Data Management Competency Profiles for Provincial Health Information Officers and Medical Records Officers

PAPUA NEW GUINEA

National Department of Health

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National Department of Health

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FOREWORD BY THE SECRETARY FOR HEALTH

Papua New Guinea has made significant progress over the last five years with electronic health information systems. The National Health Information System (NHIS) for example, which was first established in the late 1980's as a paper-based system, is now electronic allowing for direct data entry. The eNHIS, as of end of 2022, has been rolled out to all 22 provinces of the country. Data is entered by heath workers in tablets and can be seen immediately at the provincial and national levels.

The roll-out of the eNHIS and other electronic health information systems have allowed for real-time analysis and interpretation of data. With these advances, the data needs and skills required of our health information workforce are changing. As such, capacity building is critical to ensure that that our health information workforce continues to have the necessary skills to undertake data management, analysis, and data quality assessments with.

The Monitoring and Evaluation Strategic Plan for the National Health Plan 2021-2030 outlines capacity building as a key action to strengthen monitoring and evaluation and health information. As part of implementation of the Strategic Plan, the National Department of Health worked with the World Health Organization in 2022 to define the data management competencies required in Provincial Health Information Officer (PHIO) and Medical Records Officer (MRO) roles. This involved analyzing the job descriptions of provincial health information officers, medical records officers, and M&E officers at the NDoH, interviewing officers to gain an improved understanding of their roles and responsibilities, and consulting with relevant branches in the NDoH, PHAs, and other partners working in health information.

I wish to thank all partners involved in developing the competency profiles for PHIOs and MROs. The competency profiles outlined in the document will be used to inform short-term and long-term capacity building plans and development of career pathways. I request all partners working with PHIOs and MROs to build on these agreed competencies in future trainings so that we move towards sustainable capacity building of our health information workforce.

Dr Osborne Liko
Secretary for Health

1. INTRODUCTION

The Papua New Guinea National Department of Health has developed a Monitoring & Evaluation Strategic Plan for the *National Health Plan 2021-2030* (NHP). The Strategic Plan outlines how health sector performance will be measured and tracked over the period of the NHP, as well as actions to strengthen monitoring and evaluation and health information systems. A key action outlined in the Monitoring and Evaluation Strategic Plan is capacity building.

An adequate and skilled health information workforce is critical for timely generation, analysis, and use of quality data. However, significant gaps remain at the national and sub-national levels in Papua New Guinea, with insufficient staff with the skills needed in key areas such as data management and analysis. To date, capacity building initiatives aimed at improving monitoring and evaluation/data skills have largely been conducted for specific programme priorities.

Competencies are the abilities of health workers to effectively combine their knowledge, skills, and attitudes in practise, and reflect them in their behaviour. A competency-based approach is considered an effective way to build capacity systematically and sustainably. A standard set of competencies required for data-related roles, however, have not yet been defined in Papua New Guinea.

With support from the World Health Organization (WHO), the National Department of Health worked to better define data management competencies. Competencies were first defined for provincial health information officers and medical records officers, in recognition of their critical role in developing routine health information systems. The process involved analysis of job descriptions, interviews with officers to better understand their responsibilities, and consultations with stakeholders (National Department of Health, Provincial Health Authorities, development partners, etc.) in August and October 2022.

Through this process, competency profiles were agreed for both roles. The profiles outline the skills, knowledge and attitudes required in 17 data management domains ranging from data management planning to data entry and data interpretation. The *Data Management Competency Framework*[1] developed by WHO was used as a basis.

The competency profiles are to be used to inform training needs assessments and development of long-term capacity building plans, in addition to assessment of individual competencies and creation of career development plans. Capacity building activities and trainings for provincial health information officers and medical records officers should build the competencies outlined in profiles.

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1   World Health Organization. Regional Office for the Western Pacific. (2023) . Data management competency framework. WHO Regional Office for the Western Pacific. https://apps.who.int/iris/handle/10665/367502.

2. OVERVIEW OF THE COMPETENCY PROFILES

2.1. What is a competency?

In the context of these profiles, the term competency means: "The ability to complete a designated, professional activity to a predetermined standard"[2]. Competence is determined by the existence and interaction of three separate elements as illustrated in the table below.

Figure 1: The three elements of competency

#	Dimension	Definition
1	Knowledge	The condition of cognitive awareness and understanding of something with a degree of familiarity and depth, gained through learning, experience or association.
2	Skill	The innate and/or acquired ability to apply knowledge, aptitude, acumen, learnt techniques and experience effectively and readily in the performance of specific tasks for a specific purpose or outcome often with set resources
3	Attitude	A personal mindset, belief or feeling held about a particular issue, subject, person or situation which underpins and drives personal behaviours

2.2. What is a competency profile?

A competency profile is a graphic illustration of a set of defined competencies that are required by a specific role (necessary to fulfil the role responsibilities) and/or demonstrated by an individual (through a combination of acquired knowledge and practical skills).

2.3. How were the data management competency profiles developed?

The data management competency profiles were developed based on role responsibilities. Data management responsibilities for a given role were identified through a review of job descriptions and discussions with individuals in the roles. The identified responsibilities were then matched to competency domains and proficiency levels in the World Health Organization *Data Management Competency Framework* (see sections below) to develop draft competency profiles. Finally, consultations were held with key stakeholders working in health information in Papua New Guinea at national and sub-national levels to determine if changes were needed and agree on the profiles.

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2   (i) Entrustability of professional activities and competency-based training. Med Educ. 2005;39(12):1176-1177. doi: 10.1111/j.1365-2929.2005.02341.

(ii) Curriculum development for the workplace using *Entrustable Professional Activities* (EPAs): AMEE Guide No. 99;Olle Ten Cate, Huiju Carrie Chen,   Reinier G Hoff, Harm Peters,Harold Bok, Marieke van der Schaaf; Affiliations expand PMID: 26172347 DOI: 10.3109/0142159X.2015.1060308
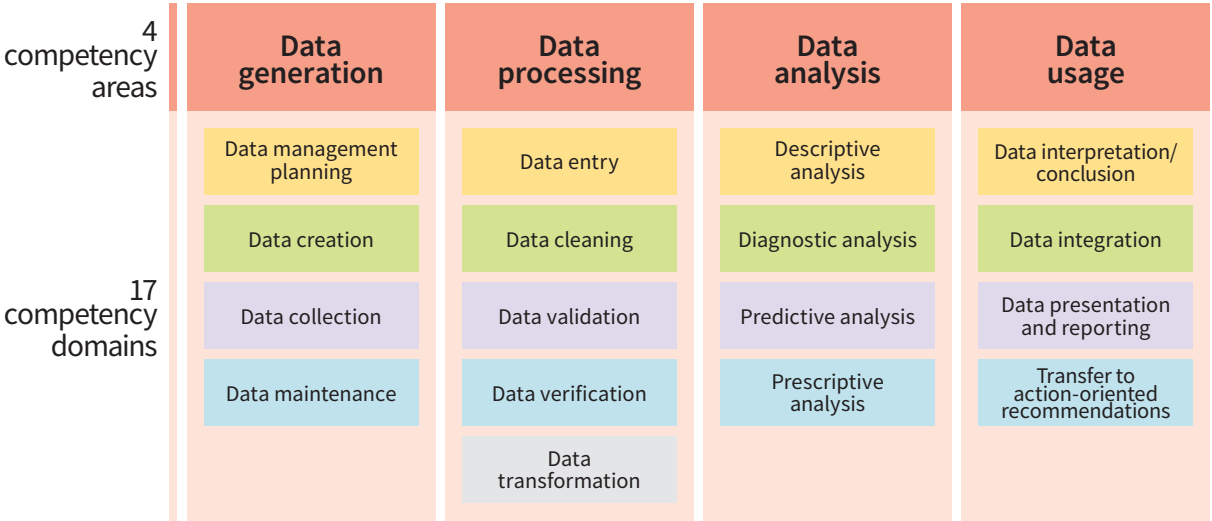
2.3.1. The WHO Data Management Competency Framework

The *Data Management Competency Framework*, developed by the WHO Regional Office for the Western Pacific, is a tool designed to support building sustainable human capacity within the health information workforce. The Framework is designed as a practical tool to enable human resource personnel, trainers, officers in data management related roles and their managers:

a) to identify required data management role competencies and proficiency levels (required competency profile);

b) to identify employees' data management competencies and proficiency levels;

c) to map the gaps between required and actual competencies; and

d) to draft competency development plans at individual, team, department, division and organizational levels.

The Framework is designed around the four core competency areas spanning the data management cycle: (1) data generation, (2) data processing, (3) data analysis and (4) data usage. Each competency area, in turn, is disaggregated into a set of competency domains. The Framework has a total of 17 domains (divided in the four areas), which were identified through expert consultation (Figure 2).

Figure 2: Data Management Competency Framework Structure

| 4 competency areas	Data generation	Data processing	Data analysis	Data usage
17 competency domains	Data management planning	Data entry	Descriptive analysis	Data interpretation/ conclusion
	Data creation	Data cleaning	Diagnostic analysis	Data integration
	Data collection	Data validation	Predictive analysis	Data presentation and reporting
	Data maintenance	Data verification	Prescriptive analysis	Transfer to action-oriented recommendations
		Data transformation		

2.3.2. Proficiency levels

Proficiency is defined as the level of expertise and accomplishment achieved in a particular competency domain. The *Data Management Competency Framework* categorizes competency in four levels ranging from learner-beginner to master practitioner (Figure 3).

Figure 3: Hierarchy of proficiency levels in the WHO Data Management Competency Framework

Level	Classification	Proficiency level description
1	Learner - beginner	A learner beginner has a level of theoretical knowledge and may have some but limited practical work experience. The employee will require supervised, delegated on – the – job incrementing tasks with regular coaching and feedback.
2	Novice - practitioner	Is in the role for one year(+) and is developing competency across relevant role domains but continues to work under supervision and oversight on all but the most basic delegated tasks
3	Independent Practitioner	Is independently and reliably competent in the specific domain. Rarely is there a need to refer for advice or guidance, only in unique or exceptional situations
4	Master practitioner	Has achieved mastery in the domain. Is an acknowledged expert and expands the boundaries of domain knowledge through research, experimentation and innovation. Is recognized as a trainer and mentor, sought by peers and others for technical advice and guidance.

In each competency domain, the Framework outlines knowledge and skills required at each proficiency level (Figure 4).

**Figure 4: Sample structure of data management competency profile
based on the Data Management Competency Framework**
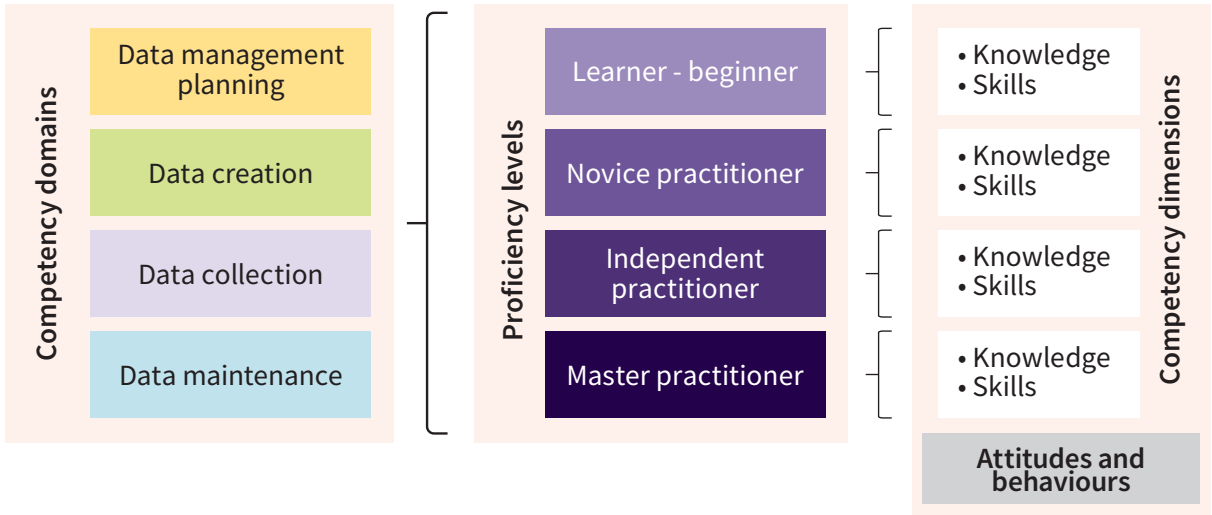
A data management competency profile outlines the proficiency levels required in specific data management domains for the given data-related role (Figure 5).

Figure 5: Example of domain and proficiency structure

Competence domain	Learner - Beginner	Novice Practitioner	Independent Practitioner	Master Practitioner
Data generation				
Data management planning	X			
Data creation		X		
Data collection			X	
Data maintenance	X			
Data processing				
Data entry			X	
Data cleaning		X		
Data validation		X		
Data verification		X		
Data transformation	X			

2.3.3. Attitudes as a competency dimension

Technical performance must be underpinned by a set of positive personal attitudes which, in turn drive positive behaviours that add value. The data management competency framework describes four attitudinal domains to direct the behaviour of employees focused on professionalism: curiosity, commitment, collaboration and compliance. Being professional means constantly keeping your knowledge and skills up to date – learning and development based on innate curiosity. It means delivering on both commitments made and high-quality work. It means demonstrating that you are a team player - reliable, respectful, and competent. It means never doing anything that would compromise professional integrity. These are the benchmark characteristics and standards that all professionals exhibit regardless of context or situation.

3. COMPETENCY PROFILE FOR PROVINCIAL HEALTH INFORMATION OFFICERS

Competence Domain	Learner - Beginner	Novice Practitioner	Independent Practitioner	Master Practitioner
Data generation				
Data management planning	X			
Data creation		X		
Data collection			X	
Data maintenance	X			
Data processing				
Data entry			X	
Data cleaning		X		
Data validation		X		
Data verification		X		
Data transformation	X			
Data analysis				
Descriptive analysis			X	
Diagnostic analysis		X		
Predictive analysis	X			
Prescriptive analysis	Not a required competency			
Data usage				
Data interpretation/conclusion			X	
Data integration	X			
Data presentation and reporting			X	
Transfer to action-oriented recommendations		X		

* Source: World Health Organization. Regional Office for the Western Pacific. (2023). Data management competency framework. WHO Regional Office for the Western Pacific. https://apps.who.int/iris/handle/10665/367502.

Data generation	Competency domain: **Data management planning**
Learner-beginner	**KNOWLEDGE REQUIRED** *Be able to describe or explain:* • What a data management plan (or adapted term for localized use) is • The purpose, role and importance of a data management plan in the data generation process • Why data are organizational assets and why data security risks should be monitored and mitigated • The core ISO data standards and data management planning principles • The critical limitations of data • The most common risks associated with data • How and under what circumstances identified data risks should be escalated through the risk management structure. **SKILLS REQUIRED** *Be able to do the following:* • Identify any missing key information in a data request and seek further clarification • Recognise and categorise different data types/sets into an ascending order of value and ascending order of risk to the organisation • Identify where ISO data standards and data management planning principles have been applied (or not) in a sample data management plan • Categorise the levels of potential value and utilisation of different datasets based on their limitations • Categorise different data types and datasets in ascending order of risk to the organization (low, medium, high, mission threatening)

Data generation	Competency domain: **Data creation**
Novice Practitioner	**KNOWLEDGE REQUIRED** *Be able to describe or explain:* • The differences between input, output, outcome and impact health indicators • The basics of research design: types of primary research studies (e.g. observational, experimental) and the key elements of each one • The concept of bias, how bias can occur and its potential effects on the dataset. • The distinctions between survey, routine heath information system and research data generation • The distinct types of data (longitudinal, event, aggregate) and their use • The different data creation methods and their application contexts for analysis and use • The different data collection methods • The relative strengths and weaknesses of each data collection method • Awareness that some groups might be underrepresented in your dataset depending on how collection is set up.

continued

Data generation	Competency domain: **Data creation**

Novice Practitioner

SKILLS REQUIRED

Be able to do the following:

- Determine which data creation method(s) is/are the most appropriate for the data request
- Appreciate different data creation methods and their suitability for different data requests
- Properly define data elements required in a relevant aggregate report/data request
- Determine and describe the key components of the data creation methods (e.g. target population, sampling method, inclusion criteria), with moderate supervision
- Identify reliable data sources for secondary analysis
- Map existing data related to the indicator to measure
- Identify whether the data required already exists and assess the feasibility of obtaining it

Data generation	Competency domain: **Data collection**

Independent practitioner

KNOWLEDGE REQUIRED

Be able to describe or explain:

- The basics of information flow, data standards for data collection and the potential consequences of deviating from data standards
- The tools for routine data collection and their application in context
- Options in obtaining data and the advantages and disadvantages associated with each option.
- How to identify different and reliable data sources
- Methods and standards for generating patient/client identification in digital/paper formats that can be easily authenticated and linked to existing standards if any
- Commonly used data collection tools, techniques and methods, their advantages and disadvantages and their application contexts.
- The relative strengths and weaknesses of each of the collection tools, techniques and methods), including the difference between paper-based and digital tools (and how they can complement each other)
- The relevant data sources for a given data collection activity or programme
- How to map the information flow related to the data for collection
- How to design data validation rules for digital tools and clear SOPs.

SKILLS REQUIRED

Be able to do the following:

- Encode relevant data accurately and reliably into the RHIS.
- Identify data requirements and extract relevant, reliable data to suit the purpose and task.
- Check, validate and verify the data source(s)
- Design client coding systems for data collection
- Design data validation rules for digital tools and clear Standard Operating Protocols
- Map existing information flows for data collection

Data generation	Competency domain: **Data collection**
Independent practitioner	• Design, develop and use relevant and assessor-friendly data collection tools for defined indicators • Select relevant data collection methods for each defined indicator • Train assessors on data collection • Produce or reuse standard and codes for unit of analysis • Identify situations data collections need to be modified and seek approval as appropriate • Confidently launch and monitor new rounds of same data collection • Source comparable data from paper (logbook/tally) or digital sources • Ascertain the data collected is fit for purpose

Data generation	Competency domain: **Data maintenance**
Learner-beginner	**KNOWLEDGE REQUIRED** *Be able to describe or explain:* • What a data maintenance plan is and its role and importance in the data generation process • The various and different responsibilities involved with ownership of data • Why and how legislative/polices may influence restrictions on data storage • The various and differing considerations in data maintenance such as data ownership, legislative restrictions on data storage, data integrity, data retrieval, data recovery, data retention, data management responsibility, data disposal & storage cost. **SKILLS REQUIRED** *Be able to do the following:* • Outline the framework, structure or contents of a basic data maintenance plan • Create a basic database according to a set of given standards • Modify an existing database.

Data processing	Competency domain: **Data entry**
Independent practitioner	**KNOWLEDGE REQUIRED** *Be able to describe or explain:* • How a data system is structured, how it works and the role of data entry in the data management cycle • The different types of data (qualitative and quantitative) and the subtypes of each one, including what is a variable, observation, datum/data point, and what are the different types of quantitative variables (numeric, logical, character, complex) • The definition of metadata and its function in the data management cycle (i.e. the characteristics of data elements and their implications for data entry, e.g. dates should be a standard format yyyymmdd, percentages should not be above 100, names should be input as text and conform to naming protocols and standards) • The difference between a data-point value (content of field) and a label (description of that data field) • Data-entry features and capabilities of MS Excel and Word. *continued*

Data processing	Competency domain: **Data entry**

Independent practitioner

- The concepts of reporting completeness (timeliness, latency and consistency) and their application in data entry and data entry planning
- The most common challenges related to data entry on computer and paper-based platforms and for specific datasets (depending on the job requirements)
- The data entry flow from paper-based sources to digitalization and the implications for data entry, how to refer to original documentation to enter missing data.
- How to source comparable data from paper (logbook/tally) or digital sources
- How to create a template/empty database in which data are entered (structure of the dataset and explain how it is different to simple data entry)
- The essence of potential specialty areas such as:
  - What matrix variables are (for network data)
  - Geographic Information Systems (GIS) specific variables or data
  - What CAPI data collection systems are and how data are collected and stored
- How to transfer stored data from the data collection software/source system to the appropriate data management system data warehouse.

SKILLS REQUIRED

Be able to do the following:

- Complete data entry into MS Excel, Word and other systems used in country, timely, accurately and to required standards
- Record, collect and report the data points in a logbook, tally, data entry form or any other data entry tool, accurately and within expected time frames
- Correctly identify whether data errors are systematic or random
- Identify and overcome the most common challenges related to data entry on both digital and paper-based platforms and for specific datasets
- Complete a data entry flow from paper-based sources to digitalization.
- Access original documentation to enter missing data.
- Make point corrections to errors due to random chance and recognize when to escalate for assistance (e.g. systemic errors that they are unable to fix).
- Identify whether the bug or fault is in the system or in the data, and dependent upon the finding, take appropriate action – e.g. self-correct or escalate.
- Recover "lost" or "corrupted" data and address system failure issues.
- Create a template/empty database in which the data are entered (structure of the dataset)
- Complete basic tasks in potential specialty areas, ex:
  - Using matrix variables (for network data)
  - Using Geographic Information Systems (GIS) specific variables or data
  - Collecting and storing data using computer assisted personal interview (CAPI) data collection systems
- Transfer stored data from data collection software/system to the data-warehouse
- Fix systemic errors (e.g. by mass dataset update) and using system tools reduce their future occurrence (e.g. data validation rules, applying correct data types, etc.)
- Identify, report and explain problems with data entry in a manner that is standard, clear and intelligible
- Instruct junior staff and review data entry for matrices.

Data processing	Competency domain: **Data cleaning**

Novice Practitioner

KNOWLEDGE REQUIRED

Be able to describe or explain:

- The role and importance of data cleaning in the data management cycle
- The rationale for and importance of recording the data cleaning process (logging data cleaning actions) including what issues have been identified and resolved
- How to identify and remove duplicates from datasets.
- The factors that influence reporting completeness and how they are factored into the (data) cleaning process
- What diagnostic filters/screens are and how/when they are used in the data cleaning process
- The different methods used for identification of data inconsistencies (e.g. convert data types, standardized capitalization, random white spaces, inconsistent formatting, spelling errors) and how to correct them
- Intermediate- to advanced-level data cleaning functions and capabilities in MS Excel and Word
- Know the meanings and difference between an "error", "implausible value" and "outlier" and how to deal appropriately with each one

SKILLS REQUIRED

Be able to do the following:

- Highlight data using colours
- Format a "line list" and "pivot table"
- Identify and record "errors", recognize "implausible values" and "outliers" in a dataset, and deal with them appropriately
- Identify and remove duplicates from datasets
- Apply the various diagnostic filters/screens used in the data cleaning process
- Apply the different methods for identifying inconsistencies in data and be able to correct them.
- Select and use the most appropriate cleaning tools and techniques for the specific data cleaning task;
- Identify data inconsistencies and identify and remove data sets using different de-duplication methods;
- Complete data cleaning tasks applying the core cleaning steps / tools and appropriate software / or functions (at least DHIS2/Excel, Word, if, vlookup, index) for the specific data cleaning task;
- Synthesise and report key data quality issues resolved.

Data processing	Competency domain: **Data validation**

Novice Practitioner

KNOWLEDGE REQUIRED

Be able to describe or explain:

- What data validation is and its role and importance in the data entry process
- The rules for capturing data consistently and why these rules are important
- The key characteristics used to define data quality (i.e. validity, accuracy, completeness, consistency, uniformity).
- The diagnostic tests/screens available for data validation, their specific purposes and how to use them for common attributes

continued

Data processing	Competency domain: **Data validation**
  Novice Practitioner	• The purpose and rationale for recording data validation actions and how to document the validation process in a standard reporting format • The data validation rules and diagnostic tests/screens for any type of data, their specific purposes and how to use them, comparing data points systematically and rigorously • How to refer to original data sources to correct data quality issues. **SKILLS REQUIRED** *Be able to do the following:* • Complete basic data validation using standard rules/guidelines in place for common attributes and the key data quality characteristics • Document the data validation process using a standard reporting format • Implement preliminary data validation checks as directed by senior staff • Use diagnostic tests/screens for any type of data, comparing data points systematically and rigorously • Revert to original data sources to correct data quality issues • Set limits for possible numeric values for a given field and enter values that fit within a list or range of acceptable values • Compare data points systematically and rigorously • Complete a data quality validation check based on the 8 data validation characteristics • Review source of data points (e.g. paper-based documentation) to solve potential data quality issues based on validation findings • Document the validation process on a standard reporting format.

Data processing	Competency domain: **Data verification**
  Novice Practitioner	**KNOWLEDGE REQUIRED** *Be able to describe or explain:* • How to migrate, merge and append data to be able to identify potential data quality issues for data verification. **SKILLS REQUIRED** *Be able to do the following:* • Complete verification tasks using each of the four verification methods (i.e. inspection, demonstration, test, analysis) under supervision • Document the verification process on a standard reporting format • Migrate, merge and append data to be able to identify potential data quality issues for data verification; • Document the data verification processes on a standard reporting format

Data processing	Competency domain: **Data transformation**
Learner-beginner	**KNOWLEDGE REQUIRED** *Be able to describe or explain:* • The purpose, benefits and challenges of data transformation • The different types of data transformation and when and how they are applied in the data transformation process • The objective of the intended data transformation, the process required, the utility of the data elements in the data set and how they should be combined • What are the required data elements to process the indicator, whether the data elements are available and usable in the dataset, and how they should be combined • The difference between a "pivot" and a "line-list" file, and their implication for data transformation; • The different data formats, their extraction for data generation and transformation (e.g. csv, json) and how to change the data format. **SKILLS REQUIRED** *Be able to do the following:* • Produce the appropriate dataset for data transformation tasks • Complete basic data transformation tasks using appropriate software (e.g. Microsoft solutions, R, Stata, SPSS, SAS, Python) under supervision • Provide support for the creation of metadata files

Data analysis	Competency domain: **Descriptive analysis**
Independent practitioner	**KNOWLEDGE REQUIRED** *Be able to describe or explain:* • The software typically used at their workstation to perform descriptive analytics • The results of descriptive analysis correctly and accurately using the proper units, terminology, disclaimers (e.g., measles coverage for the district is 90% based on available data from 10/15 health centres) • Basic qualitative methods and the situations where they are used (e.g. observations, textual or visual analysis of books or videos, key informant interviews and focus group discussions) **SKILLS REQUIRED** *Be able to do the following:* • Implement content analysis, narrative interviewing and assist with the analysis from a qualitative data collection. • Identify and extract key messages and findings from a given descriptive analysis exercise. • Complete a basic central tendency (statistical) analysis exercise (e.g. calculate average, median, mode), dispersion (e.g. standard deviations), and disease frequency (e.g. per cent, rate, ratio, prevalence, incidence, etc.) for description of quantitative data. • Complete a basic qualitative analysis exercise for a given situation using (e.g. observations, textual or visual analysis of books or videos, key informant interviews and focus group discussions

continued

Data analysis	Competency domain: **Descriptive analysis**
Independent practitioner	• Complete a basic data visualization task with one or two layers of data information (e.g. three-line graphs to show trend of indicator over time between total, male and female populations using MS Excel). • Select and apply the most appropriate choice of graph/figure (e.g. bar chart, pie chart, line graph, map) for each data element or indicator, for a given exercise and explain the reasoning behind selection. • Complete a basic descriptive analysis task (typically collation, summarization, aggregation, structuring and organization of data using appropriate techniques, e.g. summarizing using sum of counts, and weighted average for rates, drawing 2x2 tables to describe false positivity rate of screening method vs a gold standard method). • Visualize and present findings in a logical, coherent and meaningful way, appropriate to a given case. • Select and apply the most appropriate data elements and indicators, especially relevant key performance indicators, in a given workstation, and use the correct statistical techniques to calculate them (e.g. prevalence of current tobacco use should be age-standardized, denominator of vaccination coverage should be target population instead of entire population in country, etc.). • Create various types of statistical tables and select the situations where they may be most usefully applied (e.g. 2x2 table for false positivity rates). • Recognize and detect data quality issues, such as outliers, data quality and statistical inconsistencies, and identify how they affect the results of a descriptive analysis process. • Perform descriptive analytics using the software typically used at their workstation and demonstrate how they are used • Identify statistical inconsistencies before, during, and after analysis and perform the correct follow up action to address them • Assist in the creation, selection and use of analysis outputs in data dashboards, high level reports and other data products • Describe the results of a descriptive analysis exercise, accurately, using the proper units, terminology, disclaimers • Perform descriptive analytics using the software typically used at their workstation and demonstrate how they are used • Identify statistical inconsistencies before, during, and after analysis and perform the correct follow up action to address them • Assist in the creation, selection and use of analysis outputs in data dashboards, high level reports and other data products • Describe the results of a descriptive analysis exercise, accurately, using the proper units, terminology, disclaimers

Data analysis	Competency domain: **Diagnostic analysis**
Novice Practitioner	**KNOWLEDGE REQUIRED** *Be able to describe or explain:* • The fundamentals and basic methods of diagnostic analytics • The most suitable methods of diagnostic analysis that should be applied based on different data types, research design and analysis purpose • Basic statistical theories (such as *P* value, confidence interval) *continued*

Data analysis	Competency domain: **Diagnostic analysis**
Novice Practitioner	**SKILLS REQUIRED** *Be able to do the following:* • Select the most suitable methods of diagnostic analysis which should be applied based on different data types, research design and analysis purpose. • The methods include statistical methods or other broader methods in both qualitative and quantitative areas, data visualisations etc.

Data analysis	Competency domain: **Predictive analysis**
Learner-beginner (knowledge only)	**KNOWLEDGE REQUIRED** *Be able to describe or explain:* • The purpose, objective and wider context of a planned workstation analysis project and the meaning of the expected optimizations Ex: *Immunization unit will aim to maximize immunization coverages, and minimize both dropout rates and vaccine vial wastage*

Data analysis	Competency domain: **Prescriptive analysis**
	–Not a required competency–

Data usage	Competency domain: **Data interpretation/conclusion**
Independent practitioner	**KNOWLEDGE REQUIRED** *Be able to describe or explain:* • The various basic data types, terms, methods used and analysed in the results and how each method is applied in practice • Why and how the coding process (from raw data to initial results generated) is used. • The meaning and application of key terms used in the process of forming conclusions (e.g. inductive and deductive reasoning, premise, hypothesis, supposition, inference). • Advanced data types, terms, methods used and analysed in the results, and how each method is applied in practice, and likely implications and consequences • How to use data results including data points, text, graphs, charts, and maps to draw accurate conclusions **SKILLS REQUIRED** *Be able to do the following:* • Identify the basic data types, terms, methods used and analysed in the results • Apply each of the above (types, terms, methods) in practical contexts • Interpret and draw basic conclusions based on the data results including data points, text, graphs, charts and maps • Apply advanced data types, terms, methods used and analysed in the results, and demonstrate how each method is applied in practice • Use data results including data points, text, graphs, charts, and maps to draw accurate conclusions • Communicate the results as applicable to different audiences

Data usage	Competency domain: **Data integration**
Learner-beginner	**KNOWLEDGE REQUIRED** *Be able to describe or explain:* Describe the core concept and principles of data integration **SKILLS REQUIRED** *Be able to do the following:* Apply the core concepts and basic principles in a basic data integration task

Data usage	Competency domain: **Data presentation and reporting**
Independent practitioner	**KNOWLEDGE REQUIRED** *Be able to describe or explain:* • The core concepts of data presentation and reporting (i.e. the key factors that determine the content and structure of a presentation/report – purpose, objectives, context, audience needs and expectations), including which format, tools and techniques are most appropriate for both standard and non-standard presentations and reports • The appropriate criteria to be used to determine the contents of a standard presentation/report • The core principles of integrity in data reporting and how to apply them in practice. • How the various content selection criteria would be applied in different standard or non-standard presentation and reporting scenarios. • The criteria and/or principles for assessing the quality of reports/presentations • How to examine data presentation and reporting i.e. identify and explain weaknesses in the content, structure and format that could result in suboptimal understanding of the conclusions being presented. • How to ensure data integrity in preparing and presenting data (bias, data fabrication, manipulation, misrepresentation, or falsification). **SKILLS REQUIRED** *Be able to do the following:* • Identify whether the core concepts of data presentation and reporting are evident and presented in a standard report/presentation. • Identify whether or not the appropriate content selection criteria have been applied in a particular case. • Identify whether core integrity principles have been applied in a particular report/presentation. • Demonstrate the practical application of content selection in different standard and non-standard report situations • Apply quality assessment criteria and principles in practice to produce clear, logical, and relevant structures for presentations and reports • Select the most relevant and appropriate material to be used (and omitted) to present findings and conclusions explaining the rationale for selected material to different target audiences • Demonstrate the use and application of data integrity principles (existence of bias, data fabrication, data manipulation, misrepresentation, or falsification) in the preparation of reports and presentations • Deliver expertly and confidently – based on thorough preparation, data integrity and subject knowledge

Data usage	Competency domain: **Transfer to action-oriented recommendations**
Novice Practitioner	**KNOWLEDGE REQUIRED** *Be able to describe or explain:* • The core concepts of how data can be used to form actionable insights such as the purpose and principles underpinning the Knowledge to Action Framework • Explain the meaning of each element of the SMART acronym (i.e. specific, measurable, achievable, relevant, time-bound) • Describe or explain how data are used to form actionable insights **SKILLS REQUIRED** *Be able to do the following:* • Apply the core concepts and principles of how data can be used to form actionable insights using the criteria of the Knowledge to Action Framework • Apply the SMART criteria framework to the data to formulate actionable recommendations

4. COMPETENCY PROFILE FOR MEDICAL RECORDS OFFICERS

Competence domain	Learner-beginner	Novice practitioner	Independent practitioner	Master practitioner
Data generation				
Data management planning		X		
Data creation		X		
Data collection			X	
Data maintenance		X		
Data processing				
Data entry			X	
Data cleaning			X	
Data validation			X	
Data verification			X	
Data transformation	X			
Data analysis				
Descriptive analysis		X		
Diagnostic analysis	X			
Predictive analysis	Not a required competency			
Prescriptive analysis	Not a required competency			
Data usage				
Data interpretation/conclusion		X		
Data integration	Not a required competency			
Data presentation and reporting			X	
Transfer to action-oriented recommendations	Not a required competency			

Data generation	Competency domain: **Data management planning**
Novice Practitioner	**KNOWLEDGE REQUIRED** *Be able to describe or explain:* • The expected contents, structure and core elements of a data management plan (i.e. the what and the how of the data collection, application of the data management cycle) • The purpose, role and importance of a data management plan in the data generation process • Why data are organizational assets and why data security risks should be monitored and mitigated • The core ISO data standards and data management planning principles • The critical limitations of data • The most common risks associated with data • How and under what circumstances identified data risks should be escalated through the risk management structure. • Inherent risks within overall data collection process • The factors that influence and determine the design of data collection instruments and data presentation tools and techniques (ex: the audience, the nature of the data, whether to store in a structured or unstructured manner) • The organizational process of escalating identified data security risks **SKILLS REQUIRED** *Be able to do the following:* • Identify any missing key information in a data request and seek further clarification • Recognise and categorise different data types/sets into an ascending order of value and ascending order of risk to the organisation • Identify where ISO data standards and data management planning principles have been applied (or not) in a sample data management plan • Categorise the levels of potential value and utilisation of different datasets based on their limitations • Categorise different data types and datasets in ascending order of risk to the organization (low, medium, high, mission threatening) • Draft a basic data management plan based on a provided template • Identify data risks in a provided data management plan and draft a basic risk removal/mitigation plan to address • Design basic data collection instruments and presentation tools and techniques • Initiate an appropriate data security risk escalation process

Data generation	Competency domain: **Data creation**

KNOWLEDGE REQUIRED

Be able to describe or explain:

- The differences between input, output, outcome and impact health indicators
- The basics of research design: types of primary research studies (e.g. observational, experimental) and the key elements of each one
- The concept of bias, how bias can occur and its potential effects on the dataset.
- The distinctions between survey, routine heath information system and research data generation
- The distinct types of data (longitudinal, event, aggregate) and their use
- The different data creation methods and their application contexts for analysis and use
- The different data collection methods
- The relative strengths and weaknesses of each data collection method
- Awareness that some groups might be underrepresented in your dataset depending on how collection is set up.

SKILLS REQUIRED

Be able to do the following:

- Determine which data creation method(s) is/are the most appropriate for the data request
- Appreciate different data creation methods and their suitability for different data requests
- Properly define data elements required in a relevant aggregate report/data request
- Determine and describe the key components of the data creation methods (e.g. target population, sampling method, inclusion criteria), with moderate supervision
- Identify reliable data sources for secondary analysis
- Map existing data related to the indicator to measure
- Identify whether the data required already exists and assess the feasibility of obtaining it

Novice Practitioner

Data generation	Competency domain: **Data collection**

KNOWLEDGE REQUIRED

Be able to describe or explain:

- The basics of information flow, data standards for data collection and the potential consequences of deviating from data standards
- The tools for routine data collection and their application in context
- Options in obtaining data and the advantages and disadvantages associated with each option.
- How to identify different and reliable data sources
- Methods and standards for generating patient/client identification in digital/paper formats that can be easily authenticated and linked to existing standards if any
- Commonly used data collection tools, techniques and methods, their advantages and disadvantages and their application contexts.
- The relative strengths and weaknesses of each of the collection tools, techniques and methods), including the difference between paper-based and digital tools (and how they can complement each other)

Independent practitioner

continued

Independent practitioner

- The relevant data sources for a given data collection activity or programme
- How to map the information flow related to the data for collection
- How to design data validation rules for digital tools and clear SOPs.

SKILLS REQUIRED

Be able to do the following:

- Encode relevant data accurately and reliably into the RHIS.
- Identify data requirements and extract relevant, reliable data to suit the purpose and task.
- Check, validate and verify the data source(s)
- Design client coding systems for data collection
- Design data validation rules for digital tools and clear Standard Operating Protocols
- Map existing information flows for data collection
- Design, develop and use relevant and assessor-friendly data collection tools for defined indicators
- Select relevant data collection methods for each defined indicator
- Design a set of data validation rules for digital tools
- Train assessors on data collection
- Produce or reuse standard and codes for unit of analysis
- Identify situations data collections need to be modified and seek approval as appropriate
- Confidently launch and monitor new rounds of same data collection
- Source comparable data from paper (logbook/tally) or digital sources
- Ascertain the data collected is fit for purpose

Data generation

Competency domain**: Data maintenance**

Novice Practitioner

KNOWLEDGE REQUIRED

Be able to describe or explain:

- What a data maintenance plan is and its role and importance in the data generation process
- The various and different responsibilities involved with ownership of data
- Why and how legislative/polices may influence restrictions on data storage
- The various and differing considerations in data maintenance such as data ownership, legislative restrictions on data storage, data integrity, data retrieval, data recovery, data retention, data management responsibility, data disposal & storage cost.
- The common database software and database management tools used in data maintenance and the pros and cons of each
- The various considerations in data storage including data ownership, legislative restrictions on data storage, data integrity, data retrieval, data recovery, data retention, data management responsibility, data disposal and storage cost

Data generation	Competency domain: **Data maintenance**

Novice Practitioner

SKILLS REQUIRED

Be able to do the following:

- Outline the framework, structure or contents of a basic data maintenance plan
- Create a basic database according to a set of given standards
- Modify an existing database
- Draft a template based data maintenance plan covering for example the following:
  - Core structure/subject areas of the plan
  - Components of data architecture
- (Under guidance) apply specific treatment of the following items in the plan – data ownership / structure and organization, legislative restrictions on data integrity, data retrieval, data recovery, data retention, data management responsibility, data disposal and storage cost.
- Create a basic database using common software packages
- Apply common database management tools specifically for use in the data maintenance processes

Data processing	Competency domain: **Data entry**

Independent practitioner

KNOWLEDGE REQUIRED

Be able to describe or explain:

- How a data system is structured, how it works and the role of data entry in the data management cycle
- The different types of data (qualitative and quantitative) and the subtypes of each one, including what is a variable, observation, datum/data point, and what are the different types of quantitative variables (numeric, logical, character, complex)
- The definition of metadata and its function in the data management cycle (i.e. the characteristics of data elements and their implications for data entry, e.g. dates should be a standard format yyyymmdd, percentages should not be above 100, names should be input as text and conform to naming protocols and standards)
- The difference between a data-point value (content of field) and a label (description of that data field)
- Data-entry features and capabilities of MS Excel and Word.
- The concepts of reporting completeness (timeliness, latency and consistency) and their application in data entry and data entry planning
- The most common challenges related to data entry on computer and paper-based platforms and for specific datasets (depending on the job requirements)
- The data entry flow from paper-based sources to digitalization and the implications for data entry, how to refer to original documentation to enter missing data.
- How to source comparable data from paper (logbook/tally) or digital sources
- How to create a template/empty database in which data are entered (structure of the dataset and explain how it is different to simple data entry)
- The essence of potential specialty areas such as:
  - What matrix variables are (for network data)
  - Geographic Information Systems (GIS) specific variables or data
  - What CAPI data collection systems are and how data are collected and stored
- How to transfer stored data from the data collection software/source system to the appropriate data management system data warehouse.

continued

Data processing	Competency domain: **Data entry**

SKILLS REQUIRED

Be able to do the following:

Independent practitioner

- Complete data entry into MS Excel, Word and other systems used in country, timely, accurately and to required standards
- Record, collect and report the data points in a logbook, tally, data entry form or any other data entry tool, accurately and within expected time frames
- Correctly identify whether data errors are systematic or random
- Identify and overcome the most common challenges related to data entry on both digital and paper-based platforms and for specific datasets
- Complete a data entry flow from paper-based sources to digitalization.
- Access original documentation to enter missing data.
- Make point corrections to errors due to random chance and recognize when to escalate for assistance (e.g. systemic errors that they are unable to fix).
- Identify whether the bug or fault is in the system or in the data, and dependent upon the finding, take appropriate action – e.g. self-correct or escalate.
- Recover "lost" or "corrupted" data and address system failure issues.
- Create a template/empty database in which the data are entered (structure of the dataset)
- Complete basic tasks in potential specialty areas, ex:
  - Using matrix variables (for network data)
  - Using Geographic Information Systems (GIS) specific variables or data
  - Collecting and storing data using *computer assisted personal interview* (CAPI) data collection systems
- Transfer stored data from data collection software/system to the data-warehouse
- Fix systemic errors (e.g. by mass dataset update) and using system tools reduce their future occurrence (e.g. data validation rules, applying correct data types, etc.)
- Identify, report and explain problems with data entry in a manner that is standard, clear and intelligible
- Instruct junior staff and review data entry for matrices.

Data processing	Competency domain: **Data cleaning**

KNOWLEDGE REQUIRED

Be able to describe or explain:

Independent practitioner

- The role and importance of data cleaning in the data management cycle
- The rationale for and importance of recording the data cleaning process (logging data cleaning actions) including what issues have been identified and resolved
- How to identify and remove duplicates from datasets.
- The factors that influence reporting completeness and how they are factored into the (data) cleaning process
- What diagnostic filters/screens are and how/when they are used in the data cleaning process
- The different methods used for identification of data inconsistencies (e.g. convert data types, standardized capitalization, random white spaces, inconsistent formatting, spelling errors) and how to correct them
- Intermediate- to advanced-level data cleaning functions and capabilities in MS Excel and Word

continued

Data processing	Competency domain: **Data cleaning**
Independent practitioner	• Know the meanings and difference between an "error", "implausible value" and "outlier" and how to deal appropriately with each one • How to source and/or create diagnostic filters/screens and streamline the data cleaning process; • When to pass on data changes to be approved in the data (e.g. delete or replace observations and data points). **SKILLS REQUIRED** *Be able to do the following:* • Highlight data using colours • Format a "line list" and "pivot table" • Identify and record "errors", recognize "implausible values" and "outliers" in a dataset, and deal with them appropriately • Identify and remove duplicates from datasets • Apply the various diagnostic filters/screens used in the data cleaning process • Apply the different methods for identifying inconsistencies in data and be able to correct them • Select and use the most appropriate cleaning tools and techniques for the specific data cleaning task • Identify data inconsistencies and identify and remove data sets using different de-duplication methods • Complete data cleaning tasks applying the core cleaning steps / tools and appropriate software / or functions (at least DHIS2/Excel, Word, if, vlookup, index) for the specific data cleaning task • Synthesise and report key data quality issues resolved • Source and/or create diagnostic filters/screens and streamline the data cleaning process • Identify and authenticate potential data errors and data outliers • Source data cleaning rules if documents are missing • Draft a comprehensive data cleaning report.
Data processing	Competency domain: **Data validation**
Independent practitioner	**KNOWLEDGE REQUIRED** *Be able to describe or explain:* • What data validation is and its role and importance in the data entry process • The rules for capturing data consistently and why these rules are important • The key characteristics used to define data quality (i.e. validity, accuracy, completeness, consistency, uniformity). • The diagnostic tests/screens available for data validation, their specific purposes and how to use them for common attributes • The purpose and rationale for recording data validation actions and how to document the validation process in a standard reporting format • The data validation rules and diagnostic tests/screens for any type of data, their specific purposes and how to use them, comparing data points systematically and rigorously • How to refer to original data sources to correct data quality issues. • When to approve changes in the data according to the data quality issues identified • How to identify the difference between systematic and random errors in data quality. *continued*

Data processing	Competency domain: **Data validation**

SKILLS REQUIRED

Be able to do the following:

- Complete basic data validation using standard rules/guidelines in place for common attributes and the key data quality characteristics
- Document the data validation process using a standard reporting format
- Implement preliminary data validation checks as directed by senior staff
- Use diagnostic tests/screens for any type of data, comparing data points systematically and rigorously
- Revert to original data sources to correct data quality issues
- Set limits for possible numeric values for a given field and enter values that fit within a list or range of acceptable values
- Compare data points systematically and rigorously
- Complete a data quality validation check based on the 8 data validation characteristics
- Review source of data points (e.g. paper-based documentation) to solve potential data quality issues based on validation findings
- Document the validation process on a standard reporting format.
- Run data validation checks for any type of data
- Recognise when changes are needed and take decisions about data changes based on the data quality issues identified and on the validation findings (post-validation checks actions)
- Identify and fix systematic and random errors in data quality
- Document the post-validation checks processes on a standard reporting format

Independent practitioner

Data processing	Competency domain: **Data verification**

KNOWLEDGE REQUIRED

Be able to describe or explain:

- What data verification is and its role and importance in the data entry cycle
- The key criteria used in the data verification process
- The purpose and rationale for documenting the verification process
- How to document the verification process in a standard reporting format.
- How to migrate, merge and append data to be able to identify potential data quality issues for data verification
- What steps to take to correct potential data quality issues arising during data verification;

SKILLS REQUIRED

Be able to do the following:

- Complete verification tasks using each of the four verification methods
- Document the verification process on a standard reporting format
- Migrate, merge and append data to be able to identify potential data quality issues for data verification
- Correct data quality issues arising during data verification
- Use artificial intelligence/machine learning for data verification
- Design and complete both manual and /or automated data sampling and checking exercise to verify the information in the destination system matches the source system
- Document the post-verification checks processes on a standard reporting format

Independent practitioner

Data processing	Competency domain: **Data transformation**

Learner-beginner

KNOWLEDGE REQUIRED

Be able to describe or explain:

- The purpose, benefits and challenges of data transformation
- The different types of data transformation and when and how they are applied in the data transformation process
- The objective of the intended data transformation, the process required, the utility of the data elements in the data set and how they should be combined
- What are the required data elements to process the indicator, whether the data elements are available and usable in the dataset, and how they should be combined
- The difference between a "pivot" and a "line-list" file and their implication for data transformation
- The different data formats, their extraction for data generation and transformation (e.g. csv, json) and how to change the data format.

SKILLS REQUIRED

Be able to do the following:

- Produce the appropriate dataset for data transformation tasks;
- Complete basic data transformation tasks using appropriate software (e.g. Microsoft solutions, R, Stata, SPSS, SAS, Python) under supervision
- Provide support for the creation of metadata files

Data analysis	Competency domain: **Descriptive analysis**

Novice Practitioner

KNOWLEDGE REQUIRED

Be able to describe or explain:

- Basic statistical concepts of central tendency (e.g. average, median, mode), dispersion (e.g. standard deviation) and disease frequency (e.g. per cent, rate, ratio, prevalence, incidence) for the description of quantitative data
- The most appropriate choice of graph/figure (e.g. bar chart, pie chart, line graph, map) for each data element or indicator, including the reasoning behind the selection.
- Basic interpretations of data visualisations with one or two layers of data information (e.g. rendering an indicator as three line graphs - representing total, male and female populations - over time can highlight patterns between sexes that an aggregated graph cannot)
- The data elements and indicators, especially relevant key performance indicators, in a given workstation, and the correct statistical techniques to calculate them (e.g. The SDG indicator for prevalence of current tobacco use should be age-standardized, denominator of vaccination coverage should be target population and not always the entire population in country, etc.)
- The different types of statistical tables and the situations where they may be useful (e.g. 2x2 table for false positivity rates).
- Potential data quality issues, such as the concept of outliers, data quality and statistical inconsistencies, and how they affect the results of descriptive analysis

continued

Data analysis	Competency domain: **Descriptive analysis**
Novice Practitioner	**SKILLS REQUIRED** *Be able to do the following:* • Implement content analysis, narrative interviewing and assist with the analysis from a qualitative data collection. • Identify and extract key messages and findings from a given descriptive analysis exercise. • Complete a basic central tendency (statistical) analysis exercise (e.g. calculate average, median, mode), dispersion (e.g. standard deviations), and disease frequency (e.g. per cent, rate, ratio, prevalence, incidence, etc.) for description of quantitative data. • Complete a basic qualitative analysis exercise for a given situation using (e.g. observations, textual or visual analysis of books or videos, key informant interviews and focus group discussions • Complete a basic data visualisation task with one or two layers of data information (e.g. three-line graphs to show trend of indicator over time between total, male and female populations using MS Excel). • Select and apply the most appropriate choice of graphs/ figures for each data element and explain the reasoning • Complete a basic descriptive analysis task (typically collation, summarization, aggregation, structuring, and organisation of data using appropriate techniques • Visualise and present findings in a logical, coherent and meaningful way appropriate to a given use case • Select and apply the most appropriate data elements and indicators, especially relevant key performance indicators, and use the correct statistical techniques to calculate them. • Create various types of statistical tables and select the situations where they may be most usefully applied • Recognise and detect data quality issues such as outliers, data quality and statistical inconsistencies and identify how they affect the results of a descriptive analysis process

Data analysis	Competency domain: **Diagnostic analysis**
Learner-beginner	**KNOWLEDGE REQUIRED** *Be able to describe or explain:* • The fundamentals and basic methods of diagnostic analytics **SKILLS REQUIRED** • Skills not required at this level

Data analysis	Competency domain: **Predictive analysis** –Not a required competency–

Data analysis	Competency domain: **Prescriptive analysis** –Not a required competency–

Data usage	Competency domain: **Data interpretation/conclusion**
Novice Practitioner	**KNOWLEDGE REQUIRED** *Be able to describe or explain:* • The various basic data types, terms, methods used and analysed in the results and how each method is applied in practice • Why and how the coding process (from raw data to initial results generated) is used. • The meaning and application of key terms used in the process of forming conclusions (Ex: inductive and deductive reasoning, premise, hypothesis, supposition, and inference, etc) **SKILLS REQUIRED** *Be able to do the following:* • Identify the basic data types, terms, methods used and analysed in the results • Apply each of the above (types, terms, methods) in practical contexts • Interpret and draw basic conclusions based on the data results including data points, text, graphs, charts and maps.
Data usage	Competency domain: **Data integration** **–**Not a required competency–
Data usage	Competency domain: **Data presentation and reporting**
Independent practitioner	**KNOWLEDGE REQUIRED** *Be able to describe or explain:* • The core concepts of data presentation and reporting (i.e. the key factors that determine the content and structure of a presentation/report – purpose, objectives, context, audience needs and expectations), including which format, tools and techniques are most appropriate for both standard and non-standard presentations and reports • The appropriate criteria to be used to determine the contents of a standard presentation/report • The core principles of integrity in data reporting and how to apply them in practice. • How the various content selection criteria would be applied in different standard or non-standard presentation and reporting scenarios. • The criteria and/or principles for assessing the quality of ap presentation or report • How to examine data presentation and reporting (i.e. identify and explain weaknesses in the content, structure and format that could result in suboptimal understanding of the conclusions being presented) • How to ensure data integrity in preparing and presenting data (i.e. recognize bias, data fabrication, manipulation, misrepresentation, or falsification).

Data usage	Competency domain: **Data presentation and reporting**
Independent practitioner	**SKILLS REQUIRED** *Be able to do the following:* - Identify whether the core concepts of data presentation and reporting are evident and presented in a standard report/presentation. - Identify whether or not the appropriate content selection criteria have been applied in a particular case. - Identify whether core integrity principles have been applied in a particular report/presentation. - Demonstrate the practical application of content selection in different standard and non-standard report situations - Apply quality assessment criteria and principles in practice to produce clear, logical, and relevant structures for presentations and reports - Select the most relevant and appropriate material to be used (and omitted) to present findings and conclusions explaining the rationale for selected material to different target audiences - Demonstrate the use and application of data integrity principles (existence of bias, data fabrication, data manipulation, misrepresentation, or falsification) in the preparation of reports and presentations - Deliver expertly and confidently – based on thorough preparation, data integrity and subject knowledge
Data usage	Competency domain: **Transfer to action-oriented recommendations** –Not a required competency–

5. ATTITUDES DIMENSION FOR THE PROVINCIAL HEALTH INFORMATION OFFICER AND MEDICAL RECORDS OFFICER COMPETENCY PROFILES

* Source: World Health Organization. Regional Office for the Western Pacific. (2023). Data management competency framework. WHO Regional Office for the Western Pacific. https://apps.who.int/iris/handle/10665/367502.

Beyond knowledge and skills, behaviours and mindsets which create an environment characterised by unity of purpose, integrity, respect and the pursuit of excellence are essential for long term sustainable capacity building. The Attitudes dimension of the Framework describes four attitudinal domains which direct the behaviour of employees towards professionalism.

Professionalism	Description
The attitudes, values, conduct and qualities that characterize or hallmark a professional person. Through their actions, professionals consistently demonstrate the qualities of competence, reliability, trustworthiness and integrity in their field of expertise. Being professional means keeping commitments, delivering high-quality work and consistently doing what it takes to demonstrate that you are a team player - being reliable, respectful, and competent.	

Domains	Demonstrated by the following observable behaviours while performing duties
Curiosity	• Continuously seeks to acquire new knowledge and skills. • Wants to know how things work and why things happen the way they do • Listens and observes attentively, questions intelligently and learns from experience and from others • Open to feedback and self-reflects on actions • Seeks to understand the essentials of new task or role • Demonstrates a strong appetite for learning and development • Strives to refine existing or acquire new skills
Commitment	• Reliable and dependable • Takes responsibility for own actions and holds self-accountable for results • Consistently delivers high-quality work output • Perseveres to deliver results in the face of obstacles and challenge • Proactively identifies ongoing professional development needs and close knowledge/skills gaps for self and others
Collaboration	• Communicates and collaborates openly with colleagues and partners. • Displays empathic behaviour towards others, respectful of differences in cultural and beliefs of others • Displays a willingness to help others in need • Listens actively and questions respectfully

Domains	Demonstrated by the following observable behaviours while performing duties
Compliance	• Engages with colleagues and wider stakeholders in honesty, sincerity and in good faith • Maintains neutrality from influences and pressures • Acts in the best interests of the organisation • Works diligently and take pride in own's work • Follows company policies and complies with procedures • Maintains excellent up to date work records, ensuring they are current, complete and accurate • Maintains confidentiality and integrity • Never takes advantage of position for personal gain • Declares any conflict of interest, real or perceived, immediately

ANNEX 1: OVERVIEW OF DOMAINS IN THE WORLD HEALTH ORGANIZATION DATA MANAGEMENT COMPETENCY FRAMEWORK

* Source: World Health Organization. Regional Office for the Western Pacific. (2023). Data management competency framework. WHO Regional Office for the Western Pacific. https://apps.who.int/iris/handle/10665/367502.

#	Domains	Definitions / Explanations
Competency area 1: data generation		
1	Data management planning	Data management planning is the process of delivering a formal written document (data management plan) that describes the process and methodology by which data will be created, collected and maintained throughout the lifecycle of a proposed survey, trial or research activity and beyond. Factors of relevance and concern include data source identification and validation, data quality assurance and control, selection of data types (primary, secondary, tertiary), appropriate collection methodology and data maintenance.
2	Data creation	Data creation is the process of bringing data into the realm of (human) access in an organized format for collection, analysis and interpretation. This can be achieved by means of quantitative and/or qualitative processes (e.g. questionnaires, observational studies) and approved methods of academic and scientific enquiry and examination. In HIS, this step is normally called recording using a registry (e.g. facility logbook, patient form, community health logbook) and can be done in the form of a manually prepared document or captured from the source using a data capture device, such as a barcode reader.
3	Data collection – including sourcing	Data collection is the process of gathering data of interest in an established systematic fashion that enables answers to be found to stated questions, to test hypotheses and to evaluate outcomes. Data sourcing is the process of identifying, extracting and using data from different (often multiple) internal and/or external sources to serve specific purposes.
4	Data maintenance	Data maintenance is concerned with setting standards for how data will be gathered, organized, stored and curated post capture and with ensuring these standards are met consistently, regardless of whether the storage is paper based or electronic. Data maintenance covers aspects such as organizing, coding, storing, preserving, archiving and sharing and raises inherent issues such as data sensitivity, security protection and data integrity.
Competency area 2: data processing		
5	Data entry	Data entry is the mechanical process of direct entry and/or transcribing data records (often from paper-based sources) and/or audio into a data management system by means of keyboard entry or other technological processes.
6	Data cleaning	Data cleaning is the process of examining data to identify blemishes in datasets (e.g. wrong characters, incorrect spacing and incomplete, inaccurate, incorrect, inconsistent, irrelevant or unreliable data in a dataset) and then correcting, restoring or removing the offending data prior to processing.
7	Data validation	Data validation consists of a series of documented data tests to ensure the validity (i.e. relevance, appropriateness, reliability, sourcing) and suitability of the data being reviewed.
8	Data verification	Data verification is the process of checking data to ensure and confirm by examination and provision of objective evidence that the data being reviewed are accurate, reliable and precise to the necessary level of detail and are consistent with data quality standards expected (i.e. that specified requirements have been fulfilled).
9	Data transformation	Data transformation is the process of changing the format, structure or values of data with the purpose of making the data more clear, accurate, usable and useful.

#	Domains	Definitions / Explanations
Competency area 3: data analysis		
10	Descriptive analysis	Descriptive analysis is the process of using current and historical data to identify trends and relationships to provide meaningful information on current or recent events by converting raw data into a form and format that attempts to answer who, what, where and when questions. Descriptive analytics is the cornerstone of data analysis and the starting point for all data insights. It may provide the first ideas about the subject of the analysis, for example, counts of the age or sex of the cohort under study.
11	Diagnostic analysis	Diagnostic analysis deals with causality and thus generates and tests hypotheses that provide crucial information about why a trend or relationship occurred. It is concerned with the search for identifying and understanding causation versus correlation, hypothesis testing, proving assumptions, etc., such that the analysis delivers insights that are both non-obvious and value-added to the analysis process. An example could be hypothesizing and verifying whether the age or gender of the cohort under study is truly correlated with an outcome of interest.
12	Predictive analysis	Predictive analysis is the use of data and techniques to predict (or identify) the likelihood of future outcomes. Predictive analysis draws on past and current data and often uses comprehensive and sophisticated methods (e.g. statistical algorithms and machine learning techniques) to predict the likelihood of future outcomes. The goal is to provide a prediction of what will happen in the future. An example might be the use of age and sex as input variables to a model that calculates the likelihood of purchase behaviour to increase accuracy.
13	Prescriptive analysis	Prescriptive analysis mainly focuses on the process of using data to determine an optimal course of action. It is the most advanced, sophisticated and challenging analytical domain. Prescriptive analysis combines the outcomes from the other three analytical domains and factors in information about available resources, past and current performance, possible situations and wider environmental factors, and applies them to the process of decision-making, to assist decision-makers in determining the optimum solution from a variety of available options. This is a complex and highly specialized type of analytics, the expertise for which is most commonly found in companies and organizations that provide specialist, third-party commercial services in this domain. An example might be the use of age and sex of all users of a social media site as input variables to an algorithm that maximizes watch time and engagement.
Competency area 4: data usage		
14	Data interpretation/ conclusion	Data interpretation is the process of reviewing results of data analysis, making inferences, assigning meaning to the findings and producing actionable insights from which accurate and appropriate conclusions can be drawn. Conclusion is the process of summarizing key information points and arriving at a final judgement (on an issue) based on reasoning from facts, logic and evidence of the data provided.
15	Data integration	Data integration is the process of combining data from several disparate, heterogeneous sources into a coherent data framework to retain and support a consolidated perspective of the information gathered and obtain a rounded quantitative and/or qualitative impression of the overall effect of a particular intervention (or variable) on a defined outcome with the objective of deriving actionable insights. Data integration can consolidate all kinds of data—structured, unstructured, batch and streaming—to do everything from basic querying of inventory databases to complex predictive analytics.
16	Data presentation and reporting	Data presentation and reporting is the process of collecting unprocessed data from different sources and, by use of both narrative and graphical tools, techniques and formats, converting that data into meaningful information that provides valuable insights and enable informed decision-making.
17	Transfer to action-oriented recommendations	Transfer to action-oriented recommendations is the process of transferring evidence-derived knowledge into ethically sound, action-oriented recommendations. The focus is on the characteristics of the recommendations, which should give direction to the subsequent actions. Specific, measurable, achievable, relevant and time-bound (SMART) criteria can be used to estimate the quality of action-oriented recommendations.

Notes