TOOLKIT FOR ANALYSIS AND USE OF ROUTINE HEALTH FACILITY DATA

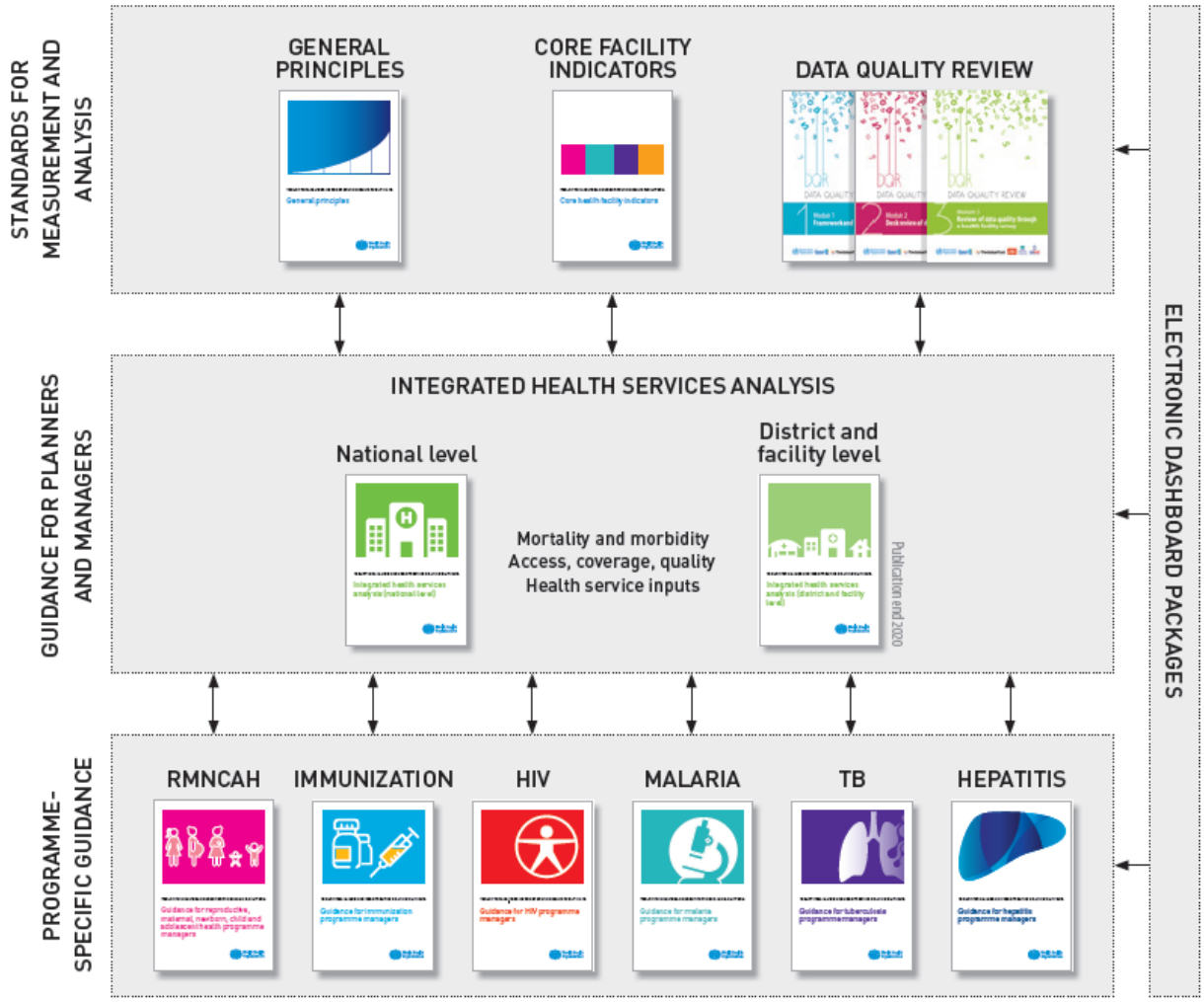
Integrated health services analysis: district and facility levels

WORKING DOCUMENT JANUARY 2021

World Health Organization

WHO TOOLKIT FOR ANALYSIS AND USE OF ROUTINE HEALTH FACILITY DATA

This document is part of the WHO Toolkit for analysis and use of routine health facility data – a set of capacity-building resources to optimize the analysis and use of data collected from health facilities through routine health information systems (RHIS). The Toolkit is a collaborative effort by multiple WHO technical programmes and partners. It promotes an integrated, standards-based approach to facility data analysis, using a limited set of standardized core indicators with recommended analyses, visualizations and dashboards.



The Toolkit consists of a series of modules that can be used individually or together:

- *General principles* introduces key concepts in routine facility data analysis that are applicable to all modules.
- *Core facility indicators* is a compendium of the indicators from the various modules.
- The Data quality review (DQR) toolkit includes guidance and tools for systematic review of the quality of routine facility data.
- *Integrated health services analysis* targets general health service managers, providing a comprehensive, integrated analysis of tracer indicators across multiple health service components and programmes.
- The *programme-specific guidance modules* are customized according to the needs of the programme. Each module contains a guidance document, training materials and an electronic configuration package for automated dashboard production.

The materials within the Toolkit will be periodically updated and expanded.

Further details: https://www.who.int/healthinfo/tools_data_analysis_routine_facility/en

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Integrated health services analysis: district and facility level

Working document January 2021

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Abbreviations

ACT	artemisinin-based combination therapy
ALOS	average length of stay
ANC	antenatal care
ART	antiretroviral therapy
BCG	*Bacille Calmette-Guerin* (vaccine)
BOR	bed occupancy rate
C-section	caesarean section
CFR	case fatality rate
CRVS	civil registration and vital statistics
DHIS2	district health information software, version 2
DTP	diphtheria–tetanus–pertussis (vaccine)
DQR	data quality review
FTE	Fulltime equivalent
GIS	geographic information system
HHFA	harmonized health facility assessment
HIS	health information system
HIV	human immunodeficiency virus
HMIS	health management information system
ICD	International Classification of Diseases
IPTp	intermittent preventive treatment for malaria during pregnancy
LMIS	logistics management information system
MCV	measles-containing vaccine
NCD	noncommunicable disease
NGO	non-governmental organization
OPD	outpatient department
Penta	pentavalent vaccine
PHC	primary health care
PLHIV	persons living with human immunodeficiency virus
RDT	rapid diagnostic test
RHIS	routine health information system
SARA	service availability and readiness assessment
SDG	sustainable development goal
TB	tuberculosis
UHC	universal health coverage
WHO	World Health Organization

Guidance overview and references

This document provides guidance on integrated analysis and use, at district and facility levels, of data collected from health facilities through routine health information systems (RHIS).

The integrated approach provides a "cross-cutting" view of health services, based on a limited set of core indicators that represent multiple programmes and service components. Such an integrated approach is central to comprehensive strengthening of primary health care (PHC), achieving universal health coverage (UHC) and contributing to the sustainable development goals (SDGs).

The guidance includes a set of core indicators, recommended ways of visualizing these indicators in standard dashboards,[1] and guidance on interpretation and use of the indicators for district and facility managers. The core indicators are organized into three main groups, with subgroups:

Group 1 indicators - Health status and epidemiological profile:

- Mortality (institutional)
- Morbidity (inpatient and outpatient)

Group 2 indicators - Health service performance:

- Utilization and access
- Coverage and quality

Group 3 indicators - Health service resources:

- Availability, distribution and efficiency of resources required by health facilities: infrastructure, health workforce, medicines and medical products, and financial resources.

The guidance consists of five chapters and nine annexes:

Chapter 1 - District data concepts and how to use this guidance:
This introductory chapter describes information needs of district and facility health managers; various sources of data and their characteristics; principles and processes for analysis of RHIS data; and the practical use of these concepts in district meetings and during supervision.

Chapter 2 - Core indicators:
Chapter 2 presents a summary list of the core indicators for integrated health services analysis.

Chapters 3 to 5 - Indicator groups:
Each of these chapters addresses an indicator group, providing indicator tables with metadata, recommended visualizations (charts and tables) and guidance on interpretation of the indicators.

Annexes - Dashboards:
Dashboards based on the indicator groups are available in Annexes 1 to 9 and serve as examples of integrated dashboards for district and facility levels. Hyperlinks are provided in the text for quick reference to the dashboards.

Questions referring to the dashboards (using hyperlinks) are included throughout the guidance. The questions aim to draw the reader into immediate application of the concepts described. For each question there is a hyperlink to the answer in Annex 10.

The *Toolkit* document *"Integrated health services analysis: national level"* provides further discussion on the integrated analysis concepts and indicators. Additional details are also found in the programme-

[1] A data dashboard is a set of data visualizations (tables, charts, maps, etc.) that are grouped together to provide an overview of key indicators.

specific *Toolkit* documents. (Refer to the diagram inside the front cover for an overview of the comprehensive set of *Toolkit* documents.)

The indicators and analyses presented in this guidance are intended to provide district and facility managers with examples of how RHIS data can be used to support decision-making. A comprehensive discussion of district and facility management is, however, beyond the scope of this document.

Learning objectives

This guidance illustrates integrated analysis of RHIS data at district and facility levels. It aims to build understanding and skills in a recommend analytic approach that:

- focuses on a minimum set of core indicators organized in three, cross-cutting indicator groups;
- uses standard visualizations to facilitate interpretation of the data: charts and tables organized into integrated dashboards, most of which can be automatically updated in an electronic database;
- supports use of dashboards for decision-making as part of district meetings, supervision visits and feedback to health facilities.

The guidance assumes that users have a basic understanding of health service indicators, analytical concepts and RHIS. Additional information is found in the suggested references listed below.

Audience

The guidance targets managers and analysts at the level of the district health system. It may also be useful to managers making operational decisions at any sub-national level. Managers are defined as staff that make decisions, mostly about obtaining, distributing and re-distributing resources to deliver health services and achieve agreed targets. Analysts are defined as staff that review data quality and assist in preparing and interpreting indicators.

Managers may include: heads and team members of the district health management team; heads of health facilities, from nurses in charge of small PHC facilities to directors of large hospitals; heads of services and/or programmes. Analysist may include: district and facility health information officers; monitoring and evaluation officers; other staff, e.g. programme officers, that review data quality and assist in interpreting the data related to their technical areas.

The guidance may also be useful to implementing partners, donors, academics and others involved in using data to strengthen health service delivery at district and facility levels.

Suggested references

Toolkit for analysis and use of routine health facility data. Geneva: World Health Organization; 2020 (https://www.who.int/healthinfo/tools_data_analysis_routine_facility/en/)

Data quality review (DQR) toolkit. Geneva: World Health Organization; 2017 (http://www.who.int/healthinfo/tools_data_analysis/dqr_modules/en/)

Data quality dashboards for district level. Geneva: World Health Organization; 2020. In press.

Routine health information systems: a curriculum on basic concepts and practice. Measure Evaluation, World Health Organization; 2017 (https://www.measureevaluation.org/our-work/routine-health-information-systems/rhis-curriculum)

Health facility and community data toolkit. Geneva: World Health Organization; 2014 (https://www.who.int/healthinfo/facility_information_systems/en/)

1 District data concepts and how to use this guidance

1.1 THE DISTRICT HEALTH SYSTEM

Districts are administrative units. They come in all shapes and sizes, from a few thousand people to multi-million populations. In many countries, districts are the main subnational administrative unit and the level that manages the public health service delivery system.

According to the WHO,[2] the District Health System is "a network of primary care health facilities that deliver a comprehensive range of promotive, preventive and curative health care services to a defined population with active participation of the community and under the supervision of a district hospital[3] and district health management team."

In this guidance, "district" and "local health system" refer to the district health system and, more generally, to any subnational authority that manages primary care networks and their referral facilities. The facilities comprising this local health system may range from very basic health posts to large, complex hospitals. The services provided and the teams of health workers delivering the services may also vary substantially, as may their capacity for and involvement in the analysis of health facility data.

Health facilities and districts are core operational levels for delivering services to strengthen PHC, achieve UHC and contribute toward achieving the health-related SDGs.

1.2 DATA NEEDS OF DISTRICT AND FACILITY MANAGERS

District and facility managers are responsible for ensuring that the health services under their management are appropriately delivered. This may include ensuring that:

- district health services are in line with national and sub-national policies, priorities and standards;
- district health services detect and respond to unusual events and changing needs;
- all segments of the district population have access to the health services they need, at the required standard of quality;
- district health services achieve required targets; and
- the resources needed to provide the services are available, equitably distributed and efficiently used.

To perform these functions, managers need information. They must have access to and the capacity to analyse and interpret the data that are routinely produced through health facility activities and regularly reported through the RHIS. They must also be able to assess information from other sources and to understand the relationships between data from the various sources.

1.3 DATA SOURCES AT SUBNATIONAL LEVEL

This guidance focuses on aggregate data reported through the RHIS. However, at district and facility levels, health information may be available from various sources as part of the broader country Health Information System (HIS). The HIS brings together data from multiple sources, including the RHIS, health

[2] Health Systems Strengthening Glossary. https://www.who.int/healthsystems/hss_glossary/en/

[3] The term "hospital" is used in this document as a generic term to describe all facilities that have inpatient services and that report on admissions, discharges and deaths. It is recognized that the precise naming of facilities may differ among countries.

facility assessments, household surveys, censuses, civil registration systems, surveillance systems, and other administrative data sources.[4]

Other data sources are mentioned briefly and are needed for calculation of some of the indicators in this guidance. Some of these other data sources may also produce data on a regular or "routine" basis (e.g. surveillance systems, logistics management information systems) and may use facility-generated information; however, in most health systems they tend to remain as separate data sources that are not fully integrated with the RHIS.

1.3.1 Routine Health Information System (RHIS)[5]

Health facilities routinely collect data on the diseases and other health conditions for which people seek care, as well as on facility activities (outputs such as number of outpatient department visits, number of vaccine doses given) and the outcomes of those activities (e.g. number of tuberculosis (TB) patients cured, number of inpatient deaths). These data are aggregated and reported at regular intervals through the RHIS to higher levels of the health system. Data are analysed and used at all these levels. While RHIS data are commonly reported each month, the frequency of reporting may vary according to the data type and the situation, e.g. daily, weekly, monthly, quarterly.

RHIS data often focus on PHC components such as outpatient consultations, maternal health, immunization, HIV, TB, etc. Depending on the facility level and health system characteristics, the RHIS may also report service components such as inpatient care (e.g. number of discharges, number of inpatient days); main outpatient and inpatient diagnoses and causes of death; surgical activity (e.g. number of caesarean sections); and special investigations (e.g. number of laboratory tests by type).

RHIS data sources are individual patient/client records (e.g. antenatal care cards, outpatient registers). Data are typically aggregated in tally sheets or counted from registers and then consolidated in monthly paper-based report forms. In most health systems, aggregate data from the monthly reports are entered into an electronic database which keeps an electronic copy of the report of each facility and each month.[6] This data entry may occur at various levels of the system, e.g. health center, hospital, district office, etc.

In some RHIS, aggregate data from all programmes are entered into the same electronic system; in other cases, specific programmes have separate systems. Some programmes (e.g. immunization, TB, HIV,) use tracking systems to record information on individual patients over time. Sometimes these tracking systems are electronic (e.g. electronic registers) and may be integrated with the RHIS but they are often separate systems and only selected aggregate data are extracted and submitted to the RHIS.

1.3.2 Surveillance systems

Surveillance systems may report daily, weekly and/or monthly on selected diseases and health conditions of public health significance. Some surveillance systems are integrated into the RHIS but in many contexts they use separate reporting systems.

[4] For further details on the components of a HIS, refer to the Health Metrics Network Framework. (http://www.who.int/healthmetrics/documents/hmn_framework200803.pdf)

[5] RHIS are also called health management information systems (HMIS). "HMIS" has also been used to describe the routine system for data not reported through programme-specific systems. For consistency, "RHIS" is used throughout this document.

[6] Some health systems or programmes rely on manual aggregation of paper-based data from multiple facilities before these aggregated values are entered into an electronic database (e.g. at district office level). In such systems, which do not keep an electronic copy of the report of each facility and each month, some of the facility-level charts and tables included in this guidance would have to be compiled manually.

1.3.3 Health service resource data

Resource data may be part of the overall HIS in different ways. Some data sets may be recorded in electronic databases while others may remain in paper format. Resource data systems may include:

- A **master facility list (MFL)** [7] contains a list of all health facilities in the administrative unit, with their location and level. The MFL should include public, private-for-profit, military, police, nongovernmental organizations (NGOs), faith-based and any other providers.
- **Health workforce / human resources information systems** maintain updated records of all health workers, including occupation and location. (Sometimes these databases are operated by the civil service authority rather than by health authorities.)
- **Logistic management information systems (LMIS)** support the management of stocks of medicines and other medical products. A well-developed LMIS records all movements of items from origin to destination, as well as movements within warehouses and facilities.
- **Financial management information systems** record all transactions related to budget execution (expenditure).

1.3.4 Population data

Population data serve as denominators for many RHIS indicators, e.g. utilization rates, coverage. It is important that all managers and analysts have an idea of the population the district system is expected to cover. However, there are often challenges in obtaining reliable population data.[8] Census-based estimates may be out-of-date or inaccurate; in general, the smaller the geographic area, the less reliable the population data. Especially challenging is the estimation of the population living in the "catchment area" of an individual health facility. Not only are estimates of populations living within a small area likely to be less reliable, but some persons living near a particular health facility may choose to seek services from a health facility in a different area.

For these reasons, when monitoring the performance of individual health facilities, this guidance recommends analyses that do not require target population estimates. Such analyses include: assessment of the trend in absolute numbers (i.e. the trend in a "numerator" alone, without reference to a "denominator"); and indicators using "facility-based" denominators (e.g. antenatal syphilis tests as a percentage of antenatal care first visits).

In some contexts, however, where facility catchment populations are considered reliable, facility coverage indicators and utilization rates can be calculated.[9] An example is presented in Box 2 below.

1.3.5 Other information sources

Other sources may include community information systems, civil registration systems, population-based surveys and health facility assessments (if available for district level), supervision reports, data from other sectors and informal sources. Information from these various sources can provide important insights into the district context and help in the interpretation of RHIS indicators.

[7] Master Facility List Resource Package: guidance for countries wanting to strengthen their Master Facility List. Geneva: World Health Organization; 2017. (https://www.who.int/healthinfo/country_monitoring_evaluation/mfl/en/#)

[8] Refer to the *Toolkit's General principles* document for further discussion on population estimates.

[9] In some countries a "Family Practice" approach is used as the main PHC delivery strategy. This usually includes registration of patients with a specific PHC facility or team. The list of registered patients then serves as the target population for the team or facility, enabling calculation of indicators with population denominators.

1.4 PRINCIPLES OF THIS GUIDANCE

This guidance is based on concepts and indicators presented in the *Toolkit* documents "*Integrated health services analysis: national level*" and "*General principles*". These documents include detailed discussions on data analysis concepts and individual indicators. The focus of the district and facility level guidance is on practical data analysis needs at these operational levels of the health system. The data analysis approach of this guidance is based on five principles, listed in Box 1.

Box 1 - Principles of this guidance

1. Integration - across programmes and services
2. Focused analysis – using core indicators
3. Standardization – of indicators, analyses and visualizations
4. Data quality assessment – along with analysis
5. Purpose-oriented analysis – for management and planning

1.4.1 Integration - across programmes and services

To make informed decisions, district managers need data that reflect performance across a wide range of domains and programmes: from coverage of immunization to utilization of financial resources. In this guidance, integrated analysis refers to the presentation of indicators from these multiple domains and programmes in ways that they can be reviewed together easily. This approach aims to reflect the scope of health service data as well as the relationships between different service components and indicators.

1.4.2 Focused analysis - using core indicators

A limited set of core indicators is used to promote focus on key service issues. These indicators serve as "tracers" to provide managers with a quick way to identify potential problems that can then be explored further through additional analysis and investigation. A summary list of core indicators for integrated health service analysis is provided in Chapter 2. These indicators are intended as a sample set, for countries and/or districts to adapt according to their context and priorities.

The core indicators are presented in three main groups, with subgroups:

Group 1 indicators- Health status and epidemiological profile:

- Mortality (institutional)
- Morbidity (inpatient and outpatient)

Group 2 indicators- Health service performance:

- Utilization and access
- Coverage and quality

Group 3 indicators- Health service resources:

- Availability, distribution and efficiency of resources required by health facilities: infrastructure, health workforce, medicines and medical products, and financial resources.[10]

Some indicators may not fit neatly into these groups. However, the groups and their subgroups are helpful in organizing the analysis and providing a focus on key aspects of service delivery.

[10] Health service resource data are complex and often not available in RHIS; however, selected concepts are briefly discussed to highlight the importance of reviewing RHIS data in relation to the resources needed to produce the services.

1.4.3 **Standardization** (of indicators, analyses and visualizations)

Standardization of data elements and indicators enables comparison over time and among places, populations and programmes. The ways in which the indicators are visualized can also be standardised: a set of standard charts, tables, etc. can be defined and grouped in a standard dashboard.

This document presents a sample set of standard dashboards for integrated health services analysis. There are dashboards for two analysis levels (health facility and district) and two time-frames (monthly and annual). Section 1.5 discusses ways of visualizing data with charts and tables. Section 1.6 introduces the sample dashboards that have been configured for a fictitious district.

Electronic data management systems such as the District Health Information Software 2 (DHIS2), have made it relatively easy to configure dashboards that present a range of charts, tables and maps. However, sometimes such dashboards include multiple unrelated tables and charts; furthermore, key indicators have sometimes been omitted. This document aims to provide database managers and staff that design visualizations with guidance on the most useful and reliable analyses and visualizations, based on a set of core indicators.

Health systems vary in their policies, priorities and data systems. For example, a country may not currently collect data on all the core indicators presented in this guidance or may use different names for data elements and indicators. Therefore, countries need to adapt the indicators and analyses according to their needs. This will usually require a process for reaching consensus on a limited set of "cross-cutting" indicators among the various stakeholders that will analyse and use the data, e.g. health programmes, HIS staff, district health officials, hospital authorities, partner organizations.

Health priorities and data systems may also vary among individual districts. District health authorities may want to customize dashboards to suit their needs. At the same time, it is important to maintain national technical oversight of such sub-national adaptations, to ensure that a standard core indicator set is available for comparison over time and among different geographic areas. In addition, a national standard core indicator set for integrated analysis, with standard analyses that all districts are required to produce, will help to ensure that key indicators are regularly reviewed and acted upon throughout the country.

1.4.4 **Data quality assessment –** along with analysis

For meaningful use by district and facility managers, the data used to produce the standard set of indicators should be complete, consistent and correct. Staff at facility and district levels are ideally placed to continually check the quality of data as they are entered into the system each month. Tools have also been developed to largely automate and speed up the process of identifying data quality problems such as suspicious values and missing data.[11]

Assessment of data quality is an essential first step in data analysis. For example: What percentage of monthly reports is missing? Are there any very suspicious monthly values ("extreme outliers")? Are there inconsistencies in the values of related data elements, e.g. a higher reported number of third doses than first doses of diphtheria–tetanus–pertussis (DTP) vaccine?[12] When review of the data reveals important missing values and inconsistencies, these should be investigated and, where appropriate, corrected. Health authorities at district level often have the authority to make such edits to the data, if they follow the established rules for documenting such changes.

[11] The WHO Data Quality Review (DQR) toolkit provides tools for automated quality review of RHIS data. WHO has also developed materials for rapidly training district and facility staff in use of DHIS2-based data quality tools. https://www.who.int/healthinfo/tools_data_analysis_routine_facility/en/

[12] Refer to the WHO DQR toolkit for detailed discussion of these and other measures of data quality.

Where inconsistencies and important missing values remain in the data, they should be presented along with the core indicator analysis. This enables understanding of the strengthens and limitations of the data and so assists in its interpretation. Such data quality findings can be included as part of a note attached to a related visualization and/or as part of a report summarizing key findings from a dashboard.

1.4.5 Purpose-oriented analysis – for management and planning

The main purpose of RHIS data is to facilitate management decision-making. This guidance offers recommendations for analysis of RHIS data to support decisions taken at district and facility levels. Analysis of data from recent months should inform short-term decisions, while review of year-to-year trends helps to guide longer-term planning.

Table 1 provides a framework summarizing these types of analyses and presents some examples of management actions informed by each type of analysis.

Table 1 : Types of analysis to support actions at district and facility levels

Level	**Health facility**		**District health system**	
Time-frame	**Short-term (monthly)**	**Long-term (annual)**	**Short-term (monthly)**	**Long-term (annual)**
Focus of the analysis	• Identify acute mortality and morbidity events • Monitor performance against targets • Monitor use of available resources	• Compare resource availability to outputs • Assess efficiency of services and programmes: staff productivity; costs per unit of service	• Monitor epidemiological trends • Monitor utilization and coverage (using population denominators) • Compare quality tracers across facilities	• Review epidemiological profile • Review equity in resource availability and service utilization • Compare efficiency across facilities • Compare with other districts
Actions informed by the analysis	• Address acute health events • Re-deploy existing resources within the facility • Address service quality issues based upon the findings	• Review and adjust resource requirements • Re-organize services within the facility	• Address acute health events • Re-deploy existing resources across the district • Adjust supervision priorities and schedule based on findings	• Adjust service delivery priorities • Plan resource requests to higher level • Allocate services across the district • Allocate resources among facilities

Note that some of the above long-term analyses relate to health resources; these analyses, while drawing upon RHIS data (and data from other sources), are not performed on a routine basis, but usually require special studies, e.g. efficiency analyses.

The sample dashboards for integrated analysis (Annexes 1 to 9) in this guidance were developed to provide examples of how RHIS data can assist managers in key decision-making areas for the above two time-frames at district and facility levels. Each dashboard consists of a sequence of visualizations (charts and tables), organised according to the indicator groups. Section 1.5 discusses the types of visualizations that are most suitable for particular purposes and ways to make use of the visualizations as part of staff meetings, supervision visits and feedback to staff.

1.5 ANALYSIS, INTERPRETATION and COMMUNICATION of RHIS FINDINGS

1.5.1 Ways to analyse RHIS data

Raw data are not very suitable for decision-making. They cannot be easily interpreted and may even be misleading. First, the data should be "cleaned" - reviewed for completeness and consistency and, where appropriate and possible, corrected. The data can then be visualized and analysed using well-designed charts and tables which enable easy identification and interpretation of key findings.

Most analyses involve some form of **comparison**: comparison over time (e.g. trends in malaria deaths); comparison between diseases (e.g. cases of malaria versus cases of pneumonia); comparison among health facilities (e.g. antenatal client screening for syphilis %); comparison against target populations (e.g. district DTP3 coverage). The types of comparisons that are used vary from one indicator to another. Several types of visualizations are useful for such comparisons. These are described below based on the questions: **When, Who, What, and Where?**

1.5.1.1. Comparisons over time – WHEN

Tables and charts can show how an indicator has changed over time (it's "trend"): over the short-term (e.g. last 12 months) or long-term (e.g. last 5 years). This enables comparison of a value in one time period to the values in other time periods. For example, for morbidity and mortality indicators, the trend may show an increase over time in certain diagnoses or causes of death. For a quality of care indicator, the trend may suggest an improvement or a decline in performance. A sharp rise or fall in the value of an indicator may also reflect a reporting error. Any significant, unexplained changes in any indicator warrant further investigation.

Figure 1 shows a table from one of the sample dashboards. It presents short-term trends in six indicators for inpatient mortality levels.

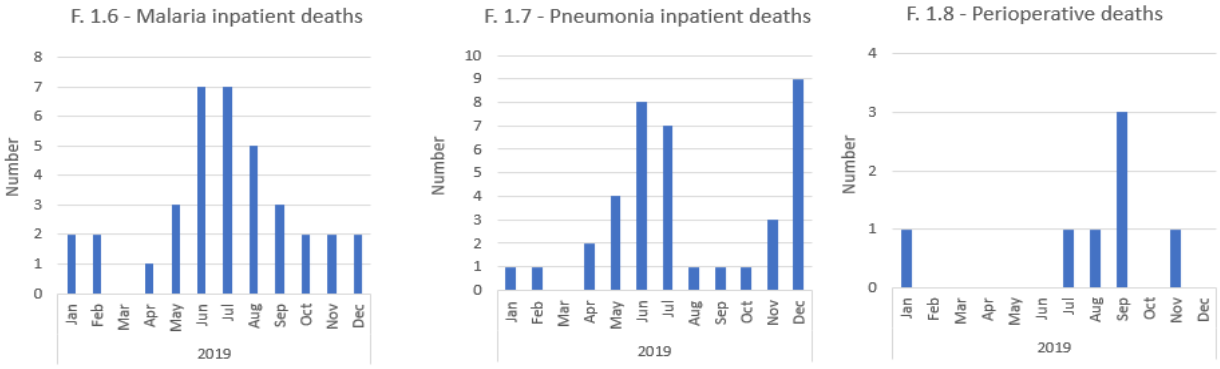
Question 1: In which month was there a sudden increase in the inpatient mortality rate? (*Click on the link to go to the answer in Annex 10. Then click Alt – Backspace to return to the question.*)

Figure 1: Short-term trends in mortality levels for Lupara District Hospital

F. 1.1 - Inpatient mortality levels (2019)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Institutional mortality rate (%)	6%	6%	0%	7%	7%	9%	9%	8%	8%	7%	6%	10%
Institutional under five mortality rate (%)	4%	5%	0%	6%	6%	6%	9%	10%	0%	5%	9%	6%
Institutional stillbirth rate (%)	5%	4%	4%	2%	3%	3%	5%	1%	4%	2%	3%	4%
Maternal deaths	1	0	0	1	0	0	1	0	0	0	3	0
Neonatal deaths	0	2	0	5	1	4	0	5	4	2	3	1
Stillbirths	10	7	8	4	7	6	10	3	8	4	5	7

Charts (Figure 2) provide a quick and clear impression of trends and differences in values. However, they are not suitable for presenting indicators with widely different values in the same chart.

Figure 2: Short-term trends in selected cause-specific mortality for Lupara District Hospital

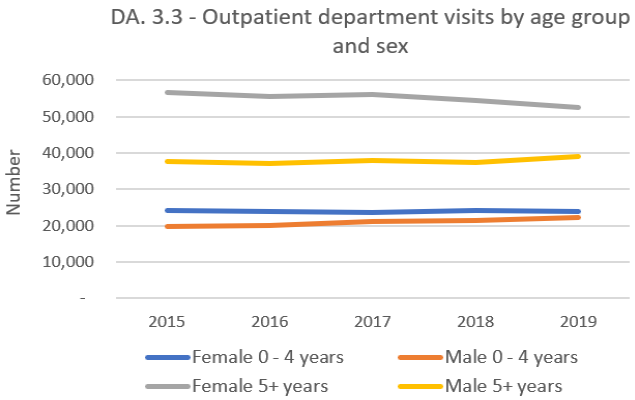


1.5.1.2. Comparisons of people – WHO

Where data are disaggregated by age group or sex, it is possible to compare the data for these groups to better understand **who** is making use of health services and how these groups differ. An example is given in Figure 3.[13]

Question 2: Which age group and which sex accounts for the most outpatient visits? What could be some possible explanations for these findings?

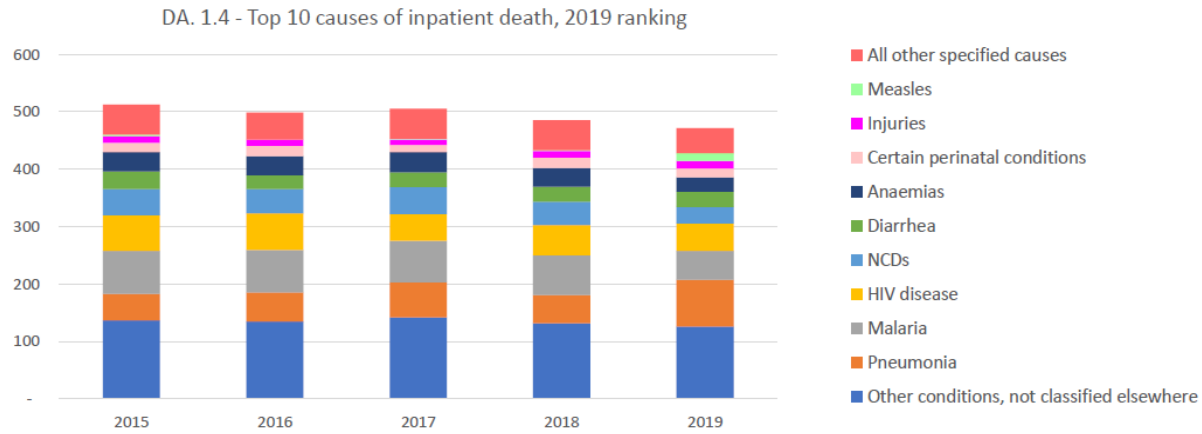
Figure 3: Long-term trends in OPD visits, by age group and sex



1.5.1.3. Comparisons of diseases - WHAT

A useful way to analyse mortality and morbidity data is to compare the numbers of cases of different diseases. Findings can be presented as a "stacked bar chart" as shown with Figures 4 and 5. Figure 4 shows the 5-year trend in the absolute number of deaths for each of the 10 leading causes of inpatient deaths. Note that the total reported number of inpatient deaths varies from year to year.

Figure 4 : Top 10 causes of inpatient deaths, Lupara district, 2015 - 2019



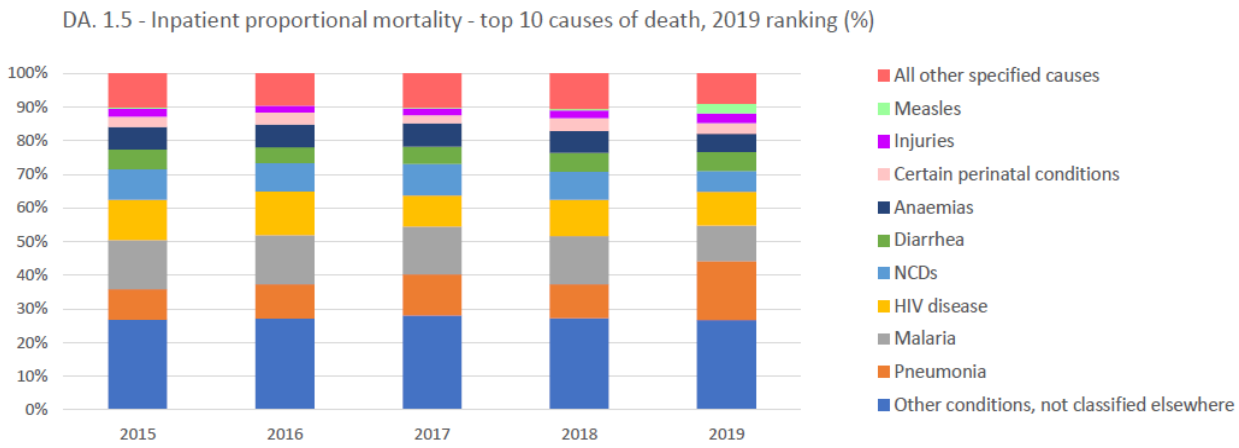
[13] By simultaneously presenting lines for different data elements, this chart illustrates not only comparison over time, but also comparison between disaggregations of an indicator.

Figure 5 presents the same data but shows the proportion of total deaths which were attributed to each of the 10 leading causes of death for each year. Note the following for Figure 5:

- the segments of each column add up to 100%;
- the segments represent the percentages for each of the top 10 causes plus a segment for "All other
- specified causes", which is the total of all the causes of death not included in the top 10;
- the series of columns shows how the percentages due to each cause have changed over time.

Question 3: What significant changes are shown in Figure 5 in the distribution of inpatient deaths in the district? The proportions changed for which causes and in which years?

Figure 5: Inpatient proportional mortality, Lupara District, 2015 - 2019



1.5.1.4. Comparisons of places - WHERE

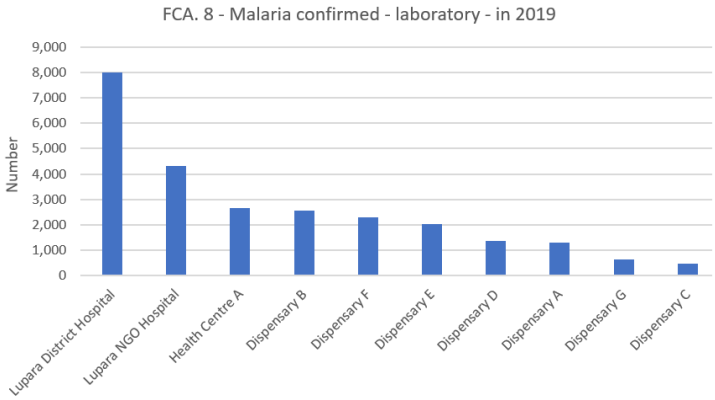
a) Comparisons of places using numerators only

Some indicators track simple numbers ("absolute numbers") without any further calculation. For example, Figure 6 shows the numbers of visits or procedures that took place in different health facilities over one year. These are also called "numerator-only indicators" – as opposed to an indicator that is calculated by dividing a numerator by a denominator (see the next section).

Figure 6: Numbers of cases, by health facility of Lupara District, last 1 year

FCA. 11 - Data elements	Lupara District	Lupara District Hospital	Lupara NGO Hospital	Health Centre A	Dispensary A
Inpatient discharges	**6,124**	4,318	1,076	730	
Surgical procedures (major)	**487**	353	134	0	0
Caesarean sections	**158**	148	10	0	0
Outpatient department visits	**166,985**	61,324	28,032	18,421	11,289
Contraceptive first time users	**2,256**	754	12	501	260
ANC 1st visits	**4,489**	1,839	141	806	530

Figure 7: Laboratory-confirmed malaria cases, last 1 year, by health

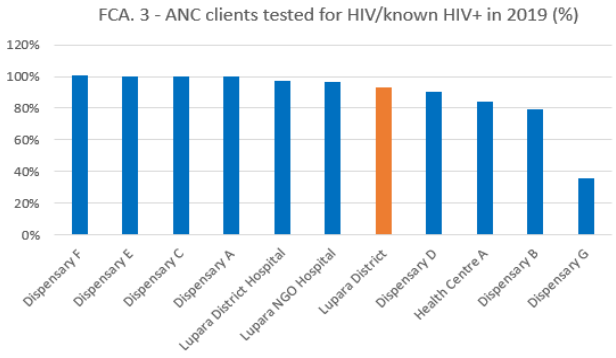


Various indicators can be used to assess the numbers of cases or activities managed by each health facility, e.g. numbers of OPD visits, inpatient discharges, ANC visits, immunizations, etc. This information is needed to guide decisions about the allocation of resources (e.g. staff, medicines, finances). Key findings can be shown in a table (Figure 6) or a bar chart (Figure 7).

b) Comparisons of places using indicators with facility-based denominators

Some indicators are calculated by dividing a numerator by a denominator using data that are collected in the same health facility. An example is shown in Figure 8. For this indicator, the number of ANC HIV tests done plus the number of ANC clients with known HIV positive status is divided by the number of ANC first visits. Such indicators can be used to compare the performance of health facilities. **Question 4**: Which health facility performed far below the district average (orange bar) for antenatal HIV testing?

Figure 8: Antenatal HIV testing (%), by health facility of Lupara District, 2019



c) Comparisons of places using population estimates as denominators

Finally, some indicators use population estimates as the denominator. Examples include the population coverage indicators (e.g. % children under one year of age that received a DTP3 dose); utilization indicators (e.g. number of OPD visits per year per person estimated to live in the area) and incidence indicators (e.g. number of inpatient malaria deaths per 100,000 persons estimated to live in the area). Such indicators can be calculated at district level where reliable estimates of the population and sub-groups of the population are available. Figures 9 and 10 show examples of visualizations of such indicators from the Lupara District dashboards. These charts show trends in indicators for a single district.

Figure 9 Immunization coverage, Lupara District

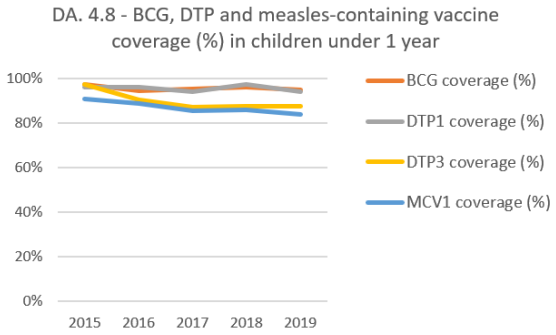
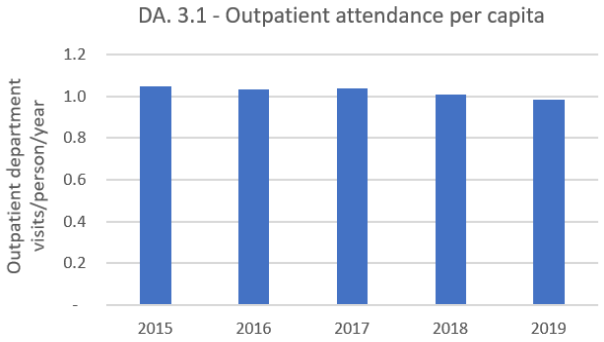


Figure 10 : OPD visits per person per year, Lupara District



Where reliable estimates of the target population are available, it is also possible to use these indicators (e.g. coverage, rates per 10 000 population, etc.) to compare different geographic areas such as districts. Example are given in Figures 11 and 12, which compare immunization coverage.

Figure 11 : Coverage of Pentavalent vaccine 1st and 3rd doses, by district, 2018 – from DHIS2 Data Use Training instance

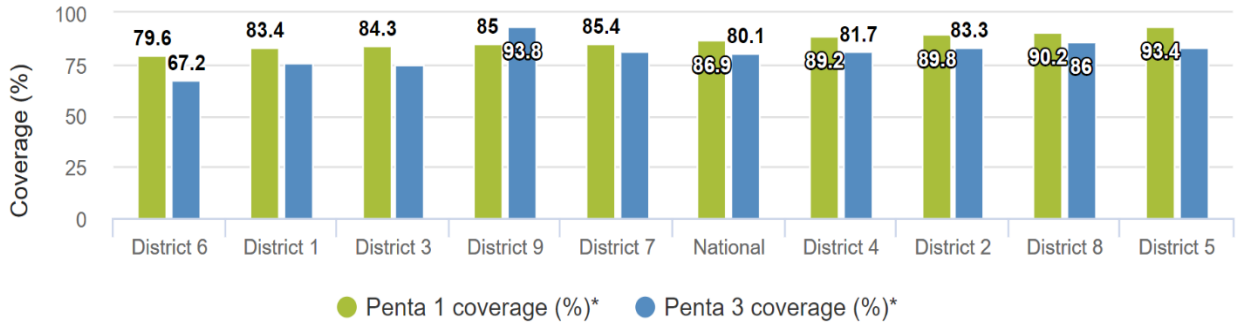
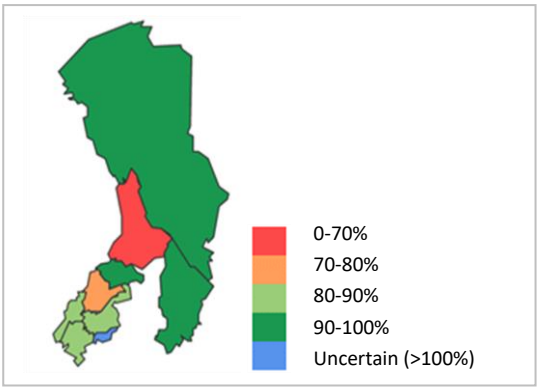


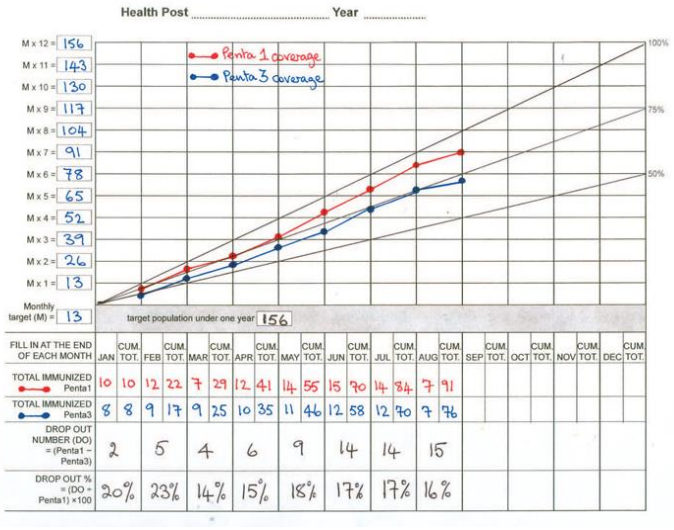
Figure 12: 2018 Penta 3 coverage, by district, Data Use Training instance of DHIS2



In theory, such indicators using a population denominator could also be calculated at facility level. However, this requires a reliable estimate for the "denominator": the population living in the facility "catchment area". An example is provided in Box 2. Reliable denominator estimates are often not available for the level of an individual health facility. Hence, this guidance uses analyses which do not require facility target populations for monitoring performance at facility level.

Box 2: Immunization monitoring charts – assessing performance at facility-level using a manual table and chart (when a reliable catchment population is available)

Where the catchment population for a health facility can be reliably estimated or counted (e.g. through a registration system), annual facility targets can be calculated, e.g. children under 1 year of age to be immunized. (Often these targets are provided by the district level). From such an annual target, a monthly target can be calculated and used to make a chart which compares the number of children targeted to be immunized since the beginning of the year (on the vertical axis) against the cumulative number of doses administered since the beginning of the year (on the horizontal axis). By adding numbers cumulatively each month and plotting results by hand, performance can be monitored without using a computer. However, it is important to note that the usefulness of this approach depends upon reliable estimation of the annual target for the health facility.



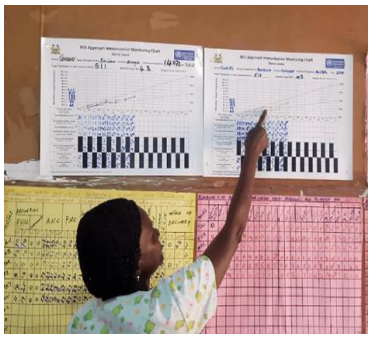


Photo: https://icap.columbia.edu/in-sierra-leone-improved-tracking-and-outreach-leads-to-surge-in-measles-immunization-coverage/

1.5.2 Communicating RHIS data findings - regular review meetings and dashboard dissemination

It may be possible for a small number of dedicated workers in the district health office and in each facility to complete all the tasks described in this guidance: data quality assurance; configuration of the charts and tables; review and interpretation of the dashboards; further investigations; and decision-making. However, involvement of a wide range of staff and partners will help to ensure understanding of the RHIS data by these stakeholders and to facilitate implementation of decisions based on the data.

This section describes how the approach suggested in this guidance could engage a broad array of key staff through a series of regular monthly or quarterly district-level review meetings and how printed dashboards could be disseminated monthly to facilities as part of a regular feedback mechanism.

1.5.2.1 District review meetings:

- **Participants:**
  - Managers of facilities and services, including the district health management team, officers-in-charge of first level facilities and inpatient facilities, and heads of clinical and support departments (e.g. pharmacy, laboratory, administration and finance).
  - Data managers, at district and facility levels
  - Supervisors and programme heads, i.e. staff members that can help to interpret and explain the issues identified through the indicators.

- **Preparations:**
  - A data quality desk review should be performed.[14] Based on the desk review, initial corrections can be made by, for example, contacting the facility where a potential data quality problem is identified.
  - The dashboards should be configured and, where participants do not have online access to the dashboards, printed copies should be made available.

- **Meeting objectives/agenda:**
  - **To review, discuss and interpret the charts and tables of the dashboards:**
    This should include any data quality issues and, if possible, provide explanations for the findings.
  - **To agree on immediate actions:**
    Dashboard interpretation should lead to decision-making. In the short term, these decisions should focus on further investigations or addressing specific problems (e.g. visiting a facility to address apparent poor performance), re-distribution of existing resources (e.g. transfer of staff from low- to high-workload facilities; re-distribution of medicines from facilities with an overstock) and/or service re-organization (e.g. expanding outreach activities to cover additional populations). Immediate linking of RHIS data with decision-making can help to build capacity in the use of data and to reinforce the relevance of the RHIS.
  - **To guide the next round of supervision visits**:
    Districts often have limited resources (e.g. staff, vehicles, budgets, time) to conduct supervision and it may not be feasible to regularly visit all facilities. The dashboards can be used to prioritise specific facilities for supervision visits, e.g. those where the data revealed problems or where further information is needed. The dashboards can also help to prioritize issues for supervision within a health facility. Supervision is often based on standard checklists; however, review of data

[14] Refer to WHO's *Data Quality Dashboards for District Level. 2020*. In press.

in advance of the visits can enable supervisors to identify issues for specific targeting during their visits.

- **To integrate results into the planning cycle:**
  One meeting per year should review annual and multi-annual system performance, and should include indicators appropriate for long-term review, e.g. those assessing access and equity. The results of these reviews should be part of the annual planning cycle, informing adjustments to activities and allocation of resources within the district, as well as supporting requests to higher levels for additional resources.

1.5.2.2 Dissemination of printed dashboards and feedback

Making standard dashboards consistently available to all facility and district managers can promote focused analysis on priorities, help programme staff to see their data within an overall integrated PHC context and also assist in capacity-building.

Dissemination mechanisms may include the following:

- Facility dashboards can be printed and sent to facility managers each month as part of a regular feedback mechanism. Ideally, written feedback on the data should accompany the dashboards.
- The dashboards can be printed and taken along on supervision visits.
- Dashboards can also be sent routinely to district managers and programme officers, via email or in hard copy.

1.6 INTRODUCTION TO THE SAMPLE DASHBOARDS AND DATABASE

The Lupara District Database

This guidance provides sample dashboards for a fictitious district called “Lupara”, created in an Excel database, the “Lupara District Database”. The dashboards are available in Annexes 1 to 9.

The Lupara District Database was created for several reasons:

- to demonstrate a comprehensive set of RHIS dashboards for district and facility levels that include most of the suggested core indicators for integrated health services analysis;
- to demonstrate recommended visualizations and good practice for presenting data; and
- to use in training materials and exercises.

The database contains data adapted from actual datasets of several countries but have been modified or modelled to illustrate specific concepts. These data do not reflect any specific district or country, nor do they necessarily represent good data quality. The Lupara dataset is limited to data elements needed to illustrate the core indicators presented in this guidance; it therefore does not represent the comprehensive data collected by a district RHIS. Excel was used as the database platform for convenience; its use is intended only for the purposes noted above. Actual RHIS databases require different platforms that are appropriate to national RHIS needs, e.g. the DHIS2.

Lupara District

Lupara District represents a rural district in a low-income country where malaria, HIV and TB are significant public health challenges and noncommunicable diseases are a growing problem. The district has a total population of 170 102 in 2019. There are ten health facilities in the district, including three inpatient facilities: Lupara District Hospital, Lupara NGO Hospital and Health Center A. There are seven first-level PHC facilities: Dispensaries A to G. With the exception of the NGO hospital, all the facilities are owned and managed by the ministry of health. Lupara District Hospital, located in the largest town of the district, serves as the district’s main referral center. Information on the numbers of inpatient beds and the staff per facility are found in the Resources dashboards.

This guidance contains nine sample dashboards, as summarized in Table 2:

Table 2 : Sample dashboards

Dashboards	Types of visualizations
Facility - short term (monthly x last 12 months[15]): Annex 1: F 12m MM - Mortality and morbidity Annex 2: F 12m UCQ - Utilization, coverage and quality	Monthly data over 12 months for a specific facility
District - short term (monthly x last 12 months): Annex 3: D 12m MM - Mortality and morbidity Annex 4: D 12m UCQ - Utilization, coverage and quality	Monthly data over 12 months for the district as a whole
District - long term (annual x last 5 years): Annex 5: D 5y MM - Mortality and morbidity Annex 6: D 5y UCQ - Utilization, coverage and quality	Annual data over 5 years for the district as a whole
Facility comparison: Annex 7: F comp 2019 - Facility comparison last calendar year or sum of last 12 months	Comparisons of the facilities in the district for a single time period
District health resources Annex 8: D 5Y RES Annex 9: F comp 2019 RES	Annual and/or monthly data on infrastructure, health workforce, stockouts and finances

Refer to the Annexes (see Annex 1) now to browse the dashboards and note the following:

- **The first six dashboards can be grouped into three pairs:**
  - Short-term trends for a specific health facility – Lupara District Hospital (Annexes 1 and 2)
  - Short-term trends for the district as-a-whole (Annexes 3 and 4)
  - Long-term trends for the district as-a-whole (Annexes 5 and 6)

- **The seventh dashboard shows comparisons of health facilities** for a one-year period (Annex 7)

- **The last pair of dashboards refer to health resources:**
  - These dashboards differ from the others in that they contain data from sources other than the Lupara District RHIS database.
  - Long-term trends for the district as-a- whole (Annex 8)
  - Comparisons of health facilities, one year (Annex 9)

- **The titles of each table or chart starts with a one-, two- or three-letter index:**
  - F: for facility 12-month trends
  - DM: for district 12-month trends
  - DA: for district 5-year trends
  - FCA: to compare facilities based on the last 12 months cumulative or the last one year
  - RA: for district 5-year trends in resources
  - FCR: to compare resources per facility based on the last one year

[15] The 12-month dashboards show the months of a calendar year; readers should assume the current date is January 2020 and that mostly complete data are available for each of the last 12 months (Jan - Dec 2019). For monthly or quarterly district meetings, dashboards should be produced for the most recent 12 months, e.g. a meeting in June 2020 should show data from June 2019 to May 2020.

- Each of the first six dashboards begins with a table summarizing the **completeness of reporting** of the relevant datasets.

- Each of the **MM dashboards** (Annexes 1, 3 and 5) is organized as follows:
  - Inpatient mortality
  - Inpatient morbidity
  - Outpatient morbidity

- Each of the **UCQ dashboards** (Annexes 2, 4 and 6) is organized as follows:
  - Utilization
  - Coverage and quality

- The **comparison dashboard** is organized as follows:
  - Facility comparison charts for selected indicators
  - Data element comparison table
  - Indicator comparison table

- Each of the **resources dashboards** is organized as follows:
  - Infrastructure
  - Health workforce
  - Medicines and medical products
  - Health finance

- **Reference tables** are provided after various dashboard sections for review of the values of multiple data elements and indicators.

- Hyperlinks inserted throughout the guidance enable the reader to easily find specific visualizations in the dashboards.

Question 5: For each of the following dashboards, describe what the visualizations have in common (for example, all the visualizations on the F 12m MM dashboard show short-term trends in mortality and morbidity data):

a. D 12m MM
b. D 5y UCQ
c. F comp 2019

Question 6: How is the F 12m UCQ dashboard different from the D 12m UCQ dashboard?

Question 7: How is the D 12m MM dashboard different from the D 5y MM dashboard?

2 Core indicators for integrated health service analysis

I. Health status & epidemiological profile	**MORTALITY (institutional)**		
	Mortality levels	1. Institutional mortality rate 2. Stillbirths in health facilities 3. Neonatal deaths in health facilities 4. Maternal deaths in health facilities	
	Leading causes of mortality	5. Leading causes of inpatient deaths	
	Mortality due to specific causes	6. Case fatality rates (CFR) for major causes 7. Population incidence of inpatient deaths 8. Peri-operative mortality rate	
	MORBIDITY (outpatient and inpatient)		
	Leading causes of morbidity	1. Leading inpatient discharge diagnoses (percentage distribution) 2. Leading outpatient diagnoses (percentage distribution)	
	Morbidity due to specific causes	3. Inpatient incidence rate 4. Outpatient incidence rate	
II. Health service performance	**UTILIZATION and ACCESS**		
	1. Outpatient attendance per capita 2. Hospital discharge rate 3. Caesarean section rate at population level		4. Surgical volume 5. Service-specific availability
	COVERAGE		
	1. Contraception first time users 2. Antenatal client 1st visit before 12 weeks 3. Antenatal care 1ST visit coverage 4. Antenatal care 4th visit coverage 5. Institutional delivery coverage		6. DTP3 coverage 7. Antiretroviral therapy (ART) coverage (current) 8. TB case notification rate 9. Hypertension new cases 10. Diabetes new cases
	QUALITY		
	1. Antenatal client syphilis screening 2. PMTCT testing 3. Intermittent preventive treatment for malaria during pregnancy (IPTp3) 4. Caesarean section rate at facility level 5. Immunization dropout rates 6. HIV care cascade		7. HIV tested new and relapse TB cases with a documented HIV status 8. Drug susceptibility test (DST) for TB cases 9. TB treatment success rate 10. Malaria diagnostic testing ratio 11. Confirmed malaria cases treated with ACT
III. Resources	**HEALTH SERVICE RESOURCES (availability, distribution and efficiency)**		
	Infrastructure	1.Health facility density and distribution 2. Hospital bed density	3. Bed occupancy rate (BOR) 4. Average length of stay (ALOS)
	Health workforce	5. Health worker density and distribution 6. Vacancy rate	7. Health worker productivity
	Essential medicines	8. Availability of essential medicines and commodities (UHC): health facilities with no stockout of essential items	
	Finance	9. Budget execution	

Detailed metadata including definition, calculation, recommended disaggregation and level of use are found at the beginning of the guidance sections for each indicator group.

3 Group I Indicators - Health status and epidemiological profile

3.1 MORTALITY (INSTITUTIONAL)

3.1.1 Core mortality indicators

Indicator	Definition	Calculation	Disaggregation	L
Mortality levels				
1. Institutional mortality rate	Deaths in health facilities (all causes) per 1000 discharges	N: Number of deaths in health facilities x 1000 D: Number of discharges* Discharges include deaths	Age (minimum: 0-4 and 5+ years) Sex; Cause of death Facility type Managing authority	D HF
2. Stillbirths in health facilities	Stillbirths* as a percentage of all births in health facilities *Baby born with no sign of life and weighing at least 1000g or born after 28 weeks of gestation	N: Number of stillbirths in health facilities x 100 D: Number of live births + still births in health facilities	Fresh, macerated	D HF
3. Neonatal deaths in health facilities	Number of newborns who die in the health facility in the first 28 days Includes any neonatal death in a facility that occurred in the first 28 days: pre-discharge after birth or upon re-admission for an illness	N: Number of neonatal deaths in health facilities	Cause of death (classified by ICD-PM) Facility type Managing authority	D HF
4. Maternal deaths in health facilities	Number of women who die in a health facility while pregnant or within the first 42 days of the end of pregnancy Includes women who gave birth outside a facility but who die in the health facility.	Number of maternal deaths in health facilities	Age (10-14, 15-19, 20+) Cause of death (classified by ICD-MM) Facility type	D HF
Leading causes of mortality				
5. Leading causes of inpatient deaths (percentage distribution)	Percentage distribution of the leading causes of death in health facilities (Proportional mortality)	N: Number of inpatient deaths by cause x 100 D: Total number of inpatient deaths	Age (0-4, 5+) Sex	D HF
Mortality due to specific causes				
6. Case fatality rates (CRF) for major causes	Cause-specific inpatient deaths per 100 discharges for major causes	N: Number of inpatient deaths due to cause "X" x 100 D: Number of discharges due to cause "X"	Age (0-4, 5+) Sex	D HF
7. Population incidence of inpatient deaths (e.g. malaria)	Number of inpatient malaria deaths per 100,000 population at risk of malaria	N: Number of inpatient deaths due to malaria x 100,000 D: Estimated total population of areas at risk of malaria	Age (0-4, 5+)	D HF
8. Perioperative mortality rate	All-cause death rate prior to discharge among patients that had one or more procedures in an operating theatre during the relevant admission	N: Number of deaths prior to discharge among inpatients that had a surgical procedure x 1000 D: Number of inpatients that had a surgical procedure	Emergency/ elective Procedure Age	D HF

L = Level of use D = District HF = Health facility

Facility type = provincial hospital, district hospital, health center, etc.; Managing authority/facility ownership = public, private, NGO, etc.; Geographic location is not presented as a disaggregation-type in the indicator tables, as all the data are expected to be analyzed by geographic location.

3.1.2 About the data

Institutional mortality refers to deaths that occur while patients are admitted in hospitals and other inpatient facilities.

In many countries, most deaths occur outside of health facilities, because of access challenges such as distance and lack of transport, as well as cultural, legal and financial issues. Civil registration and vital statistics (CRVS) systems are the official source of mortality information in a country or an administrative unit such as a district. However, these systems are under-developed in many contexts and health facility inpatient deaths (institutional mortality) are often the only available source of mortality data.

Inpatient deaths can provide an indication of the types of diseases or health conditions, and their severity, that occur in a district. They may point to an outbreak or the emergence of a new disease. They may also highlight possible delays in seeking care or problems with the quality of care in facilities. However, inpatient mortality data should be interpreted with caution, as the data are strongly influenced by the types of cases received by the facility and by the approach to recording and reporting causes of death.

Institutional mortality is part of the overall district mortality, which also includes deaths in the community. Institutional and overall district mortality profiles may be different, as certain causes of death may be more common in the community than in facilities, e.g. older people with NCDs may prefer to die at home; victims of road traffic accidents may die before reaching the hospital. Furthermore, institutional deaths may represent only a small proportion of the total deaths in the population; therefore, institutional deaths alone cannot be used to calculate overall district mortality rates.

Cause of death reporting should be standardized and coded, to avoid confusion between similar diagnoses or from ill-defined causes, and to enable comparison of the data over time and among locations. Official codes should be based on internationally agreed coding systems, such as the WHO International Classification of Diseases (ICD).[16] However, the ICD contains large numbers of diagnoses and may be challenging to use in some settings. To simplify cause of death reporting and analysis, WHO has developed the Start-Up Mortality List (SMoL)[17] as a first step towards standardized cause of death reporting.[18]

The cause of death should be based on the final diagnosis, as this may be different from the admission diagnosis. Mortality data should be disaggregated by sex and by at least the two age groups of 0-4 years and 5+ years.

3.1.3 Core analysis

Three ways to analyse institutional mortality are considered here:

- Mortality levels: the overall numbers and rates of inpatients deaths
- Leading causes of mortality: the percentage distribution of the leading causes of death
- Cause-specific mortality: the numbers and percentages of deaths due to various specific causes

3.1.3.1 Mortality levels

The purpose of this set of indicators is to assess the trends of institutional deaths and to identify unexpected changes in the overall numbers and rates.

[16] The International Classification of Diseases for Mortality and Morbidity Statistics (ICD) is a medical classification system produced by WHO. It is the international standard for reporting diseases and health conditions. https://www.who.int/classifications/en/

[17] World Health Organization (2014a). WHO application of ICD-10 for low-resource settings initial cause of death collection: The startup mortality list (ICD-10-SMoL). Vol 2.0. Geneva. http://www.who.int/healthinfo/civil_registration/ICD_10_SMoL.pdf

[18] For further details on cause of death reporting, refer to Toolkit module: Integrated health service analysis – national level

Figure 13 shows a table presenting mortality levels for Lupara District Hospital using three percentages and three absolute numbers of deaths.

Figure 13: Inpatient mortality levels, Lupara District Hospital, last 12 months

F. 1.1 - Inpatient mortality levels (2019)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Institutional mortality rate (%)	6%	6%		7%	7%	9%	9%	8%	8%	7%	6%	10%
Institutional under five mortality rate (%)	4%	5%		6%	6%	6%	9%	10%	0%	5%	9%	6%
Institutional stillbirth rate (%)	5%	4%	4%	2%	3%	3%	5%	1%	4%	2%	3%	4%
Maternal deaths	1	0		1	0	0	1	0	0	0	3	0
Neonatal deaths	0	2	0	5	1	4	0	5	4	2	3	1
Stillbirths	10	7	8	4	7	6	10	3	8	4	5	7

1. Institutional mortality rate compares the number of inpatient deaths in a specified period with the number of patients discharged from the facility in the same period. The denominator is the number of discharges. [19] Discharges include authorized discharges, transfers out and unauthorized discharges ("absconders"), as well as inpatient deaths.

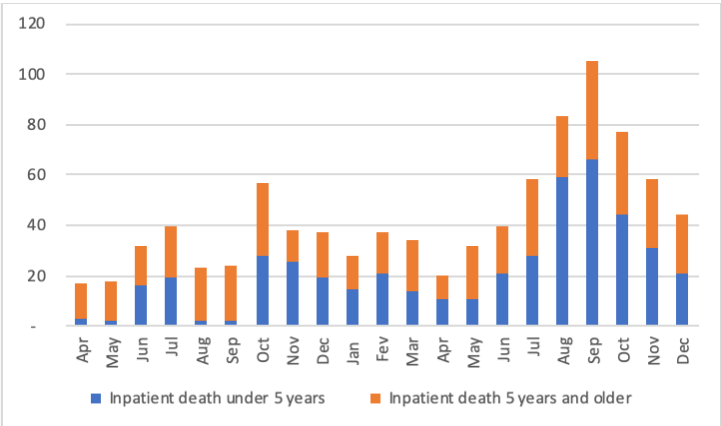
Institutional mortality is influenced by a number of issues, including the level of the facility (severe cases tend to go directly to referral hospitals, where care is perceived to be better), the range of services provided (patients requiring emergency surgery or suffering from cancer are more likely to die than others) and the context of the facility (e.g. access problems may delay care even if services are available). Therefore, comparing mortality rates between facilities or districts is very difficult.

Mortality level indicators (mortality rates or absolute numbers of deaths) are useful for assessing changes over time of institutional mortality in the same facility or in the district health system. This is illustrated by Figure 13 above (F. 1.1 of the F 12m MM dashboard). Other examples are: DM. 1.1 (D 12m MM) and DA. 1.1 a and DA. 1.1b (D 5y MM). **Question 8**: Compare DA. 1.1a and DA 1.1b in the D 5y MM dashboard. In which visualization is it easiest to identify a suspicious rise in the under five institutional mortality rate of the district?

Inpatient mortality should be disaggregated by at least two age groups (0-4 years, 4+ years) and by sex. Trends in such disaggregations are shown in F. 1.2/F. 1.3 (F12m MM dashboard), DM. 1.2/1.3 (D12m MM dashboard) and DA. 1.2 /1.3a/1.3b (D5y MM dashboard).

Another example is seen in Figure 14, which shows the monthly number of deaths in health facilities of Region A in Country X. A substantial increase in reported monthly deaths is seen between 2015 and 2016, which may represent an actual increase, but could also be due to improved reporting. Both years show an increase in the second half of the year, coinciding with the malaria season. However, in April, May, August and September 2015 very few under five deaths were reported, which points to probable data quality issues.

Figure 14 : Number of inpatient deaths by month and by age group. Apr 2015-Dec 2016, Region A, Country X.



[19] The use of discharges rather than admissions is preferred for this indicator.

Mortality data analysis should aim to identify mortality patterns different from those of previous months and years, which may reflect data quality problems or events that could explain increases in mortality, such as an outbreak or a shortage of staff or medicines. Identifying unexpected mortality patterns does not allow final conclusions to be reached but should trigger further investigations into finding the causes.

2. Stillbirths in health facilities / Institutional stillbirth rate. The stillbirth percentage is influenced by the types of cases received at a facility. Referral facilities that receive complicated cases may report much higher percentages of stillbirths than facilities that manage uncomplicated deliveries. Comparisons among facilities are therefore difficult. However, changes over time within the same facility should be investigated.

3. Number of neonatal deaths and **4. Number of maternal deaths.** Such deaths should be relatively rare events, especially at the level of an individual health facility. Therefore, any sudden increase in the numbers should be investigated.

Question 9: Review the trend in maternal deaths for Lupara District Hospital shown in F. 1.1 (dashboard F12m MM and Figure 13 above). Is there anything that warrants further investigation? Note that when an event is rare, a small change in the absolute number (e.g. from 1 to 3) represents a large percentage change and warrants careful investigation. When data are presented as a table of numbers, such small changes may be difficult to observe unless careful attention is focussed on key indicators.

3.1.3.2. Leading causes of mortality

5. Leading causes of inpatient death. This analysis provides a list of the most common causes of death in a facility or the district, and the relative proportion of each cause. This helps to create a mortality profile of the facility or district and may help to focus efforts on the main causes of death, e.g. in terms of investigating the underlying reasons, or improving staff training, service organization or supply of medicines.

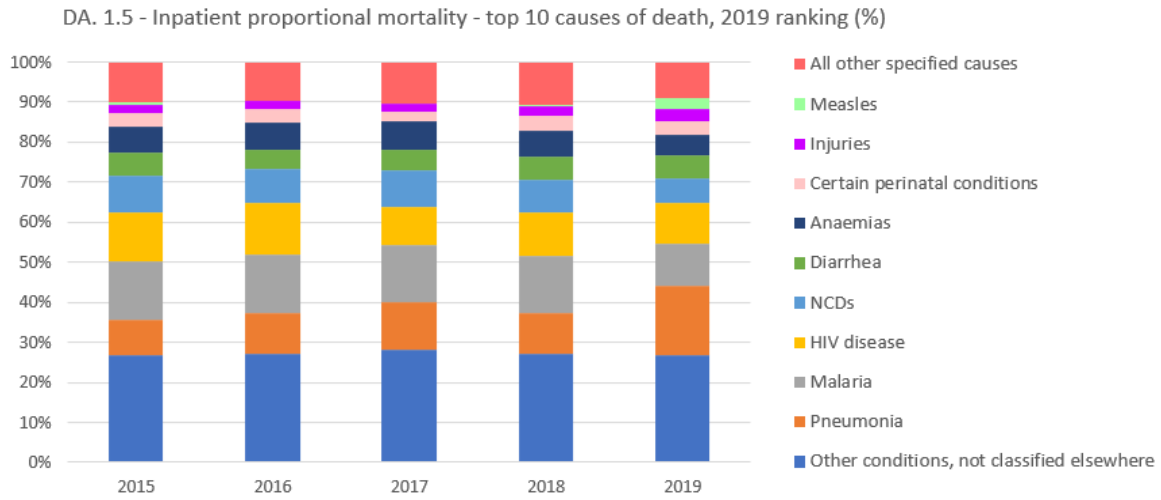
A list is created with a pre-agreed number of causes (e.g. top 10 or top 20). The list shows the number of deaths for each cause and the percentage out of the total deaths that each cause represents. The list is sorted from highest to lowest. Some causes of death such as types of injuries or chronic NCDs may be grouped together to demonstrate the importance of a particular group. Individual conditions (e.g. hypertension, diabetes, etc.) may rank low in the list, but if they are merged under "NCDs" their relative position as a cause of mortality may go up in the ranking.

For assessment of short-term trends, a series of stacked bars for each of the last 12 months (F. 1.4, DM. 1.4) can be used to identify any major change in the absolute numbers of deaths from the leading causes. Stacked bars (or a table) can also be used to show the proportions (percentages) of deaths (rather than the absolute numbers). Review of this profile over time enables identification of changes in the ranking of diseases, which may reflect increasing or decreasing importance of certain diseases as a cause of death. This is shown by Figure 15 (DA. 1.5).

Question 10: Figure 15 shows an increase in the proportion due to which cause(s) of death? For which cause of death did the proportion decrease?

Question 11: Consider the cause of death: "Other conditions, not classified elsewhere". Can health managers make decisions based on data for deaths classified with this cause?

Figure 15: Trends in proportion of deaths due to the top 10 causes, Lupara District, last 5 years[20]



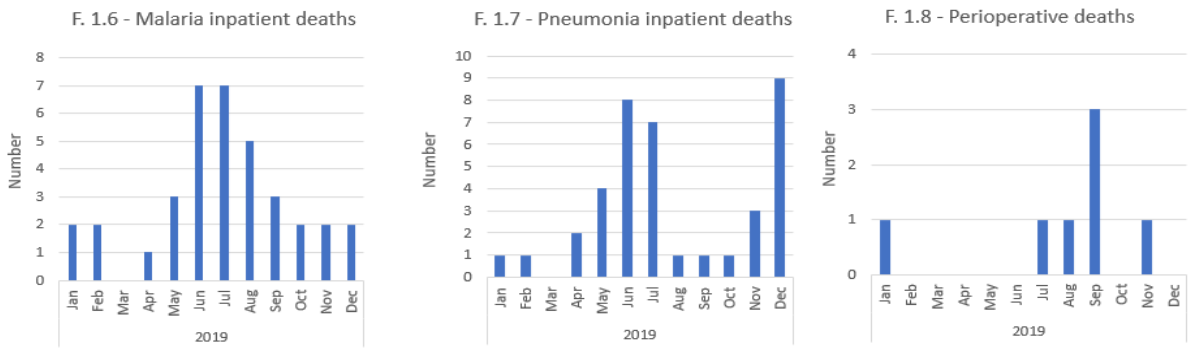
Unexpected events such as major disease outbreaks or changes in reporting practice (such as introduction of a new way of classifying causes of death) may substantially modify the ranking of diseases. However, other than in such situations, changes in the causes of death usually tend to occur slowly.

3.1.3.3. Mortality due to specific causes

Specific diseases or conditions may be selected for individual analysis, based on local disease burden and public health priorities, e.g. the district may decide to track certain diseases under surveillance or the trend in deaths due to diarrhoeal disease in children 0-4 years of age. Examples of this are shown in the Lupara F 12m MM dashboard (F. 1.6/1.7/1.8 see below), D 12m MM dashboard (DM. 1.6/1.7/1.8) and D 5y dashboard (DA. 1.6/1.7).

Question 12: Based on the data presented in Figure 16 (F. 1.6, F. 1.7 and F. 1.8), which findings demand further investigation? What is a possible explanation for why none of the three charts shows data for March?

Figure 16: Trends in absolute numbers of deaths from selected causes, last 12 months, Lupara District Hospital



Two further indicators are also used to monitor mortality due to specific causes:

6. Case fatality rates. This includes case fatality due to specific diseases (e.g. malaria, pneumonia) as well as mortality following major surgical procedures (peri-operative mortality rate). Trends in these rates are assessed with F. 1.9, DM. 1.9 and DA. 1.8. Case fatality rates may be influenced by quality of care but can be difficult to interpret as they can vary based on many factors, e.g. severity of illness on admission, age, nutritional status, other underlying illnesses, time since onset, etc.

[20] "2019 ranking" in the chart title: the data are sorted according from highest to lowest for 2019

Figure 17: Select case fatality rates, Lupara District Hospital, last 12 months

F. 1.9 - Selected fatality rates (2019)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Malaria case fatality rate (%)	5%	5%		1%	2%	5%	5%	4%	4%	5%	4%	5%
Pneumonia case fatality rate (%)	3%	4%		8%	7%	10%	12%	6%	7%	5%	12%	12%
Perioperative mortality rate (%)	3%	0%		0%	0%	0%	3%	3%	6%	0%	3%	0%

7. Population incidence of inpatient deaths due to a specific cause. This indicator assesses, at district level, the rate of deaths from a specific condition compared to the population at risk of that condition. The Lupara D5y dashboard shows the trend over the last 5 years in the population incidence of inpatient deaths from malaria (DA. 1.6) and pneumonia (DA. 1.7). As noted previously, due to unreported deaths in the community, the incidence of inpatient deaths from a disease should not be confused with the total incidence of deaths from the disease in the district. Nonetheless, for certain diseases it may be worth tracking trends in the incidence of inpatient deaths as an indirect proxy of trends in total deaths in the population.

8. Perioperative mortality rate. As with stillbirths, perioperative deaths are highly dependent on the types of cases received at the facility. Comparisons among facilities are difficult, but changes over time in the same facility should be investigated.

Question 13: Compare the trend shown in F. 1.8 with the trend shown in the bottom row of table F. 1.9 (Figure 17). Explain how and why the two trends are similar. Explain why these two trends are not identical.

3.2 MORBIDITY (outpatient and inpatient)

3.2.1 Core indicators

Indicator	Definition	Calculation	Disaggregation	L
Leading causes of morbidity				
1. Leading inpatient discharge diagnoses (percentage distribution)	Percentage distribution of the leading inpatient discharge diagnoses (Inpatient proportional morbidity)	N: Number of discharges by diagnosis x 100 D: Total number of discharges Discharges include deaths	Age (minimum: 0-4, 5+ years) Sex Facility type	D HF
2. Leading outpatient diagnoses (percentage distribution)	Percentage distribution of the leading new outpatient visits (Outpatient proportional morbidity) Includes only new visits for a specific diagnosis	N: Number of new visits by diagnosis X 100 D: Total number of new outpatient visits	Age (0-4, 5+) Sex Facility type	D HF
Morbidity due to specific conditions				
3. Inpatient incidence rate	The number of discharges per inpatient diagnosis per 1,000 population	N: Number of discharges by diagnosis X 1000 D: Total population	Age (0-4, 5+) Sex Facility type	D
4.Outpatient incidence rate	The number of new visits per outpatient diagnosis per 1000 population Includes only new visits for a specific diagnosis	N: Number of new outpatient visits by diagnosis X 1000 D: Total population	Age (0-4, 5+) Sex Facility type Disease-specific disaggregations	D

L = Level of indicator use D = District HF = Health facility

3.2.2 About the data

Institutional morbidity refers to the diseases and health conditions for which people seek care at outpatient departments (OPD) or for which they are admitted to inpatient departments (IPD).

Facility-based morbidity data have some similar limitations to mortality data. A large percentage of cases may not seek care in health facilities; therefore, facility morbidity data do not represent the true disease burden in the community. Also, in some contexts, many episodes of disease may be managed at pharmacies or by informal providers, and never be recorded or reported. Nevertheless, facility morbidity data can contribute to an understanding of disease patterns in the community.

Morbidity data are collected according to diagnostic categories. In many settings, the diagnostic categories are defined through a coding system, e.g. the ICD. In other settings, particularly for OPD, morbidity data are collected using a nationally-defined list of priority diagnoses. OPD and IPD morbidity data are analysed separately. Data on deliveries are not usually included in morbidity data.

Morbidity data provide information on both diseases of epidemic potential and diseases which, while not of urgent public health importance, represent a burden on the health system or a burden on the community in terms of disabling complications or death. Morbidity analysis can be useful to identify outbreaks that require urgent action, or to point to cases of vaccine-preventable diseases that may or not be related to lower immunization coverage. Data on epidemic-prone diseases may be collected on both “general” OPD/IPD reports as well as on surveillance reports. Discrepancies between OPD/IPD reports and surveillance reports should be investigated, to assess data quality and confirm that the relevant cases are captured in both reports.

Morbidity analysis enables the creation of a morbidity profile of the facility or district, showing the main diseases and conditions managed in facilities. This profile can support planning of resources (staff, medicines, laboratory capacity, training, etc.) that are needed for the management of these conditions.

The overall burden on the district health system from people seeking curative care is assessed through indicators of outpatient and inpatient service utilization, discussed in the "Group II indicators" chapter.

3.2.3 Core analysis

Two ways of analysing data on institutional morbidity are considered here:

- Leading causes of morbidity: the percentage distribution of the leading diseases/conditions
- Morbidity due to specific conditions: the numbers of cases or the population incidence of selected diseases or conditions

3.2.3.1. Leading causes of morbidity

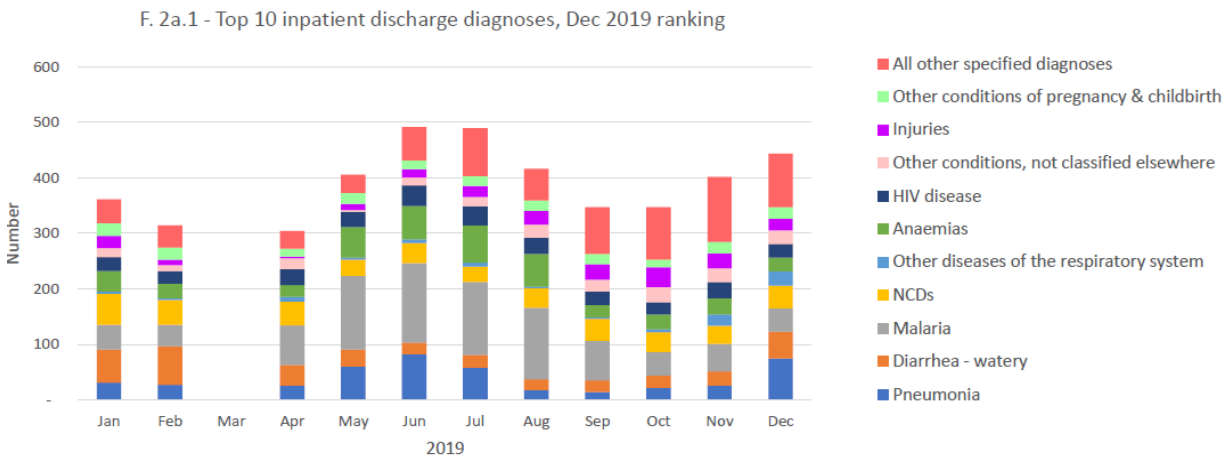
The leading causes of morbidity (or "top 10") analysis shows the most common diseases and conditions for which people seek care at a health facility.

1. Leading inpatient discharge diagnoses and **2. leading outpatient diagnoses** each provide a ranked list of the 10 to 20 most common diagnoses and the percentage that each diagnosis represents out of the total IPD or OPD diagnoses. The remaining diagnoses are then grouped under "all other specified diagnoses" [21] (which may sometimes represent a large percentage of the total diagnoses).

Calculation of the leading outpatient diagnoses includes only new cases: both numerator and denominator refer only to the first OPD visit for a particular disease or condition. For example, a hypertension case is only included for the visit at which the diagnosis is first made. Follow-up visits are not included. Therefore, the total number of OPD diagnoses (new cases) used in the causes of morbidity analysis will be different from the total number of OPD visits (new and repeat visits) counted under OPD attendance and used to calculate the OPD utilization indicator.

For assessment of short-term trends in IPD and OPD diagnoses, a series of stacked bars for each of the last 12 months can be used to identify any major change in the absolute numbers of the leading diagnoses (F. 2a.1, F. 2a.2, DM. 2a.1, DM. 2a.2; see Figure 18 below for an example). **Question 14**: Figure 18 shows a seasonal increase in which diagnoses?

Figure 18: Trend in the distribution of inpatient diagnoses, Lupara District Hospital, last 12 months

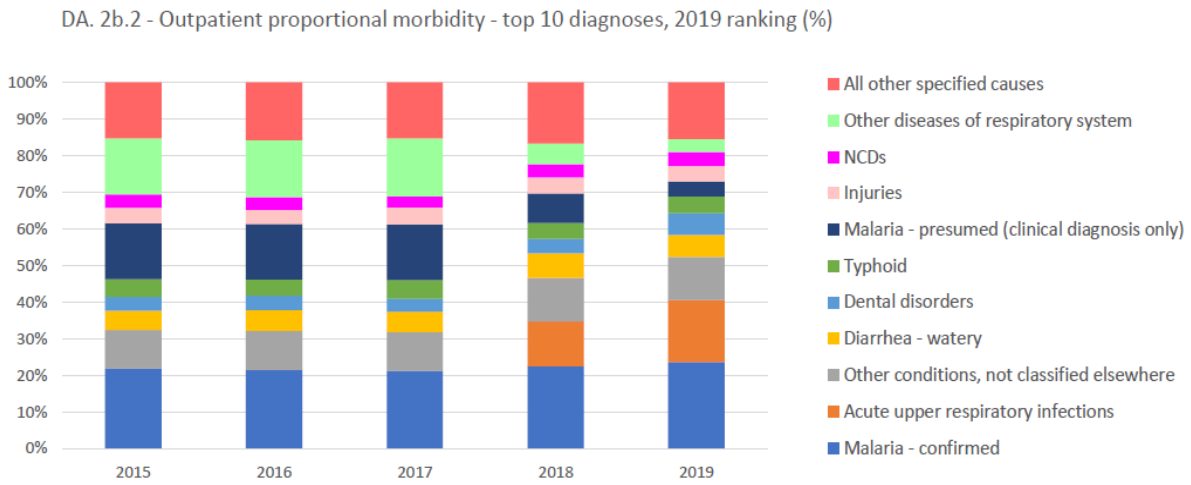


[21] This is a group of specified diagnoses and is different from the diagnostic category "Other". A large proportion of cases classified as "Other" may point to poor diagnostic skills or insufficient diagnostic categories on the reporting form.

The data in Figure 18 can also be presented with the stacked bars showing the proportion for each diagnosis, rather than the absolute numbers. Review of the morbidity profiles over time may help to identify changes in the pattern of diseases seen at health facilities. Changes in the ranking of causes of morbidity may also reflect changes in the classification system or in diagnostic practices.

Consider the trends shown in Figure 19 for Lupara District (DA. 2b.2 of D 5y MM). **Question 15**: Describe the trend in diagnoses of presumed malaria (dark blue). Discuss how this trend could be explained by the widespread adoption of malaria rapid diagnostic testing (RDT) kits beginning in 2018. How could this explain the increasing proportion of diagnoses of "Other conditions, not classified elsewhere"? Describe the trend in "Other diseases of respiratory system". Discuss how this trend could be explained by the introduction in 2018 of a new diagnostic category, "Acute upper respiratory infections".

Figure 19: Trend in the proportional distribution of outpatient diagnoses, Lupara District, last 5 years



The rank of a disease or group of diseases in the list may depend on the grouping used for reporting or for the calculations. Sometimes, it is useful to group certain related diagnoses, e.g. various types of NCDs or injuries, to show the importance of the group as a whole (which will rank higher than the individual diagnoses within the group). Note in Figure 19 that NCDs ranked # 9 as an outpatient diagnosis in Lupara District in 2019. **Question 16**: How would the chart appear different if each NCD (hypertension, heart failure, diabetes, etc.) was listed as a separate diagnosis instead of being grouped together as NCDs?

3.2.3.2. Morbidity due to specific conditions

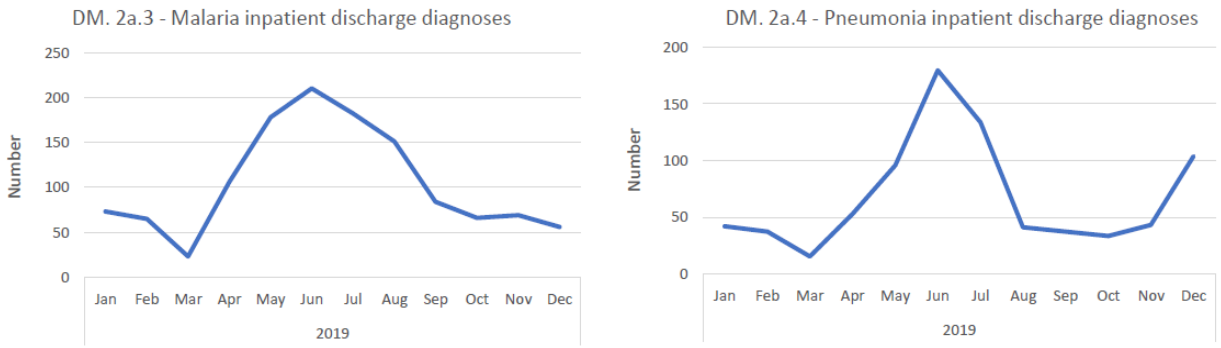
In addition to the leading causes of morbidity analysis, the district may want to specifically track selected diseases, based on local or national priorities. The dashboards for Lupara District include charts and tables for monitoring trends in inpatient and in outpatient cases of malaria and pneumonia:

- short-term trends at facility level (F 12m MM dashboard): F. 2a.3/F2a.4 for inpatients (Figure 20) and F. 2b.3/2b.4 for outpatients
- short-term trends at district level (D 12m MM dashboard): DM. 2a.3/2a.4/2b.3/2b.4

In addition, data on new cases of diseases related to specific programmes, e.g. new HIV positive tests, TB notifications, hypertension and diabetes (see, for example F. 4.10/4.11), are presented on the "UCQ" dashboards for utilization, coverage and quality.[22] Note that while the numbers of diseases reported on OPD and IPD morbidity reports should be consistent with those provided through programme reports, this is often not the case. Further investigation is needed to address such discrepancies. This is an example of the need for review of internal consistency during data quality assessment.

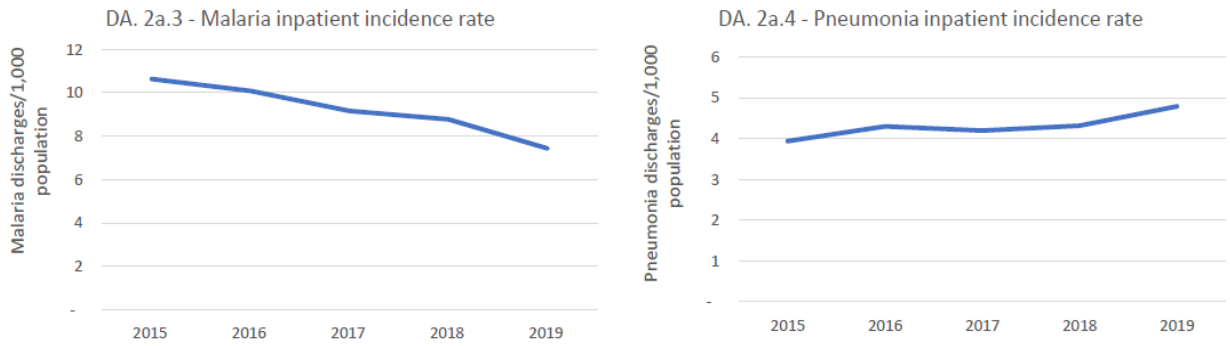
[22] Trends in new cases of diseases related to specific programmes could also be presented in the mortality and morbidity dashboards. However, in this guidance, they are presented in the coverage and quality dashboards to enable easy viewing in relation to other programme-specific indicators.

Figure 20 : Trends in the absolute numbers of selected inpatient diagnoses, last 12 months, Lupara District



3. Inpatient incidence rate and **4. Outpatient incidence rate**. The Lupara dashboards also include charts for monitoring the 5-year trends for the selected diagnoses at district level. At district level, where reliable estimates of the population are more likely to be available (than for individual facilities), it is also possible to calculate the population incidence for the selected outpatient and inpatient diagnoses. Examples are provided on the D 5y MM dashboard (DA. 2a.3/2a.4/2b.3/2b.4; see Figure 21).

Figure 21: Trends in the population incidence of selected inpatient diagnoses, Lupara District, last 5 years



Question 17: Explain the difference between the indicators charted in Figure 20 and those in Figure 21. Could the indicators in Figure 21 be used to compare the risk of malaria or the risk of pneumonia in different parts of a district? Why or why not?

3.2.3.3. Selected diseases for surveillance

Special attention should be given to the incidence of select epidemic-prone diseases. Data on the absolute numbers of cases of these diseases in Lupara District are show in Tables F. 2b.5 (F 12m MM), DM. 2b.5 (D 12y MM) and DA. 2b.5 (D 5y MM). **Question 18**: Describe any possible outbreaks suggested by Figure 22 (which disease and which month?).

Figure 22: Absolute numbers of cases of select diseases for surveillance, Lupara District, last 12 months

DM. 2b.5 - Selected diseases for surveillance (2019)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Acute haemorragic fever syndrome	0	0	0	0	0	0	0	0	0	0	0	0
Meningitis	2	0	0	0	0	1	0	1	0	2	0	0
Cholera	0	0	0	0	0	0	0	0	0	0	0	0
Diarrhea - with blood	4	5	8	3	8	7	7	4	1	3	1	3
Influenza-like illness	0	0	0	0	0	0	0	0	0	0	0	0
Measles	0	0	1	5	21	37	0	0	1	0	1	0
Mumps	3	3	2	5	0	5	5	6	2	1	2	3
Tetanus neonatal	0	0	0	0	0	0	0	0	0	0	0	0
Lymphatic filariasis	0	0	0	0	0	0	0	0	0	0	0	0

4 Group II indicators – Health service performance

4.1 UTILIZATION AND ACCESS

4.1.1 Core indicators

Indicator	Definition	Calculation	Disaggregation	L
1. Outpatient attendance per capita (Outpatient service utilization)	Number of outpatient department (OPD) visits per person per year Includes viisits for curative care only	N: Number of new visits + re-visits to OPD in a year D: Total population	Age (<5, >5) Sex	D
2. Hospital[23] discharge rate (Inpatient service utilization)	Number of inpatient discharges per 100 population per year Includes authorized discharges, absconsions, transfers out and deaths; excludes discharges for delivery	N: Number of inpatient discharges in a year X 100 D: Total population	Age (<5, >5) Sex Facility type	D
3. Caesarean section rate at population level	Percentage of deliveries by caesarean section among estimated live births in the population	N: Number of caesarean sections in a facility X 100 D: Estimated number of live births in the population	Age (10-14;15-19; 20+) Facility type	D
4. Surgical volume	Number of surgical procedures undertaken in an operating theatre per 100 000 population per year A surgical procedure is defined as the incision, excision or manipulation of tissue that needs regional or general anaesthesia, or profound sedation to control pain.	N: Number of surgical procedures in a year X 100 000 D: Total population	Procedure type Emergency vs Elective Facility type	D
5. Service-specific availability	a) Number of health facilities offering specific services per 10 000 population b) Percentage of facilities offering the specific service Specific service may include: general outpatient curative services; specific services, e.g. care for HIV, TB, NCDs, mental health; general maternal child health services; immunizations; basic emergency obstetric and neonatal care (BEmONC); comprehensive emergency obstetric and neonatal care (CEmONC); basic and comprehensive surgical care; laboratory; radiology, etc.	N: Number of facilities offering the service X 10 000 D: Total population N: Number of facilities offering the service X 100 D: Total number of facilities	Facility type Facility ownership	D

4.1.2 About the data

Service utilization refers to how often people use health services. **Access** refers to whether people are able to reach health services and use them.

Access may be influenced by many factors such as availability and functionality of services, distances to facilities, financial barriers and cultural issues. Utilization is often used to provide a rough indication (or proxy measure) of access. However, it involves more than the ability to access services: it also reflects

[23]"Hospital discharge rate" is often used to express the inpatient discharge rate; "discharge rate" is preferred to "admission rate".

whether people choose to use the services. This section discusses utilization and the availability[24] of specific services as proxies for access.

Three ways to analyse data on utilization and service availability are considered here:

- Overall service utilization:
  - Outpatient utilization: outpatient attendance per capita[25]
  - Inpatient utilization: inpatient discharges per 100 population
- Surgical service utilization: caesarean section rate at population level; surgical volume
- Service-specific availability: e.g. laboratory services

As population estimates are usually available for district level, district level utilization rates (e.g. outpatient visits per capita; hospital discharges per 100 population) can be calculated, enabling assessment of service utilization over time, as well as comparisons with other districts. As previously discussed, individual health facilities may not have reliable catchment population estimates. In this case, absolute numbers can be monitored, i.e. number of OPD visits and number of hospital discharges during a specified period. Although the absolute numbers do not allow utilization rate comparisons among facilities, they are useful for assessing changes over time in the same facility and for providing a rough idea of the utilization burden on different facilities (and hence their need for resources).

Utilization is strongly influenced by the needs and perceptions of the population. For example, it may increase quickly if an outbreak increases the number of people seeking care, but also if a new service (e.g. a nutrition programme) is introduced. Outpatient utilization may also decrease rapidly, for example, if the population becomes aware of medicine shortages.

The Lupara dashboards include charts showing trends in outpatient and inpatient utilization over the short-term for each health facility (F. 3.1/3.2 on the F 12m UCQ dashboard), short-term at district level (DM 3.1, DM.3.2 and DM. 3.3 on the D 12m UCQ dashboard) and long-term at district level (DA. 3.1, DA. 3.2 and DA. 3.3 on the D 5y UCQ dashboard). Figure 23 shows a mid-year seasonal increase in total outpatient utilization for the facilities of Lupara District. **Question 19**: For one month of 2019, the outpatient report of the largest health facility in the district was not submitted. For which month is the report missing? Figure 24 shows that the seasonal increase was also seen in June for Dispensary G, but outpatient utilization dropped sharply in the July, August and September. **Question 20**: What factors could possibly account for this sharp drop?

Figure 23 : OPD visits, last 12 months, Lupara District

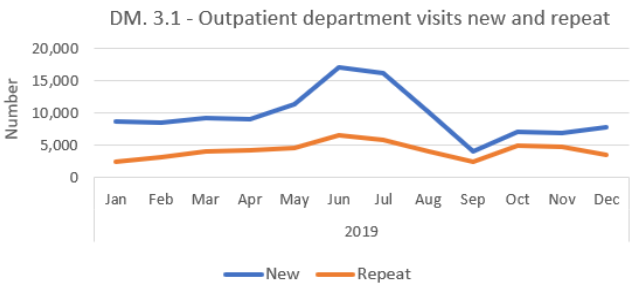
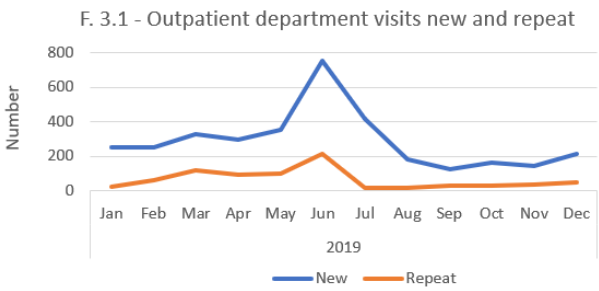


Figure 24 : OPD visits, last 12 months, Dispensary G



The Lupara dashboard also includes charts comparing the OPD visit numbers of facilities for the last one year or last 12 months cumulative (FCA.1 of F comp 2019). Figure 25 presents the percentage of all OPD visits (new visits plus re-visits) reported by each facility in the district. Lupara District Hospital reports more than 35% of all OPD visits in the district and, overall, the two hospitals account for 58% of OPD visits. This may reflect possible inappropriate use of hospital services for PHC needs, perhaps because of

[24] Access to health system resources or inputs (infrastructure, staff, medicines, etc.) are discussed under Group III indicators.

[25] This indicator may be expressed in various ways, e.g. outpatient consultations per person per year, OPD visits per person per year.

perceptions of better quality of care at hospital level; alternately, these hospitals may receive referrals from other districts or most of the population could be concentrated near these facilities. Further investigation is needed to understand the picture.

Figure 25: Outpatient visits, 2019, by health facility of Lupara District

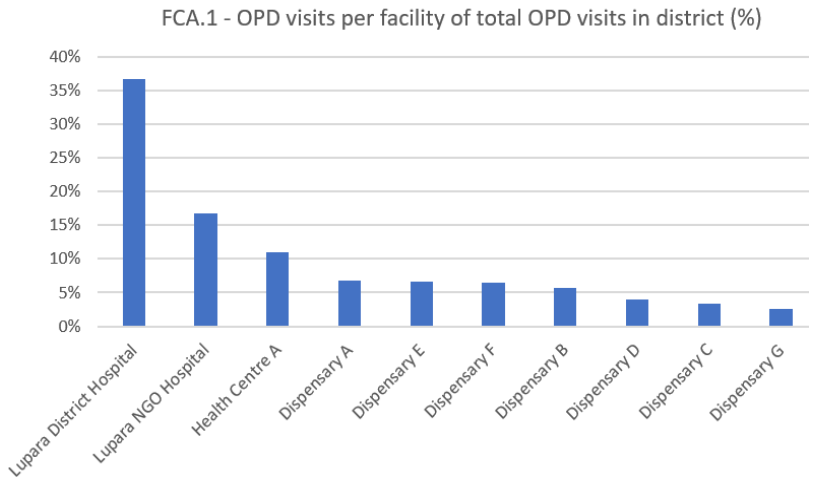


Figure 26 (from the F comp 2019 dashboard) shows how a single table can be used to compare the outpatient and inpatient numbers as well as the number of specific services delivered by each health facility in a district. Such a table deserves careful review as it presents a wealth of information about the outputs of each health facility. **Question 21:** Health Center A accounted for approximately what percentage of the inpatient discharges reported in the district in 2019?

Figure 26: Table for comparison of numbers of services provided, totals of last 12 months, by health facility of Lupara District

FCA. 11 - Data elements	Lupara District	Lupara District Hospital	Lupara NGO Hospital	Health Centre A	Dispensary A	Dispensary B	Dispensary C	Dispensary D	Dispensary E	Dispensary F	Dispensary G
Inpatient discharges	**6,124**	4,318	1,076	730							
Surgical procedures (major)	**487**	353	134	0	0	0			0	0	0
Caesarean sections	**158**	148	10	0	0	0	0	0	0	0	0
Outpatient department visits	**166,985**	61,324	28,032	18,421	11,289	9,633	5,578	6,644	11,046	10,795	4,223
Contraceptive first time users	**2,256**	754	12	501	260	132	42	39	220	254	42
ANC 1st visits	**4,489**	1,839	141	806	530	361	59	194	288	240	31
ANC 4th visits	**2,688**	1,356	54	323	335	170	63	70	144	164	9
Deliveries in facilities	**3,803**	2,427	54	460	380	86	17	54	40	284	1
BCG doses given <1 year	**4,582**	1,689	147	924	560	339	92	217	266	348	
DPT1 doses given <1 year	**4,556**	1,715	147	915	503	334	99	221	271	351	
DPT3 doses given <1 year	**4,242**	1,515	139	813	593	307	101	192	252	330	
MCV1 doses given <1 year	**4,061**	1,517	139	894	330	331	83	204	259	305	
MCV2 doses given	**3,008**	1,307	30	636	168	269	45	172	216	165	0
HIV tests positive	**532**	464	23	20	17	0	0	0	5	3	0
PLHIV new on ART	**537**	479	19	17	16	0	0	0	4	2	0
PLHIV currently on ART	**46,965**	44,594	743	744	459	84	0	84	130	127	0
Malaria - confirmed	**25,519**	8,026	4,301	2,642	1,271	2,560	442	1,349	2,025	2,288	615
Malaria - presumed (clinical diagnosis only)	**5,011**	557	274	2,019	91	520	724	132	165	278	251
Diabetes new cases	**197**	177	10	3		2		2	2	1	
Hypertension new cases	**3,163**	2,258	399	156		76		132	71	71	

Charts showing disaggregation of inpatient utilization by age group (DA. 3.5 of D 5y UCQ; DM 3.3 of D 12m UCQ; F. 3.3 of F 12m UCQ) and disaggregation of outpatient utilization by age group and/or sex (DA. 3.2/3.3 of D 5y UCQ; DM. 3.2 of D 12m UCQ; F. 3.2 of F 12m UCQ) permit assessment of the types of patients presenting to the district health system. The distributions of inpatients and outpatients by age group and by sex should be roughly constant from one period to another. Abrupt changes in the distribution warrant investigation. **Question 22**: Which sex accounts for most OPD visits? The number of persons five years or older in Lupara District is six times the number of children under five years of age. Which age group (0-4 versus 5+ years) has a higher inpatient utilization per 100 persons in the population?

Figure 28: Inpatient discharges, by age group, Lupara District, last 5 years

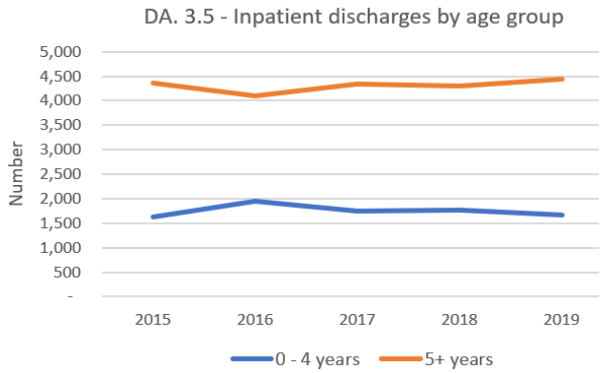
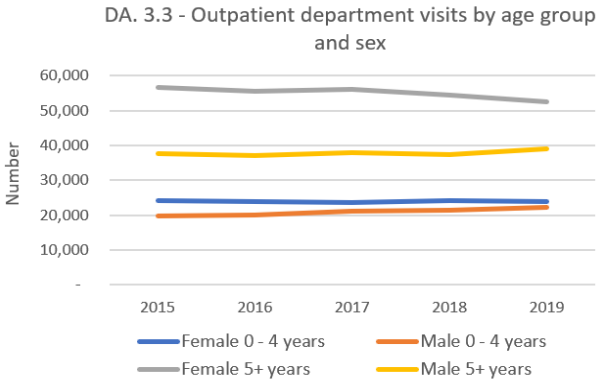


Figure 27: OPD visits, by age group and sex, Lupara District, last 5 years

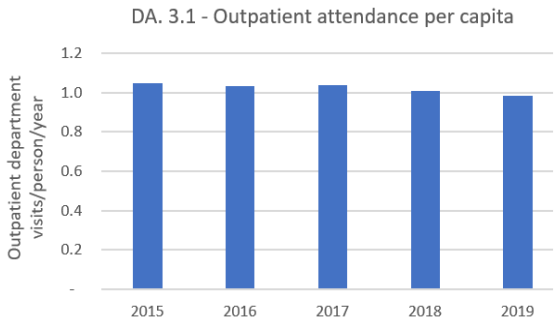


4.1.3 Core analysis

1. Outpatient attendance per capita. Where there is a reliable estimate of the population (such as at district level), utilization can be measured in terms of outpatient visits per capita (i.e. per person in the population). There is no benchmark for this indicator. It is determined by many factors, including access to a network of facilities, supply of medicines and consumables, availability of laboratory and other diagnostic services, and perceptions of quality of care. However, changes over time should be monitored.

Figure 29 (DA 3.1 of the D 5y UCQ dashboard) shows the indicator calculated from the Lupara District database covering a period of five years. The OPD utilization rate has declined slightly over the five-year period. that changes in the indicator have been slow and rather modest. As with most indicators, quick changes should trigger additional investigations to identify the reasons. **Question 23**: In DA 4.19, find "Outpatient department visits". The total number of OPD visits is higher in 2019 than in 2015, yet the OPD utilization rate has decreased. Why is this?

Figure 29: Trend in outpatient visits per capita, Lupara District, last 5 years



2. Hospital discharge rate per 100 population (DA 3.4 of the D 5y UCQ) reflects overall utilization of hospital services. In most countries, hospital/inpatient services are defined as the capacity to admit patients overnight. The indicator is calculated using discharges rather than admissions.[26] Discharges include patients officially discharged after cure or improvement, patients that absconded (unauthorized discharges), those transferred to other facilities and those who died while in the facility as an inpatient.

There is no benchmark for hospital utilization. Use of hospital services depends on various factors, including the range of services provided by the facility, access to the services and the costs associated with it. Technology may also influence the use of inpatient services, either reducing it (e.g. by introducing ambulatory or "day" surgery) and/or increasing it (e.g. by introducing advanced diagnostic capacities to identify cancer cases that then require hospitalization for further treatment). Most health systems undergo such changes and hospital discharge rates evolve accordingly.

A district health system usually does not provide all types of inpatient services and other referral services. Patients may be referred for specialized care to large hospitals outside the district. Furthermore, when

[26] If the data are of good quality, the numbers of admissions and discharges should be similar over time. However, they are not expected to be equal because, for example, some of the patients admitted in January will be discharged in February, etc.

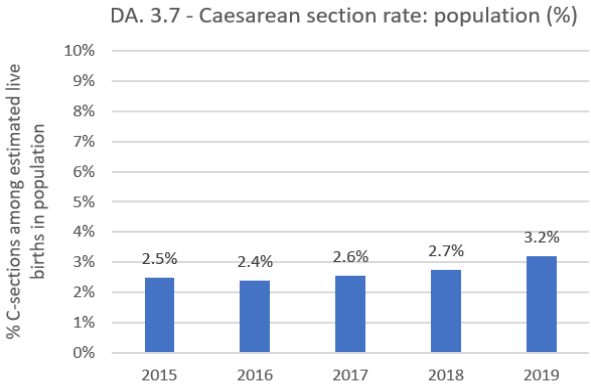
comparing districts, the presence in a district of a referral hospital that provides services for more than one district should be noted.

In a well-functioning district health system, there should be consistency in the utilization of OPD and IPD services, as well as preventive services. As the utilization of all these services may be affected by common factors, managers should look for potential common explanations for the data of all the services provided. It is also possible for some services to be affected while others are not. An example of a facility showing a decrease in outpatient utilization is provided in Figure 24 above.

3. Caesarean section rate at population level can provide an indication of access to C-section services as well as to general surgical services. C-sections are priority interventions and most district health systems try to make them accessible. Increases in C-section rates in the population (% of total estimated live births in the population) of up to 10% are associated with decreases in maternal, neonatal and infant mortality.[27] Above this level, increasing the C-section rate is no longer associated with reduced mortality.

Low C-section rates (significantly below 10% in the population) may indicate access problems, e.g. long distances to facilities. On the other hand, rates of greater than 15% may suggest overuse of C-sections. The risk of infection and complications from surgery are potentially dangerous, particularly in settings that lack the capacity to properly conduct safe surgery. This C-section rate can only be calculated where reliable population estimates are available. The multi-year trend in Lupara District's population-level C-section rate is shown with chart DA. 3.7 (D 5y UCQ dashboard; see Figure 30). The C-section rate in health facilities is discussed in the quality section.

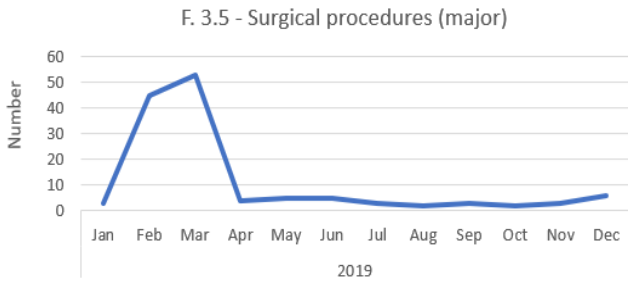
Figure 30 : Caesarean section rate at population level, Lupara district 2015 - 2019



4. Surgical volume. The multi-year trend in surgical procedures per 100 000 population, a similar indicator to C-section rate in the population, is monitored with chart DA. 3.6 (D 5y UCQ). Low surgical procedure rates in a district may indicate overall poor access to surgical services. When comparing districts based on this indicator, it is important to keep in mind that, in many health systems, most major surgical interventions are performed at higher levels of the system (urban, provincial or regional hospitals). This is the case more for elective surgeries that for emergency procedures such as C-sections.

Sometimes district level hospitals may show sudden increases in surgical procedures for short periods. This may result from visiting surgical teams that conduct large numbers of specialized operations, e.g. eye operations. An example is seen in Figure 31 which shows the short-term trend in the absolute number of surgeries performed at the Lupara NGO Hospital, with a short-term increase in the months of February and March.

Figure 31 : Trend in major surgical procedures, Lupara NGO Hospital, 2019



[27] WHO statement on caesarian section rates. World Health Organization. 2015. https://www.who.int/reproductivehealth/publications/maternal_perinatal_health/cs-statement/en/ (Accessed 13 May 2020)

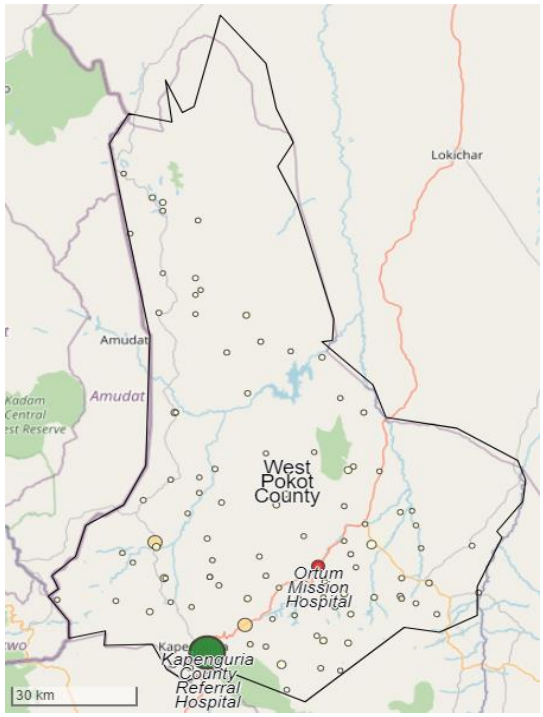
5. Service-specific availability. Information on availability of specific services is usually obtained from facility assessments and sometimes from the Master Facility List (MFL). For some services, the reporting of activity is an indication that the service is available; this information can be used as proxy measure for access to the service.

For example, the number of facilities reporting selected laboratory tests (e.g. complete blood counts) can be transformed into two access indicators: a) the **number of laboratories per 10,000 people** may be used to assess access to laboratory services, as well as equity; and b) the **percentage of facilities with laboratory services** can be used to assess the comprehensiveness of the district service network. In this example, the capacity to provide a complete blood count is used as a tracer for laboratory services. (Such an indicator would exclude facilities reporting only strip-based laboratory tests, e.g. rapid diagnostic testing (RDT) for malaria or using a glucometer for blood glucose testing.) As a further example, reporting of C-sections could be used as a proxy to indicate the capacity of a facility to provide basic surgical services.

When assessing service-specific availability within the district, the distances and travel time required to reach a facility with a specific service should also be considered. A map showing the locations of various services in relation to population and road networks is useful. Furthermore, it may not be efficient to provide certain services in all facilities. The overall district context should therefore be considered when interpreting these indicators.

Figure 32 is a map showing the location of all health facilities in Kenya's West Pokot County. Facilities with Skilled Birth Attendants are shown by the dots (all dots including those that are smallest). Only two facilities in the county (the green dot and the red dot) report C-sections. The 2014 Kenya Demographic and Health Survey found that only 2.2% of most recent deliveries in this County were reported to have been done by caesarean section.[28] **Question 24**: Based on the survey findings and the map, what are some short-term and long-term priorities for reducing maternal mortality in this County?

Figure 32: Maternity care facilities of West Pokot Country, Kenya - sites with Skilled Birth Attendants and sites providing C-sections



Source: Kenya-based DHIS2 Training Instance

[28] Compared to 8.7% nationwide and 20.7% for Nairobi.

4.2 COVERAGE

4.2.1 Core indicators

Indicator	Definition	Calculation	Disaggregation	L
1. Contraception first time users	Clients who for the first time in their life accept a contraceptive method	N: No. of clients who accept a family planning method for the 1st time	Age (10-14,15-19,20+) Sex; Unit of contraceptive method	D HF
2. Antenatal client 1st visit before 12 weeks gestation	Percentage of antenatal care clients with 1st visit before 12 weeks gestation	N: No. of ANC 1st visits before 12 weeks x 100 D: No. of ANC 1st visits	Age (10-14, 15-19, 20+)	D HF
3. Antenatal care 1st visit coverage	Percentage of estimated pregnant women in the population who had a 1st ANC visit	N: No. of ANC clients with 1st ANC visit x 100 D: Estimated no. of pregnant women	Age (10-14, 15-19, 20+)	D
4. Antenatal care 4th visit coverage	Percentage of estimated pregnant women in the population who had a 4th ANC visit	N: No. of ANC clients with 4th ANC visit x 100 D: Estimated no. of pregnant women	Age (10-14, 15-19, 20+)	D
5. Institutional delivery coverage	Percentage of women (in the population) who gave birth in a health facility	N: No. of deliveries in facilities X 100 D: Estimated no. of live births in the population	Age (10-14, 15-19, 20+)	D
6. DTP3 coverage Also coverage of other vaccines in the national schedule	Percentage of the target population that received the third dose of diphtheria-tetanus-pertussis containing vaccine (DTP3)	N: No. of children receiving DTP3 × 100 D: Estimated no. of target population	By vaccine/dose of vaccine Age (0-1 year, 1+ years for infant immunization; 1-2 years, 2+ years for toddler immunizations) Status for tetanus toxoid (pregnant women, other)	D
7. ART coverage (current)	Percentage of the estimated number of people living with HIV that are currently receiving antiretroviral therapy (ART)	N: No. persons living with HIV currently receiving ART x 100 D: Estimated no. of persons living with HIV	Age (< 15, 15+) Sex (M, F, TG) Special populations (KPs)	D
8. TB case notification rate	TB cases notified in a specified time period, usually one year, per 100,000 population	N: No. of TB cases notified in a specified time period x 100,000 D: Estimated population in the same time period	By case type: pulmonary bacteriologically confirmed vs pulmonary clinically diagnosed; By treatment history: new and relapse (incident cases) vs previously treated, excluding relapse; Age (refer to TB module); Sex	D
9. Hypertension new cases	Number of people newly diagnosed with hypertension	N: No. of hypertension new cases	Age Sex	D HF
10. Diabetes new cases	Number of people newly diagnosed with diabetes	N: No. of diabetes new cases	Age Sex	D HF

4.2.2 About the data

Coverage and quality indicators are among the most important measures for assessing health system performance. Coverage indicators compare health service activity with the population the system serves. Quality indicators assess whether services are provided according to the required standards. There are relationships between these two groups of indicators. Coverage may be considered a dimension of quality: a system that fails to achieve adequate coverage is not performing its functions adequately; if interventions are not delivered at the appropriate level of quality, coverage will not be effective.
All countries working to reach UHC monitor the coverage of various services to ensure that people receive the essential health services they need. While most of the UHC indicators require data from population-

based surveys, data from facilities and other health services provide important information about the various services needed to achieve UHC. The coverage and quality indicators in this guidance reflect the performance of key facility-based health services that contribute to UHC.

The coverage and quality indicators are presented in two groups (each group including indicators from multiple programmes) to provide a general overview of coverage and then quality measures across a range of services. However, because of the relationships between coverage and quality, coverage and quality indicators should be assessed together and are presented together in the sample dashboards.

Coverage refers to the percentage of a population that received a specific service that they need. The calculation of a coverage indicator uses the target population for the specific service as the denominator, e.g. the number of surviving infants is the denominator for DTP3 coverage. Health systems usually set coverage targets against which service performance is assessed, e.g. "90% of deliveries should take place in a health institution by 2030". Obviously, the higher the coverage, the better. However, very rapid improvements should raise suspicion. Review of coverage indicators looks mainly for any decrease or stagnation over time and for significant differences between administrative areas. These require explanation, e.g. resource shortages (staff, vaccines, etc.) or use of new services in neighbouring areas.

RHIS data enable calculation of "administrative" coverage indicators, using reported facility outputs as the numerator and estimated population (target group) as the denominator. Although administrative coverage results should be similar to coverage obtained through population surveys, there are often substantial differences.[29] Coverage indicators using RHIS data are therefore mainly used to assess changes over time within the same health system, e.g. in the period between population surveys or for small administrative divisions such as districts, for which survey data are not available.

For some programmes, it is very difficult (or impossible) to obtain coverage indicators from aggregated RHIS data, e.g. family planning, HIV and NCD care. These programmes involve long-term care with repeated visits over time. Coverage is not based on receiving a once-off intervention (e.g. the 3rd dose of DTP vaccine), but on remaining in care. A system for routine monitoring of individual longitudinal patient records is needed to know how many patients are active in the programme at any specific time. In programmes that do not implement such a system, simplified indicators can be used, e.g. the number of new contraceptive users or the number of newly diagnosed cases of HIV, hypertension, diabetes, etc. While this does not measure coverage, it provides an indication of the numbers of new cases being detected by the programme over time. (Such an approach requires the reliable counting of only "new" patients – those who are seen for first time ever for the condition or service.)

Furthermore, as previously discussed, where reliable population estimates are not available (e.g. for facility catchment populations), absolute numbers (numerators) can be used to monitor changes in the numbers of people accessing the services over time and thus provide an indirect impression of coverage trends. Refer to the section on DTP3 coverage for further discussion.

Sometimes "coverage" is used to refer to the percentage of individuals receiving a specific intervention among those that accessed the service. The denominator in such indicators is based on facility data rather than on population data, e.g. "Antenatal syphilis testing coverage". In this guidance, however, "coverage" is used exclusively to refer to population coverage. Hence, in this guidance, this indicator is named "Antenatal client syphilis screening" and it is included among the indicators of quality rather than among the indicators of coverage.

[29] Refer to "General Principles" for further discussion on administrative versus survey-based coverage estimates.

4.2.3 Core analysis

Ten indicators are presented here as tracers for coverage. (Some of these indicators do not use population estimates as the denominator, for the reasons discussed.)

1. Contraception first time users. This indicator refers to clients starting contraception for the first time in their life; it excludes clients that switch contraceptive methods. Examples of charts to monitor the short-term and long-term trend in this indicator appear as F 4.1 (F 12 y UCQ), DM 4.1 (D 12m UCQ) and DA. 4.1 (D 5y UCQ). It is presented as a count, for the reasons discussed in the previous section.

2. Antenatal client 1st visit before 12 weeks gestation. This is not a population coverage indicator as the denominator is the number of antenatal care (ANC) 1st visits; however, it is presented here as it is important to review in relation to ANC1 coverage. WHO recommends that ANC starts in the first trimester for early detection of problems and for health education and support to pregnant women. A low percentage of ANC 1st visits before 12 weeks may reflect lack of community awareness of the importance of early ANC.

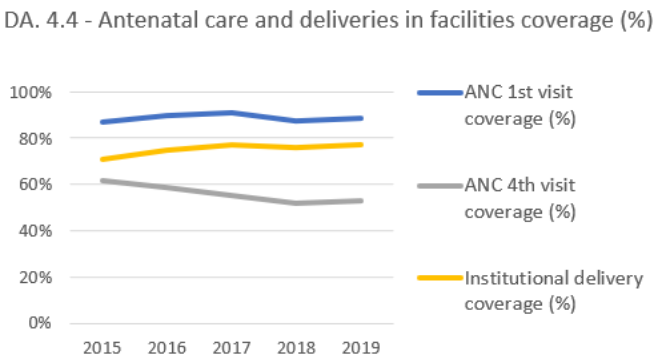
3. Antenatal care 1st visit (ANC1) coverage. This indicator reflects the number of pregnant women that attended the service at least once. High ANC1 coverage shows that women can access the service; low ANC1 coverage could reflect access problems or that women choose to not use the service.

4. Antenatal care 4th visit (ANC4) coverage. WHO recommends a minimum of eight ANC visits, at specified intervals. ANC4 coverage coincides with the UHC indicator and is important in detecting early drop-off in ANC follow up. A significant difference between ANC1 and ANC4 coverage could point to perceptions of poor quality of care or lack of awareness of the value of regular ANC. (In some settings, women may register for ANC at a public facility to enable access to free delivery care but may prefer to use a private provider after the first ANC visit.)

5. Institutional delivery coverage. WHO recommends that all births take place in health facilities so that obstetric complications can be identified and managed as soon as they occur. This is key to preventing complications and to reducing maternal and newborn deaths and stillbirths.

Figure 33 shows trends over a period of five years in coverage for maternal health services in Lupara District. ANC1 coverage remains stable at around 90% and there is some improvement in institutional deliveries. The decrease in ANC4 coverage needs to be investigated, considering that the other indicators have remained stable or improved. The significant differences between ANC1 coverage and the other indicators are also of concern. Notably, around 15% of women who are seen at least once in ANC do not have their delivery in a health facility.

Figure 33 : Maternal health coverage indicators 2015-2019. Lupara District



Where a reliable estimate of the target population is not available, such as at facility level, numerator data by themselves can give an impression of the trends in coverage for antenatal and maternal health services (e.g. absolute numbers of ANC1; see F 4.2 of the F 12my UCQ dashboard and DM 4.2 of the D 12m UCQ dashboard). Further explanation of this is provided in the following discussion on how to monitor childhood immunization coverage.

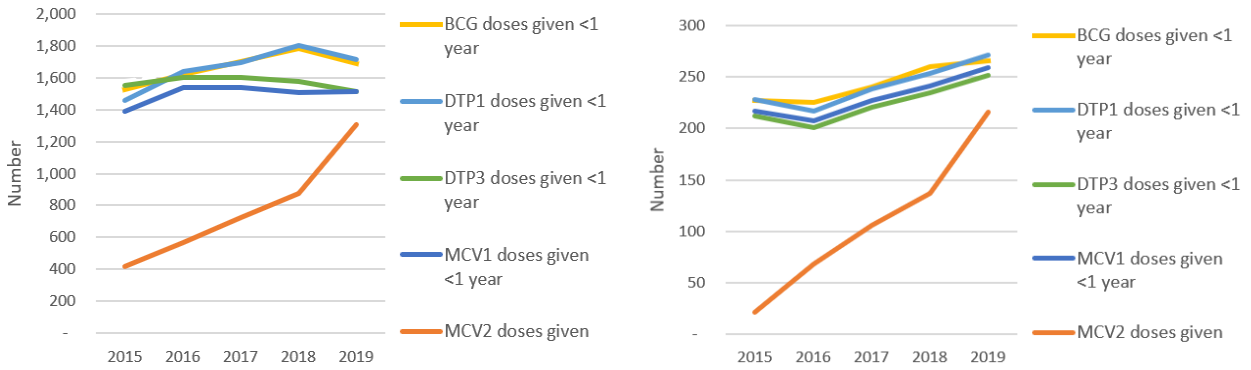
6. DTP3 coverage. The immunization programme has often been used to assess general health service access and system performance. All countries track immunization coverage through the RHIS (in addition to periodic population-based coverage surveys). Coverage of early vaccine doses (e.g. DTP1) is used to assess access. DTP3/Penta3 coverage is often used to assess the overall performance of the immunization programme, as it reflects the complexity of the service, i.e. it involves three doses (different from BCG, for example) and requires injection and therefore skilled personnel (different from Oral Polio).

Coverage based on RHIS data includes doses administered during both fixed and outreach services. Data from immunization campaigns (e.g. measles or polio) should not be included in RHIS coverage calculations.

Unless new strategies (e.g. expanded outreach) are implemented, immunization coverage rates should show a gradual but steady increase or stabilization once high rates are achieved. Unusually rapid increases, stagnation at low rates and, most importantly, decreases in coverage, should all trigger further investigation.

As discussed in Box 3 below, trends and levels of immunization coverage can be assessed even in the absence of reliable estimates of the denominator/target population. Figure 34 provides an example of how to make use of this principle.

Figure 34 : Trends in tracer vaccine doses, Lupara District Hospital (left) and Dispensary E (right), 2015 – 2019

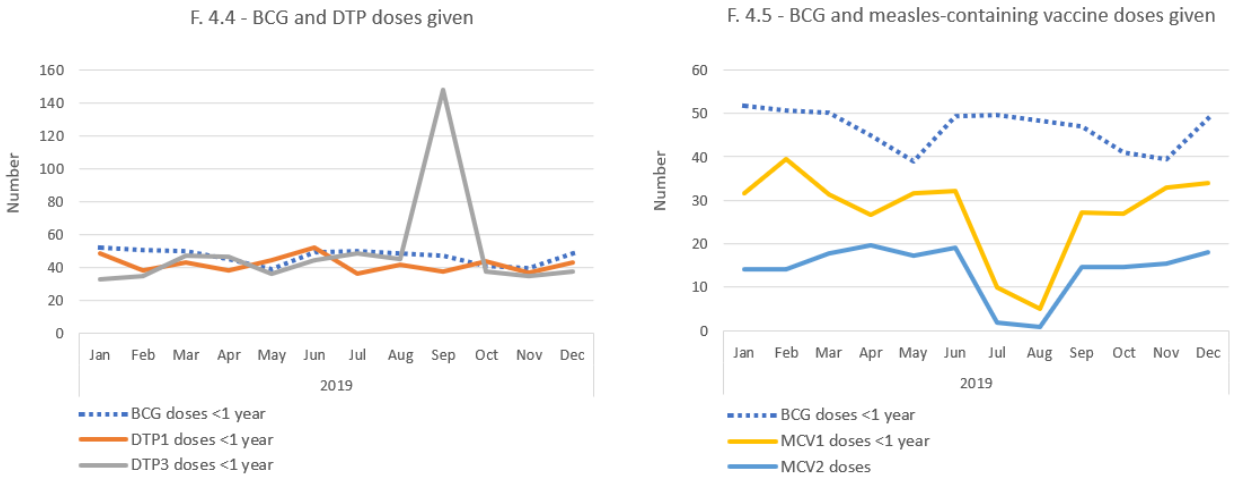


Question 25 (after reading Box 3): From a review of Figure 34, describe the trend in immunization performance for Lupara District Hospital (chart on the left). For this facility, how does performance for DTP3 and MCV1 compare with performance for BCG and DTP1? How does the immunization service performance of the district hospital compare with the performance of Dispensary E (chart on the right)?

The Lupara 12m UCQ dashboard features charts showing short-term trends in maternal health services (F. 4.2 and F. 4.3) and in immunization services (F. 4.4 and F. 4.5). As with the charts showing multi-year trends, these charts provide a lot of useful information. For example, the following two charts (Figure 35), showing trends over the last 12 months in the number of immunization doses reported by Dispensary A, reveal the following:

a) Doses given for BCG, DTP1 and DTP3 have been roughly the same and roughly stable.
b) The dropout between the first and third doses of DPT (see discussion below) has been quite small.
c) A suspicious value of DTP3 was reported for September 2019. This may be an error and should be investigated.
d) Doses given for MCV1 were lower (and for MCV2 much lower) than for the other vaccines.
e) MCV dropped substantially for July and August. Could this have been due to a stockout? It should be investigated.

Figure 36 : Trends in tracer vaccine doses, Dispensary A, last 12 months



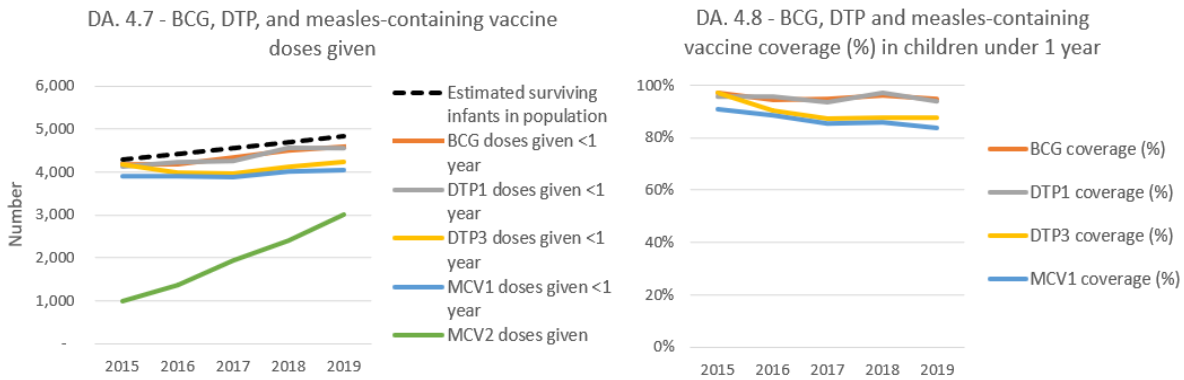
Box 3: Numerator data correspond closely to coverage estimates

Figure 36 (D 5y UCQ dashboard) shows the 5-year trend in doses (DA. 4.4) and coverage (DA. 4.5) of three vaccines in Lupara District. Consider first the chart on the right showing the trend in coverages. All rates are above 80% but show different trends. BCG and DPT1 coverage rates are high, with little annual variation. DTP3 and MCV1 both show downward trends that require investigation.

Consider next the chart on the left, showing the trends in doses given. Note the similarities between the two charts. Both charts show a similar relationship between the values for BCG and DTP1 (given earliest in a child's life) and the values for DTP3 and MCV1 (given later): the gap is small from 2015 to 2017 (with DTP3 actually being higher than DTP1 in 2017) but grows larger in 2018 and 2019. Therefore, the chart on the left (using only data on doses) provides much of the same information as the chart on the right (which requires estimates of a population-based denominator in order to calculate coverage).

The similarity between the two charts has important implications for monitoring of performance when reliable estimates of the population denominator are not available. To monitor performance of an individual facility, for example, a lot can be learned by monitoring the trend in numerators (e.g. vaccine doses) and comparing the numbers of one type of service (e.g. BCG or DTP1 doses) to the numbers of another service (e.g. DTP3 or MCV1). The same principles apply to monitoring of maternal health services using a chart such as F. 4.2 (F 12y UCQ dashboard).

Figure 35 : Trends in immunization doses and immunization coverage, by vaccine, Lupara District, last 5 years



7. Anti-Retroviral (ART) coverage compares the total (cumulative) number of persons living with HIV (PLHIV) currently on ART with the estimated number of PLHIV in the population. Calculation requires that district level estimates of PLHIV in the population are available. Estimates of PLHIV for national level are provided annually by UNAIDS and are increasingly also becoming available for subnational levels. In the absence of a PLHIV population estimate, the absolute number of PLHIV on ART should be tracked over the long-term (see of D 5y UCQ) and short-term, at district (see DM. 4.7 of D 12m UCQ) as well as facility level (see F. 4.7 of F 12m UCQ). These charts usually show only small changes from month to month. ART coverage reflects the overall capacity of the health system to diagnose, treat and retain PLHIV on treatment. These components are analysed through the HIV care cascade, discussed in the quality section.

8. Tuberculosis (TB) case notification rate compares the number of new cases diagnosed and notified with the total district population. This is not a coverage indicator but is presented here to provide an indication of TB programme activity within the context of other programmes. When comparing geographic areas such as districts, case notification rates should be assessed alongside the number of TB notifications. Notification numbers are important for understanding the overall TB case burden and for resource planning, while rates per population provide an indication of districts at high risk of TB that may need targeted interventions. Large changes in TB notifications (>10% increase or decrease per year) are not expected and should be investigated. TB notification data are typically reported on a quarterly TB report.[30] Figure 37 shows the Lupara District trend, over the last four quarters, in the numbers of TB notifications, while Figure 38 shows the trend over the last 5 years in the TB notification rate.

Figure 37 : Trend in TB notifications, Lupara District, last 4 quarters

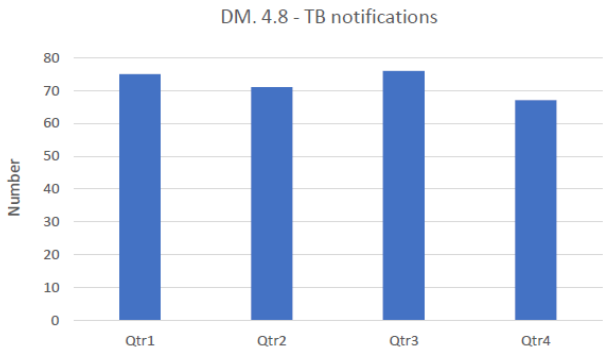


Figure 38 : TB notification rate and treatment success, Lupara district, 2015 - 2019

DA. 4.14 - TB cohort indicators	2015	2016	2017	2018	2019
TB cases notified/100,000 population	176	166	163	154	174
TB treatment success rate (%)	70%	67%	73%	59%	

9. Hypertension new cases and **10. Diabetes new cases.** The ongoing global NCD epidemic and aging populations mean that increasing numbers of people will need treatment for NCDS. As discussed previously, it is difficult to calculate coverage of care among people with chronic conditions such as NCDs using RHIS data, as the data need to be extracted from individual longitudinal patient records. This is possible in systems with electronic patient records or electronic registers but is very challenging in paper-based systems. Tracking the numbers of new cases provides an indication of the extent to which health services are detecting people with hypertension and diabetes.

Question 26: Refer to the F. 4.10 and F. 4.11 on the Lupara F 12m UCQ dashboard. Describe your findings and suggest a possible explanation for the trends seen in the two charts.

[30] There may at times be discrepancies between the number new TB diagnoses reported on the monthly OPD morbidity report and notifications reported by the TB programme on the quarterly TB report. In this case, both sets of data should be reviewed for quality issues.

4.3 QUALITY

4.3.1 Core indicators

Indicator	Definition	Calculation	Disaggregation	L
1. Antenatal client syphilis screening	Percentage of antenatal care clients screened for syphilis	N: No. of ANC clients screened for syphilis X 100 D: No. of ANC client 1st visits		D HF
2. Prevention of mother-to-child transmission (PMTCT) testing	Percentage of antenatal clients and/or women delivering in a facility who were tested for HIV (or who already know they are HIV positive), for prevention of mother-to-child transmission (PMTCT)	N: No. of pregnant women attending ANC and/or who had a facility-based delivery, who were tested for HIV during pregnancy or already knew they were HIV-positive D: No. of ANC 1st visits or No. of deliveries in facility	HIV status/test results: 1) Known HIV infection at ANC entry; 2) Tested HIV positive at ANC during current pregnancy; 3)Tested HIV negative at ANC during current pregnancy Total identified HIV positive women = 1 + 2	D HF
3. Intermittent preventive treatment for malaria during pregnancy (IPTp)	Percentage of antenatal clients that received sulfadoxine/ pyrimethamine (SP) course for IPTp3 (3rd dose)	N: No. of pregnant women given 3 doses of SP for IPT D: No. of ANC 1st visits		D HF
4. Caesarean section rate at facility level	Percentage of deliveries in health facilities by caesarean section	N: No. of caesarean sections X 100 D: No. of deliveries in facilities	Age (10-14;15-19; 20+) Facility type	D HF
5. Immunization dropout rates: DTP1 to DTP3 BCG to MCV1 MCV1 to MCV2	Percentage of infants who received a 1st dose of DPT vaccination but did not receive a 3rd dose Percentage of infants who received BCG but did not receive a 1st dose of measles vaccination Percentage of children who received a 1st dose of measles vaccination but did not receive a 2nd dose	N: (DPT1 doses – DPT3 doses) x 100 D: DPT1 doses N: (BCG doses – MCV1 doses) x 100 D: BCG doses N: (MCV1 doses - MCV2 doses) x 100 D: MCV1 doses		D HF
6. HIV care cascade	No. of persons newly diagnosed with HIV No. of persons newly diagnosed with HIV that initiated ART No. of persons retained on ART after a specified time period among those that initiated ART		Age (<1, ≥1); Sex (M, F, TG) Special populations (KPs) Specified duration: (current/ever, 12, 24, 36, 48, 60m)	D HF
7. HIV tested new and relapse TB cases with a documented HIV status	Percentage of new and relapse TB cases who had a HIV test result recorded in the TB register among all TB cases notified during a specified time period, usually 1 year	N: No. of new and relapse TB cases notified in a specified time period who had a HIV test result recorded in the TB register D: No. of new and relapse TB cases notified in the same time period		D HF
8. Drug susceptibility test (DST) for TB cases	Percentage of TB cases with DST results for at least rifampicin resistance, during a specified time period, usually 1 year	N: No. of TB cases notified with DST results for at least rifampicin resistance in a specified time period x 100 D: No. of TB cases notified in the same time period	By treatment history: new, previously treated, unknown history	D HF

9. TB treatment success rate	Percentage of TB cases successfully treated (cured or treatment completed) among TB cases notified to national health authorities during a specified time period, usually one year.	N: No. of TB cases notified in a specified period time period that were successfully treated X 100 D: No. of TB cases notified in same period	Treatment outcome; Case type; Treatment history HIV status; Drug sensitivity (Refer to TB module for details)	D HF
10. Malaria diagnostic testing ratio	Percentage of suspected malaria cases that had a diagnostic test for malaria	N: No. of malaria tests performed x 100 D: No. of suspected malaria cases	Microscopy, RDT Age (<5, 5-14, 15+)	D HF
	Malaria tests = No. of RDT + No. of microscopies Suspected cases = No. of malaria tests performed + No. of presumed cases of malaria reported Presumed cases = No. of cases diagnosed with malaria without laboratory confirmation			D HF
11. Confirmed malaria cases treated with ACT	Percentage of confirmed cases of malaria that receive first-line antimalarial treatment: artemisinin-based combination therapy (ACT)	N: No. of confirmed cases of malaria treated with ACT x 100 D: No. of confirmed cases of malaria Confirmed cases = RDT positive + microscopy positive	Age (<5, 5-14, 15+)	D HF

Notes:
Quality-related indicators are also found in other indicator groups; some indicators may require special data collection methods.
Mortality: Selected mortality indicators, e.g. CFRs, may reflect quality of care in facilities.
Morbidity: Admissions for certain diagnoses (e.g. hypertension, diabetes, chronic lung disease) may refect inadequate care in PHC facilities. Re-admissions for certain diagnoses (e.g. post-operative infections) may reflect inadequate inpatient care.
Health service resources: Availability of appropriate inputs are a prerequisite for quality services.

4.3.2 About the data

Health service quality refers to how well the service is delivered, i.e. whether it is provided according to required standards. Service quality is a critical component of UHC - without quality, coverage will not be effective and UHC cannot be achieved.

Measuring quality is important both because the quality of a service or specific intervention determines its effectiveness and because community perceptions of quality influence service utilization and coverage. Quality assessment involves comparing actual service provision to an agreed standard of "good quality". Measurement may be complex, as quality may include many different dimensions and may be influenced by multiple factors, including the availability and functionality of resources (e.g. finance, workforce, medicines, equipment), the appropriate use of these resources and the working conditions, competence and behaviour of health workers.

Assessment of the various quality dimensions often requires a health facility assessment using various data collection methods, e.g. facility audit, record review, observation, health worker interviews and patient interviews. However, RHIS indicators can provide an indication of some aspects of service quality. Even though these indicators may only provide limited and indirect measures of quality, poor performance can highlight the need for further, in-depth assessment of service quality. Furthermore, several of the quality indicators use data from more than one programme, which may provide insights into coordination of care among programmes.

This section focuses on process and outcome indicators of quality. Resource indicators are discussed in Chapter 5.

4.3.3 Core analysis

1. Antenatal client syphilis screening, **2. PMTCT testing** and **3. Intermittent preventive treatment for malaria during pregnancy (IPTp3).** These three indicators reflect standard ANC interventions in many settings. Poor performance may result from lack of commodities (e.g. syphilis tests or reagents, HIV tests, sulfadoxine-pyrimethamine [SP]) or failure of health workers to properly implement protocols.

Screening for syphilis and HIV during pregnancy enables treatment of the mother, protection of the baby and minimizes the risks of complications. In malaria-endemic areas, IPT for malaria with at least three doses of SP, at least one month apart, is recommended for all pregnancies. Some women may however present too late in pregnancy to receive three doses. This indicator should therefore be reviewed together with ANC 1st visits before 12 weeks gestation. Findings on these three indicators are presented in two ways on the Lupara dashboards:

i. There are charts showing trends in the absolute numbers of ANC clients receiving various services (see F. 4.3 of F. 12m UCQ; DM. 4.3 of DM. 12m UCQ; and DA. 4.5 and 4.6 of DA. 5y UCQ). Examples are shown as Figure 39 and Figure 40. To interpret such charts, the position of the line for a standard service (e.g. screening for syphilis) is visually compared to the position of the line for ANC 1st visits. This provides an impression of the percentage of ANC clients that received each service. For example, the red line in F. 4.3 is roughly 25% as high above zero as the dotted blue line so we can estimate that about 25% of ANC clients received IPT3.

Figure 39 : Trends in tracer antenatal services, Lupara District Hospital, last 12 months

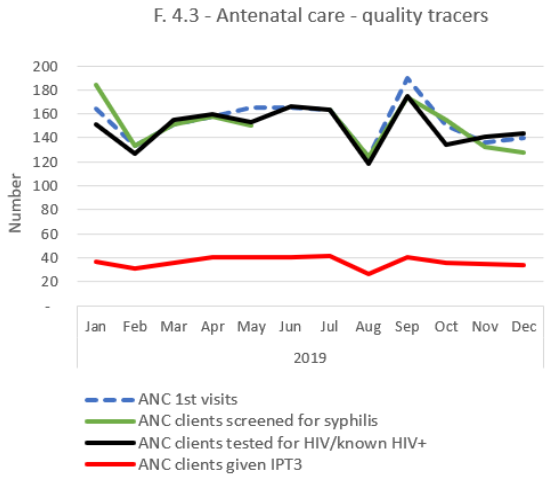
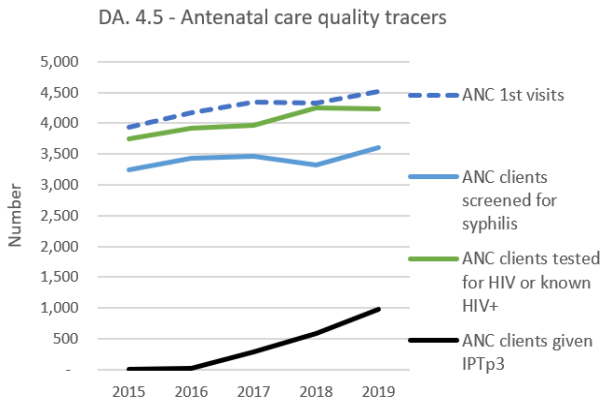


Figure 40 : Trend in tracer antenatal services, Lupara District, last 5 years



ii. There is a reference table at the end of the UCQ dashboards (e.g. DA. 4.20 in the D 5y UCQ dashboard) showing the trend in the percentage for each of these indicators as well as for several other indicators which are calculated using RHIS facility data as a denominator (see Figure 41). The ANC percentage indicators could also be presented in a chart. The reference table provides a quick way of reviewing the performance of multiple programmes in relation to each other for multiple years.

Question 27: Review DA. 4.5 to estimate the percentage value for 2019 for each of the three ANC quality indicators for Lupara district. Compare your answer with the values given in the reference table shown as Figure 41.

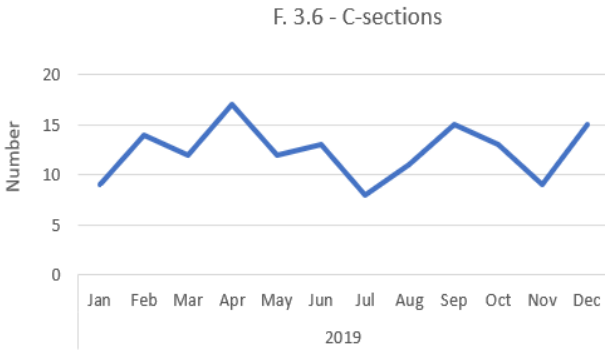
Figure 41: Reference table showing multi-year trends in indicators using facility data for denominators, Lupara District

DA. 4.20 - Indicators (facility denominators)	2015	2016	2017	2018	2019
C-section rate: facilities (%)	3.5%	3.2%	3.3%	3.6%	4.2%
Bed occupancy rate (%)	79%	73%	70%	60%	66%
Average length of stay	2.9	2.9	3.2	3.0	3.4
ANC clients 1st visit < 12 weeks (%)	12%	18%	22%	25%	32%
ANC clients tested for HIV/known HIV+ (%)	95%	94%	91%	98%	93%
ANC clients screened for syphilis (%)	82%	82%	80%	77%	80%
ANC clients given IPTp3 (%)	0%	0%	7%	13%	22%
ANC clients with 4th ANC visit (%)	71%	66%	61%	59%	60%
DTP1-DTP3 drop out rate (%)	-1.5%	6%	7%	10%	7%
BCG-MCV1 drop out rate (%)	7%	6%	10%	11%	10%
MCV1-MCV2 drop out rate (%)	75%	65%	50%	40%	26%
TB cases with drug susceptibility test (%)	77%	77%	70%	80%	72%
TB cases with documented HIV status (%)	80%	87%	87%	88%	81%
TB treatment success rate (%)	70%	67%	73%	59%	
Suspected malaria cases tested (%)	82%	81%	81%	89%	95%
Malaria confirmed - given ACT (%)	109%	107%	109%	107%	107%

4. Caesarean section rate at facility level: Compare this indicator to the c-section rate at population level discussed in the access and utilization section. WHO does not provide a benchmark for the facility level c-section rate, but emphasizes that c-sections should be provided to women in need. However, recent years have seen concerns about the rise in c-section rates and potential negative consequences for mothers and babies.[31]

It is expected that the c-section rate at facility level is higher than the rate in the population, as not all deliveries take place in facilities. C-section rates may vary widely among facilities, based on differences in infrastructure, staff capacities, clinical protocols and, particularly, in types of cases received. High-level referral facilities are more likely to receive complicated cases needing c-section. Therefore, much caution is needed in comparing facilities. However, significant changes in the rate over time in a single facility, or unusually high rates, require further investigation, particularly in the light of potential overuse of the procedure. The short-term trend in the number of c-sections at Lupara District Hospital is shown in Figure 42 (F. 3.6 of F. 12m UCQ). Refer to F. 4.13 for this facility's c-section rates in 2019.

Figure 42 : Trend in the number c-sections, Lupara District, last 12 months



It is also useful to keep track of the distribution of c-sections and other surgical procedures among the various health facilities in a district. This can be done by reviewing a table comparing health facilities by the absolute number of services provided (see table FCA. 11).

5. Immunization dropout rates. Expanded Programme on Immunization (EPI) schedules list the recommended vaccines and ages at which each dose should be given. Some vaccines require two or more doses at specified intervals. Immunization dropout rates show the percentage of children that receive an earlier dose (e.g. BCG or DTP 1) but fail to receive a subsequent dose (e.g. DTP3 or MCV). Dropout rates of above 10% are generally considered too high.

The DTP1 to DTP3 dropout rate is often used as a proxy measure for quality of care, as clients' perceptions of services when receiving the first dose may influence their decision to return for other doses. Dropout

[31] WHO statement on caesarean section rates. 2015. https://www.who.int/reproductivehealth/publications/maternal_perinatal_health/cs-statement/en/

between BCG and MCV1 (at facility level) may be seen when BCG is given in the facility where the delivery occurred, while MCV is given at a different facility. The MCV1 to MCV2 dropout rate assesses the ability of the programme to reach children after the first year of life.

When dropout rates are higher than expected, the data quality should be checked as a first step. Other aspects to investigate include the reliability of the vaccine supply and the regular implementation of both fixed and outreach immunization sessions.

A negative immunization dropout rate at district (or higher) level, based on data for 12 months or more, suggests a problem with data quality. A negative dropout means that the number of later doses of vaccine given (e.g. DTP3) is higher than the number of earlier doses given (DTP1). This may suggest, for example, that first or second doses of DTP have been misclassified and misreported as third doses.

Figure 43 (DA. 4.9 of D 5y UCQ) presents the 5-year trend in three different immunization dropout rates: DTP1 to DTP3, BCG to MCV1 and MCV 1 to MCV3. **Question 28**: For which year(s) and which indicator(s) is the dropout rate too high? For which year(s) and which indicator(s) is the dropout rate suspiciously low?

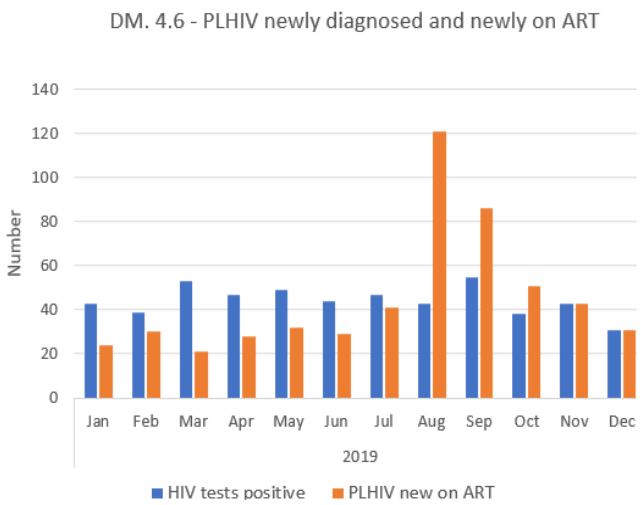
Figure 43: Immunization dropout rates, Lupara District, last 5 years

DA. 4.9 - Immunization drop out rates (%)	2015	2016	2017	2018	2019
DTP1-DTP3 drop out rate (%)	-1.5%	5.9%	7.1%	9.9%	6.9%
BCG-MCV1 drop out rate (%)	6.6%	6.2%	10.2%	10.8%	10.3%
MCV1-MCV2 drop out rate (%)	74.9%	64.9%	50.5%	40.3%	25.6%

6. HIV care cascade. The cascade shows the programme's success in retaining PLHIV in treatment. It monitors achievement of the 90-90-90 objectives of HIV care: at least 90% of PLHIV should be diagnosed; at least 90% of newly diagnosed PLHIV should start ART and, of those, at least 90% should still be on treatment at the end of a given period (e.g. one year). The Lupara District database lacks routine data for assessing the third "90". Therefore, the visualizations on the Lupara dashboard monitor only the first and second "90's". F. 4.6 (F. 12m UCQ) and DM. 4.6 (D 12m UCQ) monitor short-term trends in the indicators while DA. 4.10 (D 5y UCQ) shows the trend over the last 5 years. Ideally, the cascade data in the two columns for each month should refer to the same group (cohort) of people that were diagnosed within the same time period. However, the unlinked way in which data are captured in most RHIS means that different groups of PLHIV are included in each bar.

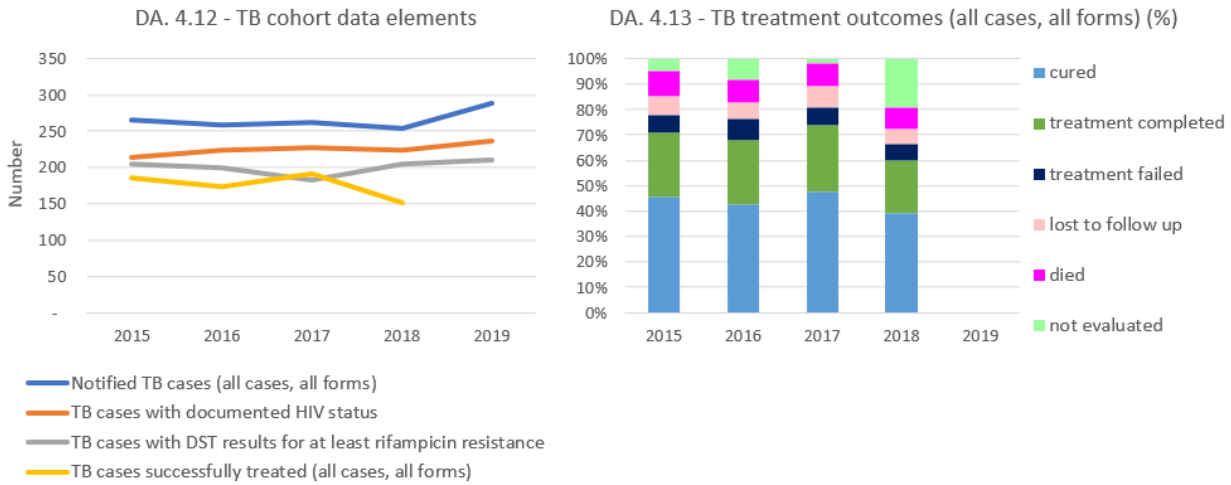
Question 29: Consider the example of Lupara District presented in Figure 44 (DM. 4.6 of D 5y UCQ). Describe your findings and suggest a possible explanation for the trends seen here.

Figure 44: PLHIV newly diagnosed and PLHIV new on ART, Lupara District, last 12 months



Monitoring the quality of TB case management:
Indicators used for annual monitoring of the quality of TB case management are shown in Figure 45 (DA. 4.12/4.13) of the D 5y UCQ dashboard).

Figure 45: Charts for monitoring TB case management, Lupara District, last 5 years



7. HIV tested new and relapse TB cases with a documented HIV status. Assessing the HIV status of all TB cases is critical for clinical management of both TB and HIV disease. Data on HIV status are collected both at TB notification and at treatment outcome reporting. Incorrect data collection and reporting may result in either under-reporting or double-counting with data showing more than 100% of TB cases tested for HIV.

8. Drug susceptibility test (DST) for TB cases measures the percentage of TB cases tested for at least rifampicin resistance. Drug resistant TB (DR-TB) can develop through inadequate treatment or can be acquired through transmission between people. WHO requires that, by 2025, all notified TB cases should have documented DST results for at least rifampicin.

9. TB treatment success rate is the percentage of notified TB cases that were cured (based on laboratory confirmation) or that completed treatment. Low treatment success rates may indicate problems with treatment management, side-effects of TB medicines, or other health problems (e.g. HIV) that lead to death or loss to follow up.

Monitoring treatment success in each treatment outcome category shows the extent to which loss to follow up, death and treatment failure each contribute to low treatment success and can help to target investigation and action. Note that TB treatment outcomes are assessed on a "cohort" of patients one year after they were diagnosed.[32] **Question 30:** Chart DA. 4.12 shows no data for 2019. What is the reason for this (other than a data quality problem)? What might explain the large light green segment (not evaluated) seen in 2018?

Monitoring the quality of malaria case management:
Trends in two indicators are used to monitor the quality of malaria case management:

10. Malaria diagnostic testing ratio. This indicator tracks the percentage of suspected malaria cases that receive a laboratory test (RDT or microscopy). Through use of these laboratory tests, health systems are working to reduce the number of "presumed malaria" diagnoses, and so to improve the accuracy of

[32] For Lupara District, the assumption is made that TB treatment outcomes are assessed annually at district level.

malaria diagnosis and to avoid unnecessary prescription of antimalarials. The target for this indicator is therefore 100%. If the number of suspected cases is not specifically reported, then:

Suspected cases = persons tested + presumed cases of malaria; or
Suspected cases = total malaria diagnoses (confirmed + presumed) + negative malaria tests.

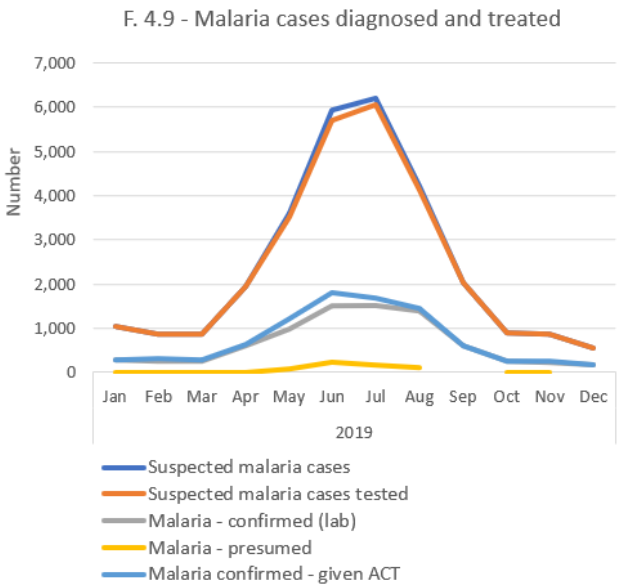
Confirmed malaria cases are those diagnosed through a laboratory test. Presumed malaria cases are those that did not receive a laboratory test but were diagnosed based on clinical assessment only.

11. Confirmed malaria cases treated with artemisinin-based combination therapy (ACT). ACT is the first line treatment for uncomplicated malaria. Low or decreasing percentages of confirmed cases treated with ACT could point to problems in the availability of ACT and/or failure to follow treatment protocols.

Findings on these two indicators are presented in two ways on the Lupara dashboards:

i. There are charts showing short-term (F. 4.9 of F 12m UCQ and DM. 4.9 of D 12m UCQ) and long-term trends (DA. 4.15 of D 5y UCQ) in the absolute numbers of: suspected malaria cases, suspected malaria cases tested, confirmed malaria cases, confirmed malaria cases treated with ACT and presumed malaria cases. An example is shown as Figure 4. To interpret such charts, look at the positions of the lines. The lines for testing and for presumed cases are compared to the line for suspected cases. The line for ACT treatment is compared to the line for confirmed case. This provides an impression of, for example, the percentage of suspected cases that were tested.

Figure 46: Data on malaria case management, Lupara District Hospital, last 12 months



ii. A reference table (DA. 4.20) at the end of the D 5y UCQ dashboard shows the multi-year trend in the annual percentage for these indicators for monitoring the quality of malaria case management (see the bottom two rows of Figure 47).

Figure 47: Reference table showing multi-year trends in indicators calculated using facility data for denominators, Lupara District 5y UCQ dashboard

DA. 4.20 - Indicators (facility denominators)	2015	2016	2017	2018	2019
C-section rate: facilities (%)	4%	3%	3%	4%	4%
Suspected malaria cases tested (%)	82%	81%	81%	89%	95%
Malaria confirmed - given ACT (%)	109%	107%	109%	107%	107%

Question 31: Review Figures 46 and 47. Are there any suspicious findings?

5 Group III indicators – Health service resources

5.1 AVAILABILITY, DISTRIBUTION and EFFICIENCY

5.1.1 Core indicators

	Indicator	Definition	Calculation	Disaggregati	L
Infrastructure					
Availability	1. Health facility density and distribution	Total number of health facilities per 10 000 population OR Population per facility (Total number of hospitals per 100 000 population)	N: no. of health facilities x 10,000 D: total population	Facility type Managing authority Specific services	D
Availability	2. Hospital bed density	Number of hospital beds per 10 000 population	N: no. of hospital beds reported as available x 10,000 D: total population	Type of bed Managing authority	D
Efficiency	3. Bed occupancy rate (BOR)	Percentage of available beds that were occupied over a specified period	N: no. of occupied bed-days X 100 D: total no. of available bed-days	Facility type and level	D HF
Efficiency	4. Average length of stay (ALOS)	Average number of days that an inpatient spends in hospital over a specified period	N: no. of occupied bed-days D: no. of discharges	Facility type	D HF
Health workforce					
Availability	5. Health worker density and distribution	Number of health workers per 10 000 population	N: total no. of skilled* health workers x 1,000 D: total population *should include only health workers with proof (degree, diploma, certificate) of professional training	Occupation Distribution: Place of employment (urban/rural; PHC / specialist clinic / hospital)	D
Availability	6. Vacancy rate	Percentage of funded full-time posts not filled for at least 6 months and which employers are actively trying to fill	N: no. of full-time posts that have not been filled for at least six months x 100 D: total no. of full-time posts	Occupation Facility type PHC vs hospital	D HF
Efficiency	7. Health worker productivity	Average number of service units provided by a given health worker in a specified period (e.g. working day, month, year)	N: no. of service units provided during a specified period D: no. of workers providing the service) x (no. of available working days during the same period)	Service type Occupation Facility	HF
Essential medicines and medical products					
Availability	8. Availability of essential medicines and medical products	Percentage of health facilities with no stockout of a basket of tracer medicines and commodities	N: no. of health facilities reporting no stockout during the period D: total no. of health facilities reporting through the RHIS	Facility type Managing authority Type of medicine or commodity (e.g. vaccines, antibiotics)	D
Financial resources					
Efficiency	9. Budget execution	Percentage of the allocated health budget that was spent over a specified period	N: expenditure x 100 D: allocated budget	Budget line Source of Funding Service	D

5.1.2 About the data

Resources (inputs or production factors) are necessary to provide health services. The main inputs for health service delivery include: health facilities (infrastructure), equipment, staff, medicines and medical products, and financial resources. Financial resources are converted into the other resources or used in monetary form, for example, to cover operational costs.

Information on the availability and use of these resources can provide insights into health service performance, including the indicators described in the previous chapters of this guidance.

The production of health resource indicators may be challenging. Data on health resources are often not available through the RHIS. However, data can be found elsewhere in the health system, e.g. administration and finance databases and paper records, pharmacy stores records. So, even if the resources data are not in the same database as RHIS data, this should not stop analysts and managers from accessing and analysing the resources data – including analyses which involve merging data from different databases.

Some preliminary steps are usually needed to extract and work with resources data before indicators can be produced. (In some cases, however, the required data may simply not be available in a usable form and the indicators cannot be calculated.)

While it may not be feasible to produce all the resource indicators proposed in this guidance on a regular basis, periodic special exercises to obtain the data can provide useful insights to inform district planning and management.

Two types of indicators using health resource data are discussed:

Availability indicators mainly compare the amount of a given resource (e.g. facilities, nurses) to the population to be served. Availability is assessed through "**density"** (resources per population[33]) and **distribution** (the locations of the resources[34]). When comparing administrative units such as districts, availability can also be used as a measure of **equity.**

Efficiency indicators compare resources with a measure of the services/outputs produced using these resources, e.g. the average number of ANC consultations per midwife per day, the number of outpatient consultations per medical doctor per day, the percentage of hospital beds that are occupied.

Efficiency involves making the best use of available resources, but also needs to be considered in relation to acceptable standards of quality and equity. For example, while a high number of consultations per health worker per day may be efficient, the quality of service will be compromised after a certain maximum is reached.

These indicators can help managers to make informed decisions about resource distribution and re-distribution. Such decisions need to achieve a balance between availability/equity and efficiency. Sometimes priority is given to availability and equity, e.g. facilities are constructed or staff deployed to offer services to small, remote populations, even if this results in low efficiency. At other times, efficiency is prioritized, e.g. some staff are re-allocated from a facility with low efficiency to one with a high burden of patients.

[33] Density may be expressed as the amount of resources per person ("per capita") or per population (e.g. per 10 000).

[34] Locations may include geographic area/location, facility type/level and provider type (e.g. public, private, NGO, etc.)

5.1.3 Core analysis

5.1.3.1. Infrastructure and equipment

- **Availability and distribution**

1. Health facility density and distribution. A facility network refers to the health facilities serving a defined population and functioning under a health management team, e.g. a district network. The network is composed of all the PHC facilities and the secondary (referral) facilities of the district. While private, NGO and other facilities are not under the responsibility of the district health management team, these facilities should be included in density indicators to understand the overall availability of services.

Information on the facility network can be obtained from a master facility list (MFL), from maps of facility locations and through geographic information systems (GIS). Some information can also be obtained from the RHIS which often includes the name, location and level of the facilities that report into the RHIS.

Some further details are important when assessing access to health facilities[35], including: geographic location, facility distribution according to population density within the district, travel distances, transport access, facility level and ownership. Also important is the availability at each facility of basic infrastructure and its condition, e.g. water, sanitation, electricity, landline phone connection, mobile phone connectivity, computers, internet. This information may be available through facility assessments conducted every few years, but is more useful if updated more frequently, e.g. through an annual self-reported facility profile.

Health facility density is a high-level indicator that provides a general idea of service availability and access. It's main use at district level is for comparison with other districts or with a nationally-defined standard. It can also be used to track changes in facility density in a single district over time. The indicator can be calculated for all facilities or (more usefully) separately for facilities of a certain level or that share certain characteristics, e.g. facilities offering PHC services or emergency surgery.

Districts with low overall facility density could be targeted for network expansion. However, the interpretation of the indicator may change if specific facility levels are considered. For example, one district may have few facilities but of a higher level (e.g. health centers providing a wide range of services), while another may have many basic facilities (e.g. dispensaries) that offer a limited set of services.

Lupara District has ten health facilities (one government hospital, one NGO hospital, one health center and seven dispensaries) and a population of 170 102 in 2019. The overall 2019 facility density of the district is: 10 x 10 000/170 102 = 0.59 facilities per 10 000 population. The density of facilities providing emergency surgery (the two hospitals) is: 2 x 10 000/170 102 = 0.18 emergency referral facilities per 10 000 population. The density of basic PHC facilities is: health centers + dispensaries (not including PHC clinics at the two hospitals) = 8 x 10 000/170 102 = 0.47 PHC facilities per 10 000 population.[36] The D 5y Resources dashboard shows the 5-year trend in these indicators (see Figure 48).

Figure 48 : Trend in facility and hospital bed density indicators, per 10 000 population, Lupara District, last 5 years

RA. 1.3 - Health facility density (MoH & NGO)	2015	2016	2017	2018	2019
Health facilities per 10,000 population	0.66	0.64	0.62	0.61	0.59
Hospitals per 10,000 population	0.13	0.13	0.12	0.12	0.12
Emergency surgery referral facilities per 10,000 population	0.13	0.13	0.12	0.12	0.12
Basic PHC facilities (health centers + dispensaries) per 10,000	0.53	0.51	0.50	0.48	0.47
Hospital bed density per 10,000 population	3.9	4.2	4.7	5.1	5.1

[35] Indicators showing availability of specific services are discussed in the section on utilization and access.

[36] These density indicators can also be expressed as: 17 010 people per facility (all facilities), 85 000 people per facility with emergency surgery, 24 300 people per basic PHC facility, etc.

While indicators such as those in Figure 48 are useful for deciding how to allocate resources among districts, at district level the key question may be how best to allocate resources among areas or facilities within the district – for example, between the district capital (often the largest town in the district) and sparsely-populated rural areas. To inform such decision making, it is essential to map the distribution of facilities (see Figure 32) and populations (including settlements which have appeared or have grown since the last census) and to assess travel times to facilities.

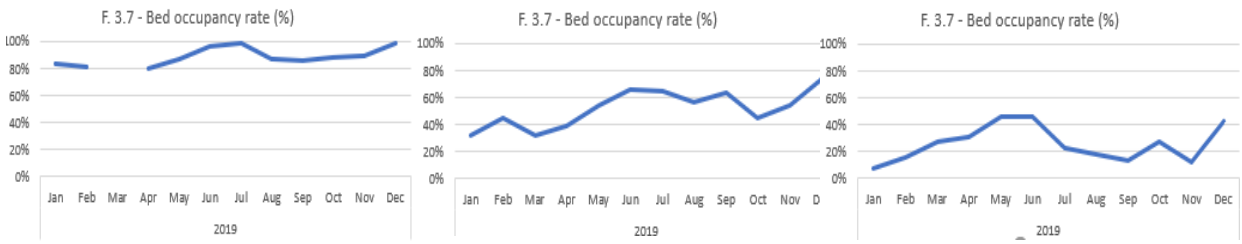
2. Hospital bed density is calculated using the total number of hospital beds of all the inpatient facilities in the district health system as the numerator, and the district population as denominator. The definition of "hospital bed" usually excludes "non-ward" beds (delivery beds, emergency room beds, etc.). The indicator can be calculated for all beds as well as for beds with a specialized use, such as maternity, intensive care or paediatric beds. As for facility density, the main use of this indicator is to assess the long-term trend in the district and for comparison with other districts or a national standard. Figure 48 above shows that hospital bed density for Lupara District has increased over the five-year period. This reflects a steady annual increase in beds at the district hospital and an increase at the NGO hospital beginning in 2018. Refer to Table RA. 1.2 of the D 5y Resources dashboard.

- **Efficiency**

3. Bed Occupancy Rate (BOR) provides an indication of the efficiency of hospital bed utilization. It provides the percentage of available beds that were occupied by patients over a defined time period, e.g. BOR for 1 year = (Sum of daily occupied beds over 365 days) x 100 / (Number of available beds x 365).
Question 32: Hospital X has 42 beds. For the month of March 2019, the sum of occupied bed days was 713. What was the BOR for March?

The number of hospital beds is often used as criterion for allocating funds or staff to a facility. However, if most beds are empty most of the time, this rationale for resource allocation is flawed. BOR can be calculated as an aggregate for the whole district, enabling comparison with other districts. BOR can also be calculated for each inpatient facility and can provide district health managers with a means of assessing facility performance and deciding on resource allocation. Traditionally, a BOR of around 85% has been considered adequate[37], as it means that most beds are occupied on an ongoing basis, but that the facility has room to respond to unexpected emergencies. BORs of above 90% have been associated with quality of care problems, e.g. early discharges and increased re-admission rates. Figure 49 presents the short-term trends in the BOR of the three inpatient facilities of Lupara District (F. 3.7 of F. 12m UCQ dashboard).

Figure 49: Bed occupancy rates, last 12 months, Lupara District Hospital (left) versus Lupara NGO Hospital (center) versus Health Center A (right)



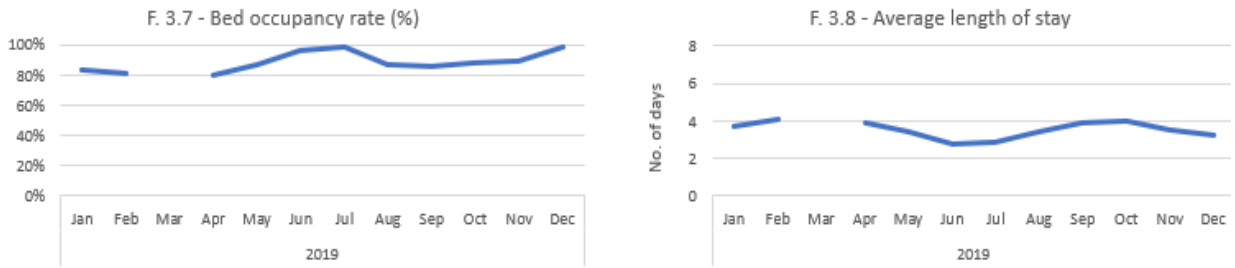
Question 33: Review the three charts and describe your findings. Which facilities appear to have had more beds than were needed in 2019? Which facility had too few beds for some months of 2019? Which trends in inpatient discharges seen in other charts may be associated with the changes in the BOR of these facilities?

[37] National Institute for Clinical Excellence United Kingdom. 2018. Chapter 39 Bed occupancy. Emergency and acute medical care in over 16s: service delivery and organisation. *NICE guideline* 94 https://www.nice.org.uk/guidance/ng94

4. Average Length of Stay (ALOS) reflects the average number of days that a patient occupies an inpatient bed in a facility over a specified period. ALOS is influenced by various factors, including the type of care provided, e.g. mental health hospitals usually show very high ALOS, while specialized surgical facilities usually have a much lower ALOS. It is also influenced by pressure on the existing beds, e.g. high BOR and high discharge rates are associated with lower ALOS. There is no standard for ALOS. The analysis should look for sudden changes, which may result from a change in the type of patients admitted, e.g. a malaria or cholera outbreak may increase hospital utilization and therefore the BOR, while ALOS is reduced.

Figure 50 shows that in the months when there were surges in inpatient admissions to Lupara District Hospital (see F. 3.3 of F. 12m UCQ), the BOR increased and the ALOS decreased. **Question 34:** Explain how this might have happened.

Figure 50: Trends in Bed Occupancy Rate (%) and Average Length of Stay (days), Lupara District Hospital, last 12 months



5.1.3.2. Health workforce

- **Availability and distribution**

The health workforce may be considered the health system's most important resource. Density and distribution refer to the numbers of health workers and their distribution by occupation according to population density, geographic location, facility level and provider type. The vacancy rate indicator indirectly shows the system's capacity to deploy and retain the necessary occupations.

Health workforce data may be obtained from various sources, e.g. district (or provincial) health workforce databases, district payrolls, facility assessments or periodic facility self-reports. Some RHIS may report data on available staff once or twice per year. There may be challenges in obtaining up-to-date workforce data; obtaining data from private providers may also be problematic, particularly in contexts where there is little regulation. At a minimum, the district should maintain an updated database of staff working in the public system.

5. Health worker density of a district is important for assessing long-term trends and for comparison with other districts or nationally-defined standards. The Lupara D 5y Resources dashboard presents the five-year trends in three indicators: medical officers per 10 000 population, medical officers plus clinical officer per 10 000 population and nurses (enrolled plus registered) per 10 000 population.

Health worker distribution (among facilities) assesses whether facilities have the staff they need to provide the required services, whether the distribution by occupation is appropriate for the facility level and whether the workers are equitably distributed among the facilities.

Figure 51 shows the (actual) distribution of staff by facility in Lupara District. Medical officers are found only in the hospitals. Clinical officers are found only in the hospitals and the health center. Nurses work at all health facilities although the roles that nurses perform at hospitals (mainly focussed on the provision on ANC, immunizations, HIV counselling and testing and support for outpatient and inpatient clinical care) differs from the roles they perform at dispensaries (where they also provide outpatient consultations).

In the district, 80% of nurses and 82% of total clinical workers (including nurses, clinical officers and medical officers) work at the two hospitals. A further 8% of nurses work at the health center. This leaves only 10% of the nurses (ten out of 96) to staff the seven dispensaries. Further investigation is needed to assess whether the district health staff have been distributed in the best possible way.

6. Vacancy rate assesses the extent to which the district is able to fill all allocated positions per facility and per occupation. The numerator is the number of full-time posts that have not been filled for at least six months and that employers are actively trying to fill; the denominator is the total number of full-time posts. Data for Lupara District are presented in Figure 51.[38]

Figure 51 : Staffing norms, actual staffing and vacancies. Selected categories. Lupara District

FCR. 2.1 - Health workforce distribution	Lupara District	Lupara District Hospital	Lupara NGO Hospital	Health Centre A	Dispensary A	B	C	D	E	F	G
Medical officers (norm)	**9**	8		1	0	0	0	0	0	0	0
Medical officers (actual)*	**7**	5	2	0	0	0	0	0	0	0	0
Medical officers (vacancies)	**4**	3		1	0	0	0	0	0	0	0
Clinical Officers (norm)	**20**	10		3	1	1	1	1	1	1	1
Clinical Officers (actual)	**11**	6	4	1	0	0	0	0	0	0	0
Clinical Officers (vacancies)	**13**	4		2	1	1	1	1	1	1	1
Registered Nurses (norm)	**22**	20		2	0	0	0	0	0	0	0
Registered Nurses (actual)	**39**	14	14	4	2	1	1	1	0	1	1
Registered Nurses (vacancies)	**-3**	6		-2	-2	-1	-1	-1	0	-1	-1
Enrolled nurses (norm)	**24**	6		4	2	2	2	2	2	2	2
Enrolled nurses (actual)	**60**	29	22	4	2	0	0	0	1	2	0
Enrolled nurses (vacancies)	**-14**	-23		0	0	2	2	2	1	0	2

*Note that, at district level, the actual staffing includes staffing of the NGO hospital whereas the norms and vacancies do not include any values for the NGO hospital

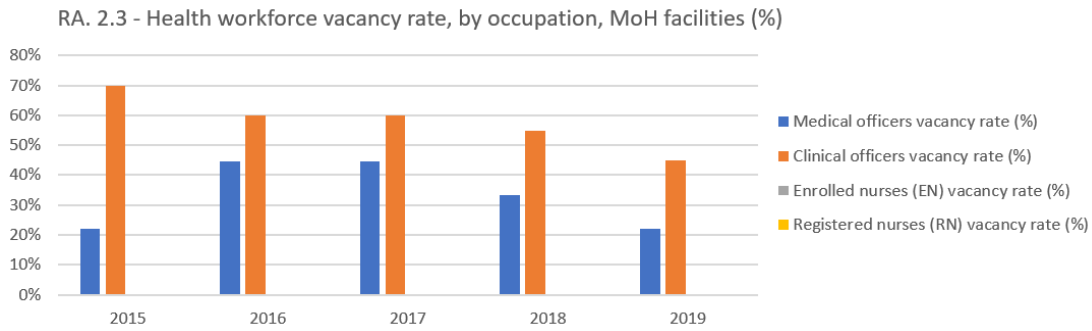
The number of vacant clinical officer positions is especially notable. Registered nurses have been used to fill clinical officer positions at several of the dispensaries, but six of the seven dispensaries have only half the nursing positions filled, while the district hospital and Health Center A have more nurses than there are nursing positions. Dispensary E has one enrolled nurse as the only staff member. It is worth asking whether additional nursing staff might be allocated to dispensaries which now have only one nurse fulfilling all functions.

Such data should be considered when making decisions about how to allocate available staff. However, staff positions are sometimes assigned without considering the demand for health services faced by each health facility. For example, Figure 53 below shows that in three dispensaries in Lupara District, each nurse attends on average fewer than 20 outpatient consultations per day, while in three other facilities each nurse attends twice that number. Thus, analysis based upon official staffing norms and vacancies may over-estimate the need for additional staffing, while under-estimating the staff needed to serve all clients at a very busy health facility.

The five-year trend in vacancy rates for government health facilities in Lupara district is presented in Figure 52. For the district as a whole, there have been no vacancies in enrolled nurses and registered nurses as the district has employed more of these occupations than are specified by the staffing norms for the nine government facilities.

[38] Staffing norms and vacancies for the NGO hospital are omitted as the norms are assumed to apply only to government facilities.

Figure 52 : Health workforce vacancy rates, by occupation, Lupara district (government facilities), 2015 - 2019



- **Efficiency**

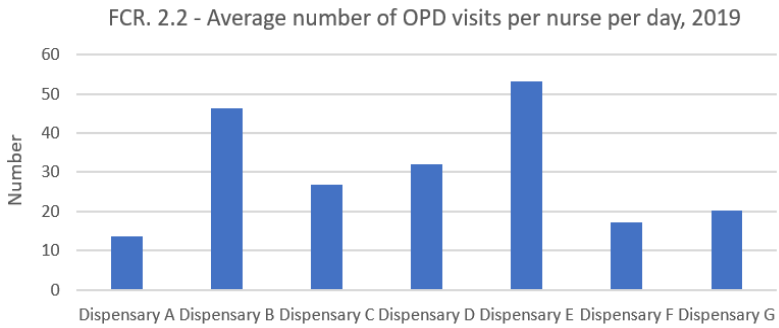
7. Health worker productivity provides a further means of analysing staffing needs. This indicator estimates the average number of service units provided per health worker per day and provides an indication of the amount of work that staff perform per day.

Productivity = number of service units provided during a specified period /
(number of workers providing the service) x (number of available working days during the same period)

"Service units" refers to the type of service provided, e.g. OPD visits, ANC visits. Box 4 shows how to estimate the number of available working days.[39] This analysis is usually conducted as a special study.

A simplified approach to assessing productivity is presented in Figure 53 which compares the dispensaries in Lupara District by the average number of OPD visits per nurse per day in 2019. The chart shows that, on average, the nursing staff in dispensaries B and E attend more patients per day than those in other dispensaries. It is possible to compare the dispensaries as they all provide similar services through a similar structure: all OPD consultations are for primary care services and there are no inpatient services. All nurses in the dispensaries provide OPD consultations.

Figure 53 : Outpatient visits per nurse per day, by dispensary of Lupara District, 2019



Note that the two hospitals and the health center were not included in this comparison. The service delivery structure in these higher-level facilities is more complex than in the dispensaries. For example, at the district hospital, OPD visits may include visits to specialist clinics that require longer consultation times than general OPD; furthermore, some clinicians spend some of their time in the inpatient wards and some of their time in OPD. For these reasons, it is not possible to simply use "total OPD consultations per clinician in the facility" to assess productivity for higher-level facilities. A special exercise is needed to estimate the percentage of time that various clinicians spend on OPD consultations before calculating the OPD productivity.

Even for the staff working at dispensaries, it is an over-simplification to assess their productivity only on the basis of the number of OPD visits. These staff are also responsible for the delivery of preventive and

[39] For further details, refer to page 15 in: WHO. 2010. Workload indicators of staffing need. https://www.who.int/hrh/resources/WISN_Eng_UsersManual.pdf?ua=1

promotive services such as ANC, deliveries, immunizations and HIV testing and counselling. Staff at some dispensaries may devote a higher percentage of their time to these preventive services than the staff at other dispensaries. A more reliable way of assessing productivity would acknowledge this by first counting the number of "full-time equivalent" (F.T.E.) nurses devoted to OPD consultations. A full-time nurse who devotes only half of her time to OPD consultations would constitute 0.5 nurse F.T.E's. An example of how to assess productivity using F.T.E.'s is presented in Box 4.

There is no global standard for this indicator and the average numbers vary substantially among countries and contexts. Nonetheless, large differences between facilities of the same level should be investigated. It may be that low OPD workload is counterbalanced by higher workload in other activities, e.g. ANC and immunization. After investigating the differences (including checking the data quality), these calculations can help to decide which facilities should be prioritized for additional resources.

Box 4: Calculating productivity

Example - calculating the productivity of midwives for ANC services in Health Center X, 2019

The calculations below should be adapted according to the context.

Estimating the available working days:

Working days per week:	5
Possible working days in a year:	52 weeks x 5 days = 260 days
Absences:	
Annual leave:	20 days
Public holidays:	12 days
Sick leave:	10 days
Other activities, e.g. training:	10 days

Scenario 1:
Available working days per year: 260 – (20+12+10+10) = 208
Number of ANC consultations provided = 12 584
Number of midwives dedicating 100% of their time to providing ANC consultations = 3
Number of midwife F.T.E.'s providing ANC consultations = 3.0

Productivity = 12 584 / (3.0 x 208) = 20.2 ANC consultations per midwife per day

Scenario 2:
Available working days per year: 260 – (20+12+10+10) = 208
Number of ANC consultations provided = 12 584
Number of midwives dedicating 100% of their time to providing ANC consultations = 2
Number of midwives dedicating 50% of their time to providing ANC consultations = 1
Number of midwife F.T.E.'s providing ANC consultations = 2.5

Productivity = 12 584/(2.5 x 208) = 24.2 ANC consultations per midwife per day

Question 35: Health Center A is open for general OPD consultations five days per week. Staff have 25 days of annual leave per year. The country has 13 official public holidays. In 2019, on average, staff in Health Center A were on sick leave for 8 days and were absent for training or other work-related activities for 10 days. For 2019, one clinical officer and one registered nurse were each assigned 50% to general OPD consultations and one registered nurse was assigned 100% to general OPD consultations. Calculate the available working days for 2019. Refer to FCA. 11 (in the FComp. 2019 dashboard) to find the facility's total OPD consultations for 2019. Calculate the average productivity in 2019 of the three staff members working in general OPD.

5.1.3.2 Medicines and commodities

- **Availability and distribution**

Comprehensive data on medicine availability and consumption are rarely available through the RHIS. The large numbers of items, different expiry dates and daily changes in stock usually require a specialised Logistics Management Information System (LMIS), either electronic or paper-based. However, some RHIS report on stockouts (or absence of stockouts) for selected medicines or other medical products as part of the monthly reports. Usually, such data reflect only whether there has been a stockout on any day during the reporting period, regardless of the duration, i.e. no distinction is made between a stockout of one day and a stockout of 29 days.

Districts may also monitor the availability of a basket of, for example, 10-20 tracer items, selected according to local priorities. Refer to Box 5 for an example of a list of tracer items. Specific baskets may be defined for different facility levels. The basket can be revised over time according to changing needs.

Box 5. Sample list of a basket of tracer medicine and medical products

Sample list of tracer items

1. Contraceptive
2. Sulfadoxine/pyrimethamine
3. Oxytocin
4. Vaccine (all/selected)
5. ORS
6. Zinc
7. Amoxicillin (or other antibiotic)
8. ACT
9. TB first line regimen
10. ART first line regimen
11. Thiazide diuretic
12. Antihypertensive/ACE inhibitor
13. Metformin (or other diabetes Medication)
14. Haloperidol
15. Urine dipstick - protein
16. Blood glucose test
17. Syphilis rapid test
18. HIV test
19. RDT
20. Genexpert

Availability of medicines and commodities can be assessed using the indicator **percentage of health facilities with no stockout of a basket of tracer items.** Figure 53 presents this indicator**,** for Lupara District during 2019, as well as showing the presence of stockouts per health facility.

Figure 54 : Stockouts of any tracer item, by facility of Lupara District, last 12 months

FCR. 3.2 - Facilities with no stockout	% of facilities	Number of facilities	Lupara District Hospital	Lupara NGO Hospital	Health Centre A	Dispensary A	B	C	D	E	F	G
Jan-19	90%	9	1	1	1	0	1	1	1	1	1	1
Feb-19	70%	7	1	1	1	0		1	1	0	1	1
Mar-19	90%	9	1	1	1	1	1	1	1	1	0	1
Apr-19	80%	8	1	0	1	1	1	1	1	1	1	0
May-19	80%	8	1	1	0	1	0	1	1	1	1	1
Jun-19	90%	9	1	1	1	1	1	0	1	1	1	1
Jul-19	40%	4	1	1	0	1	1	0	0		0	0
Aug-19	60%	6	1	1	1	1	1	0	0	1	0	0
Sep-19	90%	9	1	1	1	1	1	1	1	1	1	0
Oct-19	100%	10	1	1	1	1	1	1	1	1	1	1
Nov-19	90%	9	1	1	1	1	1	1	1	0	1	1
Dec-19	80%	8	0	1	0	1	1	1	1	1	1	1

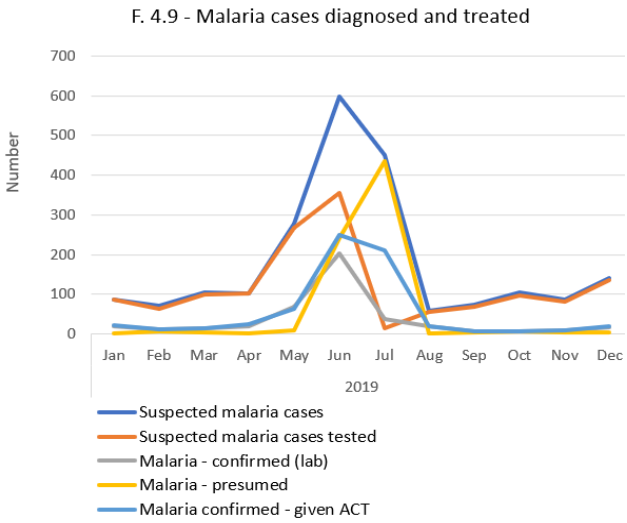
1= no stockout; 0 = presence of a stockout; blank = not reported

A decrease in the percentage of facilities with no stockout may reflect supply chain problems or an increase of utilization (such as during the peak malaria and pneumonia season of June to August), which has not been balanced with increased supply. If a facility reports stockout for a series of months, this may help to explain changes in service utilization such as for Dispensary G (where outpatient visits decreased markedly for several months; see Figure 24) or Dispensary C (where laboratory testing for malaria decreased in June and July when there was a stockout of malaria RDTs; see Figure 55 below).

Any decrease in the summary indicator (i.e. no stockout of a basket of tracer items) warrants further investigation to determine which item(s) is out of stock and why this happened.

Question 36: Explain how a stockout of malaria RDTs beginning in June 2019 at Dispensary C is consistent with the findings of both Figure 54 and Figure 55. Explain the trend in suspected cases tested and presumed malaria cases.

Figure 55 : Suspected malaria tested, diagnosed and treated, Dispensary C, January to December 2019



5.3.1.4. Financial resources

The analysis of financial resources shares some of the challenges noted for other resource indicators: these data are not usually reported through the RHIS. Furthermore, there may be multiple sources of funding and therefore multiple sources of data (e.g. government budget, global initiatives such as the Global Fund or GAVI, bilateral and multilateral donors, medicine stores, etc.). Although district health systems usually contain an administration and finance section, financial information available at district level may be limited, as most of the information is often managed at higher administrative levels or by the funders.

This section discusses two basic aspects of district finances: the annual budget allocation to the district (availability) and the execution (or spending) of this budget. Adequate assessment of financial resources at district level however usually requires a special study.

In many health systems, the budgets for most personnel costs and for most medicines and commodities are managed centrally. However, districts are often allocated a budget to pay temporary workers, overtime costs and per diems for work away from the usual job site. Districts may also have some funds to procure supplemental medicines and commodities. District budget items may also include various operating, administrative and small capital expenses. These items are often grouped into a number of major budget lines, as shown in Figure 56. (Note that these data do not reflect centrally managed funds.)

Figure 56 : Annual health budgets and expenditures, Lupara District, local currency, 2015 - 2019

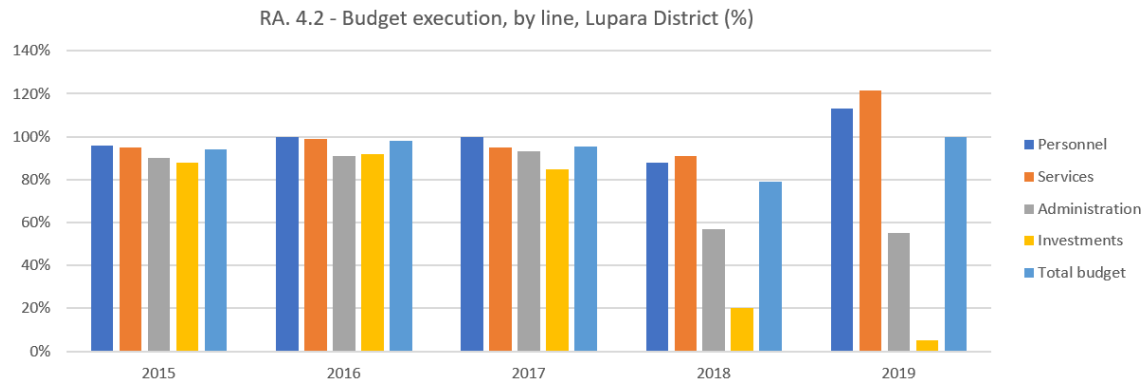
RA. 4.1 - District annual budget allocation and expenditure		2015	2016	2017	2018	2019
Personnel - including temporary hires and per diem	**Budget**	**549,840**	**598,560**	**675,120**	**633,360**	**696,000**
	Spent	522,348	580,603	668,368	544,689	765,600
Operations - including running costs for field operations (food, fuel, rental, supplemental medicines)	**Budget**	**856,800**	**836,400**	**1,020,000**	**969,000**	**1,020,000**
	Spent	788,256	878,220	877,200	872,100	1,264,800
Administration - utilties, maintenance of equipment, office supplies	**Budget**	**149,400**	**156,600**	**162,000**	**167,400**	**180,000**
	Spent	126,990	136,242	152,280	95,418	93,600
Investments - small capital projects (e.g. minor repairs)	**Budget**	**196,800**	**211,200**	**220,800**	**228,000**	**240,000**
	Spent	175,152	194,304	203,136	57,000	12,000
Total	**Budget**	**1,752,840**	**1,802,760**	**2,077,920**	**1,997,760**	**2,136,000**
	Spent	1,612,746	1,789,369	1,900,984	1,569,207	2,136,000

8. Budget execution is the percentage of the allocated budget that was actually spent over a given period. It is the simplest public finance management indicator. This information (budget and expenditure, with available detail) should be obtained on a quarterly and annual basis from the administration and finance section of the district health system. In principle, all funds should be spent by the end of the budget period (e.g. the financial year), to achieve execution rates close to 100%. Lower execution rates may occur,

for example, if the ministry of finance or other funding source did not release all the pledged/allocated funds, if implementation of activities was delayed for some reason, or if the district health system could not account for expenditure of all of the funds received. Execution rates above 100% reflect either data quality issues or spending on a budget line using funds which were originally budgeted for other lines.

Figure 57 presents the trends in budget execution rates for Lupara District. Note that in 2015, 2017 and 2018, overall expenditure was less than 100% of the total funds budgeted. This may reflect failure of budgeted funds to be released to the district or it may be due to some district-level bottleneck that prevented implementation of planned activities. In the hypothetical case of Lupara District presented in Figure 57, there was a nationwide budget shortfall in 2018 resulting in the District receiving less than 80% of the funds budgeted. To cope with this shortfall, district health managers under-spent on the investments and administration budget lines in order to pay for personnel and operations. In 2019, the district received and spent all budgeted funds, but had to respond to unexpected needs (two disease outbreaks), again by shifting funds from the administration and investment lines to personnel and operations. **Question 37**: How might these decisions affect district operations in the longer term?

Figure 57 : Trend in budget execution (%), by budget line, Lupara District, 2015 - 2019



Budget execution should be monitored quarterly at least, to identify budget lines/items (e.g. allocations for fuel or food) that were underspent or insufficient. Personnel funds usually are spent in full, while capital allocations often record a balance at the end of the implementation period. Reasons for lower-than-expected budget execution should be investigated.

Figure 58 presents a simple table that can be used to monitor cumulative expenditures against major lines of an annual budget. The most revealing information is seen in the two columns at the far right of the table: the expected balance at the start of Q4 is equal to 25% of annual budget; the actual balance is the actual amount remaining. The example shows that Lupara District has spent more than was originally budgeted on line 1 and line 2 during Q3. This resulted from unanticipated field expenses in Q3 due to a vaccination campaign in response to a measles outbreak. As a result, the actual balance is less than the expected balance for lines 1 and 2 and for the budget overall. **Question 38**: Faced with such a budget shortfall, how should district managers respond during Q4 of 2019?

Figure 58 : Summary of 2019 budget execution, Lupara District, as of the end of Q3 2019

RA. 4.3 - Summary of 2019 budget execution, Lupara District, Q3 2019

Budget line	Annual allocation	Expenditure this quarter	Cumulative Execution				Balance	
			Actual		Expected		Actual	Expected
			Amount	annual	Amount	% of annual		
1. Personnel	696,000	255,000	675,000	97%	522,000	75%	21,000	174,000
2. Operations	1,020,000	345,000	855,000	84%	765,000	75%	165,000	255,000
3. Administration	180,000	44,000	134,000	74%	135,000	75%	46,000	45,000
4. Investments	240,000	58,000	178,000	74%	180,000	75%	62,000	60,000
Total	**2,136,000**	**702,000**	**1,770,000**	**83%**	**1,602,000**	**75%**	**366,000**	**534,000**

ANNEXES

ANNEX 1 - DASHBOARD F 12M MM: Facility 12m mortality & morbidity

A standard dashboard showing trends over the last 12 months
In values for one health facility of mortality and morbidity indicators

Facility 12m Mortality and Morbidity

Health facility

All facilities	Dispensary A	Dispensary B	Dispensary C	Dispensary D	Dispensary E
Dispensary F	Dispensary G	Health Centre A	Lupara District Hos...	Lupara NGO Hospital	

MONTHLY REPORTING COMPLETENESS

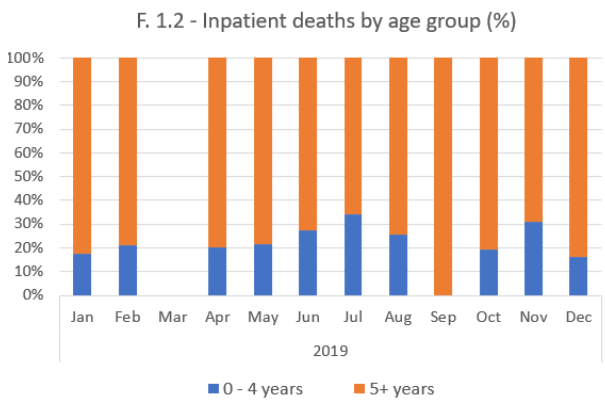
Health facility: Lupara District Hospital

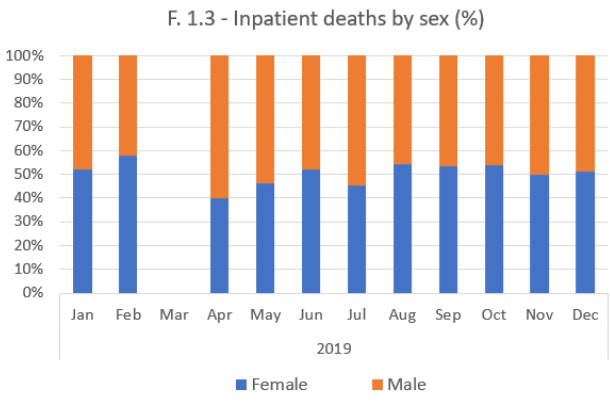
F. 0.1 - Inpatient department reports submitted	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Inpatient department report	1	1	0	1	1	1	1	1	1	1	1	1

1. INPATIENT MORTALITY

Health facility: Lupara District Hospital

F. 1.1 - Inpatient mortality levels (2019)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Institutional mortality rate (%)	6%	6%		7%	7%	9%	9%	8%	8%	7%	6%	10%
Institutional under five mortality rate (%)	4%	5%		6%	6%	6%	9%	10%	0%	5%	9%	6%
Institutional stillbirth rate (%)	5%	4%	4%	2%	3%	3%	5%	1%	4%	2%	3%	4%
Maternal deaths	1	0		1	0	0	1	0	0	0	3	0
Neonatal deaths	0	2	0	5	1	4	0	5	4	2	3	1
Stillbirths	10	7	8	4	7	6	10	3	8	4	5	7



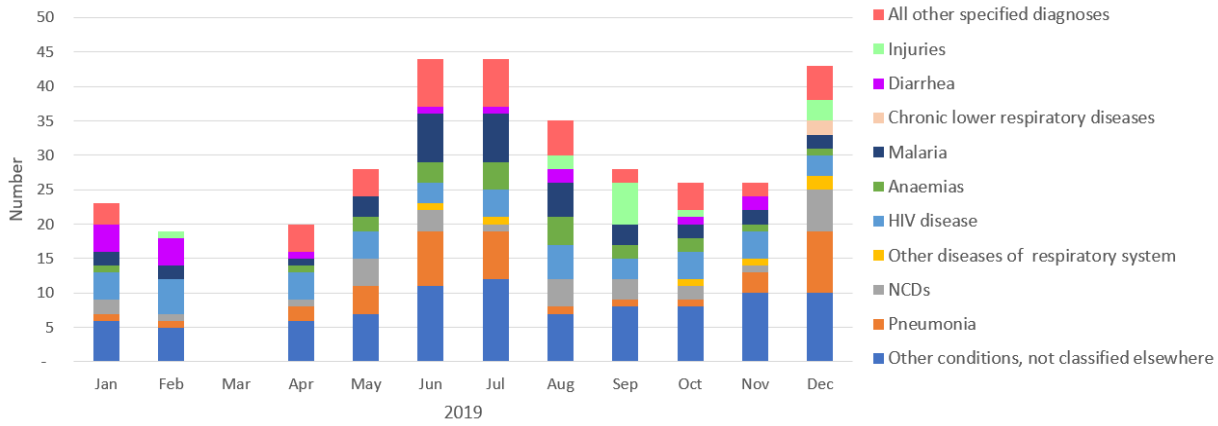


Facility 12m Mortality and Morbidity

Health facility

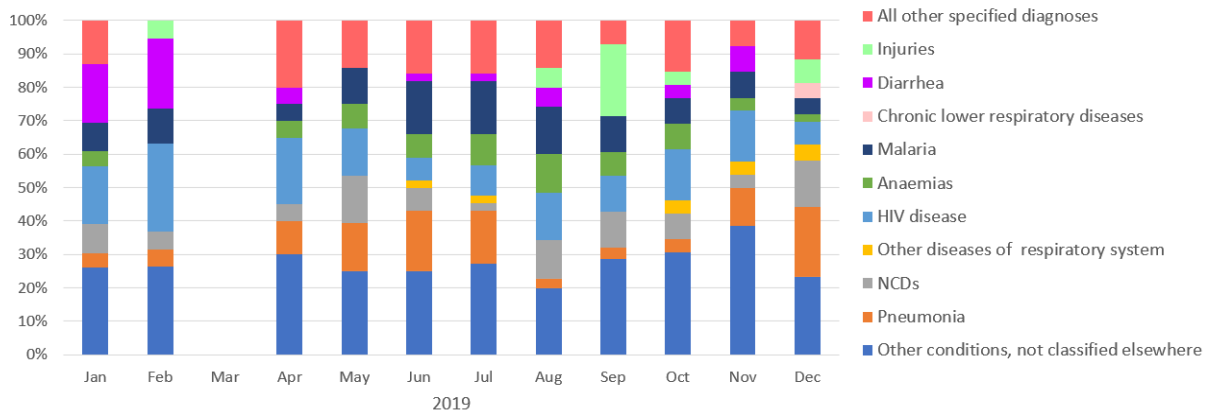
All facilities	Dispensary A	Dispensary B	Dispensary C	Dispensary D	Dispensary E
Dispensary F	Dispensary G	Health Centre A	Lupara District Hos...	Lupara NGO Hospital	

F. 1.4 - Top 10 causes of inpatient deaths, Dec 2019 ranking

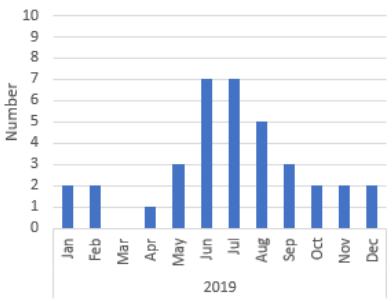


In charts F. 1.4 and F. 1.5 all chronic noncommunicable diseases and injuries are grouped under NCDs.
In December, the top 10 causes of death represent **88%** of all inpatient deaths.

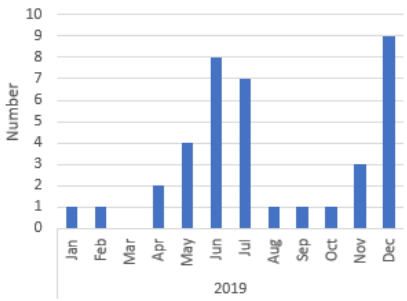
F. 1.5 - Inpatient proportional mortality, top 10 causes of death, Dec 2019 ranking (%)



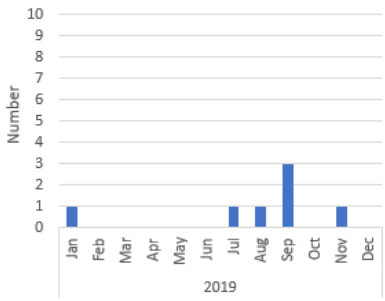
F. 1.6 - Malaria inpatient deaths



F. 1.6 Pneumonia inpatient deaths



F. 1.8 - Perioperative deaths



Health facility: Lupara District Hospital

F. 1.9 - Selected fatality rates (2019)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Malaria case fatality rate (%)	5%	5%		1%	2%	5%	5%	4%	4%	5%	4%	5%
Pneumonia case fatality rate (%)	3%	4%		8%	7%	10%	12%	6%	7%	5%	12%	12%
Perioperative mortality rate (%)	3%	0%	0%	0%	0%	0%	3%	3%	6%	0%	3%	0%

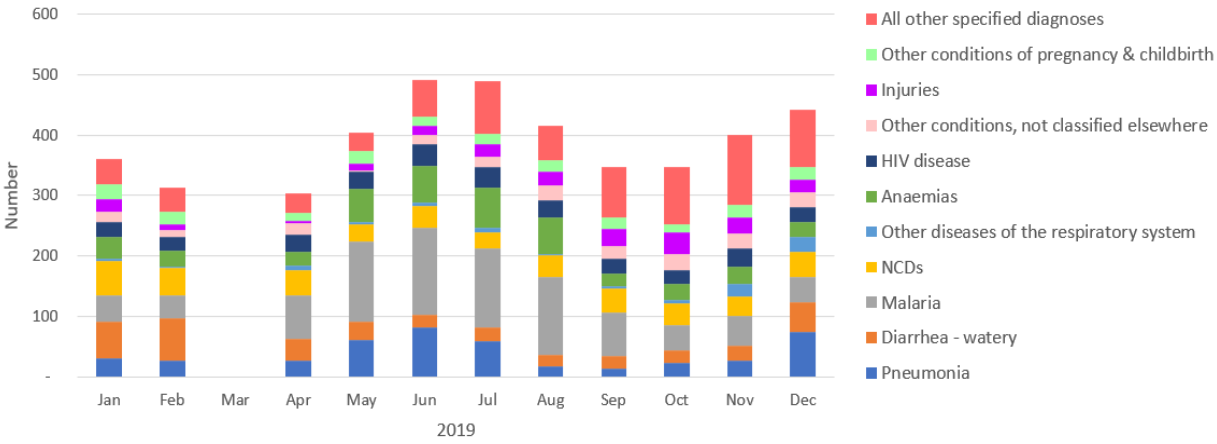
Facility 12m Mortality and Morbidity

Health facility

All facilities	Dispensary A	Dispensary B	Dispensary C	Dispensary D	Dispensary E
Dispensary F	Dispensary G	Health Centre A	Lupara District Hos...	Lupara NGO Hospital	

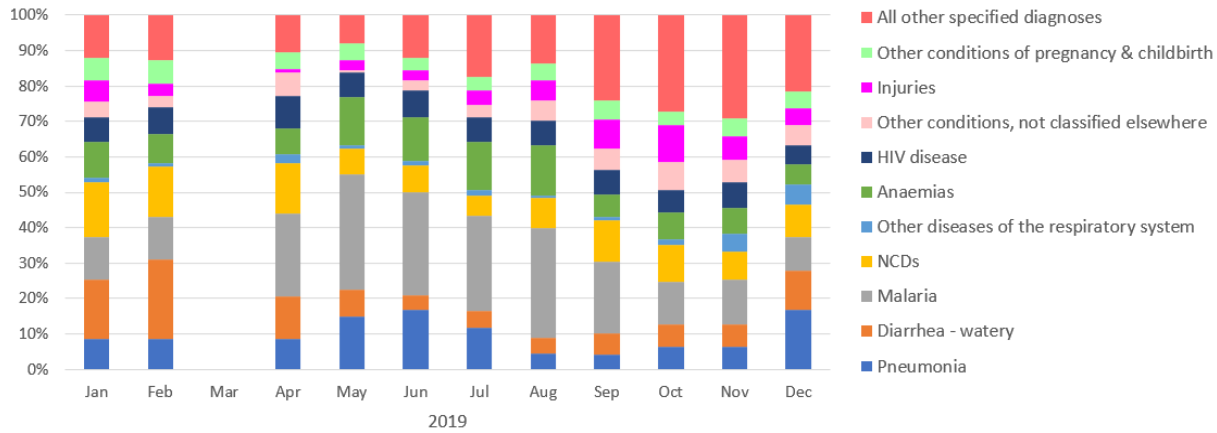
2A. INPATIENT MORBIDITY

F. 2a.1 - Top 10 inpatient discharge diagnoses, Dec 2019 ranking

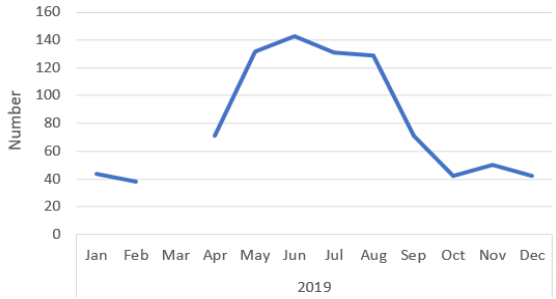


In charts F. 2a.1 and F. 2a.2 all chronic noncommunicable diseases are grouped under NCDs, and all external causes of death are grouped under injuries. In December, the top 10 diagnoses represent **78%** of all inpatient discharge diagnoses.

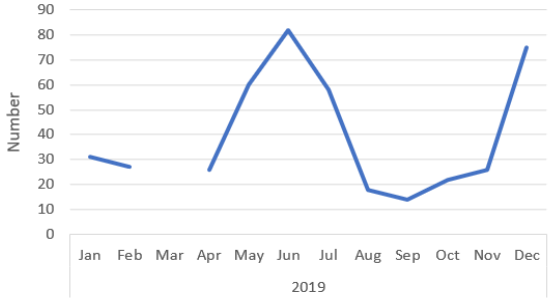
F. 2a.2 - Inpatient proportional morbidity, top 10 inpatient discharge diagnoses, Dec 2019 ranking (%)



F. 2a.3 - Malaria inpatient discharge diagnoses



F. 2a.4 - Pneumonia inpatient discharge diagnoses



Facility 12m Mortality and Morbidity

Health facility

All facilities	Dispensary A	Dispensary B	Dispensary C	Dispensary D	Dispensary E
Dispensary F	Dispensary G	Health Centre A	Lupara District Hos...	Lupara NGO Hospital	

INPATIENT MORTALITY REFERENCE TABLE

Health facility: Lupa District Hospital

F 2a.5 - Top 20 causes of inpatient deaths (De	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Other conditions, not classified elsewhere	6	5		6	7	11	12	7	8	8	10	10
Pneumonia	1	1		2	4	8	7	1	1	1	3	9
HIV disease	4	5		4	4	3	4	5	3	4	4	3
Chronic lower respiratory diseases	0	0		0	0	0	0	0	0	0	0	2
Other diseases of respiratory system	0	0		0	0	1	1	0	0	1	1	2
Transport accidents		1		0	0	0	0	1	4	1	0	2
Malaria	2	2		1	3	7	7	5	3	2	2	2
Anaemias	1	0		1	2	3	4	4	2	2	1	1
MN of breast	0	0		0	0	0	0	0	1	0	0	1
Other acute lower respiratory infections	0	0		0	0	0	0	0	0	0	0	1
Acute stroke	0	0		0	0	0	0	1	0		0	1
Renal Failure		0		0	1	0	0	1	0	1	0	1
Heart Failure	1	0		1	1	1	0	0	1	1	1	1
Influenza	0	0		0	0	0	0	0	0	0	0	1
Diabetes mellitus	0	1		0	1	1	1	1	0	0	0	1
Other condit of pregnancy & childbirth		0		1	0	0	1	0	1	0	0	1
Malnutrition	0			1	0	2	0	0	0	0	0	1
MN of prostate	0	0		0	0	0	0	0	0	0	0	1
Accidental poisoning by and exposure to noxious s	0	0		0	0	0	0	0	0	0	0	1
Certain perinatal conditions	2	0		0	2	0	4	0	0	2	0	1

In December, the top 20 causes of death represent **100%** of all inpatient deaths

INPATIENT MORBIDITY REFERENCE TABLE

Health facility: Lupa District Hospital

F. 2a.6 - Top 20 inpatient discharge diagnose ec)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Pneumonia	31	27		26	60	82	58	18	14	22	26	75
Diarrhoea - watery	60	70		37	31	21	23	19	21	22	25	48
Malaria	44	38		71	132	143	131	129	71	42	50	42
Other diseases of respiratory system	4	3		8	3	7	7	3	3	5	21	25
HIV disease	25	23		28	28	37	34	29	24	22	29	25
Anaemias	37	26		22	55	60	67	59	22	27	29	25
Other conditions, not classified elsewhere	16	10		20	3	14	17	24	21	27	25	24
Other conditions of pregnancy & childbirth	23	21		14	20	16	18	19	18	14	20	21
Influenza	0	0		0	0	0	0	0	0	0	8	18
Chronic lower respiratory diseases	0	2		0	0	2	5	4	3	4	5	12
Other acute lower respiratory infections	0	0		1	0	0	0	0	0	0	5	11
Gastric and duodenal ulcer	19	16		15	4	5	3	4	6	6	5	9
Transport accidents	9	7		2	4	9	14	12	13	13	14	9
Malnutrition	4	2		2	4	7	13	9	9	5	6	8
Septicaemia	2	0		0	0	4	8	5	4	6	7	8
Diabetes mellitus	15	10		2	2	6	7	9	9	8	5	7
Heart failure	7	5		9	12	12	5	8	10	8	5	7
Other diseases of genitourinary system	2	1		3	1	8	6	2	3	8	10	7
Other diseases - skin/subcutaneous	1	2		5	1	5	6	2	5	6	5	7
Hypertensive diseases	6	5		8	4	2	4	4	5	7	6	6

In December, the top 20 diagnoses represent **89%** of all inpatient discharge diagnoses

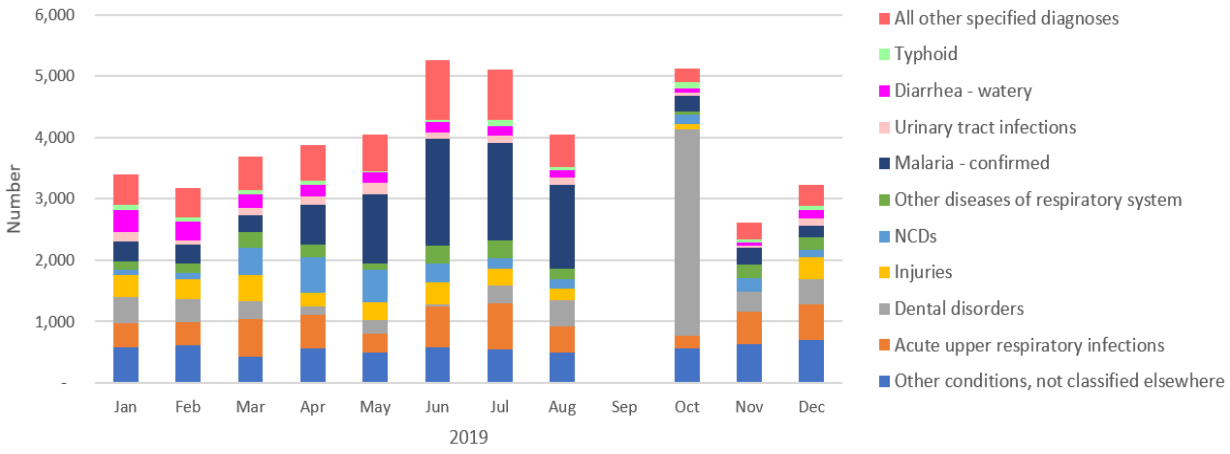
Facility 12m Mortality and Morbidity

Health facility

All facilities	Dispensary A	Dispensary B	Dispensary C	Dispensary D	Dispensary E
Dispensary F	Dispensary G	Health Centre A	Lupara District Hos...	Lupara NGO Hospital	

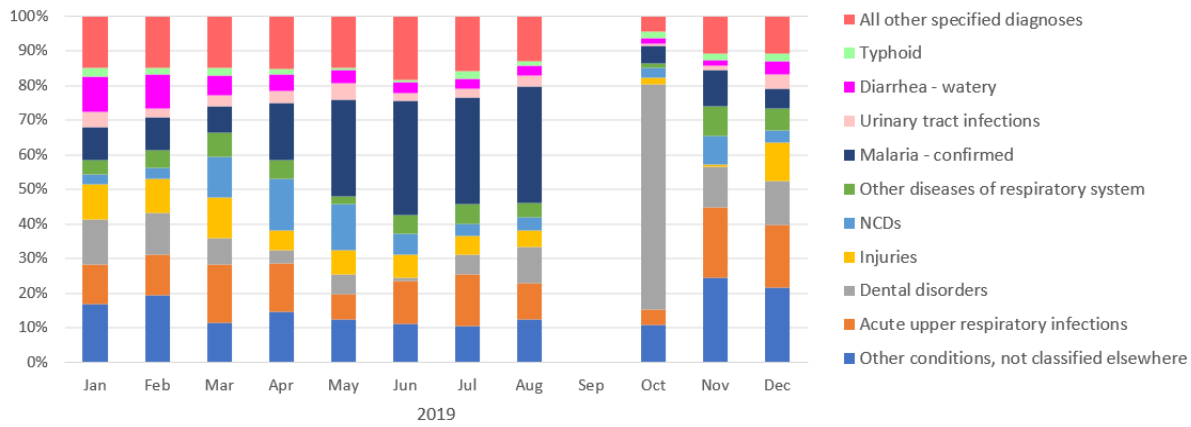
2B. OUTPATIENT MORBIDITY

F. 2b.1 - Top 10 outpatient diagnoses, Dec 2019 ranking



In charts F. 2b.1 and F. 2b.2 all chronic noncommunicable diseases are grouped under NCDs, and all external causes of death are grouped under injuries. In December, the top 10 diagnoses represer **89%** of all outpatient diagnoses.

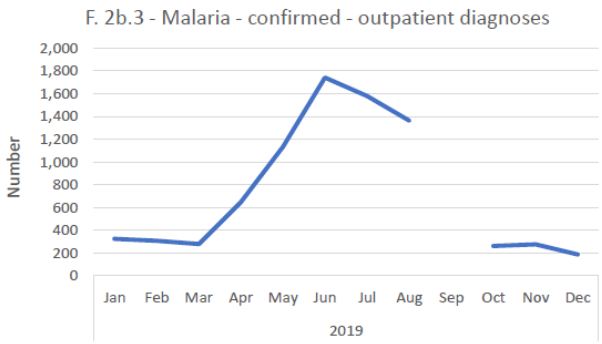
F. 2b.2 - Outpatient proportional morbidity, top 10 outpatient diagnoses, Dec 2019 ranking (%)

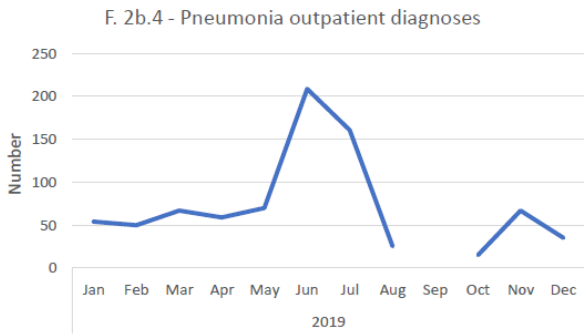


Facility 12m Mortality and Morbidity

Health facility

All facilities	Dispensary A	Dispensary B	Dispensary C	Dispensary D	Dispensary E
Dispensary F	Dispensary G	Health Centre A	Lupara District Hos...	Lupara NGO Hospital	





Health facility Lupara District Hospital

F. 2b.5 - Selected diseases for surveillance (2(	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Acute haemorragic fever syndrome	0	0	0	0	0	0	0	0		0	0	0
Meningitis	1	0	0	0	0	0		1		1	0	0
Cholera	0	0	0	0	0	0	0	0		0	0	0
Diarrhea - with blood	1	3	2	1	1	3	2	1		2	1	2
Influenza-like illness	0	0	0	0	0	0	0	0		0	0	0
Measles	0	0	1	5	8	15	0	0		0	1	0
Mumps	3	3	2	5	0	3	4	5		0	0	3
Tetanus neonatal	0	0	0	0	0	0	0	0		0	0	0
Lymphatic filariasis	0	0	0	0	0	0	0	0		0	0	0

OUTPATIENT MORBIDITY REFERENCE TABLE

Health facility Lupara District Hospital

F. 2b.6 - Top 20 outpatient diagnoses (Dec)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Other conditions, not classified elsewhere	578	614	428	571	497	581	541	501		558	640	701
Acute upper respiratory infections	389	378	617	532	302	658	760	427		217	528	583
Dental disorders	442	380	281	149	227	45	287	419		3353	313	405
Other diseases of respiratory system	138	152	251	202	96	281	295	171		56	220	200
Malaria - confirmed	325	308	280	648	1134	1739	1579	1362		262	276	189
Other injuries	145	134	176	90	123	150	100	82		38	0	159
Urinary tract infections	148	75	116	135	189	110	121	127		45	37	133
Diarrhoea - watery	350	314	219	188	155	176	156	120		71	40	125
Transport accidents	74	68	90	46	63	77	51	42		19	0	81
Hypertension	49	56	384	524	476	226	119	104		91	137	72
Typhoid	84	63	76	59	26	32	105	53		96	48	69
Musculoskeletal/connective tissue diseases	90	45	31	60	45	31	33	63		24	0	66
Chronic lower respiratory diseases	31	48	33	59	53	85	54	26		45	45	45
Infections - skin/subcutaneous	137	128	169	169	140	160	178	110		52	30	45
Burns	28	29	39	19	24	31	30	19		12	5	36
Pneumonia	54	50	67	59	70	209	161	25		15	67	35
Other bites	31	28	41	27	22	27	35	13		2	2	31
Acute diseases of the ear and mastoid process	28	26	16	33	24	23	24	25		0	12	25
Other diseases - skin/subcutaneous	24	16	40	23	15	40	34	17		23	25	24
Remainder of mental & behavioral disorders	23	13	29	17	35	26	13	10		0	2	20

In December, the top 20 diagnoses represent **94%** of all outpatient diagnoses

ANNEX 2 - DASHBOARD F 12M UCQ: Facility 12m utilization, coverage & quality

A standard dashboard for showing trends over the last 12 months
for one health facility in indicators of utilization, coverage and quality

Facility 12m Utilization, Coverage, and Quality

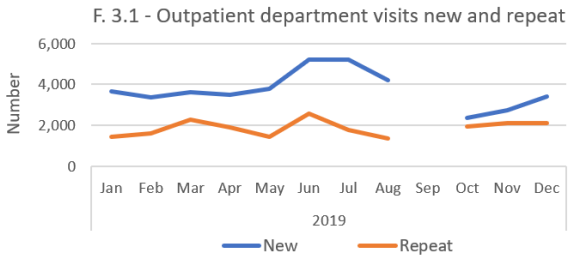
Health facility

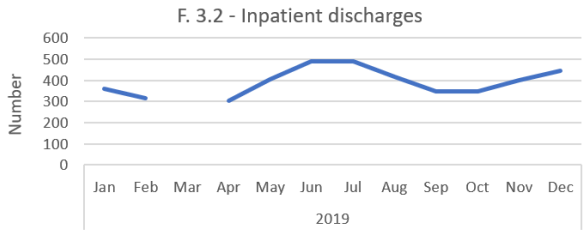
All facilities	Dispensary A	Dispensary B	Dispensary C	Dispensary D	Dispensary E
Dispensary F	Dispensary G	Health Centre A	Lupara District H...	Lupara NGO Hos...	

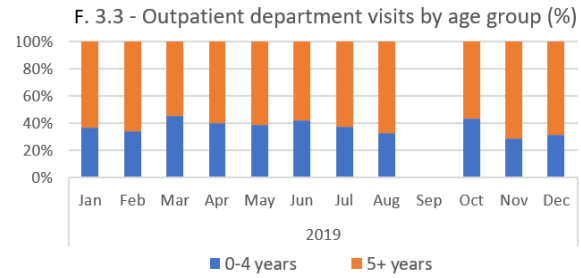
MONTHLY REPORTING COMPLETENESS

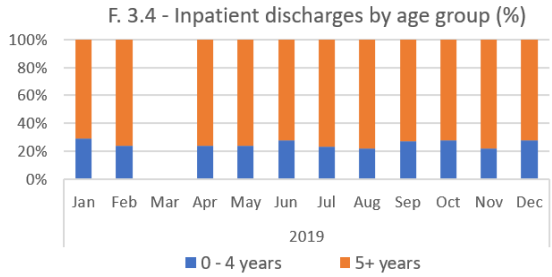
F. 0.3 - Reports submitted (2019)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Inpatient department report	1	1	0	1	1	1	1	1	1	1	1	1
Outpatient department report	1	1	1	1	1	1	1	1	0	1	1	1
RMNCAH report	1	1	1	1	1	1	1	1	1	1	1	1
Immunization report	1	1	1	1	1	1	1	1	1	1	1	1
HIV report	1	1	1	1	1	1	1	1	1	1	1	1
TB report			1			1			1			1
Malaria report	1	1	1	1	1	1	1	1	1	1	1	1
Total	**6**	**6**	**6**	**6**	**6**	**7**	**6**	**6**	**6**	**6**	**6**	**7**

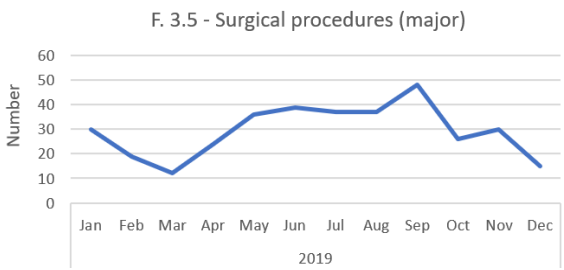
3. SERVICE UTILIZATION

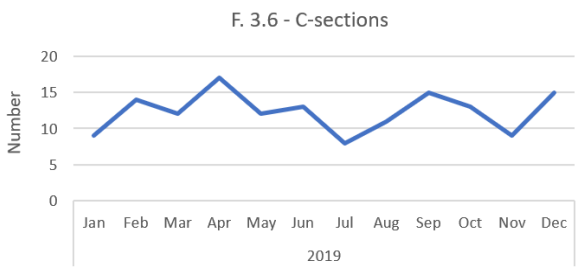


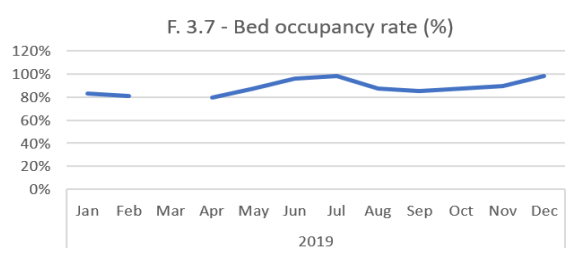


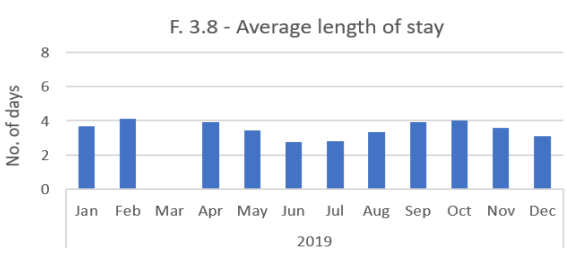












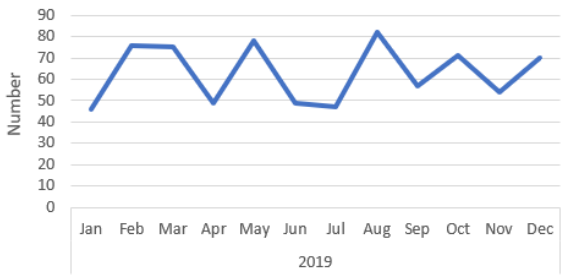
Facility 12m Utilization, Coverage, and Quality

Health facility

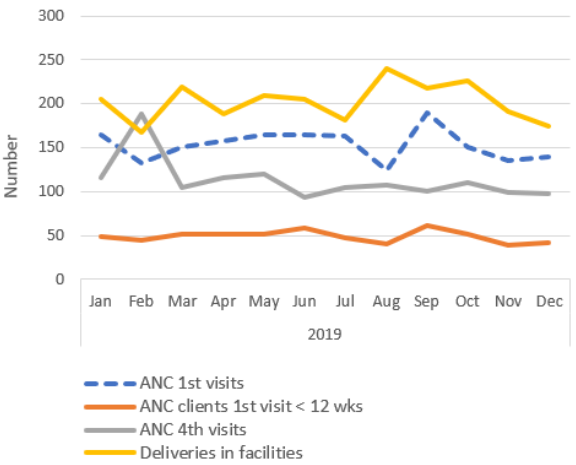
All facilities	Dispensary A	Dispensary B	Dispensary C	Dispensary D	Dispensary E
Dispensary F	Dispensary G	Health Centre A	Lupara District H...	Lupara NGO Hos...	

4. SERVICE COVERAGE AND QUALITY

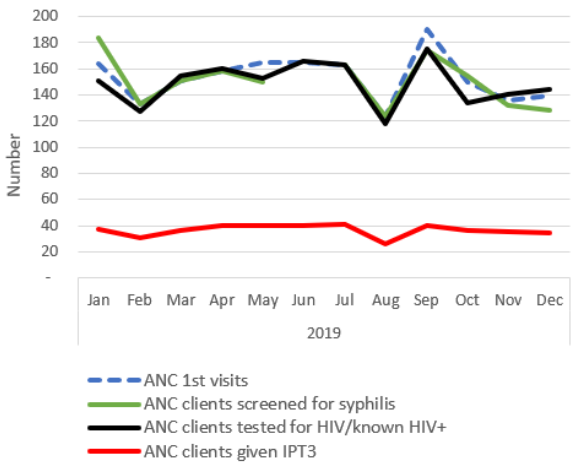
F. 4.1 - Contraception 1st time users



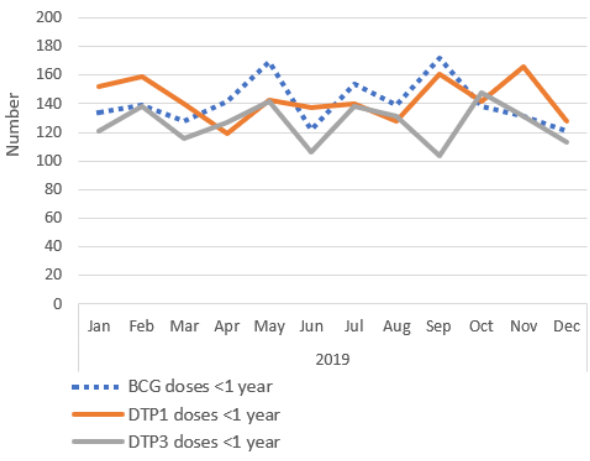
F. 4.2 - Antenatal care and deliveries in facilities



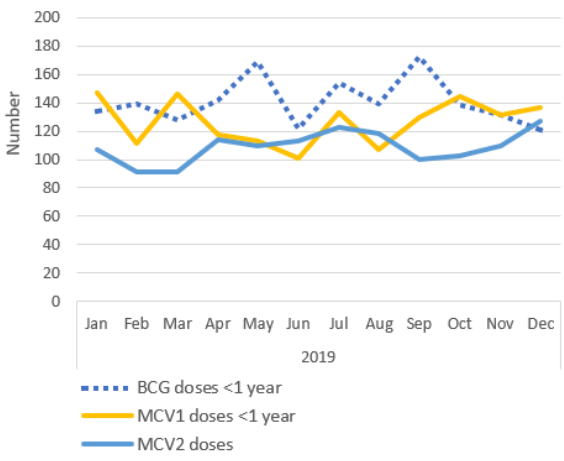
F. 4.3 - Antenatal care - quality tracers



F. 4.4 - BCG and DTP doses given



F. 4.5 - BCG and measles-containing vaccine doses given

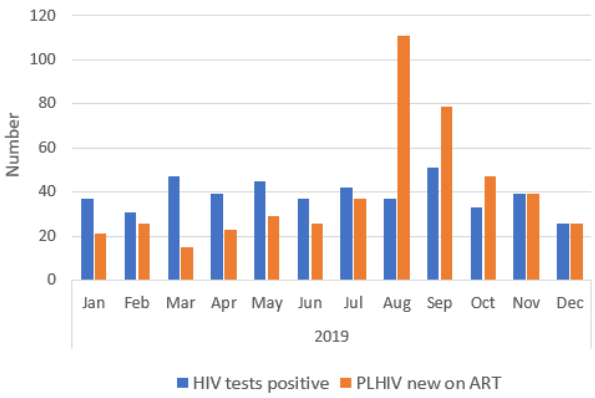


Facility 12m Utilization, Coverage, and Quality

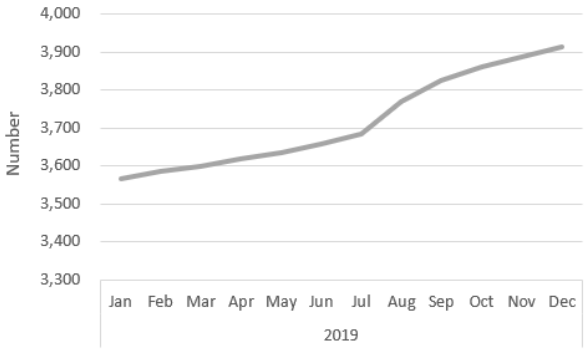
Health facility

All facilities	Dispensary A	Dispensary B	Dispensary C	Dispensary D	Dispensary E
Dispensary F	Dispensary G	Health Centre A	Lupara District H...	Lupara NGO Hos...	

F. 4.6 - PLHIV newly diagnosed and newly on ART

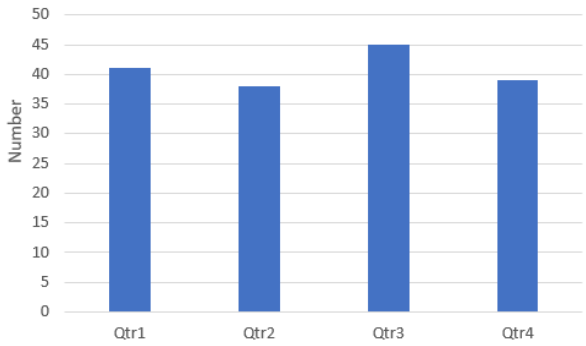


F. 4.7 - PLHIV currently on ART

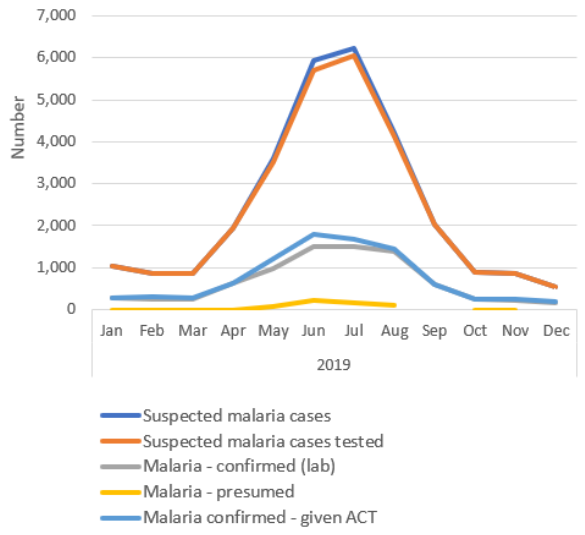


Health facility

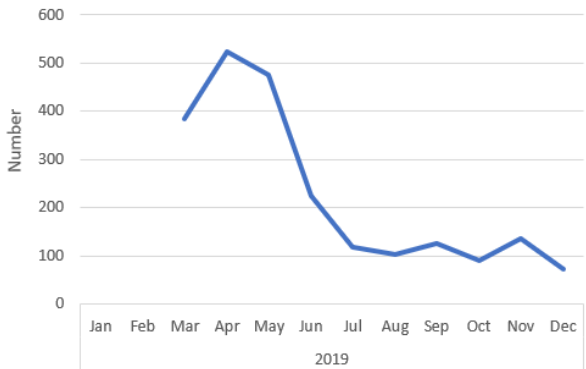
F. 4.8 - TB notifications



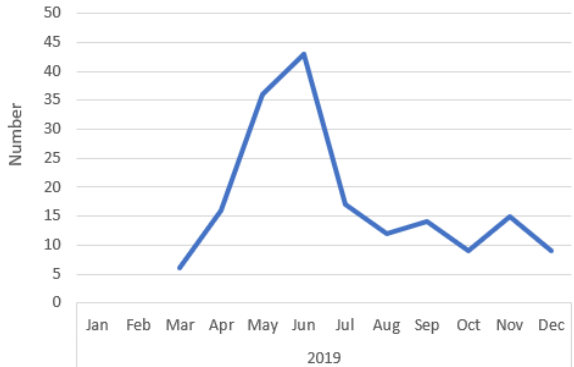
F. 4.9 - Malaria cases diagnosed and treated



F. 4.10 - Hypertension new cases



F. 4.11 - Diabetes new cases



Facility 12m Utilization, Coverage, and Quality

Health facility

All facilities	Dispensary A	Dispensary B	Dispensary C	Dispensary D	Dispensary E
Dispensary F	Dispensary G	Health Centre A	Lupara District H...	Lupara NGO Hos...	

SERVICE UTILIZATION, COVERAGE AND QUALITY REFERENCE TABLES

Health facility: Lupa District Hospital

F. 4.12 - Data elements	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Inpatient discharges	361	314		304	405	491	489	416	347	347	401	443
Surgical procedures (major)	30	19	12	24	36	39	37	37	48	26	30	15
Caesarean section	9	14	12	17	12	13	8	11	15	13	9	15
Outpatient department visits	5,076	4,934	5,890	5,377	5,185	7,781	6,948	5,535	0	4,304	4,815	5,479
Contraception first time users	46	76	75	49	78	49	47	82	57	71	54	70
ANC 1st visits	164	133	151	158	165	165	163	124	190	150	136	140
ANC 4th visits	116	188	104	116	120	94	105	107	100	110	99	97
Deliveries in facilities	205	168	219	189	209	205	182	240	218	226	191	175
BCG doses given <1 year	134	139	128	142	169	122	154	139	172	138	131	121
DTP1 doses given <1 year	152	159	140	119	143	137	140	128	161	142	166	128
DTP3 doses given <1 year	121	138	116	127	142	106	138	131	104	148	131	113
MCV1 doses given <1 year	147	111	146	117	113	101	133	107	130	144	131	137
MCV2 doses given	107	91	91	114	110	113	123	118	100	103	110	127
HIV tests positive	37	31	47	39	45	37	42	37	51	33	39	26
PLHIV new on ART	21	26	15	23	29	26	37	111	79	47	39	26
PLHIV currently on ART	3,567	3,585	3,597	3,617	3,636	3,656	3,684	3,768	3,824	3,860	3,888	3,912
Malaria - confirmed	289	264	240	615	987	1,509	1,512	1,388	589	241	234	158
Malaria - presumed (clinical diagnosis only)	0	0	0	0	83	217	154	103		0	0	
Hypertension new cases			384	524	476	226	119	104	125	91	137	72
Diabetes new cases			6	16	36	43	17	12	14	9	15	9

Health facility: Lupa District Hospital

F. 4.13 - Indicators (facility denominators)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
C-section rate: facilities (%)	4%	8%	5%	9%	6%	6%	4%	5%	7%	6%	5%	9%
Bed occupancy rate (%)	83%	81%		79%	87%	96%	98%	87%	85%	87%	89%	98%
Average length of stay	3.7	4.1		3.9	3.5	2.7	2.8	3.4	3.9	4.0	3.6	3.1
ANC clients tested for HIV/known HIV+ (%)	92%	95%	103%	101%	93%	101%	100%	95%	92%	89%	104%	103%
ANC clients screened for syphilis (%)	112%	100%	100%	100%	91%	0%	100%	100%	92%	103%	97%	91%
ANC clients given IPTp3 (%)	23%	23%	24%	25%	24%	24%	25%	21%	21%	24%	26%	24%
ANC clients with 4th ANC visit (%)	71%	141%	69%	73%	73%	57%	64%	86%	53%	73%	73%	69%
Suspected malaria cases tested (%)	100%	100%	100%	100%	98%	96%	98%	98%	100%	100%	100%	100%
Malaria confirmed - given ACT (%)	101%	115%	115%	102%	122%	120%	112%	104%	100%	109%	112%	113%

ANNEX 3 - DASHBOARD D 12M MM: District 12m mortality & morbidity

A standard dashboard showing trends over the last 12 months
In district total values of mortality and morbidity indicators

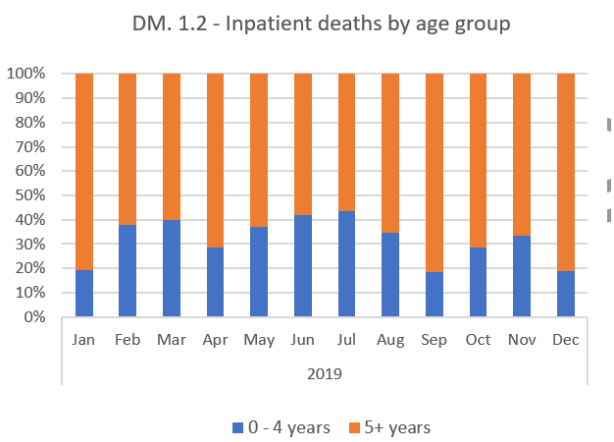
District 12m Mortality and Morbidity

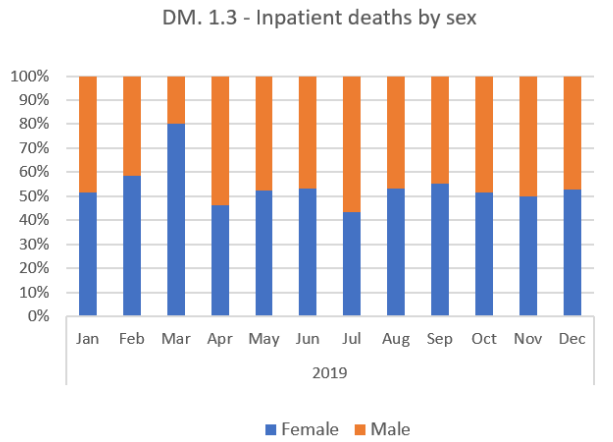
MONTHLY REPORTING COMPLETENESS

DM. 0.1 - Inpatient department reports subm	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Inpatient department report	3	3	2	3	3	3	3	3	3	3	3	3

1. INPATIENT MORTALITY

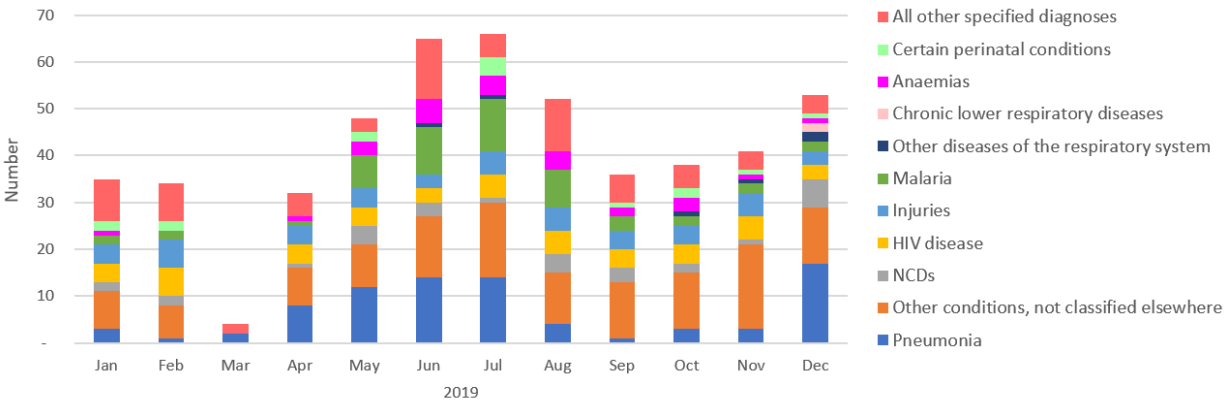
DM. 1.1 - Inpatient mortality levels (2019)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Institutional mortality rate (%)	7%	7%	4%	6%	7%	8%	9%	9%	9%	8%	7%	8%
Institutional under five mortality rate (%)	2%	3%	3%	2%	4%	4%	4%	4%	2%	3%	3%	2%
Institutional stillbirth rate (%)	3%	4%	2%	1%	3%	2%	4%	1%	2%	1%	2%	3%
Maternal deaths	1	0	0	1	0	0	1	0	0	0	3	0
Neonatal deaths	0	4	2	7	1	6	0	9	7	3	5	1
Stillbirths	11	11	8	4	10	8	11	5	8	4	6	7





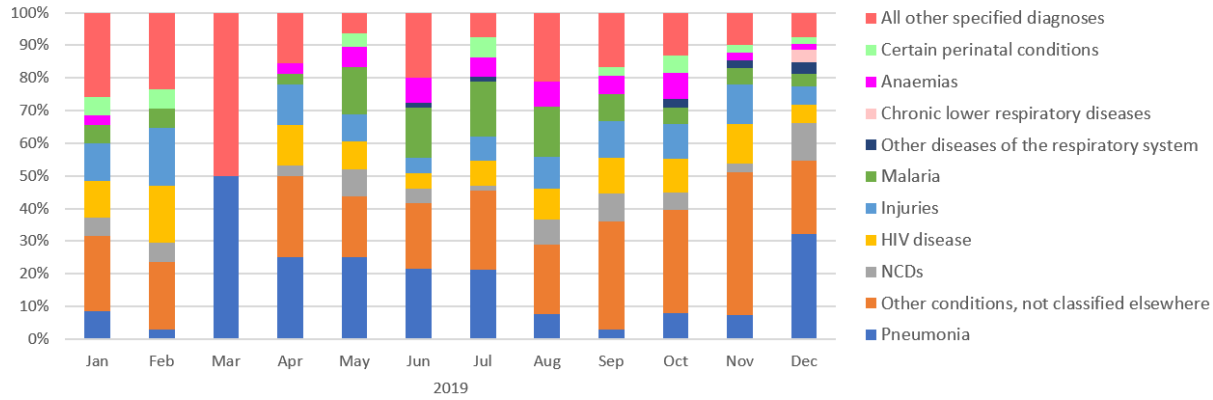
District 12m Mortality and Morbidity

DM. 1.4 - Top 10 causes of inpatient deaths, Dec 2019 ranking

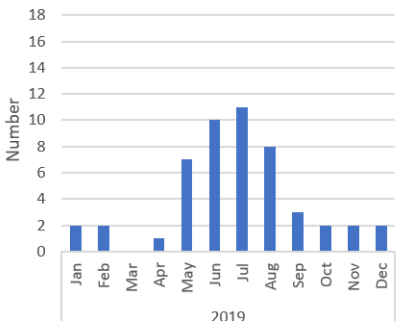


In charts DM. 1.4 and DM. 1.5 all chronic noncommunicable diseases and injuries are grouped under NCDs.
In December, the top 10 causes of death represent **92%** of all inpatient deaths.

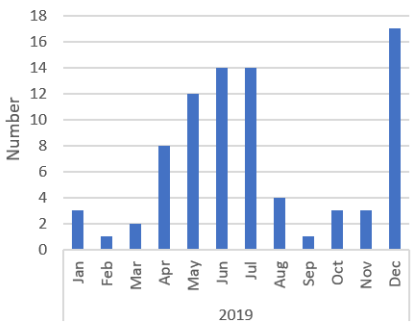
DM. 1.5 - Inpatient proportional mortality, top 10 causes of deaths, Dec 2019 ranking (%)



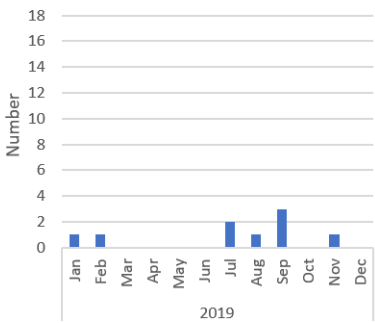
DM. 1.6 - Malaria inpatient deaths



DM. 1.7 - Pneumonia inpatient deaths



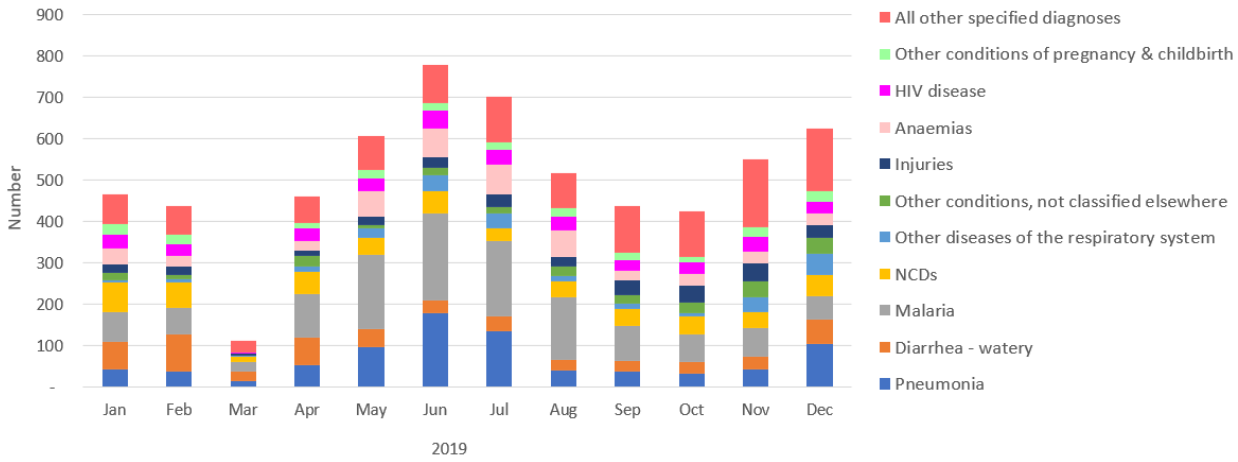
DM. 1.8 - Perioperative deaths



DM. 1.9 - Selected fatality rates (2019)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Malaria case fatality rate (%)	3%	3%	0%	1%	4%	5%	6%	5%	4%	3%	3%	4%
Pneumonia case fatality rate (%)	7%	3%	13%	15%	13%	8%	10%	10%	3%	9%	7%	16%
Perioperative mortality rate (%)	3%	2%	0%	0%	0%	0%	5%	3%	6%	0%	3%	0%

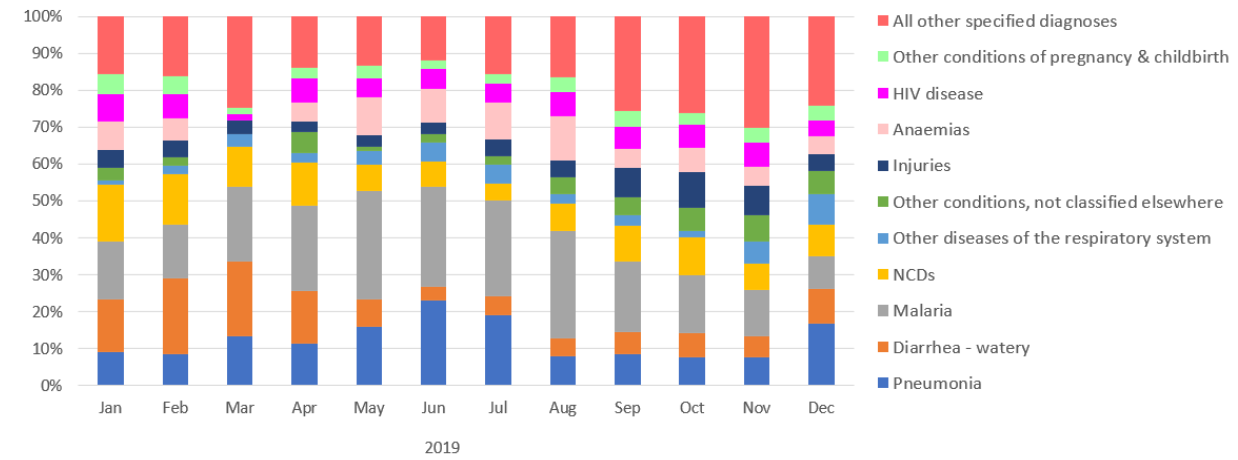
District 12m Mortality and Morbidity

DM. 2a.1 - Top 10 inpatient discharge diagnoses, Dec 2019 ranking

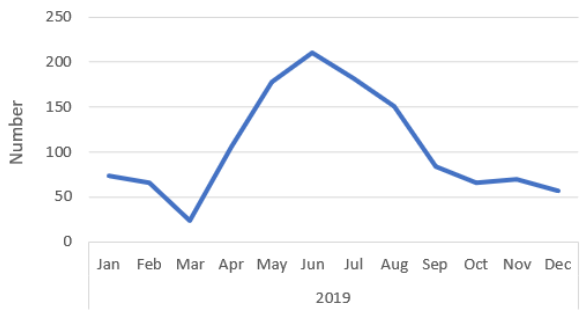


In charts DM. 2a.1 and DM. 2a.2 all chronic noncommunicable diseases are grouped under NCDs, and all external causes of death are grouped under injuries. In December, the top 10 diagnoses represent **76%** of all inpatient discharges diagnoses.

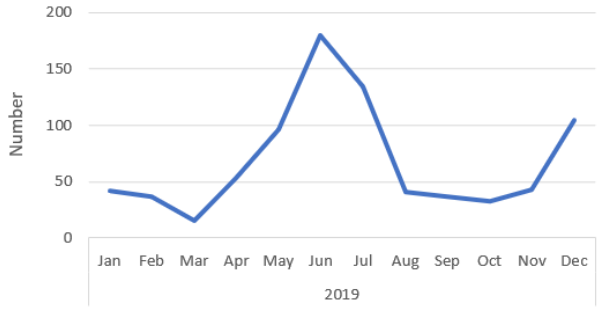
DM. 2a.2 - Inpatient proportional morbidity, top 10 inpatient discharge diagnoses, Dec 2019 ranking (%)



DM. 2a.3 - Malaria inpatient discharge diagnoses



DM. 2a.4 - Pneumonia inpatient discharge diagnoses



District 12m Mortality and Morbidity

INPATIENT MORTALITY REFERENCE TABLE

DM. 2a.5 - Top 20 causes of inpatient deaths (Dec)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Pneumonia	3	1	2	8	12	14	14	4	1	3	3	17
Other conditions, not classified elsewhere	8	7	0	8	9	13	16	11	12	12	18	12
HIV disease	4	6	0	4	4	3	5	5	4	4	5	3
Chronic lower respiratory diseases	0	0	0	0	0	0	0	0	0	0	0	2
Other diseases of the respiratory system	0	0	0	0	0	1	1	0	0	1	1	2
Transport accidents	0	1	0	0	0	0	0	1	4	1	0	2
Malaria	2	2	0	1	7	10	11	8	3	2	2	2
Anaemias	1	0	0	1	3	5	4	4	2	3	1	1
MN of breast	0	0	0	0	0	0	0	0	1	0	0	1
Other acute lower respiratory infections	0	0	1	0	0	0	0	0	1	0	0	1
Acute stroke	0	0	0	0	0	0	0	1	0	0	0	1
Renal Failure	0	0	0	0	1	0	0	1	0	1	0	1
Heart Failure	1	1	0	1	1	1	0	0	1	1	1	1
Influenza	0	0	0	0	0	0	0	0	0	0	0	1
Diabetes mellitus	0	1	0	0	1	1	1	1	0	0	0	1
Other conditions of pregnancy & childbirth	0	0	1	1	0	0	2	0	1	0	0	1
Malnutrition	0	0	0	1	0	2	0	0	0	0	0	1
MN of prostate	0	0	0	0	0	0	0	0	0	0	0	1
Accidental poisoning by and exposure to noxious	0	0	0	0	0	0	0	0	0	0	0	1
Certain perinatal conditions	2	2	0	0	2	0	4	0	1	2	1	1

In December, the top 10 causes of death represent **100%** of all inpatient deaths

INPATIENT MORBIDITY REFERENCE TABLE

DM. 2a.6 - Top 20 inpatient discharge diagnoses (Dec)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Pneumonia	42	37	15	53	96	180	134	41	37	33	43	104
Diarrhea - watery	67	90	23	66	45	29	36	25	26	28	31	59
Malaria	73	65	23	106	178	210	182	151	84	66	69	56
Other diseases of the respiratory system	6	9	4	12	23	39	35	13	12	7	34	51
Other conditions, not classified elsewhere	16	10	0	26	7	18	17	24	21	27	39	39
Anaemias	37	27	0	24	63	70	71	62	22	28	29	29
HIV disease	34	28	2	30	30	43	36	34	26	27	35	27
Other conditions of pregnancy & childbirth	25	22	2	14	21	17	18	21	19	14	23	25
Influenza	0	0	0	0	0	0	2	11	1	0	11	24
Chronic lower respiratory diseases	2	2	0	4	0	2	10	6	7	4	8	18
Transport accidents	9	11	0	4	6	15	14	12	13	13	26	18
Other acute lower respiratory infections	0	0	2	1	0	2	0	0	0	0	8	17
Other diseases - skin/subcutaneous	1	4	2	7	3	5	6	2	7	6	13	14
Septicaemia	6	0	2	0	2	4	8	5	6	6	9	12
Diabetes mellitus	19	12	2	6	2	14	9	9	9	14	5	11
Gastric and duodenal ulcer	21	19	1	15	5	5	4	4	8	6	6	9
Hypertensive diseases	8	9	2	10	10	5	5	4	5	8	8	9
Diseases of the eye and adnexa	8	9	7	9	10	9	6	7	10	11	9	8
Heart failure	11	9	2	14	14	17	5	10	10	8	8	8
Malnutrition	4	6	2	2	4	9	15	9	9	5	6	8

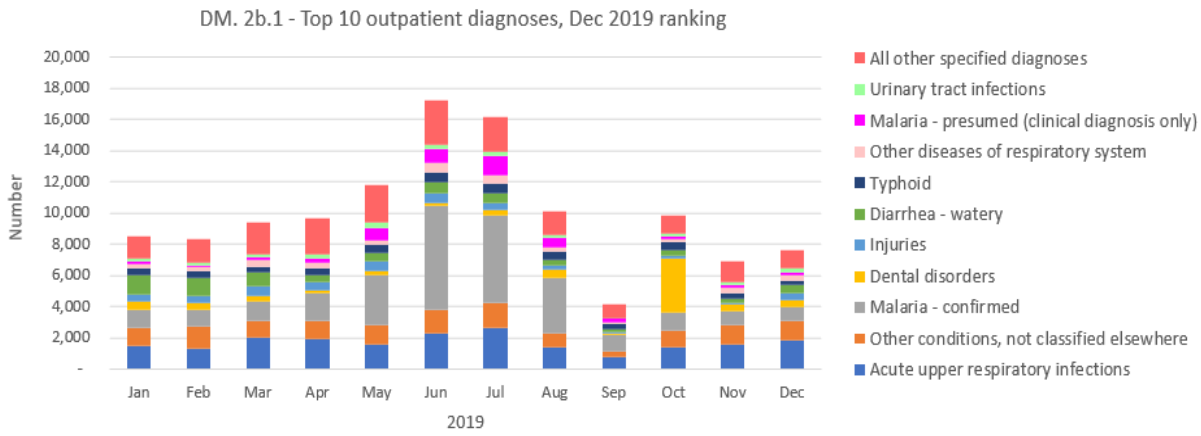
In December, the top 20 discharges represent **88%** of all inpatient diagnoses

District 12m Mortality and Morbidity

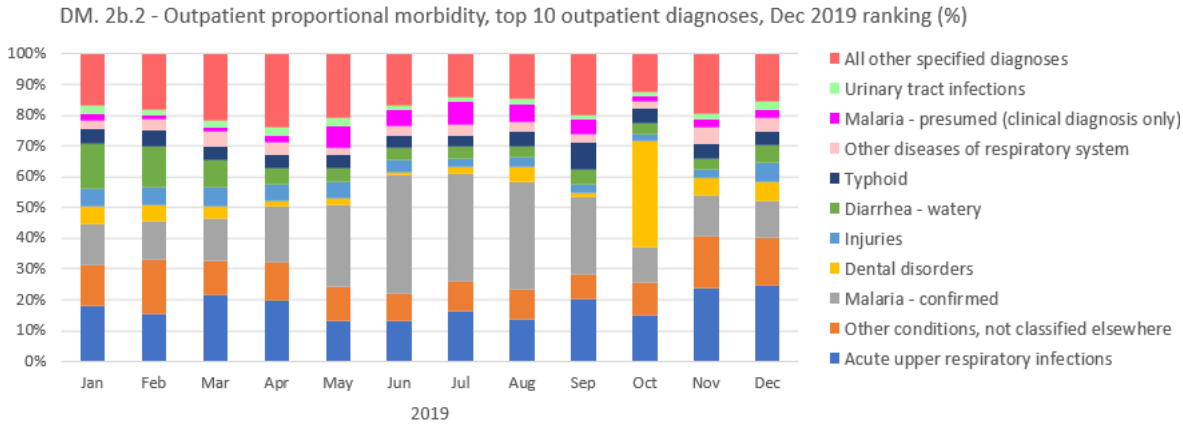
MONTHLY REPORTING COMPLETENESS

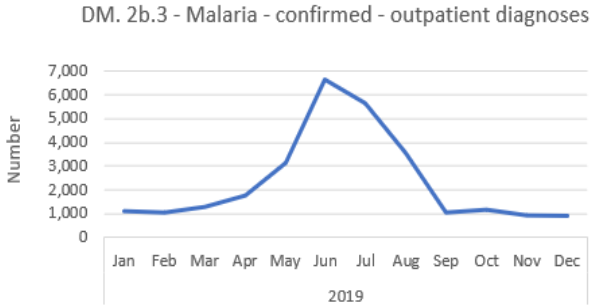
DM. 0.2 Outpatient department reports sub	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Outpatient department report	10	10	10	10	10	10	10	10	9	10	10	9

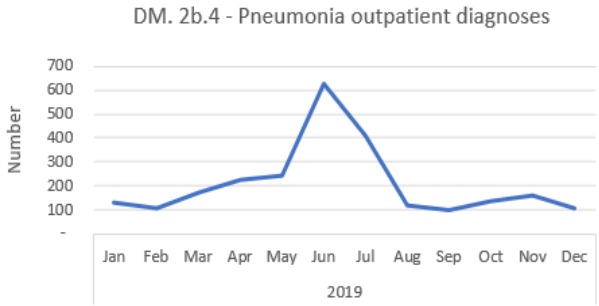
2B. OUTPATIENT MORBIDITY



In charts DM. 2b.1 and DM. 2b.2 all chronic noncommunicable diseases are grouped under NCDs, and all external causes of death are grouped under injuries. In December, the top 10 diagnoses represent **85%** of all outpatient diagnoses







District 12m Mortality and Morbidity

DM. 2b.5 - Selected diseases for surveillance	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Acute haemorragic fever syndrome	0	0	0	0	0	0	0	0	0	0	0	0
Meningitis	2	0	0	0	0	1	0	1	0	2	0	0
Cholera	0	0	0	0	0	0	0	0	0	0	0	0
Diarrhea - with blood	4	5	8	3	8	7	7	4	1	3	1	3
Influenza-like illness	0	0	0	0	0	0	0	0	0	0	0	0
Measles	0	0	1	5	21	37	0	0	1	0	1	0
Mumps	3	3	2	5	0	5	5	6	2	1	2	3
Tetanus neonatal	0	0	0	0	0	0	0	0	0	0	0	0
Lymphatic filariasis	0	0	0	0	0	0	0	0	0	0	0	0

OUTPATIENT MORBIDITY REFERENCE TABLE

DM. 2b.6 - Top 20 outpatient diagnoses (De	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Acute upper respiratory infections	1,523	1,290	2,009	1,905	1,552	2,275	2,629	1,382	825	1,455	1,622	1,872
Other conditions, not classified elsewhere	1,160	1,458	1,047	1,218	1,318	1,516	1,580	955	329	1,050	1,174	1,184
Malaria - confirmed	1,115	1,041	1,287	1,763	3,162	6,663	5,666	3,530	1,054	1,163	934	915
Dental disorders	528	450	368	161	250	141	351	501	60	3,404	397	478
Diarrhea - watery	1,270	1,120	854	507	532	688	667	360	203	363	256	454
Typhoid	396	438	398	437	533	667	599	493	365	461	328	335
Other diseases of respiratory system	263	281	452	376	268	552	541	305	112	246	378	319
Malaria - presumed (clinical diagnosis only)	164	133	142	246	815	916	1,247	596	191	171	175	215
Urinary tract infections	217	152	200	216	314	224	223	186	62	119	143	202
Other injuries	180	189	235	206	266	288	144	126	33	87	57	196
Eye infections	378	359	317	257	239	325	381	266	253	208	308	196
Infections - skin/subcutaneous	255	270	354	317	382	434	347	260	122	173	156	176
Musculoskeletal/connective tissue diseases	141	121	127	191	189	107	128	119	67	89	41	119
Pneumonia	129	109	172	222	243	628	407	118	96	134	161	109
Hypertension	74	76	415	714	647	396	236	150	44	156	180	106
Transport accidents	91	96	118	106	136	148	73	66	15	45	29	101
Chronic lower respiratory diseases	61	89	77	102	108	223	139	63	28	78	77	77
Acute diseases of the ear and mastoid process	63	62	63	67	84	132	76	68	32	47	88	59
Burns	62	52	71	62	72	86	56	41	20	39	35	51
Other diseases - skin/subcutaneous	50	51	81	69	78	115	90	54	24	53	54	50

In December, the top 20 diagnoses represent **95%** of all outpatient diagnoses.

ANNEX 4 - DASHBOARD D 12M UCQ: District 12m utilization, coverage & quality

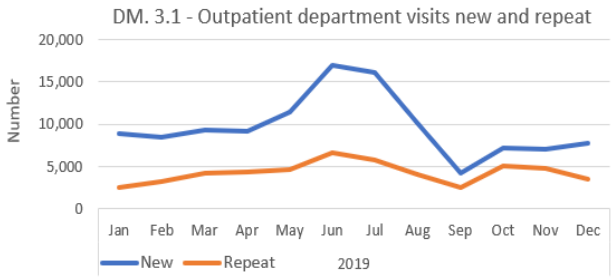
A standard dashboard for showing trends over the last 12 months in district total values of indicators of utilization, coverage and quality

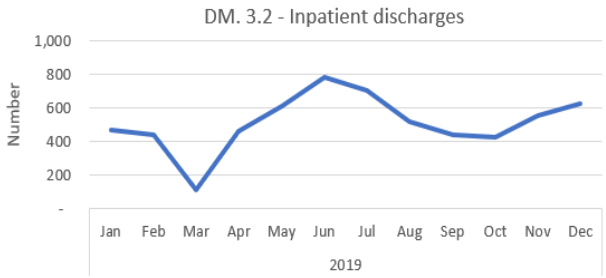
District 12m Utilization, Coverage, and Quality

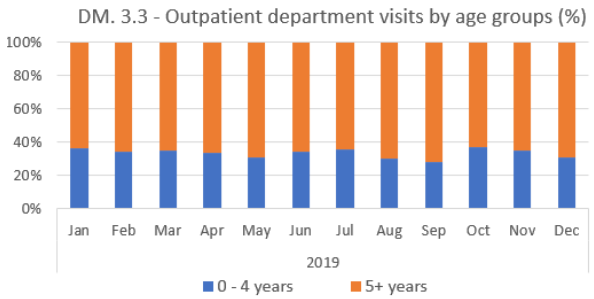
MONTHLY REPORTING COMPLETENESS

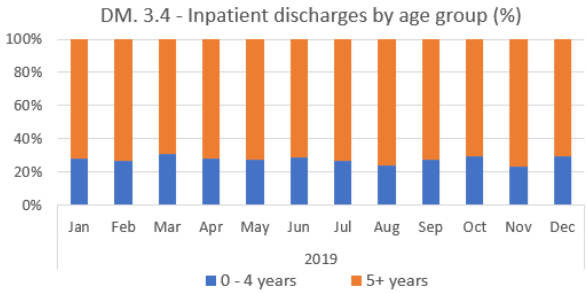
DM. 0.3 - Reports submitted (2019)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Inpatient department report	3	3	2	3	3	3	3	3	3	3	3	3
Outpatient department report	10	10	10	10	10	10	10	10	9	10	10	9
RMNCAH report	10	10	10	10	10	10	9	10	8	10	10	10
Immunization report	10	10	10	10	10	10	9	10	10	10	10	10
HIV report	10	10	10	10	10	10	10	10	10	10	10	10
TB report	0	0	10	0	0	10	0	0	10	0	0	10
Malaria report	10	10	10	9	10	10	10	10	10	10	10	10
Total	**53**	**53**	**62**	**52**	**53**	**63**	**51**	**53**	**60**	**53**	**53**	**62**

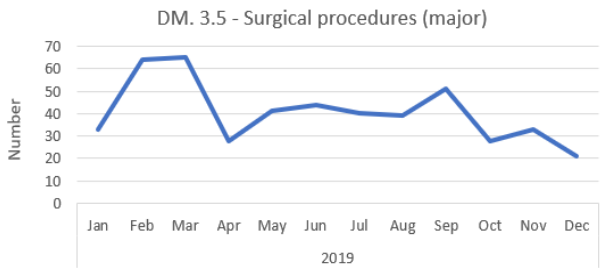
3. SERVICE UTILIZATION

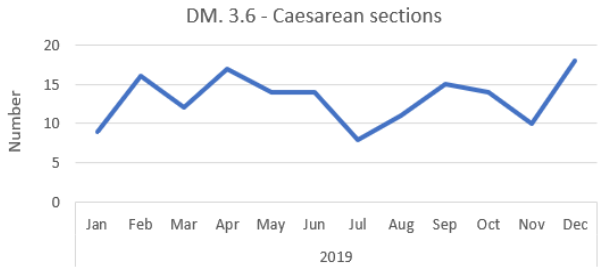


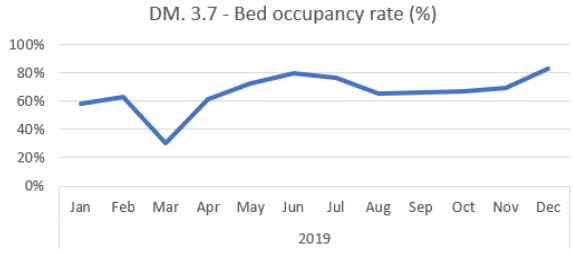


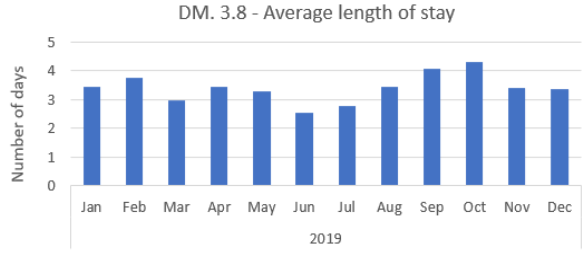






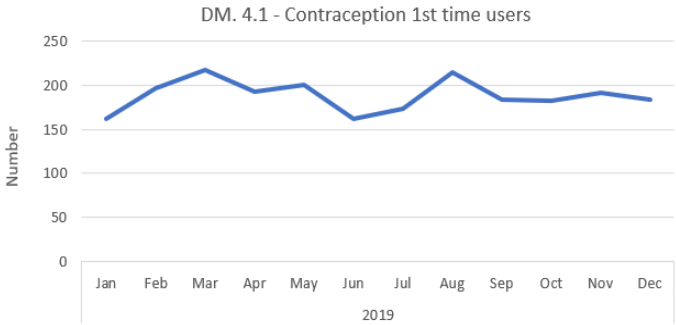


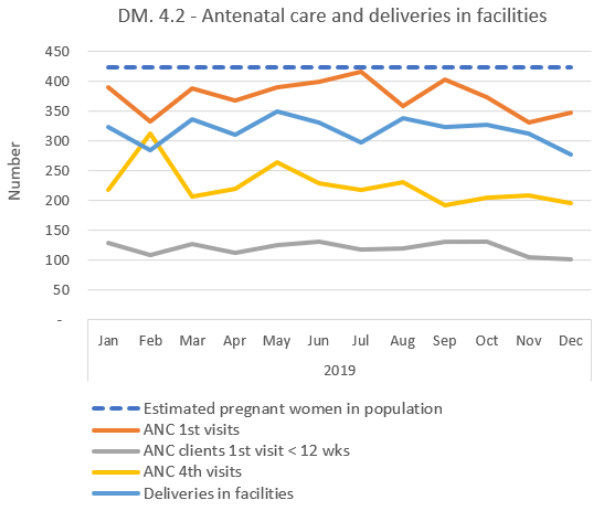


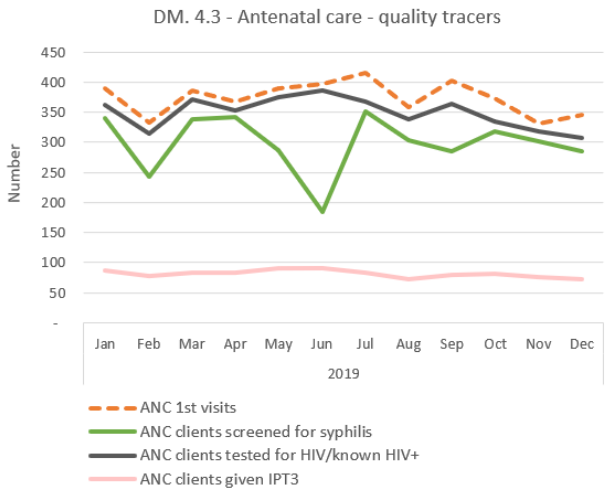


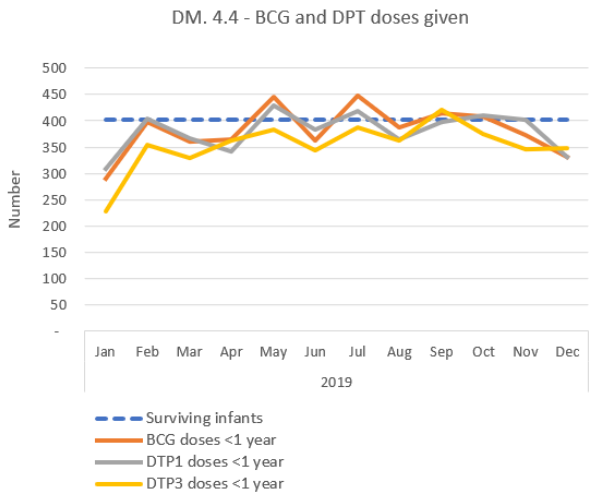
District 12m Utilization, Coverage, and Quality

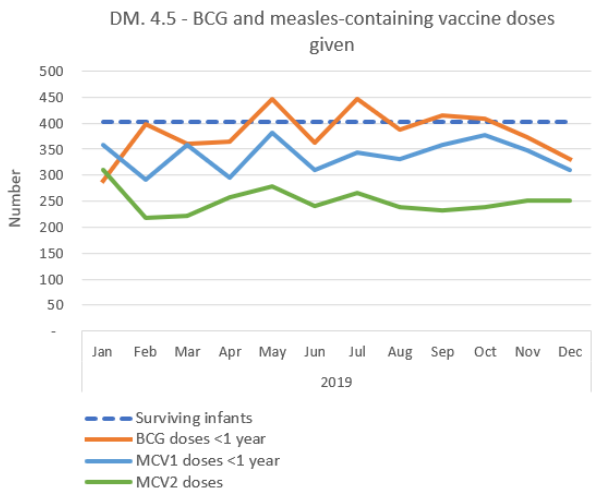
4. SERVICE COVERAGE AND QUALITY





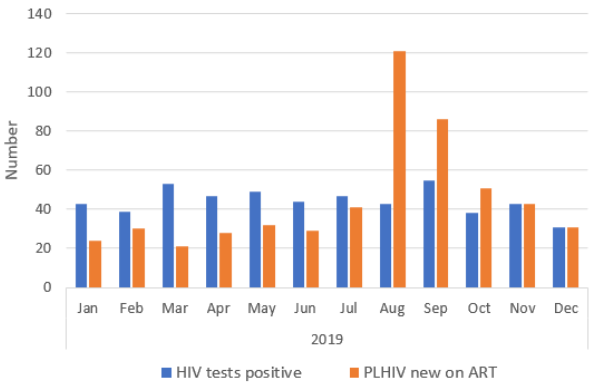




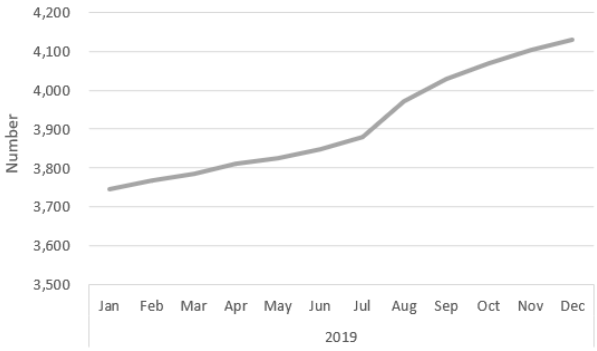


District 12m Utilization, Coverage, and Quality

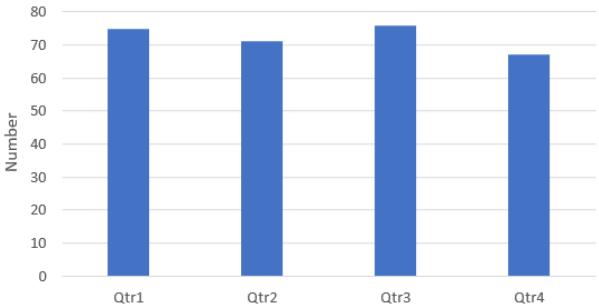
DM. 4.6 - PLHIV newly diagnosed and newly on ART



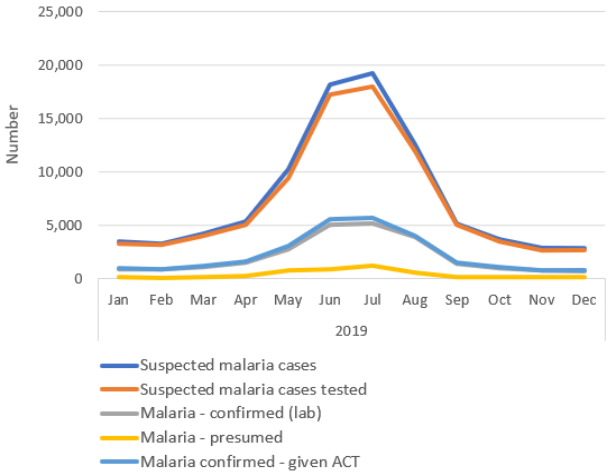
DM. 4.7 - PLHIV currently on ART



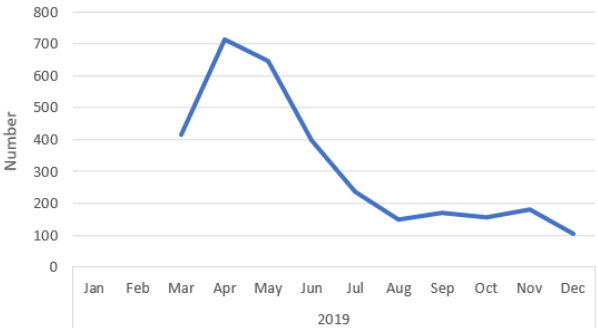
DM. 4.8 - TB notifications



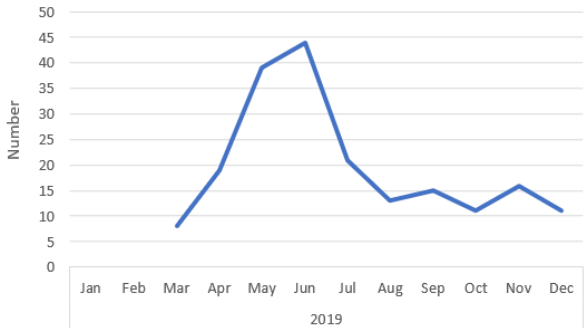
DM. 4.9 - Malaria cases diagnosed and treated



DM. 4.10 - Hypertension new cases



DM. 4.11 - Diabetes new cases



District 12m Utilization, Coverage, and Quality

SERVICE UTILIZATION, COVERAGE AND QUALITY REFERENCE TABLES

DM. 4.12 - Data elements	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Inpatient discharges	466	439	113	462	606	779	701	518	438	426	552	624
Surgical procedures (major)	33	64	65	28	41	44	40	39	51	28	33	21
Caesarean sections	9	16	12	17	14	14	8	11	15	14	10	18
Outpatient department visits	11,194	11,598	13,394	13,389	16,023	23,631	21,944	14,229	6,548	12,033	11,745	11,257
Contraception first time users	162	196	217	193	200	162	173	214	183	182	191	183
ANC 1st visits	390	332	387	367	389	398	416	358	402	373	331	346
ANC 4th visits	217	311	206	219	263	228	218	230	191	204	207	194
Deliveries in facilities	322	283	336	310	349	331	297	338	322	327	311	277
BCG doses given <1 year	290	398	361	365	446	362	448	387	414	408	372	331
DTP1 doses given <1 year	309	403	366	341	429	383	418	365	398	410	402	332
DTP3 doses given <1 year	228	355	330	362	384	343	388	362	422	375	346	347
MCV1 doses given <1 year	358	290	359	296	382	310	344	331	357	377	347	310
MCV2 doses given	311	219	223	257	279	240	267	239	232	238	251	252
HIV tests positive	43	39	53	47	49	44	47	43	55	38	43	31
PLHIV new on ART	24	30	21	28	32	29	41	121	86	51	43	31
PLHIV currently on ART	3,745	3,767	3,785	3,810	3,825	3,848	3,880	3,973	4,030	4,070	4,102	4,130
Malaria - confirmed	937	930	1,091	1,550	2,778	5,098	5,152	3,940	1,479	1,012	795	757
Malaria - presumed (clinical diagnosis only)	164	133	142	246	815	916	1,247	596	191	171	175	215
Hypertension new cases			415	714	646	396	235	150	169	155	179	104
Diabetes new cases			8	19	39	44	21	13	15	11	16	11

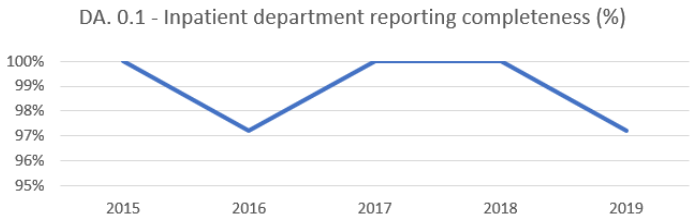
DM. 4.13 - Indicators (facility denominators)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
C-section rate: facilities (%)	3%	6%	4%	5%	4%	4%	3%	3%	5%	4%	3%	6%
Bed occupancy rate (%)	59%	63%	30%	61%	73%	80%	77%	66%	66%	67%	70%	83%
Average length of stay	3.4	3.8	3.0	3.4	3.3	2.5	2.8	3.4	4.1	4.3	3.4	3.3
ANC clients tested for HIV/known HIV+ (%)	93%	95%	96%	96%	97%	97%	88%	94%	91%	90%	96%	89%
ANC clients screened for syphilis (%)	87%	73%	88%	93%	74%	46%	85%	85%	71%	85%	91%	82%
ANC clients given IPTp3 (%)	22%	23%	22%	23%	23%	23%	20%	20%	20%	22%	23%	21%
ANC clients with 4th ANC visit (%)	56%	94%	53%	60%	68%	57%	52%	64%	48%	55%	63%	56%
Suspected malaria cases tested (%)	95%	96%	97%	95%	92%	95%	94%	95%	96%	95%	94%	93%
Malaria confirmed - given ACT (%)	109%	103%	111%	106%	110%	110%	110%	103%	105%	105%	105%	109%

ANNEX 5 - DASHBOARD D 5Y MM: District 5y mortality & morbidity

A standard dashboard showing trends over the last 5 years
in district total values of mortality and morbidity indicators

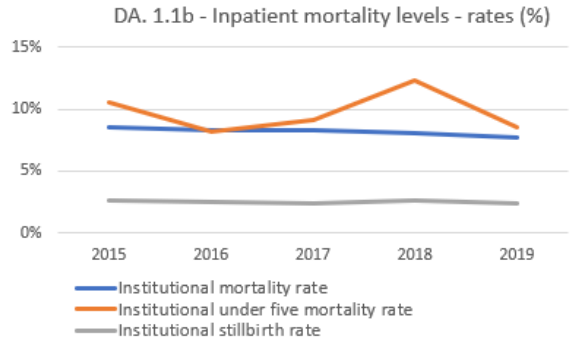
District 5y Mortality and Morbidity

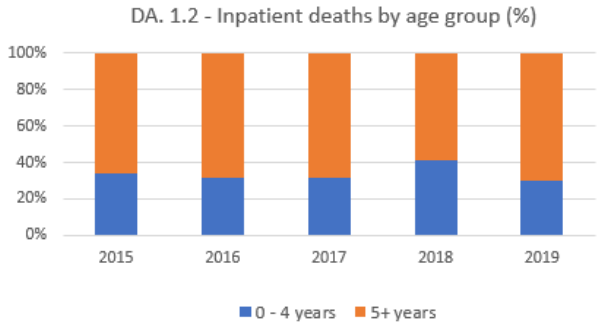
MONTHLY REPORTING COMPLETENESS

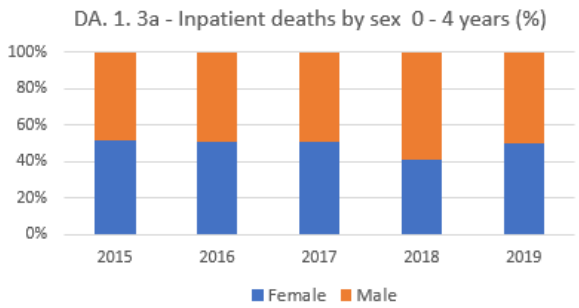


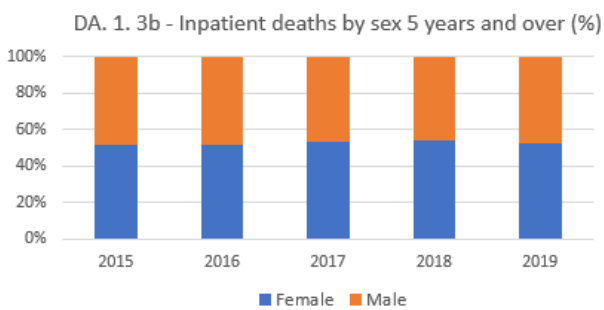
1. INPATIENT MORTALITY

DA. 1.1a - Inpatient mortality levels (numbers)	2015	2016	2017	2018	2019
Inpatient deaths	512	499	505	485	471
Inpatient deaths under five years	172	158	160	218	142
Maternal deaths	2	5	4	3	6
Neonatal deaths	43	45	41	42	45
Stillbirths	81	83	86	96	93



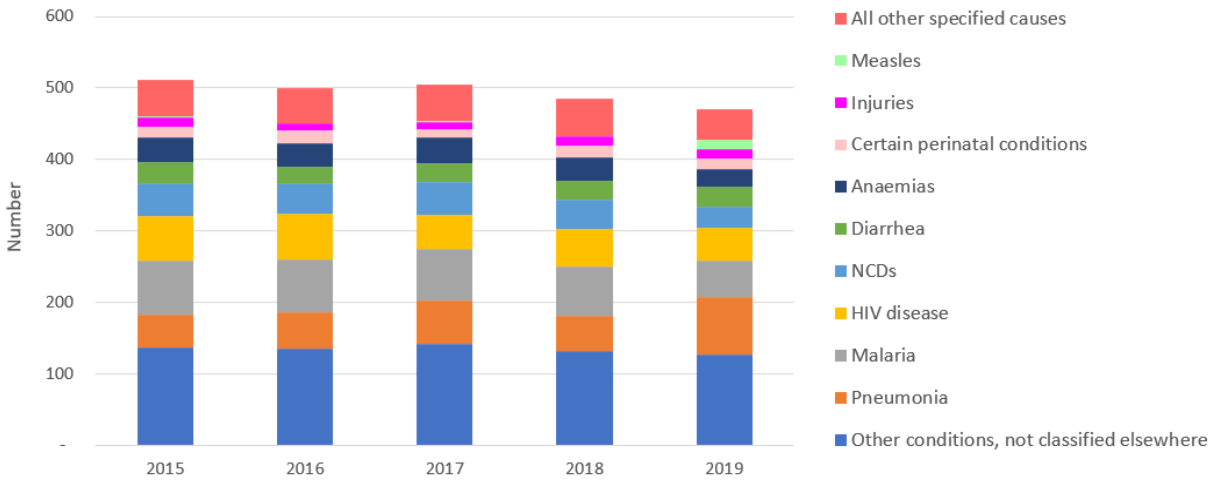






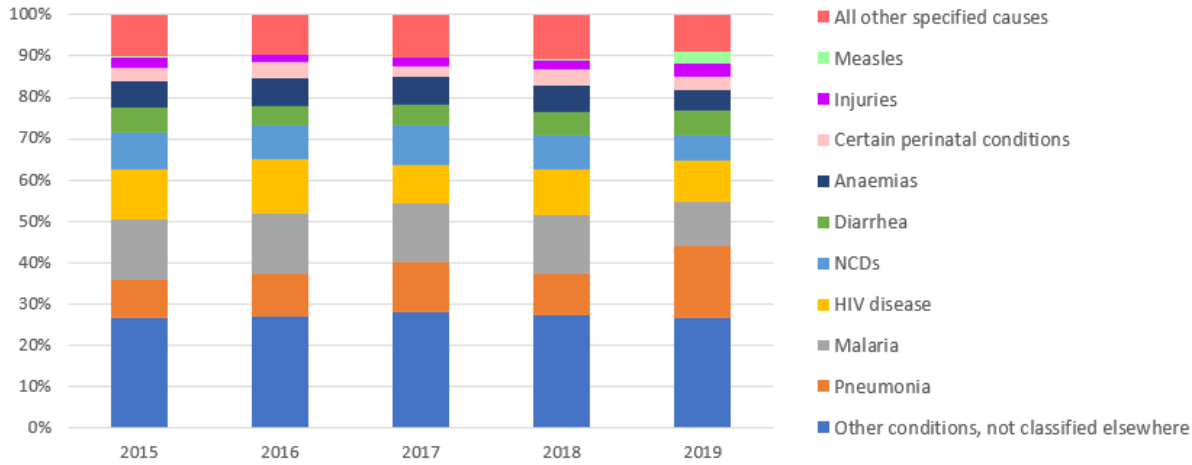
District 5y Mortality and Morbidity

DA. 1.4 - Top 10 causes of inpatient death, 2019 ranking

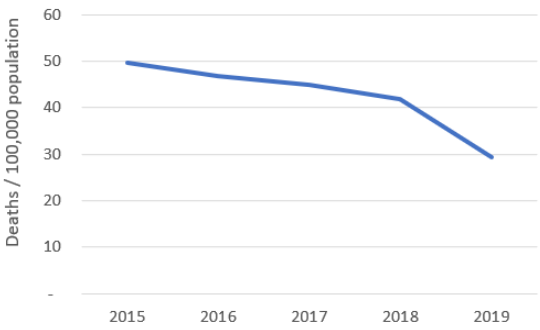


In charts DA. 1.4 and DA. 1.5 all chronic noncommunicable diseases are grouped under NCDs.
In 2019, the top 10 causes of death represent **91%** of all inpatient deaths.

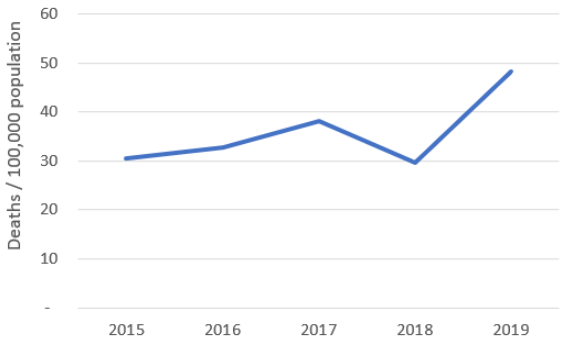
DA. 1.5 - Inpatient proportional mortality - top 10 causes of death, 2019 ranking (%)



DA 1.6 - Population incidence of malaria inpatient deaths



DA. 1.7 - Population incidence of pneumonia inpatient deaths

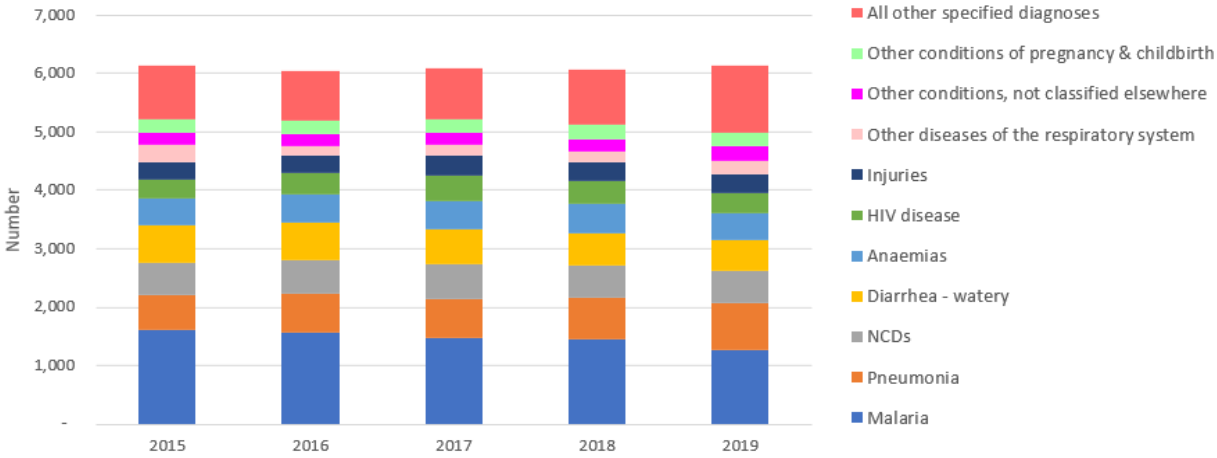


DA. 1.8 - Selected fatality rates (%)	2015	2016	2017	2018	2019
Malaria case fatality rate (%)	5%	5%	5%	5%	3%
Pneumonia case fatality rate (%)	8%	8%	9%	7%	9%

District 5y Mortality and Morbidity

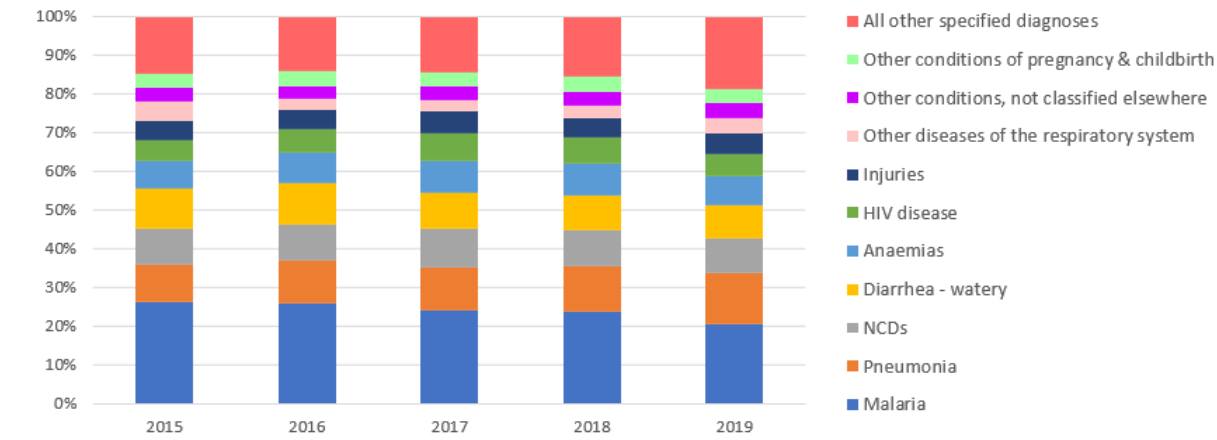
2A. INPATIENT MORBIDITY

DA. 2a.1 - Top 10 inpatient discharge diagnoses, 2019 ranking

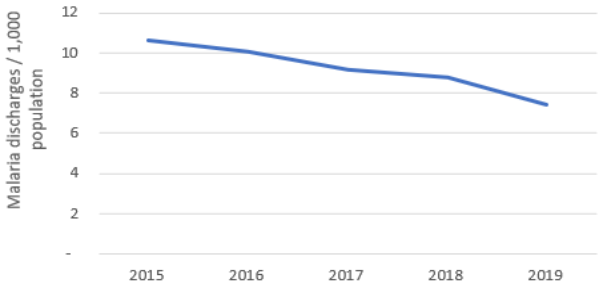


In charts DA. 2a.1 and DA. 2a.2 all chronic noncommunicable diseases are grouped under NCDs and all external causes are grouped under injuries. In 2019, the top 10 diagnoses represent **81%** of all inpatient discharge diagnoses.

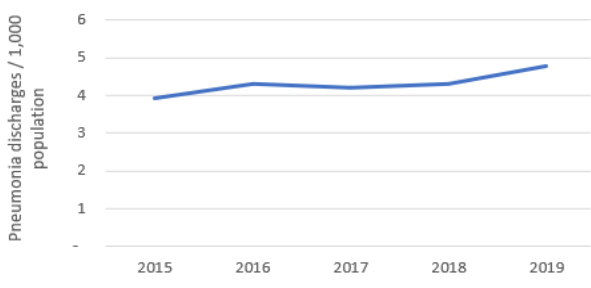
DA. 2a.2 - Inpatient proportional morbidity - top 10 discharge diagnoses, 2019 ranking (%)



DA. 2a.3 - Malaria inpatient incidence rate



DA. 2a.4 - Pneumonia inpatient incidence rate



District 5y Mortality and Morbidity

INPATIENT MORTALITY REFERENCE TABLE

DA. 2a.5 - Top 20 causes of inpatient deaths (2019)	2015	2016	2017	2018	2019
Total population	*151,065*	*155,582*	*160,270*	*165,066*	*170,102*
Other conditions, not classified elsewhere	137	135	142	132	126
Pneumonia	46	51	61	49	82
Malaria	75	73	72	69	50
HIV disease	62	65	47	53	47
Diarrhea	30	23	26	27	27
Anaemias	34	34	35	32	25
Certain perinatal conditions	16	18	12	18	15
Measles	2	0	1	1	13
Transport accidents	5	5	4	5	9
Heart Failure	14	16	17	13	9
Other diseases of the respiratory system	2	2	2	2	6
Other conditions of pregnancy & childbirth	9	8	9	8	6
Diabetes mellitus	6	5	6	5	6
Other endocr, nutr & metabolic diseases	11	10	12	15	5
Hypertensive diseases	14	10	13	11	5
Renal Failure	6	6	5	5	4
Malnutrition	5	6	5	5	4
Bacterial meningitis	5	7	6	7	4
Other acute lower respiratory infections	4	1	4	2	3
Typhoid and paratyphoid	4	4	3	2	3

In 2019, the top 20 causes of death represent **95%** of all inpatient deaths.

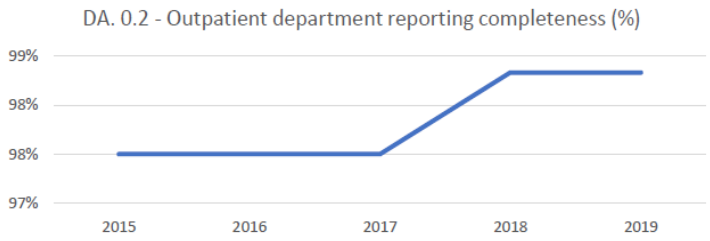
INPATIENT MORBIDITY REFERENCE TABLE

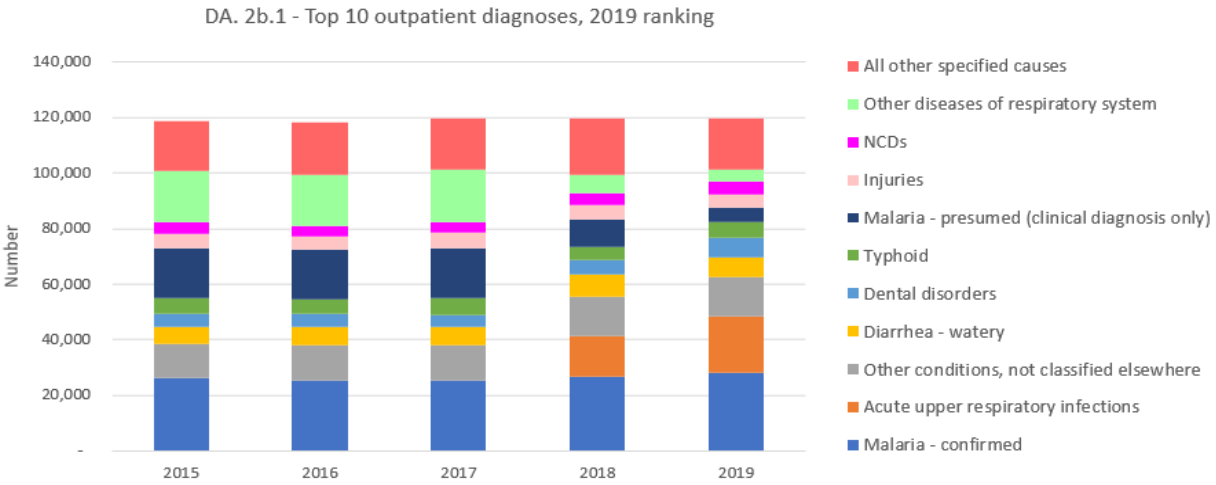
DA. 2a.6 - Top 20 inpatient discharge diagnoses (2019)	2015	2016	2017	2018	2019
Total population	*151,065*	*155,582*	*160,270*	*165,066*	*170,102*
Malaria	1,605	1,570	1,469	1,448	1,263
Pneumonia	595	669	673	712	815
Diarrhea - watery	633	657	579	552	525
Anaemias	454	478	498	495	462
HIV disease	321	361	423	405	352
Other diseases of respiratory system	306	165	180	185	245
Other conditions, not classified elsewhere	209	208	210	211	244
Other conditions of pregnancy & childbirth	223	225	219	235	221
Transport accidents	153	139	162	136	141
Heart failure	127	127	131	119	116
Diabetes mellitus	116	114	130	117	112
Diseases of eye and adnexa	104	82	67	133	103
Gastric and duodenal ulcer	119	108	124	112	103
Hypertensive diseases	76	84	85	76	83
Malnutrition	66	63	72	59	79
Other diseases of digestive system	64	57	62	64	76
Other diseases - skin/subcutaneous	55	47	43	51	70
Other diseases of genitourinary system	66	70	62	65	67
Chronic lower respiratory diseases	25	27	21	25	63
Typhoid and paratyphoid	62	61	64	70	62

In 2019, the top 20 diagnoses represent **85%** of all inpatient discharge diagnoses.

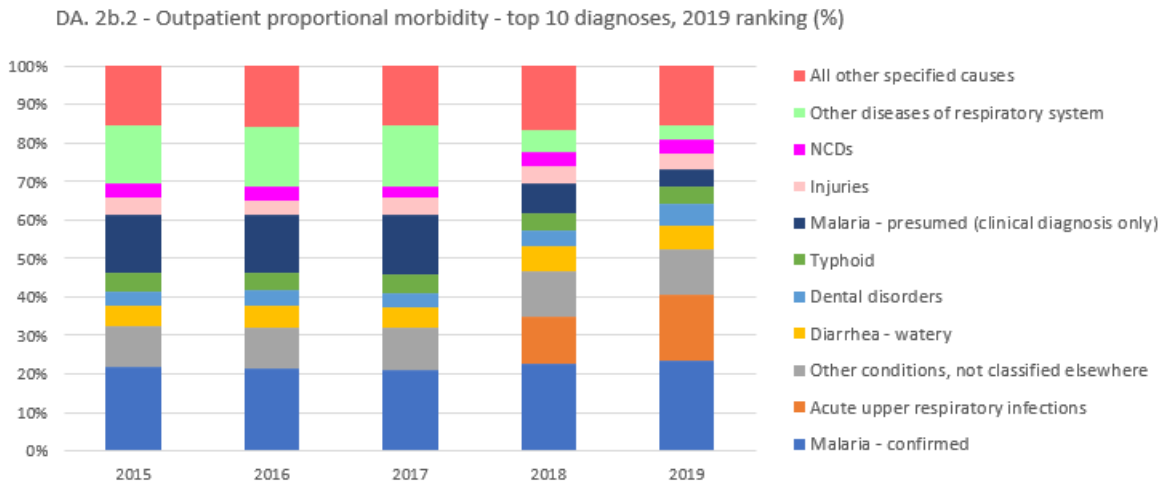
District 5y Mortality and Morbidity

MONTHLY REPORTING COMPLETENESS



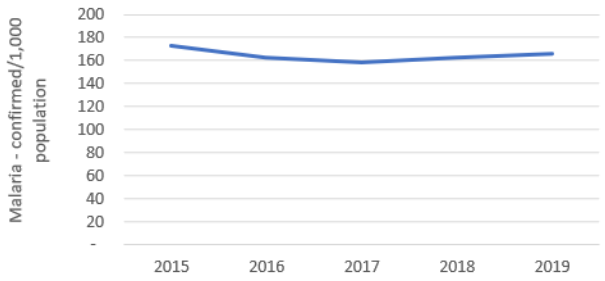


In charts DA. 2a.1 and DA. 2a.2 all chronic noncommunicable diseases are grouped under NCDs and all external causes are grouped under injuries. In 2019, the top 10 diagnoses represent **81%** of all inpatient discharge diagnoses.

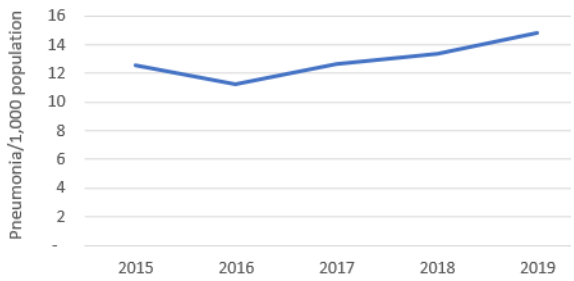


District 5y Mortality and Morbidity

DA. 2b.3 - Malaria - confirmed - outpatient incidence rate



DA 2b.4 - Pneumonia outpatient incidence rate



DA. 2b.5 - Selected diseases for surveillance	2015	2016	2017	2018	2019
Acute haemorragic fever syndrome	0	0	0	0	0
Meningitis	8	6	8	4	6
Cholera	0	0	0	0	0
Diarrhea - with blood	163	141	153	180	54
Influenza-like illness	0	0	0	0	0
Measles	6	1	6	4	66
Mumps	47	57	48	51	37
Tetanus neonatal	0	0	0	0	0
Lymphatic filariasis	0	0	0	0	0

OUTPATIENT MORBIDITY REFERENCE TABLE

DA. 2b.6 - Top 20 outpatient diagnoses (2019)	2015	2016	2017	2018	2019
Total population	*151,065*	*155,582*	*160,270*	*165,066*	*170,102*
Malaria - confirmed	26,075	25,351	25,334	26,861	28,293
Acute upper respiratory infections	0	0	0	14,718	20,339
Other conditions, not classified elsewhere	12,358	12,680	12,731	14,011	13,989
Diarrhea - watery	6,239	6,694	6,673	8,118	7,274
Dental disorders	4,556	4,608	4,105	4,805	7,089
Typhoid	5,815	5,262	6,143	5,151	5,450
Malaria - presumed (clinical diagnosis only)	18,074	17,801	18,194	9,693	5,011
Other diseases of respiratory system	18,269	18,289	19,018	6,675	4,093
Eye infections	3,413	3,836	3,503	3,500	3,487
Infections - skin/subcutaneous	3,459	3,724	3,313	4,414	3,246
Hypertension	2,411	2,189	2,001	2,341	3,194
Pneumonia	1,901	1,752	2,025	2,200	2,528
Urinary tract infections	2,346	2,113	2,404	2,290	2,258
Other injuries	1,951	1,826	2,164	2,032	2,007
Musculoskeletal/connective tissue diseases	1,479	1,457	1,347	1,201	1,439
Chronic lower respiratory diseases	825	912	689	1,531	1,122
Transport accidents	1,000	934	1,109	1,042	1,024
Acute diseases of ear and mastoid process	820	823	878	857	841
Heart failure	856	806	543	692	778
Other diseases - skin/subcutaneous	645	904	699	724	769

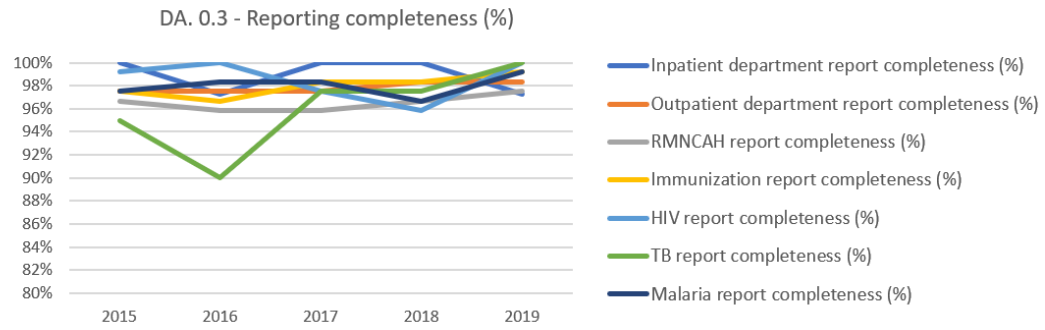
In 2019, the top 20 diagnoses represent **95%** of all outpatient diagnoses.

ANNEX 6 - DASHBOARD D 5Y UCQ: District 5y utilization, coverage & quality

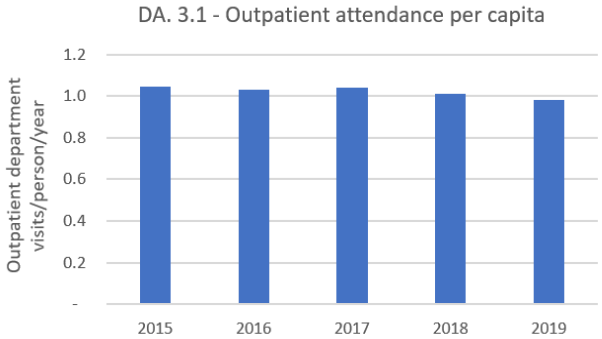
A standard dashboard for showing trends over the last 5 years
in district total values of indicators of utilization, coverage and quality

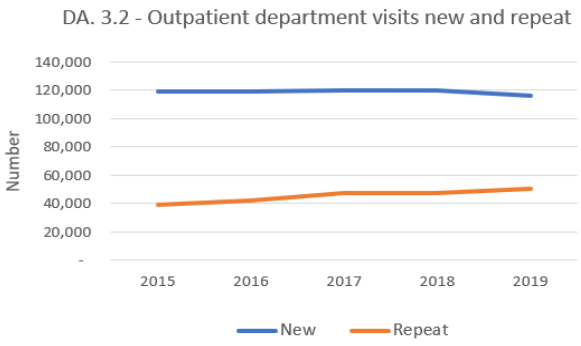
District 5y Utilization, Coverage, and Quality

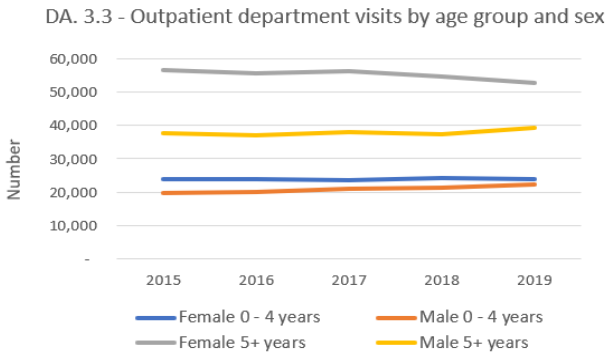
MONTHLY REPORTING COMPLETENESS

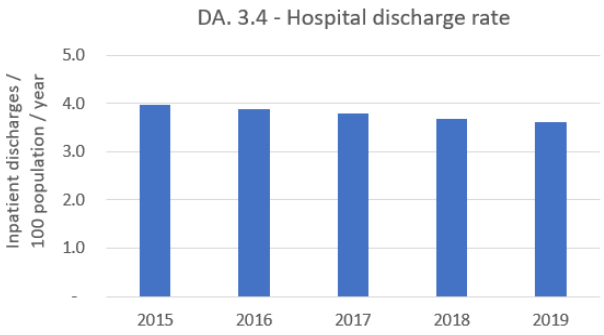


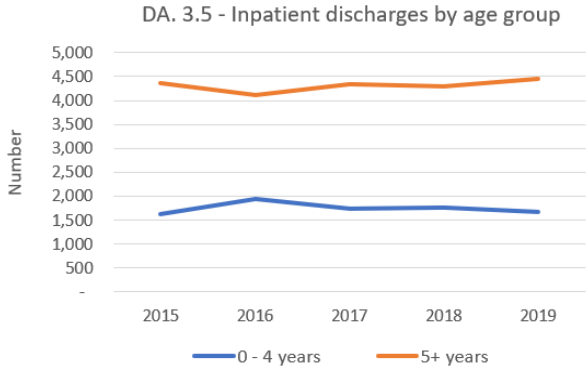
3. SERVICE UTILIZATION





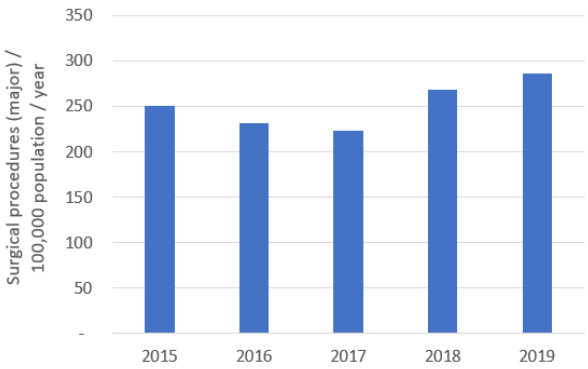




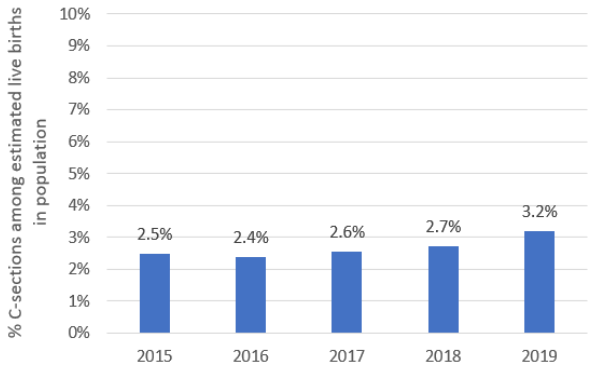


District 5y Utilization, Coverage, and Quality

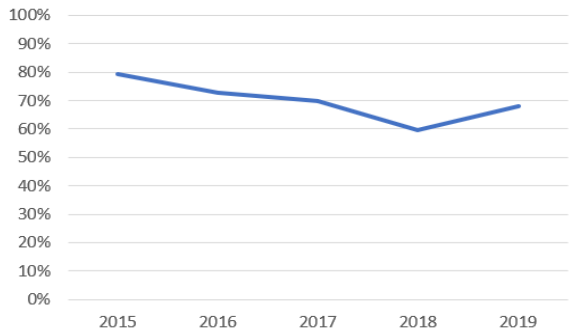
DA. 3.6 - Surgical volume



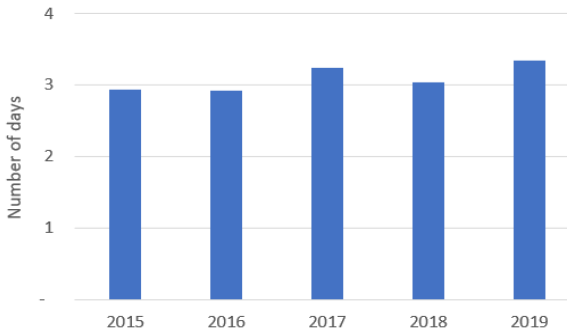
DA. 3.7 - Caesarean section rate: population (%)



DA. 3.8 - Bed occupancy rate (%)

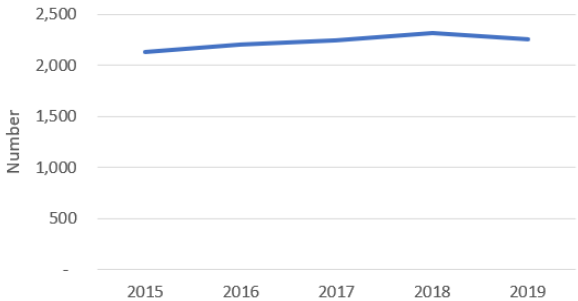


DA. 3.9 - Average length of stay

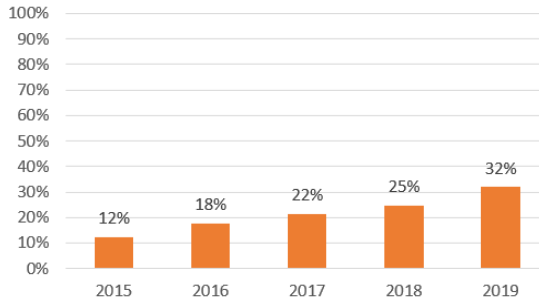


4. SERVICE COVERAGE AND QUALITY

DA. 4.1 - Contraception 1st time users

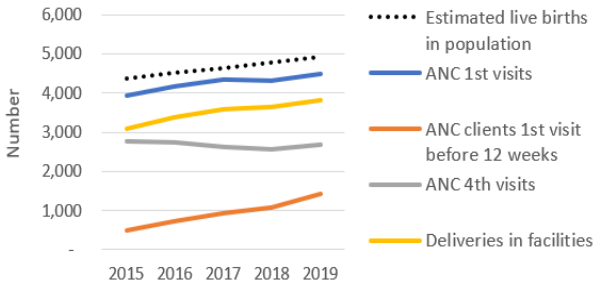


DA. 4.2 - ANC clients 1st visit < 12 weeks (%)

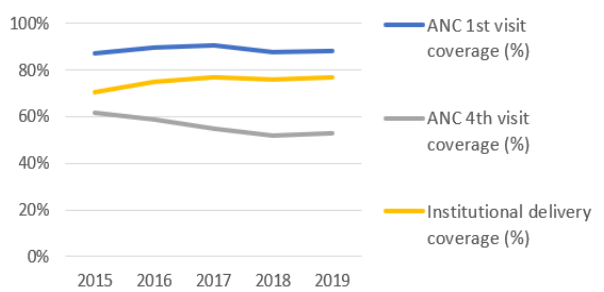


District 5y Utilization, Coverage, and Quality

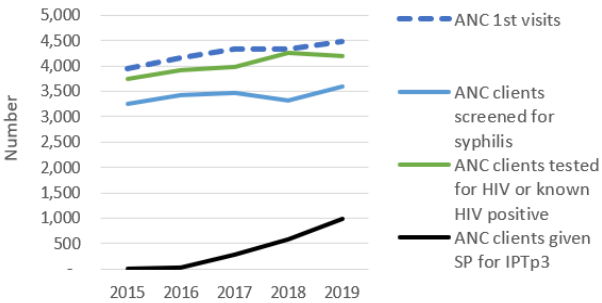
DA. 4.3 - Antenatal care and deliveries in facilities



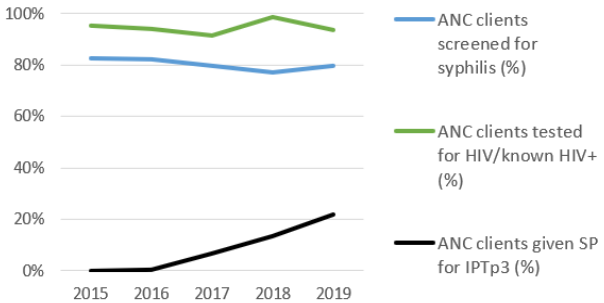
DA. 4.4 - Antenatal care and deliveries in facilities coverage (%)



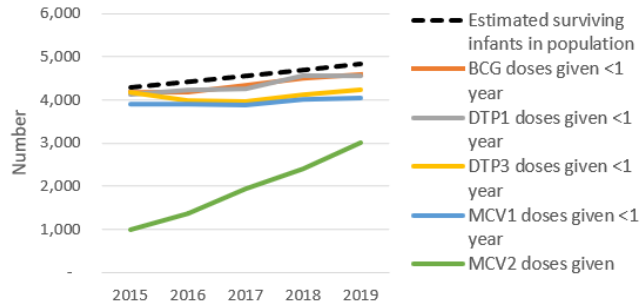
DA. 4.5 - Antenatal care quality tracers



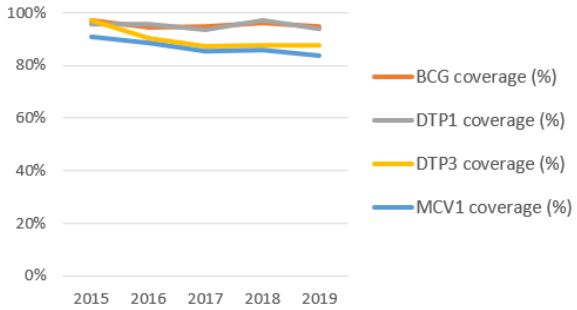
DA. 4.6 - Antenatal care quality tracers (%)



DA. 4.7 - BCG, DTP, and measles-containing vaccine doses given



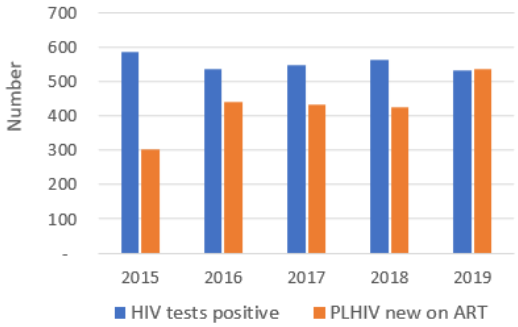
DA. 4.8 - BCG, DTP and measles-containing vaccine coverage (%) in children under 1 year



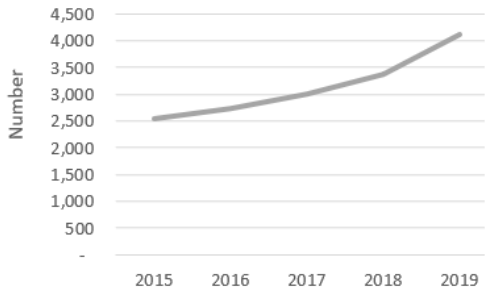
DA. 4.9 - Immunization drop out rates (%)	2015	2016	2017	2018	2019
DTP1-DTP3 drop out rate (%)	-1.5%	5.9%	7.1%	9.9%	6.9%
BCG-MCV1 drop out rate (%)	6.6%	6.2%	10.2%	10.8%	10.3%
MCV1-MCV2 drop out rate (%)	74.9%	64.9%	50.5%	40.3%	25.6%

District 5y Utilization, Coverage, and Quality

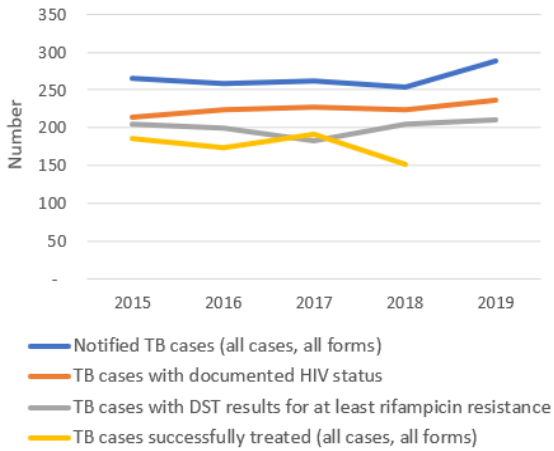
DA. 4.10 - PLHIV newly diagnosed and newly on ART



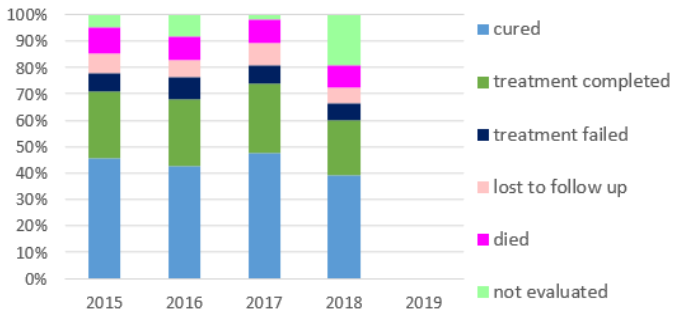
DA. 4.11 - PLHIV currently on ART



DA. 4.12 - TB cohort data elements

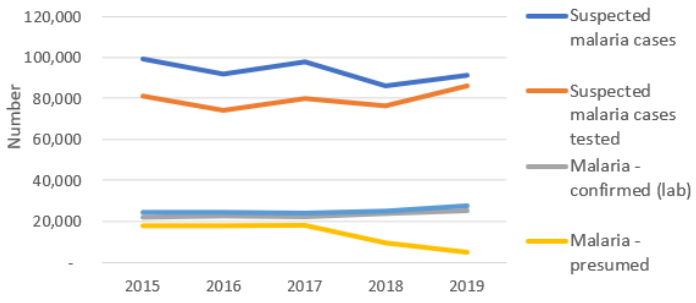


DA. 4.13 - TB treatment outcomes (all cases, all forms) (%)

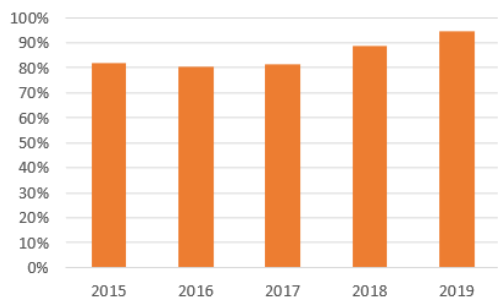


DA. 4.14 - TB cohort indicators	2015	2016	2017	2018	2019
TB cases notified/100,000 population	176	166	163	154	170
TB treatment success rate (%)	70%	67%	73%	59%	

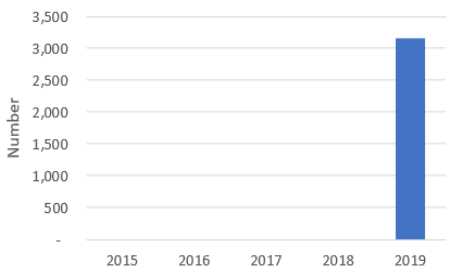
DA. 4.15 - Malaria cases diagnosed and treated



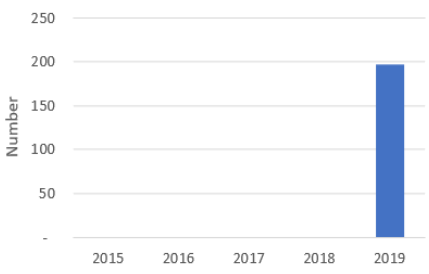
DA. 4.16 - Suspected malaria cases tested (%)



DA. 4.17 - Hypertension new cases



DA. 4.18 - Diabetes new cases



District 5y Utilization, Coverage, and Quality

SERVICE UTILIZATION, COVERAGE AND QUALITY REFERENCE TABLES

DA. 4.19 - Data elements	2015	2016	2017	2018	2019
Total population	*151,065*	*155,582*	*160,270*	*165,066*	*170,102*
Estimated pregnant women in population	*4,508*	*4,642*	*4,784*	*4,927*	*5,076*
Estimated live births in population	*4,380*	*4,511*	*4,647*	*4,786*	*4,932*
Estimated infants < 1 year (surviving infants)	*4,293*	*4,423*	*4,555*	*4,693*	*4,836*
Inpatient discharges	6,005	6,050	6,084	6,065	6,124
Surgical procedures (major)	379	360	358	443	487
Caesarean sections	109	108	119	131	158
Outpatient department visits	158,038	160,418	166,781	166,776	166,985
Contraception first time users	2,131	2,207	2,242	2,315	2,256
ANC 1st visits	3,935	4,165	4,342	4,322	4,489
ANC 4th visits	2,776	2,736	2,635	2,568	2,688
Deliveries in facilities	3,100	3,378	3,581	3,628	3,803
BCG doses given <1 year	4,181	4,174	4,329	4,514	4,582
DTP1 doses given <1 year	4,117	4,243	4,273	4,565	4,556
DTP3 doses given <1 year	4,180	3,993	3,970	4,113	4,242
MCV1 doses given <1 year	3,903	3,915	3,887	4,026	4,061
MCV2 doses given	978	1,373	1,926	2,405	3,008
HIV tests positive	584	535	546	561	532
PLHIV new on ART	303	440	432	424	537
PLHIV currently on ART	2,541	2,736	3,019	3,373	46,965
TB notifications	266	258	262	254	289
Malaria - confirmed	22,286	22,753	22,115	23,683	25,519
Malaria - presumed (clinical diagnosis only)	18,074	17,801	18,194	9,693	5,011
Hypertension new cases					3,163
Diabetes new cases					197

DA. 4.20 - Indicators (facility denominators)	2015	2016	2017	2018	2019
C-section rate: facilities (%)	3.5%	3.2%	3.3%	3.6%	4.2%
Bed occupancy rate (%)	79%	73%	70%	60%	66%
Average length of stay	2.9	2.9	3.2	3.0	3.4
ANC clients 1st visit < 12 weeks (%)	12%	18%	22%	25%	32%
ANC clients tested for HIV/known HIV+ (%)	95%	94%	91%	98%	93%
ANC clients screened for syphilis (%)	82%	82%	80%	77%	80%
ANC clients given IPTp3 (%)	0%	0%	7%	13%	22%
ANC clients with 4th ANC visit (%)	71%	66%	61%	59%	60%
DTP1-DTP3 drop out rate (%)	-1.5%	6%	7%	10%	7%
BCG-MCV1 drop out rate (%)	7%	6%	10%	11%	10%
MCV1-MCV2 drop out rate (%)	75%	65%	50%	40%	26%
TB cases with drug susceptibility test (%)	77%	77%	70%	80%	72%
TB cases with documented HIV status (%)	80%	87%	87%	88%	81%
TB treatment success rate (%)	70%	67%	73%	59%	
Suspected malaria cases tested (%)	82%	81%	81%	89%	95%
Malaria confirmed - given ACT (%)	109%	107%	109%	107%	107%

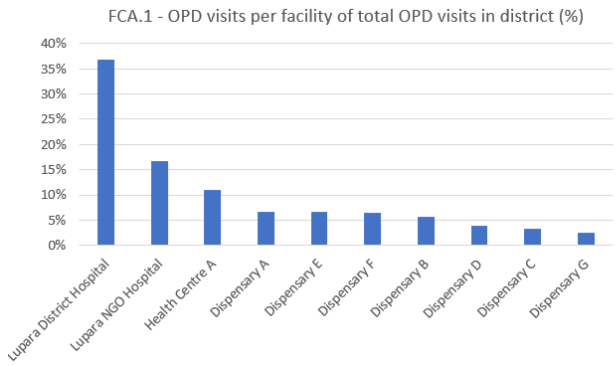
DA. 4.21 - Indicators (population denominators)	2015	2016	2017	2018	2019
Hospital discharge rate per 100 population	4.0	3.9	3.8	3.7	3.6
Surgical volume (per 100,000 population)	251	231	223	268	286
C-Section rate: population (%)	2.5%	2.4%	2.6%	2.7%	3.2%
Outpatient attendance per capita	1.0	1.0	1.0	1.0	1.0
ANC 1st visit coverage (%)	87%	90%	91%	88%	88%
ANC 4th visit coverage (%)	62%	59%	55%	52%	53%
Institutional delivery coverage (%)	71%	75%	77%	76%	77%
DTP1 coverage (%)	96%	96%	94%	97%	94%
DTP3 coverage (%)	97%	90%	87%	88%	88%
MCV1 coverage (%)	91%	89%	85%	86%	84%
TB cases notified/100,000 population	176	166	163	154	170

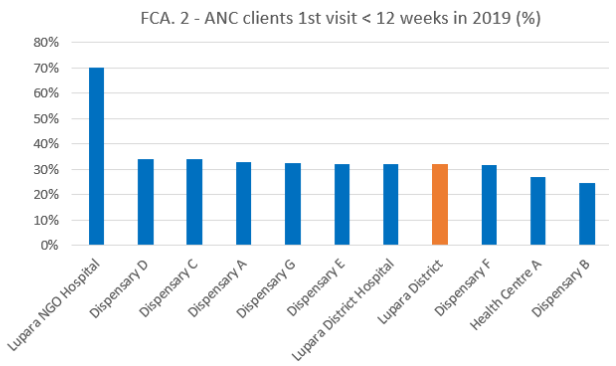
ANNEX 7 - DASHBOARD F COMP 2019: Facility one-year comparison

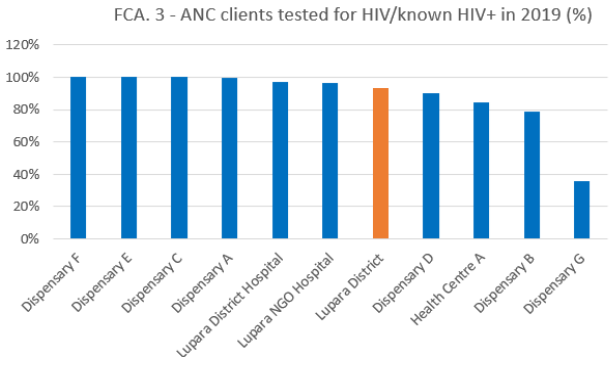
A standard dashboard for comparing health facilities based upon total values they reported for 2019

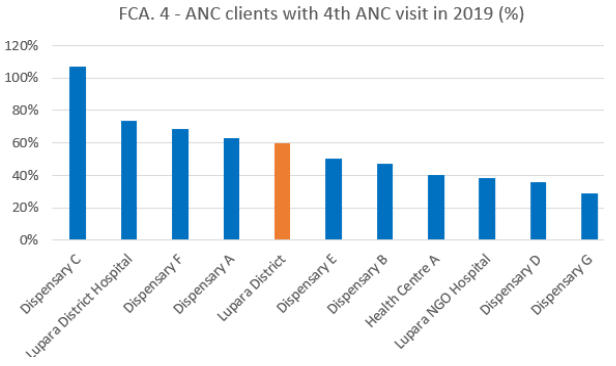
Facility Comparison 2019

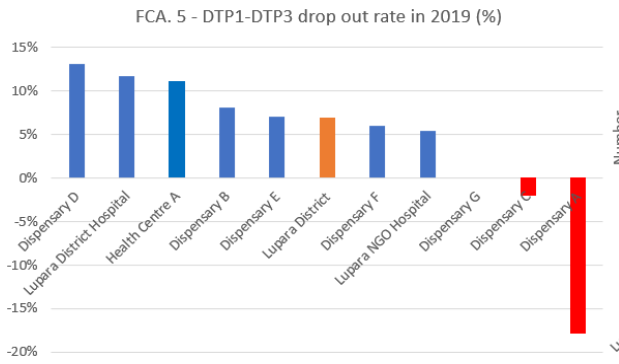
SELECTED FACILITY COMPARISON CHARTS

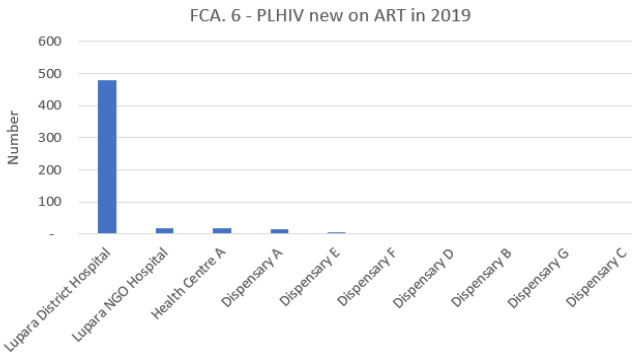


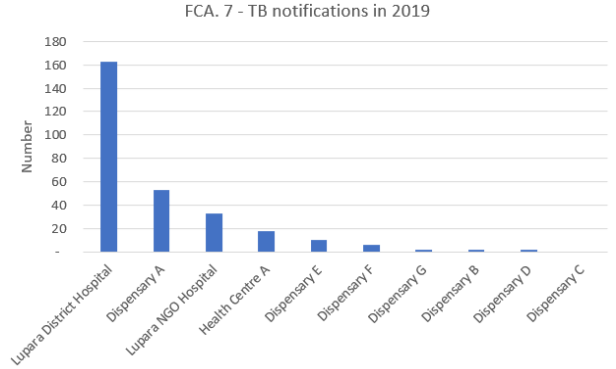


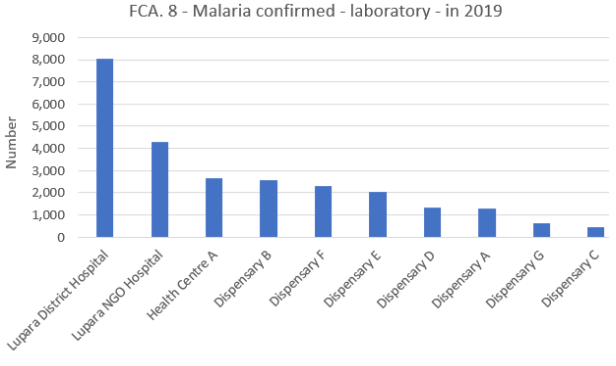




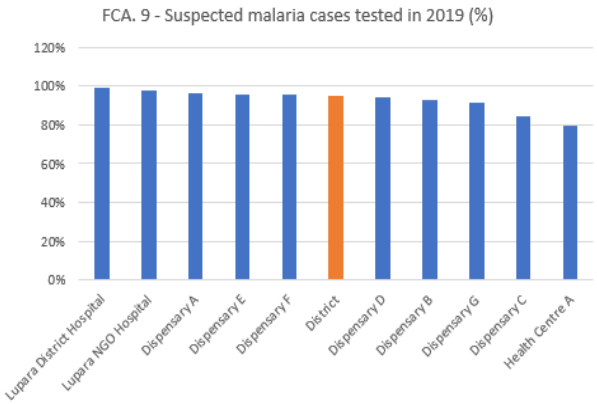


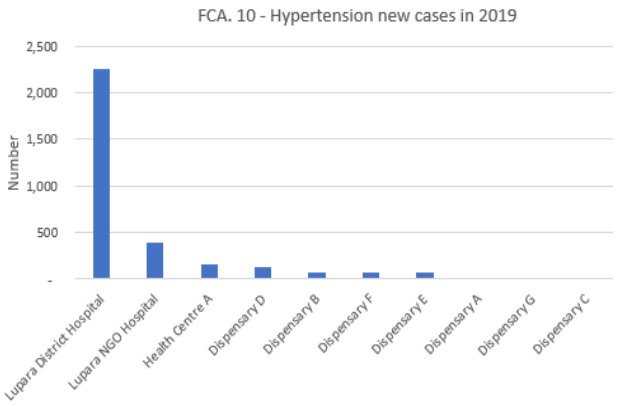






Facility Comparison 2019





Year 2019

FCA. 11 - Data elements	Lupara District	Lupara District Hospital	Lupara NGO Hospital	Health Centre A	Dispensary A	Dispensary B	Dispensary C	Dispensary D	Dispensary E	Dispensary F	Dispensary G
Inpatient discharges	**6,124**	4,318	1,076	730							
Surgical procedures (major)	**487**	353	134	0	0	0			0	0	0
Caesarean sections	**158**	148	10	0	0	0	0	0	0	0	0
Outpatient department visits	**166,985**	61,324	28,032	18,421	11,289	9,633	5,578	6,644	11,046	10,795	4,223
Contraceptive first time users	**2,256**	754	12	501	260	132	42	39	220	254	42
ANC 1st visits	**4,489**	1,839	141	806	530	361	59	194	288	240	31
ANC 4th visits	**2,688**	1,356	54	323	335	170	63	70	144	164	9
Deliveries in facilities	**3,803**	2,427	54	460	380	86	17	54	40	284	1
BCG doses given <1 year	**4,582**	1,689	147	924	560	339	92	217	266	348	
DPT1 doses given <1 year	**4,556**	1,715	147	915	503	334	99	221	271	351	
DPT3 doses given <1 year	**4,242**	1,515	139	813	593	307	101	192	252	330	
MCV1 doses given <1 year	**4,061**	1,517	139	894	330	331	83	204	259	305	
MCV2 doses given	**3,008**	1,307	30	636	168	269	45	172	216	165	0
HIV tests positive	**532**	464	23	20	17	0	0	0	5	3	0
PLHIV new on ART	**537**	479	19	17	16	0	0	0	4	2	0
PLHIV currently on ART	**46,965**	44,594	743	744	459	84	0	84	130	127	0
Malaria - confirmed	**25,519**	8,026	4,301	2,642	1,271	2,560	442	1,349	2,025	2,288	615
Malaria - presumed (clinical diagnosis only)	**5,011**	557	274	2,019	91	520	724	132	165	278	251
Diabetes new cases	**197**	177	10	3		2		2	2	1	
Hypertension new cases	**3,163**	2,258	399	156		76		132	71	71	

Year 2019

FCA. 12 - Indicators (facility denominators)	Lupara District	Lupara District Hospital	Lupara NGO Hospital	Health Centre A	Dispensary A	Dispensary B	Dispensary C	Dispensary D	Dispensary E	Dispensary F	Dispensary G
C-section rate: facilities (%)	**4%**	6%	19%								
Bed occupancy rate (%)	**66%**	88%	50%	26%							
Average length of stay	**3.4**	3.5	4.3	1.8							
ANC clients 1st visit < 12 weeks (%)	**32%**	32%	70%	27%	33%	25%	34%	34%	32%	32%	32%
ANC clients tested for HIV/known HIV+ (%)	**93%**	97%	96%	84%	100%	79%	100%	90%	100%	100%	35%
ANC clients screened for syphilis (%)	**80%**	90%	95%	73%	90%	50%	0%	78%	65%	89%	0%
ANC clients given IPTp3 (%)	**22%**	24%	17%	18%	24%	16%	25%	23%	24%	23%	26%
ANC clients with 4th ANC visit (%)	**60%**	74%	38%	40%	63%	47%	107%	36%	50%	68%	29%
DTP1-DTP3 drop out rate (%)	**7%**	12%	5%	11%	-18%	8%	-2%	13%	7%	6%	
BCG-MCV1 drop out rate (%)	**11%**	10%	5%	3%	41%	2%	10%	6%	3%	12%	
MCV1-MCV2 drop out rate (%)	**26%**	14%	78%	29%	49%	19%	46%	16%	17%	46%	
Suspected malaria cases tested (%)	**95%**	98%	98%	81%	98%	94%	66%	97%	98%	97%	89%
Malaria confirmed - given ACT (%)	**108%**	111%	102%	101%	115%	101%	151%	110%	108%	109%	104%

ANNEX 8 - DASHBOARD D5Y RES: District 5y resources

A standard dashboard for showing trends over the last 5 years of district total values for indicators of health resources

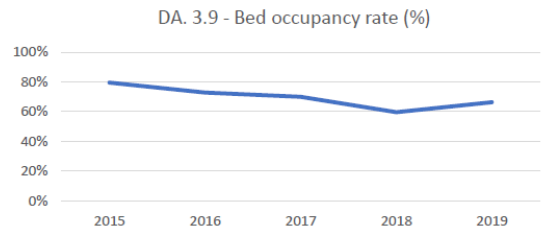
District 5y Resources

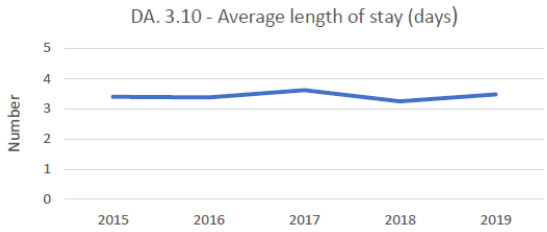
INFRASTRUCTURE

RA. 1.1 - Number of health facilities (MoH & NGO)	2015	2016	2017	2018	2019
Hospitals	2	2	2	2	2
Health centers	1	1	1	1	1
Dispensaries	7	7	7	7	7
Total	**10**	**10**	**10**	**10**	**10**

RA. 1.2 - Number of beds per health facility	2015	2016	2017	2018	2019
Lupara district hospital	32	37	42	47	50
Lupara NGO hospital	16	19	21	24	24
Health Center A	11	9	13	13	12
Total	**59**	**65**	**76**	**84**	**86**

RA. 1.3 - Health facility density (MoH & NGO)	2015	2016	2017	2018	2019
Health facilities per 10,000 population	0.66	0.64	0.62	0.61	0.59
Hospitals per 10,000 population	0.13	0.13	0.12	0.12	0.12
Emergency surgery referral facilities per 10,000 population	0.13	0.13	0.12	0.12	0.12
Basic PHC facilities (health centers + dispensaries) per 10,000	0.53	0.51	0.50	0.48	0.47
Hospital bed density per 10,000 population	3.9	4.2	4.7	5.1	5.1

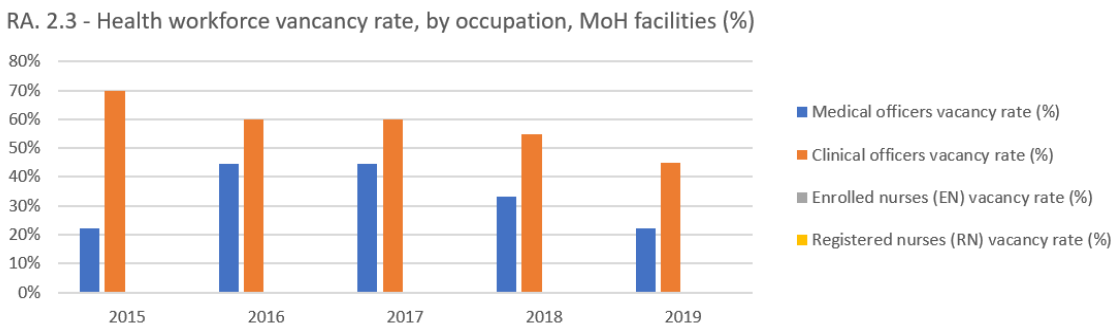




HEALTH WORKFORCE

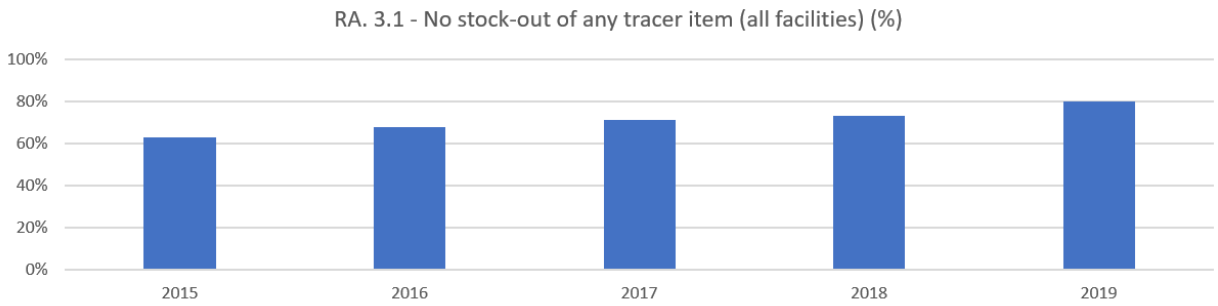
RA. 2.1 - Health workforce numbers (MoH & NGO)	2015	2016	2017	2018	2019
Medical officers	7	5	5	6	7
Clinical officers	6	8	8	9	11
Registered nurses (RN)	34	36	38	38	39
Enrolled nurses (EN)	41	43	48	58	60

RA. 2.2 - Health workforce density (MoH & NGO)	2015	2016	2017	2018	2019
Medical officers per 10,000 population	0.46	0.32	0.31	0.36	0.41
MO + CO per 10,000 population	0.86	0.84	0.81	0.91	1.06
Nurses (EN + RN) per 10,000 population	4.96	5.08	5.37	5.82	5.82



District 5y Resources

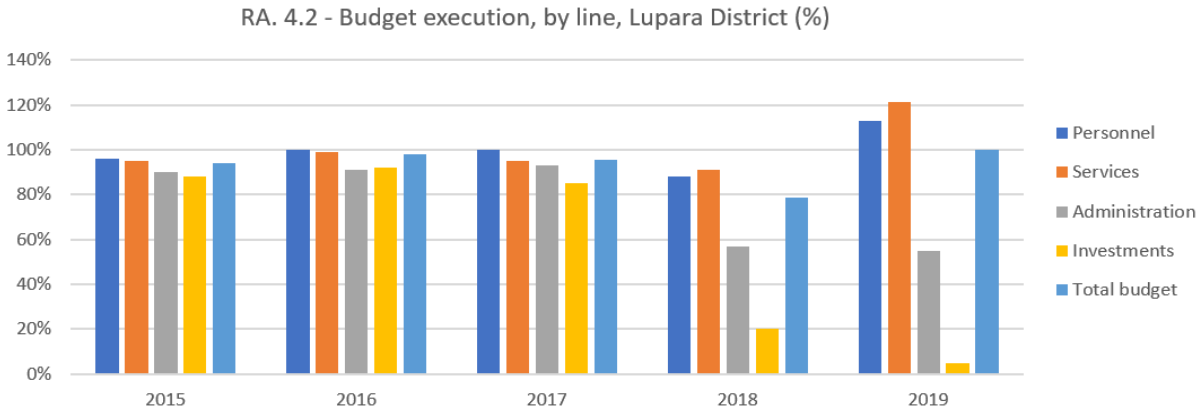
MEDICINES AND MEDICAL PRODUCTS



*% of monthly facility reports (out of 120 reports per year) reporting no stockout

FINANCES

RA. 4.1 - District annual budget allocation and expenditure		2015	2016	2017	2018	2019
Personnel - including temporary hires and per diem	**Budget**	**549,840**	**598,560**	**675,120**	**633,360**	**696,000**
	Spent	522,348	580,603	668,368	544,689	765,600
Operations - including running costs for field operations	**Budget**	**856,800**	**836,400**	**1,020,000**	**969,000**	**1,020,000**
(food, fuel, rental, supplemental medicines)	Spent	788,256	878,220	877,200	872,100	1,264,800
Administration - utilties, maintenance of equipment, office supplies	**Budget**	**149,400**	**156,600**	**162,000**	**167,400**	**180,000**
	Spent	126,990	136,242	152,280	95,418	93,600
Investments - small capital projects (e.g. minor repairs)	**Budget**	**196,800**	**211,200**	**220,800**	**228,000**	**240,000**
	Spent	175,152	194,304	203,136	57,000	12,000
Total	**Budget**	**1,752,840**	**1,802,760**	**2,077,920**	**1,997,760**	**2,136,000**
	Spent	1,612,746	1,789,369	1,900,984	1,569,207	2,136,000



RA. 4.3 - Summary of 2019 budget execution, Lupara District, Q3 2019

Budget line	Annual allocation	Expenditure this quarter	Cumulative Execution				Balance	
			Actual		Expected		Actual	Expected
			Amount	% of annual	Amount	% of annual		
1. Personnel	696,000	255,000	675,000	97%	522,000	75%	21,000	174,000
2. Operations	1,020,000	345,000	855,000	84%	765,000	75%	165,000	255,000
3. Administration	180,000	44,000	134,000	74%	135,000	75%	46,000	45,000
4. Investments	240,000	58,000	178,000	74%	180,000	75%	62,000	60,000
Total	**2,136,000**	**702,000**	**1,770,000**	**83%**	**1,602,000**	**75%**	**366,000**	**534,000**

ANNEX 9 - DASHBOARD FCOMP 2019 RES: Facility one-year comparison

A standard dashboard for comparing health facility 2019 total values for indicators of health resources

Facility comparison 2019 - Resources

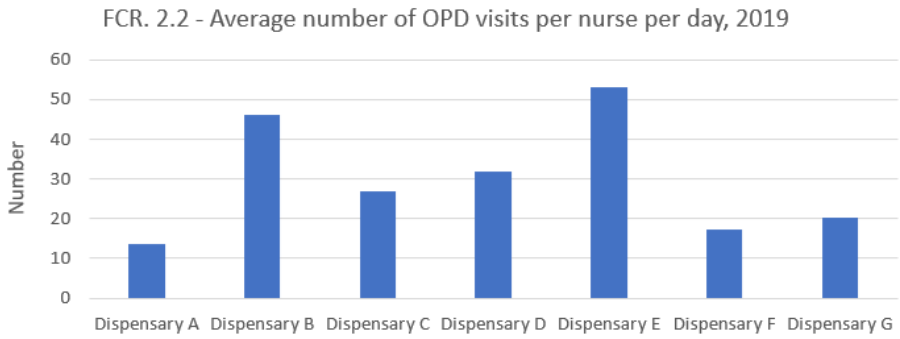
INFRASTRUCTURE

FCR. 1.1 - Beds, BOR and ALOS	Lupara District	Lupara District Hospital	Lupara NGO Hospital	Health Centre A
Inpatient beds	**86**	50	24	12
Bed occupancy rate (%)	**68%**	88%	50%	26%
Average length of stay (days)	**3.4**	3.5	4.1	1.5

HEALTH WORKFORCE

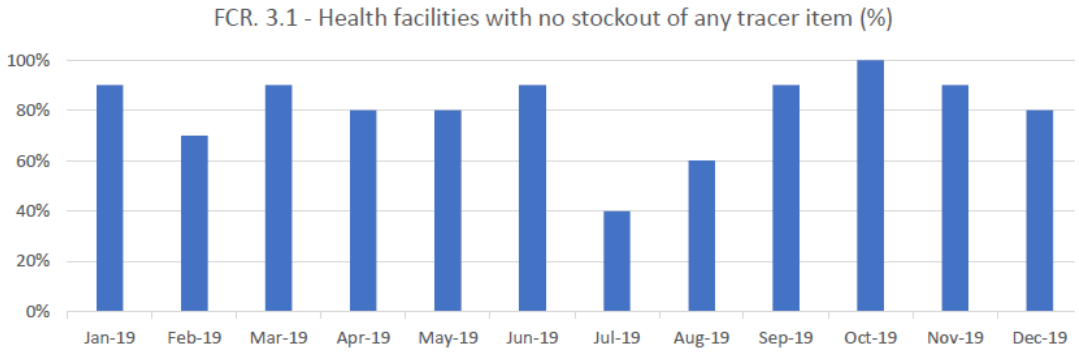
FCR. 2.1 - Health workforce distribution	Lupara District	Lupara District Hospital	Lupara NGO Hospital	Health Centre A	Dispensary A	B	C	D	E	F	G
Medical officers (norm)	**9**	8		1	0	0	0	0	0	0	0
Medical officers (actual)*	**7**	5	2	0	0	0	0	0	0	0	0
Medical officers (vacancies)	**4**	3		1	0	0	0	0	0	0	0
Clinical Officers (norm)	**20**	10		3	1	1	1	1	1	1	1
Clinical Officers (actual)	**11**	6	4	1	0	0	0	0	0	0	0
Clinical Officers (vacancies)	**13**	4		2	1	1	1	1	1	1	1
Registered Nurses (norm)	**22**	20		2	0	0	0	0	0	0	0
Registered Nurses (actual)	**39**	14	14	4	2	1	1	1	0	1	1
Registered Nurses	**-3**	6		-2	-2	-1	-1	-1	0	-1	-1
Enrolled nurses (norm)	**24**	6		4	2	2	2	2	2	2	2
Enrolled nurses (actual)	**60**	29	22	4	2	0	0	0	1	2	0
Enrolled nurses (vacancies)	**-14**	-23		0	0	2	2	2	1	0	2

*Note that, at district level, the actual staffing includes staffing of the NGO hospital whereas the norms and vacancies do not include any values for the NGO hospital



Facility comparison 2019 - Resources

MEDICINES AND MEDICAL PRODUCTS



FCR. 3.2 - Facilities with no stockout	% of facilities	number of facilities	Lupara District Hospital	Lupara NGO Hospital	Health Centre A	Dispensary A	B	C	D	E	F	G
Jan-19	90%	9	1	1	1	0	1	1	1	1	1	1
Feb-19	70%	7	1	1	1	0		1	1	0	1	1
Mar-19	90%	9	1	1	1	1	1	1	1	1	0	1
Apr-19	80%	8	1	0	1	1	1	1	1	1	1	0
May-19	80%	8	1	1	0	1	0	1	1	1	1	1
Jun-19	90%	9	1	1	1	1	1	0	1	1	1	1
Jul-19	40%	4	1	1	0	1	1	0	0		0	0
Aug-19	60%	6	1	1	1	1	1	0	0	1	0	0
Sep-19	90%	9	1	1	1	1	1	1	1	1	1	0
Oct-19	100%	10	1	1	1	1	1	1	1	1	1	1
Nov-19	90%	9	1	1	1	1	1	1	1	0	1	1
Dec-19	80%	8	0	1	0	1	1	1	1	1	1	1

1 = no stockout; 0 = stockout; blank = no data

RESOURCES REFERENCE TABLE

FCR. 5.1 - Data element/Indicator	Lupara District Hospital	Lupara NGO Hospital	Health Centre A	Dispensary A	B	C	D	E	F	G
Beds	50	24	12							
Bed occupancy rate	68%	88%	50%							
Average length of stay	3.5	4.1	1.5							
Medical officers (actual)	5	2	0	0	0	0	0	0	0	0
Clinical Officers (actual)	6	4	1	0	0	0	0	0	0	0
Registered Nurses (actual)	14	14	4	2	1	1	1	0	1	1
Enrolled nurses (actual)	29	22	4	2	0	0	0	1	2	0
Inpatient discharges	4,318	1,076	730							
Surgical procedures (major)	353	134	0							
Caesarean sections	148	10	0							
Outpatient department visits	61,324	28,032	18,421	11,289	9,633	5,578	6,644	11,046	10,795	4,223
ANC 1st visits	1,839	141	806	530	361	59	194	288	240	31
Deliveries in facilities	2,427	54	460	380	86	17	54	40	284	1
DTP1 doses given <1 year	1,715	147	915	503	334	99	221	271	351	0
PLHIV currently on ART	44,594	743	744	459	84	0	84	130	127	0
Notified TB cases (all forms)	163	33	18	53	2	0	2	10	6	2

ANNEX 10 – ANSWERS

to the questions in the guidance document

1. Question 1: There was a sudden rise in the institutional mortality rate in December 2019.
2. Question 2: Female patients older than 5 years of age account for most outpatient visits. (The population 5 years or older is greater than the population less than 5 years of age.) The higher number of female than male outpatient visits may be due to a higher level of illnesses in the female population or a higher utilization of outpatient services by women or a mixing of data on antenatal care services with data on outpatient visits.
3. Question 3: There was a decrease in the proportion of deaths due to malaria between 2018 and 2019 and a marked increase in the proportion due to pneumonia in 2019. Measles deaths feature in the top 10 causes of death in 2019 (and not in the other years), suggesting a possible measles outbreak. The proportion due to HIV disease was lower for 2017 to 2019 than for 2015 and 2016.
4. Question 4: Dispensary G performed far below the district average for antenatal HIV testing.
5. Question 5:
   a. D 12m MM – all the visualizations show short-term (month-to-month) trends in mortality or morbidity data
   b. D 5y UCQ – all the visualizations show year-to-year trends in indicators of utilization, coverage and quality
   c. F Comp 2019 – all the visualizations compare individual health facilities based upon the values of various indicators for all of 2019.
6. Question 6: Both dashboards present findings for indicators of utilization, coverage and quality. However, the F 12y UCQ dashboard presents findings for a single health facility whereas the D 12m UCQ dashboard presents findings for the district as a whole.
7. Question 7: Both dashboards present findings for mortality and morbidity indicators for the district overall. However, D 12m MM shows short-term trends whereas D 5y MM shows 5-year trends.
8. Question 8: There is a suspicious rise in the institutional under 5 mortality rate in 2018. This is much easier to see with the chart (DA. 1.1b) than it is with the table (DA 1.1a). This is one of the advantages of using a chart rather than a table to visualize data. DA. 1.2 and DA. 1.3a show that in 2018 the percentage of deaths occurring in boys was suspiciously high. This increase is most likely due to a data quality problem.
9. Question 9: The three maternal deaths in November at Lupara District Hospital, while not representing a large increase in the number of deaths, is still unusual and warrants further investigation. Furthermore, every maternal death should always be investigated.
10. Question 10: Figure 15 shows an increase in 2019 in the proportion of deaths due to pneumonia and a decrease in the proportion due to malaria.
11. Question 11: Data on deaths classified as due to “Other conditions, not elsewhere classified” cannot be interpreted and cannot be used for public health decision making. This is an example of a “garbage classification": one which has little or no public health value because it is too vague. For this reason, it is essential that the cause of death be correctly specified.
12. Question 12: Charts F. 1.6 and F. 1.7 show surges in cases of pneumonia and malaria in June and July which may be a normal seasonal pattern. Chart F. 1.7 also shows a major increase in cases of pneumonia in December – outside of the normal season for pneumonia. Chart F. 1.8 shows an increase in peri-operative deaths in September. The increase in pneumonia deaths in December and peri-operative deaths in September were both unexpected and they warrant further investigation. Data are not available for March for Lupara District Hospital because the monthly inpatient report was not submitted (see F. 0.1).

13. Question 13: F. 1.8 and F. 1.9 both show a spike in September. The two trends are not identical because F. 1.8 shows the trend in absolute numbers of peri-operative deaths while F. 1.9 shows the trend in the peri-operative deaths divided by the number of major operations. The number of major operations varies from month-to-month.

14. Question 14: The chart shows mid-year increases in pneumonia, malaria and anaemia. Less obvious is an increase in diarrhoea in January, February and again in December. As will be seen later, the increase in pneumonia diagnoses in December is not a seasonal increase but rather the result of an outbreak of respiratory disease.

15. Question 15: The chart shows several changes in the distribution of outpatient diagnoses from 2017 to 2019: "presumed malaria" and "other diseases of the respiratory system" declined while "acute upper respiratory infections", "Other conditions, not classified elsewhere" and, to some extent, "confirmed malaria" increased. All of these changes could be explained by the two new developments described. The introduction of malaria RDTs in 2018 led to a decline in "presumed malaria" and an increase in "confirmed malaria". It also led (for the suspected malaria cases that were RDT negative) to an increase in alternate diagnoses such as "Other conditions, not classified elsewhere" (a "garbage classification") and, possibly, "acute upper respiratory infections". The introduction in 2018 of the new diagnostic category, "acute upper respiratory infections", could explain the decline in "Other conditions of the respiratory system".

16. Question 16: If each NCD (hypertension, heart failure, diabetes, etc.) was listed as a separate diagnosis, it is possible that none of the individual NCDs were reported frequently enough to be among the top 10 diagnoses. Grouping the chronic NCDs together permits recognition of the emerging importance of this group of diseases.

17. Question 17: Figure 20 presents data on the absolute number of diagnoses – without any denominator. Figure 21 presents incidence rates, which are calculated by dividing the absolute number of diagnoses (numerator) by the estimated population at risk of the disease (denominator). To calculate the incidence of a disease per 1,000 population in a sub-district, a reliable estimate of the population of the sub-district is needed. Often, reliable population estimates are not available for individual sub-districts or for the "catchment areas" of individual health facilities. Without a reliable estimate of the population, incidence cannot be calculated and thus this indicator cannot be used to reliably compare the risk in different areas of the district.

18. Question 18: The data suggest that there was an outbreak of measles in April to June 2019.

19. Question 19: The suspicious drop in outpatient visits (both age groups) in September 2019 is consistent with no outpatient data being reported that month from the largest facility in the district.

20. Question 20: The decrease in outpatient utilization for a single health facility (Dispensary G) could be due to a local disruption of services. There may have been a stockout, the absence of a key health worker or an emergency in the local community.

21. Question 21**:** Health Center A accounted for 12% (730/6124) of the inpatient discharges reported in the district in 2019.

22. Question 22: More female than male inpatients were reported. Each year, the reported number of inpatients 5 years or older was about 3 times the number of inpatients < 5 years of age. Let us assume that X= the number of inpatients < 5y and Y = the number of children < 5y in the population. We are told that the number of persons 5 years or older = 6Y. So, the inpatient utilization rate for children < 5 is thus (100 x X)/Y = 100X/Y, while the inpatient utilization rate for persons 5 years or older is (100x3X)/6Y = 50X/Y. So, the inpatient utilization rate was higher for children < 5: roughly twice the rate for persons 5 years or older.

23. Question 23: Table RA. 1.1 shows that the number of facilities in Lupara district has remained unchanged over the five-year period, while the annual population estimates reflect the expected population growth.

24. Question 24: The finding from the 2014 DHS that only 2.2% of deliveries in West Pokot County had been delivered by C-section suggests that access to emergency obstetrical services in this County was too limited. The target for this indicator is closer to 10%. The map of West Pokot County suggests that communities in the northern part of the County are geographically remote from any health facility which can provide C-sections. The small number of C-sections reported by the mission hospital suggests that this NGO facility may have itself have limited capacity for this specific service. As a short-term measure, district health authorities should work with the more remote communities and their nearby health facilities to assess and reinforce their capacity to rapidly transport mothers with prolonged labour. In the longer-term, West Pokot County should aim for improved road infrastructure and development of the emergency obstetrical capacity of a health center or hospital located in the north of the County.

25. Question 25: The charts of Figure 34 show trends in the numbers of doses of various vaccines rather than the trends in coverage. However, trends in doses closely match trends in coverage. The chart for the District Hospital shows several trends: a) Until 2019, there were higher levels of doses given for BCG and DPT1 than for other vaccines. The steady growth in doses is consistent with the steady growth in the target population; b) For reasons which need further investigation, BCG and DTP1 doses given decreased in 2019; c) beginning in 2017, the stagnation in the number of doses of DTP3 and MCV1 suggests declines in coverage (in the light of the steady increase in the target population). Hence, the DTP1 to DTP3 dropout rate and the BCG to MCV1 dropout rate for this facility appear to have increased in 2017 and 2018. In contrast, the chart for Dispensary E shows: a) similar levels of doses given all 4 vaccines/doses – though somewhat lower for DTP3 and MCV1; b) except for 2016, there has been a steady annual increase for all 4 vaccines/doses – consistent with the expected annual increase in the target population. Without an estimate of the target population we cannot know the "coverage" achieved by each of the two facilities. However, the numerator data show that the immunization service performance of Facility E has been more consistent than that of Lupara District Hospital. If we know from a recent population-based survey that coverage with BCG and DTP1 was greater than 90% in the great majority of regions and districts of the country, then we might use the values for these vaccines in a typical year (not including 2019 when the values fell for Lupara District Hospital) to estimate the size of the target populations for each of the health facilities. With such assumptions, it would seem that Facility E has achieved good levels of coverage (i.e. >80%) with all 4 vaccines/doses.

26. Question 26: In this example, a new NCD screening programme was started in March 2019; the programme requires registration of all existing hypertension and diabetes patients when they presented for follow up visits, as well as registration of newly detected cases. This explains the sudden increase in cases initially. By July, most existing NCD cases had been registered and the following months show the trend in newly detected cases. The DA 5y UCQ dashboard (DA. 4.17 and DA. 4.18.) shows data only for 2019, the year in which the new programme was started.

27. Question 27: Chart DA. 4.5 shows the trend in the numbers of ANC 1st visits, which serves as the denominator, as well as the trends in the numerator values. From these it is possible, although a bit challenging, to estimate the percentage of pregnant women who received each intervention. You should find that your estimates are roughly agree with those given in the reference table shown as Figure 41.

28. Question 28: Dropout rates greater than 10% are considered too high – a sign of possible problems with access to follow-up immunizations. In Table DA. 4.9, the values greater than 10% are highlighted in red. The DTP1 to DTP3 dropout rate is negative in 2015. This may have resulted from data quality issues.

29. Question 29: Until mid-2019, PLHIV had to wait several months after diagnosis until they became eligible for ART. Hence, the blue bar for January shows persons newly diagnosed in that month, whereas many of the persons in the orange bar had been diagnosed many months previously. Then, in mid-June 2019, a national policy to treat all HIV positive persons with ART was introduced. This

resulted in a surge in the number of PLHIV new on ART, as facilities began to treat a backlog of PLHIV who had previously not been eligible.

30. Question 30 As TB treatment outcomes are assessed on a "cohort" of patients one year after they were diagnosed, there are no data on treatment outcomes for the last year (2019). As shown in DQ. 4.10, even after a year has elapsed since notification of a case, some additional months may pass before all patients in the TB treatment cohort have been evaluated for treatment outcome. This explains why the green segment (not evaluated) is larger for 2018.
31. Question 31: The chart and the table both show that the number of patients treated with ACT has exceeded the number of confirmed cases of malaria. In fact, the chart shows that ACT treatments also exceeded the number of confirmed cases plus the number of presumed cases. This warrants further investigation.
32. Question 32: BOR for March: (713 x 100) / (42 x 31) = 55%
33. Question 33: The BOR of Health Center A was less than 50% for most of the year, indicating that the facility may have too many beds. All three facilities show an increase in BOR for the months of June and July. This coincides with the malaria and pneumonia season. A second increase is seen in December, which coincides with an outbreak of respiratory illness. (Refer to F. 3.2 and DM. 3.2 to see corresponding trends in inpatient discharges.) Lupara District Hospital has a BOR of 80% or more throughout the year. This increase to 100% during June, July and December, meaning that the facility may need additional beds to be able to accommodate events such as outbreaks.
34. Question 34: Throughout June, July and December, all (100%) of the available beds were occupied at the Lupara District Hospital. To accommodate the increase in seriously ill patients during these months, it is possible that some patients were discharged sooner than they would have been under normal circumstances. While this may have been an essential coping strategy, it is possible that it could result in reduced quality of care or even the need to later re-admit some patients whose illness worsened again after discharge.
35. Question 35: Available working days for 2019 = 260 – (25+13+8+10) = 204 days. There were 18,421 general OPD consultations in 2019. OPD F.T.E's = 0.5 + 0.5 + 1 = 2. Average productivity for general OPD staff = (18,421 /((0.5 + 0.5 + 1) x 204) = 45 OPD consultations per staff member per day.
36. Question 36: Figure 53 shows that Dispensary C experienced a stockout of at least one tracer commodity from June to August 2019. This is consistent with there being a stockout of malaria RDT test kits. Figure 54 shows that, during June and July when there was a stockout of malaria RDT test kits, a significant percentage of suspected malaria cases were not tested and there was an increase in the number of cases diagnosed presumptively (i.e. without laboratory confirmation).
37. Question 37: The shifting of funds between lines of a budget (where it is permitted), can be an essential coping strategy. However, if this pattern persists it can lead to long-term under-funding of items in some budget lines, e.g. essential maintenance and repairs.
38. Question 38: The district will again have to use funds budgeted for the administration and investment lines to support payments for personnel and operations. Personnel expenses and operations may have to be limited to only essential activities for Q4 while ways will have to be found to reduce administrative expenses.

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