



Routine Health Information Systems

A Curriculum on Basic Concepts and Practice

Facilitators' Guide

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UiO : University of Oslo



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MEASURE Evaluation

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ABBREVIATIONS

AEDES	European Agency for Development and Health
ANC	antenatal care
DHMT	district health management team
DHS	Demographic and Health Survey(s)
DQA	data quality assurance
DQR	data quality review
DTP	diphtheria, tetanus, and pertussis
EA	enterprise architecture
EMR	electronic medical record
HEW	health extension worker
HIE	health information exchange
HMN	Health Metrics Network
HIS	health information system(s)
HISP	Health Information Systems Program
HMN	Health Metrics Network
ICT	information and communication technology
INSP	National Institute of Public Health in Mexico
JSI	John Snow, Inc.
LMICs	low- and middle-income countries
LMIS	logistics management information system
LQAS	lot quality assurance sampling
MDG	Millennium Development Goal
M&E	monitoring and evaluation
MA4Health	Measurement and Accountability for Results in Health
MEASURE	Monitoring and Evaluation to Assess and Use Results
MOOC	massive open and online course
MPH	master's degree in public health
OBAT	Organizational Behavioral Assessment Tool
OHIE	Open Health Information Exchange
PBF	performance-based financing
PHFI	Public Health Foundation of India

PRISM	Performance of Routine Information System Management
PUID	patient unique identifier
QI	quality improvement
RDQA	routine data quality assessment
RHIS	routine health information system(s)
SDG	Sustainable Development Goal
SEARO	South-East Asia Regional Office
USAID	United States Agency for International Development
WHO	World Health Organization

INTRODUCTION

A strong health information system (HIS) that produces reliable, timely, and good-quality data is among several factors enabling health program managers to monitor, evaluate, and improve health system performance and make evidence-informed decisions. Since the 1990s, knowledge and understanding of the role of HIS development in global health systems have improved. Despite this, use of information for evidence-informed decision making—particularly data produced by routine health information systems (RHIS)—is still very weak in most low- and middle-income countries (LMICs).

What Are Routine Health Information Systems and Why Do They Matter?

Routine health information systems (also called health facility and community information systems) generate data at regular intervals (no longer than a year) that have been collected at public and private health facilities and institutions, as well as at community-level healthcare posts and clinics. Most of the data, which document health status, health services, and health resources, are gathered by healthcare providers as they go about their work, but supervisors and ongoing health facility surveys contribute information, as well.

Purpose, Audience, and Content of This Course

To improve RHIS and ultimately, health outcomes, a global group of experts developed this basic course on RHIS in 2015–2016 and pilot-tested it in New Delhi in June 2016. The course responds to an immense and urgent need to build the capacity of the health workforce in LMICs. Its purpose is to enhance participants' capacity to conceptualize, design, develop, govern, and manage an RHIS, and use the information the system generates to improve public health practice and service delivery.

The course addresses a broad spectrum of the health workforce: (1) policymakers and senior managers; (2) RHIS staff at national, intermediate, and facility levels; (3) care providers and health technicians; and (4) students in health sciences and practice. All participants should be engaged in or interested in performing tasks related to RHIS. The course can be delivered to any one of these target audiences or to a combination of them. (See this manual's appendix for contextualization guidelines suggesting how to tailor the course to specific audiences' needs.) The course is largely designed for classroom purposes, and therefore has no field experience component.

In this core course, students will study the design, implementation, and strengthening of RHIS, which is the most common source of information on health services management and programs. An RHIS also provides regular information for many core indicators of the national health strategy. Using practical case studies, participants will learn how to improve the performance of an RHIS, by producing reliable data to inform decisions at all levels of the health system. They will also come to understand the important contribution of information and communication technology (ICT).

This facilitators' guide is part of a package of training materials for the RHIS course. It explains how to present the modules outlined in the syllabus: a separate, shorter document that provides an overview of the course.

The course consists of 10 modules covering the key aspects of RHIS (see the list below). The total duration of the course is 60 hours—equivalent to two weeks of full-time teaching. Most modules are divided into sessions that typically take about three hours to complete. (For each three hours of class time, a 15-minute break should be scheduled.) At the start of each module, the facilitator will present that module's learning objectives and the suggested references. Students should read as many of the reference documents as possible before they attend a given session.

For each session within a module, the curriculum offers a set of learning objectives, a session plan, training methods and materials, and activities. This guide also provides details on how to present the training materials that constitute each module: PowerPoint presentations to guide plenary and small-group discussions and handouts (topical materials, case studies, and exercises).

Course Overview

Introduction to RHIS

Module 1: Health Systems and Health Information Systems (3 hours)

RHIS Data Generation

Module 2: Indicators and Data Collection and Reporting (6 hours)

Module 3: Data Management Standards for Routine Health Information Systems (3 hours)

Module 4: RHIS Data Quality (3 hours)

Module 5: RHIS Data Analysis (9 hours)

Module 6: RHIS Data Demand and Use (9 hours)

RHIS Management

Module 7: RHIS Governance and Management of Resources (6 hours)

Module 8: Information and Communication Technology for RHIS (6 hours)

RHIS Strengthening and Reform

Module 9: RHIS Performance Assessment (6 hours)

Module 10: RHIS Design and Reform (9 hours)

Teaching Methods

Course delivery is based on adult learning principles. A range of teaching methods, such as lectures, discussions, case studies, exercises, and group work, will be used to address the varying learning styles of course participants. Teaching methods are further detailed under each module.

Course Materials

The course materials are a digital copy of the course syllabus, this facilitators' guide, PowerPoint presentations, case studies, exercises, relevant RHIS tools, and additional reference materials. Course materials are further detailed under each module.

MODULE 1. HEALTH SYSTEMS AND HEALTH INFORMATION SYSTEMS

Module duration: 3 hours

Module Learning Objectives

By the end of this module, participants will be able to:

- Understand the essential link between the health system and the health information system
- Explain who needs health data, what type of data is needed, and how data could be used
- Describe the health data sources and give examples of each data source and its categories
- Describe the six components of a health information system, according to the Health Metrics Network (HMN) framework
- Define RHIS and its importance
- Describe what they will learn in this RHIS course

Suggested References

- International Health Partnership + Related Initiatives (IPH+) and World Health Organization (WHO). (2011). Monitoring, evaluation and review of national health strategies: A country-led platform for information and accountability. Geneva, Switzerland: WHO. Retrieved from http://www.who.int/healthinfo/country_monitoring_evaluation/documentation/en/
- Health Metrics Network. (2012). Framework and standards for country health information system development, 2nd edition. Geneva, Switzerland: World Health Organization. Retrieved from <http://www.hrresourcecenter.org/node/746>
- World Health Organization (WHO). (2007). Everybody's business: Strengthening health systems to improve health outcomes: WHO's framework for action. Geneva, Switzerland: WHO. Retrieved from <http://www.who.int/healthsystems/strategy/en/>
- World Health Organization, United States Agency for International Development, & University of Oslo. Health facility and community data toolkit. (2014). Retrieved from http://www.who.int/healthinfo/facility_information_systems/en/

Topics Covered

- Health system and health-system building blocks
- Health-system challenges
- Functions of a health system by levels: national, regional/district, health facility, community, and individual patient/client
- Information needs for each type of health system's function, and for managing, monitoring, and evaluating health-system inputs and processes, outputs, outcomes, and impact

- Sources of health information and their categorization
- Components of a health-information system, according to the HMN framework
- Introduction to RHIS course objectives and sessions

Teaching Methods

- Facilitator presentations
- Exercises and group work
- Presentations by participants
- Plenary discussions

Materials Needed

- PowerPoint presentation: Module 1, “Introduction to RHIS”
- Flip chart paper
- Markers
- Pens or pencils
- Projection equipment
- Handout 1.1.1: “The Health Challenge: Where Do We Stand?”—a speech by Margaret Chan, M.D., Director-General, World Health Organization (WHO)
- Handout 1.1.2: Matrix on management functions and information support

Session Plan

Time	Title and Description	Methods
30 minutes	<p>Activity 1. Icebreaker Exercise: Participants’ Introductions</p> <p>Each participant comes together with his/her neighbor to become acquainted and feel comfortable with each other. Later on they present each other in the plenary session.</p>	<p>Icebreaking game</p> <p>Relevant slides from Module 1 PowerPoint presentation</p>
45 minutes	<p>Activity 2. Health System Functions</p> <p>Review Handout 1.1.1: “The Health Challenge: Where Do We Stand?”</p>	<p>Review handout, discuss, and brainstorm</p> <p>Relevant slides from PowerPoint presentation</p>
30 minutes	<p>Activity 3. Health Information Needs</p> <p>Engage participants in reviewing and discussing health system functions and information needs for each type of health system function</p> <ul style="list-style-type: none"> • Information needs for managing health inputs and processes 	<p>Relevant slides from PowerPoint presentation</p> <p>Small-group work</p>

	<ul style="list-style-type: none"> Information needs for monitoring, evaluation, and review of health outputs, outcomes, and impacts 	
30 minutes	Activity 4. Data Sources of Health Information Brainstorming and discussion	Relevant slides from PowerPoint presentation Large-group discussion
30 minutes	Activity 5. Components of a Health Information System Brainstorming and discussion	Brainstorming Relevant slides from PowerPoint presentation
15 minutes	Activity 6. Introduction to RHIS Course Objectives and Modules Present and explain	Relevant slides from PowerPoint presentation Questions, answers, and discussion

Session Activities

Activity 1. Icebreaker Exercise: Participants' Introductions (30 minutes)

Participants and facilitators introduce themselves to their neighbor for 10 minutes. They come up with answers to each of the following questions:

- What is your current organizational affiliation and function?
- Are you familiar with your country's RHIS? If so, do you have a particular role in it?
- What do you expect to learn from this course?
- If we all were animals, which animal would you prefer to be?

All come back together for a plenary session. Each participant is now introduced to the group by his or her neighbor through short answers to the questions.

The facilitator writes the answers on flip chart pages that will remain exhibited on the wall for the duration of the course.

The facilitator ends this introductory activity and starts the Module 1 PowerPoint presentation.

Activity 2. Health Systems and Their Functions: Review "Health Challenges in Today's World" (45 minutes)

Facilitator presents the slide that provides instructions for Activity 1.

All participants review Handout 1.1.1. Participants write various health challenges on a sheet of paper. (15 minutes)

The facilitator leads a discussion with the participants, who use the list of challenges to identify major themes for strengthening the health system. The facilitator shows the relevant slides from the PowerPoint presentation and engages participants in discussion. Are they familiar with the WHO framework on the six building blocks? (30 minutes)

Activity 3. Health Information Needs: Small-Group Work (30 minutes)

The facilitator shows the next slides and engages participants in discussions on the relationship between health system functions and information needs. The facilitator then presents the matrix on management functions and information support for the small-group work.

Participants break into small groups of two (each pairs up with a neighbor) to select one or two functions at each management level. The facilitator encourages the participants to identify information needs for each of the selected functions at each level and fill in the matrix.

The facilitator shows the slide that summarizes the discussion, highlighting how the information needs can be broadly categorized to manage, monitor, and evaluate health inputs and processes, outputs, outcomes, and impact.

Activity 4. Data Sources of Health Information: Large-Group Discussion (30 minutes)

The facilitator helps participants group the information needs listed in Activity 3 by the sources of health information available to meet the information needs of the health system functions. Participants discuss how to categorize the information needs and information resources, marking the information source (population or institution, routine or nonroutine) against each information need posted on the matrix from the previous activity. The facilitator shows the next relevant slides and relates them to the participants' work, discussing and explaining as needed.

Activity 5. Components of a Health Information System: Brainstorming and Discussion (30 minutes)

The facilitator helps the participants to brainstorm about and discuss components of the health information system, and to organize them according to the Health Metrics Network (HMN) framework and/or the WHO Health Facility Information System Resource Kit.

The facilitator explains differing perspectives on HIS components. Then the facilitator presents the definition, classification, and importance of RHIS as part of the national HIS, and the performance criteria of a well-functioning RHIS.

Activity 6. Introduction to RHIS Course Objectives and Modules (15 minutes)

- The facilitator shows the last slides from the PowerPoint deck for this module and explains:
 - The purpose of the course
 - Target audience
 - Course modules
- The facilitator explains that the course is designed to provide basic knowledge of HIS core competencies and that the course does not attempt to build participants' skills in those competencies. That is a task for another, advanced course.
- The facilitator further questions the participants if their expectations (as posted on the wall in Activity 1) correspond to the purpose and content of the course as presented.

MODULE 2. INDICATORS AND DATA COLLECTION AND REPORTING

Module duration: 6 hours; 2 sessions

Module Learning Objectives

By the end of this module, participants will be able to:

- Define and identify key health indicators
- Define key data-collection concepts:
 - Data
 - Data elements
- Name the major steps in planning data collection
- Map data flows and identify who is responsible for using different types of tools to collect data
- Identify several tools for data collection and reporting
- Identify methods of collecting routine health data and related data
- Identify challenges in collecting the data and how to overcome them
- Explain gender-sensitive data and sex- and age-disaggregated data and their links to data-collection tools

Suggested References

- World Health Organization. (2015). Global reference list of 100 core health indicators. Retrieved from <http://www.who.int/healthinfo/indicators/2015/en/>
- Heywood, A. & Boone, D. (2015). Guidelines for data management standards in routine health information systems. Chapel Hill, NC, USA: MEASURE Evaluation, University of North Carolina. Retrieved from www.cpc.unc.edu/measure/publications/ms-15-99
- Lippeveld, T., Sauerborn, R., & Bodart, C. (2000). Design and implementation of health information systems (pp. 88–113). Geneva, Switzerland: World Health Organization. Retrieved from <http://apps.who.int/iris/handle/10665/42289>

Sessions

- Session 1. Indicators (1 hour, 30 minutes)
- Session 2. Data Collection and Reporting Tools (4 hours, 30 minutes)

SESSION 1. INDICATORS

Session duration: 1 hour, 30 minutes

Session Learning Objectives

By the end of this session, participants will be able to:

- Define and identify relevant health indicators
- Cite five characteristics of good indicators
- Identify factors to consider while selecting indicators
- Give examples of good indicators

Topics Covered

- Information needs and indicators
- What is an indicator
- Characteristics of good indicators
- Factors to consider when selecting indicators
- Indicator metrics
- How many indicators are enough

Teaching Methods

- Facilitator presentations
- Exercise and group work
- Plenary discussion

Materials Needed

- PowerPoint presentations: Module 2, “Introduction”; Session 1, “Indicators”
- Writing board or large pad of display paper and an easel
- Markers
- Pens or pencils
- Poster paper for sticky notes
- Handout 2.1.1: Sample Indicator Reference Sheet
- Handout 2.1.2: Change in Indicators over Time
- Handout 2.1.3: Core Indicators for Routine Health Management Information Systems (based on the World Health Organization’s *Global List of 100 Core Health Indicators*)
- Projection equipment

Session Plan

Time	Title and Description	Methods
60 minutes	<p>Introduce the Module</p> <p>Information Needs and Indicators</p> <ul style="list-style-type: none"> • Define indicators, types of indicators, and measurement • Present the characteristics of a good indicator (five characteristics, with examples) • Present factors to consider when selecting indicators • Explain the link between indicators and data collection, data aggregation, and reporting tools 	<p>Lecture, presenting all PowerPoint slides for Module 2's introductory slide deck and for the module's Session 1 slide deck ("Indicators")</p> <p>Discussion</p> <p>Handout 2.1.1</p>
30 minutes	<p>Activity 1. Change in Indicators over Time</p> <p>Read and discuss this handout</p>	<p>Small group discussion</p> <p>Handout 2.1.2</p>

Session Activity

Activity 1. Change in Indicators over Time (30 minutes)

- Participants read the handout on their own
- Discuss in plenary

SESSION 2. DATA COLLECTION AND REPORTING TOOLS

Session duration: 4 hours, 30 minutes

Session Learning Objectives

By the end of this module, participants will be able to:

- Define key data-collection concepts
 - Data
 - Data elements
 - Information
 - Knowledge
- Describe different sources of RHIS data
- Identify different data-collection tools for RHIS data
- Identify methods of collecting routine health data
- Select the correct data source and data-collection tools for obtaining needed RHIS data to manage a health program
- Understand how data collection is closely linked to the predefined indicators

Topics Covered

- Overview of data collection
- Methods of collecting routine health and related data: patient/client data, health-services data, resource data (infrastructures, human resources, commodities, and finance)
- Types of data and tools for collecting data
 - Patient or client data
 - Primary healthcare facility data
 - Community-based data
 - Hospital data
 - Resource data (human resources, commodities, finance, and infrastructure)
- Data aggregation
- Data flow
- Data reporting and transmission
- Tools for data reporting
 - Monthly or quarterly reporting forms
 - Semiannual and annual reporting

Teaching Methods

- Group discussion
- Lecture

Materials Needed

- PowerPoint presentation: Session 2, “Data Collection and Reporting Tools”
- Projection equipment
- Large pad of paper, poster board, or writing board and an easel
- Marking pens
- Pens or pencils
- Samples of data-collection and reporting tools
- Instructions for group discussion and exercises
- Handout 2.2.1: “Class Activity 1: Case Study on Data Sources and Collection Tools”
- Handout 2.2.2a: Sample Generic Maternal Health Card and Instructions
- Handout 2.2.2.b: Sample Generic HIV Care and Treatment Data Collection Tools and Instructions
- Handout 2.2.3a: Sample of Data Aggregation and Reporting Tools and Instructions
- Handout 2.2.3b: Sample Generic HIV Cross-Sectional Reporting Tool and Instructions
- Handout 2.2.4a: Exercise: Linking Indicators to Data Collection Instruments
- Handout 2.2.4b: HMIS Indicator Definitions (Ethiopia)
- Handout 2.2.4c: HMIS Procedures Manual (Ethiopia)
- Handout 2.2.5: Constructing a Data Flow Chart

Session Plan

Time	Title and Description	Methods
60 minutes	<p>Activity 1. Data Collection</p> <p>Present and discuss in small groups</p> <p>Overview of Data Collection</p> <ul style="list-style-type: none"> • Definition of data collection • Highlight data collection as a core component of RHIS • Types of data to be collected: <ul style="list-style-type: none"> ○ Patient/client data ○ Primary healthcare-facility data ○ Community data ○ Hospital data • District-level data 	<p>Lecture</p> <p>Present relevant PowerPoint slides</p> <p>Handout 2.2.1: Case Study on Data Sources and Collection Tools</p>

15 minutes	Break	
30 minutes	<p>Tools for Collecting Data</p> <ul style="list-style-type: none"> • Methods of collecting data: quantitative versus qualitative • Type of data collection, aggregation, and reporting tools • Paper-based versus electronic medical records • Describe the methods of collecting RHIS data and types of data collected 	<p>Lecture</p> <p>Present relevant PowerPoint slides</p> <p>Discussion</p> <p>Handout 2.2.2a: Sample Generic Maternal Health Card and Instructions</p> <p>Handout 2.2.2.b: Sample Generic HIV Care and Treatment Data Collection Tools and Instructions</p>
60 minutes	<p>Activity 2. Linking Indicators to Data Collection and Reporting Tools</p> <p>Present and discuss</p> <p>Data Aggregation and Reporting</p> <ul style="list-style-type: none"> • Review the process of collation and aggregation of patient and other types of data • Discuss various reporting formats that could be generated based on the national guidelines and data-reporting requirements • Types of reporting <ul style="list-style-type: none"> ○ Monthly ○ Quarterly ○ Semiannually/annually 	<p>Lecture</p> <p>Present relevant PowerPoint slides</p> <p>Discussion</p> <p>Handout 2.2.3a: Sample of Data Aggregation and Reporting Tools and Instructions</p> <p>Handout 2.2.3b: Sample Generic HIV Cross-Sectional Reporting Tool and Instructions</p> <p>Group work</p> <p>Handout 2.2.4a: Exercise: Linking Indicators to Data Collection Instruments</p> <p>Handout 2.2.4b: HMIS Indicator Definitions (Ethiopia)</p> <p>Handout 2.2.4c: HMIS Procedures Manual (Ethiopia)</p>
15 minutes	Break	

45 minutes	<p>Activity 3. Constructing a Data Flow Chart</p> <p>Present and discuss in small groups</p> <p>Data Flow</p> <ul style="list-style-type: none"> • Review data-collection tools • On the poster paper provided, graphically map the data-collection and reporting system to describe and communicate how it works, drawing arrows between each instrument to suggest data flow 	<p>Lecture</p> <p>Present relevant PowerPoint slides</p> <p>Small-group exercise</p> <p>Handout 2.2.5: Constructing a Data Flow Chart</p>
45 minutes	<p>Activity 4. Challenges in RHIS Data Collection and Reporting</p> <p>Present and discuss</p>	<p>Brainstorming and group discussion and summary</p> <p>Present relevant PowerPoint slides and conclude the session</p>

Session Activities

Activity 1. Exercise on Data Collection (1 hour, 30 minutes)

- After presenting the slides on data collection, the facilitator reads the speaker note on the slide that explains the small-group work.
- Facilitator distributes Handout 2.2.1—“Case Study on Data Sources and Collection Tools”—and organizes the participants in small groups.
- Facilitator asks participants to review the case study of Country A and tell their groups the process of data collection, based on their wealth of experience in managing RHIS. Thus, all participants will become facilitators for this session.
- Facilitator asks the participants to answer the four questions in the handout, based on their reading of the case study.
- Facilitator asks a member of one group to present the answer to the first question and invites the other groups to add details they think are missing. Continue in this way until the five questions are answered and each group has a chance to contribute.
- Facilitator then presents the slides on data collection methods and tools.

Activity 2. Linking Indicators to Data Collection and Reporting Tools (1 hour)

- After presenting the slides introducing data aggregation and reporting, the facilitator reads the slide that provides instruction on Activity 2’s small-group work: Linking Indicators to Data Collection and Reporting.
- Participants will be given the HMIS Indicator List and HMIS Procedures Manual of Ethiopia and will be asked to do the following:
 - Study both documents and give their opinion of the strengths and weaknesses of the

content and format of these documents.

- For the following indicators, identify the data collection and reporting instruments as listed in the HMIS Procedures Manual.
 - C1.1.1.7 Early postnatal care coverage
 - C1.1.3.1 DPT1-HepB1-Hib1 immunization coverage
 - C1.4.2.2.7 Lost-to-follow-up rate among all forms of TB cases
 - P1.4 Average length of stay

Activity 3. Exercise on Constructing a Data Flow Chart (45 minutes)

- Facilitator asks participants to form small groups.
- Facilitator asks each group to draw a map of the data-collection and reporting system for its Country X, Y, and Z, as explained in Handout 2.2.5.
- Facilitator instructs participants to assume that country health service delivery follows the facility, district, regional, and national levels.
- Facilitator reviews each group's map of the flow of data through the system, highlighting key issues relating to data management mentioned or not mentioned.

Activity 4. Exercise on Challenges in RHIS Data Collection and Reporting (45 minutes)

- Facilitator divides participants into small groups to generate a list of key challenges to consider, or this can be done as a brainstorming exercise in plenary.
- For each identified challenge, the facilitator tries to help participants find a consensus on how it would be addressed effectively.
- Facilitator summarizes responses and consensus in plenary group and concludes the discussion.
- Facilitator concludes the session by presenting the rest of the PowerPoint Slides.

MODULE 3. DATA MANAGEMENT STANDARDS FOR ROUTINE HEALTH INFORMATION SYSTEMS

Module duration: 3 hours; 3 sessions

Module Learning Objectives

At the end of this module, participants will be able to:

- Appreciate the importance of good RHIS data management practices
- Describe data management needs for the three management levels of a health system
- Understand what structures and processes allow for good data management
- Understand when and how the standards are to be applied to local systems
- Explain the harmonized standards for health facility-based and community-based information systems and their different domains and subdomains
- Understand how the harmonized standards can improve data quality and use
- Understand the causes of RHIS data fragmentation
- Understand the key principles of RHIS data integration and interoperability

Suggested References

- Heywood, A. & Boone, D. (2015). Guidelines for data management standards in routine health information systems. Chapel Hill, NC, USA: MEASURE Evaluation, University of North Carolina. Retrieved from www.cpc.unc.edu/measure/publications/ms-15-99
- World Health Organization (WHO), United States Agency for International Development, & University of Oslo. (2015). Analysis of health facility data: Guidance for managers and analysts [Draft]. Geneva, Switzerland: WHO. Retrieved from <http://www.measureevaluation.org/his-strengthening-resource-center/resources/health-facility-data-analysis-guidance-who>

Sessions

- Session 1: Introduction to RHIS Data Management (30 minutes)
- Session 2: Standards for RHIS Data Management (1 hour, 45 minutes)
- Session 3: Data Integration and Interoperability (45 minutes)

SESSION 1. INTRODUCTION TO RHIS DATA MANAGEMENT

Session duration: 30 minutes

Session Learning Objectives

At the end of this session, participants will be able to:

- Appreciate the importance of good RHIS data management practices
- Describe data-management needs of the three RHIS management levels
- Describe data-management standards
- Understand how a standards-based approach to RHIS data-management can improve RHIS performance (and help create a culture of information)

Topics Covered

- Introduction to RHIS data management
- Data-management needs of the different RHIS management levels
- Overview of data management standards, themes, and guidelines

Teaching Methods

- Lecture
- Group/plenary discussion

Materials Needed

- PowerPoint presentations: Module 3, “Introduction”; Module 3, Session 1, “Introduction to RHIS Data Management”
- Handout 3.1.1: “Guidelines for Data Management Standards in Routine Health Information Systems”
- Projection equipment
- Large pad of paper or writing board and an easel
- Markers
- Pens or pencils

Session Plan

Time	Title and Description	Methods
30 minutes	<p>Activity 1. Introduction to RHIS Data Management Present and discuss:</p> <ul style="list-style-type: none"> • Importance of good data-management practices • Data-management needs at the different RHIS management levels • Overview of RHIS data-management standards 	Lecture, presenting all PowerPoint slides in Module 3's introductory slide deck and in the module's Session 1 slide deck ("Introduction to RHIS Data Management"), followed by plenary discussion

Session Activities

Activity 1. Introduction to RHIS Data Management (30 minutes)

- The facilitator presents the Module 3, Session 1 PowerPoint slides introducing RHIS data management and responds to questions.

SESSION 2. STANDARDS FOR RHIS DATA MANAGEMENT

Session duration: 1 hour, 45 minutes

Session Learning Objectives

At the end of this session, participants will be able to:

- Understand the importance of having standards for RHIS data management
- Understand when and how the standards are to be applied to local systems
- Explain the domains and subdomains of the standards
- Explain the harmonized RHIS data management standards
- Understand how the harmonized standards can improve RHIS performance (i.e., data quality and use)

Topics Covered

- Domains and subdomains used to organize the standards
- Harmonized standards for RHIS data management

Teaching Methods

- Lecture
- Group/plenary discussion
- Small-group activity

Materials Needed

- Module 3, Session 2 PowerPoint presentation: “RHIS Data Management Standards”
- Handout 3.2.1: “Harmonized RHIS Data Management Standards”
- Handout 3.2.2: “Exercise 1: Country Study on Rapid Assessment of RHIS Data Management Standards”
- Handout 3.2.3: “Exercise 1: Data Sets”
- Projection equipment
- Large pad of display paper or a writing board and an easel
- Markers
- Pens or pencils

Session Plan

Time	Title and Description	Methods
30 minutes	Activity 1. Standards for RHIS Data Management Present and discuss: <ul style="list-style-type: none"> • Process and sources used to identify the standards • Different standard domains and subdomains • Harmonized standards for RHIS data management • How the harmonized standards can improve RHIS performance (data quality and data use) 	PowerPoint presentation followed by plenary discussion
60 minutes	Activity 2. Group Exercise on Rapid Assessment of Harmonized Standards for RHIS Data Management	Group work followed by group presentations in plenary
15 minutes	Break	

Session Activities

Activity 1. Standards for RHIS Data Management (30 minutes)

- The facilitator presents the Module 3, Session 2 PowerPoint slides on information system standards and responds to questions.

Activity 2. Group Exercise on Harmonized Standards for RHIS (1 hour)

The facilitator divides participants into four groups and assigns each group one level of the health information system: national, subnational (other), district, or service delivery point.

- The facilitator draws from the packet of materials in Handout 3.2.3 to distribute the completed RHIS Rapid Assessment Tool Results for a fictitious country and instructs each group to go through the results (each group with a different level) of the assessment and identify areas that do not meet the global standard.
 - List problematic standards.
 - Suggest interventions to improve the standard.
- Each group will have 30 minutes to analyze the data and list problem areas and interventions.
- Each group will have 5 minutes to present results.
- Give the groups 10 minutes for discussion.

SESSION 3. DATA INTEGRATION AND INTEROPERABILITY

Session duration: 45 minutes

Session Learning Objectives

At the end of this session, participants will:

- Understand the causes of RHIS data fragmentation
- Know what integration and interoperability mean in the context of RHIS
- Understand the key principles for RHIS data integration
- Be familiar with some country examples of systems interoperability

Topics Covered

- Data fragmentation, integration, and interoperability
- Principles of RHIS data integration
- Country examples of data interoperability

Teaching Methods

- Lecture
- Group/plenary discussion
- Small-group work

Materials Needed

- Module 3, Session 3 PowerPoint presentation: “Data Integration and Interoperability”
- Projection equipment
- Large pad of display paper and stand
- Markers
- Pens or pencils

Session Plan

Time	Title and Description	Methods
45 minutes	Activity 1. Data Integration and Interoperability Present and discuss: <ul style="list-style-type: none">• Causes of data fragmentation• Principles of data integration• Country examples of data integration	PowerPoint presentation followed by plenary discussion

Session Activities

Activity 1. Data Integration and Interoperability (45 minutes)

The facilitator first questions the participants on possible causes of fragmentation of the health system. The facilitator asks participants to write down three causes of fragmentation and then questions them in plenary session.

The facilitator then presents the Module 3, Session 3 PowerPoint slides on data integration and interoperability and responds to questions.

MODULE 4. RHIS DATA QUALITY

Module duration: 3 hours; 3 sessions

Most materials in this module are extrapolated from a more in-depth toolkit on data quality for program managers and monitoring and evaluation officers (see the last reference cited in the list below). The data quality review framework and metrics proposed in this module are recommended by the World Health Organization (WHO) and partners as a standard for assessing data quality.

Module Learning Objectives

At the end of this module, participants will be able to:

- Identify the main causes of poor data quality
- Understand the data-quality conceptual framework
- Explain different dimensions of data quality
- Identify the roles and responsibilities of the three RHIS management levels in maintaining data quality
- Define, calculate, and interpret data-quality metrics
- Understand what data triangulation is and how it can strengthen analysis and information use
- Differentiate the commonly used tools and methods for assessing data quality
- Understand how to integrate data-quality assurance into routine supportive supervision
- Understand the value of monitoring and using data-quality assessment results over time

Suggested References

- Heywood, A. & Boone, D. (2015). Guidelines for data management standards in routine health information systems. Chapel Hill, NC, USA: MEASURE Evaluation, University of North Carolina. Retrieved from www.cpc.unc.edu/measure/publications/ms-15-99
- MEASURE Evaluation. (n.d.) PRISM: Performance of routine information system management framework [Website]. Retrieved from <http://www.cpc.unc.edu/measure/tools/monitoring-evaluation-systems/prism>
- MEASURE Evaluation. Routine data quality assessment tool (RDQA) [Website]. Retrieved from <http://www.cpc.unc.edu/measure/tools/monitoring-evaluation-systems/data-quality-assurance-tools>
- World Health Organization (WHO). (2015). Data quality review (DQR): A toolkit for facility data quality assessment, Version 1.0. Geneva, Switzerland: WHO.

Sessions

- Session 1: Introduction to Data Quality (40 minutes)
- Session 2: Data Quality Metrics (1 hour, 30 minutes)
- Session 3: Data Quality Assurance (50 minutes)

SESSION 1. INTRODUCTION TO DATA QUALITY

Session duration: 40 minutes

Session Learning Objectives

At the end of this session, participants will be able to:

- Understand the data-quality conceptual framework
- Explain the dimensions of data quality
- Know what each RHIS management level can do to ensure data quality
- Identify and distinguish the main types of data quality problems

Topics Covered

- Definition of data quality
- Link between data quality and quality assurance
- Data-quality conceptual framework
- Dimensions of data quality
- Common threats to data quality

Teaching Methods

- Lecture
- Group/plenary discussion
- Small-group work

Materials Needed

- PowerPoint presentations: Module 4, “Introduction”; Module 4, Session 1, “Introduction to Data Quality”
- Projection equipment
- Large pad of display paper and an easel
- Markers
- Pens or pencils

Session Plan

Time	Title and Description	Methods
20 minutes	<p>Activity 1. Introduction to Data Quality</p> <p>Present and discuss:</p> <ul style="list-style-type: none"> • Data quality conceptual framework • Dimensions of data quality • Common threats to data quality 	Lecture, presenting all PowerPoint slides in Module 4's introductory slide deck and in the module's Session 1 slide deck ("Introduction to Data Quality"), followed by plenary discussion
20 minutes	<p>Activity 2. Group Exercise on Causes of Poor Data Quality and Actions to Improve Data Quality</p>	Small-group exercise followed by plenary discussion

Session Activities

Activity 1. Introduction to Data Quality (20 minutes)

The facilitator presents the Module 4, Introduction PowerPoint slides and the Module 4, Session 1 slides and responds to questions.

Activity 2. Group Exercise on Causes of Poor Data Quality and Actions to Improve Data Quality (20 minutes)

Participants identify and discuss what causes poor data quality and what actions can lead to improved data quality:

- The facilitator organizes participants in small groups of five to six people.
- The facilitator instructs each group to identify the five most common challenges that they think affect data quality. For each challenge, participants should propose actions that will lead to improvements in data quality.
- Give the groups 15 minutes to discuss.
- In plenary, ask the first group to present their list of challenges and proposed solutions. Ask each subsequent group to add additional items that have not already been mentioned by the preceding group.

SESSION 2. DATA QUALITY METRICS

Session duration: 1 hour, 30 minutes

Session Learning Objectives

At the end of this session, participants will be able to:

- Understand the following data-quality performance metrics:
 - Completeness and timeliness
 - Internal consistency
 - External consistency
 - External comparisons
- Know how to calculate and interpret data-quality metrics
- Understand what data triangulation is and how it can strengthen analysis and information use

Topics Covered

- Data-quality metrics, with examples
- Measurement and analysis of data-quality metrics
- Data triangulation

Teaching Methods

- Lecture
- Group/plenary discussion
- Case study

Materials Needed

- Module 4, Session 2 PowerPoint presentation: “Data Quality Metrics”
- Handout 4.2.1: “Case Study: Data Verification and Reporting Performance”
- Handout 4.2.2: “Solutions to Case Study 4.2.1”
- Projection equipment
- Large pad of display paper and an easel
- Markers
- Pens or pencils

Session Plan

Time	Title and Description	Methods
30 minutes	<p>Activity 1. Data Quality Metrics Present and discuss:</p> <ul style="list-style-type: none"> • Data-quality metrics: how to calculate, interpret, and analyze • Accuracy and verification factor • Completeness of reports • Completeness of indicator data • Timeliness • Internal consistency <ul style="list-style-type: none"> ○ Outliers ○ Trends ○ Consistency between related indicators • External consistency <ul style="list-style-type: none"> ○ Comparison with survey results (data triangulation) ○ Consistency of population data • Triangulation of data to evaluate consistency/reliability 	Present Module 4, Session 2 PowerPoint slides (“Data Quality Metrics”) and conduct a plenary discussion
15 minutes	Break	
45 minutes	<p>Activity 2. Case Study on Data Verification and Reporting Performance</p>	<p>Review case study presented in Handout 4.2.1 in small groups</p> <p>Plenary review and discussion of case study</p>

Session Activities

Activity 1. Data Quality Metrics (30 minutes)

The facilitator presents the PowerPoint slides and responds to questions.

Activity 2. Case Study on Data Verification and Reporting Performance (45 minutes)

- The facilitator divides participants in groups of five to six people and distributes the case study (Handout 4.2.1).
- The facilitator asks for a volunteer to read the following instructions (which also appear on the first page of the handout):

As part of a PRISM assessment in Country Z, that country's health ministry would like to verify the data accuracy and reporting performance of the PMTCT program. The indicator selected was "Total of clients who received HIV counseling and testing, and received their results."

The districts and health facilities that were selected to be included in the PRISM assessment were assigned across several assessment teams. Team #5 was responsible for conducting the assessment at Tana River District Office.

Tana River District is expected to receive reports from 22 health facilities on a monthly basis. The reports should arrive by the fifth day of the following month.

The reporting period selected for verification is November 2007.

Using the reports received (also found in Handout 4.2.1), verify the data and calculate the reporting performance at the district level for the indicator "Total of clients who received HIV counseling and testing, and received their results."

Specifically, calculate the following data-quality indicators:

- Accuracy (explain if there is any over- or under-reporting)
 - Reporting completeness (availability of reports)
 - Data completeness (reports with data elements filled out)
 - Timeliness
- Once the instructions have been read aloud, the facilitator asks if participants have any questions about what they are being asked to do.
 - The facilitator gives the groups 20 minutes to work on the case study.
 - In plenary, review how each metric is calculated and the correct responses.

SESSION 3. DATA QUALITY ASSURANCE

Session duration: 50 minutes

Session Learning Objectives

At the end of this session, participants will be able to:

- Define data-quality assurance
- Understand the importance of data-quality assurance
- Understand the roles and responsibilities of RHIS management levels in maintaining data quality
- Differentiate the types of tools and methods for measuring data quality
- Understand how to integrate data-quality assurance in routine supportive supervision
- Understand the value of monitoring and using data-quality assessment results over time

Topics Covered

- Define data-quality assurance
- Data-quality assurance responsibilities at different health-management levels
- Commonly used data-quality assurance methods and techniques
- Integration of data-quality assurance with routine supervision
- Monitoring results over time

Teaching Methods

- Lecture
- Group/plenary discussion

Materials Needed

- Module 4, Session 3 PowerPoint presentation: “Data Quality Assurance”
- Projection equipment
- Large pad of display paper and an easel
- Markers
- Pens or pencils

Session Plan

Time	Title and Description	Methods
50 minutes	<p>Activity 1. Data Quality Assurance</p> <p>Present and discuss:</p> <ul style="list-style-type: none">• What data quality assurance is• How to ensure data quality at different health-management levels• How to introduce and differentiate the most commonly used data-quality assurance methods: routine data quality assessment (RDQA), PRISM, and data quality review (DQR)• Distinctions between assessment and audit• How to integrate data-quality assurance with routine supervision• How to monitor results over time	<p>Present Module 4, Session 3 PowerPoint slides (“Data Quality Assurance”) and conduct a plenary discussion</p>

Session Activities

Activity 1. Data Quality Assurance (50 minutes)

The facilitator presents the Module 4, Session 3 “Data Quality Assurance” PowerPoint slides and responds to questions.

MODULE 5. RHIS DATA ANALYSIS

Module duration: 9 hours; 3 sessions

The content of this module is derived from a more in-depth training module on analysis for managers and analysts developed by WHO and USAID (see the first reference listed below).

Module Learning Objectives

By the end of this module, participants will be able to:

- Define the basic concepts and terminology of data analysis
- Select appropriate charts
- Select appropriate indicators to be measured with routine data: the indicators that will be the focus of analysis
- Understand the link between data analysis and data quality and also the need to adjust the data if necessary, prior to analysis
- Select appropriate denominators for the calculation of indicators
- Compare findings from routine data with findings from other data sources
- Analyze routine data to produce information products: tables, graphs, and maps
- Communicate key findings of data analysis

Suggested References

- World Health Organization (WHO) & United States Agency for International Development. (2014). Analysis of health facility data: Methodological issues and solutions. Guidance for managers and analysts of health facility data. Geneva, Switzerland: WHO.
- World Health Organization. (2015). Global reference list of 100 core health indicators. Retrieved from <http://www.who.int/healthinfo/indicators/2015/en/>
- World Health Organization (WHO). (2015). Data quality review (DQR): a toolkit for facility data quality assessment, Version 1.0. Geneva, Switzerland: WHO.
- Abela, A. (2009). Chart suggestions: A thought starter. Retrieved from <http://www.infographicsblog.com/chart-suggestions-a-thought-starter-andrew-abela/>
- Evergreen, S. (2014). Presenting data effectively: Communicating your findings for maximum impact. Thousand Oaks, CA, USA: Sage Publications.
- DHIS 2 Documentation Team. *DHIS 2 user manual*. (2016). Retrieved from https://ci.dhis2.org/docs/2.24/en/user/dhis2_user_manual_en.pdf
- Excelcentral.com. Online tutorial on using Excel to create charts. Retrieved from <http://excelcentral.com/excel2007/essential/lessons/05010-create-a-simple-chart-with-two-clicks.html>

- MEASURE Evaluation. (2009). Making research findings actionable: A quick reference to communicating health information for decision-makers. Retrieved from <http://www.cpc.unc.edu/measure/resources/publications/ms-09-39>

Sessions

- Session 1: Key Concepts of Data Analysis (65 minutes)
- Session 2: Overview of Steps 1–4 of Data Analysis (2 hours, 55 minutes)
- Session 3: Overview of Step 5 of Data Analysis (5 hours)

SESSION 1. KEY CONCEPTS OF DATA ANALYSIS

Session duration: 65 minutes

Session Learning Objectives

By the end of this module, participants will be able to:

- Define basic concepts and terminology of data analysis
- Select an appropriate chart

Topics Covered

- Descriptive analysis:
 - Ratio, proportion, percentage, and rate
 - Median, mean, and trend
- Selection of the appropriate chart

Teaching Methods

- Facilitator presentation
- Exercise and group work
- Presentations by participants
- Plenary discussion

Materials Needed

- PowerPoint presentations: Module 5, “Introduction,”; Module 5, Session 1, “Key Concepts of Data Analysis”
- Large pad of display paper and an easel
- Markers
- Pens or pencils
- Poster paper for sticky notes
- Personal computer
- Handout 5.1.1: “Basic Key Concepts of Data Analysis”

Session Plan

Time	Title and Description	Methods
5 minutes	Welcome and Summary of the Module	Present Module 5's introductory slide deck
30 minutes	Key Concepts of Data Analysis Topics covered: <ul style="list-style-type: none"> • Descriptive analysis: ratio, proportion, percentage, rate, median, mean, and trend • Selection of graph based on types of data 	Lecture, showing Module 5, Session 1 PowerPoint presentation: "Key Concepts of Data Analysis"
30 minutes	Activity 1. Exercise on Ratio, Rate, Proportion, and Percentage	Handout 5.1.1: "Basic Key Concepts of Data Analysis" Exercise on basic analysis, done by participants on their own, before the session

Session Activities

Activity 1. Exercise on Ratio, Rate, Proportion, and Percentage (30 minutes)

Distribute Handout 5.1.1 ("Key Concepts of Data Analysis") the day before this session and ask participants to answer the questions on their own and be ready to share their work during the session.

To open the session, present the Module 5, Session 1 PowerPoint slides: "Key Concepts of Data Analysis." Then review the participants' answers to the questions in the handout.

SESSION 2. OVERVIEW OF STEPS 1–4 OF DATA ANALYSIS

Session duration: 2 hours, 55 minutes

Session Learning Objectives

By the end of this session, participants will be able to:

- Select appropriate indicators for data analysis
- Understand the link between data analysis and data quality and also the need to adjust data, if necessary
- Select appropriate denominators
- Compare findings from routine data with findings from other data sources
- Analyze routine data to produce information products (tables, graphs, and maps)

Topics Covered

- Selection of indicators for analysis
- Desk review of data completeness and internal consistency
- Selection of appropriate denominators
- Comparison of findings from routine data with findings from other data sources

Teaching Methods

- Facilitator presentation
- Exercise and group work
- Presentations by participants
- Plenary discussion

Materials Needed

- Module 5, Session 2 PowerPoint presentation: “Overview of Steps 1–4 of Data Analysis”
- Large pad of display paper and an easel
- Markers
- Pens or pencils
- Poster paper for sticky notes
- Personal computers
- DHIS 2 option: local network with Wi-Fi
- Handout 5.2.1: “Exercise on Practicing Data Analysis, Step 1 (Part 1)”
- Handout 5.2.2: “Exercise on Practicing Data Analysis, Step 1 (Part 2)”
- Handout 5.2.3: “WHO’s Global Reference List of Core Health Indicators” (This 136-page resource can be viewed online at <http://www.who.int/healthinfo/indicators/2015/en/>.)
- Handout 5.2.4a: “Calculating Immunization Coverage Indicators: Exercise on Practicing Data Analysis, Step 2”

- Handout 5.2.4b: “Excel Data Set on Practicing Step 2” (an Excel-based DQR tool populated with example data on ANC1, ANC4, DTP1, and DTP3 (ANC refers to antenatal care; DTP refers to the vaccine for diphtheria, tetanus, and pertussis))
- Handout 5.2.4c: “Answers on Practicing Step 2” (Excel)
- Handout 5.2.5: “Online Tutorials on the Uses of Excel Software”

Session Plan

Time	Title and Description	Methods
5 minutes	Overview of 5 Steps for Analysis <ul style="list-style-type: none"> • Focus on a limited set of core indicators • Review data quality • Select appropriate denominators • Review findings from alternative sources • Communicate key findings 	Presentation of relevant Module 5, Session 2 PowerPoint slides: “Overview of Steps 1–4 of Data Analysis” Handout 5.2.1: “Analysis of Health Facility Data: Guidance for Managers and Analysts”
15 minutes	1st Step for Analysis Topics covered: <ul style="list-style-type: none"> • Analysis of a limited set of core indicators • Key points to consider when selecting indicators (ability to assess performance, clear indicator definition, and measurable) 	Presentation of relevant PowerPoint slides
30 minutes	Activity 1. Exercise Practicing 1st Step	Presentation of relevant PowerPoint Slides Group discussion Handout 5.2.1: “Practicing Data Analysis Step 1–Part 1” Handout 5.2.2: Practicing Data Analysis Step 1–Part 2” Handout 5.2.3: WHO’s “Global Reference List of 100 Core Health Indicators”
20 minutes	2nd Step for Analysis Topics covered: <ul style="list-style-type: none"> • Review the completeness and quality of the data • Key points to consider when reviewing completeness and quality (variation, extreme outliers, and correlation) 	Presentation of relevant PowerPoint Slides
15 minutes	Break	

30 minutes	3rd and 4th Steps of Analysis Step 3: <ul style="list-style-type: none"> • Select appropriate denominators • Issues to consider when selecting denominators • DHIS 2 option: DHIS 2 software can be used to define an alternative indicator Step 4: <ul style="list-style-type: none"> • Review findings from alternative data sources • Issues to consider when selecting denominators 	Presentation of relevant PowerPoint slides Discussion
15 minutes	Break	
45 minutes	Activity 2: Exercise on Immunization Coverage <ul style="list-style-type: none"> • How to use Excel to calculate indicators from numerator and denominator data and identified problems 	Presentation of relevant PowerPoint slide Handouts 5.2.4a, 5.2.4b, and 5.2.4c <ol style="list-style-type: none"> a. Instructions b. Data set c. Answers Handout 5.2.5: "Online Tutorials on the Uses of Excel Software" (participants may view these on their own)

Session Activities

Activity 1. Exercise Practicing 1st Step (30 minutes)

- Individual reading of handout
- Group discussion of core indicators for national monitoring and evaluation (M&E) that are measureable with routine data and those that require additional data sources
- Group discussion of WHO indicators and discussion of numerators and denominators

Activity 2. Exercise Practicing Steps 1 to 4 (45 minutes)

- How to use Excel to calculate indicators from numerator and denominator data and identified problems
- Follow instructions on Handout 5.2.4a to analyze the data from the data set in Handout 5.2.4b
- For facilitators: the answers to this exercise can be found in Handout 5.2.4c

SESSION 3. OVERVIEW OF STEP 5 OF DATA ANALYSIS

Session duration: 5 hours

Session Learning Objective

By the end of this session, participants will be able to communicate key findings of data analysis.

Topics Covered

- Key dimensions of data presentation
- Data visualization
- Best practices for communicating findings
- Identifying and understanding your audience

Teaching Methods

- Facilitator presentation
- Exercise and group work
- Presentations by participants
- Plenary discussion

Materials Needed

- Module 5, Session 3 PowerPoint presentation: “Overview of Step 5 of Data Analysis”
- Large pad of display paper and an easel
- Markers
- Pens or pencils
- Poster paper for sticky notes
- Handout 5.3.1a: “Instructions for the Exercise on Data Analysis, Steps 1–5”
- Handout 5.3.1b: “Data Set for the Exercise on Data Analysis, Steps 1–5” (Excel)

Session Plan

Time	Title and Description	Methods
30 minutes	Step 5 of Data Analysis Topics covered: <ul style="list-style-type: none">• Issues to consider when visualizing data (presentation by levels, sex, trends, and geography; selecting by tables, graphs, and maps to communicate findings), audience, story, choosing a chart, chunking data, best practices, and other visuals	Presentation of relevant PowerPoint slides for Module 5, Session 3 Discussion

	<ul style="list-style-type: none"> • DHIS 2 option: Demonstration of DHIS 2 visualizer • How to interpret data • Interpreting various visualizations (line graph, pie chart, and spider graph) 	
15 minutes	Break	
2 hours	Activity 1. Exercise to Practice Steps 1–5	Presentation of relevant PowerPoint slides Group exercise based on Handouts 5.3.1a (instructions) and 5.3.1b (data set)
15 minutes	Break	
60 minutes	Group presentations of previous exercise	Presentation Discussion
60 minutes	Data communication Topics covered: <ul style="list-style-type: none"> • Elements of good communication • Communication methods that are appropriate for different audiences • Common dissemination vehicles 	Presentation of relevant PowerPoint slides

Session Activities

Activity 1. Exercise on Practicing Steps 1–5 (2 hours)

Divide the participants in small groups and distribute the exercise instructions (Handout 5.3.1a) and the corresponding Excel data set (Handout 5.3.1b). Ask participants to follow the instructions below:

1. Each group is expected to identify at least four indicators related to maternal, newborn, and child health based on WHO's definitions in the global list of core health indicators.
2. For each indicator you calculate, specify the numerator.
3. Use the following assumptions to estimate the denominator (if required):
 - a. Assuming a crude birth rate of 24.6 per 1,000 population for Jharkhand
 - b. Births=CBR x population
 - c. Pregnancies=Birth x 1.02
 - d. Deliveries=Births X 0.99
 - e. Surviving infants=Births x (1-IMR) [IMR for Jharkhand: 37 per 1,000 live births]
4. Calculate the indicator for block-wise and overall district.
5. Assess the data quality of the selected indicators.
6. Decide on three questions that you would like to answer using the data.

7. Create charts, tables, etc., using the Excel spreadsheet, to analyze your data. What type of analysis is possible using the given data?
8. Do you see any story emerging from the analysis of the data? Summarize the main finding of that story.
9. Prepare a brief report (using PPT) to discuss the block-wise performance of the indicators above and possible reasons for performance or nonperformance across blocks for an upcoming data review meeting.

Each group presents the brief report. At the end of all the presentations, the facilitator engages participants in an open discussion of the five steps based on the learning experience from the exercise.

MODULE 6. RHIS DATA DEMAND AND USE

Module duration: 9 hours; 4 sessions

Module Learning Objectives

By the end of this module, participants will be able to:

- Raise awareness of the importance of using data to inform program planning, policy development, service delivery, and resource management
- Appreciate how data-use interventions can improve an HIS
- Demonstrate skills to manage team meetings for RHIS data review that result in action plans linking data to specific program questions, upcoming decisions, and service performance improvement
- Demonstrate knowledge of how to use RHIS data for decision making at all levels of the health system:
 - Patient/client level and community management level, focusing on improving quality of care, continuity of care, and impact on behavioral change
 - Facility management level, focusing on service delivery coverage and quality of care, as well as on resource management
 - District management level, focusing on management of health services and resources and on service delivery coverage and quality
 - Regional and national levels, focusing on program management and policy development
- Demonstrate problem-solving skills to move from data analysis and problem identification to action

Suggested References

- Chewicha, K. & Azim, T. (2013). Community health information system for family-centered health care: Scale-up in Southern Nations, Nationalities and People's Region (SNNPR), Ethiopia. *Ethiopia Ministry of Health Quarterly Health Bulletin*, 5(1):49–53. Retrieved from <http://www.cpc.unc.edu/measure/resources/publications/ja-13-161>
- Judice, N. (2009). Seven steps to use routine information to improve HIV/AIDS programs: A guide for HIV/AIDS program managers and providers. Chapel Hill, NC, USA: MEASURE Evaluation, University of North Carolina. Retrieved from <http://www.cpc.unc.edu/measure/our-work/data-demand-and-use/7-steps-to-improve-hiv-aids-programs>
- LaFond, A., et al. (2003). Using data to improve service delivery: A self-evaluation approach. Retrieved from <http://www.cpc.unc.edu/measure/resources/publications/sr-03-12/>
- Marsh, D. (2000). Population-based community health information systems. In T. Lippeveld, R. Sauerborn, & C. Bodart. (Eds.), *Design and implementation of health information systems* (pp. 146–175). Geneva, Switzerland: World Health Organization. Retrieved from

<http://apps.who.int/iris/handle/10665/42289>

- MEASURE Evaluation. (2011). Tools for data demand and use in the health sector: Framework for linking data with action. Chapel Hill, NC, USA: MEASURE Evaluation, University of North Carolina. Retrieved from <http://www.cpc.unc.edu/measure/resources/publications/ms-11-46-b>

Sessions

- Session 1: Using Data to Inform Policy, Program Planning, and Service Delivery (1 hour, 30 minutes)
- Session 2: Linking Data with Action (3 hours)
- Session 3: Using Data to Inform Facility-Level Management (2 hours, 30 minutes)
- Session 4: Using Data to Inform Community-Level Management (2 hours)

SESSION 1. USING DATA TO INFORM POLICY, PROGRAM PLANNING, AND SERVICE DELIVERY

Session duration: 1 hour, 30 minutes

Session Learning Objectives

At the end of this session, participants will be able to:

- Raise awareness of the importance of using data to inform program planning, policy development, service delivery, and resource management
- Appreciate how data-use interventions can improve an information system

Topics Covered

- Data demand and use
- Benefits of M&E systems
- Commitment to use data

Teaching Methods

- Lecture
- Plenary discussion
- Hands-on exercise and facilitated discussion

Materials Needed

- PowerPoint presentations: Module 6, “Introduction”; Module 6, Session 1, “Using Data to Inform Policy, Program Planning, and Service Delivery”
- Video: “M&E for Better Lives”
- Handout 6.1.1: “M&E for Better Lives: Video Discussion Guide” (for the facilitator’s use only—not for distribution to the participants)

Session Plan

Time	Title and Description	Methods
30 minutes	Activity 1. Using Data to Inform Policies and Programs Present and discuss: <ul style="list-style-type: none">• Value of data-informed management and decision making• Strengthening health systems with information• Theory of data use to strengthen health systems• Data-demand-and-use (DDU) improvement interventions	Presentation of Module 6, “Introduction,” and Module 6, Session 1 PowerPoint slides Plenary discussion

	<ul style="list-style-type: none"> Contextual elements of the decision process 	
60 minutes	<p>Activity 2: “M&E for Better Lives” Video and Discussion</p> <ul style="list-style-type: none"> A 15-minute video telling how early investments in behavioral surveillance studies, M&E systems, and other research led to the development of improved prevention and support programs for sex workers in Jamaica Facilitated plenary discussions on specific content in the video. 	<p>Video projection</p> <p>Facilitated discussion</p>

Session Activities

Activity 1. Using Data to Inform Policies and Programs (30 minutes)

- The facilitator presents the Module 6, Session 1 PowerPoint slides—“Using Data to Inform Policy, Program Planning, and Service Delivery”—and asks if participants have any questions.

Activity 2. “M&E for Better Lives” Video and Discussion (1 hour)

- The objectives of this viewing and discussion activity are to:
 - Raise awareness of the value of health data and M&E systems to program improvement
 - Help participants analyze their own attitudes about and perceptions of the value of data
 - Explore challenges to obtaining and using data
 - Identify existing data review processes
- The facilitator shows participants a 15-minute video—available here: [Module 6 Session 1 Movie - M&E For Better Lives.mov \(1.4 GB\)](#)—that tells the story of how early investments in behavioral surveillance studies, other research, and M&E systems led to the development of improved prevention and support programs for sex workers in Jamaica.
- After participants watch the video, the facilitator will lead a group discussion about specific content in the video, following guidance in Handout 6.1.1: “M&E for Better Lives: Video Discussion Guide.” (Note: This is not a handout for participants; it is intended for the facilitator’s use only.)

SESSION 2. LINKING DATA WITH ACTION

Session duration: 3 hours

Session Learning Objectives

At the end of this session, participants will be able to:

- Understand the “seven steps approach” to use data in decision making
- Use the “Matrix for Linking Data with Action” to apply the seven steps
- Demonstrate skills to manage team RHIS data-review meetings that result in action plans linking data to specific program questions, upcoming decisions, and service performance improvement
- Demonstrate knowledge on using RHIS data for decision making at district, regional, and national levels: focus on program management and policy development
- Demonstrate problem-solving skills to move from data analysis and problem identification to action

Topics Covered

- “Seven steps approach” to using routine information in decision making
- Framework for linking data with action
- Case studies and exercises on the use of information at various levels of the health system
 - At district level: for work planning and budgeting
 - At facility level: for high-quality service delivery in the facility and for individual client management
 - At provider and community level: for client and community management

Teaching Methods

- Facilitator presentation and plenary discussion
- Facilitated group work and discussion

Materials Needed

- Module 6, Session 2 PowerPoint presentation: “Linking Data with Action”
- Handout 6.2.1: “Seven Steps Approach”
- Handout 6.2.2: “Framework for Linking Data with Action” (template)
- Handout 6.2.3: “Framework for Linking Data with Action” (example)
- Handout 6.2.4: “Priority Question Scoring Worksheet” (example)

Session Plan

Time	Title and Description	Methods
90 minutes	<p>Activity 1. Linking Data with Action, Part 1 (presentation and team activities)</p> <p>Present and discuss:</p> <ul style="list-style-type: none"> Using the “7 steps approach” to incorporate data in decision making Using the “Framework for Linking Data with Action” to apply the 7 steps Team activities Team activity on Step 1: Identifying the question of interest Team activity on Step 2: Prioritizing the question of interest Team activity on Step 3: Identifying potential data sources 	<p>Presentation of relevant PowerPoint slides</p> <p>Plenary discussion</p> <p>Handouts 6.2.1, 6.2.2, 6.2.3, and 6.2.4</p> <p>Facilitated group work</p>
15 minutes	Break	
75 minutes	<p>Activity 2. Linking Data with Action, Part 2</p> <p>Present and discuss:</p> <ul style="list-style-type: none"> Steps 4 to 7 and completing the “Framework for Linking Data with Action” Assessing the effects of data’s use in decision making Data-use scenarios 	<p>Presentation of relevant PowerPoint slides</p> <p>Plenary discussion</p> <p>Facilitated discussion of data-use scenarios</p>

Session Activities

Activity 1. Linking Data with Action (1 hour, 30 minutes)

The facilitator distributes Handout 6.2.1 to the participants and presents the Module 6, Session 2 PowerPoint Slides that cover the first three steps of the “seven steps approach.”

After presenting each step, the facilitator leads the following three team activities.

Team Activity on Step 1: Identifying the Question of Interest

Organize the participants in groups of five to six people each.

Ask the groups to brainstorm some program questions of interest using the sample “Matrix for Linking Data with Action” (Handout 6.2.3) to guide them.

Provide the following instructions:

- Start by selecting a health area of focus and the primary health goal that we would like to achieve. The health goal is like the vision of a desired future. It describes where we want to be in the future and what impact we wish to have.

- Select potential target decision makers or data users within the selected health area, as well as other stakeholders who would be involved in the decision-making process. Try to be strategic with your stakeholder selection, given limited resources.
- Identify the key management decisions that would be enhanced through the use of quality information and data analysis.
- Brainstorm or list all potential questions that would be useful for your organization to consider in order to make informed decisions about how services are delivered. Some examples are:
 - What would you like to have more information about in order to assess or improve the services you are currently delivering?
 - What key program decisions do you make that you would feel more confident about if you had appropriate information?
- Give the groups 30 minutes to brainstorm a list of questions.

Team Activity on Step 2: Prioritizing the Question of Interest

The next task for each team is to rank their questions in order of their priority. For this task, provide the following instructions:

- List the questions you’ve brainstormed on the “Priority Question Scoring Worksheet” (Handout 6.2.4).
- Identify additional criteria, if needed.
- Discuss and rank each question.
- Select a priority program question.
- Explain why you chose this question over others.
- Look back at your stakeholders and confirm your target decision makers.

Give the groups 15 minutes to prioritize their list of questions.

Team Activity on Step 3: Identifying Potential Data Sources

Next, each team will identify all potential data sources that they could use to answer their prioritized questions. For this task, provide the following instructions:

- List potential data sources that may answer the prioritized question.
- List indicators that need to be reviewed within each data source.

Give the groups 15 minutes to select data sources and indicators.

Activity 2. Linking Data with Action, Part 2 (1 hour, 15 minutes)

The facilitator goes through the remaining slides in the Module 6, Session 2 “Linking Data with Action” presentation (covering Steps 4–7 and three scenarios) and then conducts a plenary discussion.

SESSION 3: USING DATA TO INFORM FACILITY-LEVEL MANAGEMENT

Session duration: 2 hours, 30 minutes

Session Learning Objectives

At the end of this session, participants will be able to:

- Demonstrate knowledge of how to use RHIS data for decision making
 - At patient/client management level: focus on improving quality of care, including continuity of care and behavioral change
 - At facility management level: focus on service delivery coverage and quality of care
 - At district management level: focus on management of health services and resources as well as on service delivery coverage and quality
- Demonstrate problem-solving skills to move from data analysis and problem identification to action

Topics Covered

- Exercises on the use of information for improving the quality of services provided:
 - At district level: for work planning and budgeting
 - At facility level: for high-quality service delivery in the facility and for individual client management
 - At provider and community level: for client and community management

Teaching Methods

- Facilitator presentation and plenary discussion
- Facilitated group work and discussion

Materials Needed

- Module 6, Session 3 PowerPoint presentation: “Using Data to Inform Facility-Level Management”
- Simulation exercise package of handouts (Handouts 6.3.1–6.3.9): Monitoring of RHIS data at HIV and AIDS clinics to improve the quality of services

Session Plan

Time	Title and Description	Methods
30 minutes	Introduction on use of information for district and facility management	Presentation of Module 6, Session 3 PowerPoint slides: "Using Data to Inform Facility-Level Management"
15 minutes	Break	
105 minutes	<p>Activity 1. Simulation Exercise on Monitoring of RHIS Data at HIV and AIDS Clinics to Improve the Quality of Services</p> <p>PowerPoint presentation introducing the simulation exercise: "Data Use to Improve Quality of Care in Africa" (Module 6, Session 3, Slides 14–26)</p> <ul style="list-style-type: none"> • Group work session • Group debriefing on this exercise in plenary 	Role-play and group work on the analysis of quality improvement (QI) indicator results and problem identification)

Activity 1. Simulation Exercise on Monitoring RHIS Data at HIV and AIDS Clinics to Improve the Quality of Services

This exercise consists of a PowerPoint slide presentation and a group work session, giving participants a chance to learn about analyzing processes in a classroom setting that simulates a real-life situation. The groups may then share their work in a plenary session.

The objective of this simulation exercise is to provide participants with practical classroom experience on how to proceed to implement changes once results from the measurement of quality improvement (QI) indicators are available. The exercise focuses on identifying the causes of below-standard performance.

The facilitator follows the "Instructions for Trainers" in Handout 6.3.1 in the Simulation Exercise Handouts Package within Module 6 to conduct this exercise, and distributes the "Instructions for Participants" in Handout 6.3.2 (also in the simulation exercise package) to the participants. The facilitator also makes the CD4 Database (Handout 6.3.3), the "Laboratory CD4 Register" (Handout 6.3.4), and other materials in this package available for the participants' reference, either on paper or on their laptops.

SESSION 4: USING DATA TO INFORM COMMUNITY-LEVEL MANAGEMENT

Session duration: 2 hours

Session Learning Objectives

At the end of this session, participants will be able to:

- Explain the importance of data at the community level for the management of health services
- Demonstrate the skills to use data for problem identification, analysis, and action at the community level

Topics Covered

- Use of community-based health information
- Ethiopia Case Study 1: “Community Health Information System in Action in the Southern Nations, Nationalities, and Peoples’ Region (SNPPR), Ethiopia”
- Ethiopia Case Study 2: “Analysis and Use of Data at the Community Level”

Teaching Methods

- Facilitator presentation and plenary discussion
- Facilitated group work and discussion

Materials Needed

- Module 6, Session 4 PowerPoint presentation: “Using Data to Inform Community-Level Management”
- Video: “Small Package.....Big Impact” (<https://vimeo.com/140829594>)
- Ethiopia Case Study 1 package of handouts: Information use at individual and household levels
- Ethiopia Case Study 2 handout for trainers and for participants: Analysis and use of a data set at the community level

Session Plan

Time	Title and Description	Methods
30 minutes	Introduction to the use of information at the community level	Present Module 6, Session 4 PowerPoint: “Using Data to Inform Community-Level Management” (all slides)
45 minutes	Activity 1: “Ethiopia Case Study 1: Community Health Information System in Action in SNNPR” <ul style="list-style-type: none">• Group work session	Present “Ethiopia Case Study Overview” PowerPoint (all slides) and “Ethiopia Case

	<ul style="list-style-type: none"> Group debriefing on this exercise in plenary 	Study” PowerPoint slides relevant to Case Study 1 Facilitated small group work
45 minutes	Activity 2: “Ethiopia Case Study 2: Analysis and Use of Data at the Community Level” <ul style="list-style-type: none"> Group work session Group debriefing on this exercise in plenary 	Present Ethiopia Case Study” PowerPoint slides relevant to Case Study 2 Facilitated small-group work

Activity 1. Case Study: Community Health Information System in Action in SNNPR, Ethiopia (45 minutes)

This exercise consists of a lecture/slide presentation, a group work session, and a plenary session where groups share their reports.

The objective of this case study is for participants to gain an understanding of how data are being used for patient/client and community management in a real-life situation in a health post in Ethiopia. The focus of this case study is the community-management level, and how community-health workers, as well as health facility-based healthcare providers and district health managers, can use data produced by the community health information system to improve community health services as well as public health. The case study describes how female “health extension workers” (HEWs) in a health post in Ethiopia use family folders and a tickler file system to improve the health of households and individuals in the Southern Nations, Nationalities and Peoples Region (SNNPR) of Ethiopia.

The facilitator follows the “Instructions for Trainers” handout in the Ethiopia Case Study 1 Handouts Package within Module 6 to conduct this exercise, and distributes the “Instructions for Participants” handout (also in the Ethiopia Case Study 1 package) to the participants. The facilitator distributes to the participants the other materials in this package: the case study itself (“Community Health Information System in Action in SNNPR”); the two pages from the “Family Folder”; the integrated mother and child health card (one for girls and one for boys); and the health card. The participants will need to refer to these materials for this activity.

Activity 2. Case Study: Analysis and Use of Data at the Community Level (45 minutes)

This exercise consists of a lecture/slide presentation, a group work session, and a plenary session where groups share their reports.

The purpose of this case study is to understand the CHIS data from an HEW’s perspective. The facilitator follows the “Instructions for Trainers” handout in the Ethiopia Case Study 2 package within Module 6 to conduct this exercise, and distributes the “Instructions for Participants” handout (also in the Ethiopia Case Study 2 package) to the participants. This handout includes a data set and questions.

Participants will work in small groups to discuss how an HEW interprets and can use the aggregate data. They will briefly report their findings in plenary session.

MODULE 7. RHIS GOVERNANCE AND MANAGEMENT OF RESOURCES

Module duration: 6 hours; 2 sessions

Module Learning Objectives

By the end of this module, participants will be able to:

- Define and understand the importance of RHIS governance
- Understand the functions of RHIS governance and how to use the tools to help facilitate the performance of these functions
- Define and understand the importance of managing RHIS resources
- Understand key concepts, approaches, and procedures for the effective management of RHIS resources (human, financial, and material: for example, commodities and ICT)
- Distinguish between RHIS governance and RHIS management, leadership, and organization, and recognize where they may overlap

Suggested References

- Barbazza, E. & Tello, J. (2014). A review of health governance: Definitions, dimensions, and tools to govern. *Health Policy*, 116(1):1–11. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/24485914>
- Heywood, A. & Boone, D. (2015). Guidelines for data management standards in routine health information systems. Chapel Hill, NC, USA: MEASURE Evaluation, University of North Carolina. Retrieved from www.cpc.unc.edu/measure/publications/ms-15-99

Sessions

- Session 1. RHIS Governance (4 hours)
- Session 2. Management of RHIS Resources (2 hours)

SESSION 1. RHIS GOVERNANCE

Session duration: 4 hours

Session Learning Objectives

By the end of this session, participants will be able to:

- Understand the overall concept of governance and governance functions
- Relate governance concepts to RHIS governance

Topics Covered

- Definition and examples of governance in RHIS
- Governance functions:
 - Promote accountability and transparency
 - Foster partnerships and coordination
 - Formulate policy and strategic direction
 - Generate information and intelligence
 - Design and organize the RHIS
 - Promote participation and consensus
 - Develop regulations
 - Promote advocacy
- Tools of governance: leadership, legislation, policy, strategic plans, organization and systems design, and technical working groups (TWG)
- Indicators to measure the effectiveness of governance

Teaching Methods

- Lecture
- Brainstorming
- Hands-on exercises
- Case studies

Materials Needed

- PowerPoint presentations: Module 7, “Introduction”; Module 7, Session 1, “RHIS Governance”
- Large pad of display paper and an easel
- Markers
- Pens or pencils
- Handout 7.1.1: “Health System Definitions”

- Handout 7.1.2: “Aspects of Decentralization in the Health System”
- Handout 7.1.3: “Definitions of Governance in Health”
- Handout 7.1.4: “Common Tools Used to Enable Subfunctions of Governance in Health”
- Handout 7.1.5: “Aspects of HIS/RHIS Strategic Planning and Policy”
- Handout 7.1.6: “HIS Strategic Planning in Afghanistan”
- Handout 7.1.7: “Examples of Common HIS-Related Regulations and Legislation”
- Handout 7.1.8: “Examples of RHIS Accountability and Transparency”
- Handout 7.1.9: “Exercise on Accountability and Transparency”
- Handout 7.1.10: “Two Examples of National Mechanisms of HIS Coordination and Partnership”
- Handout 7.1.11: “Exercise on Common Ministry of Health Organizational Structures for National HIS Functions”
- Handout 7.1.12: “Selected HIS Organizational Practices, Principles, and Pitfalls”
- Handout 7.1.13: “Case Study on RHIS Governance in Malawi”

Session Plan

Time	Title and Description	Methods
15 minutes	<p>Activity 1. Introduction Discuss the learning objectives of the module and topics to be covered</p>	Module 7 PowerPoint presentation: “Introduction” (all slides)
15 minutes	<p>Activity 2. Overview of Health Services System and Links with a Country’s Governance System</p> <ul style="list-style-type: none"> • Healthcare system structure and functions • Centralized versus decentralized healthcare system • Functions and roles of tiers of government in health system management 	<p>Presentation of relevant slides from Module 7, Session 1 PowerPoint: “RHIS Governance”</p> <p>Handout 7.1.1: “Health System Definitions”</p> <p>Handout 7.1.2: “Aspects of Decentralization in the Health System”</p>
15 minutes	<p>Activity 3. Key Concepts of RHIS Governance Define and explain key concepts and terms in RHIS governance</p> <ul style="list-style-type: none"> • Governance in and for health • Leadership and management • Regulations and legislation • Standards and procedures • Promoting accountability and transparency • Fostering partnerships and coordination • Formulating policy and strategic direction 	<p>Presentation of relevant PowerPoint slides</p> <p>Handout 7.1.3: “Definitions of Governance in Health”</p> <p>Handout 7.1.4: “Common Tools Used to Enable Subfunctions of Governance in Health”</p> <p>Exercise/group discussion</p>

	<ul style="list-style-type: none"> • Design and organization of RHIS in support of health services • Participation and consensus • Advocacy • Oversight (generating information and intelligence) 	
30 minutes	<p>Activity 4. RHIS Policy and Strategic Planning Explain and discuss:</p> <ul style="list-style-type: none"> • Vision and mission • Goals and objectives • Strategic-planning process • Components of a strategic-planning process • Planning cycles • Identification of health-system priorities • Links to the evidence base 	<p>Presentation of relevant PowerPoint slides</p> <p>Handout 7.1.5: "Aspects of HIS/RHIS Strategic Planning and Policy"</p> <p>Handout 7.1.6: "HIS Strategic Planning in Afghanistan"</p> <p>Exercise</p> <p>Group discussion</p> <p>Brainstorming</p> <p>Sharing experience in developing policy and strategic plans</p>
15 minutes	Break	
30 minutes	<p>Activity 5. HIS Legal Framework and Legislation Explain:</p> <ul style="list-style-type: none"> • Reporting requirements • Data confidentiality • Required actions based on RHIS data • RHIS performance assessment • Private sector participation 	<p>Presentation of relevant PowerPoint slides</p> <p>Handout 7.1.7: "Examples of Common HIS-Related Regulations and Legislation"</p> <p>Group exercise</p>
30 minutes	<p>Activity 6. Promoting RHIS Accountability and Transparency Discuss how to promote RHIS accountability and transparency</p>	<p>Presentation of relevant PowerPoint slides</p> <p>Handout 7.1.8: "Examples of HIS/RHIS Accountability and Transparency"</p> <p>Exercise</p> <p>Group discussion</p>
30 minutes	<p>Activity 7. Fostering Partnerships and Coordination Explain the importance of fostering partnerships and coordination, and the mechanisms for achieving them</p>	<p>Presentation of relevant PowerPoint slides</p> <p>Exercise</p>

		<p>Handout 7.1.9: "Exercise on Accountability and Transparency"</p> <p>Handout 7.1.10: "Two Examples of National Mechanisms of HIS Coordination and Partnership"</p> <p>Discussion</p>
30 minutes	<p>Activity 8. RHIS/HIS Organizational Principles and Structural Considerations</p> <p>Discuss:</p> <ul style="list-style-type: none"> Organizational links between the various subsystems and data sources (HMIS, disease surveillance, logistics management information system (LMIS), surveys, CR&VS) Organizational links between a health-information system, M&E, and ICT 	<p>Presentation of relevant PowerPoint slide</p> <p>Handout 7.1.11: "Exercise on Common MOH Organizational Structures for National HIS Functions"</p> <p>Handout 7.1.12: "Selected HIS Organizational Practices, Principles, and Pitfalls"</p> <p>Discussion</p>
30 minutes	<p>Activity 9. Case Study on RHIS Governance in Malawi</p> <ul style="list-style-type: none"> Participants read the case study (15 minutes) Facilitator discusses the case study (15 minutes) 	<p>Handout 7.1.13: "Case Study on RHIS Governance in Malawi"</p> <p>Individual reading</p> <p>Plenary discussion</p>

Session Activities

Activity 1. Introduction (15 minutes)

The facilitator shows the relevant slides and explains the learning objectives and topics covered in this module.

Activity 2. Overview of the Health Services System and Links with a Country's Governance System (15 minutes)

- The facilitator reviews Handout 7.1.1, which helps to define health systems and shows the relevant slides. The health system map will help to link the health system to the HIS/RHIS.
- Participants draw on their experience in countries with decentralized health systems to discuss the benefits and challenges of decentralized service and system management. The facilitator refers to Handout 7.1.2 on decentralization for later reading.

Activity 3. Key Concepts of RHIS Governance (15 minutes)

- Participants are divided in three or four smaller groups.

- Facilitator refers to Handout 7.1.3 and shows the relevant slides, explaining that recognition of the importance of governance in public sectors is a recent phenomenon, and that many definitions of governance in health have emerged, as shown in the handouts (definitions of and tools for governance in health).
- Facilitator asks participants to review Handout 7.1.4, which provides examples of common tools used to enable subfunctions of governance.

Activity 4. RHIS Policy and Strategic Planning (30 minutes)

- Participants discuss their experiences with and opinions of HIS strategic planning. They review the Health Metrics Network’s HIS strategic planning process (Handout 7.1.5).
- Facilitator shows the relevant slides and summarizes the discussion on the key components of HIS strategic planning.
- Participants divide into small groups and review the Afghanistan case study (Handout 7.1.6). They share their opinions on the lessons learned.

Activity 5. HIS Legal and Regulatory Framework and Legislation (30 minutes)

- The facilitator displays the relevant slide and explains what participants will do in small groups.
- Participants in small groups review, supplement, and discuss the list of common HIS-related regulations and legislation (Handout 7.1.7). They generate general functional categories of HIS regulations and legislations, listing presumed benefits and risks.
- Subgroups report back to the plenary group.

Activity 6. Promoting RHIS Accountability and Transparency (30 minutes)

- Facilitator introduces the slides on RHIS accountability and transparency, and explains that the participants will be reviewing the following topics:
 - Examples of RHIS/HIS performance and development as possible subjects for accountability
 - Methods to increase accountability for proper RHIS operations, management, and use among health-system units, departments, managers, and staff
 - Importance and benefit of required transparency for RHIS accountability.
- Participants in small groups review Handout 7.1.8 and choose from four to six RHIS/HIS performance areas for discussion of measures for accountability. For each area, define and discuss the levels and measures of accountability felt to be most important, and identify the means by which transparency can be used to aid the pursuit of accountability.

Activity 7. Fostering Partnership and Coordination (30 minutes)

- The facilitator shows the introductory slides. Participants in small groups review the RHIS/HIS performance subjects listed in Section 1 of Handout 7.1.9. They identify subjects that require partnerships and coordination.

- Participants review the two country examples of coordination approaches (Handout 7.1.10).
- In plenary discussion, participants identify and record common, effective coordination and partnership mechanisms, based on their experiences.

Activity 8. RHIS/HIS Organizational Principles and Structural Considerations (30 minutes)

- Facilitator shows the relevant slide and informs participants that they will be reviewing the following topics:
 - Common health ministry HIS functions, subsystems, organizational structures, and linkages
 - Principles and practices to consider
 - Common HIS organizational pitfalls to avoid
- Participants working in small groups review and discuss Handout 7.1.11 on HIS functions as suggested by indicators of HIS performance. They list HIS functions that are commonly supported through dedicated units, departments, or programs and indicate important linkages among common HIS organizational units. The facilitator invites the groups to present and compare their lists.
- In plenary, participants review Handout 7.1.12 to discuss which statements are commonly true. Later, the facilitator invites individual participants to respond to the question accompanying each statement.

Activity 9. Case Study on RHIS Governance in Malawi (30 minutes)

The facilitator asks the participants to read the case study on RHIS Governance in Malawi (15 minutes).

After the participants have read the case study, the facilitator can ask a number of questions in the plenary session (for another 15 minutes), such as:

- What governance structure was established and for what purposes?
- What are the strengths of such an arrangement?
- What are the challenges of this governance structure and how to mitigate the?
- What alternative arrangements can the participant suggest in lieu of the governance structure presented?

SESSION 2. MANAGEMENT OF RHIS RESOURCES

Session duration: 2 hours

Session Learning Objectives

By the end of this session, participants will be able to describe essential aspects of managing RHIS resources (particularly human, financial, and physical resources) and will understand the importance of adhering to RHIS procedures and standards.

Topics Covered

Management of RHIS resources

- Human resources (staffing and workforce development)
 - Workforce needs/capacity assessment
 - Training infrastructure (database on preservice and in-service training methods, materials, policies, and resources)
 - Supportive supervision
 - Mechanisms for professional development
 - Adherence to procedures and standards of RHIS operations and functioning (for example, standard operating procedures)
- Financial resources (financial planning and management, including budgeting and accounting mechanisms)
- Physical resources: commodities and ICT
 - Needs/capacity assessment
 - Procurement
 - Maintenance

Teaching Methods

- Facilitator presentation
- Exercise and group work
- Presentations by participants

Materials Needed

- Module 7, Session 2 PowerPoint presentation: “Management of RHIS Resources”
- Large pad of display paper and an easel
- Markers
- Pens or pencils
- Handout 7.2.1: “Some Common RHIS/HIS Resource Mobilization Challenges”

- Handout 7.2.2: “Case Study of Resource Sustainability for Lot Quality Assurance Sampling (LQAS) Health Monitoring in Uganda”
- Handout 7.2.3: “Common Health Service Subsystems and Related HIS Functions for Which Staff Development Is Needed”
- Handout 7.2.4: “Conditions and Challenges that Complicate the Planning and Budgeting of Critical RHIS Funding”
- Handout 7.2.5: “Instructions for the Subgroup Exercise: Preventing and Solving Infrastructure and Commodities Problems”

Session Plan

Time	Title and Description	Methods
30 minutes	<p>Activity 1. Introduction to RHIS Resource Management Present and discuss concepts of RHIS resources and their management</p>	<p>Presentation of relevant slides from the Module 7, Session 2 PowerPoint: “Management of RHIS Resources”</p> <p>Handout 7.2.1: “Some Common RHIS/HIS Resource Mobilization Challenges”</p> <p>Handout 7.2.2: “Case Study of Resource Sustainability for Lot Quality Assurance Sampling (LQAS) Health Monitoring in Uganda”</p> <p>Discussion</p>
30 minutes	<p>Activity 2. RHIS Human Resources Present and discuss:</p> <ul style="list-style-type: none"> • Different aspects of the management of RHIS human resources (staffing and workforce development) • Workforce needs/capacity assessment • Training infrastructure (database on training, preservice and in-service training methods, materials, policies, and resources) • Supportive supervision • Mechanisms for professional development • Degrees of specialization and devotion to RHIS 	<p>Presentation of relevant PowerPoint slides</p> <p>Handout 7.2.3: “Common Health Service Subsystems and Related HIS Functions for Which Staff Development Is Needed”</p> <p>Discussion</p>
30 minutes	<p>Activity 3. Management of RHIS Financial Resources</p>	<p>Presentation of relevant PowerPoint slides</p>

	<p>Present and discuss financial planning and management:</p> <ul style="list-style-type: none"> • Budgeting mechanisms • Accounting mechanisms • Staffing requirements • ICT/software requirements • Financial reporting requirements (link to RHIS) 	<p>Handout 7.2.4: “Conditions and Challenges that Complicate the Planning and Budgeting of Critical RHIS Funding”</p> <p>Exercise</p>
30 minutes	<p>Activity 4. Management of RHIS Infrastructure and Commodities</p> <p>Present and discuss:</p> <ul style="list-style-type: none"> • Management of RHIS infrastructure and commodities <ul style="list-style-type: none"> ○ Printed supplies ○ Communications infrastructure (telephone, Internet) ○ Hardware and software • Needs/capacity assessment • Stock management at health-system levels • Forecasting needs • Troubleshooting and maintenance 	<p>Presentation of relevant PowerPoint slides</p> <p>Handout 7.2.5: “Instructions for the Subgroup Exercise: Preventing and Solving Infrastructure and Commodities Problems”</p> <p>Exercise or case study</p>

Session Activities

Activity 1. Introduction to RHIS Resource Management (30 minutes)

- Facilitator shows the relevant slide to introduce the discussion on the management of RHIS resources, and briefly mentions the general categories and types of RHIS resources.
- Participants read Handouts 7.2.1 and 7.2.2 to understand some common RHIS/HIS resource-mobilization challenges. The facilitator summarizes, showing the relevant slide, and invites discussion on the challenges of RHIS resource mobilization.

Activity 2. RHIS Human Resources (30 minutes)

- Facilitator shows the relevant slide to initiate a discussion on RHIS workforce requirements and development, and stresses that RHIS human-resource development entails understanding RHIS/HIS workforce needs, the degrees of involvement and specialization, training and staff capacity development needs (types of training and training resource requirements for specific functions), means for professional development, and staff performance monitoring and support.
- Participants review Handout 7.2.3 to link the types of staff involved in carrying out RHIS functions. (Participants list the staff involved in RHIS/HIS functions in Column 6 of the framework only for the first two service support systems). The facilitator summarizes the exercise using the remaining slides on management of human resources.

Activity 3. Management of RHIS Financial Resources (30 minutes)

- The facilitator shows the relevant slide to initiate discussion on requirements for RHIS funding, and invites participants to provide examples of financial budgeting, accounting and reporting requirements, and challenges for RHIS-related activities. The participants review Handout 7.2.4—“Conditions and Challenges that Complicate the Planning and Budgeting of Critical RHIS Funding”—and express their views in the plenary.
- The facilitator shows the relevant slide to engage discussion on the common sources of RHIS funding requirements.

Activity 4. Management of RHIS Infrastructure and Commodities (30 minutes)

- Using Slide 7.2.11, the facilitator invites the participants to brainstorm on the main items of RHIS infrastructure and commodities. Participants discuss, based on their experiences, the more important items to monitor and maintain in RHIS infrastructure and commodities. They also discuss the primary means to monitor RHIS infrastructure and commodities.
- The facilitator shows the slide that explains the group activity. Then, working in smaller groups, participants discuss the questions in Handout 7.2.5.
- The facilitator shows the remaining slide and participants share their views in the plenary.

MODULE 8. INFORMATION AND COMMUNICATION TECHNOLOGY FOR RHIS

Module duration: 6 hours; 4 sessions

Module Learning Objectives

By the end of this module, participants will be able to:

- Explain key terms used in eHealth (defined as the use of ICT in health systems)
- Discuss how application architecture fits in the overall enterprise architecture (EA)
- Describe the role of ICT in integration and interoperability of RHIS
- Explain the importance and application of patient-centered information systems
- Demonstrate competence in the use of ICT standards for RHIS

Suggested References

- Digital Development Principles Working Group. (n.d.) Principles for digital development [Website]. Retrieved from <http://digitalprinciples.org/>
- Healthcare Information and Management Systems Society (HIMSS). (2013). [HIMSS board-approved definition of interoperability](http://www.himss.org/ResourceLibrary/genResourceFAQReg.aspx?ItemNumber=23990) [Website]. Retrieved from <http://www.himss.org/ResourceLibrary/genResourceFAQReg.aspx?ItemNumber=23990>
- Ritz, D., Althausen, C., & Wilson, K. (2014). Connecting health information systems for better health: Leveraging interoperability standards to link patient, provider, payer, and policymaker data. Seattle, WA, USA: PATH and Joint Learning Network for Universal Health Coverage. Retrieved from <http://www.jointlearningnetwork.org/resources/connecting-health-information-systems-for-better-health>
- Sandeep, R. (2016). An introduction to user centered design [Website]. Retrieved from <http://www.slideshare.net/rohansandeep/anintroductiontoucd>
- Stansfield, S., Orobato, N., Lubinski, D., Uggowitz, S., & Mwanyika, H. The case for a national health information system architecture: A missing link to guiding national development and implementation. Retrieved from <https://www.hingx.org/Share/Details/986>
- Usability First. (n.d.) Introduction to user-centered design [Website]. Retrieved from <http://www.usabilityfirst.com/about-usability/introduction-to-user-centered-design/>
- Usability.gov. (2016). What and why of usability: User-centered design basics. Retrieved from <http://www.usability.gov/what-and-why/user-centered-design.html>
- Web Accessibility Initiative. (n.d.). WAI website redesign project. Retrieved from <https://www.w3.org/WAI/redesign/project.html>

Sessions

- Session 1: eHealth, mHealth, and Health Information System Architecture (2 hours)
- Session 2: RHIS Integration and Interoperability (1 hour, 30 minutes)
- Session 3: Patient-Centered Information Systems (1 hour)
- Session 4: Data Repository/Data Warehouse (1 hour, 30 minutes)

SESSION 1. EHEALTH, MHEALTH, AND HEALTH INFORMATION SYSTEM ARCHITECTURE

Session duration: 2 hours

Session Learning Objectives

By the end of this session, participants will be able to:

- Explain key terms used in eHealth
- Discuss how application/technology architecture fits in the overall EA

Topics Covered

Overview of eHealth and mHealth

- Definition of eHealth terms
- Applications of eHealth and mHealth (health interventions supported by mobile devices)
- How ICT is used in data collection, transfer, analysis, and use
- Limitations and considerations for using ICT in resource-poor settings
- Enterprise architecture
- Discuss EA, with an emphasis on application/technology architecture

Teaching Methods

Facilitator presentation and plenary discussion

Materials Needed

- PowerPoint presentations: Module 8, “Introduction”; Module 8, Session 1, “eHealth, mHealth, and Health Information System Enterprise Architecture”
- Projection equipment
- Large pad of display paper and an easel
- Handout 8.1.1: “Discussion of Case Study on eHealth Center in India”
- Handout 8.1.2: “Journal Article on the eHealth Center”

Session Plan

Time	Title and Description	Methods
30 minutes	Activity 1. Overview of eHealth <ul style="list-style-type: none">• Definition of eHealth terms• Applications of eHealth and mHealth• Limitations and considerations of eHealth	Presentation of Module 8 “Introduction” PowerPoint slides and relevant slides from the Module 8, Session 1 PowerPoint (“eHealth, mHealth, and HIS EA”)

		Discussion
30 minutes	Activity 2. Enterprise Architecture (EA) In plenary session, discuss: <ul style="list-style-type: none"> • EA, with an emphasis on application/technology architecture • How application/technology architecture interacts with business and data architecture • Ecology of HIS in LMICs • Summary of discussions on EA 	Lecture on EA, with an emphasis on applications and technology Presentation of relevant PowerPoint slides
15 minutes	Break	
45 minutes	Activity 3. Case Study on an eHealth Center in India <ul style="list-style-type: none"> • See Handout 8.1.1 and 8.1.2 	Small-group discussion

Session Activities

Activity 1. Overview of eHealth (30 minutes)

Definition of Terms

- Facilitator elaborates on eHealth definitions and terms, showing the relevant slides.
- Facilitator gives examples of eHealth interventions (showing the relevant slide) and encourages participants to give more examples from their countries.
- Participants engage in a discussion on the importance of eHealth.
- Facilitator shows the relevant slide and elaborates on the topic, based on the comments of the participants.

Applications of eHealth and mHealth

- Facilitator encourages participants to name various mHealth and eHealth applications.
- Facilitator shows the relevant slides and elaborates on some of the many uses of eHealth and mHealth, emphasizing:
 - The gradual introduction of ICT solutions that are replacing paper-based systems
 - Efficiency of sophisticated relational databases for data interoperability, integration, and storage
 - Use of ICT solutions for enhanced and efficient data collection, storage, data access and sharing, data analysis and visualization, and data quality
 - Limitations/considerations of using eHealth solutions

Activity 2. Enterprise Architecture (EA) (30 minutes)

Ecology of HIS in LMICs

- Participants express their opinions on the current situation of HIS in LMICs, based on their experiences. Facilitator summarizes the discussion, showing the relevant slide.

Introduction to EA

- Facilitator presents an overview of EA and explains the need for it, showing the relevant slide.
- Facilitator shows the relevant slide and discusses the subcomponents of each of the four types of architectures.
- Facilitator outlines the principles of each type of architecture, as shown on the relevant slide.
- Facilitator shows the relevant slide and explains how developing EA can help align and leverage investments in HIS strengthening, bring in stakeholders to collaborate, and promote interoperability and use of the information system.
- A good example is the EA in Rwanda (show the corresponding slide).
- Facilitator summarizes the discussions with the last slide in the deck for this session.

Activity 3. Case Study on eHealth Center in India (45 minutes)

- Facilitator distributes Handout 8.1.1 and the journal article (Handout 8.1.2) that describes the eHealth Center
- Participants break up into small groups and discuss the questions in Handout 8.1.1.
- After 30 minutes, the facilitator asks the group leaders to briefly share their responses to the questions.

SESSION 2. RHIS INTEGRATION AND INTEROPERABILITY

Session duration: 1 hour, 30 minutes

Session Learning Objectives

By the end of this session, participants will be able to explain data linkage terms and describe the role of ICT in integration and interoperability of the RHIS.

Topics Covered

Using ICT for systems integration and interoperability:

- Environment for effective systems integration and interoperability
- Use of ICT standards for systems integration and interoperability
- Data accessibility: open health information exchange (HIE), meta-data sharing)
- Data privacy and security

Teaching Methods

- PowerPoint presentations:
- Brainstorming
- Case studies

Materials Needed

- Module 8, Session 2 PowerPoint presentation: “Using ICT for Integration and Interoperability of Health Information Systems”
- Projection equipment
- Sticky notes
- Large pad of display paper and an easel

Session Plan

Time	Title and Description	Methods
90 minutes	Using ICT for Integration and Interoperability in Health Information Systems Introduce and elaborate the following concepts: <ul style="list-style-type: none">• Use of ICT standards for systems integration and interoperability• Data accessibility (OpenHIE and metadata sharing)• Data privacy and security	Module 8, Session 2 PowerPoint presentation: “RHIS Integration and Interoperability” Review of case studies of data integration and system interoperability achieved in LMICs

	<p>Activity 1. Introduce Data Linkage Terminologies (15 minutes)</p> <p>Activity 2. Elaborate Data Linkage Terminologies (15 minutes)</p> <p>Activity 3. Discuss the Role of the Master Facility List in Linking Data from Various Sources (15 minutes)</p> <p>Activity 4. Exemplify Data Linkages (15 minutes)</p> <p>Activity 5. Explain the Decision Support System (15 minutes)</p> <p>Activity 6. Discuss the Concepts of Data Privacy, Security, and Confidentiality (15 minutes)</p>	<p>Discussion</p> <p>Q&A</p> <p>Group activities</p>
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Session Activities

Activity 1. Introduce Data Linkage Terminologies (15 minutes)

- Facilitator shows the relevant slides and briefly mentions the different terminologies used in relation to linking data that will be discussed in this session.
- Participants discuss why HIS data integration and interoperability are necessary.
- Facilitator shows the relevant slides and reiterates that, in isolation, routine health information is limited in its effectiveness for making informed decisions. Combining RHIS data with population census data greatly improves decision making, because the population data provide denominators for current ongoing health measures and indicators. Demographic and health surveys (DHS) provide accurate population-based indicator values, but they are limited in that they are only periodic measurements (usually taken every three to five years), and their ability to provide subnational estimates are limited by their sample sizes. Thus, DHS data can provide accurate estimates at the national and limited (regional) subnational levels for a specific time, while RHIS data, combined with population census data, can provide estimates for periods when DHS data are not available, and for district and lower levels for which data cannot be obtained by DHS.

Activity 2. Elaborate Data Linkage Terminologies (15 minutes)

Facilitator shows the relevant slides to:

- Explain RHIS integration and interoperability
- Discuss metadata sharing
- Explain the HIE and OpenHIE, and how the HIE is an integral part of the data architecture

Activity 3. Discuss the Role of the Master Facility List in Linking Data from Various Sources (15 minutes)

Facilitator shows the relevant slides and discusses briefly the master facility list (MFL), its unique feature that helps in linking data from various sources, and how it helps to improve the HIS.

The facilitator reiterates the benefits of having a comprehensive, up-to-date, and accurate MFL to promote data linkages.

Activity 4. Exemplify Data Linkages (15 minutes)

Facilitator invites participants to share examples of linking data for various purposes and uses the relevant slides to elucidate how data from different sources are linked, providing a better picture of a situation and better decision making.

Activity 5. Explain the Decision Support System (15 minutes)

Showing the relevant slides, the facilitator elaborates on the decision support system and its uses (retrospective comparative analysis of data, data mining, and modeling) and purposes (easy and prompt data analysis, visual presentation, interpretation, and use by health managers who are otherwise busy or have limited data analysis skills).

Activity 6. Discuss the Concepts of Data Privacy, Security, and Confidentiality (15 minutes)

The facilitator shows the relevant slides and explains that ensuring privacy, security, and confidentiality of personal health information is a fundamental principle of HIS management.

SESSION 3. PATIENT-CENTERED INFORMATION SYSTEMS

Session duration: 1 hour

Session Learning Objective

By the end of this session, participants will be able to explain the importance and application of patient-centered information systems.

Topics Covered

- Electronic medical records (EMRs) and aggregate-information systems
- Types of EMRs
- Benefits of EMRs
- Patient unique identifiers (PUIDs)

Teaching Methods

- PowerPoint presentation
- Brainstorming
- Group discussion

Materials Needed

- Module 8, Session 3 PowerPoint presentation: “Patient-Centered Information Systems”
- Projection equipment
- Sticky notes
- Large pad of display paper and an easel

Session Plan

Time	Title and Description	Methods
45 minutes	Patient-Centered Information Systems Introduce and elaborate the following concepts: <ul style="list-style-type: none">• EMRs and aggregate information systems• Readiness for patient-centered IT solutions• Development of PUIDs Activity 1. Overview of Electronic Medical Records (EMRs) (20 minutes) Activity 2. Discuss EMR Implementation Considerations (5 minutes)	Module 8, Session 3 PowerPoint presentation/lecture: “Patient-Centered Information Systems” Brainstorming Q&A Group activities

	Activity 3. Explain PUIDs (5 minutes)	
	Activity 4. Summarize the Discussion (15 minutes)	
15 minutes	Break	

Session Activities

Activity 1. Overview of Electronic Medical Records (EMRs) (20 minutes)

Based on the slide presentation for Module 3:

- Facilitator explains session objectives, introduces the concept of EMRs, provides a comparison of aggregate-level health information with EMRs, lists types of EMRs, and explains the pros and cons of different types of EMRs.
- Facilitator invites discussion of the benefits of EMRs and further clarifies the concepts and benefits.

Activity 2. Discuss EMR Implementation Considerations (5 minutes)

Participants discuss what must be considered in implementing EMRs.

Facilitator clarifies the important considerations for EMR implementation.

Activity 3. Explain PUIDs (5 minutes)

Facilitator discusses PUIDs and elaborates on their components, functions, and objectives.

Activity 4. Summarize the Discussion (15 minutes)

Facilitator discusses the contribution of EMRs to patient care and healthcare systems, and participants discuss their experiences with EMR implementation challenges.

SESSION 4. DATA REPOSITORY/DATA WAREHOUSE

Session duration: 1 hour, 30 minutes

Session Learning Objective

By the end of this session, participants will be able to explain the basic definitions and concepts of data repositories and data warehousing architectures.

Topics Covered

Patient-centered information systems:

- Electronic medical records (EMRs) and aggregate information systems
- Readiness for patient-centered IT solutions
- Development of patients' unique identifiers
- Data repositories/data warehouses

Teaching Methods

- PowerPoint presentation
- Brainstorming
- Discussion

Materials Needed

- Module 8, Session 4 PowerPoint presentation: "Data Repository"
- Projection equipment
- Sticky notes
- Large pad of display paper and an easel

Session Plan

Time	Title and Description	Methods
90 minutes	Data Repository Introduce and explain the concepts of a data repository (or data warehouse) and data-warehouse architecture	Module 8, Session 4 PowerPoint presentation/lecture: "Data Repository" Brainstorming Q&A Group activities

	<p>Activity 1. Introduction to Data Repository/Data Warehouse (25 minutes)</p> <p>Activity 2. Discuss Data Warehouse Architecture (25 minutes)</p> <p>Activity 3. Clarify the Differences between a Data Warehouse and Operational Data (20 minutes)</p> <p>Activity 4. Summarize and Explain the Data Warehousing Process (20 minutes)</p>	
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Activity 1. Introduction to Data Repository/Data Warehouse (25 minutes)

Using the relevant slides for this session:

- Facilitator provides an overview of the data repository.
- Facilitator introduces the concept and definition of the data warehouse.
- Facilitator explains aspects of the data warehouse (subject-oriented, integrated, time-variant, and nonvolatile).

Activity 2. Discuss Data Warehouse Architecture (25 minutes)

Facilitator discusses data warehouse architecture and its variants, showing the relevant slides.

Activity 3. Clarify the Differences between a Data Warehouse and Operational Data (20 minutes)

The facilitator presents the relevant slide and clarifies the differences.

Activity 4. Summarize and Explain the Data Warehousing Process (20 minutes)

Facilitator shows the final slides and summarizes the process.

MODULE 9. RHIS PERFORMANCE ASSESSMENT

Module duration: 6 hours; 3 sessions

Module Learning Objectives

By the end of this session, participants will be able to:

- Explain frameworks for assessing RHIS
- Demonstrate understanding of the RHIS standards across the four domains
- Demonstrate understanding of the three categories of determinants of RHIS performance
- Diagnose RHIS performance (to measure production, management, and use of high-quality data)
- Describe the RHIS Rapid Assessment Tool and the purpose of its implementation
- Apply the PRISM tools to identify and analyze possible constraints on successful implementation of an RHIS

Suggested References

- Aqil, A., Lippeveld, T., & Hozumi, D. (2009). PRISM framework: A paradigm shift for designing, strengthening and evaluating routine health information systems. *Health Policy and Planning*, 24(3):217–228. Retrieved from <http://www.cpc.unc.edu/measure/publications/ja-09-99>
- Aqil, A., Lippeveld, T., Moussa, T., & Barry, A. (2012). Performance of Routine Information Systems Management (PRISM) tools user guide. Chapel Hill, NC, USA: MEASURE Evaluation, University of North Carolina. Retrieved from <http://www.cpc.unc.edu/measure/publications/ms-12-51>
- Belay, H. & Lippeveld, T. (2013). Inventory of PRISM framework and tools: Application of PRISM tools and interventions for strengthening routine health information system performance. Chapel Hill, NC, USA: MEASURE Evaluation, University of North Carolina. Retrieved from <http://www.cpc.unc.edu/measure/publications/wp-13-138?searchterm=PRISM+invent>
- Heywood, A. & Boone, D. (2015). Guidelines for data management standards in routine health information systems. Chapel Hill, NC, USA: MEASURE Evaluation, University of North Carolina. Retrieved from www.cpc.unc.edu/measure/publications/ms-15-99
- Hotchkiss, D., Aqil, A., Lippeveld, T., & Mukooyo, E. (2010). Evaluation of the Performance of Routine Information System Management (PRISM) framework: Evidence from Uganda. *BMC Health Services Research*, 10:188. Retrieved from <http://www.biomedcentral.com/1472-6963/10/188>
- International Health Partnership + Related Initiatives (IPH+) and World Health Organization (WHO). (2011). Monitoring, evaluation and review of national health strategies: A country-led platform for information and accountability. Geneva, Switzerland: WHO. Retrieved from

http://www.who.int/healthinfo/country_monitoring_evaluation/documentation/en/

- MEASURE Evaluation. (2016). RHIS Rapid Assessment Tool (RAT). Chapel Hill, NC, USA: MEASURE Evaluation, University of North Carolina.
- MEASURE Evaluation. PRISM: Performance of Routine Information System Management Framework [Website]. Retrieved from <http://www.cpc.unc.edu/measure/resources/tools/monitoring-evaluation-systems/prism>
- World Health Organization, United States Agency for International Development, & University of Oslo. Health facility and community data toolkit. (2014). Retrieved from http://www.who.int/healthinfo/facility_information_systems/en/

Sessions

- Session 1: Introduction to Frameworks for Assessing RHIS (1 hour)
- Session 2: Overview of the RHIS Rapid Assessment Tool (2 hours)
- Session 3: Overview of PRISM Assessment Tools (3 hours)

SESSION 1. INTRODUCTION TO FRAMEWORKS FOR ASSESSING RHIS

Session duration: 1 hour

Session Learning Objectives

By the end of this session, participants will be able to:

- Review RHIS standards
- Define RHIS performance
- Define factors influencing RHIS performance
- Explain the frameworks for assessing RHIS

Topics Covered

- Domains of RHIS standards
- Determinants of RHIS performance
- Introduction to the frameworks for assessing RHIS performance

Teaching Methods

Facilitator presentation and plenary discussion

Material Needed

- PowerPoint presentation: Module 9, “Introduction”; Module 9, Session 1, “Introduction to Frameworks for Assessing RHIS”
- Large pad of display paper and an easel
- Markers
- Poster paper for sticky notes
- Handout 9.1.1: “The PRISM Conceptual Framework”
- Projection equipment

Session Plan

Time	Title and Description	Methods
60 minutes	Introduction to Frameworks for Assessing RHIS Performance (20 minutes) <ul style="list-style-type: none">• Relationship between M&E and HIS• Measuring RHIS performance: the PRISM framework	Present Module 9 “Introduction” PowerPoint slides and then Module 9, Session 1 PowerPoint “Introduction to Frameworks for Assessing RHIS”

	<ul style="list-style-type: none"> • Highlight the three determinants of PRISM • Review the RHIS performance improvement conceptual framework • Provide background of the harmonized RHIS standards • Review domains of the RHIS standards (Module 3, Session 2) <p>Activity 1. Group Work (20 minutes)</p> <p>Activity 2. Group Work (20 minutes)</p>	<p>Plenary discussion</p> <p>Handout 9.1.1: “The PRISM Conceptual Framework”</p>
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Session Activity

Facilitator presents the PowerPoint slides and conducts a plenary discussion of this material.

Activity 1. Group Work (20 minutes)

This activity is described on a slide in the Module 9, Session 1 PowerPoint presentation. Facilitator divides participants into groups of five or six and asks them to do the following:

- List three bottlenecks you are facing in the current RHIS.
- Identify the root causes contributing to the problem.

Activity 2. Group Work (20 minutes)

This activity is described on a slide in the Module 9, Session 1 PowerPoint presentation. Keep the same groups of five to six people and ask them to do the following:

- Categorize the causes identified in the previous group work, according to the PRISM Framework.
- Each small group will then report its work in plenary.

SESSION 2. OVERVIEW OF THE RHIS RAPID ASSESSMENT TOOL

Session duration: 2 hours

Session Learning Objectives

At the end of this session, participants will:

- Be familiar with the RHIS Rapid Assessment Tool
- Know how and when to implement this tool and score and analyze results
- Understand how the tool's results can be used for action planning

Topics Covered

- RHIS Rapid Assessment Tool
- Implementation, including workshop preparation, selecting participants, and outlining the process
- Scoring, analysis, and interpretation of results
- Action planning using this tool's results

Teaching Methods

- Lecture
- Group/plenary discussion
- Tool demonstration

Materials Needed

- Module 9, Session 2 PowerPoint presentation: "Overview of the RHIS Rapid Assessment Tool"
- Projection equipment
- Laptop computers
- Large pad of display paper and an easel
- Markers
- Pens or pencils
- Handout 9.2.1: "RHIS Rapid Assessment Tool"

Session Plan

Time	Title and Description	Methods
45 minutes	Activity 1. RHIS Rapid Assessment Tool (RAT) Present and discuss: <ul style="list-style-type: none"> • Overview of the tool • Discuss how to implement the tool, score and analyze the results, and use results for action planning 	PowerPoint presentation of Module 9, Session 2 slides followed by plenary discussion Handout 9.2.1: RHIS RAT
15 minutes	Break	
60 minutes	Activity 2. Rapid Assessment Tool Demonstration	Tool demonstration Plenary discussion (Q/A)

Session Activities

Activity 1. RHIS Rapid Assessment Tool (45 minutes)

- The facilitator presents the Module 9, Session 2 PowerPoint slides on the RHIS Rapid Assessment Tool and responds to questions.

Activity 2. Rapid Assessment Tool Demonstration (1 hour)

- The facilitator asks participants to access the tool on their computers (if computers are available to the participants).
- The facilitator demonstrates use of the tool so participants can see the tool's features for data entry, scoring, and analysis.
- The facilitator answers questions.

SESSION 3. OVERVIEW OF PRISM ASSESSMENT TOOLS

Session duration: 3 hours

Session Learning Objectives

By the end of this session, participants will be able to:

- Describe how the set of PRISM tools is organized
- Explain the purpose of each tool
- Understand how to apply PRISM tools to diagnose RHIS performance and its determinants

Topics Covered

- Overview of PRISM tools to assess and improve RHIS performance
 - RHIS overview tool
 - RHIS performance diagnostic tool
 - Electronic RHIS assessment tool
 - Management assessment tool
 - Facility/office checklist
 - Organizational and behavioral assessment tool
- RHIS assessment process
 - Steps to conduct a PRISM assessment
 - Analysis and presentation of PRISM data
 - Examples of the application of PRISM tools in various countries

Teaching Methods

- Facilitator presentation
- Group/plenary discussion

Materials Needed

- Module 9, Session 3 PowerPoint presentation: “Overview of PRISM Assessment Tools”
- Large pad of display paper and an easel
- Markers
- Poster paper for sticky notes
- Laptop to prepare the presentation
- Projection equipment
- Handout 9.3.1: “Lottery Questions”
- Handout 9.3.2: “PRISM Tools User Guide” (may be accessed online at <http://www.cpc.unc.edu/measure/resources/publications/ms-12-51>)

Session Plan

Time	Title and Description	Methods
2 hours	Overview of Tools to Assess RHIS Performance <ul style="list-style-type: none"> Explain and discuss the purpose, content (measurements) and applicability of PRISM tools 	Presentation of the relevant slides in Module 9, Session 3 PowerPoint: "Overview of PRISM Assessment Tools"
15 minutes	Break	
45 minutes	Activity 1. Lottery RHIS Performance Assessment Process <ul style="list-style-type: none"> Steps to conduct a PRISM assessment Analysis and presentation of data Examples of the application of PRISM tools in various countries 	Handout 9.3.1: "Lottery Questions" Presentation of remaining slides in this PowerPoint deck Handout 9.3.2: "PRISM Tools User Guide"

Session Activity

Activity 1. Lottery (45 minutes)

- Facilitator prepares small, folded chits—each with one of the following questions on it:
 - What are the names of some PRISM tools?
 - When will you use the Organizational Behavioral Assessment Tool (OBAT)?
 - A health facility in-charge wants to assess the data quality of the RHIS. Which tool should he/she use?
 - Which tools will you use to assess RHIS policy- and strategy-level status?
 - Which tool will you use to map the RHIS structure in the country? How will this mapping help in deciding an RHIS strengthening intervention?
 - When is data quality review (DQR) done?
 - What is a verification factor? How will you calculate it? What information will that provide?
 - What are the broad themes of the RHIS Rapid Assessment Tool?
 - How will you conduct an assessment using PRISM tools?
- Facilitator puts the chits in a container of some sort.
- Facilitator goes around the room, asking participants one by one to draw a chit and answer the question written on it.
- Facilitator expresses appreciation for each participant's effort to answer and clarifies the response, if necessary.

MODULE 10. RHIS DESIGN AND REFORM

Module duration: 9 hours; 3 sessions

Module Learning Objectives

By the end of this module, participants will be able to:

- Describe the six components of an RHIS, categorized as inputs, processes, and outputs
- Explain the guiding principles of RHIS reform/strengthening
- Understand the roadmap to RHIS reform/strengthening
- Describe the importance of stakeholders' engagement and how to conduct stakeholders' analysis to reach out to stakeholders for ensuring collaboration on and ownership of RHIS design and reform
- Describe the process of RHIS design
- Explain the core elements of an RHIS strengthening/scale-up plan

Suggested References

- International Health Partnership + Related Initiatives (IPH+) and World Health Organization (WHO). (2011). *Monitoring, evaluation and review of national health strategies: A country-led platform for information and accountability*. Geneva, Switzerland: WHO. Retrieved from http://www.who.int/healthinfo/country_monitoring_evaluation/documentation/en/
- Health Metrics Network. (2012). *Framework and standards for country health information systems*, 2nd edition. (2012). Geneva, Switzerland: World Health Organization. Retrieved from <https://www.measureevaluation.org/his-strengthening-resource-center/resources/hmn-framework-and-standards-for-country-health-information-systems>
- Lippeveld, T., Sauerborn, R., & Bodart, C. (Eds.) (2000). *Design and implementation of health information systems*. Geneva, Switzerland: World Health Organization. Retrieved from <http://apps.who.int/iris/handle/10665/42289>
- Wodon A., Lecharlier, F., Greindl, I., De Lamalle, J., De Caluwe, P., & D'Altilia, J. (2010). *Health information system*, 2nd edition. Paris, France: L'Harmattan.

Sessions

- Session 1: RHIS Design and Reform: Guiding Principles and Roadmap (3 hours)
- Session 2: RHIS Design and Reform Process (3 hours)
- Session 3: RHIS Reform in the Context of Scalability and Sustainability (3 hours)

SESSION 1. RHIS DESIGN AND REFORM: GUIDING PRINCIPLES AND ROADMAP

Session duration: 3 hours

Session Learning Objectives

By the end of this module, participants will be able to:

- Describe the six components of an RHIS, categorized as inputs, processes, and outputs
- Explain the guiding principles of RHIS reform/strengthening
- Understand the theory of change (TOC) for RHIS reform/strengthening

Topics Covered

The six components of an HIS (from the Health Metrics Network Framework), applied to RHIS and categorized as inputs, processes, and outputs

- Inputs
 - (1) Resources:
 - RHIS leadership and governance, coordination mechanism, policies and strategic plan, and capacity building resources
 - Financial, logistic, and human resources, and ICT resources
- Processes
 - (2) Indicators
 - (3) Data sources
 - (4) Data management
- Outputs
 - (5) Information products
 - (6) Dissemination and use

The guiding principles of HIS/RHIS development/strengthening

- Country leadership and ownership
- Responsiveness to country needs and demands
- Building upon existing initiatives and systems
- Broad-based consensus and stakeholder involvement
- Gradual and incremental process with long-term vision
- Integration

RHIS strengthening/change pathways

- Improved data quality
- Improved data use

- Improved RHIS management

Teaching Methods

- Facilitator presentation
- Brainstorming
- Exercise and group work
- Presentations by participants

Materials Needed

- PowerPoint presentations: Module 10, “Introduction”; Module 10, Session 1, “RHIS Design and Reform: Guiding Principles and Road Map”
- Large pad of display paper and an easel
- Large sticky notes/cards
- Markers
- Handout 10.1.1: “The Six Components of an HIS” (from the HMN Framework, pages 16–17)
- Handout 10.1.2: Case Study: “Strengthening the RHIS of the Ministry of Health and Family Welfare, Bangladesh”
- Handout 10.1.3: “RHIS Strengthening Theory of Change”

Session Plan

Time	Title	Methods
45 minutes	Activity 1. The 6 Components of an HIS	<p>Presentation of the relevant Module 10 “Introduction” PowerPoint slides and Module 10, Session 1 PowerPoint Slides</p> <p>Handout 10.1.1: “The Six Components of an HIS”</p>
60 minutes	<p>RHIS Strengthening Guiding Principles</p> <p>Activity 2. Case Study: Bangladesh</p>	<p>Presentation of the relevant Module 10, Session 1 PowerPoint slides</p> <p>Small-group and plenary discussions of the case study</p> <p>Handout 10.1.2: Case study, “Strengthening the RHIS of the MOHFW in Bangladesh”</p>
15 minutes	Break	
60 minutes	Activity 3. Brainstorming on Pathways to RHIS Strengthening	<p>Presentation of the relevant Module 10, Session 1 PowerPoint slides</p> <p>Discussion and brainstorming</p> <p>Handout 10.1.3: “RHIS Strengthening Theory of Change” (stakeholder engagement matrix)</p>

Session Activities

Activity 1. The 6 Components of an HIS (45 minutes)

- Facilitator greets participants and explains the session objectives. Facilitator asks participants to read Handout 10.1.1 (pages 16–17 of the HMN framework document, on the six HIS components).
- Facilitator encourages participants to provide country-specific examples of each component.
- Facilitator records participant responses on large display paper and summarizes the discussion.

Activity 2. Case Study: Bangladesh (1 hour)

- In groups of two, participants go through the case study (Handout 10.1.2).
- Facilitator asks participants to point out the broad principles of RHIS strengthening that were followed (or not followed) there, and records these responses on the large sheet of display paper.
- Facilitator summarizes the Bangladesh situation in terms of following the guiding principles for HIS strengthening, and encourages a discussion involving the participants' previous responses.

Activity 3. Brainstorming on Pathways to RHIS Strengthening (1 hour)

- Facilitator encourages participants to brainstorm about the possible pathways for strengthening RHIS.
- Facilitator encourages participants to develop a theory of change on RHIS strengthening, taking into consideration the PRISM framework of RHIS performance and its determinants and the core components of health-facility/community-based information system strengthening.
- Facilitator asks participants to review Handout 10.1.3 (“RHIS Strengthening Theory of Change”).
- Facilitator engages participants in discussion of this theory of change.

SESSION 2. RHIS DESIGN AND REFORM PROCESS

Session duration: 3 hours

Session Learning Objectives

By the end of this module, participants will be able to:

- Describe the importance of stakeholders' engagement and how to conduct stakeholder analysis to ensure collaboration on and ownership of RHIS design and reform
- Describe the process of RHIS design
- Explain the rationale for selecting core RHIS indicators
- Explain the types of data collection and reporting tools required for RHIS indicators

Topics Covered

RHIS design process

- Convene stakeholders, establish leadership and coordination mechanisms, and undertake performance assessment
- Identify routine information needs and indicators

RHIS indicators

- Use business architecture to define data architecture
- Rationalize and prioritize indicators

Teaching Methods

- Facilitator presentation
- Brainstorming
- Exercise and group work
- Presentations by participants

Materials Needed

- Module 10, Session 2 PowerPoint presentation: "RHIS Design & Reform Process"
- Large pad of display paper and an easel
- Large sticky notes/cards
- Markers
- Handout 10.2.1: Stakeholder Analysis Matrix
- Handout 10.2.2: Maternal Survival Strategy

Session Plan

Time	Title	Methods
90 minutes	Activity 1. RHIS Design Process, Part 1 (20 minutes) Activity 2. Convening Stakeholders (20 minutes) Activity 3. Stakeholder Analysis (35 minutes) Activity 4. RHIS Assessments (15 minutes)	Presentation of relevant Module 10, Session 2 PowerPoint slides Brainstorming Handout 10.2.1: “Stakeholder Analysis Matrix”
15 minutes	Break	
75 minutes	Activity 5. RHIS Design Process, Part 2 Identifying Routine Information Needs and Indicators	Group work Presentation of relevant PowerPoint slides Handout 10.2.2: “Maternal Survival Strategy”

Session Activities

Activity 1. RHIS Design Process: Introduction (20 minutes)

Facilitator informs the participants that this session builds on previous lessons. In this session, the focus is on:

- Engaging stakeholders and establishing leadership and coordination mechanisms
- Assessing the RHIS
- Identifying routine/institution-based information needs and indicators
- Describing routine/institution-based data requirements and tools at different levels

Activity 2. Convening Stakeholders: Brainstorming (20 minutes)

- Facilitator encourages participants to brainstorm on how to convene stakeholders, by asking and discussing the following questions:
 - Who are the stakeholders for RHIS strengthening?
 - Why is it important to engage stakeholders?
 - Who leads the process?
- Facilitator records responses on a large sheet of display paper and compares participants’ comments with the content of the relevant slides, encouraging discussion and clarifying as necessary.
- Participants are asked to review the “Stakeholder Analysis Matrix” (Handout 10.2.1). The facilitator provides the necessary explanation of the tool.

Activity 3. Stakeholder Analysis: Small-Group Work (35 minutes)

Participants are divided into three to four groups and asked to complete the “Stakeholder Analysis Matrix” (Handout 10.2.1). Each group is assigned one category of stakeholder and the group chooses a stakeholder belonging to that category and fills in the matrix accordingly.

Activity 4. RHIS Assessments: Recap (15 minutes)

Facilitator shows the slide with instruction on the activity. Participants brainstorm about the RHIS assessment tools they have studied during the course, and specifically in Module 9. The facilitator reiterates the purposes of each tool:

- PRISM tools
- RHIS Rapid Assessment Tool
- Data Quality Review (DQR)
- M&E Assessment, Planning, and Costing tool (under development by WHO as of early 2017)

Activity 5. RHIS Design: Identifying Routine Information Needs and Indicators (1 hour, 15 minutes)

- Participants discuss lessons learned on data collection and reporting from a previous session.
- Showing the relevant slides, the facilitator organizes the participants in three to four groups, and distributes Handout 10.2.2 on maternal survival strategies.
- Participants in each group:
 - Identify the routine information needs for monitoring the implementation of the strategy.
 - List the possible indicators to routinely monitor the strategy.
 - Prioritize the items listed.
 - Identify the data elements required for calculating the indicators.
 - List the data elements for the selected indicators that can be feasibly collected by the health facility and the community healthcare provider.
- After the group work, each group presents its work to the plenary group.
- Facilitator engages participants to discuss RHIS indicator selection, emphasizing the importance of rationalization and prioritization and including only those data elements in the RHIS that can be routinely collected by the health facilities and community-based healthcare providers.

SESSION 3. RHIS REFORM IN THE CONTEXT OF SCALABILITY AND SUSTAINABILITY

Session duration: 3 hours

Session Learning Objectives

By the end of this module, participants will be able to describe key considerations in the design of data recording and reporting tools (especially in the context of scalability and sustainability) and explain the core elements of an RHIS strengthening/scale-up plan.

Topics Covered

- Describe data requirements and data collection and reporting tools at different levels (including ICT)
- Understand the key considerations for data collection and reporting tools (including ICT)
- Match data requirements to data sources/tools

Develop an RHIS strengthening/scale-up/sustainability plan: core elements

- Leadership, coordination, and stakeholder involvement
- Assessment
- RHIS design/reform focused on data quality and use of information for data management
- RHIS management (governance and resource management)
- Capacity building
- Monitoring and supervision
- ICT support

Teaching Methods

- Facilitator presentation
- Brainstorming
- Exercise and group work
- Presentations by participants

Material Needed

- Module 10, Session 3 PowerPoint presentation: “RHIS Reform in the Context of Scalability and Sustainability”
- Large pad of display paper and an easel
- Large sticky notes
- Markers
- Handout 10.3.1: “Performance of RHIS Management in Liberia: PRISM Assessment”

Session Plan

Time	Title	Methods
60 minutes	RHIS Design Process, Part 3 Activity 1: RHIS Design—Data Requirements and Data Collection Tools (20 minutes) Activity 2: Designing RHIS Data Collection Tools (40 minutes)	Presentation of relevant Module 10, Session 3 PowerPoint slides Brainstorming and recap Group work Handout 10.2.2: “Maternal Survival Strategy”
15 minutes	Break	
105 minutes	Activity 3: Core Processes of RHIS Strengthening Plan Core processes Developing an action plan Case study: Effect of RHIS Strengthening on RHIS Performance	Presentation of relevant PowerPoint slides Small-group work Handout 10.3.1: “Performance of RHIS Management in Liberia: PRISM Assessment”
60 minutes	Activity 4: RHIS Strengthening Plan Discussion Small-group work	Presentation of relevant PowerPoint slides

Session Activities

Activity 1. RHIS Design: Data Requirements and Data Collection Tools (Brainstorming) (20 minutes)

- Participants recap the discussion from the end of Session 2, in the context of scalability and sustainability of the RHIS design.
- Participants brainstorm about key considerations in the design of data recording and reporting tools for different levels.
- Facilitator records their responses on a large sheet of display paper, elaborates, and shows the relevant slide.

Activity 2. Designing RHIS Data Collection Tools (Group Work) (40 minutes)

- Facilitator organizes participants in three to four groups.
- The facilitator reminds the participants what was taught in Module 2 about indicators and data collection/reporting. This session assumes basic knowledge of these topics.

- Participants turn again to Handout 10.2.2 (“Maternal Survival Strategies”), and discuss:
 - Information needs for providing maternal health services based on one of these strategies
 - Data elements that should be collected for meeting those information needs
 - Types of tools (paper-based, electronic, combined, longitudinal patient record, and service registry) that would be most appropriate in a health facility and a community healthcare setting
 - Ease of extracting data from such tools for reporting on the indicators selected in the previous activity
- After 20 minutes, each group presents its work to the plenary group.
- Facilitator acknowledges and summarizes the activity and reiterates that the purpose of this exercise was to walk participants through the process of designing data collection tools to help them understand the key considerations involved.

Activity 3. Core Processes of RHIS Strengthening Plan (1 hour, 45 minutes)

- Facilitator introduces the core processes involved in RHIS strengthening (showing the relevant slide).
- Showing the relevant slides, the facilitator engages the participants to discuss and explain:
 - What a problem statement is and what attributes a good problem statement has
 - How to write good management objectives based on a problem statement
 - Tool for prioritizing solutions
 - Types of RHIS strengthening interventions (technical, behavioral, and organizational)
 - Advocacy as an organizational intervention to improve RHIS

Activity 4. RHIS Strengthening Plan (Small-Group Work) (1 hour)

- Participants break up into three or four groups, as before.
- Facilitator shows the relevant slide and explains the group assignment.
 - In Liberia, a PRISM assessments was conducted in 2012 and an action plan was drafted to improve identified gaps in RHIS performance. A second PRISM assessment was implemented in 2014.
- Facilitator reads the questions aloud:
 - Did the 2012 RHIS strengthening plan improve RHIS performance? Explain why or why not.
 - What would you recommend after the 2014 PRISM assessment? Propose at least one technical/organizational/behavioral intervention.
- Facilitator explains time management:

- Read the paper (mainly starting on page 32) (20 min).
- Lead a group discussion (40 minutes).
- Write answers to the two questions on flip chart paper and stick the paper to the wall (15 minutes).
- Gallery walk (30 minutes)
 - Groups walk around to read one another's answers and add stickers if they have comments.
- Facilitator shows the slide on RHIS strengthening and encourages the participants to discuss the strategic plans they have developed, relate the plans to the RHIS theory of change, and explain how these strategies will address/influence the various pathways to RHIS strengthening.

END OF COURSE

The facilitator thanks participants for their active engagement and concludes the course.

APPENDIX. CONTEXTUALIZATION GUIDELINES

Introduction

These general guidelines are for regional- and country-level RHIS managers to contextualize the course materials for *Routine Health Information Systems: A Curriculum on Basic Concepts and Practices*. Trainers can refer to this guidance as they adapt and customize the generic curriculum to suit their specific audiences, geographic context, and teaching setting. Input from field experiences will enrich these guidelines in later versions of the RHIS course.

Contextualization Method

The course as it has been developed is generic. The main components that trainers could contextualize are the following:

- Duration of the course: The 60 hours required to teach this curriculum could be expanded or contracted; also, the course could be taught over a longer period rather than in one intensive two-week session.
- Selection of modules and training materials: Some modules or sessions may be more relevant to the students' educational and professional backgrounds than others.
- Contextualization of case studies and exercises: Trainers can pick and choose among those provided here or substitute others according to their relevance to students' professional backgrounds and to the geographic setting.

In the following paragraphs we will examine the need for contextualization for each of the following three situations:

- Target audiences
- Teaching settings
- Geographic settings

Contextualization for Specific Target Audiences

The RHIS basic course is designed for at least four target audiences: (1) senior public health managers and policymakers; (2) district-level managers; (3) care providers and health technicians; and (4) students in health sciences and practice. Participants in the third and fourth categories may have minimal basic education, and trainers will need to simplify or adapt the language in the PowerPoint presentations and case studies for them. Below we suggest ways to adjust the course to meet the needs of each of these four groups.

Senior public health managers and policymakers

Many senior public health managers and policymakers are unaware of how exactly an RHIS functions and how it can help to improve health services and health outcomes. Yet they are the ones who make decisions on investments to improve RHIS performance. This course can give them the basic knowledge they need. However, busy schedules and responsibilities make it unlikely that this audience can attend a

two-week course. Also, some of the modules have more detail than these people need. Therefore, substantial restructuring of the course will be necessary to adapt the course to this audience.

- Course duration
 - Shorten the course to three to four days
 - [Or] Spread the modules over a longer period (say, one module per week).
- Modules
 - Shorten all modules—especially Modules 2–6 and 9–10.
- Case studies and exercises
 - Probably most case studies and exercises will have to be skipped, for lack of time.

District-level managers

District health management teams (DHMTs) often are more focused on program monitoring and quality of service delivery. But a well-performing RHIS can help them to manage health programs and service delivery. This course is perfectly tailored to their needs. If possible, they should go through the full course as part of the in-service training program for DHMTs.

- Course duration
 - Shorten the course to one week if two weeks is not feasible.
 - [or] Space the full course over a longer period than two weeks.
- Modules:
 - All modules are useful to district-level managers, but if necessary, Modules 9 and 10 could be shortened.
- Case studies and exercises
 - It is highly recommended to retain the case studies and exercises as part of the course for this audience.

Care providers (doctors, nurses, and health auxiliaries)

Care providers tend to be the main data collectors in an RHIS and they are also important users of the information an RHIS generates for facility, community, and client management. Nevertheless, preservice training programs rarely cover RHIS. Thus, this course is perfectly tailored to this audience's needs. Unfortunately, in many settings funding is not available to provide a two-week course to all care providers without endangering service delivery.

- Course duration
 - Shorten the course to one week if two weeks are not feasible.
 - [Or] Space the full course over a longer period than two weeks.
- Modules:

- Prioritize Modules 1–6.
- Case studies and exercises
 - It is highly recommended to retain the case studies and exercises as part of the course for this audience.

Preservice training audiences (doctors, nurses, paramedics, and those studying for a master’s degree in public health [MPH])

This basic RHIS course responds very well to the training needs of doctors, nurses, paramedics, and MPH students. Yet in most LMICs, RHIS is not part of the preservice training programs for doctors, nurses, and paramedics and also not part of master’s degree programs in public health. Also, most of these training programs are heavily regulated, usually by agencies other than the health ministry. Introduction of the RHIS course, or of part of the course, will need to be negotiated with the appropriate authorities. Some advice for contextualization follows.

- Invite guest speakers with RHIS field experience.
- Incorporate field visits to health facilities to observe the RHIS in action.
- Provide opportunities to apply and practice tools and concepts introduced in the sessions.
- Add a student assessment component if the course carries credit to meet degree requirements. Quizzes at the end of each module can test whether the learning objectives were achieved. A final exam or project will also need to be incorporated.

Contextualization for Specific Teaching Settings

Online course

It would be efficient to transform the RHIS course into a massive open and online course (MOOC). But this will need important contextualization of the training materials, such as case studies and exercises. An RHIS MOOC will reach a big number of participants eventually. In order for the MOOC to be socioculturally sensitive, it should be organized by geographic regions rather than globally.

The RHIS course can also be split in a number of regular online certificate short courses (for example, a MOOC on data quality or on the use of information and communication technology for RHIS).

In-class teaching

Given the participatory nature of this course and the many case studies and exercises, ideally no more than 25 participants should be registered.

The current course does not include structured field visits, but these are desirable for particular audiences, such as students in preservice training settings.

Contextualization for Specific Geographic Settings

Finally, the RHIS course will need to be contextualized to various regional settings in the world, as well as to specific country situations. Adapting the course to address specific sociocultural aspects will improve the learning environment.

The first requirement is the availability of the RHIS course in languages other than English. We plan to offer French and Spanish translations. Other languages can be added where needed.

Other opportunities for contextualization are some of the examples used in the course as well as the case studies and exercises. These need to be adapted to regional, national, and local settings.

- Adaptation to regional and country settings:
 - Mainly sociocultural adaptations, such as references to religious or nutritional habits
- Adaptation to country and local environment (national, intermediate, facility, and community settings)
 - Based on public health national legislation, policies, and standard operating procedures
 - Based on organizational structure of health services (such as nomenclature of health facilities)
 - Based on human resource management (such as nomenclature of positions)
 - Basic educational level
- Adaptation of the course to country RHIS priorities, such as indicator selection, data management, information and communication technology, governance, and data quality and use, teaching particular, high-priority modules in full and shortening others



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