **Impact of leadership:** The government has a focused, long-standing plan for transforming the lives of its citizens through digital technologies with a special emphasis on using ICT in health and care. Cyclical, long-term plans and policies ensure continuity and allow integration of learning and experiences. Additionally, partnerships with private players that align with the government's strategic initiatives (e.g., the 10-year pact with Babyl Rwanda) enables the use of appropriate technologies.
- **Vision 2020:** The Ministry of Finance and Planning developed and implemented a framework in 2020 for Rwanda's development to build Rwandan identity following the 1994 genocide and civil war. Citizen health, an essential pillar of this framework, is being promoted through ICT – the government established The Centre for the Fourth Industrial Revolution in 2020 to bring together different stakeholders to co-design, test, and refine policy frameworks and governance protocols that maximize the benefits while minimizing the risks of upcoming technologies.

- **SMART Rwanda:** Rwanda's master plan for transforming the society ICT shows the need for holistic policymaking. By identifying the interactions between different societal aspects, Rwanda is meeting its health and care objectives through intersectoral complementary ICT policies.
- **Practical targets and enablers:** The government set a goal to provide access to health and care services within 30 minutes of walking for every citizen. It is making progress in achieving this goal through health posts that have expanded services, including virtual delivery for connecting community health workers to health centers.

Integrating socio-economic aspects into policymaking and implementation can ensure greater health equity and addressing data privacy concerns can increase adoption.

- **CBHI:** The scheme considers socio-economic status of an individual for deciding premiums, which builds trust and increases adoption. Since the government's recent 10-year partnership with Babyl Rwanda covers virtual solutions, this scheme is likely to ensure improved access to all sections of the society.
- **Patient data sharing:** Rwanda is working on a legal framework to govern patient data sharing in alignment with its policy on protection of personal data and privacy enacted in October 2021 (058/2021).

Going forward, virtual health and care adoption in Rwanda could benefit from policy focus on:

- **Health and care data management:** The present policies provide guidance on collecting and managing data. However, they do not address data access, analyses, and security; future developments are likely to address these aspects.
- **Infrastructure:** The strategies can be evolved further to provide detailed guidance for financing telemedicine infrastructure.



Singapore has a predominantly private primary health and care sector with roughly 80% of primary health and care needs being met by private providers.<sup>201</sup> The costs, including consultation and medicine expenses, are borne by the patients or subsidized through employer-provided insurance. Public health and care centers cater to about 20% of primary health and care needs at subsidized rates, with subsidies being greater for those under 18 years and over 65.

In tertiary care, the public health and care system is more prominent and covers about 80% of those needs.<sup>200</sup> It is funded through direct government subsidies, mandatory contributions, national health insurance, and cost sharing.

#### Singapore health and care key metrics

Metric	Status
Progress on achieving SDG3	Challenges remain. Score moderately improving, insufficient to attain goal
UHC service coverage index	<b>86</b> (global median value – 68)
Global burden of disease: DALY (per 100,000)	<b>18,487</b> (global mean value – 32,801)
Health expenditure as % of general government expenditure	<b>14.5%</b>
Out of pocket expenditure as % of current health expenditure	<b>30.2%</b>
% of individuals using the internet	<b>76%</b>
Doctor density (per 10,000)	<b>24.6</b> (WHO recommendation – 10)
Cost of data (1.5 GB mobile broadband, US\$)	<b>US\$17.94</b> (global mean – US\$8.70)
Digital skills among population	<b>5.58</b> (global median – 4.21)

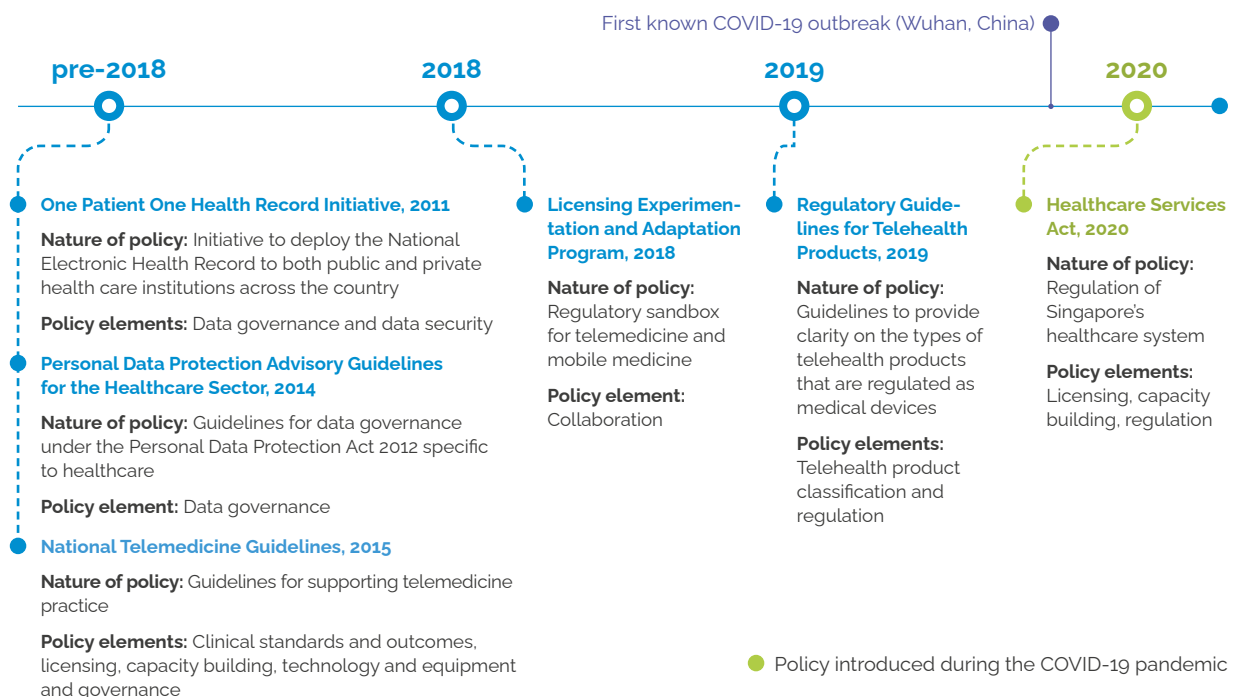
## Virtual health and care developments

Singapore saw strong adoption of virtual health and care prior to the COVID-19 pandemic as major private players in the sector entered the market in the last decade. However, the pandemic accelerated the uptake significantly, as it did in several parts of the world.

- *HealthHub* is a national digital health platform developed in May 2014 which is used by the citizens to view personal information, access records, and perform health and care transactions.<sup>202</sup>
- In response to the COVID-19 pandemic, the government provided subsidies to teleconsultation applications through an approval mechanism; it also extended the public health coverage (MediSave) to video consultations for follow-ups in all approved chronic diseases.<sup>203</sup>
- *MyDoc*, a key private player launched in 2012, saw a 32-fold increase in weekly signup rates within the first weekend of opening its global COVID-19 clinic.<sup>204</sup>
- Telemedicine consultations at six public health institutions increased 18-fold from about 2000 patients in 2017 until early 2020 to almost 36,000 patients between early 2020 and January 2021).<sup>205</sup>
- The government distributed a wearable device called the *TraceTogether Token*, which does not use GPS or internet connectivity, in response to low uptake and data security concerns of its COVID-tracing app *TraceTogether*.<sup>206</sup>
- In 2021, *Doctor Anywhere*, a virtual care platform, partnered with Omron Healthcare, a Japanese health monitoring device maker, to share health and care data. This would enable medical professionals to have timely access to patient data to provide the right treatment options for preventing heart attacks and strokes.<sup>207</sup>

## Policy landscape

Singapore has been regulating virtual health and care from before the COVID-19 pandemic and uses a collaborative approach for policymaking. The timeline below shows some of the key virtual health and care policies in Singapore.



## Policy elements and policies

### Digital skills building

Health and care professionals should be trained in the use of technology and equipment while obtaining the appropriate behavior and communication skills required in a telemedicine interaction.

*National Telemedicine Guidelines, 2015*

The government has a telemedicine e-training program for designing and delivering telemedicine services that prioritize patient safety and welfare.

*Listing of Direct Telemedicine Providers: Transition Approach Prior to Licensing Under the Healthcare Services Act (HCSA), 2020*

Training is linked to reimbursement: Only the doctors who complete online training are authorized to provide subsidized consultations under government schemes.<sup>208</sup>

### Collaboration

Telemedicine guidelines are developed and endorsed by an advisory committee comprising leading providers and various professional bodies such as the Agency for Integrated Care; Academy of Medicine, Singapore; College of Family Physicians, Singapore; Case Management Society of Singapore; Health Sciences Authority; Pharmaceutical Society of Singapore; Singapore Nurses Association; etc.

*National Telemedicine Guidelines, 2015*

### Financing

A one-time funding of US\$14.7 million (Singaporean \$20 million) ("Early Contribution Incentive") was provided to incentivize private health and care providers who contributed data to the National Electronic Health Record.

*One Patient One Health Record Initiative, 2011*

Pre-approved digital solutions including teleconsultation services can receive government subsidies if they are assessed to be effective, market-tested, and cost-effective.

*Infocomm Media Development Authority of Singapore + Enterprise Singapore Notification, 2020*

### Human- and equity-centric

Older, disabled, and low-income citizens are provided subsidized outpatient medical and dental treatments.

*Community Health Assist Scheme, 2012*

The community health assist scheme is regularly updated to reflect the changing needs. Notable revisions: inclusion of several chronic conditions in subsidies, increase in coverage through removal of qualifying age, lowered income thresholds, etc.

### Interoperability

Use of interoperability standards such as ISO/TR 16056, and ISO/TS 16058 is promoted for effective and efficient delivery of telemedicine services.

*National Telemedicine Guidelines, 2015*

### Liability

Senior management in organizations is accountable for telemedicine services including the supervision of all persons directly responsible for development, coordination, and operation.

*National Telemedicine Guidelines, 2015*



## Licensing

Telemedicine providers are to be registered and licensed with the respective regulatory and licensing body.	<i>National Telemedicine Guidelines, 2015; Healthcare Services Act, 2020</i>
Telemedicine providers offering services to overseas patients are required to adhere to the same standards as in Singapore as well as standards of the country the patient is residing in.	<i>National Telemedicine Guidelines, 2015</i>
Direct doctor-/dentist-led teleconsultations, including those by health and care institutions require a telemedicine license. However, other service providers such as platforms offering software as a service, directory listings, payment solutions, etc. and traditional/alternate medicine providers do not require a telemedicine license.	<i>Healthcare Services Act, 2020</i>

## Reimbursement

Video consultations are reimbursed by Community Health Assist Scheme and MediSave for all twenty chronic conditions through Chronic Disease Management Program.	<i>Time-Limited Extension of CHAS Subsidy and Use of Medisave for Follow Up of Chronic Conditions Through Video Consultations In View Of COVID-19, 2020</i>
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## Supporting policies

Singapore's policies for continuously improving ICT infrastructure and providing digital solutions to citizens are influencing the adoption of virtual health and care.

**Intelligent Nation 2015, Information and Communications Technology Master Plan, 2006**

### Nature of policy:

A 10-year master plan to improve Singapore's ICT infrastructure and develop a digital-ready workforce.

### Policy impact:

The policy resulted in noticeable improvements in access and uptake of ICT across different sectors. Initiatives for virtual health and care include:

- **Smart Elderly Monitoring and Alarm System** (launched 2015): This system uses motion sensors to track everyday activities of older and chronically ill people including location, sleeping patterns and duration spent in the toilets and then alerts caregivers through text messages and alarms for abnormalities. The service is presently offered commercially by two providers – ConnectedLife and Astralink Technology.<sup>209</sup>
- **HealthHub** (launched 2016): A citizen health information system that integrates health and care data and information from multiple sources including the National Electronic Health Record system, National Immunization Registry, School Health System, and School Dental System for round-the-clock access to health-related content, personalized health records, and e-services.

## Outlook

The Singapore government has pushed virtual health and care adoption through several policy measures before and during the COVID-19 pandemic.

- **National Electronic Health Record (NEHR):** Since 2011 NEHR has been progressively deployed in public and private health care institutions across the country to support the *One Patient, One Health Record* initiative. It collects patient health records across different health and care providers to enable authorized health and care professionals to have a complete medical history of their patients and assures data security for individuals.
- **Licensing Experimentation and Adaptation Program:** A public-private regulatory sandbox initiative (2018–2021) for telemedicine and mobile medicine was leveraged to support innovation and deliver care based on safety and welfare. It helped the government gather insights on telemedicine services from eleven participating providers, which were used to form the telemedicine e-training program launched in March 2020.

Singapore's upcoming Healthcare Services Bill (passed, yet to be enacted) will address areas that earlier policies did not.

- **Services-based licensing:** Licensing mechanisms will shift from traditional licensing to services-based licensing. The Ministry of Health groups licensable health and care services into six broad categories: hospital services, ambulatory care services, long-term residential care services, non-premise-based services, health support services, and special services.

Going forward, virtual health and care adoption in Singapore could benefit from increased policy focus on:

- **Policy integration:** Singapore's telehealth sector could benefit from an inclusive legislation that defines a long-term strategic vision, provides required regulatory checks, and makes adoption scalable and implementable across the health and care spectrum.
- **Liability issues:** It is presently unclear who bears the legal responsibility in cases of malpractice or negligence when administering virtual health and care, which requires further guidelines and clarification.


**South Africa**

The public health and care system in South Africa contains five layers: primary health care (clinics), district hospitals, regional hospitals, tertiary hospitals, and central hospitals.<sup>210</sup> It serves 84% of the population, with the rest being serviced by private health and care providers.<sup>211</sup> However, the distribution of medical professionals is noticeably imbalanced: about 79% of doctors work privately, leaving only 21% of them for the public sector.<sup>212</sup> This creates accessibility and quality problems in the public health system.

Additionally, only 16% of the population is covered by a medical aid scheme because cost is still a barrier for most of the population.<sup>213</sup> The country plans to provide universal health coverage through a national scheme for health insurance for ensuring that all citizens and residents get good quality health and care from both the public and private sectors irrespective of social status.<sup>214</sup>

**South Africa health and care key metrics**

Metric	Status
Progress on achieving SDG3	Major challenges remain. Overall score moderately improving, insufficient to attain goal
UHC service coverage index	<b>69</b> (global median value – 68)
Global burden of disease: DALY (per 100,000)	<b>47,829</b> (global mean value – 32,801)
Health expenditure as % of general government expenditure	<b>15.3%</b>
Out of pocket expenditure as % of current health expenditure	<b>5.7%</b>
% of individuals using the internet	<b>68%</b>
Doctor density (per 10,000)	<b>7.92</b> (WHO recommendation – 10)
Cost of data (1.5 GB mobile broadband, US\$)	<b>US\$10.21</b> (global mean – US\$8.70)
Digital skills among population	<b>3.27</b> (global median – 4.21)

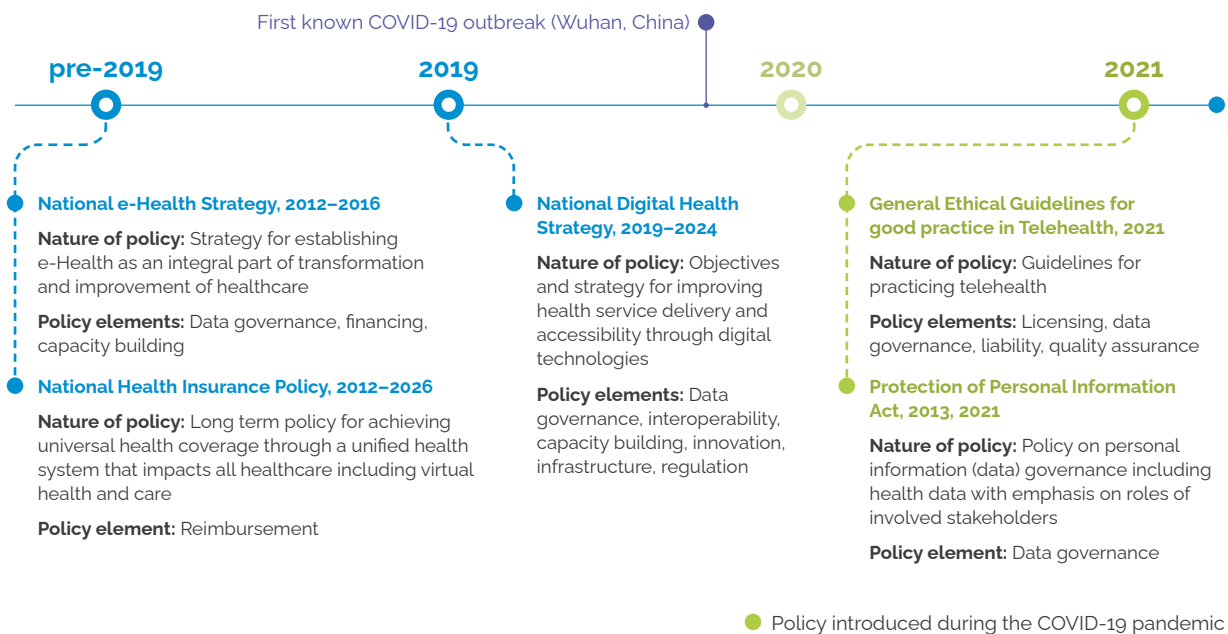
## Virtual health and care developments

South Africa saw significant uptake of virtual health and care in light of the COVID-19 pandemic as restrictions were waived off for remote delivery of health and care. Some highlights surrounding virtual health and care include:

- In 2019, the separate national eHealth and mHealth strategies were merged into a single digital health strategy – the National Digital Health Strategy, 2019–2024.<sup>215</sup>
- In response to the COVID-19 pandemic, the Health Professions Council of South Africa (HPCSA), a statutory body, temporarily allowed telehealth consultation without the physical presence of servicing health and care providers, which was earlier a requirement.<sup>216</sup>
- *Healthforce*, a virtual health and care provider, saw over 110,000 virtual consultations within one year of its launch in 2020.<sup>217</sup>

## Policy landscape

South Africa's National Digital Health Strategy, 2019–2024 aims to improve health and care delivery through digital technologies. The timeline lists several key virtual health and care-related policies in South Africa.



## Policy elements and policies

### Collaboration

Co-creation and collaboration among different stakeholders are encouraged by

- establishing effective mechanisms between public and private sector stakeholders to build cost-effective digital health solutions, reduce data costs and build better infrastructure for digital health,
- creating a standard schedule of regular engagement with all stakeholders, particularly users, to get a buy-in, and
- developing a model for co-creation of clinical applications in line with the principles of user experience design.

*National Digital Health Strategy, 2019–2024*

### Data governance

Data about an individual's personal life, including health, cannot be acquired outside a health and care setting.

The following stakeholders are primarily allowed to process health and care data including virtual health and care data:

- Medical professionals, health and care institutions or facilities, or social services, if such processing is necessary for proper treatment and care, or for the administration of the institution or professional practice concerned.
- Insurance companies, medical schemes, medical scheme administrators, and managed health and care organizations, if such processing is necessary for assessing the risk to be insured by the insurance company or covered by the medical scheme and the data originator has not objected to the processing.
- Schools, if such processing is necessary to provide special support for pupils or make special arrangements in connection with their health.
- Any public or private body managing the care of a child if such processing is necessary for the performance of their lawful duties.

*Protection of Personal Information Act, 2021*

The telehealth provider is required to securely maintain detailed records of the patient's condition and information transmitted, online or otherwise.

A standardized manner of documentation is recommended to ensure that all health and care providers comply with the same protocol for history taking, reporting findings, and creating reserves and hard copies where necessary.

*General Ethical Guidelines for Good Practice in Telehealth, 2021*

A Master Patient Index is to be established for all citizens, with all patient information systems being required to implement a unique identifier to facilitate the movement of patients within and across provinces.

An open standards and open architecture approach is to be adopted for expanding the National Health Normative Standards Framework for Interoperability in eHealth in South Africa, 2014, and for extending the health enterprise architecture.

*National Digital Health Strategy, 2019–2024*

### Financing

A national grant for digital health implementation is to be established for aligning and coordinating investments by targeting a proportionate allocation of three to five per cent of expenditure on health.

- Decision-making, especially for technology and infrastructure, is to be based on a digital health impact model with clear matrices and user-friendly tools.

*National Digital Health Strategy, 2019–2024*

## Governance

Local leadership teams are to be developed for providing clinical, executive, and political leadership for the digital health agenda in hospitals, clinics, communities, and households by

- establishing a comprehensive leadership and change management approach with initiatives to empower digital health champions,
- introducing a data-driven approach for adaptive leadership through the implementation of business intelligence solutions,
- creating a network of clinical digital health leaders and champions for the strategy, and
- engaging political leadership in key departments to harness government-wide development of internet infrastructure and reducing connectivity costs.

*National Digital Health Strategy, 2019–2024*

## Human- and equity-centric

Everyone has the right to access to health and care services that include:

- Timely emergency care at any health care facility that is open, regardless of one's ability to pay.
- Treatment and rehabilitation that must be made known to the patient to enable the patient to understand such treatment or rehabilitation and their consequences.
- Provision for special needs in the case of newborn infants, children, pregnant women, the aged, disabled persons, patients in pain, and persons living with HIV.
- Counseling without discrimination, coercion, or violence on matters such as reproductive health, cancer, or HIV/AIDS.
- Palliative care that is affordable and effective in cases of incurable or terminal illness.
- A positive disposition displayed by health care providers that demonstrates courtesy, human dignity, patience, empathy, and tolerance.
- Health information that includes information on the availability of health services and how best to use such services; such information should be in the language understood by the patient.

*National Patient Rights Charter, 2016*

Virtual health and care solutions are required to achieve better health outcomes enabled by person-centered digital health.

*National Digital Health Strategy, 2019–2024*

## Licensing

Only those providers who have been deemed competent and are registered in their respective professions are authorized to participate in telehealth practice either as consulting providers or servicing providers.

For cross-border delivery, providers serving South African patients are required to be registered with the regulating bodies in their original states as well as with HPCSA.

*General Ethical Guidelines for Good Practice in Telehealth, 2021*

## Quality assurance

Providers are required adhere to the same standards of professional practice as for in-person consultations.

Providers are advised not to practice telehealth without ensuring that the equipment and accessories used are optimally operational.

*General Ethical Guidelines for Good Practice in Telehealth, 2021*

## Regulation

Telehealth should be practiced in circumstances where there is an already established provider-patient relationship or in cases where it is required in the best clinical interest of patients.

The following provisions also apply to virtual health and care providers:

- Telehealth can replicate physical consultations as far as possible, but not as a substitute.
- It is desirable that the provider shall have established a professional relationship with the patient before telehealth services can be considered; this condition can be relaxed depending on the emergency.
- Telehealth-only medical practice is not allowed.
- Use of social media platforms is not recommended as a failure to maintain strictly professional relationships with patients could result in ethical dilemmas.
- Obtaining informed patient consent, orally recorded or written, is mandatory before starting any telehealth consultation; this process must include informing the patient about who will access their information, the purpose of the telehealth service, the cost of the service, and the implications of the use of such information.

*The Health Professions Council of South Africa Response to COVID-19 Pandemic, 2020; General Ethical Guidelines for Good Practice in Telehealth, 2021*

## Supporting policies

Health is a strategic focus area in South Africa's long-term strategic development plan, which recommends using available technologies for improving the health system. This, along with the initiative to provide health and care coverage to all citizens, is supporting the adoption of virtual health and care in the country.

### National Development Plan Vision 2030, 2012

#### **Nature of policy:**

A holistic, long-term national development plan with special focus on improving the health of all citizens. Key focus areas include addressing the social determinants that affect health and diseases, improving health information systems, financing universal health and care coverage, and improving quality.

### National Health Insurance Policy, 2012–2026

#### **Nature of policy:**

A strategic policy for creating a health and care insurance fund based on social solidarity by pooling public revenue to eliminate payment differences between the private and public sectors.

#### **Policy impact:**

The national drive for ensuring health and care insurance for all citizens is being implemented in three phases that started in 2012 and will run until 2026. Once fully implemented, every South African will have a right to access comprehensive health and care services free of charge at the point of use at accredited health facilities using a unique health card. More than 44 million citizens (out of a total population of 59.3 million) are already registered in the electronic Health Patient Registration System, a part of the ongoing preparations for fully implementing the insurance scheme.<sup>218</sup>



## Role of the private sector

- **Healthforce** provides a freemium model-based solution in partnership with Webrock Ventures, a Swedish investment company, for on-demand and scheduled consultations and continuous wellness management.<sup>219</sup>
- **Vula Mobile**, a secure medical chat and referral solution, remotely connects primary health workers in far-off regions with specialists. It is being used in more than 4600 facilities by 22,000 doctors and is helping over 600,000 patients.<sup>220</sup>
- **Quro medical**, a South African virtual health and care provider, provides hospital-level care at home through Africa's largest virtual care hospital as a safe and affordable alternative to general ward admissions.<sup>221</sup>

## Outlook

The adoption of virtual health and care in South Africa is being driven by several strategic initiatives and measures.

- **Vision 2030:** A long-term strategic vision for transforming health and care in South Africa to achieve universal health coverage. The framework identifies health and care as a priority area and encourages use of appropriate technologies and solutions such as virtual health and care.
- **eHealth and Digital health strategies:** The government develops five-year strategies for utilizing available technologies to achieve national health and care objectives. These mid-term strategies build upon each other through knowledge and experience-sharing. They allow policy continuity and integrate new technological developments into the national health and care plan.

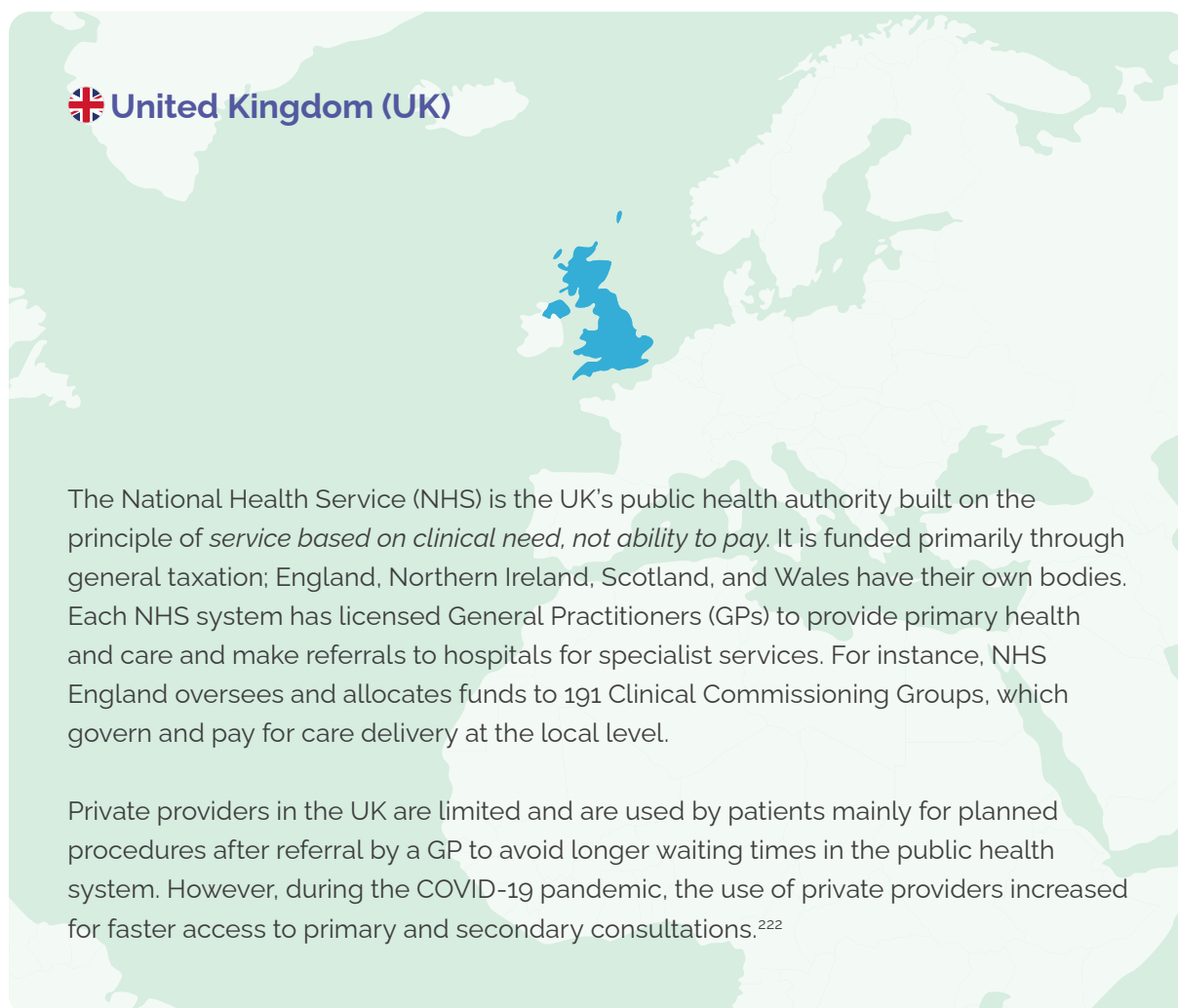
- **Move towards data integration:** Initiatives for standardized, unique patient identities and open standards-based health exchanges facilitate seamless health and care delivery across the country and create transparency and trust in the system.

The state-driven health and care financing system is a much-needed step for achieving health and care equity.

- **National health insurance:** Based on a fund pooling mechanism, the insurance provides health and care financing coverage to all citizens irrespective of their socio-economic status and ensures affordable health and care.

Going forward, virtual health and care adoption in South Africa could benefit from policy focus on:

- **Data acquisition:** The present policy recommends a standardized manner of documentation for virtual health and care data but could also specify the basis of these standards, how they will be enforced, and measures in cases of non-compliance.
- **Quality measures:** Guidance around minimal requirements, implementation protocols, and quality check mechanisms for virtual health and care infrastructure could also be provided.



### Virtual health and care developments

The United Kingdom's health and care system is majorly driven by the public health system through the NHS. The country's apex body for health and care made virtual health and care a key focus area in years prior to the COVID-19 pandemic. The UK had a relatively established virtual health and care market prior to the COVID-19 pandemic with policies on regulation and reimbursement and the presence of private providers such as Babylon and Push Doctor.<sup>223</sup> The important developments surrounding virtual health and care in the UK are:

- The COVID-19 pandemic accelerated growth and adoption of virtual health and care solutions and prompted investments and partnerships in this sector. The UK accounted for 30% of investment in digital health technologies in Europe in 2020 by volume and value.<sup>224</sup>
- In 2018, the NHS launched its digital application (*NHS App*) for health and care delivery that has over 22 million users as of December 2021.<sup>225</sup>
  - The app is used to book GP appointments, order repeat prescriptions, access the NHS COVID Pass service, and register organ donation decisions.
  - The *NHS App* saw a 912% increase in usage for repeat prescriptions and appointments between December 2019 and 2020.<sup>226</sup>

- The NHS released its Long Term Plan in 2019, which promotes digitization of primary and secondary care. The target is to reach a core level of digitization by 2024.<sup>227</sup>
- The NHS also launched the NHSX unit in 2019 to lead digital transformation within the public health system.
- In 2019, the NHS published a review detailing key actions to be taken to empower the health and care workforce by equipping them with the required digital skills to deliver health and care in the future.<sup>228</sup>
- In 2020, the NHS partnered with Doctor Care Anywhere to provide training to GPs for conducting phone and video consultations.
- Key private virtual health and care providers (launch year) are Babylon Health (2013), Benevolent AI (2013), Doctor Care Anywhere (2013), Congenica (2014), Push Doctor (2015), and HealthHero (2019).

### Achieving a core level of digitization

A policy-driven initiative for promoting equitable access to health and care is ensuring a minimum level of digital infrastructure and software across all care delivery levels.

- NHS UK is coordinating a roughly US\$10.6 billion (£8.1 billion) initiative to achieve a core level of digitization in health and care by 2025. (Priorities and Operational Planning Guidance, 2022-2023)
- It defines systems to be acute, community, and mental health providers.
- There is a strong emphasis on developing shared care collaboratives, which are partnerships between two or more trusts having a shared purpose that they achieve through effective decision-making arrangements to increase consistency, improve resilience, and streamline specialization.

#### Targets:

##### 2022

- Each system develops annual priorities and three-year digital investment plans as per NHSX's What Good Looks Like framework that suggests
  - including provisions for robust cyber security across the system,
  - reflecting ambitions to consolidate purchasing and deployment of digital capabilities, such as electronic patient records and workforce management systems, at system level where possible,

- setting out the steps being taken locally to support digital inclusion and
- considering how digital services can support the NHS Net Zero Agenda, which is the NHS's target of becoming the world's first net zero carbon emissions national health service by 2040.

- All suppliers comply with interoperability standards when they are finalized.

##### 2023

- All systems within a Shared Care Record collaborative can exchange information among themselves.
- Local authorities can connect to their local Shared Care Record solution.
- General practices promote digital solutions so that adult registration reaches 60% on the NHS App and NHS UK.
- The workforce acquires skills to maximize the opportunities of digital solutions.

##### 2024

- Shared Care Record collaboratives can exchange information nationally.

##### 2025

- NHS e-Referral Service becomes an any-to-any health sector triage, referral, and booking system.

## Policy landscape

The NHS Long Term Plan, 2019, focuses on redesigning patient care through digital and virtual means. The timeline lists key policies in virtual health and care in the UK.



## Policy elements and policies

<b>Digital skills building</b>	
A special budget set for training, education, and continuing professional development is to be used for workforce transformation.	<i>NHS Long Term Plan, 2019</i>
<b>Collaboration</b>	
Local health watch groups are involved to support NHS teams in ensuring that the views of patients and the public are heard; local support is secured by adapting the overall strategy into local five-year strategies.	<i>NHS Long Term Plan, 2019</i>
NHS 24 in Scotland adopts six principles: awareness, inclusion, purpose, timely and transparent, respectful, and measurable, to set the standards for building consistent, open, and respectful relationships with stakeholders.	<i>Stakeholder Engagement Framework 2019–2021</i>
Clinical commissioning groups and NHS England are guided on how to integrate co-creation in policymaking through 10 key actions.	<i>Patient and Public Participation in Commissioning Health and Care, 2017</i>
<b>Data governance</b>	
Health and care digital architecture should be <ul style="list-style-type: none"> <li>• based on understandable data and cyber security standards, guidance and frameworks,</li> <li>• mandated across the NHS, and</li> <li>• "secure by default" as per the GDPR.</li> </ul>	<i>The Future of Healthcare: Our Vision for Digital, Data and Technology in Health and Care, 2018</i>
Organizations with access to patient data and systems must use the Data Security and Protection Toolkit to practice good data security and handle personal information correctly.	
Health and care providers are required to be fair, transparent, and accountable on data usage and follow the data minimization principles of GDPR.	<i>A Guide to Good Practice for Digital and Data-Driven Health Technologies, 2018</i>
Providers should comply with the UK GDPR to ensure data protection and privacy in different use cases such as general use, criminal enforcement, and intelligence services.	<i>Data Protection Act, 2018</i>
<b>Health outcomes</b>	
Health and care providers should show evidence of effectiveness for intended use and an evidence base for choosing an algorithm and performance monitoring plan.	<i>Initial Code of Conduct for Data-Driven Health and Care Technology, 2018</i>
<b>Human- and equity-centric</b>	
Projects are required to use a self-assessment model to evaluate fairness and eliminate the potential of unintended discrimination of individuals and social groups.	<i>Data Ethics Framework, 2018</i>
NHS England and Clinical Commissioning Groups must reduce health inequalities between patients in access to health services and the outcomes achieved.	<i>Health and Social Care Act, 2012</i>

### Interoperability

Anyone writing code for use by the NHS is required to know about open data and technology standards in compliance with clinical data standards.

*The Future of Healthcare: Our Vision for Digital, Data and Technology in Health and Care, 2018*

### Liability

Patients and users can bring compensation claims for material and non-material damage arising due to violation of the UK GDPR by providers or other platforms.

*Data Protection Act, 2018*

### Regulation

In England, virtual health and care providers are regulated under the category of transport services, triage, and medical advice provided; other countries in the UK have not clarified this aspect.

*Regulation of Digital Healthcare Providers in Primary Care, 2017*

All GPs are required to enroll in the NHS app.

*NHS Long Term Plan, 2019*

In England, virtual health and care providers must secure registration from the Care Quality Commission and satisfy requirements of the Health and Social Care Act before providing services.

### Reimbursement

Virtual health and care services can be reimbursed through the NHS by selling directly to trusts or primary care organizations, procurement through NHS supply chains, or public tenders. They are required to undergo technology appraisal from the National Institute for Health and Care Excellence to receive funding from the NHS.

*Technology Appraisal Guidance, 2019*

## Supporting policies

The UK's policies on rural and urban digitization are increasing internet connectivity and supporting the adoption of virtual health and care.

Government Digital Inclusion Strategy, 2014

### Nature of policy:

A strategy to increase the use of digital tools among the population. It involved a public-private partnership with digital skills charity Go ON UK.

### Shared Rural Network Campaign (SRN), 2021

#### Nature of project:

A US\$1.3 billion (£1 billion) government-aided project with the UK's four mobile network operators to improve rural broadband connectivity by eliminating gaps in coverage.

#### Policy impact:<sup>229</sup>

- The number of people who are offline fell from 7.6 million to 6.3 million in 2014 and to 5.3 million in 2018.
- The percentage of adults who do not use the internet declined from 14.8% in 2014 to 10.0% in 2018.

## Outlook

Virtual health and care adoption is being encouraged by the NHS through several measures.

- **Use of the NHS App:** The NHS App builds upon the legacy of the NHS to increase trust and gain acceptance for the new mode of health and care delivery.
- **Integration of features in the NHS App:** The NHS App saw almost a doubling of its user base to nearly 10.4 million users in eight weeks after introduction of the COVID-19 Pass (on May 17, 2021), which is used to share COVID-19 vaccination records or test results.
- **Addition of digitization to universal health coverage:** The NHS Long Term Plan contains a commitment that by 2023–2024, every patient in the UK will be able to access *digital-first primary care*; access to primary care services through online consultations are a key part of achieving this commitment.

Policy measures are positively influencing adoption in the UK through collaboration with stakeholders.

- **Stakeholder engagement:** Involving local communities and health watch groups during the complete policy life cycle from policy inception, formulation, execution, to implementation, is driving ownership and building trust.
- **Clear rules of engagement:** Stakeholder engagement aims for inclusivity and is based on respect, promoting awareness, and accountability through regular performance measurements.

Going forward, virtual health and care adoption in the UK could benefit from increased policy focus on:

- **Health outcomes:** The present policy suggests utilizing real-world evidence in decision-making but further guidance is needed on generating this evidence, the type of evidence allowed, and who should evaluate.
- **Equity-linked implementation:** Present policies provide principles for promoting equity and serving health and care solutions to all without biases. However, their implementation is still voluntary, and checks and balances are missing.




 The image shows a map of the United States of America, with the country highlighted in blue. The map is set against a light green background that features a faint world map.
 

## United States of America (USA)

The health and care system in the USA is governed by federal laws and state-level regulations. The federal government's responsibilities include setting legislation and national strategies, administering and paying for federal programs like *Medicare*, funding health insurance for federal employees and the military, and regulating pharmaceutical products and medical devices. The states set eligibility thresholds and patient cost-sharing requirements, regulate private insurance, and license health professionals.<sup>230</sup>

The USA has a hybrid public-private health and care insurance system that includes employment-based insurance (54.4%) and public programs such as *Medicare* (18.4%) and *Medicaid* (17.8%), among others. In 2020, 8.6% of the population (28 million) did not have health insurance.<sup>231</sup>

### USA health and care key metrics

Metric	Status
Progress on achieving SDG3	Significant challenges remain. Score moderately improving, insufficient to attain goal
UHC service coverage index	<b>84</b> (global median value – 68)
Global burden of disease: DALY (per 100,000)	<b>33,866</b> (global mean value – 32,801)
Health expenditure as % of general government expenditure	<b>22.3%</b>
Out of pocket expenditure as % of current health expenditure	<b>11.3%</b>
% of individuals using the internet	<b>89%</b>
Doctor density (per 10,000)	<b>26.1</b> (WHO recommendation – 10)
Cost of data (1.5 GB mobile broadband, US\$)	<b>US\$21.78</b> (global mean – US\$8.70)
Digital skills among population	<b>5.33</b> (global median – 4.21)

The high cost of medical services is one of the key health and care challenges in the USA. Some of the reasons for it are:

- Higher administrative and governance costs due to the fragmented landscape: The USA spends about 8% of its health and care dollar on administrative costs, compared to 1–3% in 10 of the highest-income countries.<sup>232</sup>
- High spending on pharmaceutical costs: The USA has the world's highest spending on pharmaceuticals at US\$1,443 per person, compared to an average of US\$749 in 10 of the highest-income countries.<sup>231</sup>
- Hospitals as profit centers: During 2007–2014, inpatient and outpatient hospital care prices grew much faster than physician prices.<sup>233</sup>

Notably, this high spending on health and care does not necessarily translate into better health outcomes. The USA lags comparable countries in terms of disease burden, quality, and access.<sup>234</sup>

### Virtual health and care developments

Prior to the COVID-19 pandemic, virtual health and care were highly restricted geographically in the USA because of state licensure laws as well as reimbursement restrictions. The COVID-19 pandemic caused the restrictions to be waived temporarily because of which the sector saw significant uptake. The key virtual health and care developments in USA are discussed below:

- During the initial waves of the COVID-19 pandemic, the USA increased the availability of virtual health and care by lifting restrictions on inter-state licensing and allowing reimbursements.
- Between 2019 and 2021, the Food and Drug Administration (FDA) approved 213 artificial intelligence-/machine learning-enabled smart diagnostics and digital therapeutics devices, compared to 103 between 2016 and 2018.<sup>235</sup>
- There was a 30-fold increase in telehealth consultations, and a 100-fold increase in e-visits and virtual check-ins\*\*\*\* of *Medicare* beneficiaries between the year preceding March 2021 and March 2020.<sup>11, 236</sup> Nearly half the telehealth users during the COVID-19 pandemic were first-time users.<sup>34</sup>
- Behavioral and psychological health and care saw the highest increase in telehealth among all specialties with a 32-fold increase in 2020.<sup>235</sup>
- In 2020, the FDA established the Digital Health Center of Excellence for providing centralized expertise and serving as a resource for digital health technologies and policy for innovators and the public.<sup>237</sup>
- *Teladoc Health*, a virtual health and care provider, acquired digital health company Livongo in a deal valued at US\$18.5 billion – the largest digital health acquisition to date.<sup>238</sup>

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\*\*\*\**Medicare* differentiates between three kinds of virtual visits – telehealth consultation, e-visits, and virtual check-ins. Telehealth consultation occurs when the provider uses an interactive audio-video telecommunication system that permits real-time communication between the distant site and the patient at home. E-visits are non-face-to-face patient-initiated communications through an online patient portal while virtual check-ins are short patient-initiated communications with a health and care provider.

## Policy landscape

The timeline lists several recent and upcoming policies that promise to increase the adoption of virtual health and care in the USA.



## Policy elements and policies

### Collaboration

The Community Connected Health initiative aims to provide quality health care to underserved communities by gaining stakeholder input on how to use digital health for communities.

*Request for Information on Strengthening Community Health Through Technology, 2022*

### Financing

Federal funding is available for procuring telecommunication services, information services, and connected devices necessary to enable telehealth.

*COVID-19 Telehealth Program under Consolidated Appropriations Act, 2021*

## Health outcomes

Sponsors of clinical investigations are required to explain why a virtual health and care technology is fit for purpose in the clinical investigation; this includes providing details of the technology used and information on how it measures the clinical event.

*Digital Health Technologies for Remote Data Acquisition in Clinical Investigations, 2021*

Clinical effectiveness research studies are sponsored by the government through non-profit organizations such as the Patient-Centered Outcomes Research Institute.

## Human- and equity-centric

People with pre-existing medical conditions are covered by the public health system; this avoids potential discrimination in private market, which could charge high premiums.

*Affordable Care Act, 2010*

Rural and underserved communities are given additional financial impetus to expand telehealth.

Virtual health and care solutions are required to consider education, language, age, and technical aptitude of participants to reduce bias in clinical trials.

*Digital Health Technologies for Remote Data Acquisition in Clinical Investigations, 2021*

## Innovation

Digital health technologies can be used to acquire data remotely from participants in clinical investigations of medical products.

Investigators must ensure that a digital health technology is fit for purpose for its proposed use in a specific clinical investigation.

- The level of verification and validation must be sufficient to support its use in the clinical investigation.
- The digital health technology is required to correspond to the clinical outcome to be assessed and consider if the design/operating characteristics affect trial participants' use adversely.

To maintain data integrity, the output of the digital health technology and associated metadata is to be transmitted to an electronic data repository that is protected from changes and maintained until the end of the record retention period.

Additionally, investigators are required to:

- train trial participants and personnel and develop a plan to provide technical assistance,
- develop a risk management plan to address potential problems (e.g., interference between mobile applications, or loss, damage, and replacement),
- develop a safety monitoring plan for the participants' safety, and
- develop a contingency plan for any changes to the digital health technology (e.g., discontinuation of a specific model, operating system updates).

*Digital Health Technologies for Remote Data Acquisition in Clinical Investigations, 2021*

## Interoperability

Data exchange is to be based on Health Level 7® Fast Healthcare Interoperability Resources® (HL7 FHIR) Release 4.0.1 through secure application programming interfaces (APIs).

*Interoperability and Patient Access Final Rule, 2020*

Privacy and security of patient information is supported by the standards adopted by the Centers for Medicare & Medicaid Services (CMS). Payers are required to:

- Maintain a secure, standards-based API that allows patients to easily access their claims and encounter information, including cost, as well as a defined sub-set of their clinical information through third-party applications of their choice.

- Make provider directory information publicly available and publish a report of eligible clinicians, hospitals, and critical access hospitals which attest to certain interoperability requirements.
- Exchange certain patient clinical data at the patient's request, allowing the patient to take their information with them as they move from payer to payer over time to help create a cumulative health record with their current payer.

### Licensing

In response to the COVID-19 pandemic, licensing requirements for providing services are temporarily waived (earlier required by CMS): providers do not need a license in the state where they are delivering telemedicine.

*Expansion Of Telehealth With 1135 Waiver, March 2020*

- As of January 2022, providers can practice telehealth across 21 states.

### Quality assurance

Health Insurance Portability and Accountability Act (HIPAA) regulations are relaxed to allow use of different remote delivery technologies.

*Notification of Enforcement Discretion for Telehealth Remote Communications During the COVID-19 Nationwide Public Health Emergency, March 2020*

- Physicians and health providers are allowed to use any non-public-facing video conferencing and text messaging technology to enable telehealth visits through applications such as FaceTime, Facebook Messenger and Whatsapp even if they do not meet the HIPAA privacy, security, and breach notification rules.

### Regulation

Qualified health and care providers are allowed to prescribe several categories of drugs through telehealth without in-person consultation.

*DEA068, March 2020*

- Controlled substances (e.g., buprenorphine treatment for opiate use disorders)
- Abortion-inducing medications

Regulations on liability, licensing, and reimbursements can be changed quickly to respond to public health emergencies such as the COVID-19 pandemic to make health and care as accessible as possible, including remotely.

*Public Readiness and Emergency Preparedness Act, 2005*

### Reimbursement

**Medicare** and **Medicaid** telehealth benefits are expanded to increase user benefits in the COVID-19 pandemic era:

*S.150 – Ensuring Parity in MA for Audio-Only Telehealth Act of 2021*

- Users can access telehealth services from any geographic location (earlier, the coverage was limited to rural areas only).
- Users are allowed to receive service from their homes (earlier, only sites such as a physician's office, skilled nursing facility, or hospital qualified as originating sites to be reimbursed under **Medicare**).
- Providers are allowed to treat first-time patients (earlier, providers were required to have a prior established relationship with the patient in the last three years to be eligible for providing telehealth).
- Federal approval is not needed for state **Medicaid** programs to reimburse providers for telehealth services in the same manner or at the same rate that states pay for in-person services.
- Audio-only telemedicine services such as those through fixed-line phones, including for behavioral health services and patient education services, are covered.

As of August 2021, 16 states require payment parity for telehealth.<sup>239</sup>

CMS added several audio and speech-language pathology-related services to the list of services that can be reimbursed.

*List of services payable under the Medicare Physician Fee Schedule when furnished via telehealth, 2021*

## Supporting policies

Insurance and broadband policies in the USA are resulting in increased, affordable coverage and digital infrastructural development, both of which are supporting the adoption of virtual health and care. Additionally, the private sector is taking renewed interest, which is likely to improve integration of virtual delivery.

### Patient Protection and Affordable Care Act, 2010

#### Nature of policy:

A comprehensive national health care reform to expand health and care insurance coverage and improve access to care.

#### Policy impact:

The policy was the largest expansion of public financing in health and care. It resulted in an estimated 20 million citizens gaining coverage, reducing the share of uninsured adults aged 19–64 years from 20% in 2010 to 8.6% in 2020.

- With virtual health and care reimbursements now being covered by *Medicaid* and *Medicare*, the policy provided an important foundation for the use and adoption of virtual health and care.

### Emergency Broadband Benefit, 2021

#### Nature of policy:

A rule by the Federal Communications Commission to provide financial subsidies for broadband services and equipment in low-income households and tribal areas.

#### Policy impact:

The policy is seeing positive results with enrollment of around 6.4 million low-income/tribal households as of October 2021 (out of roughly 33.5 million that qualify).<sup>240</sup>

## Role of the private sector

### Amazon Care (Amazon)

- It provides virtual care services for employees of Amazon and other companies.<sup>241</sup>
- They also aim to promote remote home-based care through partnership with Moving Health Home, a home health and care advocacy group.<sup>242</sup>

### Walmart Health (Walmart)

- Walmart Health acquired MeMD, a multispecialty telehealth provider, to provide virtual care services in primary care, urgent care, and behavioral health.<sup>243</sup>
- The company also partnered with virtual care companies Grand Rounds Health and Doctor On Demand to overcome health disparities among African American workers.<sup>244</sup>

### Best Buy Health (Best Buy)

- Best Buy Health acquired Current Health, a home-based care technology platform, to bring together remote patient monitoring, telehealth, and patient engagement into a single solution for health and care organizations.<sup>245</sup>

## Outlook

The USA is providing strong financial support for expanding virtual health and care during the COVID-19 pandemic through several policy initiatives.

- **Connected Care:** A three-year, US\$100 million pilot program for selected virtual health and care providers who cover low-income segments; the program provides for up to 85% of broadband, network equipment, and information services costs.
- **COVID-19 Telehealth Program:** A US\$250 million program that supports projects increasing access to virtual health and care services through better broadband connectivity and connected devices.
- **US Department of Agriculture Distance Learning and Telemedicine Grant Program:** A US\$44.5 million program to help rural communities acquire technology and training needed for connecting medical professionals with patients.
- **Investments in telehealth for rural and underserved communities:** The government launched several telehealth programs for underserved communities amounting to US\$19 million in August 2021.
  - Telehealth Technology-Enabled Learning Program: A US\$4.3 million initiative to develop sustainable telementoring programs and networks in rural and medically underserved communities.
  - Telehealth Resource Centers: A US\$4.6 million fund for providing telehealth information, assistance, and education to potential providers.
  - Evidence-Based Direct to Consumer Telehealth Network Program: A US\$3.9 million program to help health networks improve access to telehealth services and assess their efficacy.
  - Telehealth Centers of Excellence Program: A US\$6.5 million program to improve care for rural communities with high rates of chronic disease and poverty.

Policymakers are seeing value in several telehealth regulations that were temporarily waived during the initial phases of the COVID-19 pandemic and are looking to make these permanent.

- **Creating Opportunities Now for Necessary and Effective Care Technologies (CONNECT) for Health Act, 2021:** A yet-to-be passed policy that aims to make several waivers permanent, such as removal of geographic restrictions, expansion of originating sites, permitting rural health clinics and federal health centers to provide telehealth, etc.

Going forward, virtual health and care adoption in the USA could benefit from increased policy focus on:

- **Quality of care and reimbursement:** Specialized equipment is needed at home for monitoring vital signs such as oxygen saturation, temperature, blood pressure, fetal heart rate, etc. in various cases. Policy guidelines can provide greater clarity on whether this specialized equipment is to be reimbursed by the patient out of pocket or by the health system.
- **Federal policy:** Policies in the USA are highly state-specific which makes uniform adoption of virtual health and care difficult at a national level. Greater consistency in policy formulation and implementation across states through federal policy interventions on minimum standards, and inter-state experience-sharing mechanisms could accelerate virtual health and care adoption.



# Overviews

## An outline of selected virtual health and care policies.

Each country overview outlines the country's health and care context, notable virtual health and care developments, and one or more selected policies and elements.

### Bangladesh

Bangladesh has a decentralized health and care system served by private providers, non-governmental organizations, the national government, and international welfare organizations. This fragmented landscape causes many challenges such as unequal treatment programs between social classes.<sup>246</sup>

*Praava Health*, a virtual and in-person health and care provider, recorded a 40% growth in services in 2020.<sup>247</sup>

Notable virtual health and care players are *Maya*, *Praava Health*, *Shastho Batayon*, *Tonic*, *Sebaghar*, *LifeSpring*, and *Synesis Health*.<sup>248</sup>

#### Bangladesh health and care key metrics

Metric	Status
Progress on achieving SDG3	Major challenges remain. Moderate improvement in score but not enough to attain goal
UHC service coverage index	<b>48</b> (global median value – 68)
Global burden of disease: DALY (per 100,000)	<b>27,077</b> (global mean value – 32,801)
Health expenditure as % of general government expenditure	<b>3.0%</b>
Out of pocket expenditure as % of current health expenditure	<b>72.7%</b>
% of individuals using the internet	<b>13%</b>
Doctor density (per 10,000)	<b>6.67</b> (WHO recommendation – 10)
Cost of data (1.5 GB mobile broadband, US\$)	<b>US\$3.04</b> (global mean – US\$8.70)
Digital skills among population	<b>3.55</b> (global median – 4.21)

### Key virtual health and care policies

#### Telemedicine Guidelines, 2020

##### Nature of policy:

Guidelines for enabling registered medical doctors to effectively use telemedicine for improving health and care services and

access to all. They specify that telemedicine includes all channels of communication with the patient that use ICT platforms, including video, audio, text, and digital data exchange.

##### Policy elements:

Data governance, reimbursement, remote delivery, leadership, digital skills building

## Key policy elements

Data governance	
Doctors are required to maintain records of telemedicine interactions, such as phone or video logs, emails, chats, texts, etc., and other patient information, such as prescription and patient records, reports, documents, images, diagnostics, data, etc., generated during telemedicine consultation.	<i>Telemedicine Guidelines, 2020</i>
Regulation	
Drugs prescribed through telemedicine are limited based on the channel of consultation (video or audio or text) and the nature of consultation (first check-up or follow-up).	<i>Telemedicine Guidelines, 2020</i>

## Canada

Canada has a decentralized, universal, and publicly funded health and care system. Medically necessary hospital and physician services are free at the point of use.<sup>249</sup>

Between 2019 and 2020, the government-funded Ontario Telemedicine Network saw a 200-fold increase in virtual consultations.<sup>250</sup>

Notable virtual health and care players are *Akira*, *Maple*, *Dialogue*, *eCare*, *GOeVisit*, and *Wello*.

Canada health and care key metrics	
Metric	Status
Progress on achieving SDG3	Significant challenges remain. On track or maintaining SDG achievement
UHC service coverage index	<b>89</b> (global median value – 68)
Global burden of disease: DALY (per 100,000)	<b>27,336</b> (global mean value – 32,801)
Health expenditure as % of general government expenditure	<b>18.6%</b>
Out of pocket expenditure as % of current health expenditure	<b>14.9%</b>
% of individuals using the internet	<b>97%</b>
Doctor density (per 10,000)	<b>24.43</b> (WHO recommendation – 10)
Cost of data (1.5 GB mobile broadband, US\$)	<b>US\$24.95</b> (global mean – US\$8.70)
Digital skills among population	<b>5.07</b> (global median – 4.21)

## Key virtual health and care policies

### Virtual Care – Policy Framework, 2021

#### Nature of policy:

The policy framework promotes the sustainable use of virtual health and care solutions through six key pillars: patient and community-centered approaches, equitable access, compensation, change management,

quality assurance, and licensing. These pillars are the basis of several recommendations for integrating virtual delivery into mainstream health and care.

#### Policy elements:

Financing, reimbursement, quality assurance, digital skills building, licensing, human- and equity-centric.

## Key policy elements

### Human- and equity-centric

Patient and community-centered approaches are to be integrated in virtual health and care, for instance, by following best practices for patient engagement.

*Virtual Care – Policy Framework, 2021*

Barriers to equitable access to virtual health and care services for vulnerable and underrepresented groups must be identified and overcome through engagement.

Digital disparities and the need for equity in access to affordable broadband must be considered while formulating policies.

Approaches to enhance digital health literacy for patients are to be developed.

Publicly funded health systems must enhance access to virtual health and care services.

### Licensing

Common licensing and registration, including a national (across jurisdictional boundaries) license for virtual health and care as a potential first step or pilot, is to be developed.

*Virtual Care – Policy Framework, 2021*

Common licensing is to be linked to payments through reciprocal billing mechanisms.

### Reimbursement

Virtual services should be considered as a channel for delivering quality patient care.

*Virtual Care – Policy Framework, 2021*

Reciprocal billing (service being provided in one state and paid for in another) is to be considered to increase the delivery of virtual health and care services across jurisdictional borders.

## China

China has a three-tiered health and care delivery system in rural and urban areas. Rurally, it operates at county, township, and village levels, and in urban areas, it services the municipal, district, and community levels. Coverage is through resident-based and employee-based health insurances.<sup>251</sup>

The COVID-19 pandemic saw an increase in the number of telemedicine providers from fewer than 150 in late 2019 to nearly 600 in mid-2020.<sup>252</sup>

*WeDoctor*, China's largest telemedicine network, owns 27 internet hospitals and provides remote appointment facility to 7800 hospitals across China including 95% of the top-tier public hospitals in the country.

At the peak of the COVID-19 pandemic in Wuhan, *WeDoctor* handled 97% of the city's medical needs.<sup>253</sup>

*AI Nurse*, a preventive and proactive health and care solution developed in collaboration between Tencent (WeChat) and the Novartis Foundation, aids management of chronic diseases including cardiovascular diseases from pre-diagnosis to hospital discharge and enables ongoing at-home disease management.<sup>254</sup>

Notable virtual health and care players are *WeDoctor*, *JD Health*, *Ping An Good Health (formerly Ping An Good Doctor)*, and *Alibaba Health*.

China health and care key metrics	
Metric	Status
Progress on achieving SDG3	Significant challenges remain. Score moderately improving, insufficient to attain goal
UHC service coverage index	<b>79</b> (global median value – 68)
Global burden of disease: DALY (per 100,000)	<b>26,871</b> (global mean value – 32,801)
Health expenditure as % of general government expenditure	<b>8.8%</b>
Out of pocket expenditure as % of current health expenditure	<b>35.2%</b>
% of individuals using the internet	<b>71%</b>
Doctor density (per 10,000)	<b>22.27</b> (WHO recommendation – 10)
Cost of data (1.5 GB mobile broadband, US\$)	<b>US\$4.28</b> (global mean – US\$8.70)
Digital skills among population	<b>4.66</b> (global median – 4.21)

### Key virtual health and care policies

[Notice of National-level Remote Consultation Work for Severely Critical Patients with New Coronary Pneumonia, National Health Office Medical Letter No. 153, 2020](#)

#### Nature of policy:

The policy recommends operational requirements and standards for providing teleconsultations through a national platform, the National Remote Center, for severe and critically ill COVID-19 patients.

#### Policy element:

Quality assurance

## Data Security Law, 2021

### Nature of policy:

A policy on data governance, which regulates data processing and security, including health and care data, considering China's economic

and social development, national security, and social and lawful interests of citizens and organizations.

### Policy element:

Data governance

## Key policy elements

### Data governance

All virtual health and care providers are required to implement the multi-level protection scheme.

*Data Security Law, 2021*

- Security levels range from 1 to 5, with 5 reserved for sensitive government facilities and systems.
- Health or medical big data is Level 3 and above.
- If personal medical information constitutes "important data", critical information infrastructure operators should store such personal medical information within China.
- The network operator should conduct a security assessment if necessary to provide personal information or important data abroad.

### Quality assurance

Remote providers are required to fulfill certain requirements for availing teleconsultations through the national telehealth platform:

*Notice of National-Level Remote Consultation Work for Severely Critical Patients with New Coronary Pneumonia, National Health Office Medical Letter No. 153, 2020*

- Consultation organization requirements:
  - The designated hospitals should apply in accordance with the operation process of the National Remote Center Consultation Platform.
- Other requirements:
  - All provincial health administrative departments should guide designated hospitals in their jurisdictions to carry out remote consultations for severe and critical cases.
  - All designated hospitals should appoint a special person responsible for the management of remote consultations to ensure smooth communication.

## Colombia

Health and care is a basic right for all citizens and foreigners in Colombia. Coverage is provided through three types of medical coverage:

- Health Promoting Entities (Entidades Promotoras de Salud – EPS): mandated public health and care for all residents
- System for Selecting Beneficiaries of Social Programs (Sistema de Selección de Beneficiarios de Programas Sociales – SISBEN): free government-subsidized coverage for low-income and homeless citizens

- Private health insurance companies<sup>255</sup>

There was a 117% increase in the number of health and care providers offering telemedicine and a 192% increase in the types of telemedicine services between January 2020 and September 2020.<sup>256</sup>

Notable virtual health and care players in Colombia are *1Doc3*, *DonDoctor*, and *Enterapia*.

Colombia health and care key metrics	
Metric	Status
Progress on achieving SDG3	Significant challenges remain. Score moderately improving, insufficient to attain goal
UHC service coverage index	<b>76</b> (global median value – 68)
Global burden of disease: DALY (per 100,000)	<b>24,212</b> (global mean value – 32,801)
Health expenditure as % of general government expenditure	<b>16.9%</b>
Out of pocket expenditure as % of current health expenditure	<b>14.9%</b>
% of individuals using the internet	<b>65%</b>
Doctor density (per 10,000)	<b>23.27</b> (WHO recommendation – 10)
Cost of data (1.5 GB mobile broadband, US\$)	<b>US\$10.55</b> (global mean – US\$8.70)
Digital skills among population	<b>3.80</b> (global median – 4.21)

## Key virtual health and care policies

### Guide for the Implementation of the Principle of Demonstrated Responsibility in International Personal Data Transfers, 2021

#### Nature of policy:

A data governance guidance for cross-border sharing of health and care data. It specifies conditions under which citizen health and care data can be transferred out of the country considering individual rights.

#### Policy element:

Data governance

## Key policy elements

Data governance	
<p>Cross-border transfer of any personal data (including telehealth data) is forbidden by law, unless it is made to a country which offers adequate levels of data protection.</p> <p>The following countries (non-exhaustive) are declared to have adequate levels of data protection: Australia, Austria, Belgium, Bulgaria, Costa Rica, Croatia, Cyprus, Malta, Mexico, the UK, the USA, and countries declared to have adequate protection standards by the European Community.</p> <p>Prohibition does not apply in cases when the data owner authorizes cross-border transfer or where the transfer is required for health or public hygiene reasons.</p> <p>The following must be observed during cross-border transfer of telehealth data (non-exhaustive):</p> <ul style="list-style-type: none"> <li>• Assessment of impact on individual privacy</li> <li>• Incorporation of privacy, ethics, and security by design and by default</li> <li>• Verification that one is empowered to transfer or transmit personal data to another country</li> <li>• Compliance with the accountability measures</li> <li>• Consideration of the subsequent transfers of personal data</li> </ul>	<p><i>Guide for the Implementation of the Principle of Demonstrated Responsibility in International Personal Data Transfers, 2021: Law 1581 of 2012, 2012</i></p>

## Estonia

Estonia operates a solidarity-based health insurance system – health and care for everyone who pays social taxes.<sup>257</sup> In 2020, 40% of all health and care-related visits were

virtual (out of 200,000), compared to mainly family-medicine-related visits earlier.<sup>258</sup> Notable virtual health and care players are *Minudoc* and *Viveo Health*.

### Estonia health and care key metrics

Metric	Status
Progress on achieving SDG3	Major challenges remain. Score moderately improving, insufficient to attain goal
UHC service coverage index	<b>75</b> (global median value – 68)
Global burden of disease: DALY (per 100,000)	<b>34,728</b> (global mean value – 32,801)
Health expenditure as % of general government expenditure	<b>12.9%</b>
Out of pocket expenditure as % of current health expenditure	<b>24.0%</b>
% of individuals using the internet	<b>89%</b>
Doctor density (per 10,000)	<b>34.72</b> (WHO recommendation – 10)
Cost of data (1.5 GB mobile broadband, US\$)	<b>US\$7.36</b> (global mean – US\$8.70)
Digital skills among population	<b>5.43</b> (global median – 4.21)

## Key virtual health and care policies

### eHealth Strategic Development Plan 2020

#### Nature of policy:

A five-year strategic development plan that focuses on eHealth initiatives. These include developing a high-quality health data and infrastructure, achieving human-centeredness

and personalized medicine, providing holistic patient care and cooperation at the organizational level, achieving health service efficiency and analytical capacity, and developing remote health and care solutions.

#### Policy elements:

Human- and equity-centric, infrastructure, collaboration

## Key policy elements

### Human- and equity-centric

Estonia's *eHealth Strategic Development Plan, 2020* focuses on persons and personal medicine, and requires health services to serve the needs of every individual person by:

- Creating a service-based patient portal.
- Developing a person-focused data management and data use monitoring service.
- Facilitating implementation of individual applications supporting adaptation of behavior.

It recommends developing decision support systems by:

- Implementing national services for clinical decision-making support.
- Developing applications in personal medicine.

The country is also developing a personal medicine data warehouse and associated analytical e-services for handling genetic and health data.

*eHealth Strategic Development Plan, 2020*



## Infrastructure

The *eHealth Strategic Development Plan, 2020* suggests building uniform and distributed infrastructure for virtual health and care data to achieve the quickest and most flexible capability for e-services by:

*eHealth Strategic Development Plan, 2020*

- Developing capabilities for secondary use of information by relying on data-based sharing.
- Creating an analytical data warehouse based on the distributed data of eHealth.
- Developing mutual data exchange for supporting analytical and monitoring capabilities.

The plan also recommends improving existing blockchain technology to ensure a transparent and simpler view of clinical data to the patient.

- In 2016, the *Estonian E-Health Foundation* and *Guardtime*, a data security firm, partnered to safeguard patient health records using blockchain.<sup>259</sup>
- Currently, blockchain is used to maintain the entire health and care billing, 95% of health and care data, and 99% of prescription information.<sup>260</sup>



The health and care system in Fiji, a country of about 330 islands, exhibits differences in the access to public health and care between the main islands and rural areas, with the latter having lower access. In total, a network of 84 health centers and 98 nursing stations serves

the primary health and care needs of the country.<sup>261</sup>

*Vuniwai* is Fiji's first telemedicine platform launched in June 2021.<sup>262</sup>

### Fiji health and care key metrics

Metric	Status
Progress on achieving SDG3	Major challenges remain. Score stagnating or increasing at less than 50% of required rate
UHC service coverage index	<b>64</b> (global median value – 68)
Global burden of disease: DALY (per 100,000)	<b>36,090</b> (global mean value – 32,801)
Health expenditure as % of general government expenditure	<b>8.3%</b>
Out of pocket expenditure as % of current health expenditure	<b>13.2%</b>
% of individuals using the internet	<b>50%</b>
Doctor density (per 10,000)	<b>8.6</b> (WHO recommendation – 10)
Cost of data (1.5 GB mobile broadband, US\$)	<b>US\$12.82</b> (global mean – US\$8.70)

## Key virtual health and care policies

### Strategic Plan, 2020–2025

#### Nature of policy:

A five-year strategic plan for achieving Universal Health Coverage and improving the health and well-being of all citizens by bettering their social determinants of health and care. It has three strategic priorities:

reforming public health services for a population-based approach to managing diseases and the climate crisis; increasing access to quality, safe, and patient-focused clinical services; and driving efficient and effective management of the health system.

#### Policy elements:

Human-centric, digital skills building, collaboration

## Key policy elements

### Digital skills building

A competent, supported, and motivated workforce is to be developed so that the contribution of every member is recognized and valued by

*Strategic Plan, 2020–2025*

- increasing the number of competent doctors, nurses, midwives, allied health workers, and psychiatrists providing health and care services either directly or indirectly, and
- ensuring diversity in the workforce through mechanisms that enable gender equality in the workforce and help support people living with disabilities to enter the workforce.

### Collaboration

A Digital Health Profile and Maturity Assessment Toolkit (DHPMAT) has been co-created with the WHO to assist Pacific Island Countries, including Fiji, in using digital tools for national health priorities.<sup>263</sup> It comprises:

*Strategic Plan, 2020–2025*

- The Digital Health Profile, to be used as the information source for maturity assessment.
- The Digital Health Maturity Assessment Tool, to guide an objective self-assessment of the strengths and weaknesses of the essential digital health foundation.
  - Foundation: Informatics technology infrastructure; essential digital health tools; readiness for information sharing; health system adoption; quality improvement; measurement, monitoring, and evaluation
  - Maturity levels: Basic, controlled, standardized, optimized, innovative

Impact: Increased awareness of the link between the DHPMAT and the WHO eHealth Regional Strategy. This ensures relevance and facilitates the scale-up and testing.



Ghana's health and care system is organized into national, regional and district levels. Health and care reimbursements are through a national health insurance scheme that provides coverage for major health issues like malaria.

The 2010 eHealth strategy promoted virtual delivery of health and care through digital skills building. Later initiatives such as *eHealthGhana* (2013) and *Mahiri Mobile* (2013) further developed the use of virtual solutions for increasing access.

During the COVID-19 pandemic, Ghana used virtual health and care in several areas such as clinical supplies (use of drones for disinfecting public places and delivering PPE and COVID-19 test kits), teleconsultations,

telehealth, hotspot mapping using data dashboards, contact tracing, etc.<sup>264</sup>

Notable virtual health and care players are *MyCare*, *mPharma*, *GlobalMed*, and *Bisa Health*.

Ghana health and care key metrics	
Metric	Status
Progress on achieving SDG3	Major challenges remain. Score moderately improving, insufficient to attain goal
UHC service coverage index	<b>47</b> (global median value – 68)
Global burden of disease: DALY (per 100,000)	<b>38,958</b> (global mean value – 32,801)
Health expenditure as % of general government expenditure	<b>6.5%</b>
Out of pocket expenditure as % of current health expenditure	<b>36.2%</b>
% of individuals using the internet	<b>53%</b>
Doctor density (per 10,000)	<b>1.7</b> (WHO recommendation – 10)
Cost of data (1.5 GB mobile broadband, US\$)	<b>US\$3.41</b> (global mean – US\$8.70)
Digital skills among population	<b>4.21</b> (global median – 4.21)

## Key virtual health and care policies

### Ghana Telemedicine Program, 2011

#### Nature of policy:

A program for expanding accessibility of quality care in remote areas by reducing

transport times and costs for patients. It started as a pilot covering 30 communities of about 35,000 people and was implemented nationwide in 2016.

#### Policy elements:

Human- and equity-centric, collaboration

## Key policy elements

Collaboration
<p>The Ghana Health Service and Ministry of Health collaborated with The Novartis Foundation on a roadmap for scaling up Ghana's telemedicine program in 2016 by setting up and staffing six teleconsultation centers across the country for achieving nationwide coverage.</p> <p>Impact – Integration of telemedicine in the health system proved to be significantly helpful during the COVID-19 pandemic and saw rapid acceleration. The collaboration also enabled creation of a toolkit to share best practices for setting up a provider-to-provider solution.<sup>265</sup></p> <p>develoPPP (launched January 2019) is a public-private partnership between GIZ Ghana and the Ghana Health Service. It is financed by the German government to involve the private sector in delivering health and care remotely.<sup>266</sup></p> <p>Impact – <i>Bisa Health</i> Application, a telehealth solution, which provides public education on the COVID-19 pandemic, was successfully used for reducing face-to-face doctor consultations and congestion at health facilities.<sup>267</sup></p>



Kenya's health and care comprises public, private, faith- and NGO-based systems. The public health and care system is organized into six levels: community services, dispensaries, health and maternity centers, sub-county and medium-sized private hospitals, county referral and large private hospitals, and national referral hospitals.<sup>268</sup>

20 health facilities are provisionally approved to offer telemedicine services by the Kenya Medical Practitioners and Dentists Council (KMPDC), a regulatory body as of February 2021.<sup>269, 270</sup>

Notable virtual health and care players include *MYDAWA*, *Maisha Meds*, *HealthX Africa*, *m-TIBA*, and *Vezeeta*.

Kenya health and care key metrics	
Metric	Status
Progress on achieving SDG3	Major challenges remain. Moderate improvement in score but not enough to attain goal
UHC service coverage index	<b>55</b> (global median value – 68)
Global burden of disease: DALY (per 100,000)	<b>35,201</b> (global mean value – 32,801)
Health expenditure as % of general government expenditure	<b>8.3%</b>
Out of pocket expenditure as % of current health expenditure	<b>24.3%</b>
% of individuals using the internet	<b>23%</b>
Doctor density (per 10,000)	<b>1.57</b> (WHO recommendation – 10)
Cost of data (1.5 GB mobile broadband, US\$)	<b>US\$4.66</b> (global mean – US\$8.70)
Digital skills among population	<b>4.55</b> (global median – 4.21)

## Key virtual health and care policies

### National eHealth Policy, 2016–2030

#### Nature of policy:

Derived from the main Kenya Health Policy, the policy aims to strengthen and accelerate integration of ICTs into the health and care system. It focuses on developing infrastructure and software for managing and delivering essential health and care.

#### Policy elements:

Human-centric, infrastructure, interoperability, innovation, digital skills building

### National Community Health Digitization Strategy, 2020–2025

#### Nature of policy:

A blueprint for shaping the rapidly growing digital health and care ecosystem, this strategy recommends developing a national electronic Community Health Information System (eCHIS) to strengthen community health service delivery.

#### Policy elements:

Governance, interoperability, digital skills building, collaboration, quality assurance

## Key policy elements

Collaboration	
<p>Different stakeholders in the engineering, health, and ICT sectors as well as end users are to be involved in the design, development, and implementation of eHealth initiatives for best outcomes.</p> <ul style="list-style-type: none"> <li>Public-private partnerships are encouraged.</li> <li>An eHealth investment plan is being developed and implemented. Where possible, priority is given to open-source platforms.</li> </ul> <p><i>Akiba ya Roho</i>, a new delivery model co-created by Access Afya and Boehringer Ingelheim, brings together retail pharmacies, clinics, telemedicine, and digital tools for health and care providers to provide low-cost consultations, lab work, and medications.<sup>271</sup></p>	<p><i>Kenya National eHealth Policy, 2016–2030</i></p>
Interoperability	
<p>Standardized eHealth hardware and software is to be procured for ensuring quality, confidentiality, privacy, security, and the integrity of health and care data.</p>	<p><i>Kenya National eHealth Policy, 2016–2030</i></p>
<p>Minimum standards and compliance requirements for overall architecture are specified for a Community Health Information System.</p>	<p><i>National Community Health Digitization Strategy, 2020–2025</i></p>
<p>eCHIS is operating through a public-private partnership between the Kenyan Ministry of Health, Living Goods, and the Johnson and Johnson Center for Health Worker Innovation.<sup>272</sup>  <sup>273</sup> The pilot was launched in Kisumu County in 2021.<sup>274</sup></p>	

## Senegal

Senegal's health and care system has a three-tiered structure consisting of regional hospitals, health centers, and health posts. There are only a few private care providers. Overall access to health and care is a major challenge in the country with 32% of rural citizens living without access to any medical care.<sup>275</sup>

In 2014, Senegal became the first country in French-speaking Africa to implement the

WHO's *BeHe@lthy BeMobile* program for improving diabetes management that used SMS for preventive information.<sup>274, 276, 277</sup> In June 2019, the Senegal Agency for Universal Health launched SunuCMU, a digital triage system that guides citizens to the closest possible medical provider.

Notable virtual health and care players are *iCliniq* and *Zuri*.

Senegal health and care key metrics	
Metric	Status
Progress on achieving SDG3	Major challenges remain. Score moderately improving, insufficient to attain goal
UHC service coverage index	<b>45</b> (global median value – 68)
Global burden of disease: DALY (per 100,000)	<b>36,169</b> (global mean value – 32,801)
Health expenditure as % of general government expenditure	<b>4.3%</b>
Out of pocket expenditure as % of current health expenditure	<b>51.0%</b>
% of individuals using the internet	<b>40%</b>
Doctor density (per 10,000)	<b>0.88</b> (WHO recommendation – 10)
Cost of data (1.5 GB mobile broadband, US\$)	<b>US\$3.28</b> (global mean – US\$8.70)
Digital skills among population	<b>4.21</b> (global median – 4.21)

## Key virtual health and care policies

### National Strategy of Digital Health, 2018–2023

#### Nature of policy:

A strategic framework for achieving universal health coverage using digital tools. Focus areas include promoting access to quality care through eHealth, encouraging

prevention and management of health risks, strengthening the performance of health personnel, and improving health governance through the availability of quality and secure information at all levels of the health system.

#### Policy elements:

Governance, regulation, infrastructure, financing, interoperability

## Key policy elements

### Collaboration

Operational public health dashboards created in collaboration with the Program for Appropriate Technology in Health (PATH) and the Tableau Foundation through initiatives like “Visualize No Malaria” enable monitoring of population-level health and care parameters.

As a result, Senegal's dashboards to track malaria and health center visits were leveraged for managing the COVID-19 pandemic. Health workers were able to ensure swift response by dividing health and care resources correctly and conducting public information campaigns.<sup>278</sup>


**Uganda**

Uganda's decentralized health and care system is serviced through referral hospitals and semi-autonomous institutions nationally, and through health teams and health centers at the village and district levels.<sup>279</sup>

*Rocket Health*, a telehealth provider, saw a 500-fold increase in phone and video consultations in 2020.<sup>50</sup>

Notable virtual health and care players are *Rocket Health* and *mPharma*.

Uganda health and care key metrics	
Metric	Status
Progress on achieving SDG3	Major challenges remain. Score moderately improving, insufficient to attain goal
UHC service coverage index	<b>45</b> (global median value – 68)
Global burden of disease: DALY (per 100,000)	<b>41,513</b> (global mean value – 32,801)
Health expenditure as % of general government expenditure	<b>3.1%</b>
Out of pocket expenditure as % of current health expenditure	<b>38.3%</b>
% of individuals using the internet	<b>4%</b>
Doctor density (per 10,000)	<b>1.54</b> (WHO recommendation – 10)
Cost of data (1.5 GB mobile broadband, US\$)	<b>US\$5.36</b> (global mean – US\$8.70)
Digital skills among population	<b>3.42</b> (global median – 4.21)

## Key virtual health and care policies

### National eHealth Strategy, 2017–2021

#### Nature of policy:

The strategy aims to use ICTs for digitally transforming the country's health and care by improving the leadership and governance structures as well as other policy elements. It is based on the principles of client-focused eHealth agenda, equity, user-friendly technology applications, multi-sectoral approach, human rights-based approach, and generating a quality information base for strategic planning and policy development.

#### Policy elements:

Governance, infrastructure, interoperability, data governance, digital skills building, innovation, collaboration, regulation



## Key policy elements

### Leadership

The governance structure is required to integrate management and technical teams for combining knowledge, skills, and stakeholder needs to take advantage of stakeholder contributions on a continuous basis. It is based on:

*National eHealth Strategy, 2017–2021*

- Meeting stakeholder needs
- Covering the enterprise end-to-end
- Applying a single integrated framework
- Enabling a holistic approach
- Separating governance from management

Composition of the governance structure:

Governance area	Proposed governance establishment
Evaluating, directing, and monitoring	The National eHealth Steering Committee sets overall national eHealth direction and priorities.
Align, plan, and organize	The eHealth Technical Working Group develops and oversees implementation of the eHealth Strategy.
Build, acquire, and implement	The eHealth Entity coordinates the implementation of the national eHealth strategy, investment, project management, and execution.
Delivery, service, and support	The eHealth Entity addresses relationships and interactions with existing regulatory bodies and functions with a focus on accountability.
Monitor, evaluate, and assess	The eHealth M&E Function reviews and reports eHealth indicators in alignment with international, regional, and national health indicators.

## United Arab Emirates (UAE)

The UAE's health and care system is regulated at the federal and emirate levels by authorities like the Ministry of Health and Prevention, the Health Authority Abu Dhabi (HAAD), the Dubai Health Authority (DHA), and the Emirates Health Authority (EHA).<sup>280</sup>

*vHealth*, an international telehealth provider, saw a 500% increase in the use of its services in the UAE between March and September 2020 compared to the same period in 2019.<sup>281</sup>

UAE health and care key metrics	
Metric	Status
Progress on achieving SDG3	Challenges remain. On track or maintaining SDG achievement
UHC service coverage index	<b>76</b> (global median value – 68)
Global burden of disease: DALY (per 100,000)	<b>23,161</b> (global mean value – 32,801)
Health expenditure as % of general government expenditure	<b>7.4%</b>
Out of pocket expenditure as % of current health expenditure	<b>12.5%</b>
% of individuals using the internet	<b>100%</b>
Doctor density (per 10,000)	<b>26.01</b> (WHO recommendation – 10)
Cost of data (1.5 GB mobile broadband, US\$)	<b>US\$28.59</b> (global mean – US\$8.70)
Digital skills among population	<b>5.32</b> (global median – 4.21)

## Key virtual health and care policies

### Federal Law No. 2 of 2019 (Health Data Law), 2019

#### Nature of policy:

A data governance policy that specifies the scope and modes of health and care data storage and sharing including cross-border cases. It also recommends establishing a central authority that works in coordination with the federal and local health authorities to store, collect, and exchange health and care data.

#### Policy element:

Data governance

## Key policy elements

### Data governance

Health information and health services data may not be stored, processed, generated, or transferred outside the country, unless specified through a decision issued by the Health Authority in coordination with the Ministry.

- Health and care data can be transferred for telemedicine within the UAE if access is permitted to the doctor only for a limited time, the report is shared only with intended recipients, and patient consent is obtained.
- International transfer of data is allowed in case of overseas treatment, laboratory testing, scientific research, insurance coverage and claims, medical devices and wearables, pharmacovigilance, etc.
- The data must be anonymized in cases of international transfer for scientific research, medical devices/wearables, and insurance coverage/claims.

*Health Data Law, 2019*

## Standards For Telehealth Services, 2021

#### Nature of policy:

The policy defines standards for telehealth services to include teleconsultation, tediagnosis, remote patient monitoring, mHealth, telerobotics, and telepharmacy. It also specifies minimum standards for providing these services and lists cases where it cannot be used; the latter are emergency cases for immediate life-threatening interventions, prescriptions of narcotic or controlled substances, and platforms used for face-to-face in-person consultations.

#### Policy elements:

Licensing, data governance, quality assurance

## Quality assurance

Health facilities offering telehealth must:

- Comply with UAE federal and local laws and regulations.
- Hold a license from the Dubai Health Authority.
- Have accreditation from the Quality and Accreditation Institute and Utilization Review Accreditation Commission.
- Have mandatory UAE-based secure data servers with relevant backup.

*Standards For  
Telehealth Services,  
2021*

Telerobotics and robot-assisted services can be offered if the following are fulfilled:

- Telesurgery devices should have a bi-directional master-slave system with direct user control.
- Telesurgery medical devices should be compliant with FDA and Quality System Regulations or CE Marking and ISO 9001 and ISO 9002 Standards.
- High-speed connectivity or LAN and an information management system must be in place with high-definition visual and audio capability.

## Uruguay

Uruguay's main public health provider, Administración de Los Servicios de Salud del Estado, operates more than 900 health and care units. These include hospitals for medium- and high-complexity services, primary care polyclinics, and health centers for lower complexity services.<sup>282</sup>

*Mutualista*, Uruguay's affordable health and care scheme, is based on a monthly

membership fee and small co-payments for using private hospital services. It differs from a traditional health insurance as there are no big deductibles or lifetime caps and the terms and conditions are well defined.<sup>283</sup>

*Coronavirus UY*, a COVID-19 monitoring app, had more than 600,000 downloads within six months between March and October 2020.<sup>284</sup>

## Uruguay health and care key metrics

Metric	Status
Progress on achieving SDG3	Significant challenges remain. Score moderately improving, insufficient to attain goal
UHC service coverage index	<b>80</b> (global median value – 68)
Global burden of disease: DALY (per 100,000)	<b>30,884</b> (global mean value – 32,801)
Health expenditure as % of general government expenditure	<b>20.1%</b>
Out of pocket expenditure as % of current health expenditure	<b>15.5%</b>
% of individuals using the internet	<b>83%</b>
Doctor density (per 10,000)	<b>49.4</b> (WHO recommendation – 10)
Cost of data (1.5 GB mobile broadband, US\$)	<b>US\$10.78</b> (global mean – US\$8.70)
Digital skills among population	<b>4.26</b> (global median – 4.21)

## Key virtual health and care policies

Law No. 19,869: Telemedicine – Rules for its Implementation as a Provision of Health Service, 2020

### Nature of policy:

The policy provides general guidelines to develop and implement telemedicine, for improving its efficiency and quality, and for

increasing coverage. It aligns with the national health board's recommendations for health and care providers to prioritize alternative means of access to medical consultations and decongest hospital centers during the COVID-19 pandemic.

### Policy elements:

Governance, data governance

## Key policy elements

### Governance

Uruguay defines telemedicine as the provision of health care services, where distance is a critical factor, by all health and care professionals using ICT for the exchange of valid information.

This applies for the diagnosis, treatment, and prevention of diseases and injuries; for research and evaluation; and for the continuing education of health and care workers, all in the interest of improving the health of individuals and communities. It is based on the following principles:

- **Universality:** To provide better access to health services for the entire population.
- **Equity:** To bring services closer to the population in remote places and with a scarcity of resources by breaking down geographical barriers.
- **Service quality:** To promote improvement in the quality and comprehensive care of the patient by strengthening the capacities of health personnel.
- **Efficiency:** To optimize health and care resources, improve demand management, reduce hospital stays, decrease medical act redundancies, and reduce travel time.
- **Decentralization:** To optimize services by strengthening the decentralization process of the National Integrated Health System.
- **Complementarity:** To complement the assistance provided by the treating physician through a doctor-patient link.
- **Confidentiality:** To preserve confidentiality in the doctor-patient relationship by guaranteeing security in the exchange of information.

*Law No. 19,869: Telemedicine – Rules for its Implementation as a Provision of Health Service, 2020*

## Viet Nam

The public health and care system in Viet Nam consists of four levels: central (central and regional hospitals and research institutes); provincial and district; community; and a network of village health workers. At each level, there are two tracks, one for prevention and the other for clinical acute care.

In August 2020, the Ministry of Health partnered with VinGroup to use *DrAid*, a mobile X-ray solution that improves treatment consistency through knowledge transfer. Central-level doctors can connect with doctors at other levels to diagnose pulmonary, cardiac, and bone disorders – including COVID-19 infections.<sup>285</sup>

There was a 600% increase in daily teleconsultations on the *Doctor Anywhere* platform in December 2020.<sup>286</sup> In August 2021, the government launched a public telehealth platform for linking all district-level health

facilities for improving health and care access (August 2021).<sup>287</sup>

Notable virtual health and care players include *Doctor Anywhere*, *Jio Health*, and *BuyMed*.

Viet Nam health and care key metrics	
Metric	Status
Progress on achieving SDG3	Major challenges remain. Score moderately improving, insufficient to attain goal
UHC service coverage index	<b>75</b> (global median value – 68)
Global burden of disease: DALY (per 100,000)	<b>26,783</b> (global mean value – 32,801)
Health expenditure as % of general government expenditure	<b>10.1%</b>
Out of pocket expenditure as % of current health expenditure	<b>43.0%</b>
% of individuals using the internet	<b>70%</b>
Doctor density (per 10,000)	<b>8.3</b> (WHO recommendation – 10)
Cost of data (1.5 GB mobile broadband, US\$)	<b>US\$2.15</b> (global mean – US\$8.70)
Digital skills among population	<b>3.77</b> (global median – 4.21)

## Key virtual health and care policies

### Scheme for Remote Medical Examination and Treatment for 2020–2025, 2020

#### Nature of policy:

The scheme recommends building a national network for telemedicine that connects the 24 national hospitals with provincial and district hospitals to promote teleconsultation at these levels.

#### Policy elements:

Regulation, infrastructure

### Program for National Digital Transformation by 2025 with Orientation Towards 2030, 2020

#### Nature of policy:

The program aims to ensure that all health and care facilities have a telemedicine unit for delivering health and care remotely, reducing in-patient visits, preventing mass gatherings, and reducing risks of cross-infection, especially during pandemics such as the COVID-19 pandemic.

#### Policy elements:

Leadership, governance, regulation

## Key policy elements

### Governance

Digital transformation in the health and care sector is to be prioritized by:

- Developing telemedicine platforms to ensure that all health and care establishments have a telemedicine unit.
- Developing digital health and care systems to facilitate administrative reform, reduce in-patient visits, improve quality, use electronic medical records, pay hospital fees, etc.
- Creating a digital personal health dossier for each citizen based on *one private doctor for each citizen*.
- Creating legal mechanisms to provide telemedicine and electronic medical prescriptions.

*Program for National Digital Transformation by 2025 with Orientation Towards 2030, 2020*

### Human- and equity-centric

Health facilities and clinics in inaccessible mountainous regions are connected with 30 tertiary hospitals in Hanoi and Ho Chi Minh City for remote consultation and treatment.

*Scheme for Remote Medical Examination and Treatment for 2020–2025, 2020*

## Appendix II: Actions for Key Stakeholders

In addition to policy initiatives, the integration of virtual delivery into mainstream health and care requires active support from key stakeholders. This section outlines direct actions by different stakeholders that can complement policymaking.

### Direct actions by different stakeholders to complement policy initiatives



#### Health and care providers and organizations

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- Engage with **users** to familiarize them with virtual delivery of health and care and promote acceptance.
  - Develop ways to **continuously improve** the process, techniques, and integration of virtual delivery of health and care to increase the quality of care delivered.
    - Identify gaps in the existing care delivery chain that can benefit from virtual solutions.
  - Align the organization's **health data strategy with national data governance** policies to uphold the rights and privacy of users.
    - Define clear data management processes during patient identification and engagement.
    - Build a comprehensive database and insights dashboard of patients with integrated clinical, social determinants, and claims data.
  - Offer **expert guidance** to policymakers to periodically refine and improve virtual health and care policies.
    - Cultivate consensus around the positive impact of integrating virtual solutions in health and care delivery through reproducible evidence.
  - Implement **workforce training** to increase technology adoption and operationalize the new modes of health and care delivery.
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#### Payers, financiers and insurers

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- Integrate **virtual and in-person payment mechanisms** to enable continuity in delivery of health and care and to simplify the experience for users.
  - Participate in **policymaking** to enable strategies that ensure virtual delivery of health and care and quality of service through fair pricing strategies and regular provider assessments.
  - Consider adjusting insurance **premium payments based on the socio-economic status** of users to achieve health and care equity.
  - Revise the **coverage plans** periodically based on evidence of effectiveness of virtual or in-person delivery for different medical conditions when such evidence becomes available to ensure best possible user experience.
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## Private sector and startups

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- Design and develop **interoperable solutions** and products based on open standards to uncover health and care data silos for integration with national health information exchanges and the possibility to develop better virtual health and care solutions.
    - Share industry best practices with public health systems to evolve global standards and minimize similar, competing products.
  - Adapt and innovate considering **immediate and future national and global health and care priorities** to improve the likelihood of adoption and uptake by governments, health and care providers, and payers.
    - Support pilot initiatives and facilitate their scale-up.
  - Collaborate with **other stakeholders** such as health and care providers, payers, communities, and policymakers to ensure that innovation is inclusive and in sync with their requirements.
    - Provide support to the government to address gaps and streamline processes.
    - Work together with health organizations to ensure that virtual solutions are designed for easy integration with existing health systems.
  - Make available **data repositories** for public health benefits to expand the potential of virtual delivery for achieving better health outcomes and improving health systems.
  - Consider developing products based on **familiarity and relevance** principles – users are more likely to use a new product or solution that has some elements (e.g., look, feel, etc.) of what they are already familiar with and what they actually need – to ensure faster acceptance.
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## Advocacy groups

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- Bring together different stakeholders and interest groups to support the **integration of virtual delivery** of health and care solutions into the mainstream.
  - Drive public education campaigns to show the benefits of integrating virtual solutions in health and care delivery.
- Aid the transfer of **global best practices** and novel health and care delivery solutions aligned with a country's health and care priorities to achieve national goals faster.
  - Make available global evidence based on real-world data to promote decision-making driven by better health outcomes.
  - Promote open data standards and include interoperability in good data governance practices.
  - Encourage international policy cooperation and development of common policy frameworks, templates, and mechanisms through health and care parliamentary networks such as the digital health policy desk of UNITE, the global parliamentarian network to fight infectious diseases.
- Advocate for strong privacy, security, and data protection.
- Promote **inclusive policymaking** by highlighting digital divides (existing or potential), identifying gaps in policy aims and actual results, and suggesting appropriate solutions.
  - Push for the enforcement of fundamental rights while delivering health and care virtually as well as during research.



- Establish **observer groups** to enable third-party, independent monitoring of governance and regulatory compliance, and to highlight responsibility for ensuring policies and innovations respond to the health needs of all communities, especially those still left behind.
    - Promote fair and privacy-compliant data monetization practices.
  - Work together with **local and regional stakeholders** to promote virtual delivery of health and care, especially for cases where other countries are benefiting.
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## **INGOs, civil society, and implementers**

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- Highlight digital divides and **work with policymakers** to efficiently utilize virtual delivery of health and care for bridging these inequities.
  - Promote virtual delivery of health and care by **educating citizens** about its benefits, safe use, and complementarity to traditional, in-person service delivery.
  - Act as a **channel between communities and all other stakeholders** to highlight areas of need and improvement in policy, solution, pricing, and implementation.
    - Participate with the government and private sector in planning and implementing digital skills building and strengthening delivery capabilities.
    - Showcase evidence-backed positive health outcomes of virtual solutions to generate strong political and leadership support.
  - Advocate to ensure **equitable availability and access**, same quality, and free at the point of use health and care to all sections of the society, especially when strategic use of virtual delivery can overcome several equity gaps.
  - Encourage adoption by actively engaging with **local and regional stakeholders** to customize virtual health and care solutions to local needs and preferences.
  - Promote and fund local initiatives that implement open data standards and create positive health impact using virtual means.
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## **Academia and researchers**

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- Work together with other stakeholders to identify gap areas for evidence generation for clinical and policy decisions.
  - Generate and **make available evidence** required for assessing the efficacy of virtual health and care in different clinical and non-clinical use cases.
  - Offer cutting-edge, **expert advice and support** to other stakeholders to improve the virtual health and care delivery chain and establish a hybrid continuum of care.
  - Create scientifically robust solutions for improving the delivery of health and care virtually.
  - Develop periodically revised curricula, training programs, certifications, and competency models to update the skills of the workforce in using new technologies in virtual health and care.
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