Government of Pakistan
Ministry of National Health Services,
Regulations & Coordination

NATIONAL DIGITAL HEALTH FRAMEWORK OF PAKISTAN

2022–2030

Pakistan: National Digital Health Framework

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List of Abbreviations

WHO World Health Organization

WHA World Health Assembly

M/o NHSR&C Ministry of National Health Services, Regulation and Coordination

DHIS District Health Information System

IT Information Technology

AMA American Medical Association

AI Artificial Intelligence

SDGs Sustainable Development Goals.

IoT Internet of Things

HDI Human Development Index

UHC Universal Health Coverage

RMNCAH Reproductive, Maternal, Newborn, Child and Adolescent Health

NCDs Non-communicable Diseases

SSP Sehat Sahulat Program

vLMIS Vaccine Logistic Management Information System

EPI Expanded Program on Immunization

IMNCI Integrated Management of Childhood Illnesses

ICT Islamabad Capital Territory

KP Khyber Pakhtunkhwa

HCPs Healthcare Providers

USAID United States Agency for International Development

TECH Transformation and Excellence Center for Health

DoH Department of Health

EMR Electronic Medical Records

NHWA National Health Workforce Accounts

CSR Corporate Social Responsibility

HRH Human Resource for Health

CRVS Civil Registration and Vital Statistic

ICD International Classification of Disease

HRMIS Human Resource Management Information System

LHW MIS Lady Health Worker Management Information System

MNCH MIS Maternal Newborn and Child Health Management Information System

LMIS Logistics Management Information System

EML Essential Medicines List

DRAP Drug Regulatory Authority Pakistan

IDSR Integrated Disease Surveillance and Response

PHIS Pakistan Health Information System

PITB Pakistan Information Technology Board

HMIS Health Management Information System

NRSP National Rural Support Program

AKDN Aga Khan Development Network

1. Executive Summary

According to the WHO Global strategy on digital health 2020 to 2025, digital health is defined as "the field of knowledge and practice associated with the development and use of digital technologies to improve health." Digital health should become an integral part of health priorities and benefit people in a way that is ethical, safe, reliable, equitable, and sustainable. It must be developed with accessibility, scalability, replicability, and Interoperability with data security, privacy, and confidentiality in mind. The Government of Pakistan has initiated some initiatives in this direction, including the National Action Plan and the National Health Information System Action plan, to accelerate the transformation of the Pakistan healthcare system. Pakistan's health sector, despite its challenges and shortcomings, is quickly adapting and moving towards a digital environment. Various efforts have been made by the public and private sectors in Pakistan to promote digital health. Health sector in Pakistan is gradually moving towards complete digitalization, through a phase-wise shift towards DHIS2 and other digital solutions have been planned. Various telemedicine and telehealth initiatives have emerged in Pakistan, especially during the COVID-19 pandemic. mHealth technologies are becoming increasingly common in Pakistan for project monitoring and data entry purposes with increasing numbers of smartphone users in Pakistan. There are also various e-health platforms in Pakistan for online consultations and patient management like Oladoc, MARHAM, and many more. While there are multiple gaps in the digital health environment in Pakistan owing to the lack of infrastructure and capacity, there are also many opportunities, especially during the COVID-19 pandemic due to the widespread use and normalization of telemedicine and e-learning in healthcare. With increasing digital health initiatives in Pakistan, there is a solid need to formulate a national-level digital health strategy and framework in consultation with all relevant stakeholders to strategically map out a concrete plan to digitize the healthcare sector in Pakistan. The aim of this National digital health strategy and framework is to advance and apply digital health technologies for achieving the vision of health for all. The National Digital Health Strategy of Pakistan was formulated through an extensive consultative and review process. The vision of the National Digital Health Framework in Pakistan is to achieve a healthy population by employing digital technology, effectively creating an empowered, people-centered, safe, and value-based health system. The strategy's mission is to ensure availability, integration, and adaption of digital health solutions for an improved and strengthened healthcare delivery system by 2030. The National Digital Health Framework has the following strategic objectives:

1. Promote National Collaboration and Advance the Transfer of Knowledge on Digital Health
2. Advance the Implementation of National Digital Health Strategies
3. Strengthen Governance of Digital Health at National and Provincial Levels
4. Advocate Digital Health based people -Centered Health System
5. Create a National Interoperable Digital Health Ecosystem in Pakistan

The National Digital Health Framework in Pakistan has a detailed strategic action plan presenting the challenges and action points under governance, finance, human resource, research, innovation and health information systems, modern IT technologies, health services, health services delivery, and collaborations. The strategic action plan details the carefully analyzed and anticipated challenges under each heading, and action points are suggested to address each challenge. Based on the strategic action plan, a detailed monitoring and evaluation strategy has been mapped out to track the progress towards achieving the strategic objectives of the strategy stating the timelines, responsible departments, and indicators against each action point.

2. Introduction & Background

In 2005 the World Health Assembly in resolution WHA58.28 on eHealth urged the Member States "to consider drawing up a long-term strategic plan for developing and implementing eHealth services to promote equitable, affordable, and universal access to their benefits." Today more than 120 Member States – including low- and middle-income countries – have developed such policies and initiatives. Digital health should become an integral part of health priorities and benefit people in a way that is ethical, safe, reliable, equitable, and sustainable. It must be developed with accessibility, scalability, replicability, and Interoperability with data security, privacy, and confidentiality in mind.

According to the WHO Global strategy on digital health 2020 to 2025, digital health is defined as "the field of knowledge and practice associated with the development and use of digital technologies to improve health."[i] The health sector during recent time has started adapting to the advancements in the digital world. Digital health is being viewed as an important and possibly an integral conduit to achieve SDGs by ensuring accessible and affordable solutions for people who have limited access to the health system and services. Digital health has a broad scope and includes wearable devices, mobile health, telehealth, health technologies, disease modeling, diagnostics, health services management, artificial intelligence (AI), big data analytics, the internet of things, and telemedicine.

Terminologies

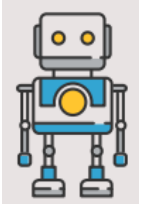
Telehealth means using electronic information and telecommunications technologies to support a wide range of remotely managed and implemented health care: Long-distance clinical care and patient monitoring/follow-up, patient and professional health-related education, public health, and health administration. Technologies can include videoconferencing, the internet, store-and-forward imaging (an image is saved, then sent to the other party, rather than live), streaming media, and terrestrial or wireless communications.

Telemedicine permits two-way, real-time interactive communication between a patient and physician. This means both patient and physician must use interactive telecommunications equipment that includes, at a minimum, audiovisual equipment.

mHealth means using mobile-based solutions to deliver health services as defined by American Medical Association (AMA). Examples of mHealth include an app for a smartphone that allows users to assess their risk for cardiovascular disease and then identifies nearby screening locations to schedule an appointment, as well as sensors that can measure blood pressure, pulse, glucose, and other physiologic parameters.

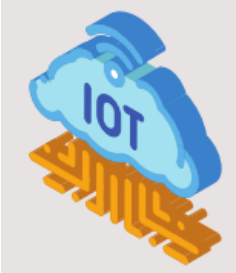
Wearable devices are wearable technology in healthcare that includes electronic devices that consumers can wear, like Fitbits and smartwatches, and are designed to collect the data of users' health and exercise. These devices can even send a user's health information to a doctor or other healthcare professional in real-time.

Artificial Intelligence (AI) in healthcare is an overarching term used to describe the utilization of machine-learning algorithms and software, or AI, to emulate human cognition in the analysis, interpretation, and comprehension of complex medical and healthcare data.

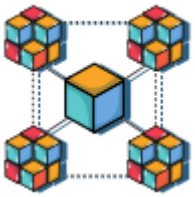


Robotics in medicine help by relieving medical personnel from routine tasks that take their time away from more pressing responsibilities and making medical procedures safer and less costly for patients. They can also perform accurate surgery in tiny places and transport dangerous substances.

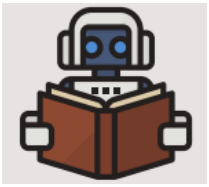
Big Data Analysis in healthcare is a term used to describe the analysis and use of massive volumes of information created by the adoption of digital technologies that collect patients' records and help in managing hospital performance, otherwise too large and complex for traditional technologies. In essence, big-style data refers to the vast quantities of information created by the digitization of everything that gets consolidated and analyzed by specific technologies. Applied to healthcare, it will use specific health data of a population (or of a particular individual) and potentially help to prevent epidemics, cure disease, cut down costs, etc. It can also be used for predictive disease modeling, bioinformatics, genomics, geospatial analytics, etc.



Internet of things (IoT) has opened up a world of possibilities in medicine: when connected to the internet, ordinary medical devices can collect invaluable additional data, give extra insight into symptoms and trends, enable remote care, and generally give patients more control over their lives and treatment. IoT can automate patient care workflow with the help of healthcare mobility solutions and other new technologies and next-gen healthcare facilities. IoT in healthcare enables Interoperability, machine-to-machine communication, information exchange, and data movement that makes healthcare service delivery effective.



Block chain has a wide range of applications and uses in healthcare. The ledger technology facilitates the secure transfer of patient medical records, manages the medicine supply chain, and helps healthcare researchers unlock genetic code.



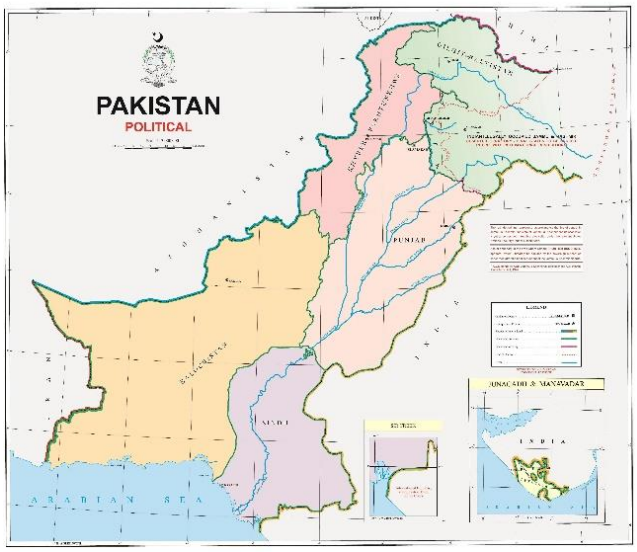
Machine learning is helping to streamline administrative processes in hospitals, map and treat infectious diseases and personalize medical treatments. Despite warnings from some doctors that things are moving too fast, the rate of progress keeps increasing. [2]

The Government of Pakistan has initiated some initiatives in this direction, including the National Action Plan and the National Health Information System Action plan, to accelerate the transformation of the Pakistan healthcare system. The action plans/ strategies aim to ensure that managers and decision-makers use data to identify and solve problems, measure performance, and allocate resources; and that health workers use data for improved continuity of care through tracking of clients, supporting clinical decisions, and providing services efficiently.

In 2019, the Ministry of National Health Services, Regulations & Coordination (M/o NHSR&C) conducted a first-ever National Stakeholders workshop on the development of Digital Health Framework for Pakistan with the support of WHO with key representatives from Provincial/Area Department of Health relevant Ministries and departments (e.g., Ministry of Information and Communication, etc.), representatives from National health systems, technology and innovation suppliers working in Digital Health applications. Developing and implementing an actionable National Digital Health Framework for Pakistan brings together efforts of national stakeholders to identify and plan to adopt appropriate actions that address digital health priorities in full alignment with the national context and health priorities of Pakistan.

2.1 Country Background

2.1.1 Demographics



Pakistan is the world's fifth-most populous country, with its 2020 estimated population of around 227 million.[3] In addition, approximately 1.3 - 1.7 million Afghan refugees are also residing in Pakistan.[4] The administrative units of Pakistan consist of four Provinces (Punjab, Sindh, Balochistan, and Khyber Pakhtunkhwa), Federating areas including Azad Jammu and Kashmir; and Gilgit-Baltistan and Islamabad Capital Territory. The majority (67.5%) of the population resides in rural areas, but due to rapid urbanization across the megacities, this demographic change is manifesting as social and cultural changes in these cities. Geographical expanse-wise, Pakistan is ranked as the 33rd largest country, spanning 881,913 square kilometers.

2.1.2. Socioeconomic Indicators

The overall life expectancy at birth is 66 years (males: 65; females: 67)[5]. The literacy rate for men is 71% and 49% among women.[6] Human Development Index (HDI) of Pakistan is 0.557, and therefore the country ranks at 154[7] among all the countries of the world. Poverty varies significantly among rural (35.6%) and urban areas (18.2%) [8] according to planning commission estimates and from province to province. The Out-of-pocket spending for health constitutes about 56% of the current total health expenditure.[9]

2.1.3 Health Care Delivery System

Pakistan underwent organizational reforms through 18th amendment to the constitution. As a result, health care provision and management were decentralized and are now primarily the responsibility of the provincial governments.

The health care delivery system in Pakistan consists of both public and private sectors. The public sector provides services at the primary, secondary, and tertiary levels of delivery. The service provision is organized around preventive, promotive, curative, and rehabilitative services. Preventive and promotive services are mainly provided through various national programs and community health workers' interfacing with the communities through primary healthcare facilities and outreach activities. The curative and rehabilitative services are being provided mainly at the secondary and tertiary care facilities (Figure 2). The private sector provides the major part of health services through for-profit and non-profit entities (Figure 3).

Specialized and tertiary level private sector health facilities are primarily concentrated in main urban areas and can be difficult to access and afford for residents of hard-to-reach rural areas.

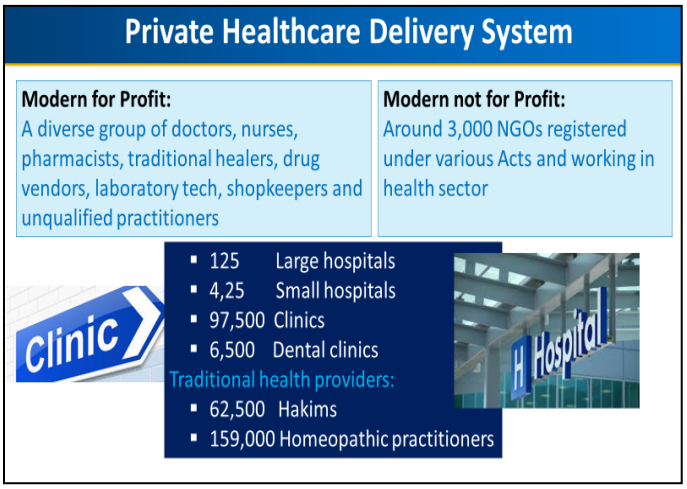


Figure 1: Pakistan Statistical Year Book 2017

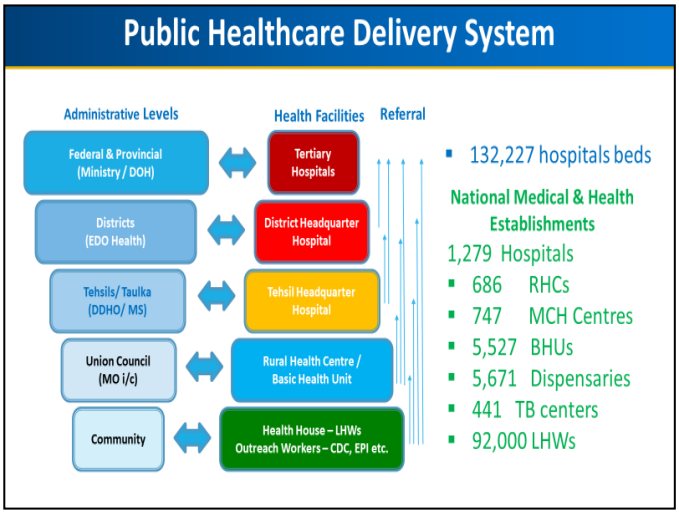


Figure 2: National Medical & Health Establishments (Pakistan Economic Survey 2019-20)

2.1.4 Health Indicators

Pakistan has developed a Universal Health Coverage (UHC) Benefits Package (BP) for implementation across five service delivery platforms. The UHC Index provides a snapshot of the current status of the health system and is a composite of 16 indicators across four domains, i.e., Reproductive, Maternal, Neonatal, Child and Adolescent Health (RMNCAH), Communicable Diseases, Non-Communicable Diseases (NCDs), and Health Services (Table 1). The progress in indicators is given in an overall score based on the aggregate score of the four domains. The 2018 UHC Index for Pakistan is 47.53[10]. This means that Pakistan is less than halfway through in terms of achieving targets in the four domains, for which the target to be achieved is an Index score of 100.

Table 1: UHC Index of Pakistan 2018. (Source: UHC-BP of Pakistan, M/o NHSR&C)

UHC INDEX DOMAINS	TRACER INDICATOR	Area Score
RMNCH	Family Planning: Demand satisfied with modern method	63.17
	Antenatal Care: 4+ visits	
	Child immunization	
	Care-seeking behaviour for child pneumonia (%)	
Communicable Diseases	Tuberculosis effective treatment	35.06
	HIV treatment	
	Insecticide-treated nets for malaria prevention	
	At least basic sanitation	
Non-communicable Diseases	Normal blood pressure	53.27
	Normal blood sugar	
	Cervical cancer screening among women 30-49 years	
	Tobacco non-smoking	
Services Access & Capacity	Hospital beds per 10,000 population against the threshold	43.33
	Doctor density against the threshold	
	Availability of essential medicines in PHC	
	IHR core capacity index	
Total		47.53

2.1.5 Health Expenditure

Public sector expenditure for health has remained on the lower side (3.2 % of GDP), along with chronic shortages of trained staff, essential drugs, medicines, and other supplies in most public sector health facilities. As a result, patients frequently have to seek medical care in the private health sector, demonstrated by the fact that 58.5% of total health care expenditure is in private sector out of which 88% is out-of-pocket expenditures by private households. (Figure 4).

The health expenditure situation in the country is quite grim. While the annual expenditure requirement to achieve Universal Health Coverage targets is US$ 271 per person, the current per capita expenditure is a dismal US$ 48 annually. [9]

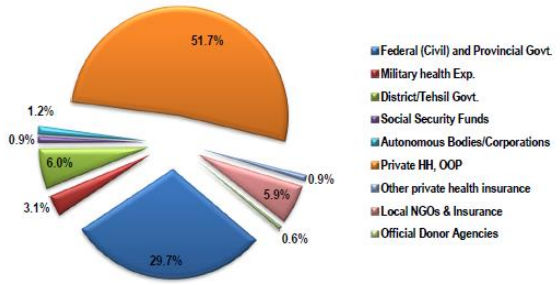


Figure 3: Health expenditure by source of funding - NHA 2015-16

2.1.6 Health protection

The government has introduced health insurance called the Sehat Sahulat Program (SSP). The SSP program's objective is to improve access of the poor population to good quality medical services through a micro health insurance scheme. The program provides insurance cover for selected maternal, cardiac, cancer, burns, renal services, and procedures as inpatient hospital cover to the most underserved and deserving segments of the population. By October 2018, 3.2 million families had been enrolled in the program across 38 districts. Over the next three to five years, the Sehat Sahulat Program plans to expand coverage to a total of 11 million families across Pakistan.[11] The Ehsaas Nashonuma is a health and nutrition conditional cash transfer program which aims to address stunting in children under 23 months of age. Pakistan's high rates of 40.2% stunting, 28.9% underweight and 17.7% wasting are indicative of an on-going crisis among children. Stunting negatively impacts brain function, organ development, and immune system, ultimately limiting future productivity. Prime Minister Imran Khan launched this program on August 13, 2020 in 14 districts of the country in the first phase which include Rajanpur, Khanewal, Khyber, Upper Dir, Kalat, Lasbela, Bagh, Hattian Bala, Kharmang, Diamer, Astore, Badin, Dadu and Islamabad selected on the basis of high stunting rate and in consultation with the provincial health departments. Under the program, 50 Ehsaas Nashunama Marakiz/Centers have been established at Tehsil level health facilities to provide all Nashonuma services under one roof. Ehsaas Nashonuma is fully funded by the government of Pakistan. World Food Program has been hired as an implementing partner to carry out all the activities of the program.[12]oreover, Pakistan Bait-ul-Mal (PBM) is an autonomous body contributing to poverty alleviation in Pakistan supported by Zakat, where beneficiaries are selected according to a specific eligibility criteria. Between 2020 and 2021, medical assistance was provided to 16,729 people under this program. [13]

2.1.7 Digital Landscape in Pakistan

The telecommunication industry offers great opportunities for digital health by providing better access to high-speed internet and ready sources of communication. Globally, amongst the countries where the telecommunication market is rapidly growing, Pakistan stands at the third position

due to the availability of mobile phones, internet service providers, and application software. In 2018, the Ministry of Information Technology and Telecommunication formulated the Digital Pakistan Policy, which served as a foundation for the development of a holistic digital ecosystem for the rapid delivery of next-generation digital services, applications, and contents.[14] There were 61.34 million internet users in Pakistan (January 2021), which increased by 11 million (+21%) between 2020 and 2021.

Internet penetration in Pakistan stood at 35% in January 2020. There were 46 million social media users in Pakistan in January 2021, which increased by 9 million (+24%) between 2020 and 2021. Social media penetration in Pakistan stood at 20.6 % in January 2020. There were 173.2 million mobile connections in Pakistan in January 2021. The number of mobile connections in Pakistan increased by 6.9 million (+4.2%) between January 2020 and January 2021. The number of mobile connections in Pakistan in January 2021 was equivalent to 77.7% of the total population. The IT and telecommunication sectors have shown tremendous growth with an increase in the 3G/4G penetration rate in Pakistan. The four major mobile operators, Jazz, Telenor, Zong, and Ufone, have driven the country rapidly towards the digital world. 3G/4G services have facilitated real-time data collection and transmission by healthcare providers. The 3G-enabled handsets also provide an opportunity for video conferencing or image transfers like x-rays. The elaborate mobile network coverage in Pakistan provides access to the general public for a diverse set of digital health solutions that must be utilized to improve health outcomes in Pakistan.[15]

2.2 National Priorities on Digital Health

A national workshop was conducted in September 2020, where the national priority areas on digital health were finalized and the related digital health applications were discussed. Following are key priority areas for digital health strategy in Pakistan:

2.2.1. Communicable Diseases:

In Pakistan, there are numerous vertical disease specific programs on Expanded Program on Immunization, Polio, Dengue, Hepatitis B and C HIV/AIDS, Tuberculosis, Malaria, Crimean-Congo Hemorrhagic Fever, and Leishmaniosis etc. The identified priority in Pakistan is to digitize and integrate the various vertical programs, especially when it comes to data flow mechanisms. The Monitoring and Evaluation structures and regular analytical reports must be implemented meticulously and digitized for data-informed decision-making in disease control. In addition, the use of technology and Artificial Intelligence needs to be explored and employed for disease modeling in relation to timely diagnosis, surveillance, and control. The infrastructure and human resource readiness must be improved as per these advancements.

2.2.2. Non-Communicable Diseases:

For non-communicable diseases, the identified priority in Pakistan is to use digital technologies to promote a healthy lifestyle, physical activity, and safe driving. Various applications and software should be used for self-assessment, screening, and tracking of diseases and ensuring a high-quality continuum of care for patients. A significant amount of work is still needed for developing electronic medical records that are linked with diagnostics and treatment registries. Moreover, the use of online knowledge management units, mobile applications, and social media portals should be promoted.

Interoperability must be ensured in all digital systems and applications. The use of telemedicine should be normalized, and office mechanisms must be automated. All monitoring mechanisms must be digitized to promote the use of executive dashboards and business intelligence for decision-making.

2.2.3. Reproductive, Maternal, Neonatal, Child and Adolescent Health:

Various digital technologies have been used for improving access and health outcomes for RMNCAH. Such technologies should be promoted and scaled up to reach more areas and populations. Some successful applications are Misali digital app for family planning, Preg app for antenatal and postnatal care, Raha app for gestational diabetes, Zindagi Mehfooz app, Teeko, eVacc, and IMNCI applications. Moreover, vLMIS and EPI coverage dashboards must be integrated with national health databases. The use of telemedicine and remote consultations must also be promoted for enhancing access.

2.2.4. Emergencies:

Pakistan has faced various emergencies in the form of natural disasters and security incidents that have had direct or indirect effects on the health of the population. Digital technology must be used to improve community awareness, preparedness, and capacity to respond to emergencies. Digital apps must be designed for example disease surveillance and response, public health labs, trainings of health human resource on various levels. Moreover, work must be done to develop and implement integrated communication systems for disaster preparedness, response, and rehabilitation. In consideration of the One Health approach, the animal health, environmental health and disaster management systems are included in the national identified priorities for digital health in Pakistan.

2.2.5. Health services Delivery Systems:

Pakistan's general health delivery systems must take advantage of the various new available digital technologies in Pakistan to improve the processes. Integrated health information systems must be developed to link the data and knowledge base from different programs into one portal. Steps must be taken to digitize all data from all health facilities and link it to other national databases like the national identification database (NADRA) to aid the tracking of our population's health status through various indicators. Systems must be developed for timely detection and surveillance of new and existing disease outbreaks by working on Integrated Disease Surveillance and Response System. The capacity and readiness of infrastructure and human resources from all levels of the healthcare delivery system must be improved for all the planned digital health initiatives.

2.2.6. One Health:

The context of one health approach for communicable diseases pertains to the inclusion of information on the agriculture, veterinary and environment sector, keeping in view the transmissibility of various diseases. 'One Health' is an approach for designing and implementing programs, policies, legislation, and research in which multiple sectors communicate and work together to achieve better public health outcomes. The areas of work in which a One Health approach is particularly relevant is to include food security and safety, the control of zoonosis (diseases that can spread across animals and humans, such as flu, rabies, and brucellosis), and combating antibiotic resistance (when bacteria mutate after being exposed to antibiotics leading to drug-resistant forms, that are more difficult to treat).

The one health approach in digital health means to integrate the digital technologies and initiatives in all the areas of One Health like Environmental Health, Disaster Management, Urban Health, Population Studies, Mental Health, zoonotic human health and health in all policies , gender mainstreaming and equity-related disease surveillance, etc. [16]

2.2.7. Education and environment:

Education affects the early development of children and has effects on the mental and physical health of the population by affecting their attitudes and awareness. It also encompasses the education of health care providers, which later informs the quality of their practice in the health sector. Therefore, it must be prioritized in the national digital health strategy of Pakistan. Similarly, the environmental indicators have their direct effects on population health, e.g., air quality. The climate, air, temperature, etc., all affect health in one way or another. Therefore, it is included in the national priorities for digital health framework.

Table 2: National Priorities on Digital Health in Pakistan

Category	National Priority Areas	Priorities in Digital Health
Communicable Diseases	**Polio, Dengue, Hepatitis B&C, HIV/TB, CCHF, Leishmaniosis**	• M&E Activities • Resource Allocation • Telemedicine • Creating awareness • Digitization of health systems • Development of disease models • Supporting the use of AI • Improving Interoperability and standardization • Ensuring appropriate infrastructure • Improving the capacity of the workforce
Non-Communicable Diseases	**Hypertension, Diabetes, Cancer, Depression, Road Traffic Injuries**	• Health Information/Promotion • Diagnostic & Treatment Registry • Online access to Knowledge Management Units • Mobile Apps, Social Media portal (Departmental/Organizational Websites) • Electronic Medical record • Ensure Interoperability among different Web-Based systems/Apps • Tele-Health (remote access for diagnostic and treatment, e.g., Telemedicine, Tele Radiology • Office Automation – Governance & Accountability • E Monitoring • Evidence-based decision making – Executive Dashboard • Business Intelligence

Maternal, Newborn, Child and Adolescent Health	**Family Planning**	• Misali Digital app in Sindh • Access to information and knowledge about reproductive health based on a monthly cycle • choice of methods to use for contraception • Reminders for consultations
	Maternal Healthcare	• Preg App for antenatal and postnatal care • Raha App for Gestation Diabetes • Access to skilled birth delivery
	Neonatal and Child Health	• Zindagi Mehfooz (ZM) • eVacc • VLMIS • EPI coverage dashboard • Teeko • IMCI App
	Adolescent Health	• Access to reproductive health services **(Telemedicine)**
Emergencies	**Community Awareness and capacity building**	• Include in the curriculum of schools (basic life support courses) • mobile applications
	Preparedness and Response & Rehabilitation	• Integrated communication systems with central control and command
Healthcare Delivery	**Disease outbreaks**	Integrated disease surveillance and response system
	Coordination between the organizations/departments (healthcare institutions)	• Linkage/sharing of patient information-identification through NADRA • Integration between vertical programs • Integration in databases • Interoperability and standardization
	Human Resource	• Decision support systems • Telemedicine • Mobile health units

3 National Digital Health Framework in Pakistan

3.1. The rationale for Digital Health Framework in Pakistan

The evolving role of Information and Communication Technology (ICT) cannot be ignored in the social sector, including health. Digital health offers ways to improve access and quality of care in health, offering significant benefits to the healthcare providers (HCPs) as well as to the patients and communities. eHealth initiatives can aid remote providers in the provision of healthcare to patients, improving knowledge of HCPs and information management for facilitating efficient decision-making. Pakistan is at the 3rd position globally among countries in terms of growth in the telecommunication market due to the availability of mobile phones, internet service providers, and application software. With time, Pakistan is emerging as a robust digital economy influencing the standards of living and health outcomes of local masses positively.[17]

Over two-third population lives in rural areas and lacks necessary access to healthcare services[18]. Even with limited resources, various digital health initiatives in Pakistan have provided an opportunity for deploying requisite infrastructure/equipment and establishing digital linkages for the delivery of healthcare facilities. Such initiatives are documented to resolve problems of accessibility and facilitate the timely provision of healthcare.

Pakistan's health sector, despite its challenges and shortcomings, is quickly adapting and moving towards a digital environment. However, most systems are still fragmented and there is a need for them to be linked with functional integration at all levels. . Moreover, the digital advancements in the healthcare sector in Pakistan need a unified and harmonized direction. There is a strong need for standardizing all digital health initiatives in Pakistan. There is, therefore, a solid need to formulate a national-level digital health strategy and framework in consultation with all relevant stakeholders to strategically map out a concrete plan to digitize the healthcare sector in Pakistan.

3.2. Aims

To advance and apply digital health technologies for achieving UHC and aligned with the National Health Vision.

This document sets out a vision, strategic objectives, and a framework for action to advance digital health at the national, provincial, and district levels. Its premise is to encourage national collaboration and to support provinces/areas in their programs, towards improved healthcare service delivery, implementing health & population strategies, and achieving universal health coverage, health-related Sustainable Development Goals and other international commitments. It also aims to promote research, improve evidence and share information on digital health to ensure a solid foundation to accelerate the achievement of Sustainable Development Goal 3 (Ensure healthy lives and promote well-being for all at all ages).

3.3. Development process

The National Digital Health Framework of Pakistan was formulated through an extensive consultative and review process involving all relevant stakeholders. A multitude of stakeholders from the health and non-health sectors was involved in the development of the Digital Health Framework due to the multi-sectoral scope of the document. Several stakeholders representing federal-level ministries, provincial line departments, and

development partners participated in developing the framework. A requisite literature review was conducted on the global, regional, and Pakistan's situation on digital health. The first consultative workshop was conducted on formulating the National Digital Health Framework in September 2020. The objectives of the workshop were to discuss the status of digital health in Pakistan, introduce national digital health strategy components to stakeholders, share the experience of technology and draft a preliminary national vision and proposed actions. The outcome was to plan for specific actions and required resources to establish and implement a national digital health strategy. Representatives from all key stakeholders were interviewed, and their suggestions were consolidated for the strategy. The first draft was developed keeping the suggestions in view and under the close supervision of M/o NHSR&C. The draft was discussed in a consultative meeting with all major stakeholders for feedback. The second draft was developed after feedback and was sent for further review process to all stakeholders. After the review process, the final draft was developed and endorsed in a final consultative meeting by all stakeholders. The National Digital Health Framework province-wise consultative workshop activities are listed in Annex A. The list of participants from each provincial workshop are attached from Annex B to H.

3.4. Guiding Principles

This strategy commits to removing the significant impediments that most developing countries face in engaging with and accessing new digital health technologies, such as an appropriate enabling environment, adequate resources, infrastructure to support the digital transformation, education, human capacity, financial investment, and internet connectivity, as well as issues related to legacy infrastructure, technology ownership, privacy, security, and adapting and implementing global standards and technology flows. It promotes the protection of people, populations, health care professionals, and systems against misinformation and the misuse of information, cyber-attacks, fraud and exploitation, monetization of health data, racism, and human rights violations.

This strategy promotes syntactic and semantic Interoperability with WHO's norms and standards as a cornerstone of health information to enable sharing of information in a connected world and underscores the need to ground digital foundations within national strategies, and emphasizes the need to work with different sectors and stakeholders at all levels. It is people-centered, trust-based, evidence-based, effective, efficient, sustainable, inclusive, equitable, and contextualized. The growing global challenge of digital waste on health and the environment will also be appropriately managed. The following guiding principles aim to orient Pakistan's strategy towards the appropriate and sustainable adoption of digital health.

1. Acknowledge that institutionalization of digital health in the national health system requires a decision and commitment by the country
2. Recognize that successful digital health initiatives require an Integrated Strategy
3. Promote the appropriate use of digital technologies for health
4. Recognizes the urgent need to address the major impediments faced by least-developed countries implementing digital health technologies

4 Situation Analysis -Digital Initiatives in the Health sector of Pakistan

The Digital Pakistan Policy in 2018 included a section on eHealth where the Ministry of IT and Telecommunication proposed to facilitate the M/o NHSR&C to accelerate the use of telemedicine; promote digitization and automation of existing hospitals; share information for preventive care of dominant disease groups in local languages, and set eHealth service providers accreditation and requisite protocols and standards. [14] Various efforts have been made by the public and private sectors in Pakistan to move towards digital health environment. Recently, Transformation and Excellence Center for Health (TECH) was established at NIH in Feb 2020 to strengthen the national public health system of Pakistan. Moreover, USAID has helped Pakistan digitize more than 4 million records for Drugs Regulatory Authority Pakistan (DRAP). Following are some areas where some developments have been made to digitize the healthcare system:

4.1. Health Information Systems in Pakistan

The defunct Federal Ministry of Health developed a Health Management Information System (HMIS) in 1992, which marked the beginning of the digitization of health data. In 2005 HMIS was replaced with District Health Information System (DHIS) which is serving as the mainframe for recording and reporting data from public health facilities pushing the reporting and management levels towards digitization. In the next phase, a shift towards DHIS2 and IDSR (Integrated Disease Surveillance and Response System) has been planned along with the integration of HIVAIDS, TB, Malaria, etc., specific MIS into a single platform. The DHIS2 modules for Disease Surveillance and reporting system are being implemented in 11 districts of the country with the support of CDC and PHE. A Pakistan Health Information System (PHIS) has been developed by the DG Health Wing within the M/o NHSR&C, which serves as a national level knowledge hub based on DHIS, M&E data, health surveys, and vertical programs data.[19]

The Punjab government and the Pakistan Information Technology Board (PITB) have worked to introduce a Hospital Information Management System (HIMS) which helps record information regarding patient registration, billing of consultation and diagnostic services, financial assessment, nursing, e-prescriptions, medical records, investigation orders, template for investigation reports, diagnostic machinery integration, pharmacy automation, appointment mechanism, inventory control, waste management, human resources, accounts, and payroll[20]. Similar initiatives are being designed and implemented in KP province, while Sindh has been on the pathway of its various vertical program's management information systems being digitized in recent years.

4.2. Telemedicine Initiatives in Pakistan

The project of telemedicine was started in Pakistan by the Electronic Government Directorate (EGD) Ministry of Information and Technology Islamabad in 2007 in Mayo Hospital-Lahore, Holy Family Hospital-Rawalpindi, and Jinnah Postgraduate Medical Center (JPMC)-Karachi. The project is still functional in Mayo Hospital Lahore, where it is providing teleconsultations to DHQs of Gujrat, Rajanpur, Jhang, and DG Khan. The project is functioning in Holy Family Hospital under the National Rural Support Program (NRSP), and the program is providing specialist consultations to the rural population of Attock, Pindigheb, Khushab,

DG Khan, RY Khan, Mithan Kot, Jhang, Rajanpur, and Gujrat.

Aga Khan Health Services Pakistan and Aga Khan Development Network (AKDN) eHealth Resource Center Aga Khan University started a teleconsultation link between different levels of health care facilities for patient management, triage, and referral of cases. Programs were implemented to connect the Gilgit Medical Center to three secondary care and primary care health facilities of Hunza and Ghizer districts[21].

Khyber Pakhtunkhwa Information Technology Board - KPITB, in collaboration with the KP Health Department, signed an agreement with COMSATS Internet Services for establishing and operating a Telemedicine Center in Behali, District Manshera. The facility will be extended across Khyber Pakhtunkhwa. There is a dire need for telehealth facilities in the rural areas of KPK, and this telemedicine project, e-Ilaj, will provide specialized healthcare services in far-flung areas of KPK. At the same time, it will lessen the burden on tertiary care hospitals.

4.3. mHealth Initiatives in Pakistan

The major mobile operators in Pakistan have worked on providing mHealth facilities to their users in rural areas. Jazz has done commendable work by developing the Healthpass app to improve health outflow management and developed Jazz BIMA Sehat Service. Other such examples are Zong Accidental Insurance and Ufone's Utahafuz.[22]

Teeku is a mobile app developed by Aga Khan University aimed at helping vaccinators record immunization data, generate reliable data for better monitoring, and improve the coverage of the expanded program on immunization (EPI) vaccines such as the pentavalent and pneumococcal conjugate vaccine.[23] Moreover, PITB has also introduced a GPS-enabled mobile application called Dengue Activity Tracking System for tracking the spread of Dengue fever, Biometric Attendance System for Health Facilities, Monitoring System for Polio Campaign, and many more. In two recent epidemics of the extensively drug-resistant typhoid and human immunodeficiency virus (HIV) in the province of Sindh, geospatial mapping helped considerably with identifying the root causes of the outbreaks and with isolating cases and their spread.[20] Furthermore, there is a Misali app in Sindh for family planning, Pregg App for antenatal and postnatal care, and a Raha app for gestational diabetes. For immunization, there is the Zindagi Mehfooz app and the eVacc mobile app.

One more program, Health Watch, was launched in 2014 across Punjab with the collaboration of the PITB. The purpose of the program was to monitor the quality of health services extended to citizens of the province at all kinds of health facilities. Under this e-monitoring project, android phones and SIMs with internet connectivity were provided to the District Health Managers. The DHMs visit health facilities and submits the inspected data (attendance of the staff, availability of medicines/stock-outs, overall health facility conditions/highlight non-functional equipment) through this Health Watch application. Over 3,000 health facilities across Punjab are monitored by 210 health officers, including the Chief Executive Officer (CEO) Health, District Officer Health (DOH), and Deputy District Officer Health (DDOH).

Sindh government has launched a mHealth initiative called "Tibbi." It is a smartphone-based health application, and it will replace existing paper-based systems. Through this application, health workers will be able to collect real-time data about the use of health services and the performance of all health

delivery points. This will also enhance the monitoring and performance of government health staff across the province.

4.4. e-Health Initiatives in Pakistan

Oladoc is a leading online doctor booking platform in Pakistan24. Pliro is an online healthcare platform for patients providing features of online doctor booking appointments, lab test booking, reviews, rates & location of doctors. Patients can visit the website or download the mobile application, search for the relevant doctor in their city & book online appointments. For doctors, it provides an online clinic management solution with modules of the appointment management system, electronic medical record, invoicing & billing, and monthly reporting[25]. Sehat Kahani is an all-female healthcare providers' platform for clients who prefer female doctors and for female doctors who would like to practice from home.[21] DoctHERs is a similar initiative. MARHAM is another successful online consultation page on the social media platform on Facebook where qualified doctors can remotely provide expert opinions to clients[26].

The Aga Khan University, a highly well-reputed university-cum-hospital setup, has a Center for Innovation in Medical Education [27], which provides access to a d-Health clinic, a digital library, and a digital research unit where d-Health technologies are built and tested. The Center also envisions the "next-generation hospital ward" by simulating a futuristic 8-bed virtual ward with the latest patient monitoring, networking, and teleconferencing facilities.

Another digital initiative called eVaccs [23] is a vaccination project that is rolled out by the Government of Punjab and KPK, in collaboration with the MoNHSRC and WHO (World Health Organization). The project automates the whole process of immunization, from ensuring on-the-field vaccinator attendance to increasing geographical coverage of vaccination. The program is applauded for its impact, reaching out to 2.6 million children so far and increasing overall coverage for low-income rural areas by approximately 160% in almost two years.

4.5. COVID-19-Specific Digital Health Solutions

In Pakistan, the use of digital health technologies in handling the COVID-19 pandemic has surged, especially in the public sector. Pakistan is using the TTQ (Testing, Tracing and Quarantine) technology to deal with the COVID-19 pandemic. There is an online COVID-19 statistics dashboard and a mobile platform. There is a mobile application called "Pak Neghayban" which can be used by people and health managers to keep track of the availability of beds and ventilators for COVID-19 patients. There have been a number of procurement and logistics management systems developed and are in use in Pakistan during the COVID-19 pandemic i.e. Resource Management System (RMS), an online COVID-19 NDMA procurement system, a COVID-19 forecasting calculator for COVID-19 inventory and a COVID-19 LMIS. There are also some real-time registries like IDIMS and NIMS (National Immunization Management System) for management of COVID-19 immunization linked with NADRA records. There is also a COVID-19–specific telehealth portal where patients can consult a doctor online in both public and private hospitals called Sehat Kahani and an SMS text messaging-based EHSAAS emergency cash transfer program providing financial support to citizens identified by the government's poverty criteria during the enforced COVID-19 lockdown. There is a centralized care-based information management system for COVID-19 patients. For tracking and

surveillance of COVID-19 in travelers there is a COVID-19 traveler's surveillance management information system and COVID-19 Pass Track. In addition to all these, there is also an e-learning program for frontline clinical staff for management of COVID-19 patients. "Yarane Watan" is another initiative to engage the Pakistani diaspora abroad, especially doctors, to help Pakistan get through this global emergency.
In addition to these, various new projects are making use of online dashboards and mobile applications that are donor-funded and limited to the specific projects or are in the pilot phase.

4.6. Gaps in Digital Health in Pakistan

Despite the many promising digital health initiatives in Pakistan, there are various challenges and barriers that are hindering the progress of a digital health ecosystem in Pakistan. Some key challenges (but not limited to the below listed) are as follows:

- **Limited availability of infrastructure:** Lack of infrastructure for digital health, including the availability of smartphones, high-speed internet, and computer devices. Most smartphone users are concentrated in urban households. Most hospitals, BHUs, and tertiary-level health facilities do not have the infrastructure capacity to incorporate digital health interventions.
- **Finances:** Lack of funds and budget to continue or scale up most digital health interventions beyond the pilot projects. There are high budget requirements to establish and implement digital health interventions, including human resources, infrastructure, software, and server costs.
- **Integration and Interoperability:** Most digital health projects and interventions are fragmented and vertical. There is also a poor collaboration between the government and stakeholders on unifying their efforts and data sharing. As a result, most digital health initiatives remain isolated and fragmented. There is also a lack of linkages of various sources of data with the national health database PHIS. The Interoperability between various systems and databases also remains insufficient.
- **Low e-Literacy** There is a low e-literacy rate in different levels of HCPs. There is a low human resource capacity for digital health at all levels.
- **Lack of Courses and Programs:** There is a lack of undergraduate and postgraduate degrees and courses on digital health in Pakistan, further resulting in a lack of qualified staff for handling and leading digital health interventions.
- **Poor Quality of Data:** There is a poor availability and quality of Electronic Medical Records (EMRs) in Pakistan. Data storage and retention in the health sector are also substandard. Unorganized datasets lead to poor analysis resulting in faulty trends and predictions.
- **Lack of ethics:** A lack of ethical and legal regulations for digital health on the national level is a serious challenge in digital health. There is a strong need for the standardization of digital health projects in Pakistan. There must be a unified national direction for all initiatives in digital health to achieve national strategic goals.

- **Lack of Data Security and Privacy:** There are no regulations regarding privacy and data security in healthcare data that meet HIPAA (Health Insurance Portability and Accountability Act of 1996) requirements. Therefore, there is a potential for misuse and monetization of health data in Pakistan. [21]
- **Lack of Collaboration:** There is poor collaboration within and between different departments in the health sector regarding data sharing and the use of digital technologies in healthcare. Moreover, there is a poor collaboration between various sectors as well, e.g., Education
- **Lack of equity of access:** There is a huge gap in access to digital technologies across Pakistan. There are many areas where internet connectivity is still a problem.
- **Limited capacity:** There is a lack of infrastructure and human resource capacity for the implementation of digital technologies in the health sector in Pakistan.
- **Limited skilled Human Resources:** There is a lack of human resources for digital technology in healthcare in Pakistan. There are hardly any dedicated data entry operators and very poor availability of e-literate staff in all health facilities and health administration. There must be a decimated unit for Digital Health.

4.7. Opportunities for Pakistan in Digital Health

In addition to challenges, there are multiple opportunities for Pakistan in the area of digital health. Many new opportunities have surfaced during the crisis of the COVID-19 pandemic, where forced lockdowns and a strong need for social distance accelerated various sectors towards digitization which can be utilized by the health sector as well. Following are some opportunities:

- Despite the lack of smartphones, most people in Pakistan, even in rural settings, have access to text messages and phone calls. These services have been used in various health initiatives and present an opportunity to plan more.
- COVID-19 pandemic recently has pushed various public and private hospitals towards telemedicine. Even the hospitals previously not equipped with the facility have developed this capacity out of need, and perhaps the trend can continue.
- ELearning has become more prevalent during the COVID-19 pandemic. Therefore, this opportunity can be utilized for online training of HCPs on various areas of healthcare more cost-effectively and can also be used for patients for education on self-management of various conditions.
- Remote working has been normalized during the ongoing pandemic. This situation presents a better opportunity and acceptability of remote consultations for patients and also HCPs (especially females) who were unable to work due to various social barriers.
- The pandemic has necessitated the emergence of various online portals, dashboards, and mobile applications for disease tracking and surveillance, disease management, awareness, screening, and self-management, etc. These established platforms are being successfully used for COVID-19 and can be adapted to other prevalent

communicable and non-communicable diseases and conditions in Pakistan. In Pakistan, citizen records are already digitized in NADRA databases which presents an opportunity to link patient data with identification records.

- DHIS is a basic routine reporting platform that is widely used and available in Pakistan, which records data on several indicators monthly. This presents an opportunity for a smooth conversion to and adaptation of DHIS2.
- In Pakistan, most vertical programs are already using digital platforms for reporting, presenting an opportunity for the integration of platforms.
- In Pakistan, there are various health mobile applications available for data recording, self-assessment, reporting, etc., and they can be scaled up or serve as templates for the development of further applications.
- There are various EMR systems already available in Pakistan which can be adopted by other health facilities, and their data can be linked to integrated databases.
- There are multiple digital platforms available from different health programs with a significant body of data that can be integrated and made interoperable.
- There is a large body of patient and health data available in Pakistan. It presents an opportunity for better utilization of data for decision-making.
- ICD coding system is piloted in 55 facilities of Punjab.
- Logistics Management Information Systems including vaccines, contraceptive, Covid commodities etc. implemented in Pakistan.

5 Digital Health Strategy Framework

5.1. Vision and Mission

Vision is creating an empowered, people-centered, safe, and value-based health system by employing digital technology to achieve healthy population.

Mission is to ensure availability, integration, and adaptation of digital health solutions for an improved and strengthened healthcare delivery system by 2030.

5.2. Strategic Objectives

The five strategic objectives set out in the National strategy are interrelated and designed to be pursued in parallel. They are intended to provide guidance and coordination on National matters and to strengthen synergies between initiatives and stakeholders. This, in turn, is expected to improve digital health at all levels.

5.2.1. Strengthen Governance of Digital Health

This strategic objective encompasses:

Governance:

- Creation of sustainable and robust governance structures
- Building capacity for digital health at all levels of health service delivery
- Also, engaging the private sector and get their commitment for becoming a part of the digitization of the population and health sector in Pakistan

Defining Standards:

- Promoting standards for safety, privacy, interoperability, confidentiality, and ethical use of data at the government level by policies and legislations

- Defining principles for data sharing, quality, and accuracy of population health data and prioritization of investment plans and policy
- Defining principles of the ethical use of health and population data in technologies such as AI and big data

Strengthening Data-Informed Decision-Making at Policy level:

- Monitoring and Evaluation of applications of digital health and data-informed decision making at governance and policy-making level
- E-governance in health aims to cater to the need for effectiveness and transparency in the Governmental processes and services delivery mechanisms. This will improve internal efficiencies in an organization through electronic administration

5.2.2. Advance the Implementation of National Digital Health Agenda

This strategic objective encompasses adaptation and strengthening of national digital health framework by working on:

- Leadership and Governance
- Investment and Operations
- Services and Applications for scale-up
- Integration and Sustainability
- Standards and Interoperability
- Flexible Digital Health Infrastructure
- Adaptable Health Workforce
- Legislation, Ethics, Policies, and Compliance
- Building institutional capacity for safe and appropriate use and scale-up of digital health, especially in the public sector
- Employing best practices from the private sector and other international examples/initiatives and their replication in the public sector.

5.2.3. Promote National Collaboration and Advance the Transfer of Knowledge on Digital Health

This strategic objective encompasses:

Stakeholders (organizations) and alignment with targets and commitments:

- The alignment of stakeholders to take advantage of the opportunities in digital health and meet the challenges.
- Alignment with indicators and data requirements for various national and international health initiatives and agendas (e.g., SDGs, UHC, IHR)

Collaborations and Partnerships:

- Maximize collaborations and partnerships for digital health based linkages between:
  - Government agencies within the health sector
  - Private-sector agencies and health outlets
  - Work towards building new collaborations and partnerships for digital health.

Cross-sectoral partnerships:

- Building cross-sectoral partnerships for digital health

Governance and transfer of knowledge:

- Defining standards, norms, and policies that must be in place to ensure:
  - Investment
  - Sustainability
  - Quality and safety of digital health products and cutting edge health technologies.
  - Assess and promote the latest, appropriate, and innovative health technologies and digital health products.

5.2.4. Solicit Digital Health based People -Centered Health System

This strategic objective encompasses:

All-inclusive approach:

- Advancing digital health literacy, equality, and all-inclusive approaches to adoption and management of digital health technologies
- Attitudes to, practice in, and public awareness of digital health should be addressed

Improving Digital Health Literacy:

- Improve digital health literacy at the population level
- Increasing awareness of evidence-based self-management tools
- Use of digital health in the education of patients about health

Patient Engagement:

- Engagement of patients, families, and communities in digital health initiatives

5.2.5. Create a National Interoperable Digital Health Ecosystem in Pakistan

This strategic objective encompasses:

- A national interoperable digital health ecosystem should be set up in such a way that the information technology health infrastructures are both interoperable among each other and capable of sharing health data with infrastructures of other countries
- IT infrastructure and connectivity should be available for the national digital health ecosystem
- There must be defined standards of Interoperability, Data Security, and Legislation for the national digital health ecosystem
- It must enable health information sharing between databases, organizations, provinces, countries, and regions
- There must be an available human resource for the digital health ecosystem with the required qualification and capacity
- It must have defined standards for functional requirements and a set of functional and technical specifications, standards, and profiles
- To support the establishment of and participation in an interoperable digital health ecosystem, strong political leadership on all levels is required, in particular towards the engagement of all involved parties and to secure the legal and organizational implementation, funding as well as suitable governance structures and mechanism for the management of health data for primary and secondary use

6 Strategic Action Plan

This section includes the implementation plan for digital health strategy and framework 2021-2030. It explains how we plan on addressing the gaps and challenges in various areas of digital health in Pakistan.

6.1. Governance

The leading organization spearheading the digital health strategy is the MoNHSRC. In Pakistan, there is a Personal Data Protection Bill that has not been approved by the Senate or National Assembly yet. The data security and storage measures must be compliant with the Health Insurance Portability and Accountability Act of 1996.

Challenges

- Availability/ enforcement/ implementation of legislation regarding digitization in the health sector: health information protection, data privacy, data security & data storage
- Trust deficit due to lack of legislation

- Slow adaptation of advanced technology use
- Bringing private sector on board for health data sharing
- Lack of governance structure for services such as Telemedicine, mHealth, Telehealth, and others
- There is no collective decision-making between different sectors on health indicators.

Action Points

- Develop costed action plan for implementation of Digital Health Framework
- Develop and implement legislation for digital health including data security, privacy, storage and engaging private sector to name a few
- Rules and regulations need to keep pace with rapidly changing technology
- Develop rules for the governance of health services provided through the digital medium
- Establish a mechanism for collective decision-making based on shared data between different sectors on indicators affecting health.
- Develop guidelines, SOPs, and regulatory framework for streamlining digital health services

6.2. Digital Health Finance

Challenges

- Significant financial implications on health budgets due to extensive cost for infrastructure development and to keep up with the evolving digital ecosystem
- Exploring additional financial sources for digital health implementation

Action Points

- Increase health sector spending for the implementation of the digital health framework
- Conduct a costing exercise and develop a costed implementation plan
- Involve the private sector for the expertise and sharing the associated costs
- Engaging corporate sector under CSR (corporate social responsibility)

6.3. Human Resource

Challenges

- Shortage of trained human resources for health with the skills to use digital software/ applications
- Limited courses/programs for digital health in the health education institutions
- Lack of representation of digital health professionals in National Health Workforce Accounts (NHWA)
- Career progression for digital health professionals is not aligned with the future needs of the health sector
- Limited information on human resources for health numbers due to lack of health workforce registries
- Lack of training opportunities for end-users on use of HIS software/ applications

Action Points

- Assess digital health workforce requirements for implementation of digital health framework
- Develop guidelines for minimum qualifications required for the digital

health workforce (ToR and job descriptions)
- Create vacancies and recruit appropriately qualified human resources for the implementation of digital health framework
- Introduce courses/ programs on digital health/ other education institutes
- Establish an accreditation mechanism for recognition of digital health professionals
- Ensure representation of digital health professionals in NHWA
- Work towards establishment/ operationalization of health workforce registries
- Develop and deploy e-learning modules to train HR on the use of HIS software/ applications
- Promote the use of e-learning platforms for capacity building of HRH

6.4. Research, Innovation and Health Information System

6.4.1 Registration, Surveillance, and EMR

Challenges

- Lack of real-time desegregated data reporting
- Paper-based information collection
- Legislation is required for mandatory reporting of notifiable diseases
- Integration of fragmented Disease Surveillance and Response System
- Data reliability and validity issues due to poor quality
- No information from the private sector

Action Points

- Legislate and implement mandatory reporting of priority (planned for implementation by 2024)
- Ensure implementation of IDSRS by 2024 with quarterly reviews of the surveillance system
- Digitize data entry at the first point of contact between health care provider and client
- Institutionalize data management standards and protocols to improve data quality
- Engagement of private sector for registration, surveillance and EMR

6.4.2 CRVS and surveys

Challenges

- Voluntary registration of vital statistics
- Weak and incomplete CRVS leading to incomplete denominator information
- Absence of Electronic Medical Record mechanism due to lack of unique identifier implementation for the population
- Absence of ICD coding for disease/ mortality reporting
- Lack of inconsistent information due to multiple surveys capturing information on the same indicators

Action Points

- Develop legislation for mandatory reporting of vital events
- Develop multisectoral costed action plan
- Strengthen CRVS, including the unique identification system in coordination with NADRA
- Train workforce on ICD coding and deploy for reporting (WHO standards on death certificates to be implemented)

- Implement One Health Survey to remove indicator inconsistencies where possible

6.4.3 Routine Health Information System

Challenges

- Paper-based data collection
- Absence of desegregated case-based and denominator information
- Unable to calculate population-based indicators
- Lack of implementation of routine reporting system in tertiary level facilities
- Does not cover private-sector health facilities
- Shift to DHIS2 platform will require financial and human resources

Action Points

- Digitize data entry at the facility level
- Introduce EMR at the facility level to facilitate cased data collection
- Implement Routine reporting system at tertiary level facilities
- Engage private sector for Routine reporting system implementation
- Prepare for the shift to DHIS2 platform and identify potential financial/ revenue streams in the health budget
- Standardization of indicators across multiple sources

6.4.4 Human Resources MIS and Registry

Challenges

Currently, there are only two provinces in the country which have some form of an HR MIS, with no digitized HR registry in Pakistan for management of Human Resource for Health in Pakistan

Action Points

The development of an electronic HR-MIS and registry has been planned which will be implemented across all provinces.

6.4.5 Laboratory

Challenges

- There is no MIS for laboratory data in Pakistan
- Laboratory data is rarely digitized and linked with the National HIS.
- **Action Points**
- An MIS must be developed for laboratory data.
- Laboratory data must be digitized and liked with the PHIS across the spectrum of public and private sectors.

6.4.6 Pharmacy MIS

Challenges

- Limited pharmacy MIS in Pakistan
- Limited use of DRAP online systems for registration, inspections, licencing etc.
- Limited use of DRAP "Med Vigilance" pharmacovigilance systems

Action Point

- Develop and establish Pharmacy MIS
- Develop e-prescription mechanism and integrate with Pharmacy MIS using EMR
- Promote use of DRAP online systems for registration, inspections, licencing etc.
- Promote use of DRAP "Med Vigilance" pharmacovigilance systems for spontaneous reporting of adverse effects and adverse events related to drugs

6.4.7 Community level Information Systems

These include the LHW MIS and MNCH MIS.

LHW MIS

The Lady Health Worker Management Information System (LHW MIS) is an information system for the management and tracking of Lady Health Workers in the community. It includes information on various indicators related to the functions of Lady Health Workers.

MNCH MIS

The Maternal Newborn and Child Health Management Information System (MNCH MIS) is an information system for tracking the MNCH indicators in Pakistan. It gathers data from both community and facilities on MNCH indicators which can be used by the policy makers to make decisions to track and improve MNCH in Pakistan.

Challenges

- The community-based information systems are still segregated by provinces and do not consolidate or display national-level statistics.
- Data collection is paper-based and is only digitized at the district level, leaving room for errors.
- There is sub optimal use of digital technologies in data collection, analysis, or use for decision-making.
- There is sub optimal use of GIS tracking in community level information systems.

Action Points

- The community-based information systems should have a consolidated page for national statistics and numbers with consolidated information from all provinces.
- Data collection should be digitized at the community health worker level.
- The use of digital technologies must be promoted in data collection, analysis, and use for decision-making in all community-level information systems.
- The use of geospatial analysis technique should be promoted for community-level information systems for the geographical tracking and mapping of health outcomes.
- Development and implementation of more interactive digital technologies for engaging community, advocacy, and improving community awareness.

6.4.8 Logistics Management Information System

Challenges

- Limited digital Logistic Management Information System (LMIS) for reporting on Essential Medicine List (EML) and Essential Equipment and consumable at the facility level

Action Points

- Utilize existing IT platform for the implementation of LMIS at community and facility level
- Establish "End-to-End Data Visibility" to manage timely procurement and uninterrupted supply chain of essentials in health facilities minimizing stock-outs and pilferage
- Strengthen existing LMIS

6.4.9 Purchasing and Inventory Control System (PICS)

Challenges

- There is no digitized PICS for public health facilities in Pakistan. There is poor tracking of supplies for health facilities in Pakistan with frequent stock-outs and poor reporting on stock-outs.

Action Points

- A digitized PICS for public health facilities in Pakistan must be developed and implemented throughout the public health facilities.
- The PICS should be designed to detect low stocks on time to prevent stock-outs and also can report the inappropriate use of stocks and pilferage.

6.4.10 Communication, Command, and Control System

During a natural disaster or emergency, there is an unexpected surge of patients like during the global pandemic of COVID-19. During these times an effective communication, command and control system is required to ensure timely and effective management of patient where all departments like ambulance, disaster management and hospitals work in synchronization and coordination.

Challenges

- There is no functioning Communication, Command, and Control (C3) System in Pakistan for automation and optimization of resources and services in health facilities
- Most communication in the health sector is still paper-based, and there is a need for introducing and implementing electronic communication in the health sector.

Action Points

- In Pakistan C3 system for automation and optimization of health, facilities must be developed and implemented. In the beginning, it can be modeled and implemented in a few large health facilities and can be later scaled up.
- Electronic communication must be introduced and implemented for all communication between human resources in the health sector.

6.5. Technology and Innovation

There is a limited use of modern digital technologies in Pakistan such as Artificial Intelligence, Machine Learning, Big Data Analytics, and Internet of Things etc. However, in this framework we plan to encourage and incorporate their use in healthcare.

6.5.1. Artificial Intelligence

Challenges

- There is almost no use of AI in the health sector in Pakistan.
- There is only some fragmented research on the topic in Pakistan.

Action Points

- The use of AI must be promoted in various areas of the health sector.
- More research and innovation must be encouraged in the field of AI in healthcare.
- Epidemic projection by using lab data and AI to predict an epidemic and link it to the Disease surveillance

6.5.2. Machine Learning/Data Modelling

Challenges

- There is almost no use of machine learning in the health sector in Pakistan.
- There is only some fragmented research on machine learning in the health sector in Pakistan.
- There is limited use of disease or data modeling in Pakistan for disease surveillance or otherwise.

Action Points

- The use of machine learning must be promoted in various areas of the health sector.
- More research and innovation must be encouraged in the field of Machine Learning in healthcare.
- There use of data or disease modeling must be promoted and encouraged in the health sector in Pakistan.
- A platform that can be used to read the text on paper and automatically digitize it, which can be used to digitize the paper-based DHIS forms.

6.5.3. Internet of Things (IoT)

Challenges

- Despite the widespread use of various smart devices in Pakistan, their data, commands, or information is not linked with any of the systems in the health sector.

Action Points

- The use of IoT must be established in Pakistan
- The data and information from various smart devices in Pakistan must be linked to the health systems and databases.
- The use of smart devices in the health sector must be promoted.

6.5.4. Wearable Devices

Challenges

- There is some use of wearable devices in Pakistan like Fitbit etc., but they are expensive and not available to the most vulnerable groups of the population
- There is a limited range of wearable devices for health in Pakistan.
- There is no database for recording information from the population using wearable devices.

Action Points

- The essential wearable devices for health must be made widely available to the population.
- A wide range of wearable devices for disease tracking and health care must be made available in Pakistan.
- Databases and dashboards must be developed to record information from the population using wearable devices on various health indicators measured by the devices.

6.5.5. Decision Support Systems

Challenges

- There is little to no use of Decision Support Systems in Pakistan in the health sector.

Action Points

- Decision Support Systems must be developed and used in the health sector in Pakistan.

6.6 Health Services

6.6.1. mHealth, telemedicine, telehealth

Challenges

- Lack of legal instrument to regulate mHealth, telemedicine, telehealth
- Fragmented, project-based mHealth, telehealth, and telemedicine initiatives
- Poor integration with national health systems
- Sustainability issue with most mHealth, telehealth, and telemedicine initiatives
- Lack of standardization of digital health services
    - **Action Points**
- Develop legal instrument to regulate mHealth, telemedicine, telehealth Integrate various fragmented mHealth, telehealth, and telemedicine initiatives with national HISs
- Assess which mHealth, telehealth, and telemedicine initiatives have the potential to be scaled up in a sustainable way

6.6.2. Infrastructure

Challenges

- Unreliable internet connectivity at health facilities
- Lack of appropriate ICT equipment that can facilitate digital health functions

Action Points

- Conduct capacity and needs assessment for infrastructure for digital health in health facilities
    - Ensure reliable internet availability to cover all geographical locations
    - Adopt innovative techniques for data collection from remote health facilities
    - Adequate equipment must be made available for digital health functions
    - Digital mapping of all HFs (geographic) plus what basic infrastructure is available for use and planning

6.7 Research, discovery, and collaboration

Challenges

- The field of digital health is still new in Pakistan and requires much more research.
- There is limited collaboration between institutions and departments on innovations in digital health in Pakistan

Action Points

- Research and innovation must be promoted in the field of digital health in Pakistan.
- Various departments and institutions must collaborate on research in digital health in Pakistan.

6.8 Inter-Sectoral linkages

Challenges

- There are limited inter-sectoral linkages in Pakistan for the achievement of better health & population outcomes, especially for digital health initiatives.
- There is poor integration of data and data sharing from databases of different sectors on indicators affecting public health.

Action Point

- Inter-sectoral linkages to be developed between the department of health and other government departments at all levels for the achievement of better health outcomes in the population, especially in terms of digital health.
- Ensure integration of databases from different sectors and timely data sharing of health indicators.
- A health multisectoral linked digital SDGs platform is developed, where health can support the planning commission to achieve or improve our commitment toward global responsibility.

Following are the various suggested inter-sectoral linkages for digital health:

6.8.1 Planning, Development and Special Initiatives Sector

A multisectoral approach has to be adopted for achieving SDGs and Universal Health Coverage in Pakistan. The same approach needs to be implemented in digital health strategy where all sectors must be on board with the plan. The M/o NHSR&C plans to coordinate with the Ministry of Planning, Development, and Special Initiatives on the use of digital health in the achievement of health-related SDGs, Universal Health Coverage, International Health Regulations, and CRVS.

6.8.2 Education and Professional Training Sector

Mo NHSR&C needs to coordinate with the education department on using digital health for improvement of adolescent mental health; child health, growth, and development; hygiene, sanitation, and WASH programs in schools; dental hygiene programs in schools and immunizations in schools.

6.8.3 Climate Change/ Environment Sector

There must be linkages between the health sector and climate change sector for coordinating efforts on using digital health for analyzing and addressing effects of climate indicators on health, for example, air quality index, ozone layer depletion, etc. Moreover, environmental indicators like drinking water quality and sanitation are also important for population health.

6.8.4 Food Security and Research Sector

The Ministry of National Food Security and Research works in various areas related to health like food security, nutrition, malnutrition, livestock, animal quarantine, animal immunization, poultry, and dairy production, etc. They also have a national veterinary laboratory dealing with zoonotic disease surveillance. They must be on board with the digital health sector in Pakistan

6.8.5 Finance Sector

The finance department must be taken on board for the digitization of health financing and health insurance plans and schemes introduced by the government, in addition to sustainable funding of the National Digital Health Strategy and Framework in Pakistan.

6.8.6 Information Technology & Telecommunication Sector

Efforts must be coordinated with the Ministry of Information Technology in Pakistan for the digitization of the health sector since they are experts in digitization. Their opinion must be sought to digitize the health sector and for improving Interoperability in the existing digital health systems.

6.8.7 Science & Technology Sector

The health sector and ministry of science and technology must collaborate for the required research and innovations in the field of digital health. The universities and research institutes should work with the health sector through data sharing and collaborated research projects and trials for digital innovations.

6.8.8 Information & Broadcasting Sector

The Ministry of Information and Broadcasting can help enhance population awareness regarding various planned digital health initiatives in Pakistan. They can be used to broadcast health messages to the general public.

6.8.9 Interior/ Home Sector

The Ministry of Interior must be kept on board for digital health initiatives using population data or locations to ensure that population security is not compromised. Moreover, the patient information through case-based medical records may be linked with the unique identification number of the person linking it with NADRA records

7 Monitoring and Evaluation

S. No	Strategic area	Plan/ Action points	Indicator	Status	Timeline	Responsibility	Potential Impact
1	**Governance**	Seek endorsement of departments of health towards implementation of national digital health & framework	- Conduct provincial/ area consultations (7)	In Progress- On Track	Mar-21	Provincial Departments of Health MoNHSR&C	Mutual consensus on goals, objectives, and strategic direction for digital health in Pakistan
2			- Endorsed digital health framework	In Progress- On Track	Apr-21	Provincial Departments of Health MoNHSR&C	
3		Develop/ implement legislation for health data security, privacy, and storage	- Respective provincial drafts prepared for health data security, privacy, and storage	To be decided		Provincial Governments with Department of Health	-Legislative cover available for digital health initiatives -Legislation based ownership for government
5		Rules and regulations to keep pace with rapidly changing technology	- SoPs, protocols, and guidelines developed and finalized	To be decided		Provincial Governments with Department of Health	Quick adoption of new technologies and improved regulatory environment for adoption
6		Explore the development of legislation to bring the private sector in the loop of health data sharing	- Establish the submission of routine health data in provinces where health care commissions (HCC) are present	To be decided		Provincial Governments with Department of Health	Data reporting from the private sector and linkage to Provincial/ National databases
7			- Establish legislation to bring the private sector in the loop of health data sharing through HCC/ regulatory authority	To be decided		Provincial Governments with Department of Health	
8		Develop rules for the governance of health services provided through the digital medium	- SoPs, protocols, and guidelines developed and finalized	To be decided		Provincial Governments with Department of Health	Care through digital media standardized

9		Identify processes requiring digitization for drugs and health technologies regulation	- Drug and health technologies regulatory functions digitized	To be decided		Provincial Departments of Health MoNHSR&C	Regulatory functions efficient, strengthened, and transparent
10	**Finance**	Increase health sector spending for the implementation of the digital health framework	- Enhanced financial allocations committed				Sustainable financing for digital health framework
11			- Funds released as per commitment on a timely basis				
12			- Expenditure as per the commitment				
13		Conduct a costing exercise and develop a costed implementation plan	- Costed implementation plan developed and finalized				
14		Involve the private sector for the expertise and contribute towards associated costs	- Commitment of the private sector secured				
15			- Mechanism for private sector contribution developed and finalized				
16	**Human Resource**	Assess digital health workforce requirements for implementation of digital health framework	- Assessment completed across all levels of health care service delivery and provinces/ regions				- Well-resourced environment for implementation of Digital health framework
17		Develop guidelines for minimum qualifications required for the digital health workforce (ToR, and job descriptions)	- SOPs, ToR, and guidelines developed and finalized				
18		Recruit appropriately qualified human resources	- Recruitment process initiated				

19		for the implementation of digital health framework	- Recruitment process completed				
20		Introduce courses/ programs on digital health/ other education institutes	- Work plan for development of courses/ programs finalized and partner education institutes identified				
21			- Courses developed in collaboration with educational institutes				
22		Establish an accreditation mechanism for recognition of digital health professionals	- Accreditation criteria and mechanism for implementation developed and finalized				
23		Ensure representation of digital health professionals in National Health Workforce Accounts (NHWA)	- All-inclusive NHWA for digital health professionals established				
24		Work towards establishment/ operationalization of health workforce registries	- HRH registry digitization completed and operationalized				
25	**Inter-Sectoral linkages**	Develop Inter-sectoral linkages between the department of health and other government departments at all levels for the achievement of better health outcomes	- Constitution and notification of Technical Working Group (TWG)			Line departments and Department of Health	- Formalized cross-sectoral decision-making process established and functional- Consultative cross-sectoral evidence-based decisions taken
26		Work towards improvement in the integration of data from different sectors	- Consultation and finalization of data sharing mechanism, frequency, and components			Line departments and Department of Health	

27		Establish a mechanism for collective decision making based on shared data	- Protocols for decision making agreed upon - TWG meetings organized for collective decision making			Line departments and Department of Health	
28	**Research, innovation & Information system (Registration, EMR, and Surveillance)**	Legislate and implement mandatory reporting of priority diseases by the private sector (planned for implementation by 2024)	- Establish legislation to bring the private sector in the loop of health data sharing through HCC/ regulatory authority				Data reporting from the private sector and linkage to Provincial/ National databases
29		- Health registration and enumeration of all citizens	- Phase wise implementation of health registration and enumeration of all citizens				Establishment of Health Registration system
30		Digitize data entry at the first point of contact between health care provider and client (EMR)	- Phase wise implementation of data entry at the first point of contact based on EMR for IDSRS				Establishment of digital EMR
31		Ensure implementation of IDSRS with quarterly reviews of the surveillance system	- Quarterly IDSRS reports are generated digitally and reviewed				- Increased comprehensive of IDSRS data at the provincial/ national levels
32		Institutionalize data management standards and protocols to improve data quality	- SOPs, protocols, and guidelines developed and finalized				
33		Extend IDSRS to include the private sector	Establish digital linkages for submission of IDSRS data from the private sector				
34	**Research, innovation & Information system (CRVS and Surveys)**	Strengthen CRVS, including the unique identification system in coordination with NADRA	- Complete official requirements for mandatory reporting and registration of vital events				Increased comprehensive of vital events data
35		Train workforce on ICD coding and deploy for reporting (WHO standards on death certificates to be implemented)	- Training material on ICD developed - Mater trainers trained on ICD - Cascade of training rolled out for ICD				- Increased validity of health CRVS data

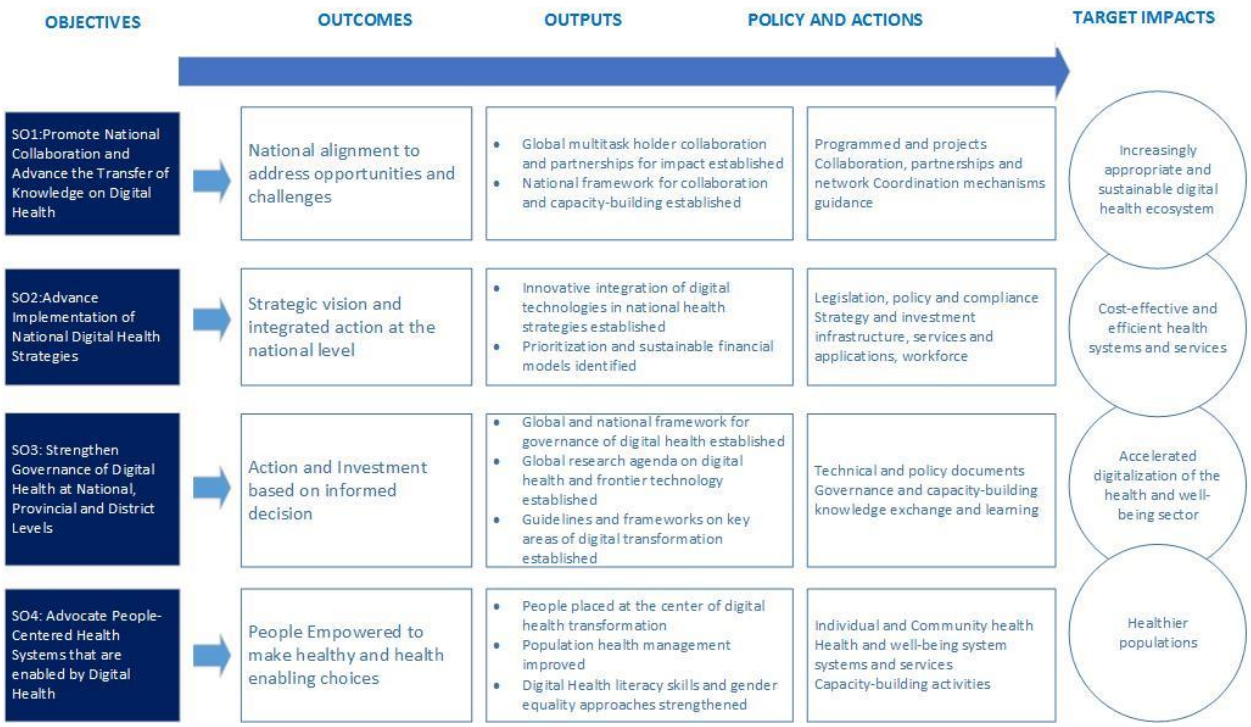
36		Implement One Health Survey to remove indicator inconsistencies where possible	- Consultations and mutually agreed on Meta Data of One Health-related indicators				- Removal of inconsistencies due to multiple surveys and harmonization of indicators
37	**Research, innovation & Information system (DHIS)**	Digitize data entry at facility level	- Phase wise implementation of health registration, enumeration and EMR across the system				- Universal registration and EMR established
38		Introduce EMR at the facility level to facilitate cased data collection					- Enhanced reliability, accuracy, completeness, and timeliness of health information (individual and point of care level)
39		Implement DHIS at tertiary level facilities	- DHIS implemented at tertiary level facilities phase-wise				
40		Engage private sector for DHIS implementation	- Phase wise implementation of health registration, enumeration, and EMR across the private sector				
41		Prepare for the shift to DHIS2 and identify potential financial/ revenue streams in the health budget	- Phase wise shifting of DHIS to DHIS2 platform				
42	**Research, innovation & Information system (LMIS) Purchasing and Inventory Control System (PICS)**	Utilize existing IT platform for the implementation of LMIS at community and facility level	- Phase wise implementation of LMIS at community and facility level				Management, timely procurement, and uninterrupted supply chain of required supplies in health facilities established
43		Establish "End-to-End Data Visibility" to manage timely procurement and uninterrupted supply chain of essentials in health facilities minimizing stock-outs and pilferage	- "End-to-End Data Visibility" established				
44		Develop and implement a digitized PICS for public health facilities in Pakistan	- digitized PICS for public health facilities in Pakistan implemented				

45		Designed PICS to detect low stocks on time to prevent stock-outs and report pilferage					
46		Digitize Contraceptive LMIS	- Phase wise implementation of cLMIS at community and facility level				
47	**Research, innovation & Information system (Lab MIS, Community MIS, Pharmacy MIS)**	Develop MIS for laboratory data	- Conduct comprehensive landscape and situation analysis for the implementation of Lab MIS- Software for Lab MIS developed and deployed- Capacity for Lab MIS developed (material and training)				- Integration and operationalization of existing and new MISs
48		Digitize and link laboratory data with Provincial/ national Dashboard (PHIS)	- Linkages of Lab MIS established with Provincial/ National Dashboard (PHIS)				
49		Integrate vertical Program MISs	- Vertical Program MISs integrated phase-wise				
50		Develop and establish Pharmacy MIS	- Conduct comprehensive landscape and situation analysis for the implementation of Pharmacy MIS				
51		Develop 'e-prescription' mechanism and integrate with Pharmacy MIS using EMR	- Software for Pharmacy MIS developed and deployed - Capacity for Pharmacy MIS developed (material and training)				
52	**Research, innovation & Information system** **Communication, Command**	Develop and implement a C3 system for automation and optimization of health facilities	- Personnel, financial, and equipment related requirements for C3 system assessed and identified across all service delivery, administrative, managerial, and cross-sectoral linkage operations				E-Filing C3 system established and contributing in decision making

53	**and Control System(C3)**	Digitize and automate intra health sector communication to facilitate timely decisions	- Decision-making communication digitized and automated				
54	**Technology**	Tap into resources available at the National Centre for AI established recently	- Efficient working relationship established with National Centre for AI				- Environment for the adoption of latest digital solutions established for service delivery (preventive, promotive & curative)
55		Promote the use of machine learning in various areas of the health sector	- Machine learning tools developed and incorporated for improved service delivery and oversight				
56		Promote the use of smart devices in the health sector and link to HIS	- Handheld smart device-based solutions developed, deployed, and linked to HIS				
57		Develop and deploy Decision Support Systems (DSS)	- Decision Support Systems developed and deployed				
58	**Health Services** **MHealth, telemedicine, telehealth**	Integrate various fragmented mHealth, telehealth, and telemedicine initiatives with national HISs	- Enhanced population coverage of mHealth, telehealth, and telemedicine initiatives				- Responsive, efficient, sustainable, and accountable initiatives identified and scaled up
59		Assess which mHealth, telehealth, and telemedicine initiatives have the potential to be scaled up in a sustainable way	- Systematic review of nationwide services conducted				
60		Develop guidelines, SOPs, and regulatory framework for streamlining digital health services	- SoPs, protocols, and guidelines developed and finalized				

61	**Health Services** **Infrastructure and Training**	Conduct capacity and needs assessment for infrastructure for digital health in health facilities	- Needs assessment exercise for infrastructure capacity updated/ completed				- Enhanced reliability, accuracy, completeness, and timeliness of health information
62		Ensure reliable internet availability to cover all geographical locations	- Reliable internet availability covers all geographical locations, especially remote areas, provided				
63		Adopt innovative techniques for data collection from remote health facilities	- Innovative solutions developed and deployed for data collection from remote facilities				
64		Adequate equipment must be made available for digital health functions	- Adequate equipment for implementation of digital solutions made available phase-wise as per requirements				
65		Develop and deploy e-learning modules to train HR on the use of HIS software/ applications	- e-Learning modules developed and deployed phase-wise				
66	**Monitoring & Evaluation**	Implement performance review mechanism for health workforce working in the public sector	- Performance review mechanism for health workforce digitized				Real-time oversight and HR management
67		SDGs monitoring framework to track progress Monitoring of health indicators ensured through national surveys/ ONE HEALTH SURVEY	- SDGs monitoring framework digitized				Real-time SDG progress monitoring and oversight

STRATEGIC FRAMEWORK



8 Way Forward/Recommendations

Overall recommendations/way forward

- Follow up consultations with DoH provinces/regions and health development partners- by Ensuring stakeholder engagement in all steps of the process
- Facilitating provincial input, allowing specificity and comparability
- Coordination mechanism to be established by formalizing an advisory and technical working group
- Developing related legislations and governing bodies
- Ensuring coordination of DH applications by different stakeholders, whether in the public or private sector
- Developing national/provincial regulatory authorities
- Ensuring special attention/resources for assistive technologies
- Ensuring attention/resources for universal **access** to healthcare by people in remote and rural areas
- Establishing a national DH registry/roster
- Relating development in HIS with DH applications
- Supporting physicians / other members of the healthcare team, who had to leave the health workforce, with DH applications (working from home)
- Supporting evidence and research on best cost-effective DH applications

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Annex A

National Digital Health Framework – Province wise Consultative Meeting Activities

Activity	Province	Date	Picture	Attendance Sheet
National Digital Health Framework – Consultative Meeting with Balochistan	**Quetta (Balochistan)**	February 19th, 2021		**Annex – A**
National Digital Health Framework – Consultative Meeting with Sindh	**Karachi (Sindh)**	February 22nd, 2021		**Annex – B**
National Digital Health Framework – Consultative Meeting with KP	**Peshawar (KP)**	February 23rd, 2021		**Annex – C**

Activity	Province	Date	Picture	Attendance Sheet
National Digital Health Framework – Consultative Meeting with Punjab	**Punjab (Lahore)**	February 26th, 2021		**Annex – D**
National Digital Health Framework – Consultative Meeting with AJK	AJK (Muzaffarabad)	July 15, 2021		**Annex – E**

Activity	Province	Date	Picture	Attendance Sheet
National Digital Health Framework – Consultative Meeting with GB	GB (Gilgit)	July 30, 2021		**Annex – F**
National Digital Health Framework – Consultative Meeting with ICT	Federal	August 13, 2021		**Annex – G**

Activity	Province	Date	Picture	Attendance Sheet
				

Annex – B

Consultative Workshop Balochistan (February 19th, 2021)

Name	Area	Designation	Department	Contact no	Email
Dr. Sabeen Afzal	Federal	Deputy Director Health Systems, M/O NHSR&C	M/o NHSR&C	0333 5509275	drsabeenafzal@gmail.com
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Annex – E

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Annex – G

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Annex – H

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