Health information system:
Types and sources of health data with a spotlight on routine health facility data

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Objectives of the session

- Review key types and sources of health data, including differences, advantages and limitations

- Outline key sources of data for maternal, newborn, child and adolescent health (MNCAH)

- Provide background on what is meant by routine health information system (RHIS) and why it is important

- Review types of health facility data collection and reporting tools and forms

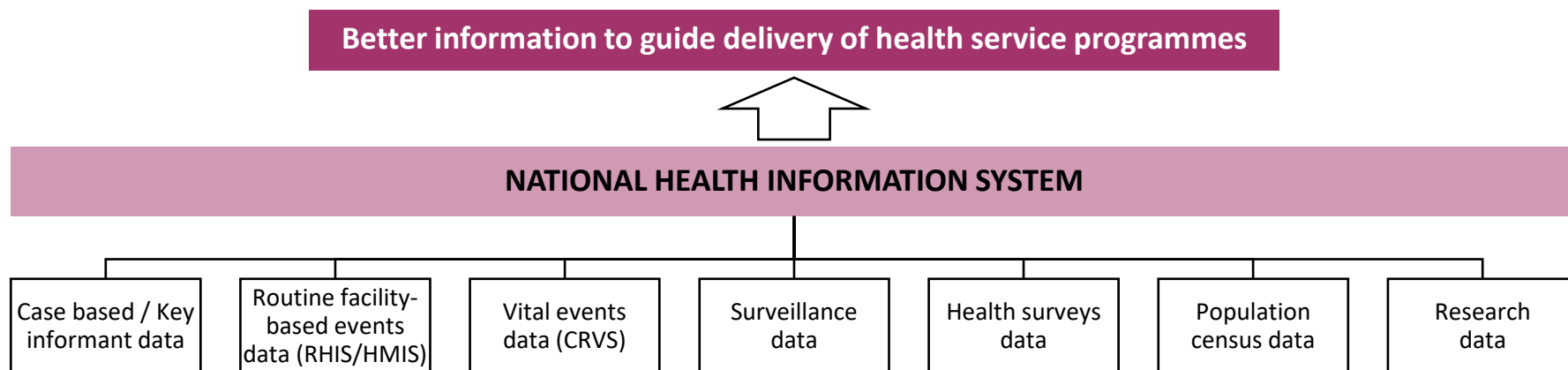- Introduce how raw data and data elements become useable information

TYPES AND SOURCES OF HEALTH DATA

Health data and health information systems

Why are health data needed?

- Health data are critically important for effective monitoring of health situations and trends, developing policies and plans, allocating resources and identifying areas for research at all levels of the health system.
- Country governments and development partners rely heavily on country data to improve the delivery of health services.
- Generation of good quality, timely, comparable and disaggregated data requires robust health information systems.

What do we mean by health information systems?

A **health information system (HIS)** serves to generate "information to enable decision-makers at all levels of the health system to identify problems and needs, make evidence-based decisions on health policy and allocate scarce resources optimally".[1]

Better information to guide delivery of health service programmes

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NATIONAL HEALTH INFORMATION SYSTEM

Case based / Key informant data	Routine facility-based events data (RHIS/HMIS)	Vital events data (CRVS)	Surveillance data	Health surveys data	Population census data	Research data

Adapted content and image from original slides from: World Health Organization REGIONAL OFFICE FOR Africa

[1] World Health Organization (2008). *Toolkit on monitoring health systems strengthening. Health information systems.*

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A **health information system (HIS)** "has four key functions: data generation, compilation, analysis and synthesis, and communication and use ".[1]
- The **HIS includes several types and sources of data**, *such as*: routine health information system (RHIS) data, health facility assessments, population-based surveys, etc.

The system of regular recording, reporting, analysis and presentation of health facility data is known as the **routine health information system (RHIS)**.[2]

"These systems generate data collected at public and private health facilities and institutions, and at community-level healthcare posts and clinics—at regular intervals of a year at minimum. The data give a picture of health status, health services, and health resources. Most of the data are gathered by healthcare providers, by supervisors, and through routine health facility surveys. The sources of those data are generally individual health records, records of services delivered, and resource health records including financial, commodity, or laboratory records."[3]

The **health management information system (HMIS)** "is a data collection system designed to support planning, management, and decision making in health facilities and organizations."[3]

RHIS vs. HMIS
The RHIS is sometimes referred to as the HMIS.[2] While these terms may be used interchangeably, in some contexts an HMIS "may not include data on disease or health outcomes."[3]

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[1] World Health Organization (2008). *Toolkit on monitoring health systems strengthening. Health information systems.*
[2] World Health Organization (2021). Toolkit for analysis and use of routine health facility data - General principles.
[3] MEASURE Evaluation. Health Information Systems Strengthening Resource Center. Terms related to HIS.

What are some types and sources of health data?

Routine data

- Health facility service utilization and delivery data
  - Health management information system (HMIS)
- Commodity stock data
  - Logistics management information system (LMIS)
- Surveillance data
- Community-based data
  - Community health information system (CHIS)
- Civil registration and vital statistics (CRVS)

Administrative data

- Human resources
- Financing and health expenditure

Health facility assessments

- WHO Harmonized health facility assessment (HHFA), Service Provision Assessments (SPA), etc.
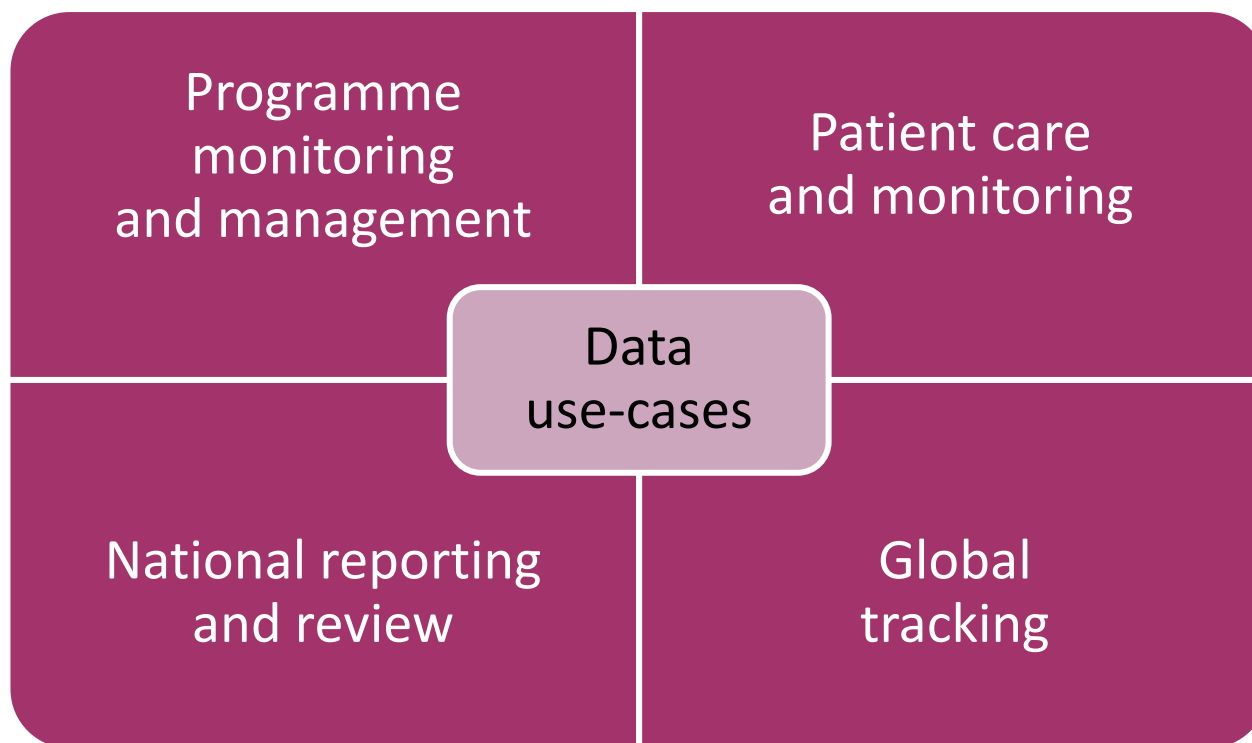
Population and household surveys

- Demographic and health surveys (DHS), UNICEF Multiple Indicator Cluster Surveys (MICS), Malaria Indicator Surveys (MIS), AIDS Indicator Survey (AIS), etc.

Modeled estimates

- Mortality (UN inter-agency estimates, e.g. IGME, MMEIG), pre-term birth estimates, etc.

Need to know **how** to use **which** data **when** and for **what**

Programme monitoring and management

Patient care and monitoring

Data use-cases

National reporting and review

Global tracking

What are the differences between different types and sources of health data?

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Routine vs. non-routine data

- Routine data are collected continuously and reported at specified routine intervals
  - Come from a health information system (HIS) and its sub-systems that are collected as part of an ongoing system

- Non-routine data are collected at certain periods of time or over a specific period of time
  - Come from surveys or special studies carried out for specific purposes

Differences in

- Purpose (e.g. national review, subnational planning, programme monitoring, global tracking, etc.)
- Primary collection
- Aggregation
- Reporting
- Management
- Data use and analysis

Result: Data sources have advantages and limitations.

Advantages and disadvantages of different types and sources of health data

- It is important to know all key sources of health data. Different data sources have comparative advantages and limitations

- The comparative advantages of survey/estimates data and routine/administrative data are complementary
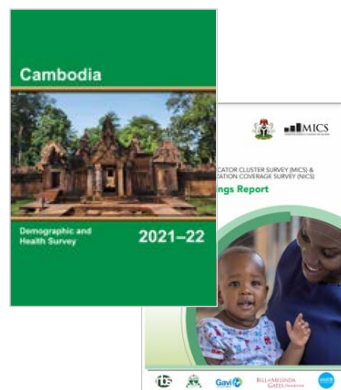
	Surveys, health facility assessments, estimates	Routine facility-based and administrative data
Frequency	Less frequent updates (3-5 years)	More frequent, ongoing collection
Granularity	Less granular (national, regional/state)	More granular (district, facility, community, individual)
Reliability	Sample for valid coverage estimates	Coverage calculation requires denominator determination; data quality issues
Denominators	Coverage is population-based	Coverage limited to facility-based interventions
Representativity/ bias	Data for knowledge, attitudes, practices, access, demand, coverage, quality, etc.	Data limited to access, coverage and quality indicators
Equity dimensions	Disaggregation by age, sex, education level, wealth quintile, urban/rural residence, ethnicity, etc.; analysis based on what is collected	Disaggregation of data may be limited as data are aggregated and reported; based on what is reported in tools

Key MNCAH data sources

Routine health facility data
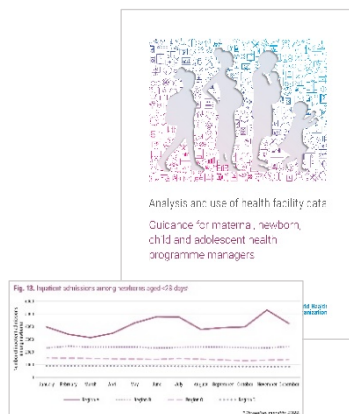
[Routine data from health facilities](#) allow for analysis of trends of utilization of services over time and comparison of multiple time points.

Population and household surveys

[DHS](#) and [MICS](#) surveys provide nationally representative data on key health indicators. The surveys can be used for understanding trends within and between countries.

Health facility assessments

[Health facility assessments](#) can provide information on health facility and workforce capacities to maintain provision of health services and to assess community needs and perceptions.

Modeled estimates

Modeled estimates for trends in population demographics, [maternal](#) and [child](#) mortality and [stillbirths](#), and other indicators allow for comparison on key MNCAH indicators across countries.

Contextual information and data

Information on health expenditure, human resources for health [national health legislation, policies and guidelines](#), related to MNACH provide important contextual information to interpret health data.
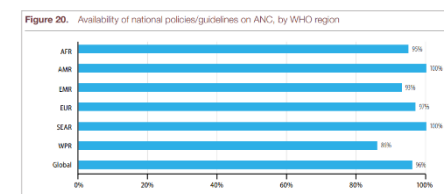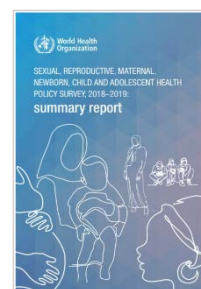
ROUTINE HEALTH FACILITY DATA:
WHAT ARE THEY AND WHY ARE THEY IMPORTANT?

Spotlight on routine health facility data

Routine health facility data represent services provided/utilized at clinics, hospitals and other health service delivery points at the time that services are provided.

- These data may be entered at the health service delivery (e.g. health facility) point or at subnational level (e.g. district office). The data are summarized and reported to the appropriate administrative authorities.

- The system of regular recording, reporting, analysis and presentation of health facility data is known as the **routine health information system** (RHIS).[1]

Advantages

- Reported at regular, more frequent intervals
  - Can provide data in a timely manner
  - Can be used to monitor trends over time
- High geographic granularity (subnational, facility, geo-referenced, etc. data)
- Customizable configuration enables calculation of indicators to fit use cases (e.g. facility- vs. population-based denominators)

Limitations

- Data often limited to facility-based interventions
  - Can also exclude data from private sector facilities
- Difficult to understand demand-side of health service utilization (knowledge, attitudes, behaviours, etc.)
- Quality concerns (under/over counting/reporting, denominators)

Despite limitations, routine health facility data are an important source of timely information!

Quality of RHIS data can improve through increased analysis and use

[1] World Health Organization (2021). Toolkit for analysis and use of routine health facility data - General principles.
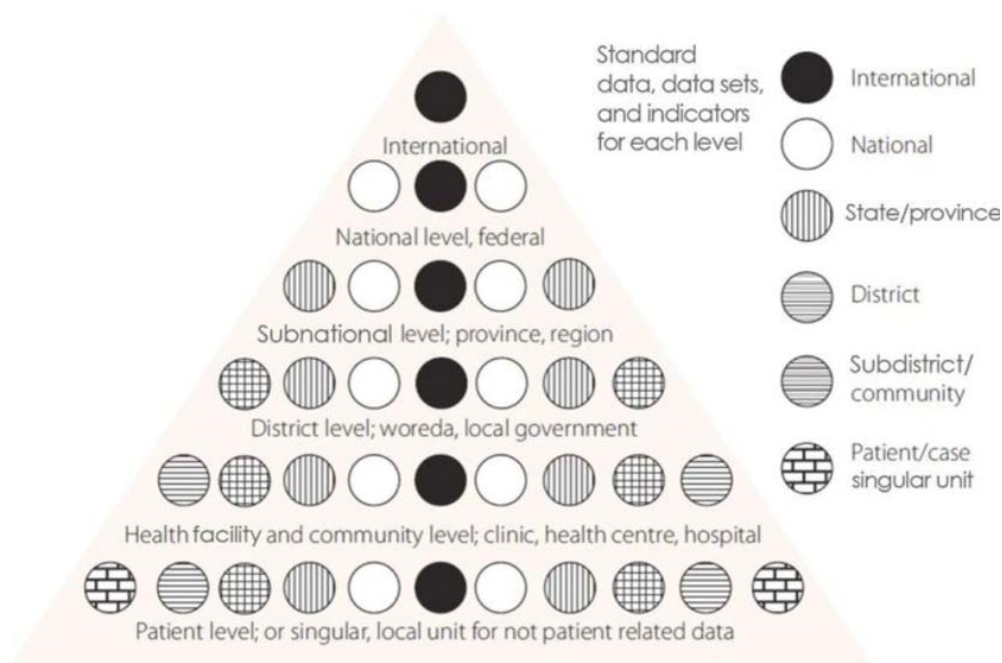
Note: The WHO *Toolkit for analysis and use of routine health facility data – General principles* document uses the terms routine health information system but says that the RHIS may also be referred to as the health management information system (HMIS).

Why are routine health facility data important?

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- They are widely used for **national and subnational health sector reviews and planning**

- They for the **basis of national reports of health statistics** and periodic analytical reviews of health system performance

- They are used to **assess health programmes**, such as MNCAH, at all levels of the health system

- They can be used to **measure levels, study trends and assess inequalities between key populations** for a range of standard health indicators related to service delivery and utilization, leading diagnoses and health outcomes among patients/clients

- Unlike periodic population and facility surveys which take place every few years using a limited sample, **regular collection and analysis of routine health facility data provide frequent and current assessments of health utilization** at all levels of the health system

- Routine data can be used to **estimate coverage of interventions at population level** for some MNCAH indicators

- Routine data are **used as input data for data modeling**, including for estimating population denominator data for many MNCAH indicators

ROUTINE HEALTH FACILITY DATA: COLLECTION AND REPORTING

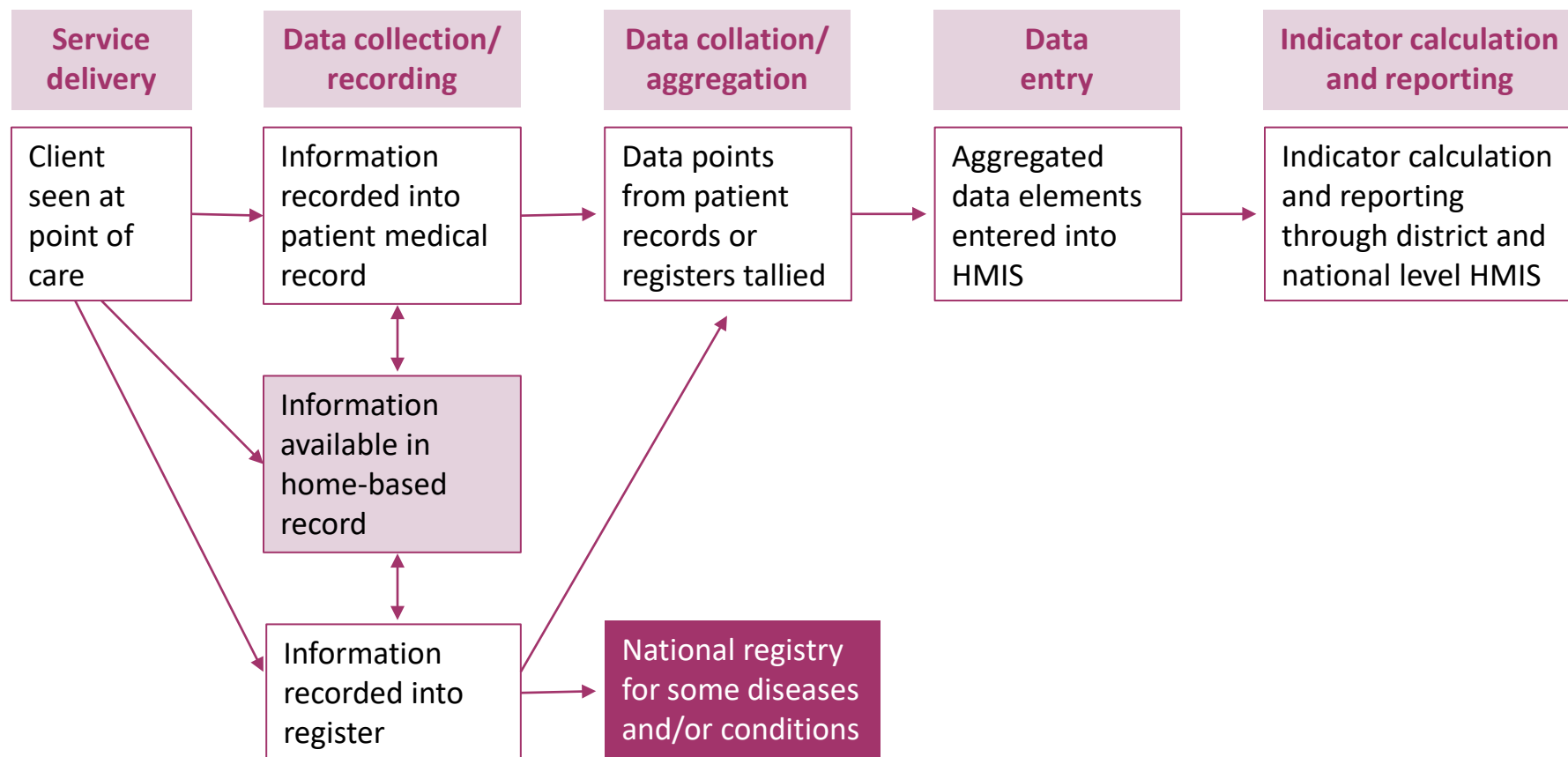# Purpose of routine data collection and reporting

- Obtain information about health conditions and characteristics

- Report information manually or electronically to higher levels:

  - from facility to district (or other local government authority)

  - from district to region (or state)

  - from region to national government authority

  - from national government for global reporting or development of estimates

- Inform periodic self-evaluation (for example monitor facility-based coverage rates)

Example of data flow through the RHIS

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Service delivery	Data collection/ recording	Data collation/ aggregation	Data entry	Indicator calculation and reporting
Client seen at point of care	Information recorded into patient medical record	Data points from patient records or registers tallied	Aggregated data elements entered into HMIS	Indicator calculation and reporting through district and national level HMIS

Information available in home-based record

Information recorded into register

National registry for some diseases and/or conditions

A client's data can be directly recorded into a register or first into a medical record, from which data are aggregated into a register. (If an individual has a home-based record this information should be reconciled with either the medical record, or both.) Depending on a country's system, for aggregated data reporting, once data are tallied from the registers (or directly from the medical records), they can be entered as data elements in the HMIS in preparation for indicator calculation. **The above illustration may not be applicable or relevant in all settings; the steps from service delivery to routine health indicator reporting vary by national/subnational/facility systems.**

Tools and forms used for RHIS data collection and recording

Patient/client data collection tools (individual records)

- Individual patient records (including electronic records) or files, prescription cards, patient files

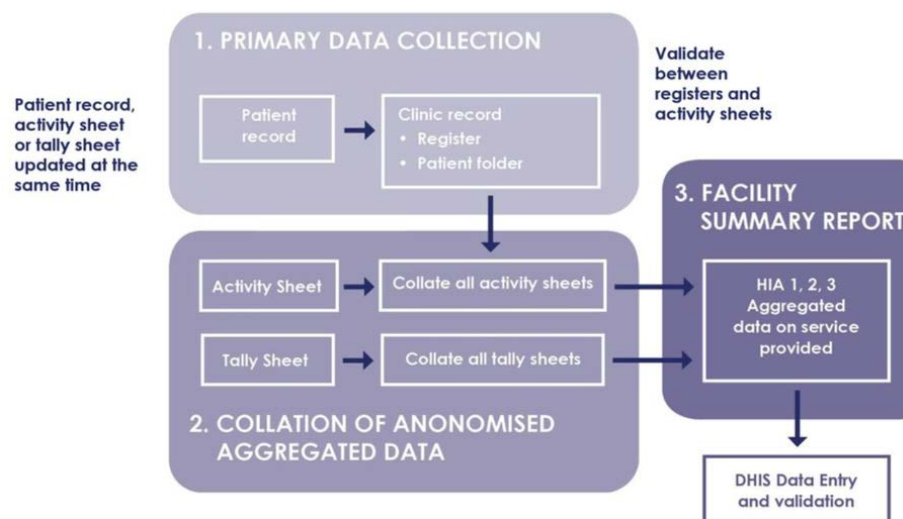## Health facility data collection tools

- Registries, tally sheets, logbooks, stock/supply files, financial ledgers

Community data forms

- Records of services provided outside of the facility by community/village health workers

Note: A **home-based record** is a "health document used to record the history of health services received by an individual. It is kept in the household…and is intended to be integrated into the health information system and complement records maintained by health facilities."

World Health Organization (2018) *WHO recommendations on home-based records for maternal, newborn and child health*.

Example: Data collection, collation and reporting in a health facility (Zambia HMIS Procedure Manual)

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Data collation and aggregation – summary

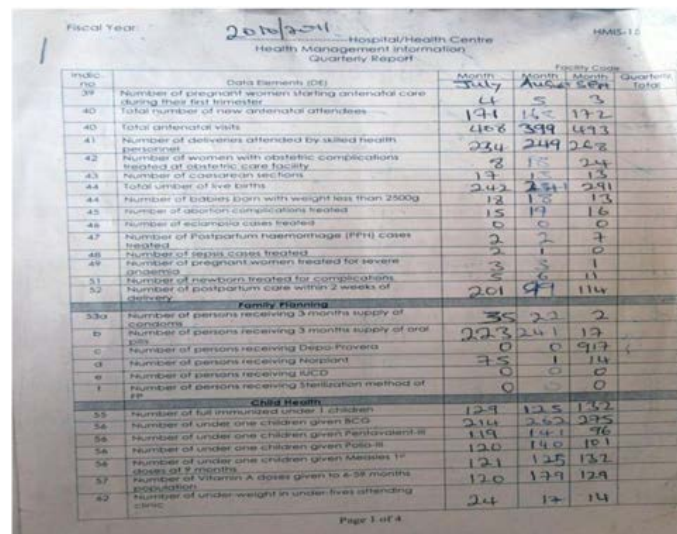Where data are searched, gathered and presented in a report-based, summarized format, such as:

- Summary in tabular form
- Graph
- Dashboard
- Information board at community level

Frequency could be:

- Weekly
- Monthly
- Quarterly
- Semi-annually
- Annually

Uses could include:

- Routine reporting
  - Weekly epidemiological surveillance report
  - Health unit outpatient and inpatient monthly reports
- Health unit performance
  - Health unit quarterly report
  - Health unit annual assessment

Example: HMIS quarterly report for hospitals or health centres

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- Usually several (manual) steps before data are entered in any database/storage

  – Tally sheets

  – Tally sheet totals at end of month

  – Monthly summary forms, which are reported to the next level

- Data aggregation may be performed manually or electronically (using software)

Outpatient Consultations all ages	Jan	Feb	Mar	Apr	May	Jun	Jul.	Aug	Sept	Oct	Nov	Dec	Total
Total Number of consultations													
NEW CASES													
Lower Resp Tract Infection													
Diarrhoea													
Malaria													
Measles Immunised													
Measles Non-immunised													
Suspicion Tb													
Meningitis													
Others													
Total													
Annual attendance rate:													

Example: Annual summary of outpatient consultations

Target population =	
Total number of consultations	
Number of 1st Ante-natal visits (= Number of women presenting for a 1st Ante-Natal visit during a pregnancy)	
Number of women presenting for consultations during the 3rd trimester	
Number of high risk pregnancies detected	
Number of high risk deliveries detected	
Number women referred to a referral facility	
Number of women presenting for a first AN visit and having already received 5 TT doses (TT5) before this 1st visit;	
Number of presenting women having received one TT dose (from TT2 to TT5) during current pregnancy	
Number of presenting women protected against tetanus at delivery	

$$\text{Monthly antenatal care coverage rate} = \frac{\text{Number of 1}^{st}\text{ ante-natal visits} * 100}{\text{Target population}/12}$$

Example: Monthly antenatal consultation report

Adapted content from original slide from:

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Data elements to indicators: Basic concepts

Raw data (e.g. on services provided to people in health facilities) are available at the first stage of information gathering, but are not always directly useable.

To make these data useable, they must be transformed into information that can be used, such as formulation of indicators to monitor and assess programmes, such as MNCAH.

It is important to understanding the how the data collection and reporting forms and processes generate data elements (numerators, denominators) and how these are used to formulate MNCAH indicators.

Data elements and data
A data element is a recorded event. Data represent an aggregation of data elements, in the form of numbers, characters, and images.

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Information
Data are organized with reference to a context, which gives data meaning.

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Knowledge
When information is analyzed, communicated, and acted upon, it becomes knowledge.

- Review exercises under **Types and sources of MNCAH data** in *Companion exercises to strengthen analysis and use of routine health facility data for MNCAH.*

- Discuss responses in plenary.