Comprehensive assessment of Libya's health information system 2017

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Foreword

The health information system is a key component of any health system. All the pillars of health systems depend on a strong health information system to guide their planning and decision-making activities, consequently, strengthening the health information system in Libya is a priority of the Ministry of Health.

Owing to the current challenges facing Libya, there is interruption in the flow of information. The timely availability of health information is difficult because of delayed and inconsistent reporting from health facilities and programmes. Similarly, other data gathering mechanisms, such as registration of deaths, are also facing challenges due to the current crisis.

We are grateful to the European Union and the World Health Organization for their support in the strengthening of Libya's health information system and for the conducting of this comprehensive assessment, which involved the engagement of all relevant stakeholders.

I am confident that the implementation of all the priority actions identified in the assessment will strengthen the health information system in Libya, and all health sector partners will have access to quality health information. The evidence-based information produced by Libya's Health Information Centre will guide the political leadership and decision-makers to plan effectively and will bring positive changes to the health system.

I would like to take this opportunity to thank the organizers, workshop participants, relevant stakeholders and WHO for their technical support, which has resulted in development of a roadmap for health information system improvement in Libya.

I am especially grateful to the European Union for their recognition of the importance of strengthening Libya's health information system and for their financial support to the Ministry of Health of Libya to achieve this aim.

Dr Omar Bashir Altaher
Minister of Health
Libya

Preface

The availability of reliable data on the strengths, weaknesses and performance of different pillars of a health system is needed to plan, implement and measure health interventions. Successful strengthening of health systems requires relevant, timely and accurate information on the health system itself. The essence of a health information system is to collect, organize, analyse and safely store and protect that information.

The effectiveness of the health information system in Libya has been adversely affected by the armed conflict in the country. Health information is vital to providing planners and policy-makers with data and evidence to develop effective policies and decisions for quality patient care and optimal system performance. With the widespread computerization of health records, traditional (paper-based) records are being replaced with electronic records. The tools of health information and technology are continually improving to bring greater efficiency to information management in the health care sector.

A well-functioning health system that covers the entire population is now regarded as the first line of defence against the threat from emerging and re-emerging diseases. Apart from strengthened health security, Libya has much to gain from its commitment to strengthening its health information system, ensuring effective medicine supply chain management and progressing service delivery towards universal health coverage.

For decades, the greatest barriers to better health have been a weak health system and inadequate information, policies, medicines and human resources. A commitment to universal health coverage means a commitment to working together and addressing these barriers.

Organizing health services based on reliable data and solid evidence promotes a comprehensive and coherent approach to health which emphasizes people-centred, quality care throughout the life course, stresses prevention as well as curative care, and moves away from a focus on individual diseases to population health for universal health coverage.

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We also express our gratitude to staff and officials from the Ministry of Health, Bureau of Statistics and Census, the Vital Registration Authority, the Social Information Centre, General Information Authority and other stakeholders for providing information and insights into their information systems.

The following national experts facilitated working group sessions (the main source of information for this report): Dr Fatima Salem, Dr Huda K.S. Kutrani, Dr Ramadan Osman, Dr Mohamed Hashem, Dr Ghassan Karem and Dr Hajer Elkout.

We gratefully acknowledge the financial support of the European Union, without which we would not have been able to produce this report.

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Acronyms

CRVS	Civil registration and vital statistics
DHIS	District health information system
EU	European Union
EWARN	Early Warning Alert and Response Network
HISP INDIA	Health Information Systems Programme, India
HIS	Health Information System
ICD	International Classification of Diseases
ICT	Information and Communications Technology
SDGs	Sustainable Development Goals
WHO	World Health Organization

Executive summary

Health information systems (HIS), including civil registration and vital statistics (CRVS) systems, are indispensable sources of health information data for programme monitoring, performance monitoring, quality of care, planning, and policy-making. The HIS and CRVS systems provide continuous information on the coverage of services in the health sector and on mortality statistics, including cause of death. The availability of data at the subnational level provides countries with an opportunity to assess equity in the provision of health services.

This assessment was commissioned by the World Health Organization (WHO) in May 2017 as part of the inception phase for the two-year Strengthening Health Information System and Medical Supply Chain Management (SHAMS) project, funded by the European Union. With support from the Ministry of Health and an international consultant, a team from WHO reviewed the extent to which the Libyan HIS adheres to a sound policy and institutional environment; the utilization of well-functioning data sources; the availability of strong institutional capacity for data collection, management, analysis, use and dissemination; and the implementation of effective mechanisms for review, data use and action. The assessment methodology was based on the approach developed by the WHO Regional Office for the Eastern Mediterranean for comprehensive assessment of health information systems. During the assessment of the Libyan HIS, discussions were guided by the WHO monitoring and evaluation assessment and planning tool, which aims at gaining an overview of the weaknesses and strengths of national health information systems and identifying priority actions based on those findings.

In collaboration with HISP INDIA, the review team also assessed the interest and potential to pilot District Health Information System (DHIS-2) technology in selected facilities as part of efforts to enhance information gathering, analysis and use for decision-making.

In this review, a number of observations were made relating to the HIS in Libya. The main strengths include the existence of the Health Information Centre within the Ministry of Health, which coordinates HIS activities; the growing demand for health-related information from senior programme managers, policy-makers, donors, nongovernmental organizations and other key health sector actors; and a well-defined system of data collection and reporting from facility to national level. The review team also documented the existence of well-defined catchment areas, administrative boundaries and geo-referenced health facilities. Information from censuses and surveys conducted by the Bureau of Statistics and Census and other partners is regularly used. The National Centre for Disease Control is one of the key centres within the Ministry of Health with active information systems. The fully automated vital registration system is also a key data source. The availability of a master facility list and a defined list of priority diseases under current national surveillance, including alert thresholds and a completed CRVS assessment, are additional areas of strength.

Nevertheless, the HIS in Libya has a number of weaknesses: about one third of the attributes of a functional HIS are not present across all components. Libya does not have a comprehensive costed monitoring and evaluation plan; there are no standard operating procedures for data management, institutionalized data quality assessments or even a functioning, integrated web-based HIS system. Effective mechanisms for review and action, such as independent reviews of data, linkages between health sector reviews and disease- and programme-specific reviews, and active engagement of civil society in-country reviews, are also non-existent. In addition, the Health Information Centre lacks a monitoring and evaluation unit and a unit responsible for collecting and processing emergency information.

While the detailed priority actions and their timeline are provided in the main body of this report, the overarching recommendations for intervention emanating from the assessment are presented below.

Governance:

- Establish a functional national steering committee, with representation from all key national HIS stakeholders, to coordinate HIS activities at the national level.
- Create a sub-technical committee to develop a monitoring and evaluation plan for the HIS.
- Improve coordination among the Ministry of Health, various programmes, and other HIS stakeholders.

Infrastructure and support:

- Strengthen routine HIS by training Ministry of Health cadres at all levels and purchasing relevant information and communications technology equipment.
- Pilot DHIS-2 to improve the collection, processing and analysis of data for planning and evidence-based decision-making.
- Expand the number of surveillance teams and surveillance sites, including the expansion of mobile units to respond more efficiently and in a timely manner to outbreaks.

Data management and standards:

- Complete the human resources registry to improve decision-making regarding human resources for health.
- Develop a national guidebook for notifiable diseases.

Quality assurance:

- Establish a department/unit for ICD encoding in every hospital as one of the means to improve the system for death notification and certification.
- Strengthen capacities for conducting household surveys and censuses, including capacities to improve analysis and report writing.
- Implement a system of joint periodic progress and performance reviews and independent reviews of data to promote evidence-based decision-making.

Data dissemination and use:

- Develop an integrated web-based HIS system to address fragmentation challenges.
- Raise awareness on the importance of data and conducting "training of trainers" on data use and analysis.
- Develop inter-ministerial mechanisms to promote health information-sharing related to migrant populations.

The priority actions presented in this report will support the Ministry of Health, in collaboration with other stakeholders, to develop short-, mid- and long-term plans for HIS strengthening. While it may take 4–5 years or more to see the effects of the process of strengthening the HIS entirely, the immediate focus for Libya should be designing interventions that can strengthen existing HIS operations without much change ("quick-wins") and that are able to meet the target indicators for the European Union-funded SHAMS project. These can be developed through the involvement of stakeholders and HIS specialists.

An important step will be for the Ministry and other stakeholders to vet the findings and priority actions or recommendations of this assessment and align them with their analysis and final direction to make them part of a single, agreed set of recommendations. Identifying interventions is

the first stage in the improvement process. What remains critical though is to cost the interventions, the estimated number of person-days, and, where necessary, the number of individuals to be trained or the amount of materials/equipment to be purchased and the proposed time frame which are consistent with the roadmap of key priority actions presented in Section 6 of this report. The costing and development of an HIS improvement plan can be carried out by a small group of technical and programme HIS experts (i.e. a technical committee). The proposed time frames can be adjusted based on the actual time period for the commencement or implementation of the HIS improvement plan.

1. Background

1.1 Overview of the health situation in Libya

The health sector in Libya has been facing the worst humanitarian crisis in its recent history. Historically, the reduced capacity health system of Libya has further been deteriorated due to fragmented governance, limited financial resources, inadequate human resources and acute shortages of basic life-saving medicines and equipment. Results from surveys have repeatedly shown that improved health care delivery is the greatest need for Libya, yet prioritizing this has been a challenge. As a result, Libya has experienced poor health outcomes, largely due to the deterioration in health care services.

In order to assess the readiness of Libya's health sector to deliver health care to the population, a Service Availability and Readiness Assessment was conducted in 2016. Among other things, the results showed that 17% of the hospitals and 20% of primary health care centres (polyclinics, health centres and health units) were closed. The availability and readiness of services in primary health care centres and hospitals was extremely low. Lack of readiness was the result of acute shortages of life-saving medicines, medical supplies and equipment along with critical shortages of human resources, particularly specialized physicians, nurses, midwives and technicians. These shortages were critical at the primary health care level. As a result, referral and tertiary hospitals were overloaded with patients presenting with common illnesses and unable to meet the demand. The provision of primary health care, especially for communicable diseases among migrants and refugees in detention centres, is a major challenge.

Another challenge with the health system is the limited health screening mechanisms at the borders/ports of entry which increases the likelihood of importation of viruses and bacteria from other countries, including polio, Ebola and Zika viruses.

Despite Libya's complex political framework, which has negatively affected the health structure, WHO and other national and international health partners have united efforts to provide maximum assistance to reduce avoidable morbidities and mortalities and prevent the occurrence of major outbreaks. A robust early warning alert and response system (EWARS) was established in February 2016, and as of May 2017 it was reporting on eight immediate notification and 18 weekly communicable diseases. In 2015–2016, WHO also supported Libya by providing life-saving medical supplies and the procurement of essential medicines, benefiting approximately 2 million people.

In collaboration with Johns Hopkins University, WHO prepared 35 priority actions which will strengthen accident and emergency care in hospitals. In Libya, WHO has recently recruited an expert to support the Ministry of Health in establishing an emergency management department. This includes an emergency operations centre, an intra- and intersectoral coordination platform, and several support units, such as human resources, capacity-building, communications and partnership. WHO will also support the emergency management department in areas related to capacity-building and the development of a strategic framework, policy, operational plan and protocols. The national emergency management department and the emergency operations centre will be established in Tripoli following the establishment of similar structures and programmes in the eastern and southern areas of the country.

To sum up, the following elements remain major challenges currently facing the Libyan health system.

- Access to health care is particularly difficult in all conflict-affected areas, including Ubari, Sebha, Aljafara, Sirt, Derna, Benghazi, Azzawya and Tripoli. The most vulnerable include the injured; older people; children; people with disabilities; hard-to-reach people; women (pregnant, lactating mothers and those within the reproductive age group); 241 000 internally

displaced people; 356 000 returnees; 101 000 refugees; 195 000 migrants; and 437 000 non-displaced individuals.

- The availability of essential medicines is deficient in public health facilities due to reduced accessibility and in private facilities due to increasing costs of medicines.
- Access to health professionals, including specialized nurses, midwives and technicians, is poor, particularly in hard-to-reach areas, in terms of availability, accessibility, acceptability and quality.
- Robust disease control programmes to detect and combat infectious diseases and life-threatening diseases such as polio, measles and HIV/AIDS are lacking. Maintenance of immunization against childhood infectious diseases at primary health care level, as well as support to referral systems, are also poor.
- Sustainable electricity provision and solar energy backup for public health services are needed to enable critical medical operations.

1.2 Overview of the health information system

In Libya, the Health Information Centre was established in the Ministry in 2006 under Law No. 4 of 1990. Since then, the Centre has had its own annual budget; it collects routine data from health facilities, conducts health surveys, trains human resources for the statistical units and issues various statistical reports. At the time of the assessment, the Health Information Centre was headed by a director general overseeing 26 staff, comprising statisticians, information technologists, data entry and documentation clerks and a health information consultant. The Centre comprises five offices: Statistics and research, Data analysis, Information technology, Documentation, and Administration and finance.

Historically, health information is received directly from the statistical offices in all the hospitals and from the statistical units of the Directorate of Health at the district level. Reports are generated accordingly and all the annual reports from 2004 to 2014 are available and can be accessed from the Centre's website.[1]

However, due to current political challenges, the flow of information from hospitals and primary health care centres has been interrupted and substantially reduced.

The National Centre for Disease Control is the main entity responsible for disease surveillance and response. All disease-specific programmes have a disease notification system and they report annually to the Health Information Centre.

Information on vital registration for births is available in almost 100% of cases and information on deaths in around 60% of cases. The Vital Registration Authority has extended its birth and death registry services to seven branches and 380 service offices covering the whole country, including the establishment of civil registry offices in all major hospitals and medical centres. With technical support from WHO, the Vital Registration Authority conducted rapid and comprehensive CRVS assessments in 2013 and 2015 and is adapting the regional strategy for strengthening CRVS, especially in areas related to death certification and the use of the International Classification of Diseases (ICD-10) for mortality coding. Vital statistics are issued by the Bureau of Statistics and Census, which carries out the general population census every 10 years. The last census, however, was conducted in 2006 and the next is planned for 2018.

The Health Information Centre, in collaboration with the National Centre for Disease Control and the Libyan Cardiac Society, conducted the WHO STEPwise approach to surveillance survey in 2009; the Global Youth Tobacco Survey in 2003, 2007 and 2010; the Global School Personnel Survey in 2003 and 2010; and the Global School-based

[1] http://www.seha.ly/, accessed 9 September 2020.

Student Health Survey in 2007. The Global Health Professional Student Survey was conducted in 2006. The Centre is also a custodian of two cancer registries (Benghazi and Sabratha). The Pan-Arab Project for Family Health survey was conducted in cooperation with the National Centre for Disease Control and the Bureau of Statistics and Census in 2007 and 2014.

In collaboration with WHO, the Centre also conducted Service Availability Readiness Assessments in 2012 and 2016. Health-related information is also available from school health services, the Libyan Nursing Board and the Libyan Board for Medical Specialities.

Libya has adopted the WHO Regional Framework for health information systems and the 68 core indicators[2] for monitoring the health situation and health system performance. Additional indicators will be added to the list to cover Sustainable Development Goal (SDG) [3] on health. An assessment conducted by WHO in 2016 on country capacity to report on the core indicators3 showed that Libya was reporting 53% of the population-based indicators and 65% of the institutional-based indicators.

In order to strengthen the HIS, WHO and the Health Information Centre conducted an assessment of the Libyan HIS from 9 to 12 May 2017 to commence the main activities of the two-year Strengthening Health information system And Medicines Supply chain management (SHAMS) project funded by the European Union (EU).[4]

2. Purpose and objectives of assessment

Theoretically, the Libyan HIS is managed at the central level by the Ministry of Health in Tripoli with 23 information offices located across the country (see Fig. 1 for schematic representation). Before the conflict, these 23 subcentres were responsible for collecting, collating and transmitting data to the central level of the Ministry through electronic reporting. Although there were major gaps in the information collection and reporting, data on disease burden and service usage and outcome were available to some extent. All the data received at central level were used to publish an annual report. No reports have, however, been produced since 2013. Of 1656 primary health care facilities, only a limited number were reporting the data. Reasons for non-reporting included closure of some hospitals and primary health care centres, closure of most subcentres due to lack of training, non-availability of human resources, limited access to the Internet, and use of older versions of data recording tools and formats.

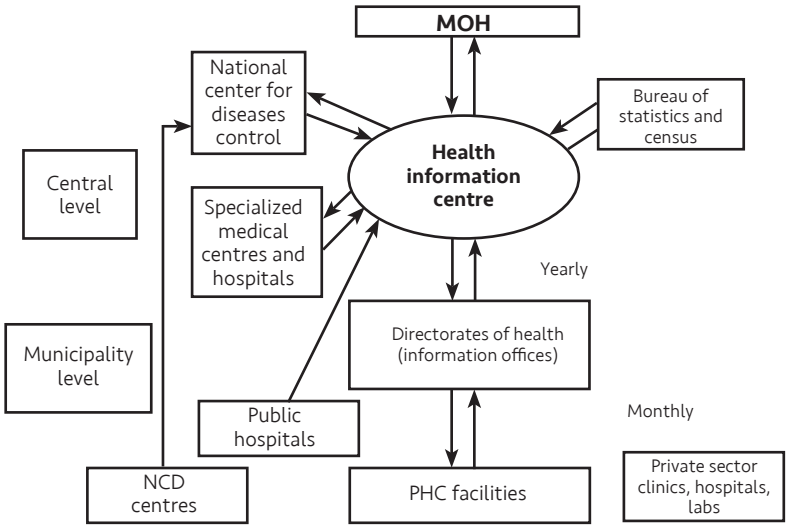
Another challenge with the Libyan HIS is lack of training for resource persons who were positioned in information offices, hospitals and district health administration. Any existing data are seldom used for decision-making purposes because the system and the Ministry have limited capacity in this respect. Although WHO supported the Ministry in the strengthening of a comprehensive CRVS system, there is still a need for further capacity-building.

With funding from the European Union through the SHAMS project, the Government has initiated efforts to strengthen the national HIS, supported by WHO. Strengthening the HIS in Libya will help the country to monitor its health development

[2] Framework for health information systems and core indicators for monitoring health situation and health system performance 2016. Cairo, WHO Regional Office for the Eastern Mediterranean; 2016 (http://applications.emro.who.int/dsaf/EMROPUB_2016_EN_19169.pdf?ua=1, accessed 9 September 2020).

[3] Summary report on the intercountry workshop on country capacity to report on core indicators, WHO, Regional Office for the Eastern Mediterranean, Cairo, Egypt, 15–17 August 2016.

[4] The overall objective of the Strengthening Health information system And Medicines Supply chain management (SHAMS) project is to improve the health care provision efficiency in Libya by focusing on two components: 1) the supply management chain; and 2) health information system management.



Source: Ministry of Health Libya

Fig. 1. Schematic representation of the routine health information system in Libya

agenda, as well as enhance its reporting capacity on the 100 core health indicators,[5] including 68 regional core indicators. To achieve this, a review of the HIS was planned to improve the regularity and reliability of information produced by the existing Health Information Centre; boosting outreach of information gathering; analysing health information intended as an essential part of public health planning; and decision-making. The assessment report provides a description of the HIS, including overall HIS structure within the country; information flow; governance and quality assurance; infrastructure; data management and standards; dissemination and use of data for policy and planning; analysis of its strengths and weaknesses; and recommendations on how to further develop the system to respond to the requirements of reporting on national and international priorities and commitments, such as the SDGs. The results of the review will help the Government develop a prioritized and detailed roadmap for HIS improvement and reporting of core indicators at national, regional and international levels.

3. Assessment methodology

3.1 Review approach

In line with the priority areas outlined in the terms of reference, the review team focused on an approach to develop a common understanding of the information systems and databases; assessing the strengths and weaknesses of these components and operations within the HIS; and providing recommendations consistent with global standards, indicator frameworks and guidelines. The assessment methodology was based on the approach developed by the WHO Regional Office for the Eastern Mediterranean for comprehensive assessment of HIS (Fig. 2). During the assessment, discussions were guided by the WHO monitoring and evaluation assessment and planning tool, which aims to obtain an overview of the strengths and weaknesses of national monitoring and evaluation systems and identify priority actions based on those findings. In collaboration with the HISP INDIA, the review team also assessed the interest and potential of the Ministry to pilot the District Health Information System (DHIS-2) technology in selected

[5] 100 core health indicators, 2015 (http://www.who.int/healthinfo/indicators/2015/100CoreHealthIndicators_2015_infographic.pdf?ua=1, accessed 9 September 2020).

facilities as part of efforts to enhance information gathering, analysis and use for decision-making.

3.2 Document reviews

Before the mission, the team reviewed documents provided by the Ministry, documents available in the public domain and some documents from previous WHO missions related to HIS in Libya. Some documents were also received during the meetings.

3.3 Assessment workshop and working groups

A four-day workshop was conducted in Tunis, Tunisia, from 9 to 12 May 2017 to learn about specific information systems, focusing on information systems directly relevant to Ministry interests. Presentations on information systems were made by the Health Information Centre, the National Centre for Disease Control, the Bureau of Statistics and Census, the Vital Registration Authority and the Social Information Centre. Six working group sessions were held focusing on key issues of a functioning HIS: policy and governance; CRVS; routine HIS; disease surveillance; institutional capacities; and review, data use and decision-making. Presentations, discussions and working group sessions revolved around the type of systems used, problems related to data collection and flow, limited capacity of staff to use information for decision-making, difficulty in assembling information from different sources at all levels, and the importance of mainstreaming emergency information needs into the Libyan HIS. The availability of information and communications technology support and plans for the development of future systems were also discussed. Discussions were guided by the quantitative WHO monitoring and evaluation assessment and planning tool. Additional qualitative questions were adapted from the Performance of Routine Information System Management framework.6 The qualitative questions focused on other critical HIS issues not captured in the attributes of the assessment and planning tool.

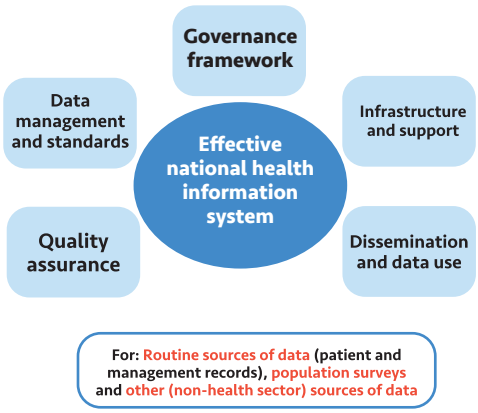


Fig. 2. Effective national health information system

The review team included an international consultant on CRVS systems. WHO contributed to review the status of the implementation of the CRVS improvement plan that emanated from the CRVS comprehensive assessment workshop, conducted in April 2015, and the implementation progress workshop conducted in September 2016. A debriefing meeting was held with the Ministry representatives and other stakeholders on the last day of the mission to present the observations made in this review and to discuss next steps. Representatives from the WHO country office also participated in the meetings. Annex 1 lists participants of the HIS assessment workshop.

3.4 Synthesis of findings, recommendations and report preparation

In addition to the documents that were reviewed and the information gathered during the discussion and working groups with Ministry of Health officials and other stakeholders, the team also used technical judgement and carefully organized the findings according to the thematic areas of the monitoring and evaluation Assessment and Planning tool. The team used this as a basis to

[6] The Performance of Routine Information System Management (PRISM) framework consists of tools to assess routine HIS performance, identify technical, behavioural and organizational factors that affect routine HISs and identify priority interventions to improve performance, quality and use of routine health data.

formulate priority actions or recommendations and finalize the road map for HIS improvement in Libya. Each team member contributed to each of the sections of the report, which were then compiled and shared with working group session facilitators for review and feedback. After incorporating feedback from the facilitators, the final report was shared with the Ministry of Health and all stakeholders.

4. Key findings

Enhanced management of health information is a key step to achieving better health outcomes in Libya. Evidence-based decision-making can only be achieved in the presence of a functional HIS. The growing demand for health-related information by policy-makers, programme managers, donors, nongovernmental organizations, the public at large and other stakeholders demands a unified, well defined system of data collection and reporting from the health facility level to the national level that will suit all the users of the data.

Libya, as is the case with most countries, uses the HIS to serve multiple users and a wide range of purposes. This discussion of the key findings on HIS focuses on three key components: a quantitative scoring on the availability of key attributes of a functional HIS; a qualitative assessment of selected HIS functionality issues that were not covered in detail using the scoring approach; and assessment of key performance metrics, their status and means of verification. Then the key priorities for improvement are identified in later sections based on the findings reported in this section.

4.1 HIS assessment and planning tool: scoring

The monitoring and evaluation/HIS assessment and planning tool was used to obtain an overview of the current status of the different components of the monitoring and evaluation platform of the health sector, and to identify a set of priority actions to strengthen or develop the system. The tool includes a checklist of the attributes of the four main components of a functioning monitoring and evaluation platform: sound policy and institutional environment; well-functioning data sources; strong analytical capacities; and mechanisms for review and action. The tool, which has been translated into Arabic, was presented to the participants in a plenary session.

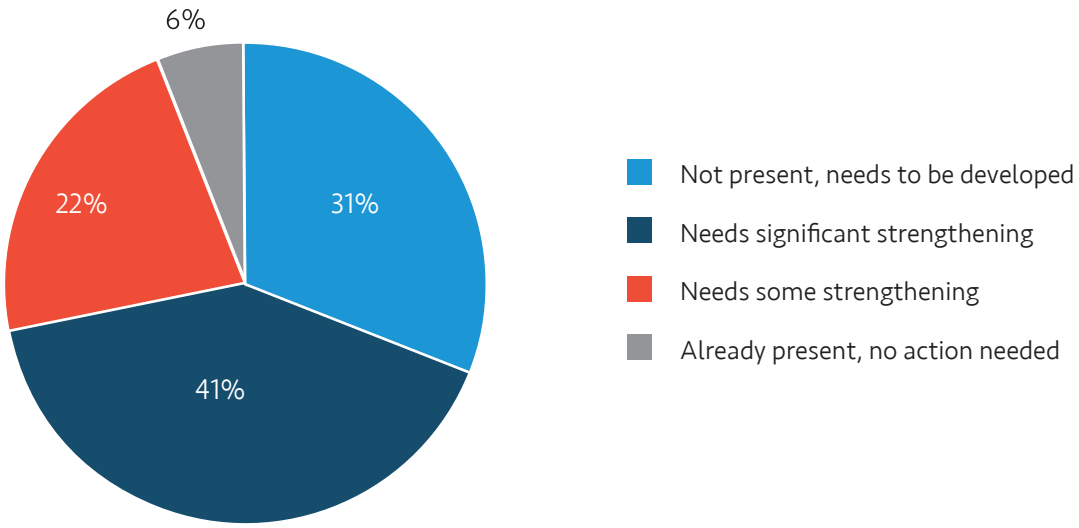


Fig. 3. Summary of scores from the monitoring and evaluation assessment and planning tool

Participants in the workshop were divided into six groups to score the 71 attributes on the checklist under the following categories:

- sound policy and institutional environment;
- well-functioning data sources: health facility and community information systems; health systems information (e.g. logistics management information system, national health accounts, human resources);
- well-functioning data sources: disease surveillance
- well-functioning data sources: household surveys, censuses, CRVS;
- strong institutional capacity for data collection, management, analysis, use and dissemination;
- effective country mechanisms for review and action.

According to the assessment conducted by the workshop participants, about one third of the attributes of a functioning platform are not present, distributed across all components. Libya does not have a comprehensive costed monitoring and evaluation plan; there are no standard operating procedures for data management, institutionalized data quality assessments or even a functioning, integrated, web-based HIS system. Effective mechanisms for review and action such as independent reviews of data, linkages between health sector reviews and disease- and programme-specific reviews, and active engagement of civil society in country reviews, are also non-existent.

More than half of the attributes (63%) need some or significant strengthening, meaning that although the key attributes of a good functioning HIS are in place, there is still significant room for improvement. This includes key strategic areas such as improving coordination mechanisms, strengthening data sources (certification in cause of death, adequate infrastructure and staffing for a functional routine health information system, coordination and implementation of surveys; and improving health systems monitoring); and building analytical institutional capacities on data dissemination and use.

Finally, only few attributes are already present and do not require further action. That is, a master facility list is in place; a defined list of priority diseases under current national surveillance, including alert thresholds, has been defined; and a CRVS assessment has been conducted.

Table 1 summarizes some of the key issues discussed for the key components in each of the working groups, aggregated in two main domains: substantial support is needed (which includes attributes scored as 1 and 2); and some support is needed (score 3).

A full table summarizing the scores for each attribute and component of the monitoring and evaluation platform is included in Annex 3. The priorities emerging from the discussion (captured in Table 1) have also been included in the roadmap (see Section 6).

4.2 Qualitative inputs

4.2.1 Addressing qualitative aspects and identifying priorities

In addition to scoring the attributes of a functioning HIS, a series of questions to address some qualitative aspects of the national HIS were developed to help in identifying priorities. This section outlines the main findings.

- Existing information systems were mapped and equity stratifiers identified. The country has several information subsystems responding to the different needs of the Ministry of Health. The routine HIS collects aggregated information from facility level, and is paper-based. The laboratory information system is also paper-based, but some subsystems such as disease-specific subsystems (TB and HIV) or the disease surveillance system are mixed (collection of

Table 1. Key areas in the health information system (HIS) requiring improvement identified in working groups

Key HIS component	Substantial support needed	Some support needed
Sound policy and institutional environment	The lack of an agreed national health strategic plan poses a crucial challenge to the HIS, resulting in unclear definition of indicators to be monitored, lack of HIS plan, and no clear standard operating procedures for monitoring progress. A key priority action to address this is to create a committee to develop a monitoring and evaluation plan.	There is a weak coordination of HIS and monitoring and evaluation activities, due to unstable institutional administrative structures, continuous institutional changes, and irregular meetings. Improved coordination is needed between the Ministry of Health and programmes. This should run in parallel with the establishment of a committee to develop a HIS plan.
Health facility and community information systems; health systems information (logistics management information systems, national health accounts, human resources)	Current infrastructure, staffing and analytical capacities to ensure a functional routine HIS is in place are insufficient. Health resources are also inadequately tracked, as are other health monitoring systems. Key activities to strengthen routine HISs include training of Ministry of Health cadres at all levels; and purchasing ICT equipment. DHIS-2 will be rolled-out nationally. A comprehensive hospital management system should be developed.	Data on the availability of human resources are available, but are not used to inform decisions. Data on 60 000 health workers have been entered by the Information and Documentation Centre. Work is under way to enter remaining data. The human resources registry should be completed.
Disease surveillance	There are still significant gaps in disease surveillance: public health laboratories do not have the capacity to diagnose and confirm diseases that have to be reported; the private sector is not routinely involved in case detection; surveillance programmes are not integrated; and some essential equipment, such as ICT and vehicles, are not available. A key priority for the Ministry of Health is to expand the number of surveillance teams and surveillance sites, including the expansion of mobile units to respond more efficiently and promptly to outbreaks. Additional disease registries must be developed, e.g. a cancer registry.	Currently, there is no unified national guide for standardized definitions for diseases under surveillance. Outbreak verification is delayed sometimes, and weekly reports are not submitted on time. A key priority action to address this is to develop a national guidebook for notifiable diseases.

Table 1. Key areas in the health information system (HIS) requiring improvement identified in working groups

Key HIS component	Substantial support needed	Some support needed
Household surveys, censuses, CRVS	Although there is a system for death notification and certification, a huge gap in cause of death certification, according to the ICD code, was identified. The system for death certification and data entry should be improved. A department/unit for encoding should be created in every hospital. Options such as payment for performance could be explored to improve death certification. Capacities for analysis of data from surveys are limited. To strengthen capacities to conduct household surveys and censuses, recruitment and training of statisticians and data collectors are needed. Capacity-building of the National Statistics Office and public health institutes is also needed.	There are coordination mechanisms for CRVS, although the implementation plan needs to be accelerated. The national health plan should include a harmonised health survey plan. All stakeholders should be actively engaged through the Ministry of Planning to implement surveys and censuses.
Strong institutional capacity for data collection, management, analysis, use and dissemination	Analysis of data can be substantially improved. Strengthening the organizational communication mechanism between relevant sectors was identified as a priority jointly with other actions such as the recruitment of staff, providing training and building specialized capacity in data analysis (e.g. statistical packages such as SPSS).	Data, methods and analyses are publically available, but there is still room for improvement. Although intersectoral coordination has started to define levels of and rights to data access, intersectoral cooperation in presenting and discussing annual data needs further strengthening.
Effective country mechanisms for review and action	A system of joint periodic progress and performance reviews needs to be created/substantially improved, including independent reviews of data, the active engagement of civil society and the incorporation of results from reviews into decision-making. Suggested activities include raising awareness on the importance of data; conducting "training of trainers" on data use and analysis; and conducting a budget analysis in relation to health data to inform further budget allocations.	No scoring was attributed.

data is paper-based, but the information is later introduced into an electronic database).

- Equity dimensions disaggregated by the routine systems were analysed. All relevant information subsystems provide information disaggregated by sex. Education and occupational status is also provided by the human resources registry. However, routine information systems do not provide information on wealth/income status, race, ethnicity or migration status. Disease-specific information systems provide disaggregated data on nationality (Libyan/non-Libyan).

- Data collection tools (forms and registers) were listed. The list included medical records, nursing records, admission and discharge forms, intensive care unit records, death certificate records, investigation records, pharmacy store records, outpatient department records, discharge forms, and other online/electronic forms which are filled in at the hospital level for special services, such as noncommunicable diseases. The forms/registers need further analysis, especially if the routine HIS is going to be migrated to DHIS-2. Some forms, such as the death certificate records, will need to be revised (i.e. adding enough space to write in English and Arabic).

- Tools for data collection, reporting and management of surveillance information were described. Two tools were described: the Early Warning and Response Network (EWARN), an electronic tool used for immediate and weekly reporting, which is not yet fully functional; and the notification tool, which is paper-based at peripheral (health facility) level, with data being introduced into an electronic database at central level.

- Composition and capacities of rapid response teams were described. Libya's response to outbreaks is provided by rapid response teams at two levels: central teams, which can be deployed within 24 hours; and 36 governorate-level teams, which need additional time to investigate and respond to outbreaks. The last formal training was conducted in 2007.

- A list of surveys that have been conducted in Libya during the past five years was generated. Two health facility assessments were conducted (Service Availability and Readiness Assessments in 2012 and 2016) and at least three household surveys (Pan-Arab Project for Family Health, household multisector needs assessment, workforce survey). A more detailed analysis of the indicators generated, comparability and/or evolution of indicators over time would be needed. Also, as pointed out during the scoring and planning exercise, a survey plan would be needed to identify key information needs and inform and coordinate the upcoming surveys.

- Finally, the main information products of the Libyan HIS were listed and the approach towards improving them was discussed. The main actions to improve the quality and ensure the periodicity of reporting were: conduct training in statistical software for statistical officers; assess the information needs to develop information guidelines; increase awareness on the information products; and ensure that adequate human resources for analysing and disseminating the information are in place.

4.2.2 Mainstreaming emergency information needs

In contexts where there is fragility, conflict, or infectious outbreaks, health needs and capacities may differ markedly from those of routine conditions. Just as health system and essential public health functions must continue during emergencies, so too must the knowledge of health stakeholders about their drivers, capacities and gaps. Rather than being a reactive action undertaken during the response and recovery phases of the emergency management cycle, planning for reliable and timely health information during emergencies is ideally rooted in health decision-makers' policies and procedures undertaken during the prevention and preparedness phases.

Table 2. Strategic and health objectives for the Libyan Human Response Plan

Objective	Indicator	In need	Baseline	Target
SO1	Number of people in need reached with life-saving assistance through mobile medical support	Total: 88 606 Male: 32 880 Female: 25 156 Boys: 15 498 Girls: 15 072	Total: 45 035 Male: 16 712 Female: 12 786 Boys: 7877 Girls: 7660	Total: 60 000 Male: 22 265 Female: 17 035 Boys: 10 494 Girls: 10 206
	Number of health workers (medical doctors, nurses, midwifes) per 10 000 population	Total: 25 Male: 10 Female: 15	Total: 8 Male: 3 Female: 5	Total: 22 Male: 7 Female: 15
HO 1	Number of outpatient department visits per 10 000 population per year	Total: 8500 Male: 56% Female: 44% Boys: 56% Girls 44%	Total: 2658 Male: 56% Female: 44% Boys: 56% Girls 44%	Total: 8000 Male: 56% Female: 44% Boys: 56% Girls 44%
	Number of people in need reached with life-saving assistance through mobile medical support	Total: 88 606 Male: 56%, Female: 44% Boys: 56% Girls 44%	Total: 45 035 Male: 56% Female: 44% Boys: 56% Girls 44%	Total: 60 000 Male: 56% Female:44% Boys: 56% Girls 44%
HO 2	Number of health workers (medical doctors, nurses, midwifes) per 10 000 population	Same as SO1		
HO 3	Number of children receiving measles vaccination (6 months–15 years)	Total: 235 262 Boys: 131 747 Girls: 103 515	Total: 214 088 Boys: 119 890 Girls: 94 198	Total: 223 499 Boys: 125 159 Girls: 98 340
	Number of HIV patients receiving antiretroviral therapy	Total: 6330 Male: 4178 Female: 2152	Total: 4088 Male: 2698 Female: 1390	Total: 5000 Male: 3300 Female: 1700

Conceptually, this means that a national emergency preparedness and response plan must interface with national health policies, strategies and plans in a way that fulfils this need across the four components of the monitoring and evaluation platform. As a starting point, participants in working group discussions were asked to consider the most recent (2017) Libya Humanitarian Needs Overview and Humanitarian Response Plan and to elaborate upon how routine capacities across monitoring and evaluation components could both contribute to, and benefit from, information collected through the programmes of various humanitarian stakeholders.

4.2.3 Health information system in an emergency context

The Humanitarian Needs Overview and Humanitarian Response Plan are documents that are jointly drafted by emergency organizations. The Humanitarian Needs Overview outlines the evidence base, magnitude of the crisis and prioritized humanitarian needs. The Humanitarian Response Plan uses these needs to inform the development of high-level strategic objectives, which are then supported by more detailed cluster/sector plans (e.g. health, food security, education).

The 2017 Libya Humanitarian Response Plan outlines three strategic objectives, the first of which (SO 1) is to "Save lives through safe and dignified access to essential health care and essential medicines". The health sector portion of this plan also has three health objectives these support SO 1 and are described below.

1. **Health objective 1 (HO 1):** Improve access to basic life-saving primary and emergency secondary health care services through the provision of essential medicine, medical supplies and technical support for primary health care, disability care and life-saving emergency care.

2. **Health objective 2 (HO 2):** Strengthen the existing health structure and avoid the collapse of the health system by ensuring the deployment of essential health staff and a functional referral system.

3. **Health objective 3 (HO 3):** Reduce communicable disease transmission and outbreak through detection and mitigation measures.

Each strategic and health objective has specific objectives, indicators and targets (Table 2).

4.2.4 Information needs for vulnerable populations

Vulnerable populations are those that are exposed to greater health risks and who have heightened vulnerabilities or decreased capacities to respond to the hazards they encounter. In Libya, this includes the more than 1.3 million people who require urgent humanitarian assistance.[7]

This population may be disaggregated into three general groups: migrants, internally displaced persons, asylum seekers, returnees, refugees and detained populations; non-displaced Libyans living in areas affected by conflict or with reduced humanitarian access; and persons having conditions that, in the absence of timely and adequate health care, will suffer severe health consequences.

Data regarding these vulnerable groups must be mainstreamed into each phase of the five elements of an effective national health system (see Fig. 2). To achieve this, humanitarian and development-related health stakeholders must proactively dialogue with decision-makers to ensure that the minimum dataset relevant to the provision of effective, efficient and equitable care for these populations is monitored, evaluated and reviewed in a periodic fashion.

4.2.5 Feedback from group discussions on emergency mainstreaming

In group discussions, participants were instructed to consider how the specific indicators above – as well as the more general strategic and health objectives – could be informed through, and contribute to, existing HIS data tools or their modification (e.g. expanding their scope, increasing data collection frequency, or creating new, fit-for-purpose tools). To this end, groups provided input related to each of the four monitoring and evaluation components: sound policy and institutional environment; well-functioning data sources; strong institutional capacity for data collection, analysis and use; and effective country mechanisms for review and

[7] Humanitarian response plan January–December 2017: Libya. New York: UN Office for the Coordination of Humanitarian Affairs; 2016.

action. The key priority actions related to these components – within the context of emergency settings – are presented in Section 6.

4.3 Key performance metrics

Table 3 summarizes some key metrics of a functioning HIS based on input from the group discussions and plenary sessions.

5. DHIS-2 requirements for implementation

5.1 Demonstration of DHIS-2 technology

As briefly discussed in Section 3, the review team discussed the DHIS-2 technology and its potential for enhancing information gathering, analysis

Table 3. Assessment of key metrics of a functioning health information system identified in the working groups

Metrics	Country data source(s)	Status (Libya)	Means of verification (actual country data source)
One monitoring and evaluation plan used by Government and partners	Ministry of Health	Monitoring and evaluation plan has not been developed yet	N/A
National plan for integrated digital architecture	Ministry of Telecommunications; Ministry of Health	N/A	N/A
Country has 10-year comprehensive survey plan	National Statistics Office; Bureau of Census; Ministry of Health	Comprehensive survey plan does not exist	N/A
Two or more key data-points available to monitor progress towards health-related SDGs1	Demographic and health survey or multiple indicator cluster survey, WHO STEPwise approach to surveillance, living standards measurement survey, other surveys		
Birth registration coverage (%)	CRVS, sample registration system, Demographic and health survey or multiple indicator cluster survey	98%	Libya: Health Systems Profile (WHO, 2016)
Death registration coverage (%)	CRVS, sample registration system	60%	Libya: Health Systems Profile (WHO, 2016)
Percentage of registered deaths with cause of death	CRVS, sample registration system, facility reporting systems;	66% of the total deaths	CRVS and Ministry of Health
Annual statistics on community deaths	The International Network for the Demographic Evaluation of Populations and their Health (INDEPTH) or sample registration system	No statistics on community deaths	N/A all deaths to be certified by physicians
Percentage of timely and complete reporting	Routine reporting system	Data are not routinely analysed	N/A
Annual data quality reviews	Ministry of Health	No regular quality reviews conducted	N/A
Facility surveys in past two years	Ministry of Health	Services availability and readiness assessment conducted in 2016	Services availability and readiness assessment (May 2017)

Table 3. Assessment of key metrics of a functioning health information system identified in the working groups

Metrics	Country data source(s)	Status (Libya)	Means of verification (actual country data source)
Annual data on availability of essential medicines	Routine reporting systems, facility surveys	Services availability and readiness assessment conducted in 2016	Services availability and readiness assessment (May 2017)
International Health Regulations compliance (index)	Ministry of Health	Last assessment conducted in 2015 by self-assessment	No feedback on total score received by the country
Percentage of outbreaks/ events reported and investigated in less than 48 hours	Routine reporting systems, including surveillance	Outbreak, events investigated and response in one week	EWARNs; routine surveillance
Health expenditures updated at least once in past two years	National health accounts; public expenditure tracking survey	No health expenditures publicly for four years	N/A
Human resources for health data updated within past two years and publicly available	Human resources for health database/registry/observatory; National human resources for health accounts	Human Resources for Health database exists: 60 000 records included	Human resources for health database
Annual statistical reports with disaggregation published	Ministry of Health	Available	General Information Authority
Health sector progress and performance analysis carried out within the past five years	Ministry of Health	No	Health sector progress and performance report has not been published recently due to instability
National institution(s) with capacity in data analysis	Ministry of Health; National Statistics Office	Yes	Training, upgrading; Improve and support application tools
Data-driven policy reports/ briefs publically available on national priorities and targets	Ministry of Health; National Statistics Office	Policy reports/ briefs have not been published recently due to political instability	N/A
Health data available to subnational decision-makers	Ministry of Health	No systematic availability of data at subnational level	N/A
Health statistics with latest reports and data available to the public (data repository/ observatory)	Ministry of Health	No publically available data repository. Ministry of Health website has some key information available	N/A

and use for decision-making. To achieve this, a demonstration of the technology was made by the HISP INDIA followed by discussions of the various attributes of DHIS-2 and the possibility of piloting it in Libya.

The demonstration of DHIS-2 focused on its components and use as an open-source medical system which also functions as a data collection, aggregation and reporting tool. Workshop participants were informed that DHIS-2 was implemented by the Health Information Systems Programme (HISP) – a global network established to strengthen HIS in low- and middle-income countries.[8] The DHIS-2 platform runs on HTML5 and Java, which allows for the customization of HIS. Participants were informed that DHIS-2 is primarily used for aggregated data-based systems, although it also has a module for patient tracking. It provides a platform on which a HIS can be built, and is designed as a data warehouse to serve as a repository for various types of data in a health systems context. Notable attributes of DHIS-2 include data entry at the health facility level, predefined analysis tools, user-defined dashboards and a GIS interface. It can also be used to collect and share essential clinical health data records across multiple health facilities, as well as collecting detailed ICD-10 codes for inpatient admissions and deaths to enhance data analysis of morbidity and mortality.

5.2 Requirements for DHIS-2 implementation

The HISP INDIA team shared and discussed with the participants the three building blocks for DHIS-2 implementation: what, where and when. Specifically, it is important to know the type of information that needs to be generated by DHIS-2 (what); to decide on the location, reporting structure, and flow of information to be collected (where); and to decide on the reporting frequencies (when, e.g. weekly, monthly, quarterly).

Discussions also focused on the four main phases of implementation listed below.

- Phase 1: gathering required information (i.e. achieved through the workshop);
- Phase 2: systems design and development (i.e. release of prototypes with a focus on routine HIS);
- Phase 3: capacity-building and pilot implementation in selected facilities across the country and various levels of service delivery;
- Phase 4: large-scale implementation (i.e. addition of vertical programmes and integrating with existing systems).

In separate meetings, HISP INDIA discussed with the Ministry of Health and WHO detailed requirements for implementing DHIS-2 as part of the SHAMS Project. In broad terms, these discussions focused on ensuring timely submission by the Ministry of Health of the required documentation or information to design the DHIS-2 system for Libya; selection of a DHIS-2 team by the Ministry of Health as the focal point for the system design and piloting; organizing a visit by HISP INDIA to Libya to conduct capacity-building workshop; and planning for three levels of training within the project cycle: 1) master trainers on end-user training; 2) DHIS-2 design and configuration; and 3) DHIS-2 information use.

6. Roadmap of key priority actions

Priority actions were identified during working group sessions based on the score of the attributes and the qualitative information gathered on day 2 of the workshop. The priorities were discussed extensively in a plenary session, with substantial input from the Ministry of Health and other key stakeholders. A tentative time frame, responsibility for the actions, and other key actors needed for implementation

[8] DHIS-2. http://www.dhis2.org/, accessed 1 September 2020.

Table 4. Key priority interventions to enhance Libya's health information system, 2017–2021

Roadmap of key priority actions			Chronogram				
Strategic dimension	**Key priority action**	**Responsible party/other actors**	**2017**	**2018**	**2019**	**2020**	**2021**
Policy, governance and institutional environment	Hold a national workshop to define monitoring and evaluation coordination mechanisms, including programmes, partners	HIC, other ministries, partners	X				
	Establish a technical committee to develop the national monitoring and evaluation and surveillance plan	HIC, other ministries	X				
	Assess the structure and functionality of the Health Information Centre for effectiveness	HIC	X	X			
	Develop a HIS strategy	HIC, WHO, other ministries and partners	X	X			
	Develop an e-health strategy	MOH, HIC, GIA, GACI, WHO	X	X			
	Establish a monitoring and evaluation unit and emergency HIS unit within the Health Information Centre to collect data on emergency, including refugees/asylum seekers	HIC, other ministries, partners	X	X			
	Discuss and adopt the SDGs across state sectors through information and planning management centres	HIC, other ministries	X				
	Designate the Health Information Centre as focal point for SDGs and built its capacity on collection and reporting of health-related SDG data	MOH					
	Support development of the national health strategic plan	MOH, WHO, all health actors	X	X	X		
	Standardize type, collection intervals and flow of data so that information systems may interface between humanitarian health providers and de facto health authorities	HIC, WHO, all health actors	X	X	X		
	Standardize data sources that capture migration status-related information or inequity stratifiers	HIC, WHO, all health actors	X	X			
	Strengthen the Health Information Centre to be a potential candidate as a WHO collaborating centre	MOH	X	X	X		

Table 4. Key priority interventions to enhance Libya's health information system, 2017–2021 (cont.)

Roadmap of key priority actions			Chronogram				
Strategic dimension	**Key priority action**	**Responsible party/other actors**	**2017**	**2018**	**2019**	**2020**	**2021**
Routine health information systems	Train and develop the skills of key staff at the central level	HIC, EU, WHO	X	X	X	X	X
	Assign and recruit specialists to work in the field of health statistics and informatics	HIC, EU, WHO	X	X			
	Recruit and train data clerks at national and facility levels as per accredited health facility	HIC, EU, WHO	X	X			
	Build specialized capacity in effective supervision at health facility level and health sector-reporting entities	HIC, EU, WHO	X	X	X	X	X
	Develop guidelines for data collection, processing and dissemination	HIC, EU, WHO	X	X	X		
	Provide incentives for data collectors (thank you messages, awards)	HIC, EU, WHO	X	X			
	Conduct relevant training for key staff on feedback, keeping records, reporting and the use of health-related information	HIC, EU, WHO	X	X			
	Develop unified data architecture in the context of DHIS-2 roll-out	HIC, WHO	X	X			
	Roll out DHIS-2 nationwide (training, integrating programmes, procuring equipment)	HIC, EU, WHO	X				
	Develop and implement a hospital management information system	HIC, EU, WHO	X	X			
	Implement quality of care and patient safety standards, including a systematic quality of care assessment report	HIC, EU, WHO	X	X			
	Interface humanitarian actors' facility-based data collection tools with local or district-level systems	HIC, WHO, NGOs	X	X			
Health systems monitoring	Support information and documentation centre to complete the health workforce registry	HIC, EU, WHO	X	X			
	Train financial and technical staff in national health accounts, and adopt national health accounts, and develop financial skills, including the private sector	EU, WHO	X	X			
	Establish mechanisms to use the results of health accounts to inform planning	EU, WHO	X	X			
	Procure and install the inventory monitoring system and provide training to staff	EU, WHO	X	X			
	Adopt a complementary ministerial decree on information sources	MOH, other ministries	X				

Table 4. Key priority interventions to enhance Libya's health information system, 2017–2021 (cont.)

Roadmap of key priority actions			Chronogram				
Strategic dimension	**Key priority action**	**Responsible party/other actors**	**2017**	**2018**	**2019**	**2020**	**2021**
Surveillance	Develop a national standard case definition for all diseases under surveillance	NCDC, medical universities, WHO	X	X			
	Expand notification system to hospitals, public health facilities, private sector, immigration retention centres, etc.	NCDC. MOH, private sector	X	X	X		
	Build capacity of public health laboratories and surveillance sites: equipment, ICT and training	NCDC, WHO	X	X	X	X	
	Train surveillance officers on data collection and analysis	NCDC, HIC	X	X			
	Expand EWARN sites and rapid response teams in coordination with the Health Information Centre	NCDC, HIC, WHO	X	X			
	Collect data on non-camp vulnerable populations (especially migrant and detained populations) to gain greater insight into their health status and the threats they face	NCDC, WHO IOM, UNHCR	X	X			
	Establish disease-specific registries	HIC, WHO	X	X	X		
Household surveys and censuses	Develop household surveys plan as part of the monitoring and evaluation plan/health sector plan	MOH, WHO, HIC, NCDC, other sectors	X	X			
	Involve all related stakeholders to implement the surveys and censuses in line with the survey plan and SDG targets	MOP, MOH, BSC, CRA, GIA, GACI,	X	X	X	X	X
	Build the capacity of the Bureau of Statistics and Census, Vital Registration Authority, National Centre for Disease Control, Health Information Centre and other public health institutions, including recruitment of statisticians and data collectors	BSC, WHO, MOH	X	X	X	X	X
	Conduct surveys on burden of disease, maternal and infant mortality, and health and nutrition examination	MOH, other UN agencies	X	X	X		
	Build capacity for sampling techniques and survey implementation	HIC, BSC, WHO NCDC	X	X	X	X	X
	Update the census form by adding relevant health-related questions	MOH, HIC WHO	X	X			

Table 4. Key priority interventions to enhance Libya's health information system, 2017–2021 (cont.)

Roadmap of key priority actions			Chronogram				
Strategic dimension	**Key priority action**	**Responsible party/other actors**	**2017**	**2018**	**2019**	**2020**	**2021**
Civil registration and vital statistics	Reactivate the multisectoral CRVS committee	BSC, CRA, HIC, WHO	X	X			
	Enhance awareness of the Civil Registration Authority on the importance of CRVS data for public health through awareness/advocacy workshops	CRA, MOH, HIC, WHO	X	X	X		
	Update the current birth and death notification forms as per WHO standards	MOH, HIC, WHO	X	X			
	Build capacity of physicians and Civil Registration Authority personnel, including use of incentives for proper completion of death registration	BSC, HIC, CRA, WHO	X	X	X		
	Create and train units for ICD coding at every hospital	BSC, HIC, CRA, WHO	X	X	X		
	Implement automated tools for data quality assessment such as ANACoD (analysis of cause of death) and IRIS (Institutional Repository for Information Sharing) for automated cause of death coding	MOH, WHO	X	X	X	X	X
	Integrate the existing databases in the Health Information Centre and Civil Registration Authority, and improve the system for death certificate collection/data entry	BSC, HIC, CRA, WHO	X	X			
	Integrate death certification and birth registration into DHIS-2	HIC, WHO	X	X			
Analysis, use and dissemination of data, including mechanisms for review and action	Improve cross-sectoral coordination to define levels and rights of access to and utilization of data and data flows	MOH, HIC	X	X			
	Build capacity (training of trainers) in statistical analysis of data, including awareness workshops, report writing and developing dissemination materials	MOH, HIC, WHO	X	X	X	X	X
	Develop a manual to analyse data	MOH, HIC, WHO	X	X			
	Strengthen national data repositories and develop open data access mechanisms with a focus on human resources management data	MOH, HIC, GIA WHO, EU	X	X			
	Support monitoring teams and develop training programmes to improve efficiency	NCDC, MOH, HIC		X			

Table 4. Key priority interventions to enhance Libya's health information system, 2017–2021 (cont.)

Roadmap of key priority actions			Chronogram				
Strategic dimension	**Key priority action**	**Responsible party/other actors**	**2017**	**2018**	**2019**	**2020**	**2021**
	Strengthen intersectoral cooperation in presenting and discussing annual data on the population and select subgroups (e.g. migrants)	NCDC, GIA, BSC, HIC, MOH	X	X	X	X	X
	Conduct a situation analysis of private health sector and civil society organizations related to health	HIC, relevant partners	X	X			
	Conduct a budget management analysis to assess efficient use of resources	MOH, relevant partners	X	X			
	Enhance mechanisms for predictable financing at the national and subnational levels for HIS strengthening in emergency contexts	MOH, MOF, relevant partners	X	X	X	X	X
	Prepare regular information products (at least six months) to support the Libya Humanitarian Response Plan's HO3 (reducing transmission of infectious diseases and enhancing outbreak detection)	Ministry of Health, HIC, WHO	X	X	X	X	X
	Compile previous four-year report from all the facilities as a short-term strategy	MOH, WHO	X	X			
	Collect data on the nature and extent of conflict-related injuries and deaths and the effect of their deleterious consequences on health system needs and capacities	MOH, WHO	X	X	X	X	X
	Update the website of the Health Information Centre regularly and include an English language option	HIC, EU, WHO	X	X	X		
	Equip the Health Information Centre with ArcGIS software for collection and analysis of georeferenced data	WHO, EU	X	X			
	Equip the Health Information Centre with printing facilities	HIC, EU	X	X	X		
	Develop a plan on use of information and dissemination through advocacy workshops at district and municipality level	HIC, WHO	X	X			
	Establish libraries and learning resource centres in the Health Information Centre and provide access to scientific health information for hospitals	HIC, WHO		X	X	X	X

Table 4. Key priority interventions to enhance Libya's health information system, 2017–2021 (cont.)

Roadmap of key priority actions			Chronogram				
Strategic dimension	**Key priority action**	**Responsible party/other actors**	**2017**	**2018**	**2019**	**2020**	**2021**
	Encourage learning and knowledge sharing of experts through participation in regional and international conferences/seminars	MOH, EU,WHO	X	X	X	X	X
	Organize study tours for staff of the Health Information Centre, Civil Registration Authority, Bureau of Statistics and Census and other stakeholders identified by the Health Information Centre	BSC, WHO	X	X	X	X	X

Note: BSC = Bureau of Statistics and Census
CRA = Civil Registration Authority
HIC = Health Information Centre
EU = European Union
GACI = General Authority for Communications and Informatics
GIA = General Information Authority
IOM = International Organization for Migration
MOH = Ministry of Health
MOF = Ministry of Finance
MOP = Ministry of Planning
NCDC = National Centre for Disease Control
NGOS = nongovernmental organizations
UNHCR = Office of the United Nations High Commissioner for Refugees
WHO = World Health Organization

were identified. Table 4 presents the key priorities identified.

7. Discussion

7.1 Recommendations

Implementing the recommendations should be made with reference to the detailed roadmap of key priority actions (Section 6). A coordination committee should oversee implementation progress and a technical subcommittee should support the operationalization of priority actions.

7.2 Sound policy and institutional environment

Recommendations and suggested activities in this component are aimed at improving management, coordination and efficiency for all HIS stakeholders. The recommendations for the sound policy and institutional environment include the measures detailed below.

- Ensure that all stakeholders agree on a national health strategic plan with clearly defined indicators to be monitored and develop a HIS plan with clear standard operating procedures to monitor progress. Establish a functional national steering committee.
- Establish a committee to develop a monitoring and evaluation plan and assist in monitoring progress in implementation of key priority actions.
- The Ministry of Health should continue its custodial role as a lead actor through advocacy, strengthening coordination of HIS and monitoring and evaluation activities, and holding regular meetings with stakeholders to update them on the progress with HIS functionalities. This should run in parallel with the establishment of a committee to develop the HIS plan.

- Strengthen the leadership of the Ministry of Health as the lead actor by establishing a monitoring and evaluation unit and an emergency HIS unit within the Health Information Centre.

- Standardize the type of data, periodicity of information collection and flow of data so that information systems may act as an interface between humanitarian health providers and de facto health authorities.

- Reduce gaps in sources of data for equity stratifiers by standardizing data sources that capture migration status-related information.

7.3 Data sources

7.3.1 Health systems, health facility and community information systems

Health systems, health facility and community information systems are core data building blocks for any HIS and need to be managed effectively and valued by all parties to the HIS. This section provides key recommendations that are essential for an HIS required to share data from health systems, health facilities, and community information systems. Key recommendations are listed below.

- Improve current infrastructure, staffing and analytical capacities to ensure a functional routine HIS is in place. This can be achieved by training Ministry of Health cadres at all levels; purchasing ICT equipment to enhance collection, processing and dissemination of data; and piloting the DHIS-2 technology for effective data collection, processing and reporting.

- Develop a comprehensive hospital management system to enhance access, retrieval and utilization of evidence-based decision-making.

- Complete the development of the human resources registry to enhance informed decision-making. While data on 60 000 health workers have been entered by the Health Information Centre, there is a need to enter the remaining data and ensure that the registry is complete and up to date and is regularly updated.

- Systematically integrate humanitarian actors' facility-based data collection tools with local or district level health authorities' information systems.

- Aggregate data with wider health authority networks. Data transmission and reporting is primarily paper-based for the majority of local and district-level information systems and while many external agencies implement various electronic information systems, they do not regularly aggregate data with wider health authority networks.

7.3.2 Disease surveillance

A fundamental function of public health is surveillance. Rapid informed response can save lives, protect the public and mitigate the impact of disease. While Libya does have an active disease surveillance system, there is still room for improvement. Key recommendations are listed below.

- Improve the capacity of public health laboratories to diagnose and confirm notifiable diseases. This can also be strengthened by routinely involving the private sector in case detection.

- Expand the number of surveillance teams and surveillance sites, including mobile units, to respond more efficiently and in a timely manner to outbreaks.

- Capture data on non-camp vulnerable populations (especially migrant and detained populations) as there is little insight into their health status and the threats they face.

- Integrate surveillance programmes and purchase essential ICT equipment and vehicles to improve surveillance staff operations.

- Develop unified guidelines and standardized definitions for notifiable diseases to minimize delays in outbreak verification and production of weekly reports.

7.3.3 CRVS, household surveys and censuses

Data from HIS sources support different decision-making processes in health policy formulation, planning and implementation. The CRVS, population-based surveys and censuses provide data for the entire population: overall health status, access to health services and other needs. Population-based data sources are comprehensive in Libya, and have been collected for a considerable time. However, there are opportunities to improve these, as detailed below.

- Improve systems for death certification and data entry by establishing a department or unit responsible for coding in every hospital. This can be enhanced by considering options, such as payment for performance to improve death certification.

- Provide a clear mandate across all the systems in terms of minimum standards for data quality related to death notification and certification. These can be achieved by implementing automated tools for data quality assessment such as ANACoD and also IRIS for automated cause of death coding to ensure reliable data quality.

- Develop an on-the-job training system for physicians on issuing medical death certificates based on the ICD and include this in the training curriculum for medical students.

- Ensure the availability of monitoring and evaluation mechanisms for the improvement of the CRVS.

- Strengthen capacity to conduct household surveys and censuses, including the analysis of data through training and recruitment of statisticians and data collectors. These efforts can be strengthened through capacity-building at the Bureau of Statistics and Census and national public health institutes.

- Develop a national household survey plan to harmonize efforts to collect population-based surveys and the generation of national, regional and international core health indicators.

- Through the Ministries of Planning and Health, strengthen coordination mechanisms for stakeholders, and CRVS stakeholders in particular, to enhance monitoring of the CRVS improvement plan and collection, processing and use of population-based data.

7.4 Institutional capacity for data management and analysis

HISs should be enhanced to produce high quality data to support evidence-based planning, policy formulation, decision-making and action. In order to improve health outcomes in Libya, HIS stakeholders should address the following key areas.

- Strengthen organizational communication mechanisms between relevant sectors in areas related to staff recruitment, training and building specialized capacity in data analysis (e.g. statistical packages, such as SPSS).

- Although data, methods, and analytical results are publically available, there is a need to enhance intersectoral coordination to define levels of and rights to data access. In addition, intersectoral cooperation should be promoted by the Ministry of Health in discussing annual data needs.

- Promote predictable financing at the national and subnational levels for HIS strengthening in emergency contexts.

- Produce institutional products with regular periodicity of at least six months to support Health Objective 3 (HO3) of the Libya Humanitarian Response Plan (reducing the transmission of infectious diseases and enhancing outbreak detection). Surveillance of specific vulnerable populations needs to be

significantly strengthened to achieve appropriate coverage.

7.5 Mechanisms for data use, review and action

Data collection and processing can only yield desired outcomes if there are mechanisms to use the data, regularly review them and implement evidence-based interventions. Key areas to strengthen these mechanisms include the points outlined below.

- Develop an integrated web-based HIS system to address fragmentation challenges.
- Significantly improve the system of joint periodic progress and performance reviews, cost monitoring and evaluation plan, conduct independent reviews of data, actively engage civil society and incorporate findings into decision-making.
- Develop inter-ministerial mechanisms to promote sharing of health information related to migrant populations.
- Raise awareness on the importance of data and conduct training of trainers on data use and analysis.
- Conduct a budget management analysis of health data to inform further budget allocations.
- Develop modalities and methods to collect data on the nature and extent of conflict-related injuries and the effect of their deleterious consequences on health system needs and capacities.

7.6 DHIS-2 implementation

The growing interest in DHIS-2 worldwide has been growing. While DHIS-2 allows countries to customize their HIS for data collection, aggregation and reporting, preparations for roll-out need to be carefully planned. For a successful roll-out of DHIS-2 pilot in Libya, the key requirements outlined by HISP INDIA (Section 5.2) should be met. These include the following considerations.

- The Ministry of Health should provide key DHIS-2 customization information such as formats for data inputs, type of data (aggregate or patient), types of report to be generated, and reporting format with formulae.
- Ensure the availability of adequate infrastructure related to server hosting and management, including Internet access in all health facilities.
- Select a DHIS-2 team with technical capacities in areas related to application development and maintenance.
- Identify pilot facilities for all the different levels of health service delivery.

8. Recommendations

Governance

- Establish a functional national steering committee, with representation from all key national HIS stakeholders, to coordinate activities at the national level.
- Create a subtechnical committee to develop a monitoring and evaluation plan.
- Improve coordination among the Ministry of Health, various programmes and other stakeholders.

Infrastructure and support

- Strengthen the routine HIS by training Ministry of Health cadres at all levels and purchase relevant ICT equipment.
- Pilot DHIS-2 to improve collection, processing and analysis of data for planning and evidence-based decision-making.
- Expand the number of surveillance teams and surveillance sites, including the expansion of

mobile units, to respond to outbreaks more efficiently and promptly.

Data management and standards

- Complete the human resources registry to improve decision-making regarding human resources for health.
- Develop a national guidebook for notifiable diseases.

Quality assurance

- Establish a department/unit for encoding in every hospital as one of the means to improve the system of death notification and certification.
- Strengthen capacities to conduct household surveys and censuses, including capacities to improve analysis and report writing.
- Implement a system of joint periodic progress and performance reviews and independent reviews of data to promote evidence-based decision-making.

Data dissemination and use

- Develop an integrated web-based HIS system to address fragmentation challenges.
- Raise awareness on the importance of data and conduct training of trainers on data use and analysis.
- Develop inter-ministerial mechanisms to promote health information-sharing related to migrant populations.

9. Next steps

Enhancing the HIS requires plans and schedules that outline the components of the system to be developed/enhanced/reformed/used as is; the expected output; costs; responsible parties; and any other recommended areas for strengthening.

In Libya, developing an HIS improvement plan will require coordination among all stakeholders at the national and subnational levels guided by a strategic plan that takes into account strengths and opportunities to improve the current HIS.

The HIS implementation plan should be based on the information provided in Section 4. Key findings on HISs (including the priority actions in Section 6) focus on building an integrated system covering the key components of a functional HIS: policy and governance; infrastructure and support; data management and standards; quality assurance; and dissemination and data use. The efforts and investments to improve the HIS can be implemented and coordinated within the context of EU SHAMS project funding, as well as other potential sources of funding in Libya and elsewhere over the planning period 2017–2021. The Ministry of Health, guided by the national health strategy, should mobilize support for consensus-building in defining the primary goals and interventions to improve the HIS.

The roadmap of priority actions and responsible actors presented in this report will support the Ministry of Health, in collaboration with other stakeholders, to develop detailed short-, mid- and long-term plans for HIS strengthening. While it may take considerable time (e.g. 4–5 years) to see the effects of the process of strengthening the HIS in its entirety, the immediate focus for Libya should be designing interventions that can strengthen existing operations without radical changes ("quick-wins"). This can be achieved through the involvement of all stakeholders and HIS specialists.

Identifying interventions is the first stage in the improvement process. It is critical to cost the interventions, estimate "person-days" and, where necessary, train individuals or purchase materials/equipment and propose a time frame, in line with the roadmap of key priority actions in Section 6. The costing can be undertaken by a small group of technical and HIS programme experts. The proposed time frames can be adjusted based on the actual time period for commencement or implementation of the HIS improvement plan.

Annex 1. Assessment teams

Assessment team members

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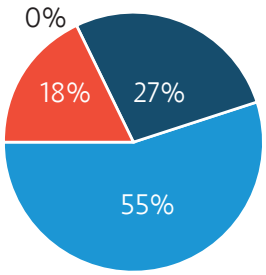
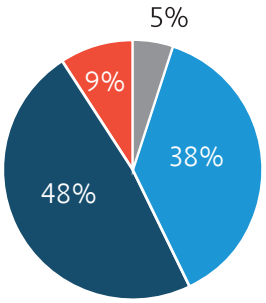
Dr Mohamed Elhenshiri	Mr Elsdieg A.I. Elsaeeh
Dr Mohamed Hashem	Ms Huda K.S. Kutrani

Annex 2. Summary of scores by working group

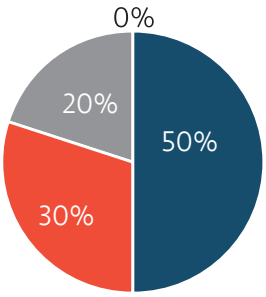
Group 1. Institutional environment



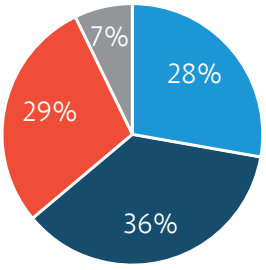
Group 2. Health facility information systems/ health systems information



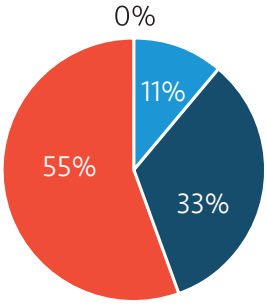
Group 3. Surveillance



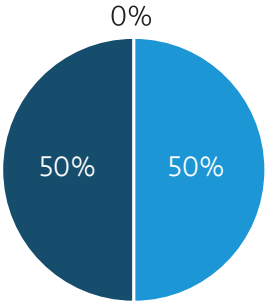
Group 4. Household surveys; censuses; CRVS



Group 5. Strong institutional capacities



Group 6. Effective country mechanisms for review and action



Key

- Not present, needs to be developed
- Needs significant strengthening
- Needs some strengthening
- Already present, no action needed

Annex 3. Results of the scoring exercise for components and attributes of the monitoring and evaluation platform

The table below captures the results of the scoring exercise for each working group and attribute.

Component	Not present, needs to be developed	Needs significant strengthening	Needs some strengthening	Already present, no action needed
Policy and institutional environment	There is a comprehensive costed monitoring and evaluation plan for the national health sector strategy. The monitoring and evaluation plan has been informed by a recent (< 2 years) assessment. The monitoring and evaluation plan includes a framework that specifies a balanced and limited set of core indicators with well-defined baselines, targets, frequency of measurement and data sources. Disease- and programme-specific monitoring, evaluation mechanisms, including indicators, are aligned with the monitoring and evaluation plan. There are agreed indicators, means of measurement and targets (developed in collaboration) for monitoring and evaluation of health-related SDGs Standard operating procedures have been written that define roles and responsibilities for collecting, managing and disseminating health data, including confidentiality.	There is a common investment framework used as the basis for partner and domestic support. There is an effective country-led coordination mechanism for monitoring and evaluation and review with active involvement and support of relevant development partners, civil society and other actors. There is a national policy/strategy for e-health and ICT development and use, including governance and legal frameworks; enterprise architecture; standardization and interoperability; and research and evaluation on e-health.	There is up-to-date legislation and detailed regulations for health information, including all data sources. There is an overall unifying health data architecture and health data collection standards.	

The table below captures the results of the scoring exercise for each working group and attribute.

Component	Not present, needs to be developed	Needs significant strengthening	Needs some strengthening	Already present, no action needed
Health facility information systems/ health systems information	Effective supervision instruments are in place (up-to-date checklist, resources). Local level decision-makers and community members analyse and use facility- and community-based information to develop appropriate service delivery strategies There is adequate training and capacity-building for a functional routine health information system. Facility reporting systems use web-based systems (e.g. DHIS) when feasible. There is a system for collection of patient management data at the point of service. Regular and independent data quality assessments are institutionalized. Health expenditures are tracked on an annual basis using the global standard of System of Health Accounts 2011 (SHA 2011). There are country-specific routine recording systems for tracking private health expenditures (e.g. by nongovernmental organizations, enterprises, private insurance, etc.), to replace health accounts annual surveys.	There is adequate infrastructure and staffing for a functional routine health information system. Feedback is systematically provided to all subreporting units. Disease- and programme-specific data elements and indicators are integrated in the common data repository. There is a harmonized system of facility assessments to verify service delivery/quality of care. Data on community-based health programmes are available in formats easy to access/linked to facility-based databases. There is strong public financial management system, tracking government budgets, disbursements and expenditures at all levels (from facility to central level). Health accounts results are used for policy planning and evaluation, from overall health system policies to health system financing policy specifically. There is a logistics information system for tracking commodities, medicines, equipment and supplies. There is a functional laboratory information system. Health systems information subsystems are interoperable or have been integrated into the health management information system.	There is a reliable and transparent system for tracking the aggregate availability of human resources. These aggregate data on human resources availability, by cadre and by health facility, are widely available for the purpose of assessing equity productivity. There is an electronic registry (HRIS) with up-to-date data on each individual health worker, including a unique identifier, qualifications and key characteristics (name, birth date, sex, contact, place of work, etc.).	There is a comprehensive list of health facilities, with unique facility identifiers and geocodes.

The table below captures the results of the scoring exercise for each working group and attribute.

Component	Not present, needs to be developed	Needs significant strengthening	Needs some strengthening	Already present, no action needed
Surveillance	There is integration of all diseases surveillance programmes. Equipment and logistics (forms and registers, computers, telephones, communications, including Internet connectivity, cars and motorbikes) are sufficient and appropriately distributed in the country to conduct public health surveillance activities. Enough staff is available at all levels to conduct public health surveillance and response.	Public and private health care facilities, laboratories and communities contribute to routine case detection. The country has adequate capacity to diagnose and record cases of notifiable diseases.	Standard case definitions are available for all diseases and syndromes under surveillance. Time frames to verify an event and to report weekly aggregated data are defined at all levels. Data are analysed on a regular basis at each level to detect events involving cases or deaths above expected levels for the particular time and place.	List of priority diseases and syndromes under current national surveillance is defined. Alert/action thresholds have been defined for priority diseases and syndromes.
Household surveys; censuses; CRVS	Systems for the automated coding of cause of death are progressively used. There are trained human resources to conduct verbal autopsies. Use of verbal autopsy is being gradually expanded to generate nationally representative cause of death statistics. There is a national survey plan and research agenda for household surveys detailing content, sequencing, periodicity and funding, aligned with the monitoring and evaluation plan and the National Health Strategy.	A functional multisectoral coordination committee is in place (National Statistics Office, Ministry of Health). Hospitals are reporting deaths, with cause of death, through medical certification using the ICD. There is information technology infrastructure for entering information on the deceased including the cause of death by individual record. The National Statistics Office publishes timely and reliable annual population estimates for various demographic and geographic groups (e.g. live births, surviving infants, women of reproductive age, for each district). There is adequate country level capacity for census and survey data collection, analysis, report writing and dissemination.	There is up-to-date legislation and regulations for civil registration and vital statistics. There are strategies and resources to strengthen the notification of births and deaths and medical certification of cause of death. A coordination mechanism is in-place to coordinate plans for the national census and national surveys. Household surveys are conducted every 2–3 years to monitor progress on key health indicators of the national health strategic plan.	A comprehensive assessment has been conducted of current CRVS performance.

The table below captures the results of the scoring exercise for each working group and attribute.

Component	Not present, needs to be developed	Needs significant strengthening	Needs some strengthening	Already present, no action needed
Strong institutional capacities	There is a regular (annual) report of progress and performance that covers progress in relation to the objectives and targets, equity and efficiency.	Strong analytical institutional capacity for supporting synthesis of data is in place. At national level, there are periodic performance reviews and analytic reviews based on robust analysis of health data from all sources, including contextual and qualitative information. There are effective processes to support analysis and use at subnational level.	Synthesis and analysis of national data is conducted using a collaborative approach involving health ministries, national statistics offices, experts and public and private sector entities. International standards are followed for analysis and presentation of key indicators in order to ensure comparability of results between populations and over time. A range of dissemination strategies exist for health information, censuses and vital statistics, including reports, policy briefs and web-based dissemination. Health data are transparent and accessible. National public health and academic institutions, advocacy groups, and the media are engaged by Ministry of Health and National Statistics Office to disseminate key health information.	
Effective country mechanisms for review and action	Independent reviews of data in strategically important programmes, such as maternal, child and perinatal deaths, are conducted regularly. There are systematic linkages between health sector reviews and disease and programme-specific reviews. Civil society organizations meaningfully participate in country reviews of progress/ performance at all levels.	Regular/transparent reviews of progress against national defined priorities with broad involvement of key stakeholders are in place. Results from reviews are incorporated into decision-making, including resource allocation. Health information flows include regular feedback and use of data locally.		

This report presents the findings of a comprehensive assessment of Libya's health information system undertaken by WHO in 2017 at the request of the Ministry of Health of Libya. Health information systems, including civil registration and vital statistics systems, provide health information data for programme and performance monitoring, quality of care, planning and policy-making. The assessment resulted in a set of recommendations for the Ministry and other stakeholders to develop comprehensive and efficient systems to: monitor health risks and determinants; track health status and outcomes, including cause-specific mortality; and assess health system performance. The recommendations also provide an opportunity for the country to respond to the growing demands for health data to measure progress towards the health-related Sustainable Development Goals.

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