Session 1 - Countries at the center: Models to align and integrate RHIS in Primary Care Settings

Facilitator: Prof. Kristin Braa, University of Oslo
Session objective and contents

Objectives: Countries from different regions to share their experiences of RHIS strengthening and discuss key issues and lessons learnt

Contents

1. Iranian PHC information systems
   - Ardeshir Khosravi - Head of the HIS at Iranian Ministry of Health

2. Situation of routine information systems in Tajikistan
   - Dr Safar Sayfuddinov - Director of the Republican Center of Medical Statistics and Information, Ministry of Health and Social Protection of the Population

3. Health information system in Oman
   - Sulaiman Al Rawahi, Ministry of Health, Oman

4. Models to align and integrate RHIS in Primary Care Settings in Nepal
   - Paban GHIMIRE, National Professional Officer WHO Nepal Country office, presenting on behalf of Nepal MoH.

5. Strengthening RHIS for PHC in China
   - Dr Xiaoxu Wang

6. "Healthy Islands Monitoring Framework - using local data to inform local issues"
   - Vicki Bennett, Australian Institute of Health and Welfare (AIHW)
**Session 1  Countries at the Centre: Models to align and Integrate RHIS in Primary Care Settings**

*Facilitator*

**Kristin Braa  University of Oslo**

Professor Kristin Braa is heading the Health Information Systems Program (HISP) at the University of Oslo, which is a global action research network responsible for the development of the District Health Information Software (DHIS2). DHIS2 is an open source, web-based health management information system (HMIS) platform. Today, DHIS2 is the world’s largest HMIS platform implemented in over 100 countries in Africa and Asia. 2.4 billion people are covered by this service in DHIS 2.

*Speakers*

**Ardeshir Khosravi  Iran**

Dr Ardeshir Khosravi is a Faculty Member and Director of the Group for Health Statistics and Health Economics at the Iranian Ministry of Health and Medical Education and a Senior Researcher of the Research Center for Health Equity at Tehran University of Medical Sciences. In 2017, Dr Khosravi was awarded by the Iranian Ministry of Health and Medical Education for improvement of the Iranian Causes of Death Registration system.

Dr Khosravi has contributed to various aspects of the Iranian Health Information System, including the implementation of various National Surveys in Iran. He is one of the primary contributors and a member of the technical committee for developing and implementing the Electronic Health Record through the Iranian Primary Health Care. Dr Khosravi holds a Doctor of Philosophy (PhD) in the field of Population Health and a Diploma in Public Health from the University of Queensland, Australia.

**Paban GHIMIRE  WHO Nepal Country Office**

Paban Kumar Ghimire is a National Professional Officer in the WHO Nepal Country Office, presenting on behalf of the Nepal Ministry of Health.

**Xiaoxu Wang  China**

Xiaoxu Wang works within the Centre for Health Statistics and Information, at the National Health Commission of China.
Saifuddinov Safar Rakhimovich  Tajikistan

Dr Saifuddinov Safar Rakhimovich is a Medical Doctor within the Center for Medical Statistics and Information, of the Ministry of Health and Social Protection of the Population of the Republic of Tajikistan.


As part of the working group, he developed the National Health Strategy of the Republic of Tajikistan for 2010-2020, the Strategic Plan for the rationalization of medical institutions of the Republic of Tajikistan for 2011-2020. He was the coordinator and technical director of a number of studies on maternal and child health, smoking problems, the health of schoolchildren, nutrition, risk factors for non-communicable diseases. With the support of the European Union, within the framework of the project “Technical Support for Strengthening the Healthcare Information System”, a Unified Healthcare Management Information System of the Republic of Tajikistan was created. This system works online and allows you to have detailed information about the health status of the population and the activities of health care institutions.

Suleiman Al Rawahi  Ministry of Health Oman

Suleiman Al Rawahi is the Head of the Biostatistics Section within the Ministry of Health in Oman. He is a statistician by background and has a Master of Public Health, Epidemiology and biostatistics from Curtin University Australia. He is the focal point for UNICEF and WHO within the Ministry.

Vicki Bennett  Australian Institute of Health and Welfare

Vicki is the Head of the Metadata and Classifications Unit at the Australian Institute of Health and Welfare, where she has held a number of different roles over the past 13 years. She has also lectured at a range of Australian universities and is passionate about ensuring that good health information is used to improve health outcomes for all.

Vicki has a degree in Health Information Management, and a Masters in Health Informatics and has had a diverse career both domestically and internationally. She has worked extensively across the Pacific over the past 18 years. She has recently been appointed as an Advisor to the Pacific Health Information Network Board and also as the President Elect for the International Federation of Health Information Management Associations.
Optimizing Routine Health Information Systems in Countries

Global consultation - Country Experience
District Health Networks in IRAN (PHC)

- BTC: Behvarz Training Centre
- HP: Health Post
- HH: Health House
- UCHC: Urban Comprehensive Health Centre
- RCHC: Rural Comprehensive Health Centre
- SP: Specialized Polyclinic
- WHV: Woman Health Volunteers
- EHR: Electronic Health Record

Diagram:
- Chancellor of University of Medical Sciences & Health Services
- Directorate of District Health Network
- BTC
- COVID-19 Lab
- District Health Center
- District Hospital
- SP
- 111 SRCHCs
- 989 SUCHCs
- COVID-19 Lab
- Test Unit
- Selected COVID-19 UCHC
- HP
- Test Unit
- Selected COVID-19 RCHC
- HP
- HP
- HP
- WHV
Rational of the Iranian PHC’s Health Information system based on Electronic Health Record (EHR)

• PHC’s Electronic Health Record was a mandate in,
  ❑ Fifth and sixth national social, cultural and economic development plan
  ❑ HTP and UHC
• Develop Health Service Delivery was based on :
  ❑ new Iranian PHC
  ❑ revised service packages based on population age groups needs, NCD and SDH

  Hence, EHR was a prerequisite particularly for expansion of family practice program and referral system.
• In 2014, in line with the Iranian HTP, the PHC’s Electronic Health record was launched across the countries.
Features of the electronic record

- The EHR, containing all continues health information and services of a person over his or her life-Sycle which are stored electronically at PHC level.
- Information can be shared among different health organizations.
- The EHR includes all health service packages by age and sex based on health network structure.
- Different levels of access are defined for Service Providers and Health Managers. It includes a wide range of information including:
  - personal demographic information,
  - records of diseases, medical records and Health cares
  - and all information affecting on individual health.

Also, there is possibility of interaction with other systems out of the Ministry of Health and Medical Education such as Insurance System, National Organization for Civil Registration, etc.
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Results of HIS intervention in I.R.Iran

**Successes:**
- Near 94 percent of the Iranian population are registered (~79,500,000)
- All PHC facilities (29,377) are using EHR using online program
- All health care and services based on service packages and age groups are electronically delivered to defined population of the PHC’s facilities.
- Electronic Referral system are using
- Electronic prescription has been designed and will used very soon
- Client satisfaction are monitored by send SMS based EHR

**Challenges:**
- Data quality particularly in early years
- No comprehensive data sharing between 4 EHR programs
- No link with private facilities
- Low coverage in mega cities
Lessons learned from HIS implementation in I.R. Iran

Recommendations:

- Developing of the PHC’s EHR is related to developing of Health Services delivery and model of care and this issue should be considered in planning and implementation of HIS
- Link between public and private facilities and sharing data needs coordination ad regulation
- Support needs (e.g. additional technical, financial, capacity building)
- Data quality assessment
- Financial and Technical support for monitoring and evolution of the program
Thanks for your attention
Optimizing Routine Health Information Systems
Models to align and integrate RHIS in Primary Care Settings
Nepal
HIS governance and RHIS flow, Nepal

- Governance structure is federal with seven provinces and 753 local levels
- National Health Policy, Public Health Service Act and CRVS strategy for health data governance
- Health facilities are kept in jurisdiction of tiers of governments
- Institutions delivering basic health services are 134 public hospitals, 2,277 non-public health facilities, 194 primary health care centres, 3,767 health posts, 11,589 PHC Outreach Clinics, 16,698 EPI clinics plus 49,481 FCHVs.
NEPAL’s Health Information and Digital Health Journey

- 2006: HSIS endorsed
- 2012: TABUCS started
- 2013: EHR/EMR piloting initiated
- 2014: WHA Resolution on standardization and interoperability
- 2015: First Telemedicine System Introduced
- 2016: HF wise online entry in HMIS
- 2018: WHA 71.1 Digital health
- 2019: eHealth Roadmap developed
- 2020: IHIMS roadmap drafted

- 1958: Reporting system for malaria eradication program and initiation of program specific reporting
- 1993: Integrated HMIS all vertical reporting systems integrated
- 1997: LMIS used in all 75 districts
- 2004: HSIS endorsed
- 2005: 1st WHA Resolution on eHealth
- 2006: Integrated info. mgmt conceptualized
- 2012: IHIMS roadmap drafted
- 2018: WHA 71.1 Digital health
- 2019: eHealth Roadmap developed
- 2020: IHIMS roadmap drafted

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- 2020: IHIMS roadmap drafted
Current status of national HIS

75% of indicators have data available to monitor the health-related SDGs

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<tr>
<th>Data sources and status for SDGs progress measurement</th>
<th>No. of measurements</th>
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<td>HMIS</td>
<td>9</td>
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<tr>
<td>HMIS (Partial)</td>
<td>12</td>
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<tr>
<td>HMIS (Partial) and CRVS</td>
<td>6</td>
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<tr>
<td>HMIS and EWARS</td>
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<tr>
<td>HMIS and Maternal and Perinatal Death Surveillance</td>
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<tr>
<td>HMIS (Partial), CRVS and Nepal Police.</td>
<td>2</td>
</tr>
<tr>
<td>HW Registry</td>
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<tr>
<td>IMIS</td>
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</tr>
<tr>
<td>LMIS</td>
<td>1</td>
</tr>
<tr>
<td>Cancer registry</td>
<td>1</td>
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<tr>
<td>Population based surveys</td>
<td>23</td>
</tr>
<tr>
<td>Total measurements</td>
<td>59</td>
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</table>
HIS intervention in Nepal

Area of HIS intervention

- RHIS designed for planning and monitoring for PHC through information on basic health care at sub-national levels
- Use of available technologies for HIS improvement
- Demand driven RHIS; considering data need at service delivery points and planning units
- Sub-national leadership for health data
- Availability of disaggregated data: geography, HF wise and administrative unit
- Public-private engagement for digital solutions
- RHIS Assessment

RHIS intervention implemented in the country

- Roadmaps for eHealth and RHIS
- Initiation to form M and E mechanism at provincial levels
- HF and HW Registries initiated
- Continuity of health surveys
- HIS integration in PME at institutional level
- Information management unit and system for COVID19 data management
Results of HIS intervention

**Successes:**
- Shortened span of health surveys through use of technology in data collection, management and dissemination
- Data availability at sub-national levels for planning and monitoring
- Emerging market for digital health solutions
- Linkages established through TWG with M and E, CRVS and population census authorities
- MoHP affiliated to Health Data Collaborative
- Practice of preparing SDGs status report and conducting data gap assessment for SDGs
- Use of SCORE recommendations in RHIS Roadmap
- Availability of COVID19 related information in IMU
- Development of SDGs National Action Plan including health data accelerator

**Challenges:**
- Indirect chain of command and loose communication for knowledge transfer
- Lack of harmonization and uniformity of interventions
- Digital divide
- Optimizing data use
- Paucity of knowledge on holistic approach for health data management and use
- Ad-hoc interventions
- Lack of support mechanism at country level for DHIS operation and maintenance
- Dependency on partners for continuity of RHIS, especially in COVID 19 data management
Lessons learned from HIS implementation

Recommendations:
- Enforcement of regulations and establish dedicated institution/mechanism for health data governance
- Urgency of digital health platform
- Equipping sub-national governance and service delivery units with capacity and infrastructure
- Expedited implementation of eHealth and RHIS roadmap for comprehensive solutions
- Expediting formation of sub-national mechanism for M and E
- Localization of SDGs and orientation
- Thinking on data; how data originators can be benefited directly
- Improving reviews with support of data
- Enhance local accountability
- Implementation research for health data interventions

Support needs
- Sharing of interventions and solutions; intra-region
- Advocacy and support for HR development
- Technical support for digital health planning and laying digital health platform
- Linking institutions for capacity building; digital health, monitoring, standards including ICD and MCCoD
- Capacity building for M and E to enhance data use
Promote UHC & PHC with digital approaches supported by optimized RHIS
Health information collection system

- **NBS**
  - General statistics incl. population employment economics

- **NHC**
  - Commission Statistics

- **NHSA**
  - Basic health insurance data, procurement & pricing of drugs

- **NMPA**
  - Approval, production and circulation of drugs

- **Other**
  - Pension, public finance, human resources, environment etc.

  - **Public Health**
  - Service Delivery
  - Drug Use
  - Population Surveillance
  - General Management
  - Primary database: EMR health record etc.
<table>
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<tr>
<th>Technical Support</th>
<th>Working Mechanism</th>
<th>Training Support</th>
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<td>Survey system</td>
<td>Working Assignment</td>
<td>Codebook</td>
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<tr>
<td>Data checking</td>
<td>Online and offline training</td>
<td>Training Courses(National)</td>
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<tr>
<td>Outliner detection</td>
<td>Investigation and survey</td>
<td>Training Activities</td>
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<tr>
<td>Multiple resource comparison</td>
<td>Statistical supervision</td>
<td>Statistic Bulletin</td>
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<td>Special training session</td>
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**Data Quality Control**

**Data Collection**

- Survey system
- Data checking
- Outliner detection
- Multiple resource comparison

**Data Cleaning**

- Investigation and survey
- Statistical supervision
- Statistic Bulletin
- Special training session
Survey population and health risks

Count births, deaths and causes of death

Optimise health service data

Review progress and performance

Enable data use for policy and action
Ситуация рутинных информационных систем здравоохранения в Таджикистане

Global consultation/ Глобальная консультация - Страновой опыт
Республика Таджикистан

Информационная система здравоохранения: достижения, перспективы.

Ministry of Health and Social Protection of the Population of the Republic of Tajikistan

World Health Organization

SCORE for Health Data Technical Package
9 сентября 2021 года Республика Таджикистан отмечает 30-летие своей независимости. За этот период Таджикистан достиг значительных успехов в повышении качества и эффективности медицинских услуг и улучшение здоровья населения. Уровень заболеваемости снизились в 3 раза, младенческой и материнской смертности более чем в 2 раза, ожидаемая продолжительности жизни при рождении увеличилось с 68,2 (2000г.) до 75,1 лет (2019г.). Используются современные методы диагностики и лечения больных, улучшена инфраструктура и внедрены новые информационные технологии.
Структура информационной системы здравоохранения

Министерство здравоохранение и социальной защиты населения РТ

Республиканский центр медицинской статистики и информации

ГЦМСиИ УЗ г. Душанбе
ОЦМСиИ УЗ Согдийской обл.
ОЦМСиИ УЗ Хактлонской обл.
ОЦМСиИ УЗ ГБАО

ЦМСиИ - Центр медицинской статистики и информации, ОМК/ОМО- оргметодкабинет/отдел
Информационные технологии 90-х годов
Информационная система здравоохранения развивалась в трёх направлениях:

1. Развитие информационной системы в целях управления здравоохранением
2. Развитие информационной системы в целях обеспечения доступа к медицинским услугам на расстоянии - телемедицина
3. Развитие информационной системы в целях наблюдения, диагностики и лечения пациентов - цифровизация здравоохранения (электронные медицинские паспорта)
1. Развитие информационной системы в целях управления здравоохранением

В сотрудничестве с ВОЗ, в рамках создание Европейской и центрально-азиатской информационных систем по общественному здравоохранению развивалась информационная система управления здравоохранением в РТ
2000-2014 годы функционировали частично автоматизированные электронные системы

**MEDSTAT** → База данных здравоохранения

**STACIONAR** → Оперативные данные

**factor.Ink** → Данные о деятельности стационара
С 2015 года начала функционировать в он-лайн формате, разработанная при поддержке Европейского Союза на базе DHIS2 информационная система по сбору, обработке и представления информации о состоянии здоровья населения и деятельности учреждений здравоохранения.

Установлены сервера, учреждений здравоохранения обеспечены компьютерной техникой, средствами связи, персонал обучен. Информация о заболеваемости формируется с использованием кодов МКБ-10.
2. Развитие информационной системы в целях обеспечения доступа к медицинским услугам на расстоянии - телемедицина

- В стране используются более 25 современных телемедицинских установок

Пандемия COVID-19 продиктовала необходимость широкого использования возможности информационных технологий в целях консультации пациентов на местах, обучения специалистов, мониторинг деятельности и принятие оперативных решений.

Установлена он-лайн связь со всеми регионами страны.
3. Развитие информационной системы в целях наблюдения, диагностики и лечения пациентов - цифровизация здравоохранения (электронные медицинские паспорта)

В рамках инициативы ВОЗ «Будущее цифровых систем здравоохранения» и принятая Правительством Республики Таджикистан «Концепция цифровой экономики», разработан проект Стратегического плана цифровизации здравоохранения на 2021-2025 годы.
Уроки, извлеченные из внедрения ИСЗ в Республике Таджикистан

- Созданная на платформе DHIS2 информационная система является отличным инструментом для формирования и использования информации в целях управления системой здравоохранения. Данная платформа не содержит информацию для наблюдения, диагностики и лечения отдельных пациентов.

- Телемедицинская система должна функционировать в рамках двухсторонних и многосторонних соглашений между отдельными учреждениями в стране и других стран с использованием сопоставимых, профессиональных, стационарных и передвижных телемедицинских установок.

- Цифровизация здравоохранения - является инструментов обеспечения доступа к достоверной информации, принятие клинических решений, использования искусственного интеллекта.
Цифровизация здравоохранения требует определенных ресурсов:

- Технические средства (сервера, компьютеры, средства связи)
- Программное обеспечение
- Обучение персонала
- Нормативно-правовая база
- Администрирование и сопровождение системы
Среднее количество дней, когда употребляются фрукты – 4.9

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Потребление фруктов и овощей (в типичную неделю, в%)
Situation of routine health information systems in Tajikistan

Global consultation - Country Experience
Republic of Tajikistan

Health Information System

achievements, perspectives

SCORE for Health Data Technical Package
On September 9, 2021, the Republic of Tajikistan celebrates the 30th anniversary of its independence. During this period, Tajikistan has made significant progress in improving the quality and efficiency of medical services and improving the health of the population. The incidence rate decreased by 3 times, infant and maternal mortality by more than 2 times, life expectancy at birth increased from 68.2 (2000) to 75.1 years (2019). Modern methods of diagnostics and treatment of patients are used, infrastructure is improved and new information technologies are introduced.
Information technology of the 90s
The health information system has evolved in three directions:

1. Development of an information system for health management purposes
2. Development of an information system to ensure remote access to medical services - Telemedicine
3. Development of an information system for the observation, diagnosis and treatment of patients - digitalization of healthcare (electronic medical passports)
1. Development of an information system for health management purposes

The health management information system in the Republic of Tajikistan was developed in cooperation with WHO, in the context of developing the European and Central Asian information systems for public health.
2000-2014 partially automated electronic systems

MEDSTAT

Healthcare database

STACIONAR

Operational data

Data on Hospital activity
Since 2015, electronic information system developed with the support of the European Union on the basis of DHIS2 for the collection, processing and presentation of information on the state of health of the population and the activities of health care institutions,

Servers have been installed, health care institutions have been provided with computers, communication facilities, personnel trained.

Information on morbidity is generated using ICD-10 codes
2. Development of an information system to ensure access to medical services at a distance - telemedicine

- More than 25 modern telemedicine installations are used in the country

The COVID-19 pandemic forced the need to use the opportunity of information technology in order to consult patients on the spot, train specialists, monitor activities and make operational decisions.

Established online connection with all regions of the country
3. Development of an information system for monitoring, diagnosing and treating patients - digitalization of health (electronic medical passports)

Through the WHO initiative "The future of digital health systems" and through the "Concept of the digital economy" adopted by the Government of the Republic of Tajikistan, a draft Strategic Plan for the digitalization of healthcare for 2021-2025 has been developed.
Lessons learned from the implementation of HIS in the Republic of Tajikistan

- The DHIS2 platform is an excellent tool for generating and using information for managing the healthcare system. This platform does not contain information for diagnosis and treatment of individual patients.

- The telemedicine system should operate within the framework of bilateral and multilateral agreements between individual institutions in the country and other countries using comparable, professional, stationary and mobile telemedicine installations.

- Digitalization of healthcare is a tool for providing access to reliable information, making clinical decisions, using artificial intelligence.
Difficulties. Support.

Digitalization of healthcare requires certain resources:

- Technical means (servers, computers, communication facilities)
- Software
- Training
- Legal and regulatory framework
- System administration and maintenance
Thank you for the attention!
Optimizing Routine Health Information Systems in Countries

Global consultation - Country Experience
Oman
Health Information Systems in Oman
About [Oman]

- Overview

**Health System in Oman**

- Governorate Health Institutions (Non-MOH)
- Ministry of Health
- Private Health Sector

**Current status of national Health Information System:**
SCOR E country profile: [https://www.who.int/data/data-collection-tools/score/country-profiles](https://www.who.int/data/data-collection-tools/score/country-profiles)

- Overall summary score (page 4)
  - Overall Score was green
  - The highest score was in “Surveillance of public health threats” & “Births & Death Registration”
  - The lowest score was “Health service resources: Health Financing”

- Data availability to monitor UHC/SDG (page 5)
  - 94% of indicators have data available to monitor the Health related SDGs
  - 74% coverage of essential Health services (3.8.1 UHC) (Source Annual Health Report 2020)
## HIS intervention in [Oman]

<table>
<thead>
<tr>
<th>What Topic</th>
<th>Support needs</th>
<th>How it’s Implementing</th>
</tr>
</thead>
</table>
| Upgrading to Fully electronic system for Births & Deaths Notification System (BDNS) | • Building Capacity to improve COD  
• How to redistribute the garbage codes.                                    | • TOT for doctors and Coders.  
• Using methodology or software to redistribute garbage codes.  
• Making brief guideline to “How to choose COD”                           |
| Upgrading the HIS in MOH to be full electronic system                      | • Building capacity to analyzing big data                                     | • Trains statistician in “analyzing big data”.  
• Trains in “making modeling and projections”  
• Making deep analyzing & writing scientific report.                      |
Input Data (Opd visits)

- Medical records (SHIFA)
- Civil ID
- Demographic info
- Clinic (New-FU)

- Nurse
  - BP, Sugar, Temp
  - Waiting time at clinic

- History
  - LAB, Rad request (waiting for results)
  - Diagnose
  - OPD morbidity (ICD-10)

- Registration
- Vital signs

- Nurse management
- Doctor management

Opd visits by age, sex, nationality, clinic, .....

Nursing procedures

Service Utilization
  - Appointments waiting period
  - Final Decision
  - Prescriptions

Cost

Health Information Reporting System (at all Levels)
Input Data (Inpatient Services Utilization)

- Medical records (SHIFA)
  - Civil ID
  - Demographic info
  - Ward/Department

- Ward/Department

- History
  - LAB, Rad request
  - Diagnose
  - IP morbidity (ICD-10)

- Registration

- Admission

- Bed Distribution
  - Bed occupancy/Turnover

- Doctor management

Discharged (Alive or dead)
Discharge ICD-10

- Final Decision

- Pharmacy

Health Information Reporting System (at all Levels)

Service Utilization

Length of stay
Bed count days
IP mortality COD

Prescriptions
A screenshot of the main screen of the dashboard (Nabdh AlShifa):
Results of HIS intervention in [Oman]

- **Successes:**
  - Digitalization of HIS in MOH (Automatically updated)
  - Increasing the quality of the data
  - Reporting National figure from the routine system (eg. Births & Deaths Data, Manpower, CDC, Blood Bank, Opd Visits, Health institutions, etc)

- **Challenges:**
  - Lacking in analyzing big data.
  - Lacking in How to calculate some SDG indicators (eg 3.5.1 & 3.5.2)
  - Low experience in how to calculate DALYs, HALE, YLD
Lessons learned from HIS implementation in [Oman]

- **Recommendations:**
  - Calculate aggregated data for SDG indicators by Age, Gender, Nationality, etc.
  - Professional staff in analyzing, estimating and making projections.
  - Upgrade some registers to be a national registers

- **Support needs** *(e.g additional technical, financial, capacity building)*
  - Building Capacity to analyzing big data
  - Tanning in Modeling, how to make projections/estimation and other related subjects.
  - Tanning in “How to write scientific reports”.
  - Support to calculate some SDG indicators, *(3.5.1 Coverage of treatment interventions (pharmacological, psychosocial and rehabilitation and aftercare services) for substance use disorders, 3.5.2 which stated “Harmful use of alcohol, defined according to the national context as alcohol per capita consumption (aged 15 years and older) within a calendar year in liters of pure alcohol).*
  - Brief guideline on “How to choose COD”, to be shared with doctors
Fundamental health information building blocks

Vicki Bennett
Head, Metadata and METeOR Unit
WHO Global Consultation on Routine Health Information Systems, 1-2 September 2021
WHO Framework on Health System Strengthening

System Building Blocks

- Service Delivery
- Health Workforce
- Information
- Medical Products, Vaccines and Technology
- Financing
- Leadership and Governance

Overall goals

- Improved Health Outcomes
- Responsiveness
- Social and Financial Risk Protection
- Improved efficiency

Defining Health Information Systems

Health Metrics Network (HMN) *Framework and Standards for Country Health Information Systems*
1. Information System Resources

- Includes the legislative, regulatory and planning frameworks, the resources that are required such as:
  - personnel
  - financing
  - logistics support
  - information and communications technology (ICT)
  - coordinating mechanisms within and between the six components
The need for a core set of indicators and related targets covering:
- determinants of health
- health system inputs, outputs and outcomes
- health status
2. Indicators cont’d. Domains of measurement of HIS

Framework and standards for country health information systems / Health Metrics Network, World Health Organization
3. Data sources

- Two main categories:
  - population-based approaches (censuses, civil registration and population surveys)
  - institution-based data (individual records, service records and resource records)
4. Data management

- Covers all aspects of data handling from collection, storage, quality-assurance and flow, to processing, compilation and analysis
5. Information products

- Data must be transformed into information that will become the basis for evidence and knowledge to shape health action.
6. Dissemination and use

- Making the data readily accessible to decision-makers and by providing incentives for, or otherwise facilitating, information use.
Health Information System (HIS) sub-systems rarely interact
Types of information systems

- **Strategic information systems**
- **Tactical information systems**
- **Operational information systems**

Decision support systems, simulation systems, performance indicators

Management information systems

EHRs/EMRs, patient administration systems, payroll, purchasing/inventory
Where to from here? Can’t computerize a bad manual process!
It is not good enough to just ‘collect’ data - we must ‘use’ information
Primary purpose:
- Information, primarily about patients, in a way that is correct, and up to date, accessible to the right people at the right time in a usable format
- Knowledge to support diagnosis and therapy
- Information about the quality of care, performance and costs

Secondary purpose:
- Improve data generation, compilation and exchange but will require the existence of clear data quality standards to be of optimal value
Digital technology can enable improved health care and outcomes but...

- Who will enter the data?
- How will it impact on current workflows?
- How will you make sure nobody is left behind?
- What is the quality of the data? Digital information sharing may support improvements in quality but could also expose poor record keeping
- How safe is the data? Promotion of information governance, privacy and security
- What are the benefits? Need for research focus on evaluation of impact on improved outcomes
## Data quality issues

<table>
<thead>
<tr>
<th>DQ impact</th>
<th>Clinical scenario</th>
<th>DQ problem</th>
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<tbody>
<tr>
<td>Clinical</td>
<td>A letter of invitation for the follow up service or a check-up was sent to a patient who recently died from cancer</td>
<td>No date of death recorded</td>
</tr>
<tr>
<td>Clinical</td>
<td>Inability to manage patients with chronic diseases</td>
<td>Multiple identities</td>
</tr>
<tr>
<td>Clinical</td>
<td>Mismatch of patient’s information</td>
<td>No single source of truth</td>
</tr>
<tr>
<td>Avoidable costs</td>
<td>Operational costs of data cleansing and manual data validation</td>
<td>High costs of duplicate processes</td>
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<tr>
<td>Service efficiency</td>
<td>Difficulties in inviting people for the service or follow-up</td>
<td>Contact details are missing or incorrect</td>
</tr>
<tr>
<td>Service efficiency</td>
<td>A new service was created or improved, but there is not enough utilization</td>
<td>Overestimation of the demand due to duplicate entries</td>
</tr>
</tbody>
</table>
Improving data quality

- Improvements in data quality and interoperability through adoption of clinical terminologies, unique identifiers and data standards
- Healthcare identifiers:
  - Identifiers for Individuals, Providers and Organisations
  - Ensures that the right information is associated with the right person
HIS mapping – sense checking the data

<table>
<thead>
<tr>
<th>Months</th>
<th>Gonorrhea</th>
<th>Trichomoniasis</th>
<th>Candida</th>
<th>Syphilis</th>
<th>HPV</th>
<th>Total</th>
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Metadata standards important for comparative analysis – across all sources of data collection

- Metadata is “data about data”
- A metadata record captures critical information about the content of a dataset - how data are defined, structured and represented
- Metadata allows data to be discovered, accessed, and re-used
- A metadata standard provides structure and consistency to data documentation
- Standards and tools vary – select according to defined criteria such as data type, organizational guidance, and available resources
- Use of standards enables data interoperability
Why secondary use of electronic health record data

- The data can provide a better understanding of:
  - the natural progress and development of diseases
  - evaluation of health care interventions
  - causes of disease
  - assessing equity of care
  - appropriateness of care
  - continuity of care
  - describing trends in health care utilization
  - efficiency and sustainability of the health care system
  - and change in health outcomes of particular population subgroups
Principles to follow

- Collect once, use many
  - Use the data collected by disease programs and add it to general management data
- Have a single source of truth
- Consider ‘respondent burden’ - KISS
  - It’s better to collect less and get 100% response than ask for too much and only get 50% response
- Only collect as often as needed
  - How often is it used?
  - How long will it realistically take to see a change in the data?
Principles to follow cont’d.

- Only collect what you actually use
  - What decision will I make based on knowing this information?
- Consider local needs before global needs
  - Make sure data is useful for management and planning
- Consider how to get the best answer to the questions that need answering
  - e.g. how is it best calculate to find out about contraceptive prevalence rate?
  - Survey vs regular data collection