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USAID Health Finance and Governance Activity

HEALTH SECTOR MICRO DATA REQUIREMENTS, NEEDS, USE AND READINESS

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Abbreviations

| | |
|-------|---|
| ACHC | Amman Comprehensive Health Center |
| CDM | Clinical Data Management |
| CIP | Civil Insurance Program |
| CMMS | Computerized Management Maintenance System |
| CPT | Current Procedural Terminology |
| DBE | Directorate of Biomedical Engineering |
| DC | Communicable Diseases |
| DDIU | Data Demand and Information Use |
| ECRI | Emergency Care Research Institute |
| EHIS | Electronic Hospital Information System (the main HIS at KAUH) |
| HER | Electronic Health Records |
| EHS | Electronic Health Solutions |
| ERP | Enterprise Resource Planning |
| GDP | Gross Domestic Product |
| GFMIS | Government Financial Management Information System |
| GOJ | Government of Jordan |
| HFG | Jordan Health Finance and Governance activity |
| HIA | Health Insurance Administration |
| HIS | Hospital Information System |
| HR | Human Resources |
| HRH | Human Resources for Health |
| ICD | International Classification of Diseases |
| ICU | Intensive Care Unit |
| ID | Identity Document/Identifier |

| | |
|--------|--|
| IERS | Interactive Electronic Reporting System |
| IT | Information Technology |
| JAMI | Jordan Association for Medical Insurance |
| JAV | Jordan Aid Fund |
| JD | Jordanian Dinar |
| JHASI | Jordan Health Aid Society International |
| JIDIS | Jordan Infectious Diseases Information System |
| JUH | Jordan University Hospital |
| KAUH | King Abdullah University Hospital |
| KHCC | King Hussein Cancer Center |
| KPI | Key Performance Indicator |
| MOF | Ministry of Finance |
| MOH | Ministry of Health |
| MOSD | Ministry of Social Development |
| NCD | Non-Communicable Diseases |
| NGO | Non-Governmental Organization |
| PACS | Picture Archiving and Communication System |
| RAIS | Refugee Assistance Information System |
| RMS | Royal Medical Services |
| UHC | Universal Health Coverage |
| UNHCR | United Nations High Commissioner for Refugees |
| UNICEF | United Nations Children's Fund |
| USA | United States of America |
| USAID | United States Agency for International Development |
| VISTA | Veterans Information Systems and Technology Architecture |
| WB | World Bank |

WHO

World Health Organization

Executive Summary

The five-year USAID Health Finance and Governance (HFG) Activity aims to improve health sector sustainability and resilience in Jordan, including universal health coverage (UHC). This goal supports Jordan's commitment to UHC declared in its National Health Strategy 2016 - 2020 ("to provide health, financial and social protection to the entire population on a fair basis") and as a 2030 Sustainable Development Goal.

HFG assessed the health sector micro data requirements, needs, use and readiness to investigate which micro level health data exists, where the data are, and in what format. Micro data is raw data that is electronically available at the facility level which captures detailed clinical, financial and utilization data related to patients, providers and health services. Micro-level data is critical to achieve some of HFG objectives such as analysis of health system efficiency, cost studies, actuarial analysis, performance reviews, and evaluation of sector transparency to civil society. In addition to supporting the needs of HFG, the results of this study can serve as a basis for other studies and research efforts that seek to identify, extract and use (electronic) data from systems in the healthcare sector.

HFG has reviewed the extent to which micro-level data are captured in the significant health finance and delivery organizations of the public and private sectors. This has been done through structured interviews at several facilities: including Al-Bashir hospital, Amman Comprehensive Health Center (ACHC), Prince Hamza hospital, the Royal Medical Services (RMS), King Hussein Cancer Center (KHCC), King Abdullah University Hospital (KAUH), Jordan University Hospital (JUH) and the Specialty Hospital.

Main findings are:

- Ministry of Health (MOH) facilities use the Hakeem system, which is also being rolled out in RMS. KHCC uses Hakeem, in conjunction with its own Enterprise Resource Planning (ERP). KAUH, JUH and the Specialty Hospital have their own systems. Hakeem has a clinical system, which is mostly implemented and a financial system, which is currently being pilot-tested in Prince Hamza hospital and ACHC. Hakeem Clinical does not contain information on insurance status and does not support invoicing and accounting.
- Key information items to identify a doctor (name, ID number) or a patient (name, birthdate, gender, ID number) are available in electronic format in all systems. Only Hakeem facilitates automatic uploading through a link with (a regularly updated copy of) the Civil Registration and Vital Statistics database. Other information on doctors is often not in the main clinical system, but in the system (application) used for HR administration.
- Clinical Systems are different, and use different codes for IDs, diagnoses and treatment. In some cases, no coding system is used, and the doctor enters text in a free text field.
- Where IS contain certain fields, it is not always guaranteed that these fields are completed correctly or completed at all. Even if a field is mandatory, it may be filled in perfunctorily.
- For public-sector facilities that are part of the MOH system, all purchases are made centrally, and the coding system in the Government Financial Management Information System (GFMS) does not currently include a tag that allows identification of the facility to which a certain expenditure relates. Investments can be traced to projects, but the relation with facilities is not one-to-one. Individual facilities do not maintain financial accounts. They just gather cash from

patients and transmit these to the Health Insurance Administration (HIA). Currently, HIA has no automatic means to check these co-payments against services provided.

To conclude this means that any effort to calculate the cost of services in different MOH facilities is very limited. It would necessarily be a manual, most likely rather cumbersome exercise, using mainly data from the MOH payroll system (to assess wages), from the Directorate of Biomedical Engineering (DBE) (to assess fixed assets) and from GFMIS (these are hugely limited as they are not facility based). For this reason, cost studies have so far been limited to the highest level, providing output in the form of “cost per bed day” and “cost per admission”, which are not always informative gauges to assess efficiency. Consequently, any effort to start costing services systematically would have to start with an effort to introduce regular accounting practices at the facilities, which itself would only make sense in a scenario where facilities are granted some form of autonomy. In a system where facilities control neither their income nor their expenditure, measuring cost of services is not only nearly impossible but also has little meaningful application. Thus, there is a close link between data availability, demand and use on the one hand and the governance of the sector on the other hand. Data availability, demand and use cannot be assessed in isolation from a concept for development and/or reform of the sector.

Similarly, actuarial projections of the development of healthcare costs can currently be made only on the highest level of aggregation (at the MOH as opposed to a facility). Any more granular work would be driven by questions relating to a reform path for the sector. Overall, it seems that, when Hakeem has been fully implemented, and issues concerning data quality have been resolved, sufficient micro-level data will exist on utilization of healthcare facilities to provide data for various thinkable stands of actuarial work. The challenge will be in extracting the data in the proper format. It is on the financial side that there is a genuine lack of data (as described above), which will be problematic when making actuarial forecasts and calculating premiums.

I. Introduction

I.1. Background

HFG works with the Jordanian government and other stakeholders to strengthen health system advances in efficiency, capabilities, and governance supporting improved health status for the population of Jordan. Increasing the demand for and use of high-quality, transparently available data, especially the micro-level data necessary for operations management and to inform decision making and monitoring in the health sector of Jordan, is one of the objectives of HFG. In addition, HFG needs micro-level data to be able to achieve its results and complete its tasks including efficiency and cost studies, actuarial analysis, performance reviews, and evaluation of sector transparency to civil society.

HFG has reviewed the extent to which micro-level data are captured and used in the significant health finance and delivery organizations of the public and private sectors. The main focus of the work has been a review of the extent to which micro-level data, recording pertinent details about health insurance and care transactions for individual consumers is systematically captured.

I.2. Different Types of Data

In many cases, the concept of “data” is treated without much differentiation. Sometimes “data” is distinguished from “information”, although “data” and “information” are often used interchangeably. Strictly speaking, “data” should refer to raw observations (e.g. number of births, number of deaths from AIDS, etc.) and “information” to the results of analysis or synthesis of those observations (e.g. fertility rates, mortality rates, etc.). Information should be used to guide decision making, which requires that appropriate and high-quality data be collected and analyzed.

However, to prioritize activities, the concept of “data” should also be dissected as per the following distinctions:

- **Data available electronically versus paper-based data.** Data that are available electronically can be more easily transferred and researched than data that are only available on paper. However, data that are available on paper should not be disregarded completely. If the importance of such data is great enough to warrant allocating a sufficient budget, such data can be transferred into an electronic format (scanned, or manually entered into a database) or checked from paper by researchers or decision makers². Electronically available data can be divided in:
 - Data that consists of scans of paper-based documents;

¹ However, it should be noted that in the process data quality can be compromised and that data may have become obsolete due to the passage of time.

² However, it should be noted that in the process data quality can be compromised and that data may have become obsolete due to the passage of time.

- Data that is available in a database (Oracle, MS Access, etc.), potentially with a data warehouse functionality added, or that can be entered in a database by electronic conversion/migration (e.g. data in an Excel sheet).

Perhaps in the future this difference will lose some of its meaning as better pattern recognition programs allow better or even flawless conversion of scans into readable electronic documents. For the moment, scans of paper-based documents are, in terms of usability for information generation, still close to the original paper documents. The scanning process mainly has advantages in terms of decreased perishability and ease of systematic archiving.

- **Data entered manually versus data that is captured automatically.** Data that is entered manually entails the risk of error due to human error, distractions, inadequate data entry guidance and training, time elapsed between the data being generated in its initial format and the moment of entering in a system, sources that contain noise, etc. Data that is generated automatically will in general much more reliable. An extreme example of the first case would be information entered by a data typist suffering from flu and working in a noisy environment, based on notes made a week before by an interviewer whose handwriting is barely legible. An example of the second case are vital life signs of a patient in an Intensive Care Unit (ICU) that are automatically captured and registered. However, in practice this distinction does not so much resemble a dichotomy, but rather more a continuum. The closer data are entered after origination and the more validity checks the system has, the more reliable the data will be. For example, a birth date entered on the spot at hospital admittance, in a mandatory field that accepts only plausible values, and is read from an insurance membership card, will have a higher level of reliability than a process where the data were first noted on a notepad, and entered at the end of the day, without any plausibility checks built in the system. Similarly, an inventory of materials used during an operation in a private hospital, made by a dedicated nurse, may have a high level of reliability, as this is a key process to the hospital. Finally, data that must be regarded as manually entered on one level, can be seen as automatically captured data on another level. For example, at some point the biographical details of a citizen (address, date of birth, etc.) have been entered into the Civil Registration and Vital Statistics system. However, when these data are called up by a IS by means of entering the National ID or social security number, then for the IS, these data are “automatically” captured rather than entered manually³.
- **Data describing facts versus data reflecting opinions.** An example of a “fact” is a birthdate, or the use of an expendable item in an operation. Facts may be misrepresented erroneously or intentionally, but they remain facts. Examples of opinion are whether people feel they have access to an appropriate level of healthcare or whether a person senses a certain communication to have been useful or understandable. Both types of data are valuable and needed. However, the first type of data is objective and can be audited (or the systems capturing this type of data can be tested for the presence of errors), whereas the second type of data is subjective. As a result, it is far more difficult to validate the second type of data as either “true” or “biased”. Biases in collecting the second type of data typically result from the way samples are collected and the way questions are framed.

³ In these cases, there is a danger that initial manual data entry errors become “institutionalized”. Therefore, it is important to have a validity check in place, and a feedback mechanism to flag, investigate and correct errors.

- **Data gathered comprehensively (for all cases) versus data based on a sample.** Data gathered comprehensively provides “the complete picture” and is not prone to statistical error. Data based on a sample is prone to statistical error (which can be calculated, a “known unknown”) but also potentially to sample bias (which is an “unknown unknown”, as otherwise it could have been avoided). In practice, it is often too hard or costly to collect comprehensive data and therefore samples are used, based on advanced statistic and sampling methods, which allow researchers to draw reliable conclusions from sample data.

The above categorization of types of data is not necessarily comprehensive. More distinctions might be added. Whereas the above applies to data in general, in healthcare the following categories of data can be distinguished:

- Clinical patient-centered data (e.g. diagnosis, treatment etc., captured in a clinical patient management system);
- Financial and accounting data (e.g. prices, inputs utilized, inventories);
- Statistical, macro-level data (e.g. numbers of cases of disease incidence over a year);
- Epidemiological alerts (data that needs to be available almost in real time);
- Effectiveness and impact measurement data (e.g. number of children vaccinated);
- Population survey data.

These categories need not be mutually exclusive. For example, basic biographical data are needed both in a clinical patient management system and in the financial billing system. The impact of a certain policy can be measured by wholesale reporting of take-up in medical facilities or by means of a limited sample-based survey. However, these categories provide a useful and practical framework to enhance our understanding of data and systems and for prioritization of efforts under this assignment.

I.3. Focus, Methodology and Limitations of the Study

I.3.1. Focus of the Study

The concept of “data readiness” triggers the question “ready for what?”. Data that are ready to support conducting business as-is need not necessarily be sufficient (“ready”) to support conducting business after one or another reform has been implemented.

The aim of this study is to investigate which data exists, where and in what format. The goal is, as stated above, “to improve health sector sustainability and resiliency in Jordan”, and to “support Jordan’s commitment to universal health coverage”. This is a goal defined at a high level of abstraction and can be reached in very different ways, varying from the establishment of a National Health Service to a system based on private insurance with state involvement to secure access at a reasonable price. Furthermore, it can be based on the current constituent parts, or involve various types of reform in the organization of the sector. While a significant body of data would be required in any scenario, different approaches would to a certain extent generate different data requirements, and thus a different answer to the question “to what extent is the data “ready?””, that is: available, accessible, timely and of proper quality. In this study, the focus is on data that is likely to be required in any approach to the organization of healthcare provision.

To plan concrete interventions, there is a need to know what type of healthcare-related data are available, where they are stored, their format and quality. Furthermore, this study can serve as a basis for other studies and research efforts that seek to identify, extract and use (electronic) data from systems in the healthcare sector⁴. Therefore, from a practical viewpoint this has been the focus of the study: to assess the data that can be identified, and thus create a baseline in this area to act upon, either by commissioning more detailed research or by designing interventions that make use of existing data sources.

The health sector in Jordan is multi-faceted or, as one could say, fragmented (for more detail please refer to Chapter 3 of this report). Different constituent parts (“silos”) of the system have different IT systems, different levels of automation and different data requirements. Therefore, concerning the focus of the effort and prioritization, the emphasis was on:

- A wide scope of research, involving as many relevant institutions as possible;
- Micro-level data availability and quality, rather than aggregate data demand, use and availability;
- Data that are captured electronically, continuously and that concern hard facts, rather than data based on surveys that concern opinions and attitudes, data that are gathered manually, or data that have been gathered on a special basis in the framework of any research question.

However, this focus is not absolute: we have attempted to cast our net as wide as possible, and to bring to light a maximum of useful information.

I.3.2. Methodology

The main tool used to gather information was structured interviews with staff involved in the capture, storage, processing and use of data. In many cases these were IT staff and/or financial/accounting staff. In most cases, it appeared that the time interval available for interviews was expected to be less than two hours, whereas often this time limit was exceeded, and meetings lasted up to three to four hours. In a few cases, multiple interviews were conducted.

In our review, we found that the notions “data”, “systems”, “work flows”, and “processes” are very much intertwined. For example, a data element can occur when the HIS captures the fact that for a certain person a lab test has taken place. For this study, we can record whether this data element is captured or not. However, for a deep understanding of the actual meaning of this data element, and the way it is used, one would have to study the system of that hospital in-depth.

Systems are generally quite complex, with a myriad of data recorded on many screens, sub-screens, drop-down menus, etc. Describing all the data captured by a system would amount to making a complete user manual for such a system, which is not practical and would exceed the sources available for this study, even if attempted for one system in one facility.

⁴ One of the requests emerging from conversation between HFG and healthcare sector leaders was to provide an inventory of health sector micro data.

The interviews were conducted in a structured manner, using a template, with questions concerning data availability clusters around the following headings:

- Systems
- Doctors
- Patients
- Transactions (outpatients)
- Transactions (inpatients)

1.3.3. A Reflection on Data Demand and Information Use (DDIU)

Researching DDIU requires an understanding of what data are available at the moment. Furthermore, it requires insight into the decisions that politicians and managers must make or should make. This requires a level of familiarity with the various constituent parts of the Jordan healthcare system and the organizational structures and processes in the various government agencies involved that by far exceeds the resources of the current study, and the stage of HFG Activity⁵. Data demand and use can only be assessed by a direct approach to a limited extent, as (especially “on the record”) representations made by officials may reflect the desired situation rather than the actual situation.

1.3.4. Limitations

Pending the above, the findings of this study are:

- Focused on availability of data that are captured electronically, continuously and that concern facts;
- Based on interviews with operational-level staff rather than top-level decision makers;
- Mostly based on unaudited oral representations, with only an occasional glance at various computer screens (often in Arabic), with only in limited cases recourse to (translated) materials.

This study was undertaken at a moment in time when the implementation of the Hakeem system in the public sector is still a work in progress.

Therefore, the findings of this study have the nature of an initial overview. If other sector data users decide to work more closely with one or another constituent part of the Jordan healthcare system, they may find it necessary to deepen their understanding of data demand, use and availability in the relevant area, taking the current report as a basis to start from.

⁵ As an example, the HFG component on Civil Society Engagement, with which this study on Health Sector Data Requirements, Needs, Use, and Readiness has a nexus concerning community information needs, is still in a very early, inception, stage.

2. Description of Main Elements of the Jordan Healthcare Sector, Relevant to Data Demand, Availability and Use

2.1. Healthcare Providers

The Jordan healthcare sector consists of public and private parts. The public part consists of facilities run and financed directly by the MOH, facilities run by the RMS and two university hospitals (JUH and KAUH). The MOH operates and funds over thirty hospitals, many comprehensive health care centers, primary care facilities and rural clinics. The RMS controls twelve hospitals.

A special case is the Prince Hamza hospital, which received a certain degree of autonomy in 2008, though autonomy is incomplete.

The private sector consists of many private hospitals and clinics. The private sector strictly runs on a payment-for-service basis. There are over 60 hospitals in this sector. However, they are smaller than the public-sector hospitals, which have more bed capacity.

KHCC is nominally private but was created under special enabling legislation and enjoys government support.

2.2. Insurance and Payment Arrangements

The arrangements in the public sector are quite complex. The hospitals under the MOH and RMS are both financed from the budget of these organizations⁶. This means that these hospitals receive their staff, pharmaceuticals, expendables, equipment and buildings in-kind.

The military have access to the RMS, and civil servants, via the Civil Insurance Program (CIP), have access to the MOH facilities. However, beyond this simple rule, there are many complexities such as:

- Highly ranked civil servants have access to RMS or private sector facilities;
- All children under age 6 are treated free of charge in the public sector⁷;
- Several serious and infectious diseases will be treated for any citizen, irrespective of status;
- Those who are covered by the public sector and live in remote places can be treated at the closest public facility, irrespective of whether it is an RMS or MOH facility;
- Citizens over 60 years old can opt to be covered against a reduced rate, and citizens over 70 years of age are covered free of charge;
- Pregnant women can opt to obtain cover for the duration of the pregnancy against a reduced rate;
- Emergency care and stabilization should be delivered to anyone at any hospital (public or private);
- Those who are recognized as poor enjoy free access to the facilities in the MOH system;
- Refugees enjoy access to health care through local NGOs, which in turn are funded by international donors. Refugees also have access to MOH services, some at low rates, some at higher rates, depending on their registration statues with UNHCR and their nationality;

⁶ RMS is not financed from the budget of the Jordan Armed Forces, but is financed directly from the Government Budget.

⁷ Without being formally included in the public insurance scheme, that is: free of charge and without having an insurance card.

- Those who are not covered, can obtain treatment by appealing to the Royal Court. In practice, even those who are insured but who prefer to use a facility that they normally would not have access to, can appeal to the Royal Court⁸.

Those who are covered are required to make certain co-payments for consultation, treatment and medicine. Those who are not covered, are called “cash payers”, and pay the rate that is generally referred to as the rate for a “capable Jordanian”⁹.

In the above the terms “covered” or “have access to” is used rather than the word “insured”. The reason is that in the public system, there is no insurance in the usual sense. There is an organization¹⁰, the HIA that issues “insurance” cards to all who have cover under the public system, except for the military, who receive their cards from RMS.

Public sector employees and public-sector retirees, who are insured with HIA pay “premiums” for this cover, (for example 3% of salary, with a maximum of 30 JD per month) but this money is neither used for the main health cover, nor is it sufficient. After all, the MOH facilities receive all their staff, pharmaceuticals, equipment, expendables and infrastructure in-kind from the government, and do not rely on payment for service.

Premiums, co-payments and the resources received from “cash payers” are all concentrated in HIA. Subsequently these resources are for the largest part used to pay for treatment of “insured” people that takes place *outside* the MOH system (in the private sector, in one of the University hospitals, at KHCC or in an RMS facility). Furthermore, a significant part is used to make “incentive payments” to staff at MOH facilities, to retain such staff¹¹.

The situation at RMS is comparable. However, employee contributions at RMS are very low, at around 2 JD – 4 JD per month, for a similar package of benefits. Therefore, in the armed forces, medical cover is even more of an employee benefit than it is in the civil service.

The private sector works fully in accordance with the principles of a market economy. Patients either pay cash, or are insured with an insurance company, often as an employee benefit provided by their employer. It should be noted that the ceilings of covered expenditure that can be insured are usually relatively low and thus people who have serious conditions may have to rely on the public system or be able and prepared to pay significant amounts of cash.

Some people have multiple cover, which may provide an additional layer of security but can also be inefficient. For example, a retired civil servant enjoys mandatory cover in the public system (for which 3% is deducted from his pension) but may also be insured at his new place of work at a private company.

⁸ In theory, the Royal Court should check if one has insurance and what it covers and in case the applicant already has insurance, pay only for conditions that are not covered by their insurance, but reportedly this is in practice often not verified.

⁹ “Capable”, in the sense of “capable to pay”, not considered poor

¹⁰ Legally, HIA is not an independent organization but a directorate of the MOH. However, it has its own accounts, management, staff, building and management.

¹¹ These payments are not based on performance, but on position, rank and years of service

A civil servant can be married to a military staff member and enjoy her own cover from the HIA-MOH system, but at the same time be covered as a dependent under the RM system (and vice-versa).

3. Description and Justification of the Major Public and Private Health Sector Organizations Included in the Data Review

The team, chose the organizations to involve in this study in such a manner, to achieve a maximally representative model of the health care sector in Jordan. The organizations visited are as follows:

Healthcare facilities:

- MOH facilities:
 - Al Bashir hospital: one of the major hospitals in the MOH network of healthcare facilities;
 - Amman Comprehensive Health Center: a primary healthcare facility, offering a comprehensive range of services to a large urban catchment area, part of the MOH network of healthcare facilities;
 - Prince Hamza hospital: a hospital in Amman, that is part of the MOH system, but has been granted a certain degree of autonomy;
- The RMS hospital cluster in Amman;
- KAUH: this hospital is not in the MOH system, and was not chosen as a representative of a class, but was chosen for its own merits as a highly professional tertiary hospital;
- JUH: similarly, this hospital was chosen for its unique importance;
- KHCC: similarly, this hospital was chosen for its special status and unique importance;
- Specialty Hospital: this hospital was chosen as a representative for the private sector.

Other organizations:

- Electronic Health Solutions (EHS): this is the entity implementing the “Hakeem” clinical patient registration system;
- HIA: this is the division of the MOH that registers all individuals covered under the MOH system, issues “insurance” cards to them, processes the employee contributions by civil servants, processes co-payments and payments by “cash payers”, pays for healthcare services provided to its “insured” that were delivered by other “silos” in the Jordan healthcare system, and determines provides the resources for “incentive” payments to staff in the MOH system;
- Four departments of the MOH:
 - The HR department;
 - The Budget and Expenditure Departments: to receive a better understanding of accounting information available at MOH;
 - The Biomedical Engineering Directorate: to receive a better understanding about the way decisions are taken on capital expenditure for MOH facilities and the role of data and information in the decision-making process;
 - The Data Division: to get a better understanding of the data captured through the Interactive Electronic Reporting System (IERS), a real-time integrated disease surveillance system which uses electronic mobile tablets for monitoring diseases of public health importance among refugees and host communities.

- Jordan Health Aid Society International (JHASI), which provides and supports healthcare services mainly to refugees.

We included a wide range of organizations and aimed to cover health related data available in Jordan to the maximum extent possible.

4. Description of Existing Data Sources and Data Availability in the Various Entities of the Jordan Healthcare System

In this chapter we will describe the main findings of our research. In the first section we present background information on the data sources and systems in the healthcare facilities in the various silos that make up the Jordan healthcare system. This information is based on interviews and somewhat idiosyncratic and variable in the amount of detail that we could elicit. It is presented mainly to provide context for the second section, in which we discuss our core-findings systematically in tabular format, on an item-by-item basis, following our questionnaire. In the third section we discuss data in other entities of the Jordan healthcare system.

4.1. Main Data Sources and Systems in Healthcare Facilities

In many MOH facilities, the Clinical¹² part of the “Hakeem” system has been implemented¹³. Hakeem is implemented by EHS, a not-for-profit company. Hakeem is an Electronic Health Records (EHR) system. Hakeem is based on the "VISTA" system from the Veteran Affairs Department of the USA. The clinical core is from VISTA, some administrative applications have been developed in-house. Financial modules are from outside providers.

Hakeem Clinical provides a patient-centered electronic record of an individuals’ key health history and care information within the public healthcare delivery system. The main goal of the system is to aid doctors and patients by facilitating the sharing of data across healthcare delivery organizations, time and geographical locations. Data sharing is important, as it allows the healthcare system to provide the patient with seamless service, also in case the patient is treated by different doctors in different locations.

This points to the main strength of Hakeem Clinical: the focus on care provided to the patient. The aim is that the patient’s records can be easily accessed from different locations and at different moments in time by different doctors, to enhance consistency in diagnosis and treatment and to increase efficiency.

Hakeem does not contain prices and does not have a billing module. However, EHS is working on a billing module, which is currently being tested on a pilot basis and expected to become available in 2018.

Hakeem plans to provide five versions (modifications) of the Hakeem system, for the following silos:

- MOH facilities: this version has been developed and to a large extent implemented;

¹² The financial part of Hakeem is in an advanced stage of development (pilot testing)

¹³ In some, such as in Al-Bashir hospital, as recently as 2017

- RMS facilities: this version has been developed, and has been implemented in 8 RMS hospitals. In 4 RMS hospitals implementation is in progress and in another 2 RMS hospitals it has yet to start. Thus far, none of the RMS primary healthcare facilities has been connected to Hakeem;
- KHCC: this version has been developed and implemented;
- JUH: this is in the planning phase; however, it would still require the consent of JUH, which currently uses its own, proprietary, systems;
- KAUH: this is in the planning phase; however, it would still require the consent of KAUH, which currently uses its own, proprietary, systems.

For the data items we researched in the framework of this study, there are no differences between the three versions currently operating. Differences relate mostly to the interfaces with administration- and financial systems.

There is no system documentation available for Hakeem. The documentation that exists relates to the original "VISTA" system. However, Hakeem keeps track of the modifications it makes to the original design for the various silos as described above. Hakeem includes an application called ISICapture, to which scans and images can be uploaded within Hakeem.

Healthcare facilities visited by our experts include Al-Bashir hospital, the ACHC, Prince Hamza hospital, the RMS, KHCC, KAUH, JUH and the Specialty Hospital. We will now discuss our findings in these facilities one by one.

4.1.1. Al-Bashir Hospital

In Al-Bashir hospital staff members from the IT department claimed no knowledge of Hakeem. They mentioned that Hakeem had only been running for one month, and stated that there was no official agreement with EHS in place yet.

Therefore, we focused on the HR system (in relation to data on doctors), and the remaining role of the "old" Al-Bashir patient management system, which is still in use in relation to billing. To clarify this, two staff members from the financial department joined the meeting.

The situation appears as follows. Medical staff now only use Hakeem. However, there are no prices recorded in Hakeem Clinical. Therefore, when treatment of an in-patient is completed, the Hakeem record is printed out on paper, and sent to the financial department. The only exception are surgeries. Surgeries are reported to the financial department manually. Furthermore, the thorax (chest) department runs on a non-automated, paper basis. Subsequently, the financial department assigns a code (and a price belonging to this code) to the paper document. The total cost is calculated manually and then manually entered into the financial system. The level of detail (breakdown of total price) that is preserved when entering this data remained unclear. Our impression was that all details are available on paper only.

To be able to enter the price, there needs to be a record of the person to be able to charge a fee or a co-payment. This is where the "old" system plays a role. When a patient is admitted, the admission department enters his/her data twice: once in Hakeem and once in the "old" system. In the "old" system, Al-Bashir staff only enter the biographical data that is required for billing. This is because historically, the financial system automatically accesses these data from the "old" system.

Concerning HR systems, there are two HR systems:

- One is the payroll system located at the MOH. HR staff at Al-Bashir hospital have access to it on a "need to know" basis, using authorizations.
- The other HR system is the Al-Bashir HR system. We did not discuss this in detail. However, it was noted that issues such as leave, punishments and letters of thanks, and professional education are recorded in this system.

Other systems in Al-Bashir hospital include a system for logging in- and outgoing correspondence, and a "Public Relations" system. We did not further discuss these systems. Al-Bashir has no system for daily basis occupancy management.

4.1.2. Amman Comprehensive Health Center (ACHC)

In ACHC, Hakeem Clinical is used to capture patient (diagnosis and treatment) data, but also a pilot version of Hakeem Financial has been implemented, and therefore in ACHC the Hakeem system also shows prices.

Hakeem was implemented at ACHC in 2015. Apart from Hakeem, there are no other automated systems in ACHC. The current IT staff worked before at the regional directorate of MOH, and were involved with statistics and HR issues. Therefore, it seems that they do not have an IT background, but have been reassigned to a new task.

There are two Hakeem liaison staff working at ACHC, but this is a temporary arrangement. They assist in the implementation of Hakeem and need to transfer their knowledge to the IT department. The HR system at ACHC is the MOH HR system. For ACHC, it is operated at the regional MOH directorate. In ACHC, there is also an HR person, but no additional local electronic HR system, and the local HR person does not have access to such a system. HR-related data are captured on a form, with a photo. When completed, the form is scanned, and uploaded into the HR system, where it can be accessed based on the national ID of the employee. Therefore, some of the employee data is electronically available. However, the data is not in the form of "fields" in a database system, but in the form of electronic scans that can be used by human operators on a case-by-case basis.

4.1.3. Prince Hamza Hospital

Although the Prince Hamza hospital has been provided with a certain degree of autonomy, this autonomy is not complete. On the one hand, many doctors are still on the MOH payroll. On the other hand, the hospital must transfer back to the state all revenues that exceed a pre-agreed budget. For this reason, we consider this hospital as part of the public sector.

Prince Hamza hospital uses the Hakeem Clinical system, and the Hakeem Financial system on a pilot basis.

4.1.4. RMS

RMS uses a customized version of the Hakeem system. Full implementation should be finalized by 2020. In the facilities where Hakeem has not yet been implemented, the patient management system is paper-

based. For financial management, RMS plans to implement a system from Malaysia, developed by the company GCI Science & Technology. RMS has its own HR system, and its own appointment system. This appointment system fulfills the minimum requirements of Hakeem, and through an interface the corresponding fields in Hakeem are automatically filled.

4.1.5. KHCC

KHCC has used Hakeem since 2014. Before that, the patient registration was paper-based, and some local systems were used. KHCC uses what is called a "separate instance" of Hakeem, that is, a version modified in line with KHCC's needs. Apart from Hakeem, KHCC has run an ERP system developed by a local IT company, ATS (Advanced Technology Systems), since 2010. This system handles invoicing, finance, and HR issues. KHCC has a PACS (Picture Archiving and Communication System): a healthcare technology for the short- and long-term storage, retrieval, management, distribution and presentation of medical images.

4.1.6. KAUH

The main system at KAUH is the Electronic Hospital Information System (EHIS). This system was purchased from a USA based vendor (CSC; now this company has merged with the Enterprise Services business of Hewlett Packard Enterprise, and become DXC Technology). The system was first implemented in 2003 and upgraded in 2012. It is Oracle-based. This company is still servicing the system based on a service contract, and sending patches/upgrades, etc.

Apart from EHIS, KAUH has systems for other functions, such as HR. However, although we made two visits, we have not had the opportunity to speak with a representative from HR. We understand that there is also a system with contact data of hospital staff, which has web-based access.

4.1.7. JUH

JUH does not use the Hakeem system yet. It uses a comprehensive healthcare management system from a local company called ATS (Advanced Technology Systems), which is used widely in the private sector in Jordan. JUH consists of multiple clinics. The ATS system was customized for each clinic.

ATS includes not only a patient management system, but also back office systems, including financial, inventory, and HR modules. Apart from this, there is an archiving system, a system for storing X-rays and a system that forms an interface with lab testing equipment (to upload results in ATS).

JUH has access to the civil affairs system, but there is no link to automatically upload biographical data. It is rarely used to check such data.

4.1.8. The Specialty Hospital

The Specialty Hospital was chosen as an example of a typical private sector hospital. The hospital was set up and is owned by private individuals. It has been in operation since 1993. Around 50% - 60% of patients are cash payers, 5% are referrals from the public system (mostly senior civil servants), and the rest are privately insured.

The IT system used is called "Careware", and was developed by the local company ATS. Our interlocutor estimated that 70% of private hospitals use this system. It is mostly geared towards capturing information on treatment provided in relation to proper and timely invoicing and financial management.

The current version has been in use since 2009. Before that, the hospital used a prior version, also provided by ATS. A new, third, release from ATS is expected soon. However, they are considering opting for a system from a different provider, e.g. SAP with a medical module, or the same system that KAUH uses. Only one private hospital started implementing a clinical data processing system, Istishari. It is still in an initial phase, and its success unclear up to this point. The system is from the company "Certacure" (a local provider).

The patient management system (the medical records) are still largely paper-based. Clinical information on laboratory tests, x-rays and other imaging, medication, and diagnosis are captured by the system. However, doctor's notes regarding a patient are available on paper only.

The system is used by some doctors only. Resident doctors are expected to use it, however specialists (who are usually not employees but have their private practices) decide for themselves whether to use it or not. If a doctor orders a test, imaging or pharmaceuticals outside of the system (making the order on paper), then staff from the lab, radiology or the pharmacy will enter the request in the system, so proper billing can take place.

If a doctor orders an operation, and time and date have been agreed, a nurse in the operation room enters details into the system (this task is fulfilled by rotation, not by especially dedicated staff). She/he will sit through the whole operation, and record every expendable used and sedative used. There will also be a charge for use of the operation theater. This means billing is quite granular and reflects inputs to a high extent.

All specialist are licensed doctors and operate as entrepreneurs, with their own clinics, except for radiologists and anesthetists, who are employees. Resident doctors are employees. These two categories ("doctor-entrepreneur" versus "doctor-employee") are treated differently in the systems, which is reflected in our findings.

Only the cost of specialists' time is not entered into the system. Doctors put their fees on paper, this paper is sent to the financial department, which enters it in the system, adds it to the invoice to the patient, then separates out this amount from the receipts and tables it for payment to the doctor. The latter is done by a dedicated accountant who is only involved in settling specialists' remuneration. Lodging is calculated per night, including care and food.

There is a paper-based archiving system. Each doctor has an HR file base on his/her hospital ID. This archive exists on paper and as a digital (scanned) copy in the digital archiving system. In practice the paper archive is used. The digital archive mostly serves as a back-up system.

4.2. Discussion of Data in Healthcare Facilities by Type of Data

Whereas in the preceding paragraphs we presented our findings on data sources and systems at the various facilities, in this section we will discuss our findings under the various headings of the questionnaire that we used as a basis for the structured interviews that we conducted.

In the discussion, we group MOH facilities, Prince Hamza hospital, RMS and KHCC together, as they are all in various stages of implementation of Hakeem Clinical. We highlight any specific differences.

4.2.1. Data Concerning Doctors

Concerning doctors, our main findings are as follows:

| Data item | Hakeem users: MOH (Al-Bashir, ACHC), Hamza, RMS, KHCC | KAUH | JUH | Specialty hospital |
|------------------------------|---|---|--|---|
| Doctor ID | A username is centrally assigned. It is a sequenced number. The doctor takes it with him, and the same username is used at each facility. In case of a change of work location, only the rights of access to the data change. The password is delivered in a closed envelope. The national ID is also stored. Those who need to make orders receive an electronic signature. Apart from this, doctors have a unique employee number, assigned by the MOH HR department. At Prince Hamza hospital, doctors who are employed by the hospital have a hospital-specific employee number. In RMS facilities, the doctor has a military number as well. | An ID and employee number are assigned. | A 3 or 4-digit number is assigned to the doctor for use in the patient treatment system, a different 6-digit number is assigned for registration as an employee. | Independent doctors have a number that starts from nine million (so the first number is 9,000,001). Doctors-employee (mostly residents) have another type of number (starting from one, mixed with other staff). |
| Doctor license number | This item is not in Hakeem, but in the MOH HR system, a scan of the license is stored. In KHCC it is in the HR module of the ERP. | Not in EHIS. Doctor license numbers are recorded electronically in the HR system and in hard copy in the doctor's file. | Not in the system; a scan of the license is in the archive. | For independent doctors: In the HR system there is a unique link for each doctor to documents in the paper archiving system, which are also available as a scan. For employees, there is a field with the license number. |
| Name | Yes, mandatory. | Yes. | Yes. | Yes, mandatory. |
| Birthdate | Yes. | Yes, but usually not completed correctly. | Yes. | Only for employees. |
| Gender | Yes. | Yes. | Yes. | Yes. |

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|----------------------------|---|--|---|--|
| Full time/part time | No, in MOH everyone is supposed to work full-time. | Yes, but working hours cannot be entered. | Yes. | Yes (by definition, this only applies to employees). |
| Temporary/permanent | Hakeem does not deal with a distinction between temporary and permanent staff. For temporary staff, no file is created even in the MOH HR system. They are not employees but contractors. | No, this status doesn't exist in EHIS. | Usually contracts are renewed yearly. | Not explicitly recorded. The standard is that the first two years are temporary, then the employee receives a permanent contract (this is specialty hospital policy, other hospitals mostly issue annual contracts). |
| Work location | Yes, name of clinic (or room/office), in case the doctor has one such location. Normally the doctor performs his duties in different rooms, depending on the day. When logging on to the system the location is automatically captured. | Not in EHIS. This is recorded in the HR system. | Yes. | Yes. |
| Address | Yes, in Hakeem there is a field, however it is not mandatory to complete and in practice usually left empty. In the HR system, only the city is registered. | Yes, these fields exist in EHIS, but are not used in practice. This data is entered in the internal KAUH contact data website. | Yes. | Yes. |
| Phone number | Yes, but not mandatory. | | No. | Yes. |
| Cell phone number | Yes, mandatory. | | Yes. | Yes. |
| E-mail | Yes, field in Hakeem, but not used. Doctors do not get a business e-mail address. Private-mail address is not stored. In KHCC this information is on the Active Directory and on the ERP. | | Yes, a professional e-mail address is provided. | Yes. |
| Specialty | Yes, to be chosen from a pre-defined list. | Yes. | Yes. | Yes, mandatory for independent doctors, not used for employees, as they are mostly residents. |

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|--|--|---|---|---|
| Sub specialty | Yes, to be chosen from a pre-defined list. | Not in EHIS. This is recorded electronically in the HR system and in hard copy in the doctor's file. | Yes. | No. |
| Date began working in location | Not in Hakeem. In Al-Bashir this is available in the HR system, and in KHCC on the ERP system. | Not in EHIS. This is recorded in the HR system. | Yes. | For independent doctors: only on paper. For employees: yes. |
| Hours worked each day | No, not stored per doctor. For outpatient clinics (each room is a clinic), this information is logged by room per day (therefore value varies from 0 - 24 hours, depending on use of the clinic). | Not in EHIS. | Not explicitly registered. Deemed implicit in records in the patient treatment system. | For independent doctors, only the number of operations and admissions are known and relevant. For employees, this is also not recorded as it is deemed to be equal to 8 for everyone. |
| Continuing medical education status | Not in Hakeem, but in the HR system. | Not in EHIS. Training programs in which the doctor participates through the hospital are recorded in the HR system. | Scans of evidence are archived in the doctor's file, and stored on paper as well. | Independent doctors: paper based, every 2 year a doctor is reaccredited. Employees: most are in training. |
| Practice Issues/complaints | No. Complaints can be filed at MOH. Any penalties or rewards are reflected in the employee file at the MOH HR department. In Prince Hamza hospital, there is a complaint log for the hospital, but it is not linked to the individual doctor's Hakeem account. In KHCC there is a paper based subsystem in the medical staff office (under the chief medical officer). | Not in EHIS. Punishments are recorded in the HR system. Notification of the court to the doctors of any legal cases opened against them shall be reported to the doctor and kept in his paper file. | Yes, information is stored in the doctor's file, both paper-based and archived electronically. Access to confidential information is limited. | Independent doctors: paper file, status in system can be changed to "suspended". For employees: a list of actions, like warnings, are in paper files (with a backup in the digital archiving system). There is a link to the paper files through the employee number. |

From the above information we draw the following conclusions:

- Main information items to identify a doctor (name, ID number) are available in electronic format in all silos;
- Systems are different, and use different codes;
- Other information on doctors is often not in the main clinical system, but in the system (application) used for HR administration;
- Some information is available only on paper or in the form of an electronic scan of a paper document;
- Where systems contain certain fields, it is not always guaranteed that these fields are completed correctly, or completed at all. Even if a field is mandatory, it may be filled in perfunctorily.

4.2.2. Data Concerning Consumers/Patients

| Data item | Hakeem users: MOH (Al-Bashir, ACHC), Hamza, RMS, KHCC | KAUH | JUH | Specialty hospital |
|---------------------|---|--|--|--|
| Patient's ID | The national ID is used for Jordanians. For others, an ID is generated as a sequential number (only the first digit has a meaning for IT staff: for example, to avoid confusion, it should not be a 2 or a 9 because national IDs start with these digits). In RMS it was mentioned that for non-Jordanians they make a number of similar length as a national ID by adding the string "0001" to the 6-digit code assigned by the Hakeem patient registration system. | A hospital generated number is assigned. | A 7-digit number is assigned to all patients (until one year ago this used to be a 6-digit number, but the number of patients has now exceeded one million). | The hospital system generates a unique number. This can be assigned at any clinic in the hospital. |
| Name | Yes, for Jordanians this is automatically imported from civil affairs database (no real-time link, but monthly updates on disk). | Yes, mandatory, manually entered. | Yes, manually entered. The patient needs to bring passport or another ID. | Yes, manually entered. |
| Birthdate | | | | |
| Gender | | | | |
| Address | Yes, for Jordanians automatically imported from civil affairs database and emergency contacts next of kin (father, or anyone legitimate in accordance with Jordanian legislation) and passport | Yes, mandatory, manually entered. | Yes. | Yes, manually entered. |

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| | number or any document approved under Jordanian law for non-Jordanians | | | |
| Phone number | There is a field. It is mandatory, but it is not always properly used (sometimes users enter invalid phone numbers just to bypass the mandatory control message from the system). | Yes, mandatory, manually entered. | No. | Yes, manually entered. |
| Cell phone number | Yes, not mandatory. Mandatory to provide at least one phone number: fixed line or cell number. | Yes, at least one contact number should be entered (manual entry). | Yes. | Yes, manually entered. |
| E-mail | There is a field, but it is usually not used. | Yes, but not mandatory, manually entered. | No. | Yes, manually entered. |
| Name of insurance | No, insurance and pricing matters are not dealt with in Hakeem Clinical (this is planned for 2018) through Hakeem Financial. In KHCC this is dealt with in the ERP. | Yes, drop-down menu, mandatory field. | Yes, code for each type of insurance, drop-down menu. | Drop-down menu of insurance companies. MOH, RMS, Royal court, JUH, etc. are considered insurers if the patient has a contract. If no contract, then by default the patient is a cash payer. |
| Start sate of insurance eligibility | No, insurance and pricing matters are not dealt with in Hakeem Clinical. In Al-Bashir, the insurance related information is entered in the Al-Bashir system: type of insurance and coverage, insurance number, beneficiary or dependent. | Yes. | Yes. | Yes. |
| End date of insurance eligibility | No, insurance and pricing matters are not dealt with in Hakeem Clinical. In KHCC this is dealt with in the ERP. | Yes. | Yes. | Yes. |
| Status: beneficiary or dependent | No, insurance and pricing matters are not dealt with in Hakeem Clinical. | Yes. | Yes. | Yes. |
| If dependent need name of | No, insurance and pricing matters are not dealt with in Hakeem Clinical. | Yes. | Yes. | Yes. |

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| beneficiary and employer | | | | |
| Can multiple coverages be registered? | No, insurance and pricing matters are not dealt with in Hakeem Clinical. | Yes. | Yes, possible to enter, but rarely used. | Yes, multiple insurers possible, the percentage per insurer can be specified. |

From the above information we draw the following conclusions:

- Main information items to identify a patient (name, birthdate, gender, ID number) are available in electronic format in all systems;
- Systems are different, and use different codes;
- Only Hakeem has a link to the “civil affairs” national registry, which is regularly updated, but not real-time. In other systems, information is manually entered;
- Hakeem Clinical does not contain information on insurance status and does not support invoicing and accounting.

4.2.3. Data on Transactions: Treatment of Outpatients

| Data item | Hakeem users: MOH (Al-Bashir, ACHC), Hamza, RMS, KHCC | KAUH | JUH | Specialty hospital |
|--|---|--------------------------------------|---|---|
| Facility ID | Automatically assigned by association with the exact location of the visit | Automatically assigned. | Yes. | No. |
| Type of visit (multiple types are possible? - visit, outpatient surgery, Emergency Room.....) | The location (ward, department, room) is the determining factor for the type of visit. No other special field for this. In RMS it was mentioned that there can be two statuses in their admission system: "appointment" or "emergency". | Yes, selected from drop-down menu. | It is registered which of the clinics, family clinic or emergency is visited. | Yes, location and procedure are recorded. |
| Service date | Automatically generated | Automatically generated. | Automatically generated. | Automatically generated. |
| Patient ID | Automatically imported | Yes, serves to identify the patient. | Yes, serves to identify the patient. | Yes, serves to identify the patient. |
| Patient Name | Yes, serves to identify the patient (selected from a shortlist of those who are on the doctor's schedule) | Automatically imported. | Automatically imported. | Automatically imported. |

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| Birthday | Automatically imported | Automatically imported. | Automatically imported. | Automatically imported. |
| Doctor ID | Automatically imported. | Automatically imported. | Automatically imported. Only one doctor can be entered as the main caregiver, a second one can be added as a consultant. | If the doctor is not an employee, the specialty hospital writes down his/her name, if he/she is an employee: ID and name are automatically generated. |
| Primary diagnosis | ICD-9 code, to be chosen from a drop-down menu, customized for specialty, but if needed a doctor has access to all codes. There is a free text field to capture pre-existing information on diagnoses and treatment, but this is to be used only for the historical patient's problem list, it is not used for current transactions ("encounters"). The codes themselves are not visible, visible is only the diagnosis (description). Every visit ('encounter") the diagnosis is re-established. In RMS facilities that have not yet implemented Hakeem, ICD-10 codes are used. | Free text field, for outpatients, ICD codes are not used. | ICD-9, you insert few letter and get a shortened drop-down menu. In some clinics doctors insert free text. | Not applicable, as for outpatients they do not do intakes, rather, perform procedures ordered by others. |
| Secondary Diagnoses | ICD-9, to be chosen from a drop-down menu, customized for specialty, but if needed has access to all codes. It is possible to add as many diagnoses as needed. In RMS facilities that have not yet implemented Hakeem, ICD-10 codes are used. | Entered by the doctor in the same "free text" note. | Yes, ICD-9, as many diagnoses as required may be entered. | Not applicable, as for outpatients, doctors do not provide diagnoses, rather, perform procedures ordered by others. |
| Services Codes (CPT4, other codes used) | Hakeem is moving to CPT4 (from 2011), to be chosen from a drop-down menu, made simpler by quick access to codes often used and extra narrative field. The codes themselves are not | No use of CPT, but instead use their own billing codes. | No use of CPT, but instead use their own billing codes. | No use of CPT, but instead use their own billing codes |

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| | visible, visible is only the diagnosis (description). More than one treatment can be entered. CPT is currently used to document the procedures that are taken during an encounter with an outpatient. For ordering procedures, an alternative procedure description, developed in-house, is used which is not linked to any coding system. The latter is the most frequently used at this stage of implementation. The process of a shift to CPT is ongoing. In KHCC, the finance module of the ERP system uses its own codes, the Jordan medical syndicate codes. In RMS internal, so-called PNF codes are used. | | | |
| Height | Yes, depends on type of service, not mandatory. | Yes, not mandatory. | Yes, not mandatory. | No. |
| Weight | | | | |
| Blood pressure | | | | |
| Radiology services | Yes, to be chosen from a drop-down menu of orders related to radiology. | Yes, drop-down menu, these are considered as "orders". | Yes. | Yes. |
| Lab services | Yes, to be chosen from a drop-down menu of orders related to lab services. | Yes, drop-down menu, these are considered as "orders" | Yes. | Yes. |
| Pharmacy, medications, name, code, strength, dose, duration, refills | Yes, selected from a drop-down menu, prescription. | Yes, drop-down menu, these are considered as "orders". | Yes, and chronic patients are given a 3-month prescription. | Yes. |
| Referral from | A special package for referrals is under development. Now referral between facilities not recorded in Hakeem Clinical. Referral is recorded on paper | There is no field for this in EHIS, just paper referrals, | Paper-based, patients are re-assessed. A referral letter from | Yes. |

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| | (scanned and uploaded). Referral within the facility is automated in Hakeem Clinical, as a consult request. | scanned and uploaded in EHIS. | HIA is required for lowest co-payments. | |
| Referral to | A special package for referrals is under development. Now referral between facilities not recorded in Hakeem Clinical. Referral is recorded on paper (scanned and uploaded). Referral within the facility is automated in Hakeem Clinical, as a consult request. | Not usually done, as KAUH services are quite comprehensive. Only exception is radiotherapy. However, it is not done through EHIS, but on paper (not scanned). In practice such a referral would be described in EHIS in the patient's progress note. | No. | Yes, only applicable if an emergency patient cannot pay or if referral is required to a tertiary, specialized, hospital like KHCC. |
| Charges (amount) | There are no prices in current version of Hakeem. Prices are to be implemented in a billing system that will be linked to the current Hakeem patient management system. ACHC and Prince Hamza hospital use Hakeem Financial on a pilot basis. In the finance system in Al-Bashir hospital the fees requested from the patients are entered (for operations, or any daily procedures), in detail (cost of stay, operation, medications, lab, radiology, etc.) and printed out. | Yes, they have a comprehensive functionality for charges and billing in EHIS. | Yes. | Yes. |

From the above information we draw the following conclusions:

- In all silos, once basic patient data (name, birthdate, gender, ID number) has been entered, it is automatically made available by the clinical system to support an outpatient encounter that is available in electronic format;
- ICD-9 codes are used almost everywhere, except for KAUH. In RMS the implementation of Hakeem gives rise to a transfer from ICD-10 to ICD-9;
- CPT code are used only in MOH facilities. In RMS, KHCC, KAUH, JUH and the Specialty Hospital, locally devised coding systems are used.
- Height, weight and blood pressure are not always recorded, but only when deemed relevant;
- Radiology and lab services, and pharmaceutical prescriptions are electronically ordered through the clinical systems;
- Referral is still mostly a paper-based process;
- Hakeem Clinical does not contain information on prices and does not support invoicing and accounting. For these functions, public sector hospitals use legacy systems, local solutions and paper-based processes. However, EHS has developed Hakeem Financial, which is currently running on a pilot basis in Hamza hospital and in ACHC. Private sector and university hospitals have historically been more focused on invoicing and financial management, as they operate under conditions of financial autonomy.

4.2.4. Data on Transactions: Treatment of Inpatients

| Data item | Hakeem users: MOH (Al-Bashir, ACHC), Hamza, RMS, KHCC | KAUH | JUH | Specialty hospital |
|--|--|------------------------------|---|------------------------------|
| Facility ID | Automatically assigned. In RMS, there is a code for each facility and hospital, and codes for wards, and beds, clinics and specialties. | Automatically assigned. | Yes. | No. |
| Date of admittance | Automatically assigned. | Automatically assigned. | Automatically assigned. | Automatically assigned. |
| Discharge date | Automatically assigned, special staff have the privilege to change the date with backward force (retrofit; e.g. if there was a system repair when a patient was checked out) | Automatically assigned. | Automatically assigned. | Automatically assigned. |
| Discharge status (dead, cured, care assigned) | Yes, using a drop-down menu. | Yes, using a drop-down menu. | Yes, using a drop-down menu (options: dead, healed, against medical advice, referred to other). | Yes, using a drop-down menu. |

| | | | | |
|-------------------------|---|--------------------------------------|---|--------------------------------------|
| Type of room/bed | Room class A+B+C is defined in Hakeem, and automatically imported once the patient is admitted to this room. However, there is no other reflection of this information or any further impact since it will only matter for financial reasons. In Hakeem Clinical, the class of the patient is reflected rather than the room class. Patients are classified as "regular", "sensitive" or "highly sensitive" and only special administrative staff deal with the admittance of the latter two categories. In Prince Hamza hospital it is claimed that not class but rather the distinction "regular" versus "isolation" room is important. In RMS it was noted that they use Hakeem only for room number and ward and their own the registration system is used to distinguish different categories. | Yes. | Yes, there are three classes, there are suites, and there is the royal suite. | Yes, there are various options. |
| Level of care - | ICU is a location type. In RMS, any transfer of location is entered into their own registration system and from there automatically adjusted on Hakeem. | Yes, using a drop-down menu. | ICU is a location type. | ICU is a location type. |
| Patient ID | Yes, serves to identify the patient and is imported automatically (both the national ID for Jordanians and the serial ID for non-Jordanians). | Yes, serves to identify the patient. | Yes, serves to identify the patient. | Yes, serves to identify the patient. |
| Patient name | Automatically imported. | Automatically imported. | Automatically imported. | Automatically imported. |
| Patient birthday | Automatically imported. | Automatically imported. | Automatically imported. | Automatically imported. |

| | | | | |
|---|--|---|--|---|
| If infant, mother name and ID | Yes, mother's name mandatory for all patients. For a minor, the guardian needs to be separately specified (can be the mother from this year). A minor is below 18 years, a pediatric patient is below 14 years. | Yes. | The caregiver must sign for approval of treatment (saved in the archiving system). | If the patient is under age 13, the caregiver has free admission. |
| Doctor ID | Automatically captured. | Automatically captured. | Automatically imported. Only one doctor can be entered as the main caregiver, a second one can be added as a consultant. As for intensive care units, 2 can be added, one as a supervisor. | Automatically captured. |
| Primary diagnosis | ICD-9, selected from a drop-down menu, customized for specialty, but if needed, access to all codes. In addition, there is a free text field to capture information on diagnoses. Thus, the module for in-patients (called "problem list") differs from the module for out-patients (called "encounters"). | ICD-10. | ICD-9, drop-down menu. | ICD-10, drop-down menu. |
| Secondary Diagnoses- ICD (how many can be entered?) | ICD-9, selected from a drop-down menu, customized for specialty, but if needed, has access to all codes. It is possible to add as many diagnoses as needed. | ICD-10, but in practice not always completed. | ICD-9, drop-down menu, as many as needed. | ICD-10, drop-down menu plus a free text field. |
| Services/Procedure Codes CPT4, standard codes, all that apply to one visit | For inpatient and ordering, CPT is not used. Instead, an alternative procedure description, developed in-house, is used which is not linked to any coding system. The process of a | KAUH does not use CPT, but instead uses its own billing codes. Exception: operations, for | JUH has its own coding system. | Local codes, unique to the specialty hospital. |

| | | | | |
|---|---|--|--|------|
| | shift to CPT is ongoing. RMS has its own codes (PNF codes). | which CPT4 codes are used. | | |
| Height | Yes, not mandatory, usually completed. | Yes, not mandatory. | Yes, not mandatory. | No. |
| Weight | Yes, not mandatory, usually completed. | Yes, not mandatory. | Yes, not mandatory. | No. |
| Blood pressure | Yes, not mandatory, usually completed. | Yes, not mandatory. | Yes, not mandatory. | No. |
| Radiology services | Yes, selected from a drop-down menu. | Yes, drop-down menu, these are considered as "orders". | Yes. | Yes. |
| Lab services | Yes, selected from a drop-down menu. | Yes, drop-down menu, these are considered as "orders". | Yes. | Yes. |
| Anesthesia | Yes, special package with many options in Hakeem Clinical (Surgery Package and Anesthesia Package). In KCCC this information is reportedly in their ERP system. | Yes, drop-down menu, these are considered as "orders". | Only the type of anesthesia and the type of sedative are recorded in the system. Other comments are on paper, which is scanned and stored in the archiving system. | Yes. |
| Pharmacy, medications, name, code, strength, dose, duration, refills | Yes, selected from a drop-down menu, order workflow process. | Yes, drop-down menu, these are considered as "orders". | Yes. | Yes. |
| Ancillary services (e.g. physiotherapy) | Treated like a normal part of treatment plan. | Yes, drop-down menu, these are considered as "orders". | Treated like a normal part of treatment plan. | Yes. |

| | | | | |
|-------------------------|---|---|---|--|
| Referral from | A special package for referrals is under development. Now referral between facilities not recorded in Hakeem Clinical. Referral is recorded on paper (scanned and uploaded). Referral within the facility is automated in Hakeem Clinical, as a consult request. Admittance through assessment by in-house physicians in each facility. | There is no field for this in EHIS, just paper referrals, scanned and uploaded in EHIS. There is an MOH representative office in KAUH that can approve emergence referrals, so they are covered, usually referred from other MOH hospital (not from private sector; RMS stopped referring to KAUH 5 years ago). | Paper-based, patients are re-assessed. A referral letter from HIA is required for lowest co-payments. | Yes. |
| Referral to | Only transfer (within hospital) is automated. Referral to outside facility is manual, but can be captured as a note on Hakeem. | Not usually done, as KAUH services are comprehensive. Only exception is radiotherapy. However, it is not done through EHIS, but on paper (not scanned). In practice such a referral would be described in EHIS in the patient's progress note. | No. | Yes, only if emergency patient cannot pay or if referral is required to a tertiary, specialized, hospital like KHCC. |
| Charges (amount) | There are no prices in current version of Hakeem. These are to be implemented in a billing system that will be linked to the current Hakeem patient management system. ACHC | Yes, they have a comprehensive functionality for charges and billing in EHIS. | Yes. | Yes. |

| | | | | |
|--|--|--|--|--|
| | and Prince Hamza hospital use Hakeem financial on a pilot basis. | | | |
|--|--|--|--|--|

From the above information we draw the following conclusions:

- In all silos, once basic patient data (name, birthdate, gender, ID number) has been entered, it is automatically made available by the clinical system to support an outpatient encounter that is available in electronic format;
- For inpatients both ICD-9 (Hakeem, JUH) and ICD-10 (KAUH, Specialty Hospital) codes are used. In RMS the implementation of Hakeem gives rise to a transfer from ICD-10 to ICD-9;
- CPT codes are not used for inpatients. In Hakeem, there are different modules for outpatients and inpatients. However, EHS is working to align these modules and to introduce the use of CPT codes for all treatments;
- Height, weight and blood pressure are not always recorded, but only when deemed relevant;
- Radiology and lab services, and pharmaceutical prescriptions are electronically ordered through the clinical systems;
- Referral is still mostly a paper-based process;
- Hakeem Clinical does not contain information on prices and does not support invoicing and accounting. Same comments apply as in the prior section.

4.3. Findings Concerning Data in Other Relevant Organizations in the Healthcare Sector

Apart from the medical facilities, HFG visited several other MOH directorates and one local NGO that play a significant role in Jordan's health sector. Some of these directorates are able to capture macro level data, while others capture micro level data in their systems. There was a need to investigate these systems, and understand the link between these systems and the ones available at the facilities, that can be used later for cost studies and actuarial analysis,

In this section, HFG will introduce these organizations, and present findings concerning data availability, use and demand. As always, given the wide scope of these investigations, findings may not always be complete and fully accurate. HFG provides an introduction, which may serve as a basis for deeper investigation into data use and demand in Jordan.

4.3.1. MOH – HR Directorate

The HR department at MOH oversees HR issues for all facilities under the purview of MOH. The HR database is built on an Oracle 10G platform. All staff (doctors, nurses, and support staff) are in the system.

There are essentially two levels of administration:

- The central HR department at MOH, operating the automated system, but also keeping paper files.
- The local HR departments. For primary care facilities these are mostly located in the regional directorates. In hospitals these are directly under MOH. Sometimes there is also an HR person in primary care facilities. These regional and local HR departments have no access to the automated system, and only keep HR files on paper. These paper files "follow" the employee

The two levels have a different scope of power. For example, the directorate for Amman can transfer staff within Amman. However, a transfer between cities requires central MOH involvement. To dismiss an employee is exclusively the prerogative of the Minister - and thus such a decision is prepared centrally.

The HR system is developed and maintained by the MOH central IT directorate and a small IT division in the HR directorate. The Government is working through the Civil Affairs Department to develop a central HR system for the government, to which MOH will also be connected. Currently, the MOH HR system is not connected to the Civil Affairs system (so there is no automatic upload of biographical data). Apart from having data fields, the system allows all paper documents to be scanned and uploaded. The transition to this system will take place in 2018. MOH is adapting its own system for smooth integration. USAID is assisting the Government in this effort (HRH 2030 program).

Interviews confirmed that within the MOH sector there is no part-time employment. By law, the working week is between 35 and 40 hours. Employees can divide their time between facilities, and they can choose to work in intensive shifts one week, being compensated another week.

4.3.2. MOH – Directorate of Information and Studies

The Directorate of Information and Studies coordinates the gathering of statistical data by means of forms, that are sent to MOH facilities. The 14 regional MOH Health Directorates perform an intermediate coordinating role by providing the compiled data to the central MOH on a compact disk. The directorate publishes the “Annual Statistical Book”, which contains data on healthcare facilities and incidence of various diseases, treatments and service provided in Jordan.

As a result, data are generated, but they are gathered manually rather than captured electronically, increasing the scope for error. Furthermore, due to the traditional nature of the data collection and compilation process, these data appear with a certain delay.

4.3.3. MOH – Budget Directorate and Expenditure Directorate

The expenditure department pays all expenses incurred and duly approved for MOH, from a single bank account maintained at the Central Bank. The annual amount is approximately 500 million JD. The expenditure department does not assess the merit of expenditure. It checks whether all documents and approvals are properly signed and appended. Since 2014, all expenditure is included in the GFMIS, a system linking all ministries’ expenditure to MOF.

Approval comes from functional departments, centrally at the MOH. Individual medical establishments have no bank accounts, and are not allowed to spend any cash. The cash co-payments they receive from individuals must be sent to the Health Insurance Administration (HIA). Directors of hospitals can approve payments up to 200 JD, but even these are paid centrally.

As a government ministry, MOH does not produce financial statements, though, these are common in the private sector. The MOH records its expense, as part of the overall Government budget execution, using budget codes.

In GFMIS, each expenditure item is assigned a 44-digit code, reflecting the ministry (9 digits), program (9), account (10), function (4), geography (6) and fund (6). Based on the code, MOH can distinguish capital expenditure items from current expenditure. and expenditures of secondary and tertiary hospitals from those related to primary care and population health. “Geography” indicates which Governorate the expenditure relates to. However, the expenditure is not grouped by facility. Thus, MOH cannot report expenditures per facility. Capital expenditure is grouped by project, not by facility.

The total code length in the system is 64 digits, of which 44 are used. Therefore, there is room to include a code for a future facility. However, the initiative for this should be taken by MOF, the leading stakeholder in GFMIS.

4.3.4. MOH – Data Directorate

The Data Directorate is a subdivision of MOH tasked with signaling the outbreak of communicable diseases (CD), in a way that is as close as possible to “real time” reporting. In recent years, mapping the incidence and spread of non-communicable diseases (NCD) has become more prominent.

The directorate has two systems:

- The Jordan Infectious Diseases Information System (JIDIS);
- The Interactive Electronic Reporting System (IERS).

Currently, JIDIS is the main system. IERS is not officially operational yet.

JIDIS has a weekly reporting frequency. Health centers communicate data via fax, e-mail or telephone to the MOH directorate on the district level, where the data is entered into JIDIS. Although the system works well, it has two disadvantages: 1) there is a delay of one week in the data, making it more difficult to prevent the spread of a disease outbreak; 2) the data are only known on district level, not on the level of the individual health center or neighborhood. There are 22 districts. Refugee camps are not included in JIDIS.

IERS was designed to overcome these issues. It is a web-based application, where data are entered on tablets with a SIM card, distributed to health facilities. Data is entered by dedicated and trained employees (focal points) only (1 or 2 at each facility). The system was developed in the United Kingdom, as a greenfield. Current problems include 1) the data transfer time being around 7 hours, due to some technical difficulty (should become 2 hours) and 2) the response rate is only 60%, instead of the desired 100%.

IERS can create alerts based on data. However, to set appropriate thresholds for the number of cases that should trigger an alert - considering factors such as the type of disease, the governorate and the season - more than 5 years of data will need to be gathered after IERS has become officially operational. Therefore, JIDIS is expected to be used for quite a while.

Both systems work much faster than the way the data is provided to the Directorate of Information and Studies, for the annual statistical yearbook¹⁴. Whereas now the focus is on Communicable Diseases (CD), IERS will also report on the prevalence of NCDs. IERS supports MOH in complying with the Pandemic Influenza Preparedness (PIP) Framework issued by the WHO. The JIDIS and IERS have no link with Hakeem.

4.3.5. Directorate of Biomedical Engineering (DBE)

The Directorate of Biomedical Engineering is a Joint Venture between the MOH and the Royal Scientific Society. It is located at the premises of the Royal Scientific Society.

This Directorate is responsible for the technical assessment of requests for new equipment, for maintenance of equipment, for maintaining a database of equipment and for training of medical staff in using equipment. It has about 150 employees, with roughly half located in around 20 workshops in various MOH facilities (first line maintenance) and the other half at the head office (second line maintenance). DBE services around 1,000 MOH facilities, including 31 hospitals and around 250 comprehensive health care centers.

The DBE maintains a computerized ledger, containing all equipment at MOH facilities, their historical cost, economic lifetime, depreciation and the cost of previous maintenance (the latter includes both the cost of spare parts and the time of DBE engineers). This is called the Computerized Management

¹⁴ IERS transfers data daily, JIDIS weekly, and the data for the yearbook is gathered monthly.

Maintenance System (CMMS). It was implemented in 2002. It contains around 43,000 items. DBE uses the Universal Medical Technology Service Nomenclature codes from ECRI Institute (formerly the "Emergency Care Research Institute"). All the data is backed up on a server in a different location. All financial amounts in CMMS are stated in JD.

At year start, DBE sets up a schedule of planned maintenance. Apart from that, it must respond within 48 hours on any report of malfunction. To assess requests for equipment, DBE has a list of the standard equipment that each facility is entitled to, based on its size and staffing. The Studies and Projects Department in DBE prepares specifications for equipment required for all MOH facilities. These are annually reviewed, considering technological progress.

DBE is mainly occupied with equipment. They also advise the Building & Maintenance Department at MOH and, in case of new buildings or reconstruction of existing buildings, DBE staff are part of the design team.

In case of equipment purchases by MOH, DBE prepares requirements, conducts the tender and advises on the best choice. However, the purchase itself is made by the MOH purchasing department (in case the value is less than 20,000 JD) or the general supplies directorate at MOF (in case the value is 20,000 JD or more). Almost all purchases are above 20,000 JD. There are about 20-40 tenders per year. In 2016, there were 34 tenders.

On average, annual purchases at the expense of the Jordan state budget amount to around 2.5 million JD in total (in 2017 this figure so far did not even reach one million), plus another 5 million JD funded by donors. Donors can express priority areas, but are not supposed to deliver equipment in-kind. All purchases are processed through regular tenders. To facilitate donors' preferences and to react fast to donors' willingness to fund equipment, DBE maintains "shopping lists" for each area of healthcare.

4.3.6. HIA

HIA registers those who are entitled to services by the MOH network of facilities. If the MOH network cannot provide the required service, or if the insured belongs to the top tier of civil servants and politicians, then the individual can have access to healthcare services in other silos, such as RMS, the university hospitals or the private sector. The second task of HIA is to keep track of-and pay amounts owed to and due by the other silos. A third function of HIA is to gather co-payments made by patients and payments for services in cash by cash payers. A fourth function is to use part of resources gathered to make "incentive payments" to staff at MOH facilities. Thus, HIA acts as a registration unit and clearing house rather than an insurance entity. It bears no risk, and only pays for services in case these are rendered by silos other than MOH.

HIA has only one electronic system. It contains the database of insured participants: those who have been issued an insurance card. It has only been functioning since 2017. The electronic system is Oracle based and was built by a local software provider.

The system is connected to the civil affairs database (containing data on the population of Jordan), with data updated every two hours. There are plans to connect the system to a list of other institutions' databases, including the civil service payroll system. However, the IT department experiences resistance

from some staff in MOH and HIA. There are also plans to implement an Enterprise Resource Management system, to computerize main functions in HIA. Currently, the financial department is still fully paper-based. The IT department has 4 staff members.

When we first consider the insured civil servants, we were told that the following fields exist¹⁵: name, gross salary, deduction, national ID, location, date of recruitment, mobile telephone (to text the insured), insurance number assigned by HIA, nationality, date of birth, gender, marital status, health status¹⁶, location (town) of issuing family booklet, civil ID for family ID¹⁷, work location, employment degree (based for level of insurance), occupation, employment status (permanent or temporary, plus date of expiry), starting date of contract, type of insurance, date of card issuance, date of expiry card, duration card (standard is 5 years).

There is no system by which HIA is informed when a new civil servant has been hired. The person needs to apply for cover and present HIA with the required documents, including salary. Subsequently, if the person receives a promotion, the salary is not automatically updated, and therefore many salary entries (if not most) are old and irrelevant.

As such, the system cannot be used by HIA to reconcile the total of salaries and contributions to the sum received from the Civil Service Bureau Database. There is no reconciliation of the total with individual-level records. However, as we stated above, this is planned to be implemented.

Other categories of people who have cover, have been issued an insurance card and are in the database are as follows:

- Retired civil servants (who pay contributions)
- Beneficiaries of the National Assistance Fund (various vulnerable/poor categories). For this group, HIA receives no premiums, but it can issue claims to MOF in case of treatment.
- Patients who are covered under “Article 30” of the relevant law as follows:
 - People age 60 -70 (who pay 72JD/year and for whom MOF should pay HIA 78 JD) and people over 70 (for whom MOF should pay HIA 150 JD/year). In fact, MOF does not pay these amounts to HIA;
 - Pregnant women, those insured voluntarily (for these groups MOF has no obligation to provide HIA with a premium on top of the premium paid by the participant);
- Exemptions, proposed by Members of Parliament;
- Voluntarily insured individuals.

Not in the database are:

- Those entitled to an exemption (free treatment) by the Royal Court or at the initiative of the Cabinet of Ministers;
- Uninsured cash payers;

¹⁵ List need not be exhaustive

¹⁶ This can be “good”, “disabled (including by chronic disease)” or “dead”.

¹⁷ Apart from an individual ID, there exist a family ID. In case of divorce, the father and the children keep this ID. The mother can choose to apply for her own ID, or to rejoin the family of her parents. In case of a new marriage, she will fall under the family ID of her new husband.

- Children under 6 years. They are entitled to free treatment based on their passports. They do not need an insurance card, and HIA is not reimbursed for their treatment: the MOH system implicitly absorbs the cost.

The financial department has no electronic means to check that the amounts (from cash payers and co-payments by insured participants) deposited by facilities in the HIA bank accounts are accurate. The only means of verification are a) internal audit within the facility and b) sample checks by HIA audit staff on the work of these internal facility audit departments.

Of note, HIA complains about RMS not providing sufficient detail in their claims for patients treated in RMS, while when we were at RMS, they said they had very detailed claims and made the same complaint about HIA.

4.3.7. Jordan Health Aid Society International (JHASI)

JHASI was set up in 2005 to provide healthcare services to the “near poor”: those who do not qualify for free healthcare from the various poverty-based programs, but can still be considered poor. In the beginning, JHASI was small-scale, run by volunteer medical staff in their private time, while funding also came from voluntary contributions (zakat, in-kind food donations, Jordan Aid Fund (JAV) contributions).

Initially, JHASI had only two clinics. As of 2006, refugees from Iraq came to Jordan and JHASI started to serve these refugees. From 2007, international donors started to fund JHASI. Currently, 95% of those insured with JHASI are registered refugees, both in camps and outside (sometimes unregistered refugees receive free care on an exceptional basis). The Board still consists mostly of volunteers, but other staff (currently around 500) are on the payroll. Currently, JHASI has five clinics, plus two clinics in camps. JHASI clinics process around 25,000 patient visits per year. The five main strands of healthcare at JHASI are: vaccinations, reproductive health consultation, primary healthcare, referral to secondary/tertiary healthcare, nutrition.

JHASI itself provides only primary care. For secondary and tertiary care, an ICT-supported referral system exists. The system communicates with JHASI clinics on the one hand, and with a long list of MOH, RMS, university and private sector hospitals on the other hand. The system also contains the medical history of the individual within JHASI. The system is linked to a SAP ERP (Enterprise Resource Planning) system, which provides a link to the financial billing of donors (main donor UNHCR). Apart from SAP Enterprise Resource Management system, JHASI has developed a Clinical Data Management (CDM) system. JHASI is not linked to Hakeem. JHASI is also not connected to the national "civil affairs" database, and therefore no data are automatically filled out by any link to national ID. This is not a big issue, as over 90% of JHASI clients are refugees.

A detailed and transparent administration process is needed to satisfy donor requirements. “Behind” donors like UNHCR, are many grants from specific donor countries that are earmarked for certain vulnerable groups, and it should be demonstrated that these grants are used to provide services to the specific group the grant focuses on.

In the referral system, JHASI has information on the MOH and private facilities it has contracts with. The system is available to be used to bring together requests for secondary and tertiary services from the JHASI clinics with available capacity at the respective hospitals JHASI has contracted.

JHASI is funded by UNHCR, based on an annual budget, not based on payment for treatment. The infrastructure provides services to refugees categorized as "vulnerable". In JHASI clinics, prices play no role, as there is no billing for services. There is a maximum per individual that should not be exceeded. Therefore, in JHASI clinics there are prices, but they are not charged, rather, only used to confirm the ceiling has not been reached.

JHASI needs prices only for lab, X-ray and drugs to assess that the individual has not exceed the ceiling, and to report to special-cause donors. Prices for drugs are based on prices achieved in tenders. For treatments in secondary/tertiary hospitals, the MOH unified price list is used, or the price invoiced by a private facility. For consults in a JHASI clinic one standard price is used for each visit (only to assess whether the individual reached the ceiling – no actual charges are made for treatment in JHASI clinics).

All information on the (notional) cost of services provided is compiled in the UNHCR's Refugee Assistance Information System (RAIS). There are no prices in CDM. There is no link between CDM and RAIS. Access to RAIS can be used by JHASI when needed to check identity to prevent duplicating the provided services.

5. Implications of Findings on Data Readiness

In this section we will discuss the implications of findings on data readiness in four areas:

- Cost studies
- Actuarial studies
- Government transparency
- Performance measurement (evaluation of potential KPIs)

5.1. Cost Studies

In cost studies, there are generally two approaches:

- **Top-down:** the expenses incurred are allocated over different facilities, wards, and types of treatment. In production enterprises this is already difficult, as there may be a large variety of products involved. In healthcare this is usually even more difficult, as every treatment is unique, especially in relation to complications and patients having multiple diagnoses and treatments. Therefore, in practice often the "cost per bed-day", "cost per-admission" or "cost per outpatient encounter" is calculated. However, these measures can be poor guidance to efficiency. For example, in countries where the cost of care is relatively low as compared with the cost of treatment (e.g. due to wages being relatively low as compared with the cost of equipment, imaging, pharmaceuticals), keeping a patient longer than necessary may drive down the cost per bed day. Similarly, admitting patients for minor ailments may drive down the cost per admission while obviously not being an efficient policy.
- **Bottom-up:** for each "product" (cure, treatment process, operation), all the inputs in terms of time, expendables, amortization of cost of equipment, etc. are measured, after which an allocation of indirect costs is made. This approach is even more difficult than the prior one. One difficulty is to define all processes in such a way, that together they account for all activities in the facility. Therefore, this method is more suitable to compare the efficiency of well-defined treatments, rather standard treatments in different facilities.

For both approaches, two types of data are required:

- Data on the use of equipment, premises, expendables, staff time, and pharmaceuticals. From our review in the prior chapter it appears that the private sector and university hospitals historically have a good grasp on these inputs, whereas, with the introduction of Hakeem Clinical, the public sector is also making significant progress, as evidence by our findings as presented in Chapter 4.
- Accounting data: data on both investments and current expenditure. For the public sector, this is where the main impediment to costing lies. Accounting data is available only at the level of MOH, without allocations per facility. At the facilities, there is no meaningful accounting function, as they are funded “in kind”. The only exception is Prince Hamza hospital, which has a certain degree of autonomy.

For this reason, no meaningful per-facility regular costing procedure can be implemented at the current time. The minimum precondition would be to extend the code for each expenditure or investment to include a string of digits that identifies the facility and (ideally) the ward for which it was purchased. This however is to our understanding not something that can be implemented by MOH on a stand-alone basis. This would need to be implemented in cooperation with the MOF, as part of general government accounting in the framework of GFMS.

In theory, what could be done, is a study where the research team could gather data from different sources for one facility. Payroll and incentive payment data could be found in the MOH HR system, data on equipment installed and its amortization can be found in the CMMS database at the DBE. Costs of pharmaceuticals could be estimated from quantities consumed and prices lists at MOH. However, this would most likely be extremely labor-intensive and a “one-off” effort rather than a sustainable process.

What has so far been achieved is cost accounting on the highest level of abstraction, involving the aforementioned “cost per bed day”, “cost per admission”, etc. for the sector. One such study was recently conducted by UNICEF (see par. 2.12. of this report).

5.2. Actuarial Studies

Actuarial studies are usually related to forecasting future expenditure, use of care and costs, based on information about current, actual volumes and assumptions about demographic and economic development. This can relate to the next year (to calculate an insurance premium), or to longer periods (5 years, a decade or multiple decades). Actuarial studies can also involve calculating cross-subsidies between different population groups, for example with the aim to calculate solidarity levies to be included in insurance premiums for the young and healthy to support the old and sick, either as part of premiums, payroll contributions or general taxes.

Based on current macro-level data, and demographic and economic assumptions, it would be possible to forecast a range of outcomes for healthcare system costs in Jordan. Any deeper actuarial analysis however, would have to be based on a research question, rooted in a certain concept for reform of the system.

It is important to stress that “data”, “systems” and “governance” cannot be completely separated. If a data element is theoretically present in the systems, this does not mean that it can be readily extracted and used. This will require additional IT efforts and expenditures, that are only warranted if they are

based in a serious intent for (parts of) the healthcare system to be reformed. For example, in all clinical IT systems that we looked at in Jordan, the date of birth, gender, diagnosis and treatment are available. However, to systematically and automatically extract and make available healthcare consumption by age and gender would require quite some efforts, which would only be justified in the framework of a seriously considered policy shift. For example, in the direction of a system of solidarity levies in the framework of a market-based compulsory insurance system.

For “nice to know”, “one-off”, research efforts in most cases the effort involved in extracting data would not be justified.

When we look at actuarial practice in the private health insurance in Jordan, we understand that:

- Primary insurers rely on quotes made by their reinsurers abroad, notwithstanding the fact that these primary insurers are in the market for many years and should have a wealth of data;
- Products have rather modest claim ceilings, meaning that insurers do not venture into offering comprehensive healthcare packages. For more costly ailments, patients still must rely on their own resources and/or the public sector.

The exact reason for these two phenomena did not become clear to us, even after discussing with market participants.

5.3. Government Transparency

The Jordanian government makes information available on healthcare by means of National Health Accounts and the Annual Statistical Book issued by the MOH. Data on healthcare spending are transparent in the sense that every expenditure item is in principle accounted for through GFMIS. There is a clear division of functions between those conducting tenders, those making decisions and those making the payment. To what extent these mechanisms can be manipulated we cannot say, as we did not perform any audit, and did not apply forensic audit techniques.

Regarding clinical treatment and doctor’s qualifications, our study found that data are available. However, the focus is on diagnosis, treatment, and invoicing where applicable, but not on providing accountability.

There are two areas that we did not specifically research, but which are by their nature prone to non-transparent decision making:

- Allocating care at the expense of the MOF by the Royal Court, based on applications.
- Recognizing families as belonging to the “poor” for free access to MOH services.

5.4. Performance Measurement (Evaluation of Potential KPIs)

Whether data are sufficient to evaluate potential Key Performance Indicators (KPIs) depends on which KPIs are to be evaluated. However, two types of KPIs can be assumed to be prevalent:

- KPIs that measure healthcare outcomes in relation to physical inputs. To evaluate these KPIs, much information is available in the clinical systems that we reviewed. Discharge status could be made richer (with a more granular choice of options).

- KPIs that measure efficiency, in financial terms: financial inputs required to achieve certain health outcomes. For this purpose, information is largely insufficient, as no cost or even accounting information is available in MOH and RMS on the facility level. In the private sector, in theory, studies could be done if there was demand for such studies. However, this would also require additional efforts in terms of costing and export (sharing) of data. Tech-savvy Third Party Administrators (TPAs) might play a role in this, but it would require a demand by their clients for such services (efficiencies comparisons).

Comparisons between the public and private sector would be difficult, because these sectors often provide different services, and – reportedly – of different quality. Moreover, even if services have a similar name, it is difficult to assess that these are the same as codes are different and definitions may differ.

It is difficult to evaluate KPIs based on non-standardized data (e.g. information written down in free text fields). On the other hand, this type of information maybe more meaningful than information based on a limited number of discrete options (e.g. a drop-down menu). In any case, KPIs may give rise to (conscious or otherwise) manipulation, thus compromising data when evaluation of KPIs is linked to (significant) financial incentives.

6. Potential Barriers to Data Demand and Use in the Healthcare Sector in Jordan

In our research we did not interview top-level decision makers. It would take a concerted effort and high-level access to investigate exactly how decisions are made in the Jordan healthcare sector, and the role of data and information (or their absence) in decision making.

On the operational level, the introduction of Hakeem will support medical staff in the public sector in their work. We understand that institutions (such as the university hospitals) that do not use Hakeem will not be forced to do so, and that from their side they are ready to link their systems to Hakeem via an interface, to arrive at a unified information space.

One potential barrier can arise if a system is cumbersome to use, or requires many repetitive moves to use. Our impression is that the staff involved in developing and maintaining systems in the sector is generally aware of this and tries to make systems as user-friendly as possible. Nevertheless, this may be a challenge as illustrated by experience (e.g. the Netherlands), where data entry by general practitioners often takes more time than is spent talking with the patient.

Another potential barrier is conservatism amongst doctors, especially those having a private practice, who may prefer to continue to work in a paper-based workflow. Training, step-by-step increasing requirements to enter information electronically, and younger generations being more tech-savvy will hopefully be ways to overcome this.

A third potential barrier is the fragmented structure of the sector, and the lack of a central decision-making platform. It is unclear who decides which data are useful to capture and made available for use.

A fourth barrier is the cost of generating data. A seemingly innocuous request for data and information may give rise to significant efforts in the IT area, and therefore such demands should be carefully studied before being officially issued. Unfocused demand may clog systems and as a result demotivate users.

7. Potential Interventions to Improve Data Generation and Data use in Relation to Different Scenarios for the Development and Organization of the Structure of the Healthcare Sector in Jordan

One scenario for the Jordan health sector would be that in broad lines it remains as it is now. In this situation, incremental improvements could be as follows:

- Further implementation of the Hakeem Clinical system;
- Further development and implementation of Hakeem Financial;
- Linking Hakeem, via interfaces, to the systems used in other silos (university hospitals and potentially the private sector);
- Direct data exchange between Civil Service Bureau data base systems and HIA systems, for HIA to have actual information on wages and staff in the public sector, qualifying for health insurance cover;
- Direct data exchange between Hakeem Financial and HIA to have timely, accurate and complete information on co-payments made by insured patients and payments made by cash-payers;
- Direct data exchange between the Ministry of Social Development and HIA, for HIA to have actual information on families that have been deemed poor and on that basis, have been granted free access to health insurance cover.

Other recommendations can only be made in the framework of a certain vision on the development and/or reform of the sector. If the MOH system would want to be able to measure the efficiency of facilities, as a very first step, expenditures should be coded to reflect the facility they relate to. For each facility a separate expense statement should be drawn up, including amortization charges for fixed assets.

A next step could be to grant healthcare facilities financial autonomy, whereby the MOH (or a subdivision of MOH, or an independent State Health Insurance Agency, potentially based on the current HIA) would act as a single payer for services. This would require the presence of a fully-fledged accounting function at each facility, which is a step further than implementing Hakeem Financial, which to our understanding is now envisioned as a billing system rather than an accounting package.

Finally, a basic package of health insurance could be made mandatory, aiming at universal coverage. Here many choices would arise:

- Would the public-sector facilities compete with private sector facilities or would the public sector remain ring-fenced for certain professions and groups?
- Would there be private insurance companies willing to offer insurance for a basic package without ceilings (or with relatively high ceilings)? Would the State cover costs above certain ceilings similarly to the way the cost of cancer treatment is covered by the State currently?
- What level of solidarity would be required between the young and the old, the healthy and those less healthy, women and men, those with and those without children?

- Would those who failed to take out insurance while not being recognized as poor, be covered nevertheless? Who would follow up to extract their contributions (e.g. the tax authorities could have a role).

On the financial side, currently data is lacking to implement such an agenda. On the clinical side however, with the implementation of Hakeem, clinical micro-level data seems to be captured to a sufficient extent, as to allow such reforms to be implemented. We understand that there still are concerns about the quality (consistency, completeness and comparability) of data. Even when that is solved, a remaining issue is the mechanisms to extract and process these data into reliable and timely information. Which exact mechanisms will be required, depends on the reforms that the Jordan government is prepared to enact.

8. Findings and Conclusions

The aim of this study is to investigate which data exists, where and in what format. The results of this study can serve as a basis for other studies and research efforts that seek to identify, extract and use (electronic) data from systems in the healthcare sector. Main findings are as follows:

- MOH facilities use the Hakeem system, which is also being rolled out in RMS. KHCC uses Hakeem, in conjunction with its own ERP. KAUH, JUH and the Specialty Hospital have their own systems. Hakeem has a clinical system, which is mostly implemented and a financial system, which is currently being pilot-tested in Prince Hamza Hospital and ACHC. Hakeem Clinical does not contain information on insurance status and does not support invoicing and accounting.
- Main information items to identify a doctor (name, ID number) or a patient (name, birthdate, gender, ID number) are available in electronic format in all systems. Only Hakeem facilitates automatic uploading through a link with (a regularly updated copy of) the Civil Registration and Vital Statistics database. Other information on doctors is often not in the main clinical system, but in the system (application) used for HR administration.
- Systems are different, and use different codes, for IDs, diagnoses and treatment. In some cases, no coding system is used, and the doctor enters text in a free text field.
- Where systems contain certain fields, it is not always guaranteed that these fields are completed correctly or completed at all. Even if a field is mandatory, it may be filled in perfunctorily.
- For public-sector facilities that are part of the MOH system, all purchases are made centrally, and the coding system in the GFMS does currently not include a tag that allows identification of the facility to which a certain expenditure relates. Investments can be traced to projects, but the relation with facilities is not one-on-one. Individual facilities do not maintain financial accounts. They just gather cash (co-) payments from patients and transmit these to HIA. Currently, HIA has no automatic means to check these co-payments against services provided.
- There are serious discrepancies between various health sub-sectors in the micro-data they capture and its format. Such differences in the same data elements make it impossible or extremely challenging to analyze data and compare performance results.

- There is need for standardization of certain key data elements (micro-level data) across the public sub-sectors in the short-term and across public and private over the long term.
- There is a significant need to improve the quality of micro-data, mostly a human problem requiring steps to strengthen accountability, measure and reward good performance.
- Efforts to initiate costing of health services systematically would have to rely on the introduction of regular accounting practices at health facilities.
- Actuarial projections of the development of healthcare costs can currently be made only on the highest level of aggregation (at the MOH as opposed to a facility). Any more granular work, the type needed for insurance premium setting for example, would be driven by questions relating to a reform path for the sector.

Annex I: Schedule of Meetings

| No. | Date | Entity | Department/ Directorate | Attendees |
|-----|----------------|--|--|---|
| 1 | June 18th 2017 | Social Security Corporation | / | General Director Assistant, Dr. MOHammad Al Tarawneh |
| 2 | June 19th 2017 | Jordan University | Health Insurance Department | Director of Health Insurance Department- Bassam Al Noaimi |
| 3 | June 19th 2017 | Nat-Health | / | General Manager, Ahmad Tijani |
| 4 | June 20th 2017 | Royal Medical Services | Directorate of Planning | Colonel Yassin Al Tawara |
| 5 | June 21st 2017 | Ministry of Health | Amman Comprehensive Health Center | Dr. Saeb Khashman |
| 6 | June 22nd 2017 | Ministry of Health | Directorate of Information and Studies | Dr. Nashaat Taani |
| 7 | June 22nd 2017 | Ministry of Health | Expenditure Directorate | MOHammad Omar |
| 8 | June 22nd 2017 | Prince Hamza Hospital | / | HR manager, Dr. Saad Kharabsheh |
| 9 | July 3rd 2017 | Jordan Health Aid Society International | / | President, Yaroup Al Ajlouni. Program Manager, Nicola Dababneh |
| 10 | July 4th 2017 | Ministry of Health | Health Insurance Administration | Dr. Ilham Khreisat (director), dr. Safaa Al Oran |
| 11 | July 6th 2017 | Royal Medical Services | Finance Directorate | Brigadier-General Ali Al Madani |
| 12 | July 10th 2017 | Jordan University Hospital | Finance Department | Director, Mr. Hussam Eddeen Najdawi |
| 13 | July 11th 2017 | King Abdullah University Hospital | / | General Director Ismaeel Matalka Deputy General Director, Khaldoon Bashaireh |
| 14 | July 11th 2017 | Jordan University for Science and Technology | HR and Admin Department | Manar Hindawi |
| 15 | July 17th 2017 | King Abdullah University Hospital | IT Department | Anas Matalka |
| 16 | July 27th 2017 | Prince Hamza Hospital | IT Department, Hakeem Personnel, Quality Assurance | MOHammad Sami, Mazen Obeidat, MOHammad Abdalla |
| 17 | July 30th 2017 | Al Bashir Hospital | IT Department | Sammar Sammuh, MOHammad Salamah |
| 18 | Aug 1st 2017 | Amman Comprehensive Health Center | Admin, and Finance Personnel | Inas Al Laham, MOHammad Hirzallah |
| 19 | Aug 8th 2017 | Jordan Health Aid Society International | IT Department | Firas Haddad, Moenes Al Qudah |

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|----|---------------|---|--|--|
| 20 | Aug 9th 2017 | Ministry of Health | HR Department | Ghaleb Al Qawasmeh |
| 21 | Aug 16th 2017 | Electronic Health Solutions / Hakeem | Project Control | Lama Al Karmi |
| 22 | Aug 17th 2017 | King Abdullah University Hospital | IT Department | Anas Mataalka |
| 23 | Aug 21st 2017 | Royal Medical Services | IT Department | Brigadier Sufian Hijazeen Lieutenant Colonel Izzat Abu Kishek |
| 24 | Aug 24th 2017 | King Hussein Cancer Center | IT Department | Dr. Imad Treish |
| 25 | Aug 28th 2017 | Jordan University Hospital | IT Department | Bayan Toom |
| 26 | Sep 7th 2017 | Ministry of Health | Budget Directorate | Muayyad Barmawi, Imtithal Arafat |
| 27 | Sep 10th 2017 | Health Insurance Administration/ Data Directorate | IT department, Finance Department | Ayoub Abbadi, Luay Haddad |
| 28 | Sep 13th 2017 | Specialty Hospital | IT department, Finance Department | Baha' Awwad, Ghassan Turab |
| 29 | Sep 17th 2017 | Arab Orient Insurance/ GIG | Business Development Department, Medical Claims Department, Operation-Medical Division | MOHammad Al Qudah, Rasha Abu Ghosh, Ibrahim Ghanem |
| 30 | Oct 4th 2017 | Ministry of Health | Directorate of Biomedical Engineering (DBE) | Dr. Firas Abu Dalou |
| 31 | Oct 4th 2017 | Ministry of Health | Data Division | Dr. Sami Al Sheikh |
| 32 | Dec 8th 2017 | Prince Hamza Hospital | IT Department, Quality Assurance | Mazen Obeidat, MOHammad Abdalla |
| 33 | Dec 12th 2017 | Jordan University Hospital | HR Department, IT Department | Lana Mheilan, Bayan Toom |
| 34 | Dec 12th 2017 | Electronic Health Solutions / Hakeem (by telephone) | Project Control | Lama Al Karmi |
| 35 | Dec 18th 2017 | Royal Medical Services | IT Department | Brigadier Sufian Hijazeen Lieutenant Colonel Izzat Abu Kishek |

Annex II: List of Studies, Reports and Background Materials Reviewed with Major Findings and Conclusions Summarized

In this annex we will highlight the main documents reviewed.

Jordan Health Finance and Governance Activity: year one workplan (USAID, November 2016–September 2017)

The workplan sets out the main objectives and activities for the first year of the Activity. This component of the Activity contributes to the following objectives:

- Objective 1: Increased spending efficiency of public resources for health in support of the GOJ's UHC goal.

On page 16 it is mentioned that HFG will “evaluate data requirements and readiness for cost studies” and “review regulations on data capture and transfer”. On page 20, it says “As a first major step toward an actuarial study, HFG will work with appropriate counterparts to list data requirements. We will identify data sources and determine whether data are complete and of sufficient quality. Data gaps will be identified with plans for work arounds and/or remediation created and followed.” The current study can be considered the first step in this direction.

Objective 1.4 on page 20 concerns “Strengthened capacity to use financial and performance data in budgeting, monitoring, and policymaking”. On page 21, there is mention of developing “plans for integrating specific MOH data management and operational systems into GFMIS”.

- Objective 2: Strengthened Governance of the Health Sector to More Effectively Coordinate, Plan, Manage, and Monitor the Health System.

On page 23 it is stated: “Reliable, quality data are essential to support evidence-based decision making. Also, collection, analysis, and timely and pointed use of data are all core enablers of strong health sector governance. HFG activities in this area during FY17 will begin with documenting barriers to access to data, data demand and use and transparency at various levels including structural, political, and technical.”

This work concerns objective 2.4: Increased demand for and use of high-quality, transparently available data to inform decision making and monitoring in the health sector

Under this objective are listed:

- Assess and document barriers to data access and use;
- Design and document recommended interventions to overcome barriers to data access and use.

On pages 29-30 it is stated: “Ability to collect and use evidence for decision making and action is critical to support health sector governance strategies and execution. [...] HFG will produce an

assessment report and share its findings and recommendations with stakeholders to help reveal organizational and technical bottlenecks and inform decisions on actions to address them. [...] The recommendations from the above assessments will be used as evidence to support the design and planning of interventions that remedy potential deficiencies to data access and use for evidence-based decision making in health care. Among possible interventions are capacity development, system development, identifying or modifying key indicators for program monitoring and management, and develop / review and update standard operating procedures for data collection and periodic reporting. Interventions will be coordinated with other USAID programs to avoid overlap.”

From the above it is clear that data availability, and especially demand and use are cross-cutting issues, where the understanding needs to be systematically and regularly updated based on interactions with various stakeholders in the sector, and where HFG provides recommendations if appropriate. The current study is a first step in this direction.

Assessment of the Jordanian Health Information System (WHO, draft of November 2016)

This report was prepared by the World Health Organization for the Jordan Ministry of Health. It provides a useful overview of various systems in use in the sector, based on desk research and interviews. Systems are distinguished as either institution-based or population-based (census, surveys, the civil registration system). Several observations are made, shortcomings are identified, and recommendations are made. The report does not discuss individual data elements and therefore is rather complementary to this study.

Towards Universal Health Coverage: A Comprehensive Review of the Health Financing System in Jordan (WB, 2015)

This World Bank report, undated but most likely written in 2015, provides an overview of health financing in Jordan. It is noted that over recent years health outcomes in Jordan have been improving and are at, or above, those of other countries in the region and in other middle-income countries. However, NCDs have been on the rise over the past decade, and along with a range of chronic diseases, constitute the dominant part of the burden of disease. At the same time a demographic transition is under way, with a still relatively young population slowly ageing. Macroeconomic projections of economic growth, fiscal balances, and expenditure requirements point to limited fiscal space for health in the years to come. The report explicitly states that reducing fragmentation of the health financing system will be key to the successful achievement of GOJ health policy goals. The report reflects on the large role of the state in healthcare delivery, and the associated detrimental effect on efficiency. The report finds that administration costs at 7.5% are relatively high. It notes that population coverage is estimated to be between 70% and 93% of the total population. Estimates of duplication of cover range from 6 percent to 10% of the insured. Although out-of-pocket payments have decreased over time, they are still high at around one third of overall healthcare spending. It is claimed that a significant part of this is spent on household pharmaceuticals. The report concludes with several recommendations for improvement.

Jordan National Health Accounts 2015

These accounts were published in April 2016. In 2015, Jordan spent approximately JD 2.25 billion (US\$ 3.2 billion) on health, or JD 236 (US\$ 332.4) per capita. Total health expenditures represented nearly 8.4% percent of GDP. The public sector is the largest source of health funding (60.7%) followed by the private sector (34.5% percent) and donors (4.7 %). The main policy issues emerging from the NHA results are:

- the high level of total health expenditures as a percentage of GDP and its implications for the ability to provide health care services at current level of quality and quantity;
- the high level of pharmaceutical expenditures (25.9 % of total health expenditures);
- the indiscriminate capital investment in the private sector and little regulation that has resulted in a surge of private hospitals; and
- the high level of spending on curative care in the public sector of 74% as compared to 18% on primary care.

Motivation and Retention of Health Workers in Ministry of Health Facilities in Four Governorates in Jordan (USAID, December 2016)

This report was produced in the framework of Human Resources for Health in 2030. The experts found that overall, there is relatively high retention in the MOH, with relatively low turnover and a low number of vacancies. Additionally, the study found that health workers' motivation is neutral to slightly positive. Health workers are most satisfied with the value that their work brings to society, interpersonal relations and team work and some working arrangements; their biggest sources of dissatisfaction included incentives, supplies and infrastructure, opportunities for professional and career development and some working arrangements. These findings conflict with the MOH's general perception of the health workforce, which identifies the distribution of doctors and nurses, combined with high turnover and poor retention, as a key challenge.

The study resulted in several recommendations for improving the motivation and retention of the health workforce in the MOH.

Jordan Health Financing System Review (WHO, July 2013)

This report was prepared by a group of experts for the WHO, using Organizational Assessment for Improving and Strengthening Health Financing (OASIS) methodology. The report provides an overview of the various funding mechanisms in the sector. It is noted that the fragmentation of the health system in Jordan led to the division of risk pooling and the creation of sometimes small risk pools, which affected the effectiveness of the pooling process in addition to accumulated high administration cost, and in some cases, restricted the choice of providers. The report laments the lack of clear regulations governing both the resource collection and pooling processes. It is noted that the MOH is considered the implicit insurer of the last resort, yet the ministry's facilities have been underfunded and lacked the skills, services, advance diagnostic technologies and medications needed for advance and complicated treatment. On the other hand, professional associations and the private sector provide a comprehensive

coverage for primary and secondary care but only a minimal coverage for catastrophic cases by setting ceilings for coverage.

Public Expenditure Perspectives (USAID, December 2011)

This study provides analysis and recommendations that can result in a variety of improvements in Jordan public finances. Different sectors are discussed, including healthcare. The report notes that Jordan's health sector is costly, but produces a wide variety of services that result in excellent levels of health and that in many areas of health care Jordan is performing better than would be expected, given its economy and demographics. Subsequently, the report discusses various opportunities to improve efficiency, effectiveness, and reduce costs.

The most important finding is the need to decentralize management of the MOH hospitals and centers and the development the use of data and evidenced-based analyses in planning and management. The report notes that the high degree of centralization undercuts management accountability and leaves little flexibility and incentives for the managers of large units to operate effectively and efficiently.

It is recommended that MOH expand its data system to collect program relevant data and to use that data in analysis, management, and decision-making. Hospital and center directors should be given individual budgets to manage, within the flexibility allowed by the General Budget Law, and be held accountable for effective management.

Budget Chapter Ministry of Health (2016)

The budget chapter states tasks of the MOH and main challenges. It provides data on strategic objectives and performance indicators, number of staff and other key information. Subsequently, expenditures for 2015 (actual) and 2016-2019 (projected) are provided, divided in "current" and "capital" expenditures. Finally, the various programs and their budgets are presented.

Decentralization in the Public Health Care of Jordan – A Situational Analysis (USAID HFG, June 2017)

The purpose of this study is to assess the situation with decentralization in health care in Jordan to provide a basis for discussing health care decentralization. It is noted that decentralization has different meanings. In Jordan, Elected Governorate Councils (GC) have no authority over health care; the sole responsibility for which rests with the governor and the MOH. As a result, the current discussion of health care decentralization is limited to de-concentration of powers within the vertical structures of the MOH. It is noted that the meaning of decentralization in Jordan will benefit from an official definition, a vision of what decentralization should look like in 5, 10, 15 years, and a measure(s) of success. Finally, it is stated that decentralization cannot accomplish goals of efficient delivery of equitable care without ensuring accountability. In Jordan's health sector, accountability is very weak. Some of the factors contributing to this problem include weak use of performance indicators, lack of tools to measure accountability and a shortage of useful and reliable data across the health care sector.

Jordan Association for Medical Insurance (JAMI) Conference Participants' Opinions on Governance and Financing Issues in Jordan (USAID, HFG, August 2017)

This document presents the findings of the interactive, IT-enabled, dialogue that the HFG team conducted to assess opinions of participants in the 2017 Annual Comprehensive Health Insurance Conference held by the Jordan Association for Medical Insurance (JAMI) on May 6 and 7, 2017. In this session, 11 health sector governance and financing statements related to advancing Universal Health Coverage (UHC) in Jordan were posed to the public, and their responses (votes and comments) were recorded, analyzed and presented in this report.

An important finding was that even among health care specialists, votes and comments are not always consistent, and that the level of understanding of the management and funding of healthcare delivery and the principles of healthcare insurance is variable.

Budget Chapter Health Insurance Fund (2016)

The document states vision, mission, strategic objectives and performance indicators of the fund, and lists the revenues of the fund and expenditures for the various programs. By far the largest expenditure items are “Use of Goods and Services” (this concerns payment for treatment by facilities outside MOH – making up around 70% of expenditure) and “Salaries, Wages and Allowances” (this concerns additional payments to MOH staff – making up around 30% of expenditure).

Health Care Cost Study at Ministry of Health (UNICEF, 2017)

This study was prepared by experts from the Brandeis University, USA and MOH for UNICEF. One of the goals was to assess the cost of expanding the civil insurance program to vulnerable Jordanians and Syrian refugees. The study uses high-level statistics on overall funding and utilization in combination with the results of earlier cases studies and international ratios to arrive at a cost per admission, per bed day, per hospital outpatient visit, per health center visit, and per average ambulatory visit, and assesses the additional cost of expanding coverage to vulnerable Jordanians and Syrian refugees.