

# Performance of Routine Information System Management (**PRISM**)

## **USER'S KIT**



## **Preparing and Conducting a PRISM Assessment**

October 2018





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For any questions about the tools or implementing any part of the assessment, please contact: [measure@measureevaluation.org](mailto:measure@measureevaluation.org).

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## ABBREVIATIONS

eRHIS	electronic routine health information system
HIS	health information system
HMIS	health management information system
LQAS	lot quality assurance sampling
MAT	Management Assessment Tool
MOH	Ministry of Health
OBAT	Organizational and Behavioral Assessment Tool
PRISM	Performance of Routine Information System Management
RHIS	routine health information system
SRS	simple random sampling
USAID	United States Agency for International Development

## OVERVIEW OF THE PRISM SERIES

Using data to make evidence-informed decisions is still weak in most low- and middle-income countries. Especially neglected are data produced by routine health information systems (RHIS). RHIS comprise data collected at public, private, and community-level health facilities and institutions. These data, gleaned from individual health records, records of services delivered, and records of health resources, give a granular, site-level picture of health status, health services, and health resources. Most are gathered by healthcare providers as they go about their work, by supervisors, and through routine health facility surveys.

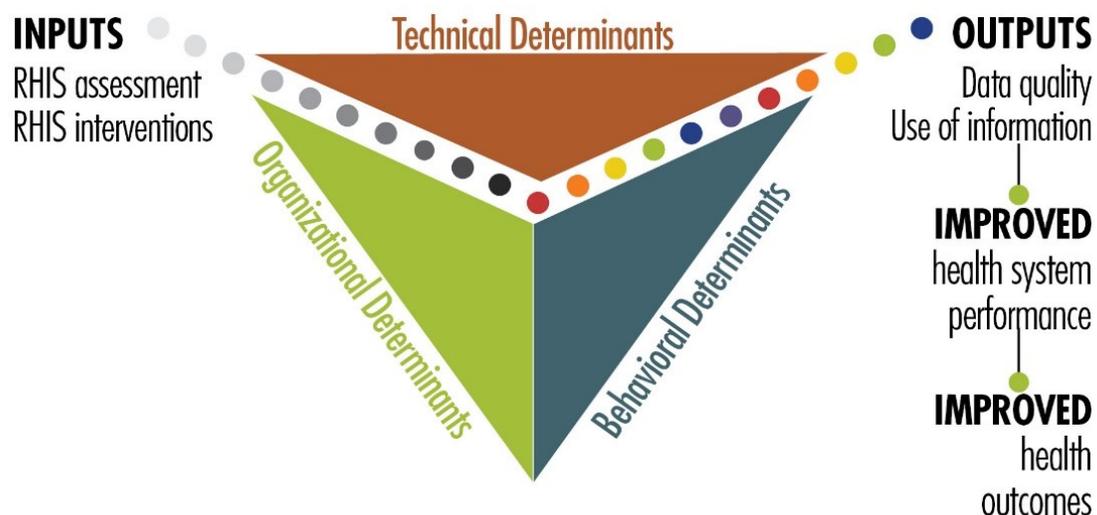
When routine data are lacking, or are not used, the results can be lower-quality services, weak infection prevention and control responses, lack of skilled health workers available where they are needed, and weak supply chains for drugs and equipment. These factors contribute to poor health outcomes for people.

MEASURE Evaluation, which is funded by the United States Agency for International Development (USAID), has provided technical and financial assistance to strengthen RHIS for more than 15 years. We have contributed to best practices at the global level and to the strengthening of RHIS data collection, data quality, analysis, and use at the country level. One of the project's mandates is to strengthen the collection, analysis, and use of these data for the delivery of high-quality health services.

MEASURE Evaluation developed the Performance of Routine Information System Management (PRISM) Framework and suite of tools in 2011 for global use in assessing the reliability and timeliness of an RHIS, in making evidence-based decisions, and in identifying gaps in an RHIS so they can be addressed and the system can be improved. The framework acknowledges the broader context in which RHIS operate. It also emphasizes the strengthening of RHIS performance through a system-based approach that sustains improvements in data quality and use. PRISM broadens the analysis of RHIS performance to cover three categories of determinants that affect performance:

- **Behavioral determinants:** The knowledge, skills, attitudes, values, and motivation of the people who collect, analyze, and use health data
- **Technical determinants:** The RHIS design, data collection forms, processes, systems, and methods
- **Organizational determinants:** Information culture, structure, resources, roles, and responsibilities of key contributors at each level of the health system

Figure 1. PRISM Framework



### What the 2018 PRISM Series Offers

With USAID’s support, MEASURE Evaluation has revised the PRISM Tools and developed other elements, based on the PRISM Framework, to create a broad array of materials: the “PRISM Series.” It’s available on the MEASURE Evaluation website (<https://www.measureevaluation.org/prism>) and has the following components:

- **PRISM Toolkit**
  - PRISM Tools (this is the fundamental manual of the PRISM Toolkit)
  - PRISM Tools to Strengthen Community Health Information Systems
  - Analysis Tool for Data from a PRISM Assessment
- **PRISM User’s Kit** (consisting of four guidance documents)
  - Preparing and Conducting a PRISM Assessment (this document)
  - Using SurveyCTO to Collect and Enter PRISM Assessment Data
  - Analyzing Data from a PRISM Assessment
  - Moving from Assessment to Action
- **PRISM Training Kit**
  - Participant’s Manual
  - Facilitator’s Manual
  - 9 PowerPoint training modules

This new, more comprehensive PRISM Series is useful for designing, strengthening, and evaluating RHIS performance and developing a plan to put the results of a PRISM assessment into action.

The revised “PRISM Tools”—the PRISM Series’ core document—offers the following data collection instruments:

### **RHIS Overview Tool**

This tool examines technical determinants, such as the structure and design of existing information systems in the health sector, information flows, and interaction of different information systems. It looks at the extent of RHIS fragmentation and redundancy and helps to initiate discussion of data integration and use.

### **Performance Diagnostic Tool**

This tool determines the overall level of RHIS performance: the level of data quality and use of information. This tool also captures technical and organizational determinants, such as indicator definitions and reporting guidelines, the level of complexity of data collection tools and reporting forms, and the existence of data-quality assurance mechanisms, RHIS data use mechanisms, and supervision and feedback mechanisms.

### **Electronic RHIS Performance Assessment Tool**

This tool examines the functionality and user-friendliness of the technology employed for generating, processing, analyzing, and using routine health data.

### **Management Assessment Tool**

The Management Assessment Tool (MAT) is designed to take rapid stock of RHIS management practices and to support the development of action plans for better management.

### **Facility/Office Checklist**

This checklist assesses the availability and status of resources needed for RHIS implementation at supervisory levels.

### **Organizational and Behavioral Assessment Tool**

The Organizational and Behavioral Assessment Tool (OBAT) questionnaire identifies behavioral and organizational determinants, such as motivation, RHIS self-efficacy, task competence, problem-solving skills, and the organizational environment promoting a culture of information.

## **Uses of the PRISM Tools**

These PRISM tools can be used together to gain an in-depth understanding of overall RHIS performance, to establish a baseline, and to rigorously evaluate the progress and effectiveness of RHIS strengthening interventions every five years, contributing to the national RHIS strategic planning process. Each PRISM tool can also be used separately for in-depth analysis of specific RHIS performance areas and issues.

## PRISM ASSESSMENT PROCESS

This guide provides details on designing, preparing, and conducting the PRISM assessment. The process has three phases:

1. Designing a PRISM assessment
2. Preparing a PRISM assessment
3. Collecting PRISM data

### Designing a PRISM Assessment

#### Engaging Stakeholders

It is essential to understand who stakeholders are and their interests, requirements, and capacity to contribute to efforts to strengthen the RHIS. Stakeholders have the power to influence the implementation of the PRISM assessment. It is important to identify the organizations and people who have a stake in the RHIS. These people or organizations are knowledgeable about the country’s or organization’s RHIS and can advocate, mobilize, or commit resources at this stage to conduct the assessment or—after the assessment—to develop and implement a coordinated and harmonized RHIS-strengthening action plan. One way to identify these stakeholders is to use MEASURE Evaluation’s stakeholder analysis matrix.

**Table 1. Stakeholder analysis matrix**

Stakeholder Analysis Matrix					
Type of stakeholder organization, group, or individual	Stakeholder description: primary purpose, affiliation, funding	Potential role in the issue or activity	Level of knowledge of the issue	Level of commitment: supports or opposes the activity, to what extent, and why?	Available resources: staff, money, technology, information, influence
Governmental					
Political					
Commercial					
Nongovernmental organization					
Other civil society					
International donor					

Source: MEASURE Evaluation. (2012). Data demand and use: Stakeholder analysis matrix and engagement tools. [PPT]. Retrieved from <https://www.slideshare.net/measureevaluation/stakeholder-engagement-11369777>.

The first step to plan and conduct a PRISM assessment is to establish country leadership and stakeholder buy-in and engagement/coordination. This will help ensure that the assessment is duly designed, owned, implemented, and used by all relevant stakeholders. We recommend establishing a health information system (HIS) advisory group within a ministry of health (MOH), drawing members from the MOH, donors, and implementing partners. If the scope of the PRISM assessment includes assessment of the private health sector information system, drawing members from the private (nonprofit and for-profit) sector should also be considered. This advisory group will guide and support the assessment’s design and implementation. Any existing HIS advisory group in the country can be expanded to serve the purpose of a PRISM advisory group.

In addition, a smaller team of technical experts should also be assembled to manage and monitor the assessment and analyze and disseminate the assessment’s data and results.

## Building Capacity

It is common to add a capacity building component to the implementation of a PRISM assessment. This creates local capacity for the country stakeholders to regularly assess their RHIS performance. Options for developing the capacity of local stakeholders to implement a PRISM assessment is presented below:

**Table 2. Capacity building options for a PRISM assessment**

Option	Capacity Development
Joint external and local team conduct assessment	Involve local stakeholders as team members in the data collection process to have some exposure. The members of the team can also contribute to the discussions on the preliminary findings/results of the PRISM assessment.
Local team trained by external experts to conduct assessment with minimal support	Local team members will have full experience starting from the design of the study to conducting the assessment, data analysis, report writing, and action planning.
Local institution trained by external experts to conduct assessments with minimal support	Local institution adopts the PRISM materials and leads the assessment.

## Setting Priorities for the Assessment

The HIS advisory group sets the assessment’s purpose in the context of national HIS priorities. Following are three purposes commonly seen.

- PRISM for evaluation.** The PRISM tools can be used to establish a baseline of the overall RHIS performance and, later on, to rigorously evaluate the progress and effectiveness of RHIS strengthening interventions every five years or so. Such evaluative assessments usually follow a cross-sectional study design that establishes what the situation is (baseline, midline, or end line) and how variables are associated with one another.
- PRISM for monitoring.** Sections of the PRISM tools (and questions therein) can be used to monitor RHIS performance in relation to production and continuous use of high-quality data in the health system. The RHIS Performance Diagnostic Tool can be adapted for monitoring, with the intention of identifying gaps in data quality and certain aspects of information use at facility and district levels to take quick corrective action. The Organizational and Behavioral Assessment Tool

(OBAT) can be used independently to monitor changes in RHIS task self-efficacy and competence. The OBAT can serve as a sensor for identifying subtle changes in staff motivation and culture of information within the organization. Repeat application of the PRISM tools can help provide a series of observations that can be helpful for monitoring the progress or change in particular aspects of the management of the information system, the data quality, and the use of information over time.

- **PRISM for ad hoc or rapid assessment.** Ad hoc assessments can be performed for in-depth understanding of specific aspects of the performance and management of the RHIS. Such targeted assessments using specific PRISM tools can be carried out for the purpose of identifying or assessing the RHIS training needs or resource gaps, or to investigate the performance of electronic RHIS (eRHIS). In such cases, the tools are chosen based on the topic to be investigated.

Available resources—human and financial—should also be taken into consideration. Appendix 1 includes a budget template that can be used to estimate the assessment’s total budget.

## Preparing for a PRISM Assessment

### Adapting the PRISM Tools

The HIS advisory group will be responsible for customizing the PRISM tools, selecting the assessment’s design, and planning implementation. We recommend using all six of the PRISM Tools’ modules during the assessment, to provide a comprehensive picture of the health system. However, the assessment can also be tailored to topic areas within each module that address the MOH’s priorities and needs. The PRISM tools that are selected should respond to a particular context and will depend on the scope of the activity, timeline, and budget available to support the efforts to improve data quality and data use. This early prioritization will inform the adaptation of the data collection instrument, to provide more in-depth information for the indicators that are most pertinent to the MOH.

Many questions are amenable to country contextualization. Here are some examples of country-specific items that can lead to customization of sections of the PRISM tools:

- Priority program indicators may be more valuable to focus on during the data accuracy check.
- The frequency of expected report production will inform the norms and standards that facilities must follow.
- Categories of personnel at a health facility, including titles and responsibilities, can be adjusted.
- Forms for checking data availability and designating who is in charge of updating these forms can be adjusted, too.

These decisions should be made before the assessment begins and should be reflected in the contextualized PRISM tools. Applying the RHIS Overview Tool a few months ahead of the actual PRISM assessment provides enough information about the structure and organization of the HIS to allow for adapting the generic PRISM tools to the local context. These changes also need to be incorporated in the data entry forms.

### Developing a Sampling Strategy

During the design phase, the HIS advisory group should select a sampling strategy appropriate to the assessment’s objective while keeping the investment within reasonable limits, by maximizing the resources for the implementation of PRISM assessments.

The sampling method applied can either expand or limit the generalizability of the assessment findings. Probability sampling is preferred, because every sampling unit (i.e., facilities, districts, etc.) has an equal chance of being selected. It provides the ability to generalize the findings across the population. Some of the commonly used probability sampling methods are simple random sampling (SRS), cluster sampling, and lot quality assurance sampling (LQAS). A complete census of all the health facilities and districts is only applicable if the total universe of health facilities is less than 30. Even in that case, if the number of sampling units ranges from 20 to 30, one can randomly select 12 health facilities using LQAS. More information related to sampling methods is available in Appendix 2.

Below are some common sampling scenarios for PRISM:

**Country estimate.** PRISM is usually used to assess RHIS performance in a given country, which requires country performance estimates. For these, obtain a random sample of five administrative units from regions or states. Each administrative unit may have many districts or counties that require randomly selecting, for the assessment, one or two per administrative unit and, within those, 19 facilities.

**Regional/provincial estimate.** If decisions are made to focus on one region or province for an RHIS performance estimate, one can follow the same steps as for a country estimate. First, randomly select five districts that can serve as lots. Second, obtain random samples of 19 facilities in each district for the assessment.

**District estimate.** District RHIS performance can easily be assessed by randomly selecting 19 facilities, if the total number of facilities is 30 or more. If there are fewer than 30 facilities, one can conduct a census of the facilities or select a minimum of 12 facilities in order to use LQAS.

## Identifying Sources of Data

Depending on the tool used for the assessment, the sources of data can be RHIS data collection tools, reports, electronic RHIS applications, interviews with RHIS focal persons, records, and other relevant documents.

To identify organizational and behavioral factors affecting the information system in an organization or unit of an organization, the tool should be administered to a cross-sectional sample of members of the unit of interest. The health department should be treated as an organization with different hierarchical levels. Therefore, it is important to sample staff (e.g., care providers, data managers, and managers) at various levels to get a representative sample of the organization.

### Facility level:

- Both first level and referral level
- Facility in-charge, HIS focal person or a staff member involved in data compilation and report preparation, and at least one person involved in data recording

### District level:

- District health officer

- At least one supervisor
- HIS focal person

#### **Regional or central level:**

- At least three relevant staff members responsible for planning, report compilation, reporting to the next level, and supervising HIS performance

## **Collecting PRISM Data**

### **Mobilizing a Core Team of Data Collectors and Supervisors**

The number of modules to be implemented determines the overall level of effort (person days). The level of the assessment (national, regional, district, or health facility) and the sample size of the sites to be visited are other influencing factors to determine the overall time frame and the team to be deployed for implementation of the assessment.

Conducting the PRISM assessment requires familiarity with the country's HIS. Data verification across program areas requires familiarity with data collection tools (registers, patient records, tally sheets, etc.) according to the selected indicators and program areas. Enumerators should ideally have experience both in recording public health data and with the data collection tools used in the field. Training of enumerators should include practice in compiling indicators for each program area, using the tools the enumerators are likely to encounter.

### **Notifying Assessment Sites and Key Informants**

The regional or district office authorities should be notified weeks prior to implementation of the PRISM assessment. Similarly, subnational health management information system (HMIS) and/or monitoring and evaluation units, such as HMIS officers at regional and district levels, should also be informed both to satisfy potential administrative protocols and to enlist their support/cooperation in completing the assessment. The health facilities sampled for the PRISM baseline assessment should be notified of the date of the visit of the assessment teams. The relevant data management staff and their supervisors should be present at the facility on the day of the visit in order to facilitate access to the relevant records, provide responses for the system assessment, and assist with the completion of the survey at the facility.

### **Training Data Collectors and Supervisors**

To ensure the appropriate use of the PRISM tools for data collection, the data collectors and supervisors need to be trained on the PRISM Tools provided in the PRISM Toolkit. The data collectors and supervisors will require detailed orientation on the data collection tools and the data collection protocols (e.g., asking for consent, allowing time for the interviewees to respond properly, verifying the responses with the help of document review in cases of questions that require physical evidence). The data collectors should be encouraged to ask clarifying questions and the trainers should ensure that all the data collectors have the same understanding of the assessment tools.

## Arranging Logistics for Data Collectors

Logistical arrangements for data collection should be organized before training the data collectors. During the training, the team managing the assessment should form teams of data collectors and their supervisors and assign the assessment sites to each team. Travel arrangements should be made in advance and communicated to the teams. Communication devices, printed tools, or electronic devices for data collection, identification cards, and official letters introducing the teams should be provided at the end of the training. Arrangements for financial support during the data collection phase should also be explained to the data collectors and their supervisors.

## Assigning Roles and Establishing Norms for Assessment Teams

### *Team Preparation*

The enumerators should work in pairs, to maximize efficiency and to control for quality during visits to offices and health facilities. The teams should plan to spend one complete day collecting data at each health facility, but completing the assessment takes more time, especially in sites with high client volume (where a large amount of data recounting will need to be done).

Assessment team members should prepare for the field visit in the following ways:

- Review the PRISM Tools and make sure each team member understands how to use them.
- Agree on which team member will carry out which parts of the assessment, and in what order.
  - Some parts require visiting and observing the facility, others require going through records, and others require interviewing staff.
  - Conduct the data recounting and cross-checking in pairs.
- Think about how to organize the team's time, especially if only one respondent is available to answer questions.

### *Enumerator's Role*

Assessment team enumerators should follow these guidelines during the data collection phase:

- Nominate one person on the team to act as the “ambassador” in charge of introducing the group members, explaining the purpose of the visit, and thanking the hosts at the end of the visit.
- Treat the informants with respect. Ask questions with patience and do not lead a respondent to a specific answer.
- Ask questions in a conversational manner, avoid interrogation methods of questioning, and use probes when appropriate.
- Do not criticize the work that is being done at the facility; offer opinions only if the hosts ask for them.

- Never assume a response. Record the response verbatim; if necessary ask for clarification.
- Listen carefully to the responses in order to avoid repeating questions.
- Record responses fully and legibly and assure that the interview follows the sequences specified after “yes” and “no” responses; make appropriate “skips.”
- Complete questionnaires fully and accurately and correct omissions or errors before departing from the district health office or health facility. Complete all fields in the questionnaire before moving to the next health facility visit scheduled.
- Deliver the completed questionnaire to the supervisor, who should check it immediately for completeness or unclear responses while still in the field.
- Notify the supervisor of any problems experienced in the field that may affect the assessment process or the quality of the results, including a problem with the tablet or SurveyCTO.
- In most cases, the assessor should complete, save, and submit the data to the supervisor on the same day.
- Copy all files to secure digital (SD) cards as data backup on a daily basis during the period when the PRISM assessment is being implemented. Determining a set point in the workday (e.g., close of business) is optimal, to create a routine of backing up files.

### *Supervisor's Role*

Assessment teams should be supervised in the field by a dedicated staff member. Supervisors are expected to:

- Cover a predetermined geographical area and a specified number of assessment teams.
- Help the assessment teams collect data, collect and review the completed questionnaires, troubleshoot problems, and finalize and submit the completed questionnaire using SurveyCTO.
- Have the daily schedule and contact numbers of the assessment team.
- Visit each team during the PRISM assessment and help the team complete the assessment (where necessary).

### *Coordinator's Role*

The PRISM assessment coordinator should:

- Select the enumerators in collaboration and consultation with relevant officials from the MOH.
- Prepare the PRISM assessment implementation plan.
- Provide management and logistical support to the assessment team deployed in the region.

## Collecting Data at the Facility

The PRISM assessment will begin with meeting the in-charge/medical director in the respective health facilities. The assessment team should ask to meet with all relevant members of the health facility, with the following agenda:

- Introduce the assessment team.
- Present the purpose and processes of the assessment.
- Explain who the key informants are.
- Explain that the assessment might take three hours.
- Mention that the assessment involves group discussions, visiting and observing the facility, going through records, interviewing staff, and, for some respondents, completing a self-assessment (using the OBAT tool).

In-person interviews with the facility in-charge and the HMIS focal person should be conducted individually. Data recounting/reviewing and the OBAT can take place simultaneously. The staff may be allowed to fill out the OBAT while the assessment team members review the registers and reports, which reduces the time spent at facility/office and increases efficiency.

At the end of the assessment, the team should meet the facility/office head and HMIS officer to:

- Give constructive and brief feedback.
- Check if the assessment questions are completely covered; if not then seek the missing information.
- Thank the facility managers and staff for their time and participation in the assessment.

## Managing Data

### Developing a Protocol

A data management protocol should be in place from the beginning of the assessment and adhered to during and after data collection. This protocol should specify the following:

- Data collection
  - Is the assessment performed using printed tools or electronic devices?
  - If printed tools are used, at what point and stage will the data be entered electronically?
- Data compilation
  - How will the data collected by individual data collectors be compiled in one place?

- How will the data entered by the individual data collectors be transferred to a central place? Will that be done physically, by bringing the electronic devices used for data entry or other data storage devices at a central place, or will the data be sent using email, or uploaded onto a central server created for the purpose of the assessment?
- Data quality assurance (see the next section for details)
- Data analysis (see the PRISM User Kit: Analyzing Data from a PRISM Assessment)
- Data storage for future use
- Access to data by others

Decisions on each of these points have to be made by the team managing the assessment and necessary arrangements should be made accordingly.

### Ensuring Data Quality

Before analyzing the data, all required data that should be collected from different levels of the health institutions and administrative units need to be checked for data quality. Incomplete, inadequate, and ill-prepared questions may result in inconclusive and blurred evidence that allow for faulty conclusions and recommendations. The concern over quality also extends to data collection, compilation, and analysis. Great care must be taken to collect accurate, valid, and high-quality information that is free from bias or illogical and incoherent responses. All teams participating in this assessment should receive intensive training to understand the PRISM tools and data being collected. Experienced field survey supervisors have to be assigned to monitor the data collection process. Consistency checking, completeness of the data, and any discrepancies will be verified; any outliers and incomplete information will be checked before leaving the assessment sites.

## APPENDIX 1. BUDGET TEMPLATE FOR A PRISM ASSESSMENT

Line Item	Quantity	Rate	Unit	Level of Effort	Total (Rate x Quantity)
<b>Labor</b>					
Lead assessor	# of individuals	\$	/day	# of days	\$
Supervisor	# of individuals	\$	/day	# of days	\$
Team coordinator	# of individuals	\$	/day	# of days	\$
Team member	# of individuals	\$	/day	# of days	\$
Subtotal Labor					\$
<b>Travel</b>					
Travel–airfare	# of individuals	\$	/trip	# of trips at that rate	\$
Per diem	# of individuals	\$	/day	# of days	\$
Local travel	# of individuals	\$	/trip	# of trips at that rate	\$
Visa	# of individuals	\$	/trip	# of visas at that rate	\$
Miscellaneous		\$			\$
Subtotal Travel					\$
<b>Subcontracts/Outside Services</b>					
Conference room	# of rooms	\$	/day	# of days	\$
Food and refreshments	# of participants	\$	/person	# of days	\$
Audiovisual equipment	# of rooms	\$	/day	# of days	\$
Driver	# of drivers	\$	/day	# of days	\$
Vehicle	# of vehicles	\$	/day	# of days	
Subtotal Subcontracts					\$
<b>Other Costs</b>					
Postage		\$			\$
Communications		\$			\$
Printing (data collection instruments, and training manuals, etc.)		\$			\$
Stationary materials	# of training participants	\$	/person		\$
Other		\$			\$
Subtotal Other Costs					\$
Total Assessment Budget					\$

## APPENDIX 2. PRISM SAMPLING METHODS

### Sampling Unit

Different PRISM tools are applicable to different levels of the health system. Nevertheless, the focus of most of the PRISM tools is the health facility, followed by the district health office. Thus, from a sampling standpoint, health facilities are the primary sampling unit for PRISM assessments. It should be noted that even though the health facilities are considered the primary sampling unit, the district and state/provincial offices within which the health facilities are located are also a target of the assessment. Various PRISM tools are applied and collect data at those levels.

Similarly, within each health facility, key respondents should be selected to administer the OBAT. These key respondents can be the health facility managers, HMIS/RHIS managers or staff, information technology (IT) staff, program managers, or any other staff relevant to the HIS.

### Units of Analysis

In the case of a PRISM assessment, the unit of analysis can be the whole country or specific regions/provinces/states within that country.

**Note:** Sampling unit is different from unit of analysis. The unit of analysis is the major entity that is being assessed or analyzed for the purposes of the assessment. The sampling unit is the single entity within a major entity that is being sampled for the purpose of data collection.

An individual district can also be the unit of analysis, depending on interest and on the availability of financial and other resources from the researchers, program managers, technical assistance organizations, or the MOH. Usually, a crucial dimension of the measurement objectives for the PRISM assessment concerns the geographic or administrative subdivisions for which the RHIS performance estimates are desired. When the PRISM assessment is general-purpose—that is, not confined to a particular area where specific programs or interventions are being carried out—it is more likely to be sizeable in scope, often covering the entire country. In such a case, it is important to specify the sampling units (regions, states, or provinces) during the assessment planning process so that the sample design can account for it. When the area is large and diverse, the country might want estimates further disaggregated for important subdomains, such as districts, for comparison purposes.

### Sampling Frame

Based on the sampling unit, complete lists of states/provinces, districts, and facilities (by type) are required to serve as the sampling frame. The selection of facilities will depend on the sampling method as described in the following section.

## Possible Sampling Methods

When it comes to sampling methods, we recommend considering one of the four following options:

1. **Simple random sampling (SRS).** With this method, all the health facilities in the sampling frame have an equal probability of being selected. However, if the unit of analysis is the country or a very large region/province/state, this would mean traveling to all the districts where the selected sample health facilities are located. From a logistics and resource perspective, this might not be a feasible option.
2. **Cluster sampling.** In the context of a PRISM assessment, a cluster is usually considered to be a unit within which the health facilities are randomly selected for the assessment. In the first stage, clusters (e.g., districts) are randomly selected. Next, the requisite number of health facilities within each cluster (i.e., district) is randomly selected. For convenience, the number of clusters to be sampled is determined by taking into consideration factors such as resources, distance, and time available for the assessment.

When standards or targets are not available, or a baseline estimate is needed to set the target, a bigger sample size is needed. In such cases, cluster sampling can be used to establish the performance estimate. This method can be used when comparison among lots is not of interest. However, the sample size may be doubled because of design effects.

The primary sampling areas are the clusters, and examples are provinces, districts, and local government areas. The cluster sample decreases the number of areas while increasing the number of facilities sampled in any one area. Clusters can be sampled proportional (i.e., the probability of selection is proportional) to the number of facilities they contain (probability proportionate to size, or PPS), to ensure that clusters with many facilities have a higher probability of being sampled. An equal number of facilities from each cluster should then be sampled, either randomly or using a census. This approach to cluster sampling does not influence the probability that a given facility will be selected; therefore, weights applied for the facilities will remain the same. However, if the approximate number of facilities within the cluster is not available, data should be weighted based on the number of facilities sampled within the clusters.

3. **Lot quality assurance sampling (LQAS).** In situations where resources are insufficient to sample enough health facilities in order to obtain precise performance estimates, countries have to rely on an alternative method, such as LQAS, which allows smaller samples while producing reliable and relevant information for decision making. LQAS is a method of classification that can also be seen as a stratified random sampling design. This requires established performance criteria or standards to determine whether each lot is meeting (or not meeting) a predetermined target level of performance or to compare performance among the clusters.

To answer the question of whether a certain performance target is achieved or not, a sample size of 19 or less could be used. The sample sizes in these lots are too small for precise performance estimates (which is not their intention), but lots can be classified as meeting or not meeting a predetermined target level of performance, and performance of different lots can be compared. This predetermined target is a crucial step in LQAS, where the objective is to separate lots into “good

performing” and “poor performing” groups, to identify areas where resources can be targeted to reach a more acceptable level of performance.

Results can be used to prioritize interventions in small, distinct geographic areas that may be underperforming or to highlight areas that have been successful in achieving a target performance. The results from the lots can also be aggregated to estimate RHIS performance. Combining the five lots of 19 facilities, it is possible to have a sample size of 95, which is the equivalent of finding an object of interest with 50 percent probability, 95 percent confidence interval, and 10 percent precision.

4. **Convenience/purposive sampling.** This method is used when resources are scarce and only a handful of health facilities can be selected. Convenient sampling also provides useful information, with the caveat that generalized results are limited. Scenarios exist in which one can combine random and convenience samples. For example, a certain number of districts is chosen for a specific reason. Randomly selecting facilities within those districts would provide objective and valid estimates for the district. However, the findings are applicable only to the district selected. In other words, the results cannot be generalized to other districts, unless those districts have similar characteristics. This method can be used in the case of targeted spot checks and cross-checks, based on identified issues with a particular geographic area, program, facility type, etc.

The table below is a guide to choosing the appropriate sampling method and sample size based on the stated purpose of the PRISM assessment.

**Table 3. Recommended sampling method based on assessment objective and sample size**

Assessment Objective	Sample Size	Sampling Method
Establish baseline of RHIS performance	≥ 100  (to be determined by the design effect; design effect of 1.2 is most commonly used)	Cluster sampling, SRS
Monitor progress on RHIS performance	40–100	Cluster sampling, LQAS
Conduct targeted spot checks and cross-checks, based on identified issues with a particular geographic area, program, facility type, etc.	10–40  (as needed)	LQAS, purposive
Conduct a midline or end line evaluation of RHIS performance	≥ 100  (to be determined by the design effect; design effect of 1.2 is most commonly used)	Cluster sampling, LQAS, SRS

## Sample Size Calculation

Sample size calculation is based on a random sample of binomial distribution:

$$n_o = (Z^2pq)/d^2$$

Where:

- **n<sub>o</sub>** is the minimum (or initial) sample size
- **Z<sup>2</sup>** is the standard score corresponding to a given confidence level. Using a 95 percent confidence level, equivalent to a 5 percent level of significance ( $\alpha = 0.05$ ), here we have **Z = 1.96**
- **p** is the prevalence, or the percentage of the study phenomena in the population (which can be obtained from previous studies); here we have **p=0.5** (50%)
- **q** is equal to (1 – p) and is known as the percentage of failure; here we have **q=0.5** (50%)
- **d** is the precision limit or proportion of sampling error (accepted bias for p in the sample); here we have **d=0.1** (10%)

In other words:  $n = (Z^2pq)/d^2 = Z^2p(1-p)/d^2$

In the last sample size:  $n = n_o / (1 + (n_o/N))$  where **N** is the population size.

In this formula, because the prevalence of the object of interest is unknown, the probability of finding the object of interest is considered to be 50 percent. This probability gives the largest sample size of 96. The sample size becomes smaller as the probability of finding the object of interest increases.

## Design Effect

Regarding cluster sampling, the larger the size of the cluster, the larger the design effect. For a cluster size of less than five, the design effect may be very small. Considering a district as a cluster with an average of 10–12 health facilities per district, the design effect is proposed to be 1.2. However, if the districts have larger numbers of health facilities, the design effect will also be larger.



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