

National e-Health Strategy 2017



Ministry of Health
Government of Nepal

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1 Introduction

Rapid and dynamic development in Information and Communication Technology (ICT) is changing the global health landscape in the form of e-Health. Governments around the world have started to implement e-Health solutions to leverage public health functions like health information management, remote medicine, and health promotion. Furthermore, e-governance initiatives have made a positive dent in promoting good governance, increasing cost efficiency, and improving the effectiveness of services in public sectors including health.

Since the last two decades, the use of ICT has started to progressively seep into Nepal's health sector. Traditional health information systems like Health Management Information System (HMIS) and Logistics Management Information System (LMIS) have adopted modern software platforms and web technologies to improve their functionalities and effectiveness. On the e-governance side, Ministry of Health (MoH) has established systems like Electronic Annual Work Plan and Budget (e-AWPB) and Transaction and Budget Control System (TABUCS) to improve financial management and health planning. MoH has introduced and started to gradually expand telemedicine services. Introduction of mobile health (mHealth) solutions are also on the rise. Similarly, Nepal's private sector has also adopted e-Health technologies in their varying capacities. Ever decreasing cost of ICT solutions and increasing prominence of open source technologies are also opportunities for Nepal to further develop and implement practical e-Health solutions.

These information systems and e-Health solutions, however, are yet to be properly integrated within the national health systems. Many systems are developed, and continue to develop, in isolation to other systems. This isolated development coupled with lack of standards and uniform codes mean most of these systems do not have functional linkages among them; therefore this lack of interoperability inhibits their efficacy in facilitating evidence-based and timely decision making at both policy and implementation levels. Lack of proper institution set-up for e-Health has hampered MoH's efforts in improving health information governance including proper resource allocation, defining the legal validity of information produced, promoting the culture of information use, developing capacities, and optimizing the functioning of information systems and e-Health solutions. Furthermore, this has also hampered MoH in accelerating the use of e-Health in areas where it can bring about positive outcomes.

Major improvements in overall health information governance is needed in order to capitalize on opportunities and harness the potential of e-Health optimally. With this in mind and, as warranted by National Health Sector Strategy 2015-2020 (NHSS), MoH has developed the National e-Health Strategy 2015-2020 to leverage e-Health solutions to improve equitable access to quality health care services for the citizens.

2 Defining e-Health

The National e-Health Strategy defines e-Health in accordance to the World Health Organization's (WHO) definition of the term that was stipulated during 58th World Health Assembly in 2005:

e-Health is the cost-effective and secure use of information and communications technologies in support of health and health-related fields, including health-care services, health surveillance, health literature, and health education, knowledge and research.

3 Scope of the National e-Health Strategy

This strategy aspires to facilitate to achieve the vision and mission set by National Health Policy (2014) and Nepal Health Sector Strategy (2015-2020) leveraging the use of ICT in health service delivery and information management. The strategic pillars, goals, and outcomes of National e-Health Strategy are designed to support the goal and nine strategic outcomes of NHSS.

4 Situation Analysis

4.1 Socio-Demographic Situation

With the human development index of 0.54, Nepal ranks 145 out of 187 countries. In 2010/11, about 25% of the total populations were living below the poverty line as compared to 30.8% living below poverty line in 2003/04 (NLSS, 2011). Nepal remains an agro-economy with 60% of population engaged on it. However, the contribution of agriculture sector to the overall GDP has declined from 61% in 1981 to 31% in 2011, while the contribution of the service sector has increased from 27% to 48% over the same period.

Total population of Nepal is about 26.5 million showing population growth rate of 1.35 per annum (CBS, 2011). National census data shows that the proportion of population is highest in the age group of 10-14 years followed by 5-9 years age group (CBS, 2011). Notably, elderly population (60 above) has increased by 2.51 times in 2011 from those reported in 1981, with an annual growth rate of 3.07% (CBS, 2011). At present the proportion of population aged 60 years and above is 8% (NLSS, 2011), which is increasing each year. The population growth rate during the decade 2001 to 2011 was 1.35 per annum. Regarding the distribution of population, half of the population (50%) lives in the Terai region and 43% in hilly region and 6.73% are living in the Mountainous region. The population growth rate is not similar throughout the country, it varies widely in urban and rural areas with 3.38 and 0.98 percentage per year respectively (CBS, 2011).

Population boom in urban areas is significant. In 1991, only 9% the population lived in urban areas and in 2011 urban population increased to 17% (CBS, 2011). Health inequities among the urban dwellers remain a major challenge. For example, children from the poorest wealth quintile in urban areas are 4.5 times more likely to die before the age of five than those of the wealthiest quintile. Similarly, only 45% of women of the urban poorest wealth quintile have access to Skilled Birth Attendants (SBA) compared to 85% for the women of urban wealthiest quintile (HERD/COMDIS, 2014).

Total numbers of households in the country are 5,427,302 with an average of 4.6 in 2014 (NMICS 2014) which was 4.9 in 2011 (NLSS, 2011). In Nepal, about 64% of the total households use the firewood as main source of cooking fuel. More than one third (i.e. 38.17%) of the population still don't have toilet in their houses. Electricity is used as the main source of lighting by more than two third (67.26%) of the population (NLSS, 2011).

The overall literacy rate of the country is 65.9%, where male literacy rate is (75.1%) which is comparatively higher than female literacy (57.4) (CBS, 2011). Population living in urban areas has better literacy (82%) as compared to the rural (63%). Similarly, literacy among 15-19 years age group is about 89% (male 92% and female 86%). However, literacy rate among the population of 65 years and above is only 21% (male 35.6% and female 6%) (CBS, 2011).

Regarding the use of various electronic devices for information and communication, about 51% of the total households have radio (53.56% in Urban and 50.17% in Rural), about 36% have television (60.67% in Urban and 30.66% in Rural). However, only about 7% households have computer and 3%

have access to internet service (CBS, 2011). The living standards survey 2011 shows that about 43% of the households in Nepal have access to internet facility within the reach of 30 minutes. However, only 3.4% of the household were using the internet service that also varies with urban (12.3%) and rural (1.3%). Similarly, according to census 2011 the households having telephone were 7.5% (23% urban and 4% rural) and mobile phone penetration was 66% (urban 85% and rural 61%) (CBS, 2011).

4.2 Present Health Situation

Nepal has made remarkable progress on improving the overall health outcomes of the citizens. Between the period of 1990 and 2014, Nepal has impressively reduced under-five mortality by 73% and infant mortality by 67%. Similarly, Nepal has been able to reduce maternal mortality by 76% between the period of 1996 and 2013. Nepal has achieved Polio Free Status, Measles Mortality Reduction Goal, MNT elimination status, and control of Japanese encephalitis. Comparing the trend of past 15 years, data shows that the proportion of fully immunized children has remarkably increased (NLSS, 2011). During the last five years DPT and Polio third dose coverage has consistently remained above 90% and measles coverage around 88%. Total Fertility Rate (TFR) was 2.6 in 2011 (NDHS, 2011) and is reduced to 2.3 in 2014 (NMICS, 2014). Antenatal care coverage at least four visits has also significantly increased over the decade from 14% in 2001 (NDHS, 2001) to 60% in 2014 (NMICS, 2014). Similarly, more than half (i.e. 56%) of the deliveries are being assisted by Skill Birth Attendance, however still almost half (45%) deliveries are being delivered at home without assistance from trained health workers. However, less progress is seen in reducing neo-natal mortality and malnutrition. Among the progressive indicators wide variation in term of region, residence, education and wealth quintile still remains major concern.

Efforts to tackle Tuberculosis, HIV and Malaria have shown remarkable progress in halting and reversing the trend of these diseases. However, multi drug resistance tuberculosis cases are increasing and remain a serious public health concern. On the other hand growing prevalence of non-communicable diseases continue to pose public health challenges. The major non-communicable diseases are diabetes, cancer, chronic respiratory diseases, oral diseases and mental disorders (IHME, 2010) (NHSS, 2015). During the last 15 years, the incidence of chronic illness has increased from 6% (1995/96) to 12 % (2010/11) (NLSS, 2011). Prevalence of chronic diseases shows the gastrointestinal and kidney/liver problem (31%), rheumatism (15%), Raised blood pressure (11%), asthma (10%), heart conditions (6%), diabetes (5%), respiratory problems (3%) and epilepsy (1%) were the major (NLSS, 2011).

Huge burden of mental health problem and increasing suicidal tendencies, road traffic accidents, geriatric health, environmental health, occupational health, adolescent health are the new emerging areas that warrant more attention and resources. In addition, increasing threats from natural disasters and adverse effects of climate change are also posing public health challenges in Nepal. The devastating earthquake of April 2015 was a stark reminder that country urgently needs to heighten its effort on emergency preparedness and response.

Physical and mental disability has also remained as one of the major public health problems in Nepal. Data shows that about 3.6% of peoples have some kind of disability which is seen comparatively more among the males (4.2%) as compared to females (3.0%) (NLSS, 2011). Major recorded disabilities includes, physical (29.2%), visual related (22.3%), hearing related (23.4%), vision/hearing related (2.4%), speech related (8.6%), mentally retarded (6.8%) and multiple disability (7.3%) (NLSS, 2011).

Quality of health services at all level remains poor. National standards are not developed for wider range of health services; those developed are not well implemented and followed. Facilities are not

accredited and assessed using a standard quality dimensions. Limited mentorship and technical support is another reason for to have poor quality at peripheral facilities. Rational use of drug is another major public health concern, mainly because anyone can get most of the drugs without authorized prescriptions and stock-outs are frequent at facilities.

Inequitable access and utilization of the health services is one of the major challenges in the health sector. The people living in rural areas, from low income quintile and selected caste/ethnic groups are facing financial, socio-cultural, geographic and institutional barriers in accessing health services. Furthermore, gender inequality poses challenge to address women's health issues. Many of these barriers can be mitigated by making available and leveraging modern ICT technologies both at demand and supply sides.

On health systems side, all aspects of human resource management – production, recruitment, deployment and retention – remains a major challenge. Furthermore, despite some improvements, public financial management and logistics and supply systems remain a major concern for the government and the development partners. To improve these systems, the government has introduced information systems such as Human Resource Development Information System (HuRDIS), Transaction Accounting and Budget Control System (TABUS), and Logistics Management Information System (LMIS); however, these systems currently do not operate at an optimum level.

Timely availability and use of health information remains poor which also hamper the government's efforts to improve equitable access to quality healthcare services. The limited use of available information also hampers the planning, monitoring and evaluation cycle.

Managing, governing and regulating health service delivery remains a daunting task for the government. In the public sector, currently there are eight central level hospitals, six regional sub-regional hospitals, and more than 4000 district level health facilities. There are also 30,000 public health workers which makes MoH second largest public sector employer. Management systems and decentralized governance required to manage these public health service outlets and workforce remain weak.

The Government of Nepal (GoN) assumes a dual role in the health sector of being a service provider as well as a service guarantor. However, its role as a service guarantor remains limited because of the government's weak stewardship and regulatory capacity for the sector at large. Specially challenging is regulating the exponentially growing private sector.

The upcoming federal form of government in Nepal requires that health sector be restructured in three-tier (federal, provincial and local) governance structure. This calls for assessing current functions and structure of the health sector and reorganizing them in three levels according to the broad national government framework. It is expected that, alike other government sectors, health sector will also face challenges in transitioning from unitary to federal structure. Nevertheless, the federalism is also an opportunity to redefine current functions and reorganize the present institutional setup of the health sector to make it more efficient and effective in tackling contemporary and emerging health challenges.

4.3 Policy Context

4.3.1 Health Policy Landscape

After the emergence of democracy, the National Health Policy (1991) was formulated. Later Second Long Term Health Plan (1997-2017) was developed to operationalize the policy provisions. The main focus then was on improving the health status of women and children, poor, underprivileged and

marginalized population living in the rural areas. The National Health Policy of 1991 also opened up the participation of the private sector in health.

The Interim Constitution of Nepal in 2007 first time accepted health as a fundamental human right. The new Constitution of Nepal, 2015 has also espoused health as a fundamental right by emphasizing equitable access to health services and right to get basic health services free of cost. The Constitution also guarantees that every citizen shall have right to get information about their health care.

To address contemporary health issues in the changing context, government formulated new National Health Policy in 2014. The new health policy emphasizes on access to quality health services; access to health information; access of the poor, marginalized and vulnerable group by adopting equitable and right based approach while developing health programmes; and improved health governance and accountability.

MoH is guided by five-year health strategic plans. The history of five-year planning in health dates back to 2005 when the Sector Wide Approach (SWAp) was introduced and the first Nepal Health Sector Programme 2005-2010 (NHSP) came into effect. In 2010, Nepal Health Sector Programme 2010-2015 (NHSP II) was introduced which mostly followed the same strategic principles of the preceding plan.

Incremental progresses were made in e-Health and health information management under NHSP I and NHSP II. Despite being placed as a prominent strategic direction in both NHSP I and NHSP II, very little progress was made in the integrated approach to information management. Different information systems seldom 'talk' to each other and suboptimal health information governance means the adequate use of information and evidence in decision making remains limited. In 2007 Health Sector Information Strategy (HSIS) was drafted but never really implemented; changes in technological, M&E and health landscape that has taken place since then warrants that this strategy be either revised or replaced. Implementation of e-Health and m-health solutions were not strategically guided during NHSP I and NHSP II periods. The new five-year health strategic plan; however, identifies the need for a national e-Health strategy.

Following the new Constitution and health policy, the third iteration of the health strategic plan – Nepal Health Sector Strategy 2015-2020 (NHSS) – has different sets of strategic directions as compared to the previous plans. The new strategy articulates nation's commitment towards achieving Universal Health Coverage (UHC) and provides the basis for garnering required resources and investments. NHSS puts a much needed emphasis on improving quality of care and strengthening systems such as human resources management, procurement and supply chain and public financial management. It positions health in the centre of overall socio-economic development and seeks multi-sectoral approach to improve the health and well-being of Nepali citizens. The strategy emphasizes on strengthening research and promoting the use of evidence. It also aspires to leverage modern technologies for better health information management. NHSS stands on four strategic pillars:

1. Quality health services
2. Equitable access to health services
3. Health systems reform
4. Multi-sectoral approach

NHSS strives towards the goal to *'improve health status of all people through accountable and equitable health service delivery system*. NHSS stipulates the following nine outcomes to achieve this goal:

1. Rebuilt and strengthened health systems: Infrastructure, HRH management, Procurement and supply chain management.
2. Improved quality of care at point-of-delivery
3. Equitable utilization of health care services
4. Strengthened decentralized planning and budgeting
5. Improved sector management and governance
6. Improved sustainability of health sector financing
7. Improved healthy lifestyles and environment
8. Strengthened management of public health emergencies
9. Improved availability and use of evidence in decision-making processes at all levels

4.3.2 ICT Policy Landscape

ICT policy environment in Nepal started to become more prominent around the turn of the Millennium. The Telecommunication Act and National Telecommunication Policy came into effect in late 1990s and Nepal drafted National IT Policy and Electronic Transaction Act in 2000. With the discourse surrounding the importance of safeguarding intellectual property in digital age, Copyright Act was also stipulated the same year. With the advent of these policy and legal provisions the government became cognizant about better regulating and governing the ICT sector.

The Government of Nepal instituted Ministry of Science and Technology in 1996 and the governance of the ICT sector was put under its purview. However, by the early 2000s there was a realization that ICT traversed across different sectors, which required stewardship and regulation amongst different government line ministries and sectors, and that a single government ministry may not have enough inter-sectoral clout for such an oversight. To address this, in 2003 GoN created High Level Information Technology Commission (HLCIT), an apex government body directly under the chairpersonship of the Prime Minister. The Commission was largely seen as a well-resourced active entity. During its tenure, the Commission put in place e-Governance Master Plan; commissioned research and studies, including the initiation of developing unified codes and interoperability framework; it standardized Nepali font; installed tele-centres in rural areas; and started the concept of establishing an IT Park near Kathmandu. The government; however, dissolved HLCIT in 2011 – a decision that is largely seen as being detrimental to overall ICT development in Nepal. Currently, the ICT sector at large is regulated and governed by several public sector entities: a semi-autonomous National Telecom Authority, Ministry of Information and Communication Technology, National Information Technology Centre under Ministry of Science and Technology, and Controller of Certification Authority, under Ministry of Information and Communication Technology.

These regulatory and governance provisions haven't produced commensurate results in the ICT sector. The main challenges seems to be a lack of strong political commitment, resistance to change, lack of legal clarity, and less than optimum IT infrastructure and standardized processes.

Among many national policies and strategies currently in place to promote and develop ICT sector, few notables ones that have important implications for the health sector are discussed below:

4.3.2.1 *National Information and Communication Technology (ICT) Policy*

The National Information and Communication Technology Policy of 2015 aspires towards the vision of Digital Nepal and recognizes ICT as a potential element to be leveraged to promote knowledge and information to support equality and sustainable growth. The Policy envisages greater Public Private Partnership (PPP) to leverage ICT solutions that are linked with national development objectives and priorities. The Policy also provides the basis for other government sectors, including health, to formulate sector-specific ICT strategies. Through this Policy, the GoN commits to invest and build national ICT and supporting infrastructures, including expanding access to broadband connectivity.

The Policy aims to establish Nepal on the top second quartile of the international ICT development index and e-government rankings by 2020. To achieve this aim, the Policy aspires to make 75% of Nepal's population digitally literate with 90% of the population having access to broadband connectivity. It envisions marked increase in the contribution of ICT industry in the national economy with at least 7.5% contribution of the GDP coming through the ICT industry by 2020.

Apart from ICT's potential to facilitate better governance with more transparent and efficient bureaucracy, the Policy recognizes the potential of ICT to significantly improve the health sector by expanding outreach services and making the health systems more efficient. The National ICT Policy stipulates the following health specific provisions:

- A detailed strategic framework to improve access to quality healthcare services through the use of ICT and other modern technologies.
- Increased investment in ICT-based healthcare systems (e-Health/m-health), including comprehensive telemedicine programme, to increase the access to modern health care services
- A collaborative approach in promoting ICT in health involving public, private and civil society actors.
- A legal or regulatory framework to govern health information and ensure security measures to safeguard the privacy of patient information.
- Measures to safeguard possible effects on human health caused by prolonged exposure to radio signals and electromagnetic fields arising out of the installation and placement of communication infrastructure
- Promotion of basic communication services and Internet access points near health facilities
- Provision of a toll-free services to not-for-profit actors working in health promotion and counselling

The National ICT Policy outlines health sector specific strategies to operationalize these policy provisions.

4.3.2.2 *Nepal e-governance Interoperability Framework*

Nepal e-government interoperability framework was developed by HLCIT in 2010 to support the government information systems to work together in an integrated manner regardless of the underlying technology or application in use. Major guiding principles of the framework are:

- **Interoperability:** The framework recommends standards and specifications to make systems interoperable and also recommends the use of free and open software systems (FOSS) in government sectors whenever possible

- Share, re-use and collaborate: The framework promotes the ICT standards to be shared, reused and be collaborative in nature among different government sector
- Scalability: The framework proposes scalable standards
- Adherence to open standards: The standards, where available, be recognized and adopted by internationally recognized bodies

4.3.2.3 *Electronic Transaction Act*

This act is instrumental in validating and providing legal recognition to electronic documents, electronic signature and electronic transactions. The act has stipulated legal provisions on electronic data transactions and digital signatures. It allows government and public entities to use electronic means for processes like bidding and tender, vacancy announcements and acceptance of electronic applications. Furthermore, the act articulates various provisions curb cybercrimes. It defines legal implications for various types of cybercrimes includes hacking, piracy, and digital copyright violation.

4.3.2.4 *Telecommunication Policy*

The Telecommunication Policy of 2004 replaces the preceding policy of 1999. The main objective of the policy is to create favourable environment for making telecommunication service reliable and accessible to all people at reasonable cost. It aspires to develop telecommunication sector to support the social and economic development of the country in collaboration with the private sector. The policy has undertaken universal access to telecommunication services as one of its strategic pillars and gives special emphasis on expanding the services to rural areas.

4.4 E-Health Initiatives

Apart from establishing various IT-based health information systems in the public sector such as HMIS, LMIS, HuRDIS, TABUCS, etc. Nepal has been dabbling with various e-Health initiatives for about a decade ago. Even though there is no formal stocktaking of these different initiatives, few noteworthy initiatives are discussed here. In 2004, HealthNet Nepal conducted a pilot project for telemedicine in Nepal. It aimed to pilot the potentials of store and forward methods in pathology, dermatology and radiology. Likewise, Om Hospital and Research Centre collaborated with Apollo Hospital in India in 2004 and started a telemedicine programme. The programme supported medical doctors in seeking assistance for diagnosis, treatments plans, e-conference. In 2006, Nepal Wireless Networking Project was established by connecting a hospital in Pokhara with a health post in Nangi Village. The Project expanded to connect 10 remote health posts and hospitals with Kathmandu Model Hospital. Similar initiative also started in Dhulikhel Hospital to provide telemedicine services to outreach centres.

In 2010, MoH started a rural-telemedicine program in 25 rural district hospitals which was eventually expanded to further five districts. It provided services through store and forward method, video-conferencing and hotline service “Hello-Health”. National Health Education, Information and Communication Centre (NHEICC) has started the use of mobile phones to disseminate information on sexual and reproductive health. NHEICC has developed National Health Communication Policy 2012, which emphasizes use of electronic means and media for health education, information and communication.

In addition, there are a number of small scale, emerging and pilot e-Health/m-health initiatives supported by different partners and stakeholders such as Save the Children, PSI Nepal, Medic Mobile, etc. WHO and UNICEF also support the piloting of VaxTrac system that uses hand-held devices to record and track vaccinations.

5 Vision and Mission Statements

Vision

E-Health facilitates the delivery of equitable and high-quality healthcare services to enable all Nepali citizens to enjoy productive and quality lives

Mission

E-Health solutions strengthen Nepal's health systems by improving the use of information and evidence in planning, managing and supporting public health and clinical interventions

6 Guiding Principles and Strategic Pillars

The National e-Health Strategy is guided by the following four overarching principles:

1. Respects people's right to health information
2. Ensures that e-Health approaches and solutions are centred around: population at large, health clients, service providers and health workers, and public health managers and decision makers.
3. Fosters collaboration and partnership with state and non-state actors
4. Strives for cost-effective, standardized, efficient, interoperable and user friendly e-Health solutions and applications

The National e-Health Strategy stands on the following three strategic pillars:

1. **GOVERNANCE AND FOUNDATION**
This pillar covers basic infrastructure required to enable the effective electronic sharing of information across the health sector which includes *standards and interoperability, legislation, policy and compliance, leadership, coordination mechanism* to ensure successful implementation of e-Health initiatives. This also includes investments for the different e-Health initiatives.
2. **CHANGE AND ADOPTION (HUMAN RESOURCE AND CAPACITY)**
This pillar covers actions that need to be carried out to encourage and enable participants in the healthcare system to adopt e-Health solutions and change their work practices to be able to use these solutions effectively.
3. **SOLUTIONS (SERVICES AND APPLICATIONS)**
This pillar covers ICT systems and tools to address the high-priority needs of population, health clients, service providers and health workforce, and healthcare managers and decision makers.

7 Goal

The goal of the National e-Health Strategy is to harness the potential of ICT technologies to improve health services, health governance and management

8 Outcomes

The outcomes are grouped according to their intended beneficiaries, i.e. population at large, health clients, health workers, and public health managers and decision makers

Population

- Outcome 1.* Facilitate promotion of healthy life styles, protection from diseases, reducing risk behaviours
- Outcome 2.* Deliver risk alerts for public health outbreaks and emergencies

Health Clients (Service Seekers)

- Outcome 3.* Improved availability and access of general and specialized healthcare services
- Outcome 4.* Increased compliance, adherence and satisfaction toward health services whilst increasing individual responsibilities for personal health

Health Workers

- Outcome 5.* Improved enabling environment and capacity for the delivery of safe and effective health services

Public Health Managers and Decision Makers

- Outcome 6.* Enhanced access to data and information for effective planning, management, governance and evidence based decision making

9 Strategic e-Health Interventions

The strategic interventions are written for each of the e-Health outcomes. Those that are in bold are prioritized interventions which will be elaborated further in Prioritized eHealth Action Plan.

| SN | eHealth Outcomes | Governance and foundation | Change and adoption (HR and capacity) | Solutions (Services and applications) |
|----------|---|--|--|---|
| 1 | Population | | | |
| 1.1 | Facilitate promotion of healthy life styles, protection from diseases, reducing risk behaviours | <ul style="list-style-type: none"> • <i>Collaboration with Community e-Centres (CeC) to deliver health messages and information to the communities</i> • Collaboration with related stakeholders to increase internet, mobile and mass media network coverage | <ul style="list-style-type: none"> • Increase public awareness regarding availability of eHealth solutions and services to promote its use • Encourage ICT service providers for delivering promotional and preventive messages | <ul style="list-style-type: none"> • Develop and deliver mobile, web and social media based health message and information applications • Develop a national web-portal to avail all information through one point of access • Operate health hotlines to improve awareness and knowledge of the population in contemporary health issues (toll-free) |
| 1.2 | Deliver risk alerts and response for public health outbreaks and emergencies | <ul style="list-style-type: none"> • Develop and implement standard protocol/guidelines and standards for delivering risk alerts | <ul style="list-style-type: none"> • Strengthen capacity to identify and develop risk alerts and response | <ul style="list-style-type: none"> • Develop, implement and strengthen real-time surveillance and disease modeling based on the data from different sources – HMIS, EWARS, DSS etc. • Establish and strengthen risk alert and response system in case of public health outbreaks and emergencies. |
| 2 | Clients (service seeker) | | | |

| SN | eHealth Outcomes | Governance and foundation | Change and adoption (HR and capacity) | Solutions (Services and applications) |
|-----|--|---|--|--|
| 2.1 | Improved availability and access of general and specialized healthcare services | <ul style="list-style-type: none"> • Institutionalize and strengthen National TeleHealth technical unit to oversee and guide the TeleHealth activities • Institutionalize and strengthen TeleHealth centers • Establish reliable network connectivity in all telehealth centres | <ul style="list-style-type: none"> • Develop and implement user friendly telemedicine consultation mechanism and platform • Strengthen capacity of the health workers to use TeleHealth services and applications • Community awareness regarding the availability of TeleHealth services (including hello health) | <ul style="list-style-type: none"> • Strengthen telemedicine and mHealth services to link specialized medical experts at central level with community health workers and volunteers • Develop ICT-enabled platforms to help chronic and long-term patients to help them (information what they should do, how and when) • Develop and implement medical consultation using call centre approach (hotline and toll-free) |
| 2.2 | Increased compliance/adherence and satisfaction toward health services whilst increasing individual responsibilities for personal health | <ul style="list-style-type: none"> • Support drive towards CRVS and development of client identifiers for use by health services | <ul style="list-style-type: none"> • Train and orient health workers to use the related applications and software | <ul style="list-style-type: none"> • Develop, implement and expand patient tracking systems – web and mobile based (HIV/AIDS, TB, MDR TB, ANC/PNC/Delivery, Immunization, Chronic and long term treatment required cases etc.) • Develop mechanism to send appointment reminder messages • Use digital personal health records |

| SN | eHealth Outcomes | Governance and foundation | Change and adoption (HR and capacity) | Solutions (Services and applications) |
|----------|---|---|--|--|
| 3 | Health workers (Service providers) | | | |
| 3.1 | Improved enabling environment and capacity for delivery of safe and effective health services | <ul style="list-style-type: none"> • Strengthen the eHealth policy and supporting environment • Improve availability and utilization of standard ICT logistics (equipments) in the health facilities • Develop protocols and guidelines for implementing telemedicine services (SoP) • Define national standard for eHealth information storage and use based on international standards such as HL7, ICD, etc. • Identify appropriate referral network and establish linkages | <ul style="list-style-type: none"> • Improve knowledge and skills of health workers (including health volunteers) on eHealth • Promote health workers to use ICT solutions and applications • Include eHealth content in the course curriculum of different level health courses | <ul style="list-style-type: none"> • Digitalize national medical standard and clinical protocol and make available to the health workers • Facilitate continuous health and medical education by creating adequate e-learning environment • Explore development of a standard nationwide health information systems for hospitals and primary care services in a phase-wise manner |

| SN | eHealth Outcomes | Governance and foundation | Change and adoption (HR and capacity) | Solutions (Services and applications) |
|-----|---|--|--|--|
| 4 | Public Health Managers and Policy Makers | | | |
| 4.1 | Enhanced access to data and information for effective planning, management, governance and evidence based decision making | <ul style="list-style-type: none"> • Establish interoperability layer for health information systems by adopting standard enterprise architecture and codes • Ensure availability of electric power to run electronic devices in collaboration with NEA and alternate source of energy • Develop and enforce minimum standard for data reporting from both state and non-state actors • Establish national health data bank and ensure security of data establishing multiple backups in different locations • Develop and rollout data sharing standards and protocols | <ul style="list-style-type: none"> • Capacity enhancement of managers and policy makers in the area of eHealth policy and strategic management – long and short term courses in collaboration with academia • Promote the use of the existing information systems for decision making , monitoring and planning | <ul style="list-style-type: none"> • Ensure quality health information from different sources available to the programme managers (user friendly dashboards) – inbuilt data validation and triangulation mechanism • Strengthening of existing health information systems – electronic record system, e-reporting (web and mobile) and e-monitoring systems, including supply chain monitoring and management system • Introduce office automation at state and non-state health institutions as a gradual transition towards paperless office |

10 Institutional Arrangements and Prerequisites

There are institutional arrangements and certain prerequisites which needs to be addressed and put in place successfully implement the National e-Health Strategy. These are:

- Constitute and institutionalize National e-Health Steering Committee and e-Health Task Force to govern the strategy
- Institutionalize the e-Health Unit at MoH and staff it with skill-mixed human resources
- Garner required resources and technical assistance;
- Develop Prioritized e-Health Action Plan and capture it in subsequent Annual Work Plan and Budget (AWPBs);
- Put in place legal provisions, for example, through Health Information Act, to regulate data use, data privacy and confidentiality issues
- Develop the monitoring framework and review the implementation status of National e-Health Strategy using existing review platforms, including during the Mid-term Review (MTR) of NHSS