Evaluation of the WHO support provided to strengthen Health Information Systems (HIS) in Nepal

Dr. P K Amarnath Babu, MBBS, MPH, PHIF
Hare Ram Bhattarai, MIS

November 2019

This report is produced with support from WCO/Nepal under the terms of contract WHO Registration 2019/895257-0 Purchase Order 202220950.

ACKNOWLEDGMENTS

The evaluators would like to thank the WHO Representative to Nepal and WCO Nepal for providing us this evaluation opportunity, supporting our activities and being very receptive to the findings and recommendations.

The Evaluators would like to acknowledge and thank the Officials of Ministry of Health and Population and various health departments, External Development Partners, Gandaki Province Health Directorate, Gandaki Zonal Hospital and Pokhara Emergency Health Response field office for their time, efforts and inputs towards this assessment. We highly appreciate the constructive and valuable feedback based on which, the evaluation report is developed.

Special thanks to Dr. Susheel Chandra Lekhak, National Professional Officer, Program Monitoring and Evaluation (PME) for his excellent co-ordination and Ms. Deepa Shrestha, Assistant, PME for her administrative and logistic support.

We extend our gratitude to Dr. Roderico Ofrin, Regional Emergency Director and Dr. Sirenda Vong, Programme Area Manager- Health Information Management (HIM) at WHO-SEARO for their support by authorizing Dr. Amarnath Babu to undertake this evaluation.

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ACRONYMS

DC	Communicable Disease Control Team
CCS	Country Co-operation Strategy
CRVS	Civil Registration and Vital Statistics
DFID	Department for International Development
DHIS2	District Health Information System 2
EDCD	Epidemiology and Diseases Control Division
EDP	External Development Partners
EWARS	Early Warnings and Response System
FTE	Full Time Equivalent
FWD	Global Health Expenditure Database
GHED	Family Welfare Division
GIZ	Deutsche Gesellschaft Fuer Internationale Zusammenarbeit
GPW	General Programme of Work
HEOC	Health Emergency Operation Centre
HIM	Health Information Management
HMIS	Health Management Information Systems
HIM	Health Information System
HMIS	Hospital Safety Index Plus
HIS	Health System Strengthening
HSI Plus	International Agency for Research on Cancer
HSS	Immunization Preventable Diseases
IARC	Leprosy Control and Disability Management Section
IPD	Low- and Middle-Income Countries
LCDMS	Monitoring and Evaluation
LMIC	Ministry of Home Affairs
M&E	Ministry of Federal Affairs and Local Development
MOHA	Ministry of Health and Population
MOFALD	Maternal and Perinatal Death Surveillance and Response
MOHP	National Centre For AIDS and STD Control
MPDSR	National Health Accounts
NCASC	Nepal Health Facilities Survey
NHA	Nepal Health Research Council
NHFS	Nepal Health Sector Support Program
NHRC	National Professional Officer
NHSSP	National Tuberculosis Center
NPO	Programme Monitoring and Evaluation
NTC	Policy, Planning and Monitoring Division
PME	
PPMD	

NCD	Non-Communicable Diseases
NDHS	National Demographic and Health Survey
NTD	Neglected Tropical Diseases
SEARO	South East Asia Regional Office
SC	Save The Children
SDG	Sustainable Development Goals
UNFPA	United Nations Population Fund
USAID	United States Agency for International Development
VPD	Vector Preventable Diseases
WCO	WHO Country Office
WHE	WHO Health Emergency
WHO	World Health Organization
UHC	Universal Health Coverage

Executive Summary

Nepal has demonstrated consistent progress over the years in strengthening its health information system (HIS) by utilizing information and communication technology in various areas ranging from country-wide implementation of HMIS, institutionalizing surveillance and surveys, establishing National Health Accounts (NHA), and promoting Electronic Health records (EHRs) to use in allied services like health logistics. In this endeavor, WCO Nepal has been providing technical assistance, implementation and operational support to MOHP for a long period. As Health Information System is one of the building blocks of the WHO's Health Systems Strengthening Framework, it is imperative for WCO to continue the support.

In the context of ongoing federalization process in Nepal and recent WHO's priorities viz Sustainable Development Goals (SDGs), Universal Health Coverage (UHC) and strategic directions of WHO's 13th General Programme of Work (GPW13), WCO decided to evaluate existing HIS support and strategically plan future HIS supports in the changed context.

For this purpose, WCO-Nepal engaged a two-member team of independent evaluators (one National and one International) to evaluate WCO's current HIS support areas, modality, and extent with respect to its relevancy, appropriateness, sustainability and degree of collaboration with Government and other external development partners.

The evaluators reviewed existing documentation, interviewed officials of MOHP/DOHS (n=17), WCO (n= 15), few External Development Partners (n= 4) and field offices (n= 6). For the interviews with Ministry officials, though detailed responses could not be elicited as per the questionnaire due to limited time of the interview than required, but the evaluators managed to obtain feedback on the key aspects of HIS support. Data on expenditure by Country office departments/units were provided by WCO Nepal.

Findings show that WCO Nepal provides support to strengthen information systems ranging from Disease Surveillance including Vector Preventable Diseases, to routine HMIS to Population Surveys etc. in Nepal. The modality of support ranges from Technical assistance to design, development and implementation of strategies, roadmaps and systems, providing human resources, capacity building, procurement of hardware/software and dissemination of data and use.

WCO Nepal spent USD 5.56 M towards above-mentioned various HIS supports for three years between 2016 and 2018. Detailed findings/feedback are articulated as a SWOT analysis on the overall HIS status of Nepal and the HIS support provided by WCO-Nepal perceived by the various stakeholders viz MOHP, WCO and EDPs. **The key findings are also presented in terms of *Relevancy, Appropriateness, Sustainability* and ability to forge *Partnership* with MoHP and EDPs for the HIS Support.**

For the support provided so far, there was a positive feedback from the MoHP and EDPs, especially in domain areas like disease surveillance including IPD surveillance where WHO is the only technical agency supporting the Ministry. The respondents perceived that WHO has the ability and flexibility to provide

support independently or collaborate with other EDPs to strengthen HIS. The HIS support plan within WHO country office almost always gets reflected in the Government workplan which gives an edge to WHO to extend support. The overall feedbacks were that the HIS support provided by WCO were relevant, appropriate and sustainable in some areas like HMIS. However, respondents perceived that WHO as a technical agency par excellence should play a more strategic role in HIS support rather than provide siloed support and shift its focus more in the areas of developing National HIS Strategy/Vision, technical facilitation and assistance for ensuring sustainability, data and interoperability standards, support institutionalizing the information system and promote use of information at all levels etc.
Considering the changing context- federalization, Ministry officials at the time of interviews, opined that WHO in addition to supporting at the National level should also extend support at the provincial and local Government levels. It is now learnt that, WCO has mobilized human resources at provincial levels, but it is to be seen how WCO will strategically mobilize them to strengthen HIS at sub-national levels.

The External Development Partners appreciate the past and ongoing collaborations with WCO-Nepal in HIS strengthening work and are looking forward to more collaborations when planned in advance and willing to support WHO to lead the development of HIS National Strategy, action plan, health information policies, architecture blueprints road maps, and overall federated HIS vision for Nepal. Key takeaways of the SWOT analysis are illustrated in figure 1 below.

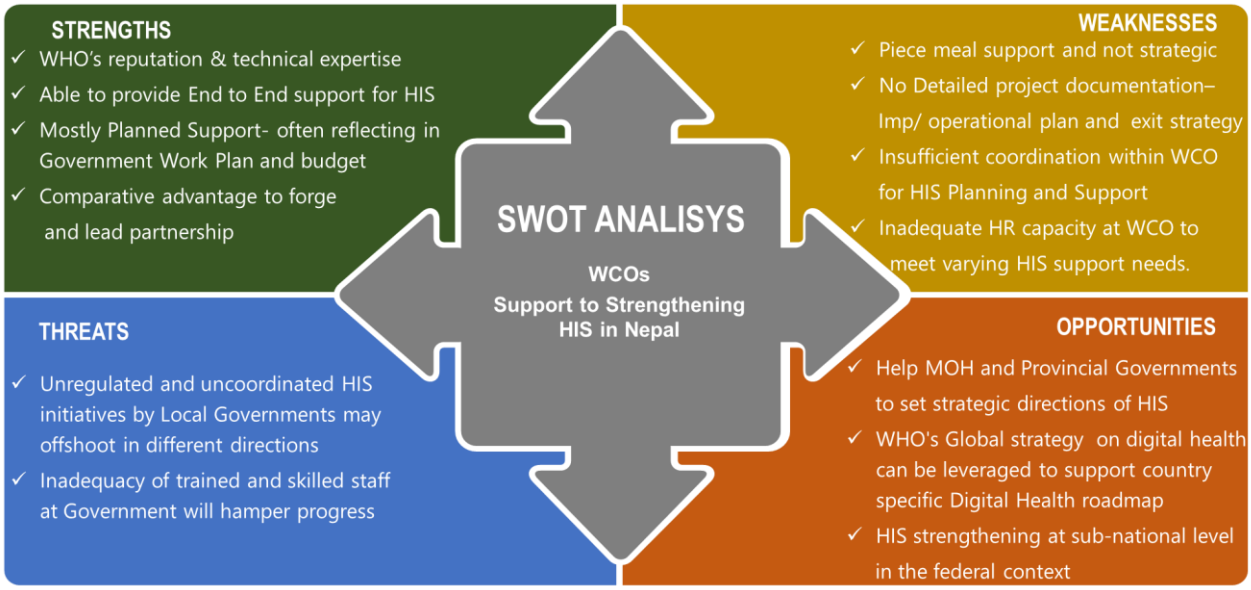


Figure 1: Key highlights of SWOT analysis on the feedback received

Based on the findings, recommendations have been provided. The set of recommendations shall serve as a guidance for future designing and planning of HIS support and ensuring continuous assessment and updating as per changing context.

To be more strategic in providing a comprehensive and coherent HIS Support, a HIS Technical working group may be created within WCO, which will oversee and review all HIS support provided by WHO in

Nepal including data analysis and use. As a key technical advisor of MOHP, WCO should ensure that data required for monitoring SDG, GPW13 and UHC, and other global indicators are available and of sufficient quality and the HIS support plans as per the CCS are fulfilled. However, the different HIS support should be supported by strategic vision and approach.

As indicated in the recently published draft on WHO's Global Strategy on Digital Health Strategy (2020-2024), WCO should support the country to adopt, own, evolve and strengthen its digital health capacity in a way that best suits its vision, context, and availability of resources. This is also a recommendation based on this evaluation findings. While extending this support, WCO Nepal should ensure that the digital health strategy of Nepal should incorporate standards-based and increasingly interoperable health information systems including HMIS, EHRs, population surveys, morbidity and mortality surveillance, registries, national health accounts (NHA), Logistics information systems etc.

Section I: Background

WHO Country Office Nepal has been providing support to Strengthen Health Information Systems (HIS) in Nepal over several years. HIS includes Routine Health Information Systems, Disease Surveillance- Both Indicator based and Event, Public Health Surveys, Civil registration and Vital statistics (CRVS), Various registries and National Health Accounts. The support ranges from Selection of data elements/indicators, development and deployment of software, and implementation including human resources support and technical assistance, capacity building and training, policy, guidelines and advocacy etc.

Moreover, WHO is working closely with health sector development partners, mainly USAID, DFID, GIZ, UNICEF and UNFPA to conduct national surveys, development of a health facility registry, and expansion of electronic online data collection and reporting, data analysis and dissemination, and measurement and reporting of health indicators.

WCO Nepal perceived that their support to the Ministry in establishing immunization preventable disease surveillance, health information management support provided aftermath of the earthquake in 2015 to improve disaster response, support to National Health Accounts, migrating HMIS software to DHIS 2 platform were well appreciated. However, WCO Nepal feels that the progress and support are not uniform throughout the different areas of health information systems.

WCO wanted to carefully review the existing HIS support and develop appropriate strategic approaches to better support the Government in strengthening HIS by also factoring in the newer developments such as (i) eHealth strategy, (ii) information need for SDGs, (iii) WHO's new thirteenth General Programme of Work (GPW13) for the period 2019 – 2023, (iv) WHEs mandate to support outbreak prone disease surveillance system, (iv) new country cooperation strategy 2018 – 2022 (v) country's changing governance system.

WCO Nepal decided to evaluate the past and ongoing HIS supports in terms of relevancy, appropriateness, sustainability and ability to forge partnerships to leverage resources with other stakeholders and based upon which design future HIS support. WCO Nepal engaged two independent evaluators to undertake the evaluation.

Section II: Evaluation

Objectives

The main objective of the evaluation is to assess the contribution, approach, appropriateness and relevancy of WCO's support to strengthen HIS and to help strategically plan future supports.

Evaluation questions:

The evaluation questions originally envisaged for this evaluation were

1. What has the support actually delivered by WHO been able to contribute to strengthen health information systems in Nepal?
2. To what extent has the intended support of WHO to develop / strengthen HIS been delivered?
3. What are issues and challenges that prevented full delivery of intended support?
4. What are the additional contributions largely attributed to WHO HIS support?
5. Are there any unintended additional results?
6. What are the key challenges faced by WHO interventions in this area at the level of inputs, processes, outputs, outcomes and impact?
7. What changes, if any, ought to be made to the current working modality and strategy to ensure that future interventions are: based on comparative advantages, tailored to the country needs, effective and efforts are sustained in the context of both internal and external changes / developments?
8. Are there any good examples of collaborations facilitated by WHO to improve health information systems in Nepal?
9. What would be the WHO's role in forging partnership among key stakeholders and partners working in the area of health information systems?

During the Phase I evaluation when the evaluation tool was finalized, it was jointly decided by the evaluators and WCO to modify the evaluation questions that some of the above evaluation questions would be beyond the scope the evaluation considering the efforts needed and timeline of the evaluation. Hence the following set of evaluation questions were agreed upon.

1. What are the health information systems supported by WCO Nepal and what is the nature of the support?
2. What are the challenges and barriers faced by WCO Nepal in supporting the various HIS initiatives in Nepal?
3. How is WCOs support perceived by the Government counterparts as well as the other partners working in HIS?
4. What are the future needs for strengthening HIS in Nepal?
5. Who are the other partners involved in strengthening HIS in Nepal and how WCO Nepal can effectively collaborate?

Methodology:

Evaluation Framework:

The evaluation was generally based on the Health Metrics Network- Assessment tool (WHO, 2008) and Measure Evaluation's Health Information System Strengthening Model (MEASURE Evaluation, 2017)

Note: While there are tools (e.g. WHO SCORE assessment tool) and guidelines for evaluating National Health Information Systems per se, such resources for evaluating the support for strengthening National HIS were not found.

1. The HMN Framework:

The Health Metrics Network (HMN) was launched in 2005 to help countries and other partners improve global health by strengthening the systems that generate health-related information for evidence-based decision-making.

As illustrated in the figure 2, the left-hand column lists the components and standards of a Health information system and the right-side column lists the guiding principles, processes and tools which together will provide for a roadmap for strengthening HIS.

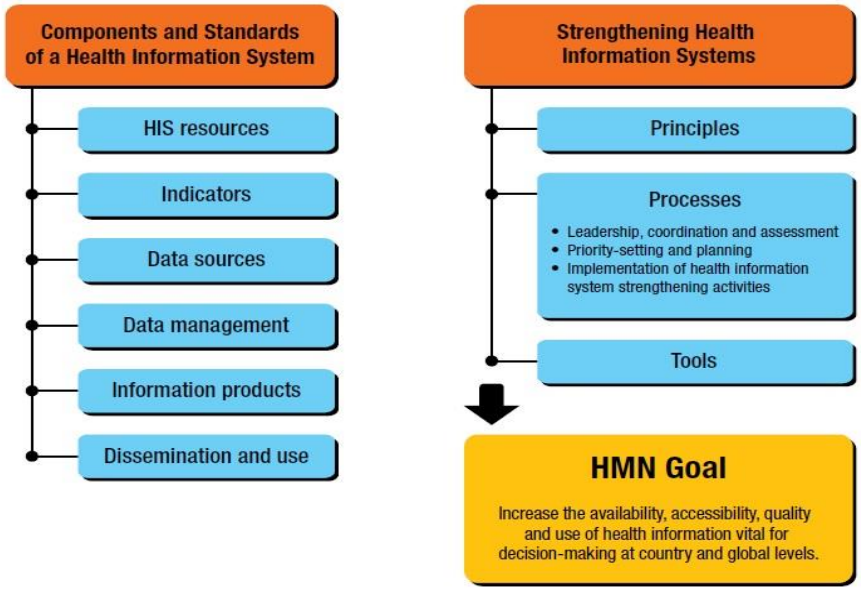


Figure 2: HMN Framework for Developing and Strengthening of HIS

2. Health Information Systems Strengthening Model (Measure Evaluation):

Health Information System is described as an ecosystem with various interlinked and inter-connected components. The Health Information Systems Strengthening Model for Low- and Middle-Income Countries (LMICs) developed by Measure Evaluation, depicted in figure 3, illustrates the following key components

Human Element- Refers to all people who interact with the information system and strengthening efforts involve effective management of HIS workforce to develop, plan, implement, use and in turn strengthen the HIS; for the user, strengthening involves capacity building.

Enabling Environment- This is sub divided into the following two domains

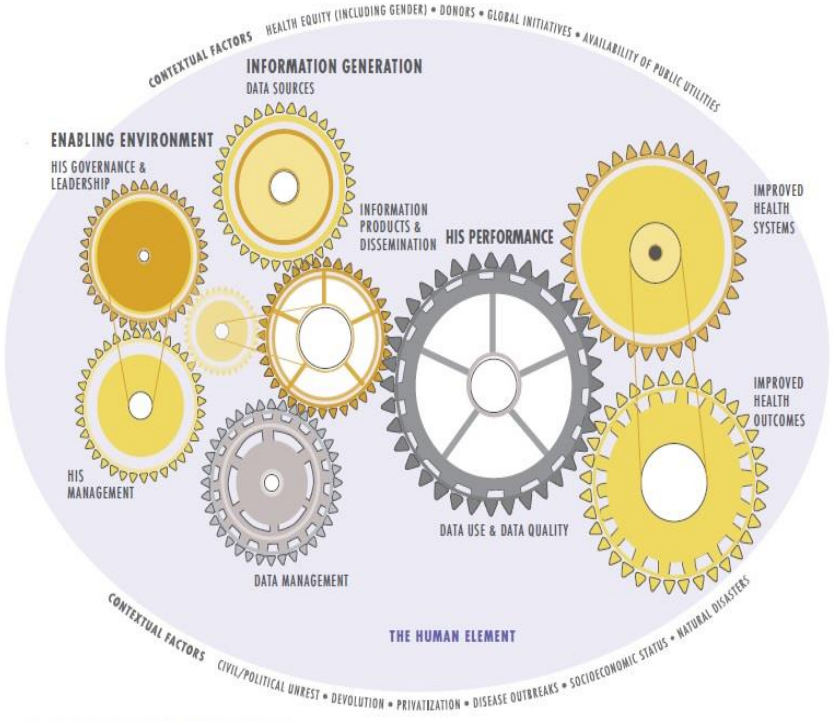


Figure 3: Health information System Strengthening Model

HIS Governance and Leadership: Includes Legislation around health information including data privacy, security and confidentiality, Governance structure, Policies and Standards

HIS Management: Financing, HR, Capacity building, information management and infrastructure development.

Information Generation- Refers to the entire process of collecting, cleaning, processing, managing and analyzing health and health related data from a variety of sources and their dissemination. Includes data from institution and population-based data sources.

HIS Performance- Ensure high quality data for decision making at all levels and data use.

Contextual Factors- Country-Specific factors and priorities that influence strengthening of HIS.

Evaluation Tool:

Broadly based on the above frameworks, semi-structured interview schedules were separately developed for data collection from Ministry Staff, WCO and other EDP staff. The interview schedule focused on the **HIS areas of Governance**, **objectives and need**, **support received/provided**, **development process**, **implementation and use of ICT**, **Outputs**, **information use**, **supporting Partners**, **Challenges in Support**, **Perceived success**, **barriers to achieving success**, **sustainability and future needs**. The interview schedules are included in Annex I.

Evaluation Process:

Timelines:

Primary data were collected in two phases- Phase I (Apr 15-24, 2019) and Phase II (April 25-June 15, 2019). Secondary data- Cost related data were extracted from GSM and provided by WCO Nepal. The timeline is illustrated in figure 4 below.

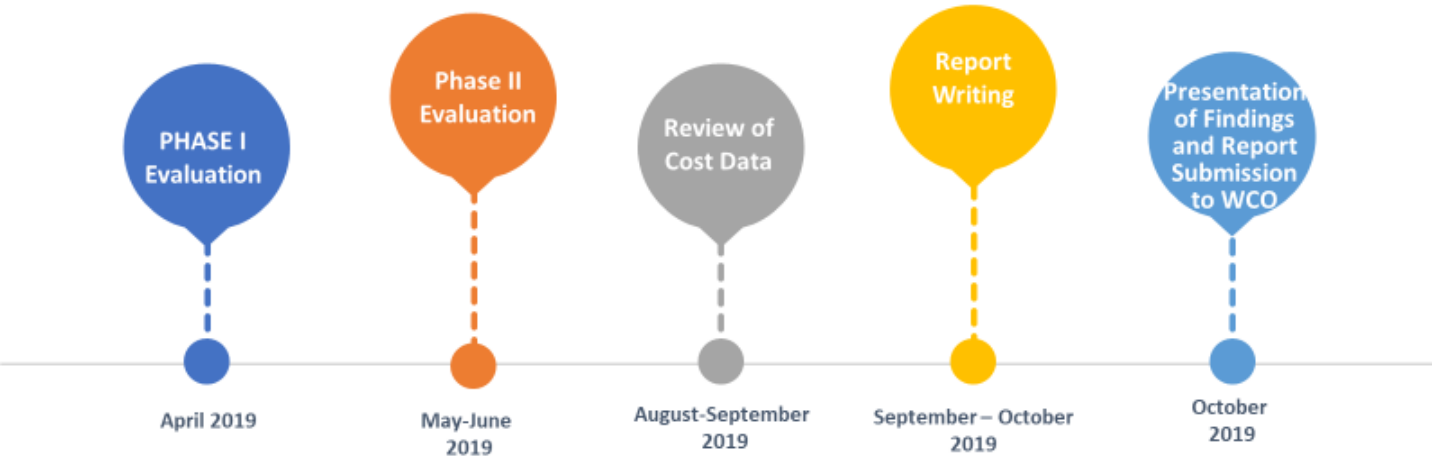


Figure 4: Timeline of evaluation activities

Inclusion and Exclusion Criteria:

Only the HIS for which WCO Nepal provides/provided support in the past were considered and included for the evaluation; all other HIS in Nepal where WCO Nepal did not participate or provide support were excluded.

Phase I Assessment (April 15-24, 2019):

The objectives of the Phase I assessment were

1. Desk review of relevant documents provided by WCO Nepal and other partners
2. Develop detailed evaluation methodology and data collection tools.
3. Document the various support (technical assistance and other supports) provided by WCO Nepal to strengthen Health Information Systems
4. Obtain feedback from the Ministry of Health officials and other external development partners on the support provided by WCO to strengthen Nepal's HIS.

Table 1 below shows the number of interviews conducted.

Organization	# of respondents interviewed
Ministry of Health and Population	5
WCO Staff	15 (interviews conducted as teams)
EDPs	3 (DFID, GIZ and NHSSP)

Table 1: Number of interviews undertaken in Phase I

Phase II Assessment (April 25- June 15, 2019):

The objectives of the Phase II assessment were

1. Collect detailed information on specific information systems supported by WCO.

2. Conduct field visits to observe operation and collect end-user feedback of selected Information Systems
3. Prepare and submit progress report
4. Prepare and submit this final report

Table 2 below highlights Phase II activities

Table 2: Interviews and Activities in Phase II

Organization	# of respondents interviewed
Ministry of Health and Population	12
WCO staff	Additional information collected as needed
EDPs	1 (USAID)
Academic Institutions	2 (BPKIHS, Dharan)
Field Visits	4 (Gandaki province – Provincial health director, Zonal hospital Medical Recorder, IPD Surveillance Officer and Information officer of HEOC)

The list of documents reviewed, list of interviewees and facilities visited during phase II are provided in Annex II.

Limitations of the Evaluation:

For most of the Interviews with the Ministry Staff, the evaluators could not get adequate information for all the questions as per the interview schedule due to challenging time schedules, however it was ensured that responses for major evaluation areas were obtained.

The financial data on costs for various phases of planning, development, deployment, operation, and maintenance for the HIS solutions and support were available after the interviews were completed, so system specific-cost related questions were not part of the interview schedule. Item wise cost (e.g. cost for infrastructure, HR, training, Software development etc.) for HIS strengthening was not available. Detailed project documents for different HIS that were evaluated were also not available for review.

Section III: Overview of HIS Concepts:

Health Information System:

Health Information System is an umbrella term encompassing all information systems including individual patient records, disease wise reporting system, health facility wise reporting system, population level surveys, morbidity and mortality surveillance, and all other health data sources. The individual systems could range from independent systems to interconnected or integrated systems, could be localized or centralized system, web based/electronic or paper based, case based or aggregate data reporting. The health information system deals with collection, transmission, processing, storage and analysis of data on health and health care. The resulting output arising out of the varied information systems are used for health-related decision making at different levels of the health system.

WHO identifies Health Information as one of the six building blocks of the health system. A well-functioning HIS is one that ensures the production, analysis, dissemination and use of reliable and timely information on health determinants, health systems performance and health status (WHO, 2007). The health information system provides the underpinnings for decision making and has four key functions- data generation, compilation, analysis and synthesis and communications and use (WHO, 2010).

In the last two decades, owing to technological advancements and affordability, more of Information and Communication Technology has been leveraged as an integral component enabling improvements to the overall functioning and efficiency (timeliness, accuracy etc.) of Health Information Systems. Health information that is of high quality, reliable, affordable and accessible- and the capacity to understand and use it – is a hallmark of empowerment. And empowerment-informing choice for citizens and health professionals alike- is another driver for eHealth (WHO and ITU, 2012).

Digital Technologies for HIS

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

mHealth (mobile health) is defined as the use of mobile devices- such as mobile phones, patient monitoring devices, personal digital assistants (PDA) and wireless devices- for medical and public health practice. *Digital Health* (WHO, 2019) means “the field of knowledge and practice associated with the development and use of digital technologies to improve health” Digital Health encompasses eHealth and mHealth.

The World Health Assembly in 2018 acknowledged the potential of digital technologies to advance the Sustainable Development Goals and in particular to support health systems in all countries in health promotion and disease prevention and by improving the accessibility, quality and affordability of health services. The WHA inter alia urges members states to assess their use of digital technologies for health including health information systems at national and sub-national levels to identify areas for

improvement, to consider how digital technologies could be integrated into existing health systems, to work towards and support interoperability of digital technologies for health by one among many things promoting use of international and open standards etc.

One of the guiding principles for the development of the Global Strategy on Digital Health (dealt in later section) is that, appropriate use of digital technologies promotes Universal health coverage in countries and for that, adoption and use of digital technologies should be guided by a robust National strategy.

As depicted in figure 2 all components are interconnected as interlinked cogs and strengthening one component will have cascading effect on the others. All these components are applicable and part of the HIS ecosystem in Nepal as well.

Recent Development: WHOs Global Strategy on Digital Health (WHO, 2019)

In 2013, WHO Member States endorsed a resolution on eHealth standardization and interoperability (WHA66.24), which urged countries "to collaborate with stakeholders to draw up a roadmap for implementation of eHealth and health data standards at national and subnational levels" and "to develop policies and legislative mechanisms linked to their national eHealth strategies".

In May 2018, the Seventy-First World Health Assembly (WHA) passed Resolution WHA71.7 on Digital Health. Amongst other topics, the Resolution requested the Director-General "to develop in close consultation with Member States and with inputs from stakeholders, a global strategy on digital health, identifying priority areas including where the World Health Organization (WHO) should focus its efforts".

Following this the Global strategy was developed and outlines four strategic objectives and a framework for action (WHO, 2019) to achieve the objectives with the larger vision to improve health for everyone, everywhere by accelerating the development and adoption of appropriate digital health solutions towards achieving health-related SDGs and the GPWs triple billion targets.

Strategic Objectives:

1. Promote global collaboration and advance the transfer of knowledge on digital health
2. Advance Implementation of National Digital Health strategies
3. Strengthen Governance for Digital Health at Global, Regional and National levels
4. Enhance people-centered health systems enabled by Digital Health

The guiding principles are

- Acknowledge that the digital health adoption process is a country's decision
- Recognize that successful digital health initiatives require a unified strategy
- Promote the use of appropriate use of digital technologies
- Recognize that there is a pressing need to address the major impediments that least-developed countries face in engaging with and accessing digital health technologies.

The targets, policy options and actions are guided by a digital health enabling environment illustrated in figure 5 below to help countries to leverage the Global strategy for achievement of national priorities.

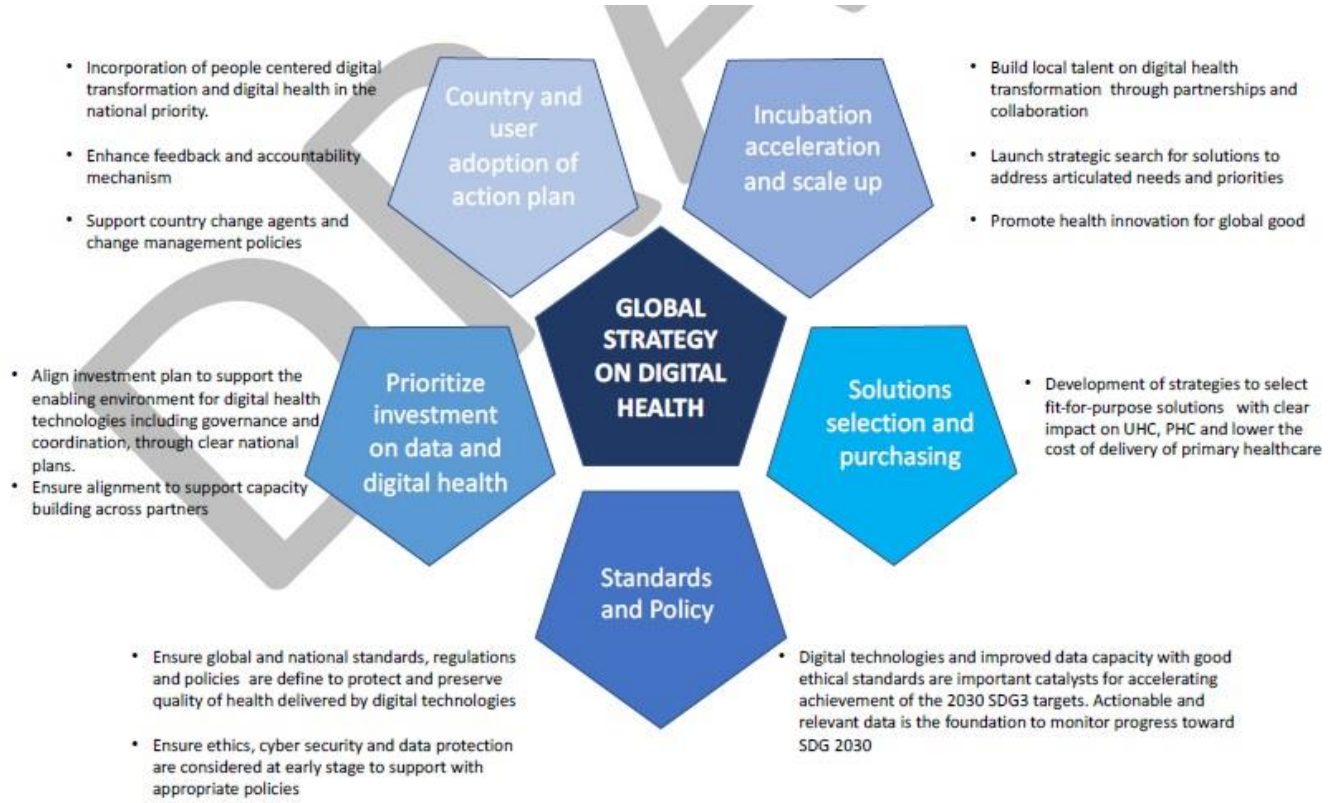
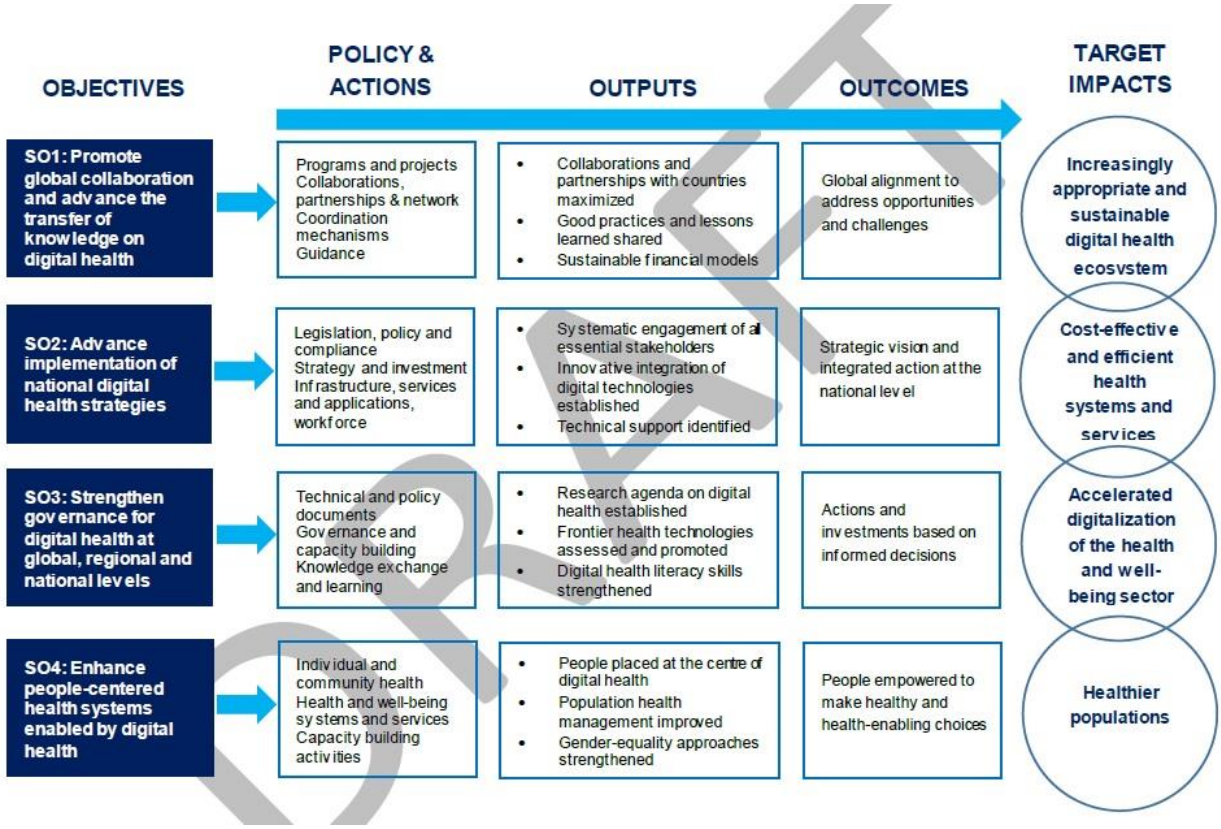


Figure 5: Enabling environment of the Global Strategy on Digital Health (WHO, 2019)

Framework for Action:

The framework for action for the global strategy on Digital Health with Policy actions, outputs and outcomes for corresponding objectives is illustrated in Figure 6 below.



For each of the strategic objectives, the policy options, proposed short-term, medium-term and long-term action options for members states, WHO Secretariat and partners are provided.

Section IV: Findings

Health Information System in Nepal:

The health information system landscape in Nepal is broad covering 7 provinces, 753 local Governments and more than 4000 health facilities. There are several surveillance systems (e.g. disease surveillance, early warning system, AMR surveillance etc.) Periodic surveys are done mostly with support from development partners. In addition, there are many vertical information systems e.g. TB, Leprosy, Malaria, NTDs and HIV/AIDS.

Regarding eHealth, the MoHPs vision is that, eHealth facilitates the delivery of equitable and high-quality health care services to enable all Nepali citizens to enjoy productive and quality lives and the corresponding Mission statement is eHealth solutions to strengthen Nepal's health systems by improving the use of information and evidence in planning, managing and supporting public health and clinical interventions. (Ministry of Health and Population, 2017)

On these lines, the use of Information technology to advance health information systems can be seen in various eHealth initiatives like HMIS (Health Management Information System), LMIS (Logistic Management Information System), EWARS, National Health Accounts (NHA), piloting of Electronic Health Record (EHR) at Government hospitals, other individual disease surveillance systems. On the

administrative front as well, digital technology penetration can be seen in initiatives like the National Health Accounts, Electronic annual workplan and budget, health workforce registry etc.

As per the data from HMIS, there are more than 5500 public health facilities in the country that includes 3808 health posts (public), 407 General Hospital (36 public and 371 non-government), 314 community health units (public), 309 Ayurveda Aushadhalaya (public), 295 Polyclinics (non-government), 288 Urban Health Center (public), 288 Primary Health Care Centers (public), 52 District Hospitals (public), 26 teaching hospitals (4 Public, and 22 Non-government), 10 Zonal Hospitals (public), 6 Central Hospitals (public), 5 Regional Hospitals (public) and 3 Sub-regional hospitals (public).

Most of the health information systems extend up to the level of health posts (HP) and that around 1200 health facilities have been enabled with Desktops/Laptops and Internet connectivity out of which nearly 500 are reporting online. With respect to disease surveillance systems, aggregate periodic reporting has been well established, and progress is being made to move towards case-based reporting.

However, with the different Health Information systems in place and serving their intended purposes, they are standalone information systems and seldom talk to each other resulting in information fragmentation thereby limiting the availability of comprehensive sector wide information and evidence for decision making. The problem of disintegrated information systems has been acknowledged and highlighted in the NHSS plans and eHealth Strategy 2017 document as well.

NHSS 2015-20 plan, placed emphasis on integrated information management approach across different programs and centers. Some of the key interventions planned were to expand digitized HMIS recording and reporting up to health posts, develop and initiate electronic health record system using free open source software, establish functional linkage of HMIS with other MISs, develop laboratory information systems and link with national HMIS and surveillance system, introduce and use of insurance management information system (IMIS) and making it compatible with DHIS2 based HMIS etc.

The eHealth strategy 2017 points out the lack of institutional set-up for eHealth which hampered MoHP's efforts in improving health information governance including proper resource allocation, defining legal validity of information produced, promoting the culture of information use, developing capacities and optimizing the functioning of information systems and eHealth solutions.

It is learnt during discussions with Ministry officials that the Ministry is now in the process to develop a more comprehensive Digital Health Roadmap for Nepal with support from WHO and partners and it has to be seen whether it will address gaps identified earlier and support the integration of different health information systems to provide comprehensive and robust information for evidence-based planning and decision making at various levels.

Nepal- WHO Country Cooperation Strategy, 2018-2022

Inter Alia mentioned in the Country Cooperation strategy 2018-2022, the following are the focus areas/ deliverables related to HIS strengthening

- Provide technical support to develop national eHealth architecture, interoperability framework and standards. Leverage use of information and communications technology (ICT) to advance implementation of eHealth strategy.
- Provide technical support to strengthen Health Management Information System (HMIS) in the federated context for reporting, in particular on UHC and the health-related SDGs.
- Expand quality and coverage of birth and mortality statistics and use of ICD-10 in hospitals in line with the mortality statistics improvement plan.
- Strengthen surveillance and laboratory diagnostic system for elimination targeted neglected tropical diseases (NTDs), specifically for Malaria and Kala Azar.
- Support the implementation of Maternal and Perinatal Death Surveillance and Response (MPDSR), and Newborn and Birth Defects Surveillance (SEAR-NBBD)
- Assist in the establishment of a comprehensive, integrated and sustainable National Disease Surveillance and Response System, especially for outbreak prone infectious diseases and other public health risks.

WHOs 13th General Programme of Work, 2019-2023 (GPW13)

GPW13 articulates that the Organization will collaborate with Member States to improve their health information systems, analytical capacity and reporting for SDG and UHC. The Organization will support countries in developing comprehensive and efficient systems to monitor health risks and determinants; track health status and outcomes, including cause specific mortality; and assess health system performance.

In this connection, outcome 4.1 of the GPW 13 Results framework specifies that effective and efficient WHO will provide better support to countries to strengthen their capacity in data and innovation.

WHO jointly with other UN agencies will help countries to strengthen civil registration and other vital statistics, as well as address issues of data privacy and security. The Organization will help countries to disaggregate data so that progress made on gender equality and health equity can be measured. The Organization will improve and develop standards and tools to collect routine data, conduct expenditure studies, and population surveys to enable countries to monitor, evaluate and adapt to meet changing health needs. The Organization will also work to strengthen country capacity to track indicators at sub-national and national levels as part of effective and harmonized health information systems.

WCOs HIS Support

Past and Present Areas of HIS Support

WCO Nepal has provided/ is providing HIS strengthening support to the below mentioned information systems in Nepal

- IPD Surveillance including Electronic Immunization recording system
- HMIS
- EWARS
- Emergency Health Information Systems
- NTDs
- Air and Water Quality Surveillance
- Birth Defect Surveillance
- CRVS

- Registry
  - HW
  - Cancer
  - Suicide
- MPDSR
- Research/ Study
- AMR Surveillance
- eHealth
- Malaria Surveillance
- Surveys
  - NCD
  - TB
  - Mental Health
- NHA
- Assessment/Reviews
- DAMS/NML/PMS
- HIV Surveillance

Type of Support

WCO Nepal provides support to all the key components of the Health Information Systems Strengthening model discussed earlier; the type of support ranges from technical assistance to policy/ technical guidelines development including data and indicator requirements, developing software, funding support, supply of hardware and IT components, capacity building, improving Data Quality including making available disaggregated data for analysis and review, Information dissemination and providing human resources support for operating such systems. Table 3 below shows the different areas where WCO provided support solely or in collaboration with other partners.

Table 3: Type of support provided to MoHP by WCO Nepal and other EDPs across different HIS*							
Health Information Systems	**Support component /partners**						
	TA (Concept, Design, Protocol etc.)	**Hardware/ Equipment procurement**	**Software Development /Adaptation**	**User training**	**Data quality**	**Dissemination / Use of information**	**Human Resource**
HMIS	**UNFPA**/GIZ/WHO/ DFID	**GIZ/GAVI**	**WHO**/GIZ	**WHO**/ GIZ	**USAID/** GIZ**/** WHO/ DFID	WHO/DFID	GIZ
Health Workforce Registry	**WHO**		**WHO**	**WHO**	**WHO**		
National Health Accounts (NHA)	**WHO**/GIZ (till 2017)			**WHO**	**WHO**	**WHO**	**WHO**
Cancer Registry	WHO (IARC)	GIZ	**GIZ**/WHO (IARC)	WHO (IARC)	WHO (IARC)	WHO (IARC)	
VPD Surveillance	**WHO**	**WHO**	**WHO**	**WHO**	**WHO**	**WHO**	**WHO**
EWARS	**WHO**		**GIZ/WHO**	**WHO**	**WHO**	**WHO/DFID**	**WHO**
MPDSR	**WHO**/ USAID/ UNICEF		**WHO**	**WHO**	**WHO**	**WHO**	**WHO**
Birth Defect Surveillance	**WHO**		**WHO**	**WHO**	**WHO**	**WHO**	
AMR Surveillance	**WHO**		**WHO**	**WHO**	**WHO**	**WHO**	
HIV Surveillance	**GF**/WHO	**GF**	**GF**	**GF**	**GF**	**GF**	**GF**
eTB Register	**GF**/WHO	**GF**	**GF**	**GF**	**GF**	**GF**	**GF**
Kala-azar surveillance (Tracker)	**WHO**		**WHO**	**WHO**	**WHO**	**WHO**	WHO
HSI Plus App (Web and Mobile Based)	**WHO**	**WHO**	**WHO**	**WHO**	**WHO**	**WHO**	**WHO**
National Demographic and Health Survey (NDHS)	**USAID**	USAID	USAID	USAID	**USAID**/DFID/WHO	**USAID/**WHO/ DFID	**USAID**
NCD: STEPwise Survey	**WHO**		**WHO**	**WHO**	**WHO**	USAID**/WHO/** DFID	
Nepal Health Facility Survey (NHFS)	**USAID/ DFID/** WHO/UNFPA	USAID/DFID	USAID/DFID	USAID/ DFID/ WHO		**USAID/**WHO/ DFID/ UNFPA	USAID/ DFID
Mental Health Survey	**WHO**		**WHO**	**WHO**	**WHO**	USAID**/WHO/** DFID	
TB Prevalence Survey	**RIT/WHO**	GF	GF	RIT/WHO	**WHO**	USAID**/WHO/** DFID	RIT/WHO

*Note: **Bold**=Lead Organization; Source: Interviews with officials from MoHP/DOH, WCO, EDPs and relevant document review

Cost for HIS Support

WCO Nepal invested around 5.56 million dollars for HIS strengthening in Nepal in the last three years between 2016 and 2018. Nearly 65% of that amount was spent for IPD Surveillance including establishing electronic Immunization records. As far as HIS support for IPD Surveillance, around 55% of the cost is towards supporting staff salary required to maintain the surveillance system.

Increasing investments are being made for the area of Emergency Health Information including surveillance of outbreak prone diseases.

Table 4: WCO Nepal's Yearly Expenditure by HIS for last 3 years (Cost in US Dollars)				
	Year of Support/Expenditure			
Support Areas	**2016**	**2017**	**2018**	**Grand Total**
IPD Surveillance	1053342(62.06%)	1471323(67.71%)	1016684(59.89%)	3541350(63.6%)
Emergency Health Information	85475(5.04%)	52730(2.43%)	139083(8.19%)	277288(4.98%)
Research/Study	39312(2.32%)	183322(8.44%)	1492(0.09%)	224126(4.03%)
MPDSR	50597(2.98%)	75008(3.45%)	66894(3.94%)	192499(3.46%)
HMIS	76758(4.52%)	55998(2.58%)	52806(3.11%)	185561(3.33%)
NHA	80515(4.74%)	27253(1.25%)	39312(2.32%)	147080(2.64%)
Assessment	41347(2.44%)	40204(1.85%)	32138(1.89%)	113690(2.04%)
NTD Information	28083(1.65%)	9945(0.46%)	74491(4.39%)	112519(2.02%)
CRVS	71009(4.18%)	35331(1.63%)	5139(0.3%)	111479(2%)
TB Prevalence Survey	8581(0.51%)	49655(2.29%)	38426(2.26%)	96662(1.74%)
Surveillance of outbreak prone infectious diseases	46115(2.72%)	18815(0.87%)	27036(1.59%)	91966(1.65%)
HW Registry	19663(1.16%)	22854(1.05%)	20918(1.23%)	63435(1.14%)
Cancer Registry	14972(0.88%)	15325(0.71%)	26130(1.54%)	56427(1.01%)
Water Quality Surveillance	9948(0.59%)	38136(1.76%)	6043(0.36%)	54127(0.97%)
NCD STEPS Survey	3713(0.22%)	0 (0%)	44252(2.61%)	47965(0.86%)
Review	19940(1.17%)	18860(0.87%)	7037(0.41%)	45837(0.82%)
Air quality	0 (0%)	0 (0%)	40226(2.37%)	40226(0.72%)
Electronic Immunization Recording System	26196(1.54%)	9554(0.44%)	4454(0.26%)	40204(0.72%)
AMR Surveillance	0 (0%)	9875(0.45%)	26518(1.56%)	36393(0.65%)
DAMS/NML/PMS	6701(0.39%)	14088(0.65%)	1384(0.08%)	22173(0.4%)
Birth Defects	2549(0.15%)	5958(0.27%)	12492(0.74%)	20999(0.38%)
eHealth	1831(0.11%)	7389(0.34%)	4977(0.29%)	14197(0.25%)
Suicide Registry	0 (0%)	11204(0.52%)	0 (0%)	11204(0.2%)
Malaria Surveillance	9964(0.59%)	0 (0%)	430(0.03%)	10394(0.19%)
Mental Health Survey	802(0.05%)	0 (0%)	8326(0.49%)	9127(0.16%)
HIV	0 (0%)	0 (0%)	961(0.06%)	961(0.02%)
Column Total	**1,697,411**	**2,172,829**	**1,697,648**	**5,567,888**

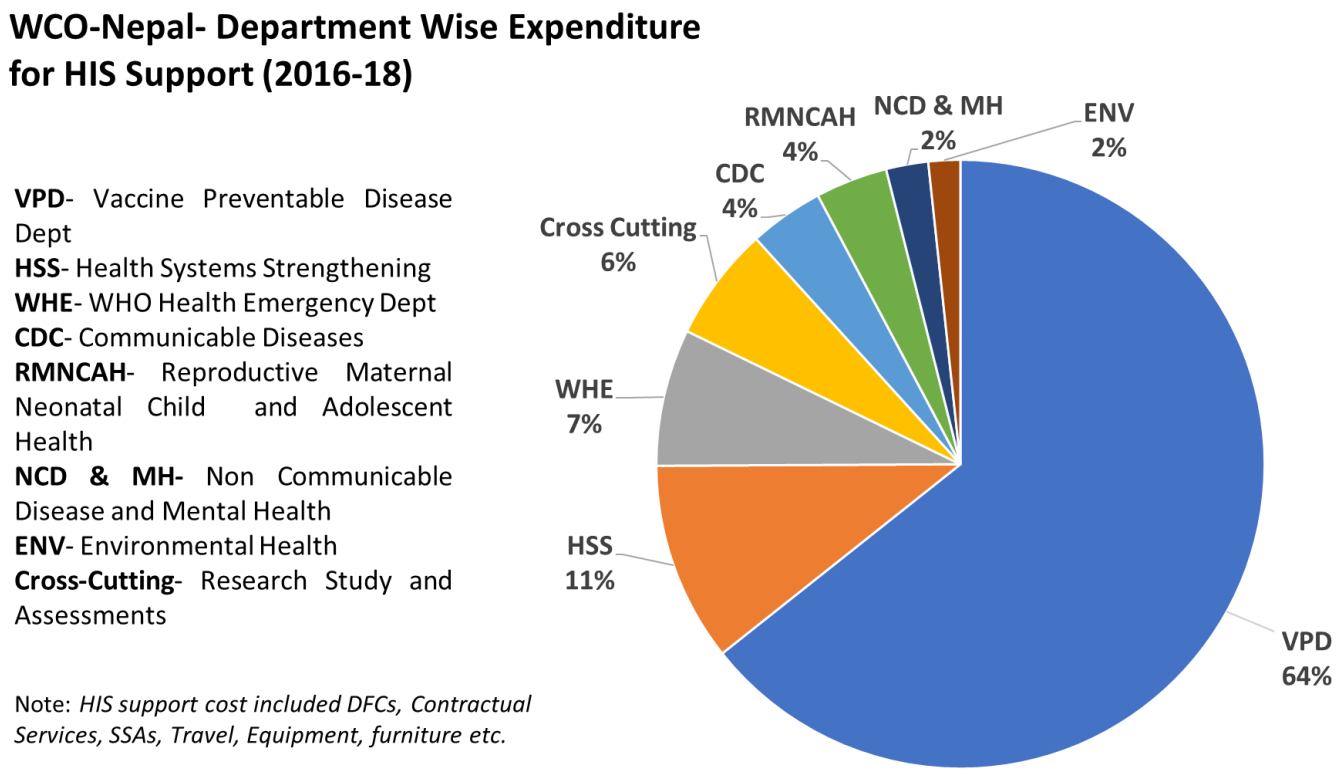


Figure 5: Pipe Chart showing Department/Unit wise expenditure in WCO Nepal for the last 3 years

Status of various HIS for which WCO provided support

Table 5 below summarizes the present status of the various HIS supported by WHO and perceived successfulness, challenges and future support needs perceived by the respondents.

Table 5: Various HIS supported by WHO- their status, Successfulness, Challenges and future needs

S. No	HIS (WCOs Support Cost in USD for 3 years 2016-18)	Status	Perceived successfulness	Challenges / Future support needs
1.	**HMIS ($185,561)**	Functional and reports are being are generated.	Support is highly appreciated.	*Dependent on EDP for major improvement in the system * Data quality issues * Need support for iHMIS
2.	**Health Workforce Registry ($63,435)**	Software is developed. Data are being entered.	Success depends on the production of reports which informs health workforce planning in the country.	*Making the system comprehensive to include all health workforce in the country would be challenge. For example, currently Paramedical staff (other than Staff Nurse, Pharmacist, Lab tech.) are not included

S. No	HIS (WCOs Support Cost in USD for 3 years 2016-18)	Status	Perceived successfulness	Challenges / Future support needs
				* Establishing it as a regular program of MoHP. For example, as of now, it is not reflected in AWPB * Support for continuous updating and report generation is needed
3.	**National Health Accounts (NHA) ($147,080)**	12/13-15/16 report published in 2018. WHO is supporting 3 staff.	* Regular production of NHA reports on yearly basis WHO Global Health * WHO's Global Health Expenditure Database (GHED) is duly updated with available data. * Use of NHA data for the ongoing Health Financing Strategy development.	* Institutionalizing NHA with ensured MoHP capacity to sustain it * Need for collaboration with other partners
4.	**Cancer Registry ($56,427)**	System established and reports are produced (e.g. Interim Analysis of data from January-May 2018. Progress report, November 2018)	* Reports are produced and used to make strategic decisions by MoHP in regards of Cancer prevention and treatment	* Sustainability plan is not available
5.	**IPD Surveillance ($3,541,350)**	WHO is fully supporting the IPD surveillance including Human Resources	* Reports that inform routine immunization activities are regularly produced * Very useful to track the diseases set for elimination/eradication (e.g. Polio). * Findings are well linked with public health actions that meet expectation of a well-functioning surveillance system.	* Sustainability plan is not available * Govt is apprehensive of managing the cost if WHO is not able to support it.

S. No	HIS (WCOs Support Cost in USD for 3 years 2016-18)	Status	Perceived successfulness	Challenges / Future support needs
6.	**EWARS ($91,966)**	* Weekly Excel reporting (at the time of evaluation) * DHIS-2 based system is now developed	* Case-based weekly reports/bulletins are produced	* Reporting timeliness * Limited number of diseases * Event based surveillance * Need for integration with other surveillance systems.
7.	**MPDSR ($192,499)**	* System/mechanism established, tools adapted and implemented. * Expanded to 11 districts (community-based VA) and 77 hospitals (facility-based audit). * Incomplete reporting from field. * Annual reports are not developed.	Assessment report produced regularly and used in strategic decision making	* HR issues * Lack of demonstration of usefulness
8.	**CRVS ($111,479)**	* Tools are adapted, and guidelines developed. * Not functioning as expected. Irregular reporting from hospitals * Operational lead has changed from MOFALD to MOHA.	-	* Establishing rapport with new operational lead
9.	**Birth Defect Surveillance ($20,999)**	* Irregular reporting from hospitals *Reports are generated from dashboard but not collaged at central level regularly *Not functioning as expected	-	* HR issues - no dedicated person * Lack of demonstration of usefulness

S. No	HIS (WCOs Support Cost in USD for 3 years 2016-18)	Status	Perceived successfulness	Challenges / Future support needs
10.	**AMR Surveillance ($36,393)**	Functional. Data from only one site entered.	NPHL is connected to GLASS	* Need to improve coverage - to get data from more sites
11.	**HIV Surveillance**	* System is working, and reports are produced. * Technical support from WHO & partners	-	Dependent on external agencies' support for system improvement and financing
12.	**eTB Register**	System under revision with technical support from WHO, NTC and financial support form TGF	All data points aligned to Global TB reporting system and coordinated meeting with HMIS and NTC for future integration in the national HMIS system when national system upgrades	WHO need to provide further TA for roll out of the new data filed and TGF funding support will be explored
13.	**Kala Azar Capture**	* In pilot in province 1 * Functional * Two cases were registered during evaluation and 17 new cases are registered by Sept 2019. * Since EWARS has migrated to online DHIS2 based platform and Kala-azar is one of the diseases to be reported under EWARS, surveillance variables used in KA tracker has been integrated into the EWARS so that the data entry duplication on two systems will be avoided.	* Scaled up to all provinces	* Absence of sustainability plan.

S. No	HIS (WCOs Support Cost in USD for 3 years 2016-18)	Status	Perceived successfulness	Challenges / Future support needs
14.	**HSI Plus App (Web and Mobile Based) ($277,288*)**	Formal approval from Government awaited (at the time of evaluation)	-	-
15.	**HEOC Information Management System (Excel Based) (* Cost includes this component)**	Collecting data from different HEOCS in Excel sheets	Health emergency related data are available at one place for analysis and results are related to actions	Capacity building of MoHP in updating the system
16.	**Leprosy Reporting and Management System (WeBLeRs) [Web Based]**	Not functional. Discontinued.	-	-
17.	**EIRS Web Based] ($40,204)**	Pilot implementation in 5 districts. Discontinued.		* Parallel data entry system * Reasons for discontinuation is not documented
18.	**ICD -10**	Training is being provided in batches in collaboration with BPKIHS.	All medical recorders and medical doctors (both from public and private health facilities) are trained and consistently use ICD-10 in diagnosis and data aggregation/ desegregation	*Need to institutionalize the system and lessen dependency on external assistance * Collaborate with additional institutions for training to expand its reach * Ensure ICD 10 are linked with three major streams – 1) eHealth – to provide standard codes for disease – morbidity and mortality, 2) HMIS- in data processing and 3) Mortality Statistics (CRVS)

S. No	HIS (WCOs Support Cost in USD for 3 years 2016-18)	Status	Perceived successfulness	Challenges / Future support needs
19.	**eHealth Strategy ($14,197)**	Completed	* Strategy document is available	* Need to establish institutional setup and build MoHP capacity * Overdependency on external technical support (e.g. from WHO, GIZ, DFID and UNICEF etc.) * Need to ensure that the operational plan/ road map aligns with WHO's global strategy on digital health

Note: HIS support Cost is provided wherever it was available. Similarly, for columns left blank, either response was not available, or it is not applicable.

SWOT Analysis of the WCO Support for HIS strengthening

Strengths

Health Information Systems in Nepal- As observed by the Evaluators

- HMIS- Ministry has nearly taken over the complete system and operating it on its own with minimal support from External Development Partners.
- The Ministry is in the process of developing a comprehensive Digital Health Roadmap for the country.
- Case based Surveillance systems such as Kala Azar Capture implementation etc. and the aim to integrate different vertical information systems as an integrated HMIS demonstrates HIS progress in the right direction.
- VPD surveillance network, well established, functional and linked with public health actions.
- Ministry with the help of partners regularly conducts surveys – NDHS, NMICS, STEPS, NHFS etc., they inform monitoring and development of new sector strategy.
- Human resource – statistics are available from MOHP to Health offices (earlier district health offices), and HWs are trained on HMIS and other surveillance functions.
- Ministry is well supported and is collaborating with WHO and other partners for strengthening various HIS.
- Due to longstanding working relations with the Ministry, WCO officials have good institutional memory of the various HIS initiatives, support and the progress in the country.
- IPD surveillance network, well established, functional and linked with public health actions
- Ministry with the help of partners regularly conducts surveys – NDHS, NMICS, STEPS, NHFS etc., they inform monitoring and development of new sector strategy
- Although, allocation from ministry to run these systems would be not good enough, but domestic resources are mobilized at least to operate routine information systems

- Human resource – statistics are available from MOHP to Health offices (earlier district health offices), and HWs are trained on HMIS and other surveillance functions.

WCO Nepal's support to strengthening HIS

As perceived by Ministry Officials interviewed

- WHO is acknowledged as a technical agency in health par excellence and Ministry appreciates and values WHO's role in HIS support in Nepal.
- WHO holds forte in areas like disease surveillance where there are no other EDPs supporting the Government and WHO has much bigger role and say.
- For some information systems like HMIS, Tracker for NTDs, EWARS, IPD Surveillance etc. WCO extends support across the full spectrum of the information system project viz policy advocacy, design and development of the software, capacity building of the various staff and implementation. This continuity of the support ensures streamlined implementation process leading to successful projects e.g. HMIS, VPD Surveillance.

As perceived by other EDPs interviewed

- WHO has more leverage in the Government over other partners in some areas like developing policy/guidelines/indicators for HIS as it has a global reputation.
- WHO can support the Government budget of the treasury model, ie DFCs to the Ministry and WHOs contribution are reflected in the Annual work plan of the Ministry whereas it is not the case for other development partners. If it is reflected in the Annual work plan, then the Government is obligated to perform the work, which is advantageous for WHO supported projects.
- Added advantage is that the WCO is aware of the Government functioning and have good rapport and access with the Ministry officials, which helps them to plan and implement their projects in a timely manner.
- WHO can support the Government starting from initial policy/ advocacy and provide support for system development, implementation and capacity building i.e. across the full spectrum of an information system.
- For HMIS support, there was a collaborative approach with WHO and EDPs for a smoother implementation and roll out of the project.

As perceived by WCO staff interviewed

- HIS Support plan are reflected in the biennium plan and for teams like CDC and VPD, their HIS support is also reflected in the Government work plan, which makes it easier for them to extend and implement their support.
- HIS systems planned with AC funding are more sustainable since the funding is flexible and able to meet both planned as well as ad-hoc requirements from the Ministry for system upgrades and enhancements.
- There is some amount of collaboration within the different teams of WCO like for examples IPD collaborates with CDC team on Hepatitis B Surveillance and likewise with WHE for Polio environmental surveillance and AMR surveillance. A surveillance Task group has been created within WCO with members from CDS (Communicable Disease Surveillance), IPD and WHE. Efforts

were made in the past to coordinate different types of supports (e.g. surveillance, HIS and IT), it needs revisiting and develop a strategy to align them.

Weakness

HIS in Nepal

- There is no comprehensive document or guideline covering HIS policy, IT architecture, data standards, interoperability framework, Data use and security etc. to govern the various Health Information systems implemented or in planning process in the country. Currently the HIS vision seems to be limited only to HMIS and not comprehensive to include information systems beyond HMIS.
- There are a lot of disjointed health information sub-systems which require extensive attention and resources for integration and interoperability.
- The HIS personnel at the Ministry (central level) are placed in different teams/divisions/departments and at times have overlapping TORs. For example, the Health Coordination Division is playing a key coordinating role for the development of Digital Health Roadmap and is supported by IT Cell which is placed in the division of Quality Standard and regulation Division. Again 'Information Systems Interoperability' is part of the TOR of the IT Cell which conflicts with the TOR of iHMIS of the Management Section of the Department of Health Services. has been the role of the IT Cell is to This arrangement hampers the HIS implementation and monitoring of outputs. This had also led to duplication in HIS planning process and investments resulting in multiple disjointed information systems.
- One of the key weakness across HIS is that high staff turnover rates due to frequent transfers Often trained staff move out and replaced by newer staff affecting the project implementation, timeliness and quality of reporting. This must be addressed as a priority.
- For information systems across many programs supported by WCO or other EDPs there is no effective single point of contact/ counterpart in the Ministry and as mentioned earlier there are multiple points of contacts in different divisions/departments, which poses a challenge in terms of implementation, coordination, maintenance and support. Though, the Policy, Planning and Monitoring Division (PPMD) of MoHP has an overall responsibility of guiding overall M&E and information system, it has not been able to play that role because of the absence of adequate staff and skill sets. A technical working group (TWG) for M&E activities is formed which meets occasionally, on need basis, to advise PPMD on matters related to M&E. But the PPMD does not have adequate capacity to fully support all M&E and HIS capacity in the country.
- Case based reporting system are not available for all diseases that are targeted for elimination which is a challenge for measuring program effectiveness and measuring elimination targets.
- HIS data quality and data use have not been assessed in the recent past. It was reported that in the recent past, the reporting rate from the health facilities was also declining mainly because of the Governance restructuring. For example, the data consolidation was previously done by the district health offices which is now the responsibility of local municipalities. Since municipalities are still developing this capacity, it is creating irregularities in reporting.
- Some of the HIS do not have documentation like software and system design, functional specifications, user acceptance testing, software requirement specifications etc. which are vital for system performance assessment or for upgradation.

- Surveillance systems are spread over different departments which at times makes it difficult for coordination and sharing resources and information. For example, while both EWARS and IPD are surveillance systems, the former is under EDCD/Surveillance system and the latter is under Family Welfare Division.

WCO Nepal's support to strengthening HIS

As perceived by Ministry Officials interviewed

- Although for some programs like disease surveillance systems where WCO plays a vital role, for most of the other HIS WCO support is offered in a piece meal approach and at times trivial not having an impact. Example the ongoing support in training provided by WCO for DHIS 2, which the Ministry can do on its own without WCO.
- WCO must have a larger system level vision and play key role in developing Data Standards, Data Quality, Interoperability, Data Use and Strategic or Guidance documents.
- No detailed requirement gathering, and readiness study was carried out by WCO e.g. development and piloting of IRIS which could not be scaled up despite being piloted in five districts. This was mainly because of the workload increased because of the requirement of maintaining both manual and electronic records.
- For some of the information systems, WCO did not have a comprehensive implementation or operational plan for example MPDSR, Birth Defect Surveillance etc. are not effectively implemented, the implementation was a piece meal approach without proper coordination mechanisms and clear exit strategy. Even for well-established systems like VPD support, WCO does not have a clear strategy for sustainability and exit strategy. Now and then WCO has requested Government to take over the VPD project only to learn that they are not ready yet. WHO takes training as the sole intervention for capacity building. They should focus more on system development.

As perceived by other EDPs interviewed

- Some of the systems WCO does not have proper project plans including exit and hand over strategy for example, HRIS (Human Resource Information System) platform for Health Workforce registry, where WCO initiated the project but the support was not continued.
- In WCO, although there are different teams, which mostly do not have information system expert, looking after their respective disease/ program information systems, on the comprehensive HIS practically there is only one staff (in HSS team) and at times the role becomes overburdened, more managerial and less technical.
- There is less coherence among HIS support provided by various teams within WCO. For example, some disease specific information systems developed and implemented by WHO themselves are not interoperable, evens for co-morbid disease conditions. There were also instances of duplicating efforts and investments example – for HMIS implementation hardware and internet connectivity were supplied to the hospitals and at the same time, the VPD team in WCO also supplied hardware for implementing the Electronic Immunization System unaware of the parallel investment.

- Some EDP partners felt that WCO does not involve them early enough in the development of support imitative and communicates for support at later stages, which makes them harder to program support because of budgetary and programmatic difficulties.

As perceived by WCO staff interviewed

- WCO built capacity for the HMIS team at the central level and now all of them moved out, there is lack of Institutional memory and continuity in the work. Similarly, at the field level WCO in the last year alone trained 1200 health workers but currently only 700 are reporting. The percentage of health facilities reporting in HMIS is also going down confounded further by the confusion in the reporting channel/hierarchy due to the restructuring process.
- For some HIS where WCO supports, it is observed that the Government doesn't build capacity or provide adequate resources to own and sustain the system. Example EWARS, if WHO or EDPs remove the support to EDCD, presently it will be challenging for the Government to sustain the system. Similarly, MPDSR and Birth Defect Surveillance are not effectively implemented owing to the non-availability of skilled and dedicated staff.
- Biennium plan while broadly covering the various plans and proposals what is not reflected well is what will be achieved and what will be the impact of the proposed system. In the workplans, specifics of the workplan like what type of HIS support, who will be providing the support, for how long and what will be the exit plan etc. is not clearly spelt.
- When HIS project is planned through VC funding, a detailed project and implementation plan must be developed including handover and sustainability. VC funds are short-lived without continuity assurance. For example, one of the projects undertaken viz the GIS mapping of health facilities is in limbo because the VC funding was over.

Opportunities

HIS in Nepal:

- Government is in the process of developing Digital Health Roadmap following the Global Digital Health Partnership (GDHP) Conference and Regional consultation on digital health policies and practice held in February 2019 in New Delhi., India. Some of the scope of this work includes coordinated investments, National digital health action plan, architecture blueprint, data Standards, shared health records (EMR/EHR, such as OpenMRS), infrastructure, policy development, and enabling greater data interoperability.
- There is a need and so the opportunity for developing National Guidelines or strategic documents covering various aspects of HIS which the local governments in the federalized structure can adopt so that HIS implementation and practices are standardized. The development and availability of the documents must be high priority since now after federalization process, there is no line of hierarchy or command from the Central to the local Government levels.
- The new provincial and local level structure provides an opportunity to build capacity of the local level institutions in developing, implementing systems and most importantly using information to make health services focused and effective. Since WCO will now have one staff at each of the provincial health directorate, it will be easier to exploit this opportunity.

WCO Nepal's support to strengthening HIS

As perceived by Ministry Officials interviewed

- WCO can bring in International expertise, Technical experts, and learnings from other countries for supporting in various areas including development of Digital Health Roadmap, guidelines around data Standards, architecture blueprint, Interoperability framework, data use and security policy etc.
- It is felt by the Ministry that the eHealth strategy 2017 needs updating, and they believe this can be a starting point to develop the detailed and costed action plan and roadmap.
- This is a crucial time for WHO to provide support for capacity building at Provincial and Local Government level. Crucial time to support federalization process. There will be around 750 Palika's or Local Governments and their capacity needs to be developed on some nationally accepted standards. To be more sustainable Government can identify Master Trainers at National or Provincial levels, who can be trained by WHO and who in turn train staff at sub national levels.
- In the context of federalization for holistic HIS strengthening, WHO can support the Government in developing policy and guidelines, indicators, SOPs at all levels and build capacity at the Central, Provincial level and the Municipality level. This is a potential investment area for WHO.
- WHO can support MOH to identify collaborating centers for health informatics or tie up with Academic institutions to place interns to support existing information systems and fix minor issues or enhancements. Currently, NHSSP program places interns at MOH.
- Ministry has developed Health facility registry, which has to be integrated with other systems such as the health workforce registry, HMIS, LMIS etc.
- Local bodies, since they are new and enthusiastic, can take up vital statistics/CRVS, MPDSR or Mortality Surveillance, verbal autopsy etc. which are otherwise not efficiently functioning well. WHO can pilot them in selected local bodies and demonstrate successful implementation models and replicate them or could convince the Government to replicate the model to other local bodies.
- Currently WHO is supporting the ICD 10 training through one center viz BPKIHS of Province 1. It is suggested that hospitals in other regions could be identified for future training. The ICD 10 training will improve the quality of morbidity and mortality reporting.

As perceived by other EDPs interviewed

- Moving forward Govt/WHO or Partner should have a jointly agreed work plan or implementation including robust M&E plan even before the project starts and it should clearly spell out the scope for all parties, funding mechanisms and the Govt. commitments and the exit strategy or plan for WHO or the partner. Say for example in the first year, WHO should invest 90% and Govt should contribute 10% funding, second year WHO can provide 70% and Govt should step up and contribute 30% and third year WHO should only contribute 50% and remaining should be from Government. Fourth year onwards WHO support should slowly come down and Government should eventually take full charge of the system. In short, WCO need to take each support as a project with clearly defined start date, end date, implementation modality, expected verifiable results and agreed sustainability strategy and joint evaluation plan.

- Despite availability of legal instrument (Public Health Service Act 2018) for private health facility reporting, it is not adequately enforced, resulting in poor data availability from private health sector.
- WHO can play a major role in strengthening and Institutionalizing HIS at the Ministry by building capacity for relevant stakeholders and putting standards and guidelines in place.
- Building on its International role, image, expertise and relationship with Government, WCO can identify need for priority health support, prepare a plan and reach out to partners working in the Health sector for support for resources. This ensures that initiatives are adequately funded and supported.

As perceived by WCO staff interviewed

- Opportunity for developing modular software packages- eg Kala Azar tracker being piloted now, which uses the DHIS 2 platform. After complete roll-out, this module can be integrated with the HMIS because it uses the same DHIS-2 based software platform, provided same metadata were used.
- IPD team regularly undertakes assessments for their programs or projects and take support from HQ/SEARO. Similar approach i.e. periodical assessments can be followed for HIS implemented or supported by WHO e.g. NHA, Health Workforce registry and Mortality statistics.

Threats

HIS in Nepal

- Various EDPs are supporting different systems. For example, USAID is supporting LMIS, DFID is another stakeholder in HIS, Medic Mobile has developed a mobile application and piloting in 3 districts, GIZ is piloting an Open MRS in a Government hospital. Against non-availability of a uniform National HIS standard including data and metadata standards, it will become a challenge for integration later.
- iHMIS section has the responsibility for integration of different systems. iHMIS section felt that there was no clarity and guideline on what exactly integration meant and how to do it. Integration requires what and how different sub-systems communicate with each other. It requires guidance both for data standards, information exchange and IT implementation that necessitates effective coordination among iHMIS, M&E and IT section of MoHP. Without a well thought out standards, strategies, clear-cut objectives and timelines and effective IT support any integration efforts will end as a failure. As IT support as IT unit at the
- In the context of federalization, local governments are empowered to implement respective information systems as per their needs and in the absence of National HIS Standards, they will not have proper guidance or reference leading to a potential situation of having different systems across various local governments.

WCO Nepal's support to strengthening HIS

As perceived by Ministry Officials interviewed

- Provincial level offices now have allocated their own budgets for developing their own systems. They have already started working in this area. Since there is no national guideline and inadequate expertise at the provincial level, they fear that the system they develop may not be in line with

the National modality posing difficulty in integration. For example, the provincial office at Gandaki Pradesh has allocated budgets for integrated surveillance system and they seem to worry about it.

As perceived by other EDPs interviewed

- There are no perceived threats.

As perceived by WCO staff interviewed

- Non- availability of Government program staff for the roll out of the project will hamper the ongoing HIS support and thereby overall project. Example IRIS and web-based Leprosy information system.
- Continuous support is not possible for projects planned under VC funds and if there is no clear exit strategy, there is reputational risk in premature exit from the project.

Summary of Key Findings

(i) Relevance

The HIS support provided by WCO Nepal is extensive and includes most areas of health information systems including routine HMIS, disease early warning systems like EWARS, domain specific information systems like IPD, vital registration systems and allied information systems like Health Workforce registry and National Health Accounts. One of the key areas where the support is missing is Electronic Health records.

For the support provided so far, the feedback has been very positive and especially for some domains such as adaptation and rollout of HMIS into DHIS-2 platform, disease surveillance including IPD surveillance, WHO is the only agency supporting the Ministry and is perceived as the most experienced with considerable expertise. In these areas the technical assistance and support provided by WHO in the areas covering policy/ guideline formulation, indicator development, system designing etc. are perceived as relevant.

(ii) Appropriateness

In the past and current contexts, the overall support provided by WCO is perceived as appropriate. The HIS support plan of WCO for example CDC and IPD teams is reflected in the Government annual workplan which demonstrates mutual understanding and agreement which underscores appropriateness of the support.

WHO is capable of supporting the Government across the full spectrum of an information system starting from conceptualization to design, development, implement and scaling up including capacity building.

However, there were also feedback apart from disease surveillance information systems, WHO needs to be more strategic and comprehensive in providing support. In some systems for example MPDSR, Birth defect Surveillance, and CRVS the support is provided in bits and pieces and not perceived as a holistic support.

Moving forwards in the context of federalization, for WHO support to be more appropriate, the Ministry Officials interviewed opined that ongoing support should be extended at the provincial and local government levels, and more focused in the areas of standards and capacity building.

(iii) Sustainability

The feedback from WCO staff was that HIS support extended through AC funding were always more sustainable for longer periods than support with VC funding. For example, disease surveillance including IPD, WHO support is so extensive that it would be assumed that WHO is operating and running the system and the support seems to be perennial. For the Information system per se to sustain, WHO should also factor in institutional building and hand over mechanisms as key ingredients to the support.

By Institution building it is meant that- an identified set of individuals/teams (with appropriate skillsets) in the identified nodal office, with relevant TORs are established to operate/maintain the system and are equipped with necessary hardware/ software and support mechanisms and are fully funded by the Government. This team or these core set of individuals will then be responsible at the National level for capacity building at different levels in the country, upgrading software (including new functionality), updating data dictionary, updating training manuals, User management (managing user accounts and passwords) etc. and they shall carry out these works independently without or minimal support from EDPs.

(iv) Forging partnerships

Apart from the disease surveillance information systems (excluding TB and HIV), in areas like HMIS, Birth Defect Surveillance, MPDSR and surveys, WCO has collaborated with other partners. Partners interviewed also gave a positive feedback on the past/present collaborations with WCO and value the expertise and support of WCO and moving forward they would continue collaboration. Partners believe that WCO can play a larger strategic role in supporting the country to develop HIS vision/policy.

Section V: Recommendations

The recommendations are drawn not only based on the evaluation findings and feedback but also considering the WHO Country Cooperation Strategy (2018-22), the GPW13 (2019-23), the federalized governance structure in Nepal, recently developed Nepal eHealth Roadmap and recently published WHO's Draft Global Strategy on Digital Health (2020-24).

1. Constitute a HIS working Group:

The evaluators suggest that WCO form a Health Information System including Data Use Working Group constituting the country office staff only, which will

a. Regularly meet, oversee and review all HIS support activities
b. Review how health data and indicators are appropriately being reviewed for quality, analyzed, interpreted, disseminated, communicated and used for policy and planning
c. Prioritize HIS support activities (a suggestive priority matrix template is provided in Annex IV)

d. Review new HIS support proposals with a standard checklist provided in Annex III.
e. Develop a Monitoring and Evaluation Framework for WCO to measure and monitor the HIS support and overall HIS progress including investments, processes and outputs.
f. Identify EDPs, Academia and Technical agencies across different HIS areas and initiate collaboration at planning stages of HIS support and investments.

2. Measure HIS performance:

For the different HIS for which WHO provides support WCO may undertake individual in-depth evaluations of these systems to measure

a. Data quality and reliability
b. Data privacy, security, and confidentiality
c. Data analysis, interpretation, and use for immediate programmatic actions
d. Information products, dissemination and use for policy actions
e. IS acceptance
f. User satisfaction

Based on the findings of such evaluations WCO Nepal shall subsequently undertake necessary specific measures to improve support in those areas. WCO as part of the evaluations should also ensure that data elements/indicators required for global reporting for example SDGs etc. are available and are of good quality. Global Reference List of 100 Core Health Indicators (plus health-related SDGs) (WHO, 2018) may be used as a reference list for this activity.

3. Ensure Compliance with Global Strategy:

WCO Nepal to ensure that all HIS for which support is provided complies with global open data standards, best practices and capacity development, architecture framework, good governance and programme management, and in line with the Global Strategies on Digital Health. WCO Nepal should also ensure that the recently developed eHealth roadmap for Nepal includes all HIS Systems and this is also in line with the Global Strategy.

4. Support Development of Health Metadata and Data Standards for Nepal:

Data standards and metadata are crucial elements in ensuring interoperability of different information systems and will help in a common interpretation/understanding of data elements from different information systems. During this evaluation, it was found that no National level health data standards exist for Nepal and we did not come across any other EDP supporting MoHP in this area. Hence the evaluators strongly recommend that WCO Nepal take the lead and support MoHP to develop the first Health Data and Meta Data Standards for Nepal.

For ongoing EHR implementations WHO can provide support by ensuring that acceptable data standards are followed (eg. LOINC, SNOMED CT etc) which can facilitate interoperability of different EHRs and enabling the possibility of Health Information Exchanges in the country.

If the existing HIS staff in the country office is already overstretched, WCO may explore the possibility of engaging additional Public Health informatics staff to manage and oversee these activities and play a coordinating role in the HIS working group.

5. Provide Strategic Support at Central and Provincial Levels:

WCO needs to make HIS support more strategic meaning all support should enable and strengthen the country to move towards and achieve the longer-term goals and targets set by the country themselves, by UN (SDGs) and by WHO (UHC, GPW13 goals, Global strategy on Digital Health etc.). WHO can be strategic in two stages of the support viz planning and Implementation.

1. **Planning Stage:** Strategic Planning will focus on outcomes/outputs and
    a. will prioritize support that will enable or help the country to achieve National UHC/SDG Goals and bridge existing gaps and would help WHO to achieve GPW 13 goals.
    b. will prioritize support areas which improves country's capacity to manage and sustain the system without perpetual dependency on WHO or other external partners.
    c. will have agreed upon timelines and indicators to measure progress
    d. will ensure adequate funding for the planned duration of support.
    e. will develop a strategic approach to institutionalize the supported system.
2. **Implementation/Execution Stage**: Strategic approach would be
    a. Engaging in areas where WHO has technical expertise
    b. Being coherent within WCO and avoiding duplicative efforts
    c. Actively identifying and collaborating with partners and leveraging their expertise and resources in achieving the planned objectives.
    d. Activities that enable capacity building within the country for sustaining the initiatives
    e. Periodic measurement and monitoring of indicators agreed upon in the planning stage.

At the provincial level, it is learnt that WCO is placing a staff for coordination and liaising with different stakeholders and support WHO activities at that level. It is not clear whether the responsibilities of this staff include supporting HIS activities. But we recommend that the staff ensure that

a. Provincial level HIS activities are in alignment with the National recommendations, roadmaps and standards
b. Relevant provincial level partners are identified and engaged for collaborative HIS support

6. Support to Develop National Capacity for HIS maintenance/security and uninterrupted functioning:

To sustain the various HIS supported by WCO, it is essential that WCO builds capacity in MoHP to maintain and manage (developing additional functionalities, redesigning the data entry forms, building new indicators, system and security upgrades, bug fixing, routine server and hardware maintenance etc.) the information systems independently without relying always on EDPs. The necessary capacities may vary from system to system and WCO shall provide support accordingly.

For example, WCO may support appropriate capacity building workshops or training programs for the concerned staff at Ministry with the assurance that such trained staff shall not be transferred for a minimal suggested period of time.
Apart from the staff at Central level, as part of the HIS capacity development WCO Nepal shall also play an advocacy role to ensure that trained staff at provincial, health facility levels etc. of the health information system are consistently available and not frequently transferred. Ministry may ensure that trained staff are replaced with trained staff preferably, or training should be arranged on priority basis to newly positioned staff in order to avoid interruptions of system use. WCO should suggest the Ministry that a proper handover and takeover takes place when existing staff is replaced by new staff.

WCO in collaboration with Ministry of Health and Academic Universities may explore the possibility of establishing a cadre of health informaticians placed at the Central and or Provincial levels to exclusively support the Government in all HIS initiatives. With high investments happening in HIS, a dedicated cadre for HIS would be an appropriate and sustainable approach to manage and maintain them.

7. Adopt Modular Systems approach:

For the information systems supported by WCO, a modular system approach may be adopted, which will ensure future interoperability with the other systems.

For example, specific disease related information systems/modules may be developed on the same/ compatible platform with that of the HMIS with appropriate interface mechanisms, so that aggregate data from such disease related modules shall automatically feed in to the HMIS thereby lessening the reporting burden on end users of such systems. Such modular approach and interface with HMIS will also facilitate the possibility of a centralized dashboard for monitoring various health information systems.

With regard to the integrated HMIS activities, it should be a well-planned series of incremental activities, wherein existing siloed information systems are made to use same metadata as that of HMIS, develop Application Program Interfaces (APIs) or develop the IS in a compatible platform (e.g. DHIS2), migrate legacy data to compatible formats, and subsequently integrate them with the larger HMIS running platform (e.g. DHIS2).

8. Engage EDPs Early:

For better and effective collaboration with different External Development Partners (EDPs), WCO Nepal should engage them at the time of planning for HIS support, which will provide adequate lead time for the EDPs for their internal administrative planning and budgeting process.

For example, at the time of planning for a HIS support, the WCO (the suggested HIS working group) may identify relevant EDPs and reach out to them with the proposed plan and seeking whether they want to collaborate and how could they support (technical expertise, Funds, HR, infrastructure etc.). Accordingly, the HIS support plan could be a joint activity proposed to the Ministry to be included in their AWB.

9. Collaborations beyond EDPs:

Beyond the EDPs, WCO Nepal should explore possible collaborations with relevant Academic Institutions, Technical Institutions/agencies to facilitate and build a HIS ecosystem in Nepal. Such an enabling ecosystem shall ensure HIS strengthening capacities for sustainability of the various HIS readily available within Nepal.

For example, for enhancing functionality of the existing HMIS which is developed on DHIS 2 platform, Ministry currently relies on EDPs who in turn reach out to experts/agencies outside of Nepal. By collaborating with local Academic Institutions and sponsoring them to DHIS 2 Academies (workshops to learn DHIS 2 customization, deployment etc.) and in exchange for their services for bug fixing, functionality enhancements etc. may establish a DHIS2 ecosystem within Nepal.

10. Develop Detailed Project Documents:

For WHO support provided to existing and future planned HIS, WCO to ensure that detailed project documents are developed and available, starting from concept note, Software requirement specification, Software contract, User Acceptance Testing, Data Dictionary, Implementation Plan, Operational Manual, User Training manuals and Service Level Agreements. The project document should also include M&E framework to gauge the progress and take necessary corrective actions, based on learning. It would be extremely important to document the lessons learned during the course of implementing the project. Detailed documentation is a commonly accepted best practice standard. Given the frequency of transfers in the Ministry as mentioned by the respondents such detailed documentation shall help the newly joined staff to understand, operate and maintain the system.

Section VI: Conclusion

The evaluation is a first of its kind, since it does not evaluate the HIS per se but evaluates the support provided by WCO to strengthen HIS in Nepal. Despite limitations the evaluation was completed and managed to describe the level of involvement and type of support provided by WCO and findings along with the expenditure details for the support for last 3 years. The respondent's feedback on the successfulness of various HIS, existing challenges and future needs were captured and presented. Based on the findings, inputs from respondents and global standards, a list of recommendations have been provided.

A priority matrix is suggested which may be used to prioritize in implementing the recommendations. This evaluation may be followed up with in-depth HIS evaluations of systems specifically where WHO has incurred expenditure and expected outcomes were not achieved; in-depth evaluations may throw more light on individual system specific issue and ways to address them.

References

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WHO. (2007). *Strengthening Health Systems to Improve Health Outcomes.* Geneva: WHO.

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WHO. (2010). *Monitoriong the building blocks of health systems; a handbook of indicators and thier measurement strategies.* Geneva: WHO.

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WHO and ITU. (2012). *National eHealth Strategy Toolkit.* Geneva: WHO.

Annex I:

EVALUATION OF WCO NEPAL's SUPPORT TO STRENGTHEN HEALTH INFORMATION SYSTEMS (HIS) IN NEPAL

KEY INFORMANT INTERVIEW SCHEDULE for WHO STAFF

Date of Interview:
Place of Interview:

Name of the Interviewee:	**Designation/Capacity (in the context of HIS experience):**
HIS Role:	**Organization:**

Information System Experience:

S.No	**Information System Associated with**	**Duration**	**Type of Association (***Design and Development, Implementation and Roll out Support, Capacity Building, Funding and HR Support***)**

1. **HIS Policy and Governance: This section contains questions to understand the HIS Policy environment in Nepal**
    - 1.1. Does the Country have a HIS Strategic Policy or Plan to regulate or guide the establishment and operation of the various health information systems? (in Phase II, what are the impacts on HIS strengthening efforts, when not having a HIS strategic plan or Policy)
    - 1.2. If not, are you aware of any initiative by GoN for having a HIS strategic plan or Legal/ Policy Framework for data collection, management, sharing?
    - 1.3. Is there an Authorized or Central Agency (highest level body) for coordinated HIS planning including investments and implementation? What is their work mandate or work modality?
    - 1.4. What has been the role of WHO in supporting HIS Policy or planning for coordinated HIS in the country?
    - 1.5. Are there other partners involved in supporting HIS Policy or planning? If yes, list them along with their specific area of support.

1.6. Is there a coordinated HIS support mechanism (synergy within different teams) within the WCO Nepal?
1.7. Is there a Central Institute or Agency responsible for monitoring and Evaluation of various programs and indicators (including SDGs) from various HIS? If not, what is the perceived impact?
1.8. Is there any National policy framework for establishing ICT infrastructure in the country? (Example- Data Center, State owned Wide Area Network etc.)

2. Focused Questions on Individual Information System:

(The following set of questions are aimed at collecting information pertaining to one information System; If the interviewee has experience with more than one information System, the same set of questions shall be repeated for each Information System- The interviewer has to record the information accordingly)

2.1 What are the objectives of the information system component you are supporting?
2.2 Who identified the need for the Information System and how? (Govt or WHO or any other partner)
2.3 Is there any standard approach to identify and prioritize the need for support? For example, was there a detailed requirement gathering or project proposal? Was there any Detailed concept note/ Implementation plan?
2.4 What is(are) the type of support(s) provided by WHO? How long is the support being provided? Is the support continuing? Will the current support be adequate in the context of federalism? If not, what should be the change in the approach for future support? Types of support- Policy Development, Technical Knowledge, Human Resources, Funding or providing Infrastructure, Capacity Building (it can be more than one)
2.5 Does the support mechanism provided by WHO help to Institutionalize the Information System within the Ministry? (Whether the support is Appropriate for sustainability?) If not, what do you think will be better support mechanism for making the system sustainable?
2.6 Whether the support is reflected in the biennium plan? In case it was an unplanned ad hoc request from MoH, how long did it take for WHO to process the request and provide support? Did it have any sort of impact on the project or its success? Did the support achieve the expected results? Any examples? In your experience do you see difference in success between planned support and unplanned support ad-hoc requests?
2.7 If the support was related to software development, did it undergo all the phases of the Software Development Life Cycle? Like Requirement Gathering, Design, Planning, Development, Testing, Roll out and Evaluation?
2.8 Is this system operating properly and producing desired results?
2.9 Is the system output is connected with the program and it is used in decision making? Do you have any examples?
2.10 Was there any previous evaluation for this Information System? If yes, please provide details and relevant documents.
2.11 Is the system properly documented? For example, the system design and operating manual is prepared and ready for reference?

2.12 What do you perceive are the success of the System? (example- User and end user Satisfaction, User and End user Acceptance, intent to use, Improved quality and timeliness of data, Use of data).

2.13 What do you think the Information System lacks behind in terms of achieving full success/ potential?

2.14 What challenges you faced/facing in this support?

- Challenges in Funding?
- Over expectation of support?
- Lack of ownership?
- Challenges in skilled Human Resource?
- Challenges in IT Infrastructure?
- Challenges in Policy support?
- Challenges with user acceptance? Does the system meet user expectations?
- Challenges in finding expert resources locally for this support?

2.15 Are there any Failure stories of this support (also in your experience) to share?

2.16 Which other partners are involved in supporting this system and does WHO collaborate with them? How long has WHO been supporting and how long has the partner collaborated? Who is the lead partner?

2.17 Who is the main counterpart (in GoN) for this support?

2.18 Will the system continue to operate at the current level if WHO support is withdrawn? Is there any exit/sustainability plan?

2.19 If it is not sustainable, do you think it is still relevant and appropriate to continue this support?

2.20 Would it be wise to stop this support and use the resources in some other areas? If yes, what would be those areas?

2.21 If the support is important but requires more time for being sustainable, should WHO look for partners to co-support it?

KEY INFORMANT INTERVIEW SCHEDULE for Ministry Officials

Date of Interview:
Place of Interview:

Name of the Interviewee:	**Designation/Capacity (in the context of HIS experience):**
HIS Role:	**Organization:**

Information System Experience:

S.No	**Information System Associated with**	**Duration**	**Type of Association (***Design and Development, Implementation and Roll out Support, Capacity Building, Funding and HR Support***)**

A. HIS Policy and Governance: This section contains questions to understand the HIS Policy environment in Nepal

1. Does the Country have a HIS Strategic Policy or Plan to regulate or guide the establishment and operation of the various health information systems? (In phase II ask what the impacts on HIS Strengthening of not having a HIS Strategic Plan or Policy)
2. Is there any legal/policy framework regarding data collection, management, sharing and publication of health data? (Example- Data Standards, Data Confidentiality, Data Storage practices, Data use agreement, Publication etc.) (In phase II ask, what is the impact of not having the legal/Policy Framework?)
3. If not, are you aware of any initiative by GON for having a HIS strategic plan or Legal/ Policy Framework for data collection, management, sharing?
4. Is there an Authorized or Central Agency (highest level body) for for coordinated HIS planning including investments and implementation? What is their work mandate or work modality?
5. What has been the role of WHO in supporting HIS Policy or planning for coordinated HIS in the country?
6. Are there other partners involved in supporting HIS Policy or planning? If yes, list them along with their specific area of support.
7. Is there a Central Institute or Agency responsible for monitoring and Evaluation of various programs and indicators (including SDGs) from various HIS? If not, what is the perceived impact?
8. Is there any National policy framework for establishing ICT infrastructure in the country? (Example- Data Center, State owned Wide Area Network etc.)

B. Focused Questions on individual Information System:

(The following set of questions are aimed at collecting information pertaining to one information System; If the interviewee has experience with more than one information System, the same set of questions shall be repeated for each Information System- The interviewer has to record the information accordingly)

1. What are the objectives of the information system component that WHO is supporting?
2. Who identified the need for the Information System and how? (Govt or WHO or any other partner)
3. Is there any standard approach to identify and prioritize the need for asking support from WHO?

   For example, was there a detailed requirement gathering or project proposal? Was there any Detailed concept note/ Implementation plan?
4. What is(are) the type of support(s) provided by WHO? How long is the support being provided? Is the support continuing? Will the current support be adequate in the context of federalism? If not, what should be the change in the approach for future support?

   Type of support- Policy Development, Technical Knowledge, Human Resources, Funding or providing Infrastructure, Capacity Building (it can be more than one)
5. Does the support mechanism provided by WHO help to Institutionalize the Information System within the Ministry? (Whether the support is Appropriate for sustainability?) If not, What do you think will be better support mechanism for making the system sustainable?
6. If the support was related to software development, did it undergo all the phases of the Software Development Life Cycle? Like Requirement Gathering, Design, Planning, Development, Testing, Roll out and Evaluation?
7. Is the Information system operating properly and producing desired results?
8. Does the system output provide feedback to the program and used in decision making? Do you have any examples?
9. Was there any previous evaluation for this Information System? If yes, please provide details and relevant documents.
10. Is the system properly documented? For example, the system design and operating manual is prepared and ready for reference?
11. What do you perceive are the success of the System? (example- User and end user Satisfaction, User and End user Acceptance, intent to use, Improved quality and timeliness of data, Use of data).
12. What do you think the Information System lacks behind in terms of achieving full success?
13. What challenges you faced/facing in this support?

    Challenges in Funding?
    Over expectation of support?
    Lack of ownership?
    Challenges in skilled Human Resource?
    Challenges in IT Infrastructure?
    Challenges in Policy support?
    Challenges with user acceptance? Does the system meet user expectations?
    Challenges in finding expert resources locally for this support?
14. Are there any Failure stories of this support (also in your experience) to share?

15. Which other partners are involved in supporting this system and does WHO collaborate with them? How long has WHO been supporting and how long has the partner collaborated? Who is the lead partner?
16. What are your thoughts and suggestions about many partners supporting one Information System? Are there any overlaps, non-coordination in support? (Only for Govt)? Is Yes, how can multi-partner support be made more effective?
17. Who is the main counterpart (GON) for this support?
18. Will the system continue to operate at the current level if WHO support is withdrawn? Is there any exit/sustainability plan?

Annex II

List of Documents reviewed:

In addition to the list mentioned in the References section, the following were reviewed as part of desk review.

c. National eHealth Strategy, 2017
d. Nepal Health Sector Strategy Implementation Plan, 2016-2021
e. Nepal Health Sector Strategy, 2015-2020
f. Nepal- WHO Country Cooperation Strategy, 2018-2022
g. Mortality Statistics in Nepal- Strategic Improvement Plan, 2016-2020 (Draft)
h. NHSSP Monitoring and Evaluation- Capacity Assessment for HSS, 2010
i. NHSSP- Consensus building workshop on strengthening HMIS- report outlining workshop findings and recommendations for Government and NHSSP support, 2011
j. NHSSP- Mismatch assessment HMIS, 2011
k. NHSSP- IT review providing recommendations for strengthening HMIS and piloting HSIS, 2011
l. WHO- Draft thirteenth general Programme of work 2019-2023

List of Interviews

Phase I evaluation

Person	Designation	Date	Purpose
WHO Country office			
Dr. Jos Vandelaer	WHO representative	15, 24 April 2019	Briefing and debriefing
Dr. Susheel Chandra Lekhak	National Professional Officer (PME)	15-24 April	Interview and coordination
Ms. Deepa Shrestha	Team Assistant (PME)	15-24 April	Coordination
Dr. Md Khurshid Alam Hyder	Public Health Administrator (HSS lead)	16 April 2019	Group interaction
Mr. Pawan Ghimire	National Professional Officer (HIS)		
Dr Lonim Prasai Dixit	National Professional Officer (NCD)		
Dr. Pooja Pradhan	National Professional Officer (MPDSR)		
Dr Reuben Samuel	Technical Officer (WHE lead)		
Mr. Dipesh Sthapit	Information Management Officer		
Dr Rajan Bikram Rayamajhi	National Professional Officer (Emergency)		
Mr Damodar Adhikari	National Professional Officer (Emergency)		
Dr. Lungten Wangchuk	Scientist (CDS team lead)	17 April	Group interaction
Dr. Usha Kiran	National Professional Officer (NTD)		
Dr. Subhash Lakhe	National Professional Officer (Malaria, Hepatitis)		
Dr Anindya Sekhar Bose	Medical officer (VPD lead)		
Ms Mona Lacoul	National Professional Officer (Data Cluster)		
Government units			
Integrated Health Information Management Section			
Dr. Sarad Sharma	Section Chief	19 April 2019	Interview
Mr. Vinod Poudel	Officer		
Health Co-ordination Division			
Mr. Mahendra Shrestha	Division Chief	18 April 2019	Interview
Policy, Planning and Monitoring Division			
Dr. Suresh Mehata	Sr. Public Health Administer	22 April 2019	Interview
Quality Standard and Regulation Division			
Dr. Deependra Raman Singh	Division Chief	23 April 2019	Interview
Partner organizations			
DFID/Nepal)			
Mr. Deepak Karki	Health Advisor	23 April 2019	Interview
GIZ/Nepal			
Mr. Saurav Bhattarai	Deputy Team Lead (Health)	19 April 2019	Interview

Person	Designation	Date	Purpose
National Health Sector Support Program (NHSSP)			
Mr. Pradeep Poudel	M&E Lead	23 April 2019	Interview

Phase II evaluation:

Person	Designation/Agency	Date
Partner organizations		
1. Ms. Sabita Tuladhar	USAID, Strategic Information and Research Advisor	30 April, 2019
2. Mr. Keshav Deuba	Strategic Information Advisor, NCASC, SC/Global Fund	03 May 2019
Government Units		
1. Mr. Bhim Prasad Sapkota	Co-Ordinator, Multisectoral co-ordination section/MOH	30 April, 2019
2. Mr Uttam Pyakurel,	Vector Preventable Disease (VPD), Data Focal Point, EDCD	02 May 2019
3. Mr Ghanshyam Pokharel	Section Chief, Vector Preventable Diseases, EDCD,	03 May 2019
4. Mr. Anil Thapa	Statistical officer, TB program	5th May 2019
5. Mr. Chudamani Bhandari	Chief Health Emergency Operation Centre (HEOC)/MOH	08 May 2019
6. Dr. Jhalak Sharma Gautam	Chief of Child health and Immunization Section	08 May 2019
7. Mr. Shambhu Gyawali	Chief Surveillance and Research Section/EDCD, EWARS	02 May 2019
8. Dr. Rabindra Baskota	Chief of Leprosy Control and Disability Management Section (LCDMS)	07 May 2019
9. Mr. Mitha Ram Thapa	Sr. Leprosy Officer Disability Management Section (LCDMS)	
10. Dr. Anjani Kumar Jha	Chief, NHRC (National Health Research Council)	14 May 2019
11. Dr. Megha Nath Dhimal	Chief Research Section, NHRC	
12. Dr. Sarad Sharma	Chief Integrated HMIS	14 May 2019
WCO		
1. Mr Roshan Karna	WHO Lead, National Health Account Office/MOH	03 May 2019
BPKIHS (BP Koirala Institute of Health Sciences)		
1. Dr. Dharanidhar Baral	Medical recorder/Demographer	10 May 2019
2. Dr. Sunil Ghimire	Professor of Public Health	
Gandaki Province		
1. Mr. Shankar Adhikary	Information Officer/HEOC-Pokhara	5 June 2019
2. Mr. Bhim Bahadur Khadka	Director – Provincial Health Directorate	6 June 2019
3. Mr. Bhim Prasad Poudel	Medical Recorder – Gandaki Zonal Hospital	7 June 2019
4. Mr. Ramu Sharma	Surveillance Officer – VPD Center	7 June 2019

Annex III

Suggested Checklist for use of the HIS working group to be constituted in WCO to review ongoing and proposed HIS future support. This is only suggestive and not exhaustive.

i. Does the support address the priority area(s) of WCO and Government? – alignment with CCS priorities and workplan.
ii. What is the type of support and which area of HIS ecosystem will be strengthened (purpose of support) and time duration of the support?
iii. Is the data optimized for data analysis, interpretation, and use at appropriate levels and purposes (individual patient care, health service delivery, aggregate data and indicators for reporting and monitoring, and other purposes)?
iv. Whether AC funds or VC funds are proposed to be used? And whether funds from WHO are sufficient for the planned duration and if not, what are the other planned options.?
v. Were detailed system requirements gathered and signed off by the Ministry or Concerned Department?
vi. Does the system requirement specify open standards and ensure interoperability with the larger HIS ecosystem in Nepal? (in the case of Nepal, whether the system follows Nepal Government Interoperability Framework, whether it can be seamlessly integrated with DHIS 2)
vii. What is the exit plan (including technology transfer and handover) for the support? Is there a transition plan agreed between WCO and Ministry?
viii. Is there Government commitment to sustain the system at end of WCO support?
ix. Have they identified who will be the owner of the systems and operate as system administrator after taking over? Are there defined SOPs, data sharing, data use, data security and confidentiality policy available or will they be developed as part of the support?
x. What are the indicators to monitor and measure the progress of the health information system? What is the baseline before start of this support and what are the targets/timelines to be achieved?
xi. Who are the EDPs working on this area and whether possibilities of collaboration were explored?
xii. Are there any parallel investments by other EDPs in this area?
xiii. Whether all relevant departments/units within WCO are aware of this proposed support and whether this HIS support is a cross-cutting initiative that needs collaborative approach? Can synergies be built with existing HIS support of WCO?

Annex IV

Suggestive Matrix for Prioritizing Implementation of Recommendations (It could also be potentially used to prioritize future HIS support as well)

Recommendations	Efforts Involved			Visibility for WCO (c)	Overall Potential Impact on HIS strengthening (d)	Priority Score (a+b+c+d)
	Activity (list activities that need to be carried out to implement corresponding recommendation)	Time (a)	Cost (b)			
Constitute a HIS Working Group						
Measure HIS Performance						
Ensure Compliance with Global Strategy						
Support Development of Health metadata and data standards for Nepal						
Provide Strategic Support at Provincial Level						
Support Development of National Capacity for HIS maintenance						
Adopt Modular Systems Approach						
Engage EDPs early						
Extend collaborations beyond EDPs						
Develop Detailed Project Documents						

Guidelines for assigning scores:

Suggested Scoring for Time-

More than 1 years requiring FTE – score 1

More than 1 year but does not require FTE- score 2

6 months- 1 years with or without FTE – score 3

Less than 6 months with FTE- score 4

Less than 6 months without FTE- score 5

Suggested Scoring for Cost-

Cost > 100000 – score 1

Cost 75000-100000 – score 2

Cost 50000- 75000 – score 3

Cost 25000-50000 – score 4

Cost < 25000 – score 5

Suggested Scoring for Visibility for WCO (subjective; but could be objective in some instances where WHO logo could be part of the software or part of the Technical document)

Very High visibility – score 5

High visibility- score 4

Moderate visibility- score 3

Low Visibility- score 2

No visibility- Score 1

Suggested Scoring for Overall Potential Impact on HIS Strengthening (more subjective)

Very high impact- Score 5

High Impact- Score 4

Moderate impact- score 3

Low Impact- Score 2

No impact- Score 1

The activities should be undertaken in order of priority set by the total score (higher the score, higher the priority).