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Inventory of PRISM Framework and Tools: Application of PRISM Tools and Interventions for Strengthening Routine Health Information System Performance

Hiwot Belay
Theo Lippeveld

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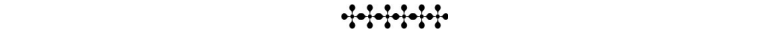

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Inventory of PRISM Framework and Tools

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Hiwot Belay

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Executive Summary

The Commission for Information and Accountability on Women's and Children's Health underscored the essential role of routine information in accelerating progress on the United Nation's Millennium Development Goals. Facility-based routine health information systems (RHIS) support health services managers and providers in their daily decision making and enhance the efficiency and innovation in the delivery of quality health services. Unfortunately, as shown by various studies, RHIS in most developing countries produce low quality data and the use of information for planning and management of the health services is weak. In the past 10 years, the USAID-funded MEASURE Evaluation project has undertaken a major effort to strengthen RHIS in developing countries.

Under the MEASURE Evaluation, an RHIS team developed the Performance of Routine Information System Management (PRISM) framework, accompanied by a set of tools to measure RHIS performance. The framework defines RHIS performance as both the production of quality data as well as documented use of information for health services decision making. It postulates that poor quality data and poor use of information for evidence-based decision making are not only due to technical issues but also a result of organizational and behavioral barriers that hinder the effective use of information. The tools therefore not only measure technical factors but also organizational and behavioral factors. PRISM methodology provides quantifiable information related to these three RHIS performance determinants that can be used to evaluate results overtime.

By the end of 2012, 23 countries throughout the world applied the PRISM tools to assess the performance of their RHIS at different levels and to guide the RHIS strengthening process. For the first time, a baseline for RHIS performance is now available in many countries: data quality ranged between 34% and 72%; and use of information between 30% and 53%. Some of the root causes for the low RHIS performance are the lack of standardization of the data management processes as well as the absence of an information culture. The RHIS improvement interventions resulting from these assessments ranged from national HIS reforms to capacity building in use of information. PRISM assessments after intervention in China, Cote d'Ivoire, and Mexico have shown substantial improvements in RHIS performance.

This paper describes the conceptual framework on the determinants of RHIS performances and effectiveness of strategies to improve the system. The examples addressed in this paper highlight the RHIS permanence in various countries at different administrative levels, efforts made to address identified gaps, and some observed progresses. Preliminary findings of PRISM assessments after intervention show encouraging results. Also, at the global level, MEASURE Evaluation is working on guidelines for RHIS data management standards.

Introduction

Reliable and timely information on service delivery and other key indicators is very valuable for health mangers at all levels. There is growing global awareness of the importance of using routine health information for decision making to reach more people with better quality health services. (HMN, 2010) A health institution-based routine health information system (RHIS) is expected to produce quality information in support of health system performance, and more particularly of health service delivery. RHIS is the backbone for planning and management of the health services at district level and below, and can potentially play an important role in program improvement and reporting at all levels.

Unfortunately, RHIS in many developing countries are unable to provide the information support needed. The data produced are of low quality and the information generated is poorly used to inform decision making. There are limited financial and human resources dedicated to RHIS. In general, health service managers have minimum understanding of the benefit of information and no incentives to use it.

Why is Routine Health Information System important? – *Districts and facilities require robust RHIS for evidence-based decision making. Health care providers need to have access to relevant patient information – patient medical history and record – to match their needs with available programs and treatments. Program managers can access information to guide routine operations, track performance, learn from past results and improve accountability. This means resources can be directed to areas where they are needed the most.*

Based on field experiences from many countries to address the weaknesses of RHIS, MEASURE Evaluation has developed a conceptual framework, called the Performance of Routine Information System Management (PRISM) framework, as well as a set of tools to measure RHIS performance. The framework defines good RHIS performance as the production of quality data as well as documented use of information for decision making. It postulates that poor data quality and poor use of information for evidence-based decision making is not only due to technical issues but also a result of organizational and behavioral barriers that hinder the effective use of information (Aqil, Lippeveld & Hozumi, 2009). Since 2004, MEASURE Evaluation in collaboration with local partners has been using the PRISM tools throughout the world to improve the performance of RHIS. The tools have been translated from English into French, Portuguese, and Spanish to facilitate wide application of RHIS assessment and strengthening interventions.

This paper documents past and current use of PRISM tools and subsequent interventions to improve RHIS performance at all levels. It also explores opportunities to expand the use of the

tools and to better adapt them to specific purposes and country contexts. The inventory was initially conducted between April and May 2011, and was updated in October 2012.

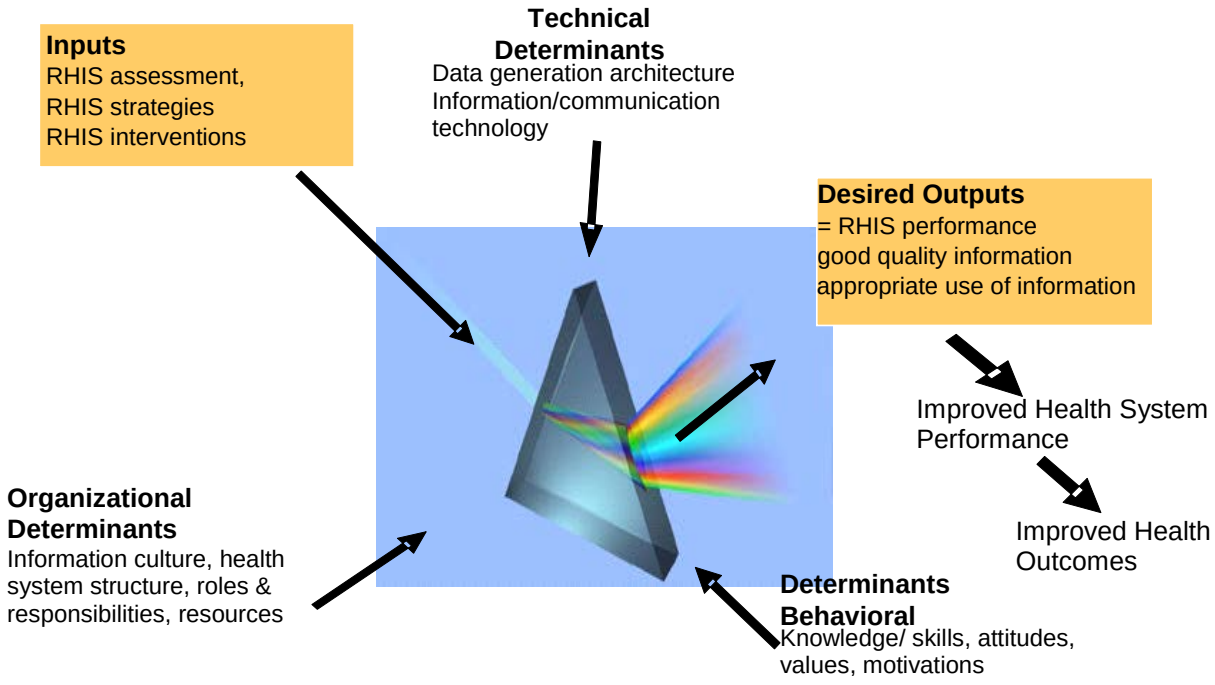
The main source of information for this study was MEASURE Evaluation staff and other public health professionals who have been involved in the development of the PRISM framework and tools, or have used them in various countries in the past. To learn about users' perceptions on implementation and benefits of the PRISM framework and tools in-depth interviews were conducted. The findings reported on country experiences have been based on a total of 11 self-administered questionnaires, six telephone or face-to-face interviews, and document reviews.

PRISM Framework for Understanding RHIS Performance

PRISM assessment encompasses not only technical factors — such as number and type of indicators, data generation architecture, and decision support systems — but also behavioral and organizational factors influencing RHIS performance.

The PRISM framework promotes strengthening of the RHIS performance through better data quality and improved information use. It hypothesizes that improved performance leads to better health system performance, which consequently affects the health status of the population. This conceptual framework provides a comprehensive picture of RHIS performance and of the key factors that determine performance: technical, behavioral and organizational factors (Aqil, Lippeveld & Hozumi, 2009; Hotchkiss, Aqil, Lippeveld, & Mukooyo, 2010). The PRISM framework assumes that if organizations promote a culture of information,[1] they will also improve their competence in conducting RHIS tasks, and thus improving their self-confidence to carryout RHIS tasks. It also suggests the absence or promotion of culture of information in an organization has a direct effect on the performance of RHIS.

Figure 1. The PRISM Framework: Determining Factors and their Impact on RHIS Production Process



[1] Hotchkiss and colleagues (2010) define the promotion of a culture of information as an organization having the capacity and control to promote values and beliefs among its members to promote collection, analysis, and use of information to accomplish its goals and mission.

Based on the PRISM framework, a set of tools has been developed to measure the RHIS performance output, processes, and determinants as well as their relationships: (1) the RHIS Performance Diagnostic Tool; (2) the RHIS Overview Tool; (3) the RHIS Management Assessment Tool; and (4) the Organizational and Behavioral Assessment Tool (OBAT).

- ***Performance Diagnostic Tool*** — As the primary component in the PRISM tool kit, this tool determines the overall RHIS performance defined by the production of quality data and information use. Data quality is measured in three dimensions: completeness, timeliness, and accuracy. The diagnostic tool assesses use of information for problem identification and solving, decision making, resource mobilization, and monitoring.

- ***RHIS Overview Tool, and facility/office checklist*** — This tool examines technical determinants, such as the structure and design of existing information systems in the health sector, information flows, and interaction between different information systems. It allows users to understand the availability and status of RHIS resources such as staffing, RHIS supplies, equipment and infrastructure at health facilities.

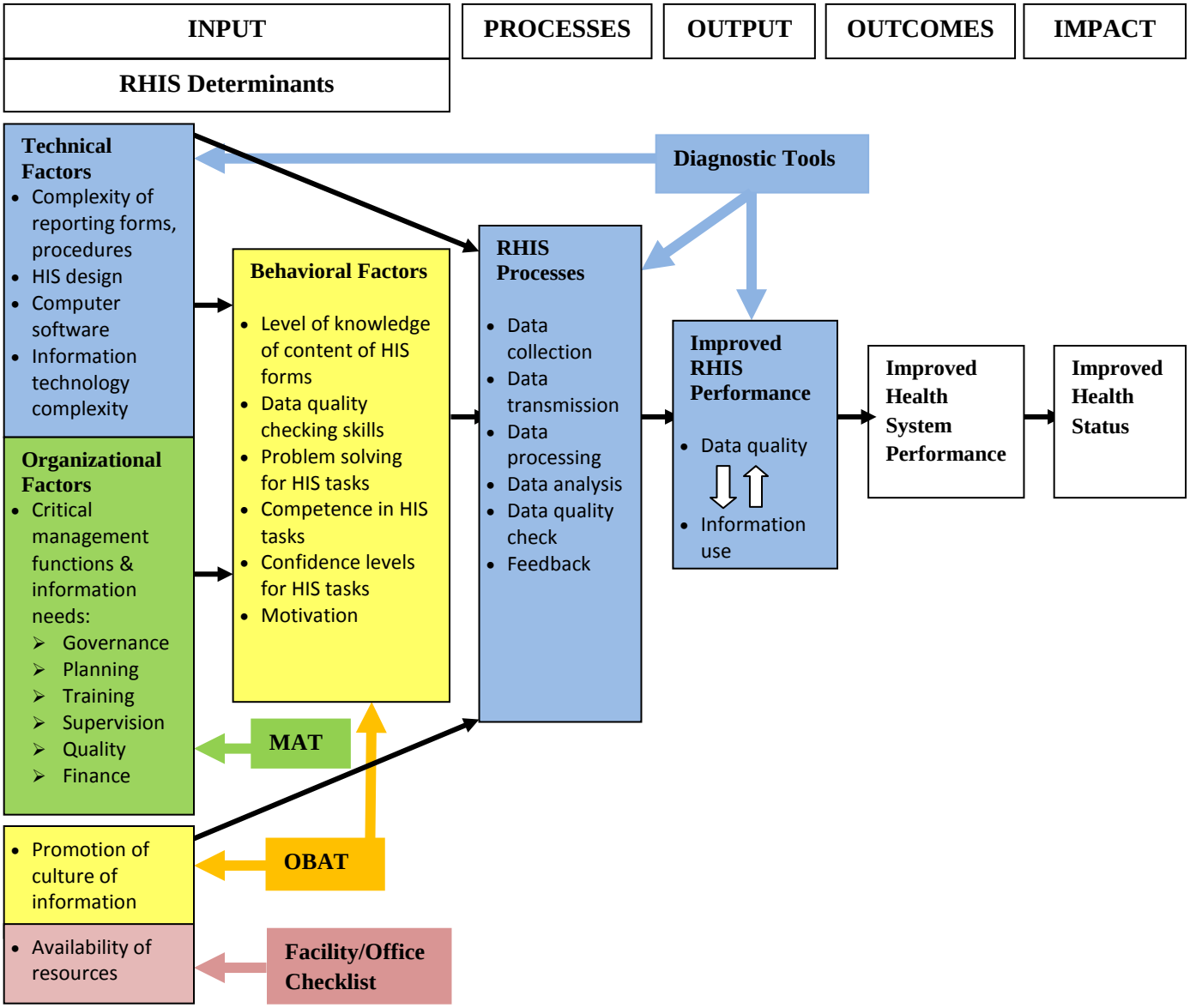
- ***Management Assessment Tool*** — This tool is designed to take rapid stock of the RHIS management practices and to guide the development of interventions for better management. It measures different RHIS management functions including governance, planning, training, supervision, use of performance improvement tools, and financial resources.

- ***Organizational and Behavioral Assessment Tool*** — This tool identifies behavioral and organizational factors that affect RHIS performance, including data demand, motivation, confidence level, task competence, and problem-solving skills. It includes various questions used to assess the promotion of a culture of information within the health department.

Prior to the development of the PRISM framework, it was felt that many efforts to reform routine health information systems did not lead to sustainable improvement and even if they did it was difficult to measure the change. The quality of the data generated through RHIS and use of the information for decision making is analyzed for all administrative levels of the health system in connection with the determining factors. Hotchkiss and colleagues (Hotchkiss, Diana & Foreit, 2012) reviewed seven notable RHIS performance improvement conceptual frameworks found in the literature and concluded that PRISM is the only framework that differentiates between RHIS inputs, processes, outputs, outcomes, and impact (figure 2). The PRISM framework and tools can help countries to assess the state of their RHIS in a quantitative way and to identify a broad set of determinants of poor RHIS performance. This allows countries to set up a more structured RHIS reform effort through the identification of a set of interventions to address RHIS weaknesses.

The PRISM tools can also be used to evaluate the effect of these RHIS strengthening interventions by comparing the baseline results with a mid-term or end-line results.

Figure 2. The PRISM Conceptual Framework



PRISM in Action: Use of PRISM Framework and Tools

In past years, considerable efforts have been made to promote use of the PRISM tools in different countries through various media, such as scientific publications, international conferences, and training courses. The tools have been translated from English into French, Portuguese, and Spanish to facilitate wide application of RHIS assessment and strengthening interventions.[2]

Evaluation of the PRISM framework and tools in Uganda confirmed the reliability of the PRISM tools for assessing RHIS task self-efficacy, motivation and promotion of a culture of information. The results also indicated that these tools are sensitive and suitable for assessing changes over time (Hotchkiss et al., 2010).

As of 2012, 23 countries in Africa, Asia, and Latin America had applied the principles and approaches of the PRISM framework as well as the tools to assess performance of their RHIS and to guide the RHIS strengthening process (see table 1). The PRISM tools were applied at health facilities (from primary care to hospitals or specialized institutions) and at various administrative levels (national or sub-national). Administrative institutions and central offices, such as health departments, provincial health directorates, or district health offices, were also assessed in some countries. Thirteen countries conducted national comprehensive health institution-based RHIS assessments. The majority of them (18 countries) adopted all four PRISM tools while four countries modified and implemented tools selectively (partially). The diagnostic tool was used in Rwanda and Timor Leste, while Costa Rica, Honduras, and Mexico used the OBAT. The PRISM diagnostic tool has also been applied to assess the community orphans and other vulnerable children (OVC) information system in Cambodia.

In several countries, partnerships have been created with national or regional training institutes and universities to develop and implement training courses on the PRISM framework, such as African Center for Higher Management Studies (CESAG) in Senegal, National School of Statistics and Applied Economics (ENSEA) in Côte d'Ivoire, National Institute of Public Health (INSP) in Mexico, and the University of Pretoria (South Africa). The courses intend to build knowledge and skills in using the PRISM tools as the basis for assessing, analyzing, solving problems and ultimately to improve RHIS performance. In 2010, an international workshop was organized on measuring and improving RHIS performance by the Routine Health Information

[2] PRISM tools and users guide are available on MEASURE Evaluation and RHINO Web site: https://www.cpc.unc.edu/measure/publications/ms-11-46d

Network (RHINO) in Guanajuato, Mexico which gathered around 100 participants from all over the world.

In addition, individuals, organizations and teaching institutions have accessed PRISM framework and tools from RHINO and MEASURE Evaluation Web sites[3] and integrated it in their courses. For example, the Pan American Health Organization (PAHO) has used the PRISM tools for training purposes in the Eastern Caribbean Countries. John Hopkins University (JHU) has made PRISM framework a central component of its health informatics training programs. Furthermore, John Hopkins University (JHU) adopted the PRISM framework to assess performance of information technology applications such as eHealth and mHealth initiatives in developing countries (Weiss & Tappis, 2011). The PRISM framework has been used even beyond the health sector in Uganda to assess the Educational Management Information System (RHINO, 2010).

Table 1. Application of PRISM

Country	Tools Applied	Period	Financed by
Cambodia	Diagnostic Tool	2011	UNICEF
China	PRISM	2007-2010	MEASURE/CDC
Costa Rica	OBAT	2009	MHI
Cote d'Ivoire	PRISM	2003-2012	MEASURE/USAID
Dominican Republic	PRISM	2008-2009	HA/MEASURE/USAID
Ecuador	PRISM	2009-2010	HA/MEASURE/USAID
Ethiopia	PRISM	2011-2012	MEASURE/USAID
Gabon	PRISM	2012	French Development Agency (AFD)
Haiti	PRISM	2008	MEASURE/USAID
Honduras	OBAT	2006	HA/MEASURE/USAID
Liberia	PRISM	2012	RBHS/USAID
Malawi	Diagnostic Tool	2010	
Mexico	OBAT	2005-2006	HA/MEASURE/USAID
Mexico	PRISM	2010	HA/MEASURE/USAID
Mozambique	PRISM	2010	MEASURE/USAID
Pakistan	PRISM	2004	TAIS/ JSI
Paraguay	PRISM	2006-2007	HA/MEASURE/USAID
Peru	PRISM	2008-2009	MEASURE/USAID
Rwanda	Diagnostic Tool and Facility Checklist	2011-2012	MSH/USAID
Senegal	PRISM	2008-2013	MEASURE/USAID
South Africa	PRISM	2006	MEASURE/USAID
Timor Leste	Diagnostic tool	2010	TAIS/ JSI
Uganda	PRISM	2004	MEASURE/USAID
Zambia	PRISM	2012	EU

[3] Since 2006, the PRISM tools and user's guide downloaded over 4,380 times from MEASURE Evaluation Web site.

PRISM Assessment: Status of RHIS Performance

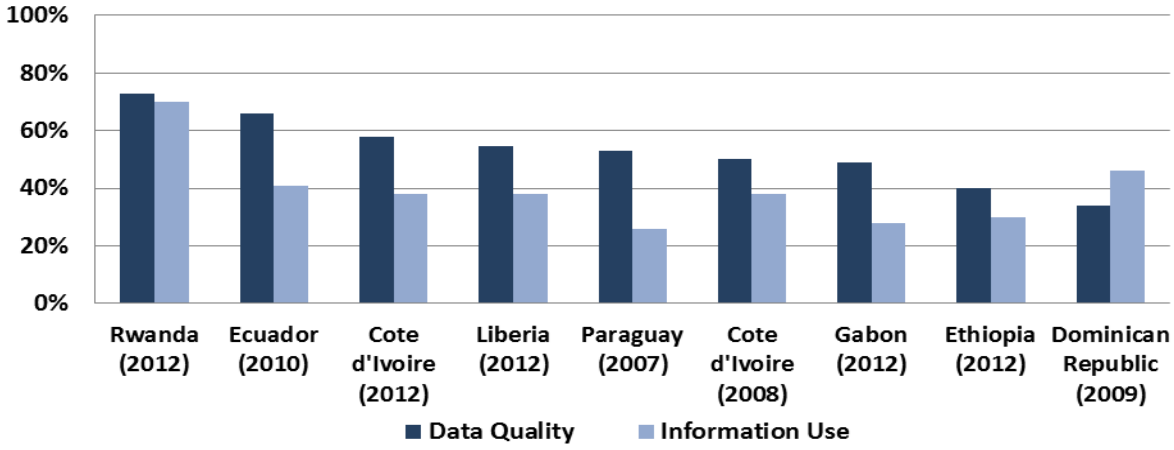
MEASURE Evaluation has helped countries to assess the state of their RHIS, and make positive changes. They have identified weaknesses in the RHIS data production and information use processes and consequently highlighted the determining factors for each problem. Some common aspects of RHIS issues identified through PRISM assessments in different countries are listed below (more detailed information can be found for each country in annex 1):

RHIS performance diagnostics: Quality assurance of health care requires availability of the right information at the right time to support patient care and health system management decisions. The PRISM tools diagnose data quality, including accuracy, timeliness, and completeness of data, as well as information use as the two essential performance indicators in the process of RHIS strengthening. Figure 3 shows levels of RHIS performance at health facility level in each country as measured by data quality and information use. Of the reviewed 25 PRISM assessment reports, 17 have captured the data accuracy while others have showed overall data quality levels. Even though availability of data improved in many countries, the quality and use of information at the point of data collection is limited. The baseline assessments showed an average of 55% data accuracy level in health facilities. An encouraging progress in data quality at health facilities emerged in the second round of PRISM assessments in Pakistan and Cote d'Ivoire. Between 2008 and 2012, data accuracy improved in Cote d'Ivoire by 17% at health facilities and doubled (from 40% to 81%) at district level.

Evidence from the various PRISM assessments revealed that availability of quality data or information does not necessarily mean that information is used for making decisions. For instance, the observed positive change in data quality in Cote d'Ivoire is not accompanied with improvement in use of information at the point of data collection. Use of information in Cote d'Ivoire remained at 38% between 2008 and 2012 at health facility level. Though more than 90% data accuracy observed in the 2010 PRSIM assessment of 158 health facilities in Mexico, only 53% of the facilities demonstrated use of information. It is also true that appropriate use of information does not guarantee the data are of good quality. This calls for better understanding of the drivers of RHIS performance.

Technical factors*:* These are the factors related to the specialized know-how and technology to develop, manage and improve RHIS processes that affect RHIS performance both directly and through behavioral factors. It also looks at availability and user friendliness of data collection forms and procedures. The assessments highlighted technical challenges related to lack of information technology, problems of data management software, poor disease identification and classification, high burden of data collection, lack of standardized indicators and procedures accompanied with limited technical knowhow.

Figure 3. Levels of RHIS performance (data quality and information use).



For instance, in Liberia the Ministry of Health and Social Welfare (MOHSW) installed District Health Information system (DHIS) software, which has the capability to generate raw data, pivot tables, dashboards, and maps to provide a comprehensive picture of health system performance. Yet, it is hardly used by senior managers at county health offices due to lack of technical capacity. In Ethiopia, the assessment conducted in Southern Nations, Nationalities and Peoples Region (SNNPR) showed that even if procedure manuals that guide data collection and analysis are developed they are not widely available at health facilities and district health offices. In Uganda, it revealed limited or no integration of HIV/AIDS and other service data in the health management information system (HMIS).

Behavioral factors*:* Performance of RHIS and processes such as data collection, data integration, capturing, transmission, processing, analysis, presentation, and feedback are directly affected by the gaps between real competencies and perceived competencies of health care professionals. Figure 4 shows a gap between self-perceived capacity and real competencies to carry out the functions of the RHIS among HIS staff at health facility level. RHIS task competencies in terms of checking data quality, analysis and use of information are limited in most countries. Managers at higher levels have limited knowledge on data quality review methods (see figure 5). Lack of problem identification and solving skills are other common issues observed among health workers in the majority of the countries. On average, 37% of the health workers were able to demonstrate skills to identify and solve problems related to information use in 10 countries including Cote d'Ivoire, Dominican Republic, Ecuador, Ethiopia, Gabon, Honduras, Mexico, Peru, South Africa, and Uganda.

Furthermore, in most countries, the limited knowledge about usefulness of data has been the primary factor linked to lack of demand for data quality and use of information. Respondents

indicated that there is no or little demand for the generated information and the information is not systematically analyzed. The assessments underlined the need to strengthen capacities in use of information of the workforce involved in RHIS.

Figure 4. HIS staff competencies to perform RHIS tasks.

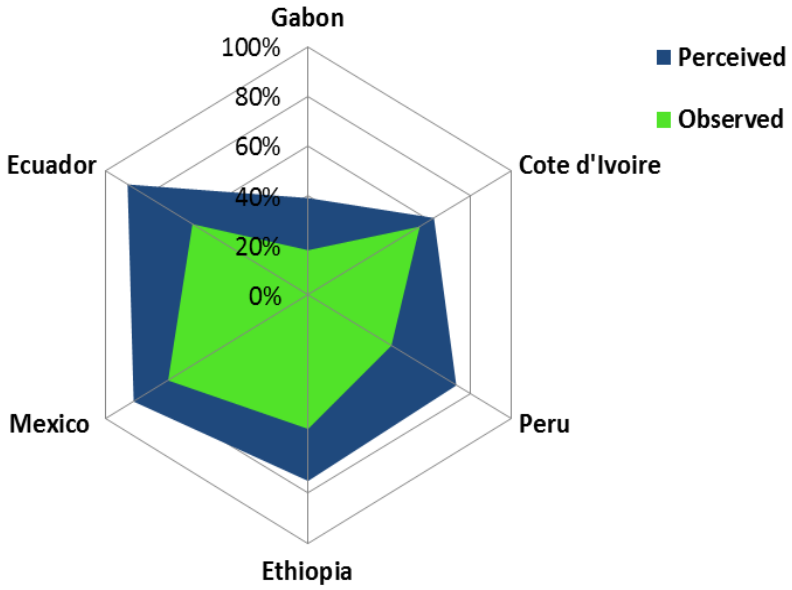
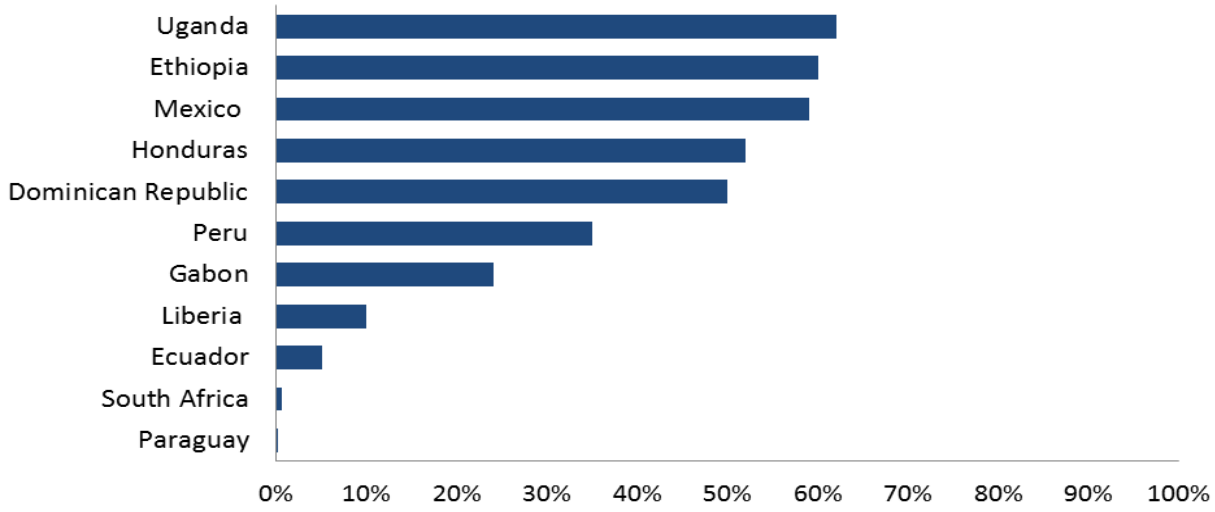


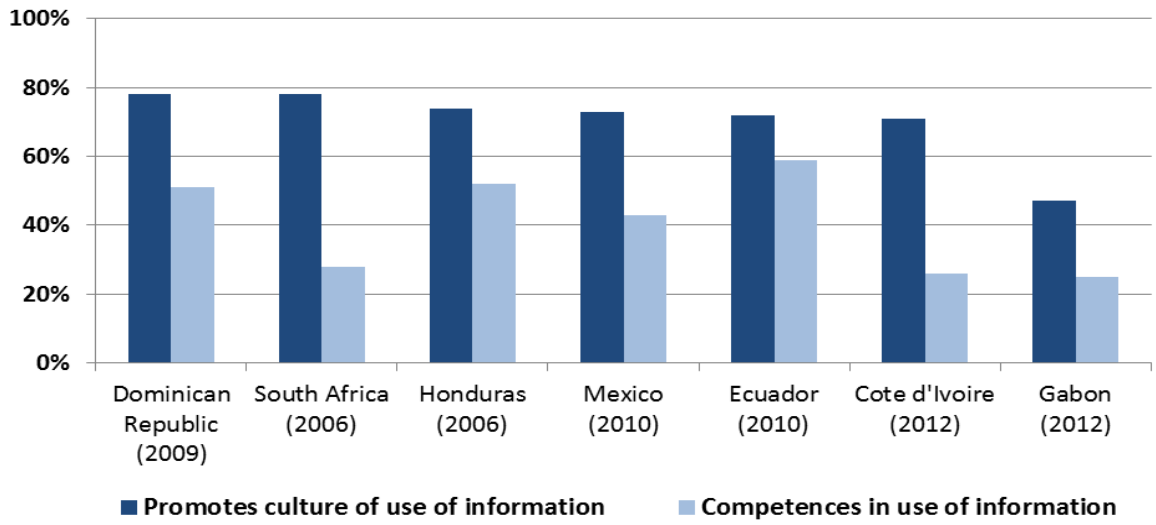
Figure 5. Knowledge on data quality review methods.



Organizational factors: The PRISM framework assumes that if organizations promote a culture of information, they will also improve their competence in conducting RHIS tasks, and thus improving their self-confidence to carry out RHIS tasks. If the work environment does not promote key RHIS attitudes and values, health workers do not internalize the values required to generate, maintain, and improve the information system. However, the countries' assessments also showed a gap between perceived promotion of a culture of information and actual competencies and knowledge of RHIS tasks (figure 6). This indicates that perceptions among the respondents that their organization promotes data quality and use of information were not aligned with actual competence to check data quality and use information. These results of low RHIS competence combined with high perceptions of promotion of a culture of information and self-efficacy for RHIS tasks are consistently reflected in PRISM assessments in Pakistan, Mexico, Cote d'Ivoire, Uganda, Gabon, Dominican Republic, and Honduras.

In regard to organizational functions of RHIS, the assessments also highlighted that the absence of rewarding good performance, low quality of supervision visits, and feedback affected health workers' motivation to perform RHIS tasks. A PRISM study in Uganda showed that, although the health facilities received a number of supervisory visits, less than 45% had received feedback. The Zambia assessment highlighted that motivation to do RHIS tasks apart from collecting and reporting data is limited. There is no incentive to produce quality data to analyze and use information as there is no supervisory or monthly report feedback provided at various levels of the system.

Figure 6. Comparison between perceived promotion of culture of use of information and actual competence to use information.

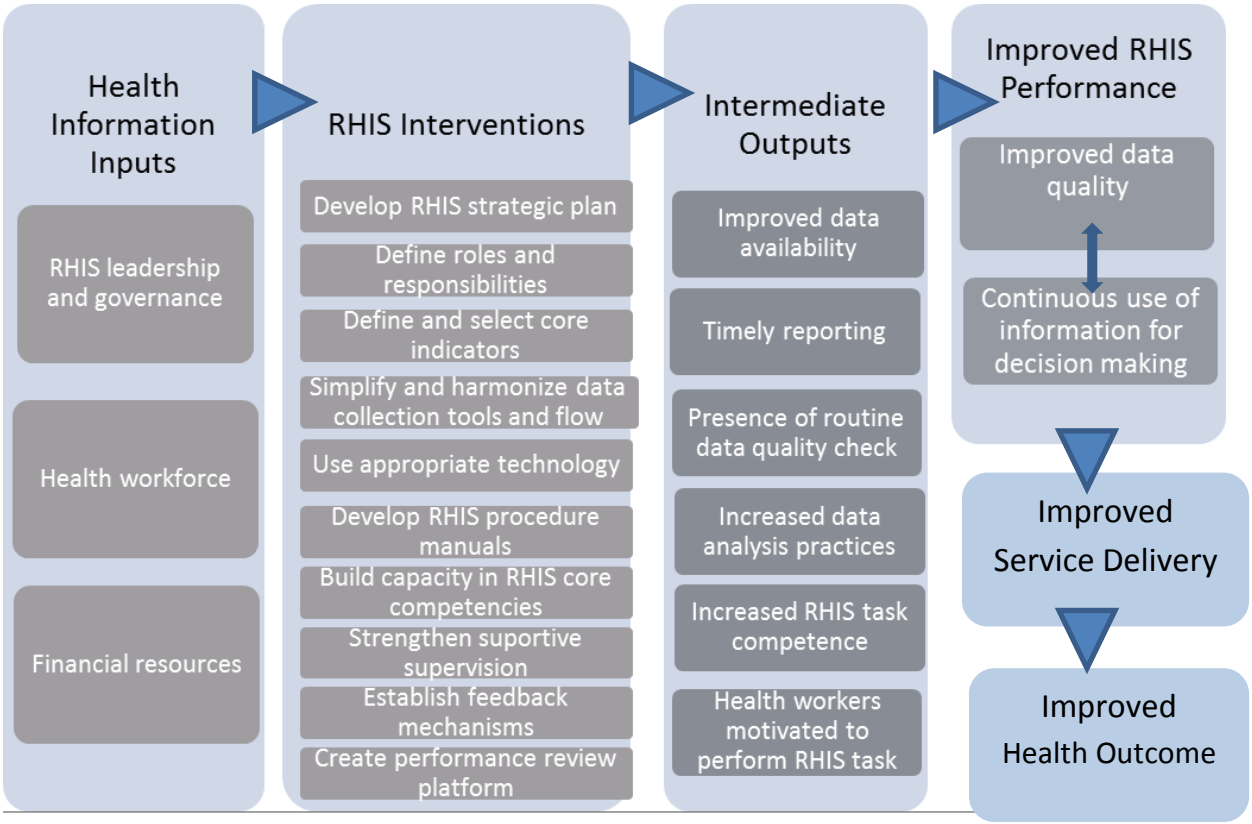


PRISM Interventions: Strengthening RHIS Performance

A health system needs internal mechanisms to develop performance targets, track progress, and create and manage knowledge for continuous improvement. PRISM allows countries to assess the casual pathways of the determinants for RHIS performance and how they affect systems prior to implementing interventions to improve the quality of the data and use of information, and to later evaluate the change brought about by the interventions. As such, it creates opportunities for improvement by identifying the strengths and weaknesses of the health information system.

Several countries have taken measures to advance the performance of routine health information systems. The RHIS improvement interventions resulting from previous assessments based on PRISM approach as shown in figure 7 ranged from supporting national HIS reforms to capacity building in use of information at all levels. In most countries, such as Dominican Republic, Haiti, Honduras, Mexico, Pakistan, Peru, and Uganda, the RHIS assessment led to development of national and local action plans to improve data quality and information use and decision making. In Mexico, the HIS assessment was used as input for the National Health Plan 2006-2012, thus establishing follow-up indicators. This section provides a summary of the interventions categorized under the three factors of RHIS performance.

Figure 7. RHIS performance improvement conceptual framework.



Technical interventions: Countries adopted different strategies to improve the quality of routine data and encourage use of information at the level of data collection and higher. The interventions consist of those that address technical barriers to the use of information and communication technology. Côte d'Ivoire and Haiti harmonized and reduced the amount of data collected through RHIS. Some countries, such as Côte d'Ivoire and Yunnan province in China, took measures to promote greater integration of reporting systems into one RHIS. In Uganda, the Ministry of Health harmonized and integrated the HIV information into the broader RHIS across the country. In Cambodia, the study contributed to streamlining of OVC report flow through the Ministry of Health. Others (Mozambique, Pakistan, Haiti, and Uganda) started standardizing data collection registers/forms and reporting forms as well as streamlining reporting flows. The Pakistan findings from the PRISM assessment served as the basis for shifting from a centralized system to a district-based system.

Improvements in information technology, initiating a move away from paper-based system, is another broadly implemented RHIS strengthening intervention. For example, in Peru a computerized HIS auditing system is used to improve the quality of data. Developing and installing data entry and analysis software and databases were some of the actions undertaken in Ecuador, Paraguay, Mexico, Pakistan, and Uganda. A PRISM assessment conducted six months after the introduction of the District Health Information System (DHIS) application[4] in Pakistan showed that level of data accuracy improved from 40% to 75%. Use of information improved from 10% before intervention to 55% after intervention. The General Directorate of Health Secretariat (DGIS) in Mexico availed a set of online databases to the general public,

PRISM IN CHINA

MEASURE Evaluation assisted the Prevention and Control Working Committee Office (PAWCO) and U.S. Centers for Disease Control and Prevention (CDC) offices of Yunnan province in China to undertake PRISM baseline and end-line assessments and to implement a training program on use of information. By 2010, use of both HIV/AIDS service information and HMIS information increased in intervention counties (50% and 83%) as compared to none intervention areas (26% and 74%). The intervention counties demonstrated better achievement of HIV/AIDS indicator targets (67%) than the control group (50%).

[4] DHIS 2 is an open-source Web-based application with data visualization features including GIS, charts, pivot tables, and dashboards developed by University of Oslo. It enables a user to create a full-fledged system for data management, and facilitates interpretation and use of information. DHIS 2 is designed to serve as data warehouse allowing data integration and exchange with other systems.

thus facilitating access to and use of information. Training of staff on DHIS2 was implemented in Liberia in conjunction with improving the communication technology platform.

Organizational interventions: Strengthening the routine health information system requires a range of developments and changes in organization, management and culture. It needs strong leadership in providing an information reach environment and in promoting the strategic role that RHIS plays in planning and managing health services. An example of strengthening the strategic leadership role of the Information Systems Unit (ASI) comes from Honduras. The Health Secretariat implemented a series of interventions including revising the legal, regulatory, conceptual and strategic RHIS framework; defining roles, responsibilities; strengthening processes; and developing RHIS products.

Most organizations are governed by rules, processes, values, and systems that have the ability to support or hinder staff's ability to use data in decision making (Aqil & Lippeveld, 2009). As part of the decentralized governance approach in Ethiopia, the regional health bureau (RHB) in SNNPR gave high importance to evidence based decision making at all levels. As such, it established performance review teams (PRTs) at every health administrative unit from the RHB to health facilities. In conjunction with creating forums for information use, a guideline was developed to strengthen and facilitate the monthly performance review meetings. Also, information use guidelines and a training manual were developed and awaiting to be endorsed by the Federal Ministry of Health general directorate. Another example of developing procedures and manuals providing clear guidelines for data quality processes and defining roles and responsibilities related to using data comes from Côte d'Ivoire. Other interventions included strengthening supportive supervision with a focus on ensuring data quality (Mozambique, South Africa, Uganda, Timor Leste); and improving RHIS coordination and collaboration (Cambodia, Dominican Republic, Ecuador, Peru).

Behavioral interventions: Creating an information culture is a long-term behavioral intervention. Although health information system restructuring did improve the information production it may not lead automatically to better use of information (RHINO, 2001). To improve continuous use of information in decision making, individual capacity in core competencies to ensure data quality and use must exist at all levels of the health system. The following are examples of actions taken to bridge the observed gap between health workers confidence and competence to perform RHIS tasks:

- fostering competent health information staff by appropriate training and recognition of necessary skills and tasks. (Côte d'Ivoire, Dominican Republic, Ecuador, Honduras, Mexico, Mozambique, Paraguay, Pakistan, Senegal, South Africa, Uganda);
- developing national and regional RHIS courses based on the PRISM tools (Côte d'Ivoire, Mexico, Senegal, South Africa);

- establishing partnerships with local teaching institutions in developing countries to set up pre-service RHIS courses and offering workshops. (Côte d'Ivoire, Senegal, South Africa, Mexico, Paraguay); and
- installing continuous and timely feedback mechanisms (China, Côte d'Ivoire, Mozambique).

Way Forward: Potential Development Areas

The questionnaire for this study (see annex 2) also included questions around the relevance and user friendliness of the PRISM tools in terms of content and format. Table 2 is a summary of the findings and comments received.

Table 2. Summary of Findings and Comments Received

Strengths	Weaknesses
Content	
• Allows for comprehensive assessment of RHIS • Designed to cover different aspects of RHIS performance • Not only highlighting strengths and weaknesses of RHIS systems but also indicating strategies to improve performance • Allows to establish measures/indicators for future follow up of RHIS performance	• Comprehensive assessment of RHIS seen as resource intensive • Limited option to gather qualitative information through the tools • Does not check on gender disaggregation • Data elements for accuracy are limited – tries to establish data quality trends based solely on two periodic data points
Format	
• Provides Access based data analysis and entry tool (DEAT) • Can perform automated analysis - generates tables and graphs automatically • Option of copy and compilation of dataset from multiple data entry points available and automated	• Some questions worded vaguely • Questions format is confusing/not user friendly • Data output format not user friendly (colorful and confusing)
Adaptability/Compatibility	
• Tools can be modified taking local context into consideration • It is flexible in a sense that it allows to personalize the analysis as per selected indicators • Gives option for generating additional charts for specific districts or indicators • Options made available on welcome page of the DEAT to set up tolerance/target ranges for data completeness, accuracy and timeliness	• Focused on facility or district level though could be adapted for use at all levels • DEAT is not compatible with different versions of access software (Microsoft and Vista) • Difficult to fully import modified or adapted questionnaires into the DEAT
Dissemination and Use	
• Availability of user guide and instruction manual • Integration of PRISM tools in RHIS courses • The PRISM tools are translated into French, Spanish, and Portuguese	• Limited knowledge or experience with PRISM among HIS experts at international and country level • Absence of a guideline for designing RHIS interventions based on PRISM assessment

Subsequent to this study, efforts were made to address some of the weaknesses highlighted above. The following revisions were made on the PRISM tools and data entry and analysis tool (DEAT):

- Gender related questions are added into the diagnostic tool to make further gender perception and competency related analysis using OBAT.
- The access-based DEAT is being revised to capture the information needed and to make the outputs more organized and user friendly. DEAT was redesigned into sub-sections and options were provided for modifying the questionnaire to take into account local context. However, special precautions will need to be taken not to modify the meaning of the individual questions, which will then affect the execution of the DEAT program.
- Expanded the number of data elements for data accuracy check from four to10 along with the expansion of period for checking data quality dimensions (accuracy, completeness and timeliness) to three point periods to look for trends.

The PRISM initiative presents a reference framework and tools for designing, strengthening, and evaluating RHIS. There are some potential areas for further development of the PRISM tools, such as the following:

- While the PRISM tools can provide a comprehensive picture of the RHIS, the tools can also be modularized for routine monitoring of certain aspects of RHIS performance. For instance, the diagnostic tool is used in Rwanda, Malawi, and Cambodia to assess RHIS performance, while the study in Mexico, Costa Rica, and Honduras focused on behavioral and organizational aspects of RHIS using OBAT. Therefore, MEASURE Evaluation should encourage tailoring and modularizing the PRISM tools to address the needs of different programs and make it more user-friendly. It will also minimize the perception that a PRISM assessment is resource intensive.
- The PRISM tools address integration, data quality and information use which are burning issues in the global health community (among funders and partners) at the moment. Capitalize on the opportunity of the current momentum in these areas and update these aspects of the tools as well as package and promote them in different settings.
- Explore possibilities to use the tools beyond institution based RHIS to strengthen some of the other data sources (e.g. community-based health information system, surveys, etc.). Recently, the diagnostic tool was used in Liberia to understand the health information system at community level.
- Qualitative methods are also useful to look into issues concerning organizational and behavioral determinants related to design and adaptation of RHIS, and the perception of system users in performing data collection, analysis and use information for decision making. (Hotchkiss, Diana & Foreit, 2012) In case of need for in-depth qualitative analysis, a qualitative survey tool could be developed separately to complement PRISM tools.

Conclusion

PRISM presents a reference framework and tools for designing, strengthening, and evaluating routine health information systems. Factors that inhibit the use of data vary between countries, organizations, levels of the health system, and facilities. Studies showed that major impediments to RHIS performance could be grouped under technical, behavioral, and environmental factors. These could be related to issues such as not using standard definitions and data collection instruments; poor recording and reporting, errors in processing data and delay in conveying information; failure to value information, absence of feedback; absence of supportive environment and supervision; etc. Hence, assessment of the organizational, technical, and behavioral factors that affect decision making is necessary to diagnose which interventions are needed to improve demand for and use of data.

The PRISM methodology provides quantifiable information related to RHIS determinants that can be used to evaluate results over time. For the first time, countries have established a baseline for RHIS performance, using the PRISM tools. Some countries conducted national PRISM assessment while in others PRISM contributed to the design, strengthening and monitoring of the RHIS. The majority of countries that have carried out assessments have included relevant improvement plans or interventions in their strategic plans, for future development related to these issues. Preliminary findings of PRISM assessments after intervention show encouraging results. Sharing the experience and knowledge gained form the use of the PRISM tools with other countries will greatly benefit the development of their respective RHIS.

References

Aqil A, Lippeveld T, Hozumi D. PRISM framework: a paradigm shift for designing, strengthening and evaluating routine health information systems. *Health Policy Plan.* 2009;24(3).

Health Metrics Network. *Building Momentum and Saving Lives: Resullts Report*. Geneva, Switzerland: World Health Organization; 2010.

Hotchkiss D, Aqil A, Lippeveld T, Mukooyo E. Evaluation of the performance of routine information system managment (PRISM) framework: evidence from Uganda. *BMC Health Serv Res.* 2010;10:188.

Hotchkiss D, Diana M, Foreit K. *How Can Routine Health Information Systems Improve Health Systems Functioning in Low-Resource Settings: Assessing the Evidence Base*. Chapel Hill, NC: MEASURE Evaluation; 2012.

RHINO. The RHINO workshop on issues and innovation in routine health information in developing countries [conference proceedings]. RHINO workshop, Potomac, MD, USA, March 14-16, 2001.

RHINO. Measuring and improving RHIS performance. Fourth international RHINO workshop [conference proceedings]. RHINO workshop, Guanajuato, Mexico, March 8-12, 2010.

Weiss W, Tappis H. *Adapting PRISM for Evaluationg of eHealth/mHealth Initiatives.* Baltimore, MD: John Hopkins University; 2011.

Annex 1. Application of PRISM Framework and Tools: Country Experiences

Year	Partners	Scope	Adaptation of PRISM Tools	Assessment Results	Interventions[5]
Cambodia: Strengthening OVC Information System					
2011	Ministry of Social Affairs, Youth and Veterans Affairs (MoSVY), UNICEF	• Assessment of performance of the pilot OVC data collection and reporting system at village, commune, district, province and NGO levels • Build staff capacity to use PRISM tools	• condensed data quality and data use tools into one tool and modified for each levels • trained staffs from MoSVY, Ministry of Planning, Ministry of Interior and MoE on the adapted PRISM tools	• data accuracy ranges from 36%-57% at village level and from 50%-75% at commune and district level for the two indicators • only 14% at village level and 75% at commune and district know report submission deadline • data processing and analysis: 75% of commune and 100% districts compile data and produce aggregated data • OVC data collection not harmonized with the commune database • multiple registers and reporting forms • limited human resources • low understanding on how to use data at village level • use of information for resource mobilization 38% at village level and 67% at commune and district levels • 33% use data to inform policy at commune and district levels • feedbacks provided from district and commune to lower level, 100% • only 71% of the village reports discussed with higher level	• finalizing OVC indicator definitions, data collection and reporting tools (T) • revising data flow (T) • proposed the following changes to be considered in the scale-up and capacity building plan: - strengthening supervision capacity (O) - improve coordination and collaboration (O) - harmonize OVC data collection and reporting (T)

[5] T= Technical , O= Organizational, B= Behavioral

Year	Partners	Scope	Adaptation of PRISM Tools	Assessment Results	Interventions[5]
China : Integrating and strengthening HMIS and HIV/AIDS reporting systems in Yunnan and Guangxi Provinces (2007-2010)					
2007 and 2010	CDC, Provincial HIV/AIDS Prevention and Control Working Committee Office (PAWCO)	• end-line assessment of HMIS and HIV/AIDS reporting system - compares progresses made in integrating and strengthening HMIS and HIV/AIDS reporting systems between old and new intervention counties and non-intervention areas		• overall use of information is better in new (83%) and old (86%) intervention counties than control group (74%) • use of HIV service information is higher in new intervention counties (50%) as compared to old counties (26%) • intervention counties met HIV indicator targets better (67%) than control group (50%). • improved use of information for better management of services, more than 80% in intervention group compared to 26% in control group • use of HMIS information for decision making is higher (94%) in old intervention counties compared to control group (86%) • HMIS task competence in terms of calculation, data plotting and interpretation improved by 30% • knowledge and practice of performance improvement tools increased from 15% to 70% • promotion of use of information in intervention counties is better (68%) than control areas (50%) • supervision quality reached 93% in intervention area compared to 88% in control group • 55% facility staff received feedback in intervention counties compared to 12% in control group	• developed training manual on use of information focused on HIV/AIDS services (O) • trained more than 350 staff (O) • introduced new data analysis template for feedback (O)

Year	Partners	Scope	Adaptation of PRISM Tools	Assessment Results	Interventions[5]
Côte d'Ivoire: Integrating HIV/AIDS information and HMIS evaluation 2003 – 2011					
2003	MoH	• applied PRISM Framework to assess HMIS performance		• data on HIV activities are not integrated with HMIS • only 62% of the districts have computers • data completeness, 62% • only 30% of the districts have computerized database	• developed RHIS improvement strategies based on PRISM Framework • selected and validated indicators (T) • integrated HIV/AIDS indicators into the RHIS (T) • developed, tested, and distributed data collection tools (T) • provided informatics kits for better data management (T) • developed RHIS courses and trained health staff (B) • Training partnership established with ENSEA to train health workers on data analysis and use of information (B) • provided DDIU trainings for decision makers (B) • developed feedback bulletins for health offices at all levels (O)
2008	MoH, ENSEA	• surveyed 119 health facilities and 12 districts to assess HMIS performance level and identify major determinants affecting HMIS performance	• adapted French version of PRISM tools • used access application instead of excel • set up tolerance range for completeness, accuracy and timeliness measures • customized the questionnaire taking into account local organization e.g. level denominations (province vs district) • data entry excel files modified to capture many data	Findings: • data accuracy 40% for districts and 43% for health facilities • timeliness of reporting,60% • data quality at health facilities, 50% • data analysis,30% • use of information for decision making 38% at health facilities and 44% at district level • inadequate supervision of the HMIS and lack of feedback. Only 7% district provide feedback to health facilities • lack of management standards and procedures of the MIS Improvements observed compared to 2003 assessment: • HIV/AIDS data collected by national tools and integrated in the HMIS • data quality, 60% • data completeness improved from 62% to 80% • data transmission between levels improved • availability of computerized database in the districts increased from 30% to 77%	

Year	Partners	Scope	Adaptation of PRISM Tools	Assessment Results	Interventions[5]
			entry points and ease data entry	• staff motivation to execute HMIS tasks reached 80% • 82% district and 62% health facility staff confident in conducting HMIS tasks • HMIS competencies: 55% of health facility and 65% of district staff • 92% staff in charge of HMIS trained • HMIS resource (computers, telephone, UPS) availability improved. • computer availability in districts reached 100%, but only 13% of health facilities and 34% of districts have internet	
2012		• surveyed 10 regions, 20 districts and 190 health facilities to assess the integrated management information system (IMIS) in relation to data quality and use of information • OBAT is administered to 342 people		Data quality • Data accuracy improved from 43% to 60% at health facilities and by 40% at district health office level. • Data quality control through supervision tripled over the four years (from 36% to 90%) • Completeness of monthly facility data reports increased from 43% to 65% • Report timelines has shown 10% decrease (from 60% to 50%) as compared to 2008. Information use • Information use in the health facilities remained constant at 38% between 2008 and 2012. • While drastic improvement in information use observed at district level (from 44% to 70%). OBAT • observed RHIS task competence among staff, 49% • self-confidence to perform RHIS tasks, 61%	

Year	Partners	Scope	Adaptation of PRISM Tools	Assessment Results	Interventions[5]
				• staff motivation for RHIS task execution, 78%	
Dominican Republic					

2008 - 2009	Secretariat of Public Health (SESPA)	• conducted an assessment of the HIS with the aim to establish HIS strengthening strategies
		
		• covered central level, all regions (9) and 93 health facilities
				• quality of data, 34% with regional variations
				  • data accuracy ranges from 15% to 98%
				  • timeliness from 30% to 80%
				  • integrity from 30% to 85%
				• use of information at facility level, 46%
				  • facilities in two regions reached 80% while the other regions achieved 55% -74%
				• presentation of information (32%), data analysis (29%)
				• discussion based on data (41%)
				• there is considerable gap between perceived promotion of a culture of information and observed competencies
				  - 72% believed checking quality of data is promoted, but only 50% demonstrated skills to review data quality
				  - 72% believed problem solving is promoted, but only 21% exhibited problem identification and solving skills
				  - 78% perceive use of information is promoted, but only 51% demonstrated skills in information use
					• developed a national strategic plan to strengthen HIS focused on training and human resources capacity building with participation of Directorate of Training and Statistics (DIES)
					• reactivated the inter-institutional technical group (including staffs working on vital statistics, population statistics, morbidity and primary health care clinical management)

Ecuador					
2010	Ministry of Public Health (MSP), National Institute of	• used PRISM tools for in depth assessment of the RHIS		• data accuracy, 71% • timeliness, 56% • data completeness, 70% • significant difference between promotion of data quality (79%) and actual skill in reviewing quality	• designing software and virtual platforms (T) • training staff (B) • established inter-institutional committee to coordinate,

Year	Partners	Scope	Adaptation of PRISM Tools	Assessment Results	Interventions[5]
	Statistics and Censuses (INEC), General Directorate of Civil Registry, Identification, and Registration (RC), National Secretariat of Planning and Development (SENPLADES)	• included 107 health facilities and 11 provincial health directorates		of data (5%) • problem solving skills, 48% • 90% confident in calculating data, only 78% knows how to calculate data • 59% demonstrated skills in information use • 44% have data interpretation skills • 24% are able to develop graphs	monitor and evaluate implementation of the strategic plan (O) • designing M&E plan (O) • developing proposal for a budget to ensure financial sustainability of the project (O) • bringing the Social Security on board in the national committee as key player in the health service (O)
Ethiopia					
2011 and 2012	SNNPR Regional Health Bureau (RHB) and zonal health departments (ZHDs)	• PRISM assessment conducted in two clusters covering 6 zones, 2 special districts and 1 town administration in SNNPR	Translated the OBAT questionnaire to Amharic (local language).	Data Quality • Over 85% report completeness • Data accuracy ranging from 32%-67% depending on data element and type of health facility. • Data quality checked in 55%-65% of health facilities by the supervisors Information use in health facilities, 35% • Almost 100% of the health facilities (except health posts) have established performance review teams (PRTs). • HMIS discussed in 50% of the PRTs. • Decisions made based on HMIs in 25%-45% of the health facilities. HMIS task confidence among staff over 80%, skill level is about 50%.	• Conducted review of decision making practice at different tiers of health management. (T) • Developed and distributed guideline for performance review team meetings. (T,O) • Restructured the performance review meetings by including management team members. (O) • A national information use guideline drafted (T) • Rolled out eHMIS to the district level providing access to the processed data set (DSS) to facilitate timely use of information for decision making. (T)

Year	Partners	Scope	Adaptation of PRISM Tools	Assessment Results	Interventions[5]
Gabon					
2011	French Development Agency and Ministry of Health	• conducted PRISM assessment in all regions, 34 health departments and 126 health facilities to establish a baseline for performance of the national HIS		• Overall data quality: 48.5% at health facilities, 70% at health department and 60% at regional levels. • Use of health information: 28% at health facilities, 42% at health department and 31% at regional levels. • The gap between staff confidence and actual competence to perform NHIS tasks ranges from 20%-30%. The gap is wider at the regional health office level. • Skill on use of health information: 23.7% at HF, 40% at health department and 51% at regional levels. • HIS resources such as registers and data collection forms are available at all levels (76.6% -91%). While computers are mostly available at health department and regional levels (74.2% and 81.8% respectively). • Recorded minimum level (less than 10%) of HIS planning, training, supervision and data quality assurance mechanisms.	Recommended interventions: • Strengthen coordination of NHIS (O) • Finalize regulations related to the management of the NHIS (O) • Review data collection tools and the training for health care providers (T) • Develop a training manual on NHIS (T) • Finalize and operationalize the database (T) • Provide registers to health facilities (T) • Enter a budget line for NHIS activities (data collection, supervision, data validation, reporting, training) (O) • Improve working condition of staff in charge of the management of health information. (O) • Reward health facilities that demonstrate good data transmission (O)
Haiti: HMIS Evaluation					
2008	USAID, MoH	• survey conducted using data quality and data use,	translated tools to French and changed	• low level of data accuracy, 60% for ANC3 visits and 50% for DPT3 • reports are not transmitted on time, ranges from	• national committee for HMIS (CONASIS) formed (O) • action plans developed at

Year	Partners	Scope	Adaptation of PRISM Tools	Assessment Results	Interventions[5]
		management assessment and OBAT tools in 20 facilities within 10 provinces (2 in each province)	wording of certain questions	20%-40% • lack of data analysis and use of information for decision making • data displayed only in 35% of facilities • information use, 37% • HMIS task competence in terms of data plotting (45%), interpretation (20%), use of information (0%) and checking data quality (40%) • less than 10% of HMIS governance, supervision and quality criteria met • promotion of culture of information: communication of target (73%), directives to use information (56%), sharing success stories (34%), advocacy (44%) • 65% supervised and no feedback mechanism • 92% of departments and 44% facilities have computers, printers and calculator	department level (in 10 departments). • attracted several donors to assist RHIS workshop (O) • identified information needs by each level of the health system (O) • designing flow of data collection and information production (processing and data analysis) (T) • selecting priority indicators for HMIS inputs (service statistics, disease surveillance, finance, human resources) (T) • identifying and revising tools for HMIS statistic service (T) • assembling human resource management system (T,O) • organizing HMIS reference manual (O)
Honduras					
2006		• applied OBAT involving 65 experts from the health information unit of national health institutions	• adjustments made in the OBAT measurement indicators	• deficiencies in the information use and data quality control • lack of recognition of merit and use of reward • lack of human and financial resources • low competencies in analysis and use of information • observed a gap between perception of culture of information and actual competence and knowledge of HMIS tasks:	• developed HIS strengthening strategic plan (O) • secured financial resource for the implementation of the plan from CIDA (O) • revised organizational model of Information Systems Unit (ASI) including its legal, conceptual and strategic framework; roles,

Year	Partners	Scope	Adaptation of PRISM Tools	Assessment Results	Interventions[5]
				- 72% acknowledged importance of reviewing the quality of data, but only 52% able to use at least two methods to review data quality - 72% believed problem solving is promoted, but only 56% exhibited problem solving skills - 74% believe information use is promoted, but only 52% demonstrated the skill to use information	processes and products (O) • developed job descriptions, procedures and manuals to implement the revised model (O) • provided training on the revised organizational model of ASI (B)
Liberia					
2012	MOHSW USAID/RBHS	• Conducted PRISM assessment in 4 counties, 76 health facilities and interviewed 360 health managers and staff to establish a baseline for RHIS performance	Also adapted the Diagnostic Tool to assess the status of the community health information system	• data quality, 57% - data curacy ranged between 38%-45% at health facilities - 91 % of health offices submitted monthly report to the county health offices - 75% of the monthly reports were submitted on time • information use at health facilities, 38% • less than 20% of health facilities received feedback on monthly reports • promotion of information culture, 48% • less than 10% of staff demonstrated data quality checking skill • there is a gap between health facility staff confidence 951%) and competence to perform RHIS tasks (9%) • of the 76 health facilities 82% have community health volunteers (CHVs) • 43% of the CHVs received data recording and reporting training • 20% of the health facilities have standard recoding	

Year	Partners	Scope	Adaptation of PRISM Tools	Assessment Results	Interventions[5]
				forms and 12% have reporting forms • Community health information system is not yet harmonized. There are multiple reporting channels of community health activities	
Malawi					
2010	MoH	• applied PRISM to assess RHIS status in Lilongwe district as part of MPH thesis by Paul Kawale		• overall use of information 44.6% • limited information feedback to facilities • 1/3 of facilities did not display information • training was limited to data collection and manual data entry • supervision not geared towards HMIS tasks • various health service information not integrated	• a proposal to improve HMIS developed –includes improving health data at district level, empower local health workers, continuous coaching, sharing lessons, better supervision and feedback
Mexico: Promoting a Culture of Information					
2005 - 2006	National Institute of Public Health (INSP), General Directorate of Health Secretariat (DGIS-SSA), Pan American Health Organization (PAHO)	• applied OBAT to evaluate the organizational framework and performance of personnel in Mexico's HIS, with a view to developing interventions for improving the use of information • involved a total of 271 informants from different levels (DGIS, Health Secretariat of federal institutions, IMSS,	revised the Spanish version of OBAT based on pre-analysis results OBAT questionnaire made available for 33 states through website	• Promotion of an information culture (68%) includes: - data quality, 72% - information use, 75% - feedback within the HIS, 66% • Organizational consideration was poor (60%), includes: - resource availability, 72% - support from high-level management, 69% - staff understanding performance assessment criteria, 51% • Observed a gap between perception of culture of information and actual competence and knowledge of HMIS tasks - 70% perceive MoH promotes checking data quality, only 59% demonstrate - 71% believe MoH encourage problem solving skills, only 40% demonstrated the skill	• designed and developed a comprehensive database which includes population, hospital stay, infrastructure and human resource information (T) • a set of database made available online to the general public (T) • HIS assessment used as input to the National Health Plan 2006-12 (O) • national plans to improve information use and decision making developed (O) • reviewing the national regulation related to health information (O) • conducted trainings and capacity building workshops(B) • INSP launched distant learning

Year	Partners	Scope	Adaptation of PRISM Tools	Assessment Results	Interventions[5]
		INGI, General Directorate of Epidemiology		- 72% believe MoH promotes use of HMIS information, only 52% demonstrated how to use data	MPH program focused on biostatistics and HIS (B)
Mexico: Guanajuato National Health Information System (SINAIS) Assessment					
2010	MoH	• Assessed the strength and weakness of existing SINAIS using PRISM tools in 8 districts and 158 facilities		• observed 95% data accuracy at facility level and 75%-85% at district level • completeness: only 22% at facility level - 100% for 3 districts and 5 districts with no data • 63% of six districts met reporting deadline, no data in the other two districts • 53% of facilities demonstrated use of information for decision • 88% staff found procedure manual, IT and HIS software user-friendly • 88% believed the software provides comprehensive pictures • 50% indicated various information systems are integrated • confidence level for collecting data, checking data quality and calculation 74% • confidence level for data interpretation, 71% but only 37% demonstrated interpretation skills • 69% believe RHIS tasks bring positive outcomes • RHIS task competence for calculation and plotting data is 76% • competences in use of information (43%) and checking data quality (56%) • only half of RHIS governance functions and one third of supervision, quality standards, training and planning criteria were met • facility staff strongly (73%) believes management	findings were shared with the RHINO workshop participants in Guanajuato

Year	Partners	Scope	Adaptation of PRISM Tools	Assessment Results	Interventions[5]
				promotes data quality, information use and problem solving. while promotion of evidence based decision making is 65% • only 48% of the facilities received one or more supervision visits over past 3 month • 85% have computer, printers and calculators while only 40% have telephone line & internet	
Mozambique: Toward Goal-Oriented Military Health Information System					
2010	Ministry of Defense	• surveyed 7 health facilities (1 hospital and 6 health centers) in 3 regions to assess performance of Military health information system	• PRISM tools translated in to Portuguese • developed database using access application	• > 90% data accuracy for specific diseases but only 72% classified correctly • absence of norms affected data quality evidenced by improper disease classification • minimum data quality assurance during supervision • multiple forms used inconsistently • one third of routine forms missing • data processing and analysis not documented • absence of graphic tools for data display • lack of feedback mechanism • team meetings held regularly and at times information used for discussion	• interventions developed to address data quality problems (T) • diseases identification workshop planned (T) • new forms developed (T) • working on improving feedback mechanism (O)
Pakistan					
2004		• as part of the reform to decentralized HMIS to district and secondary hospital level baseline assessment, design and pilot testing of new DHIS, including evaluation of the		•HMIS data accuracy, 41% • information use, 10% • HMIS task competence, 42% •during DHIS piloting period data accuracy and use of information improved from 40%-75% and 10%-55% respectively. Changes attributed to keeping records of meeting and using them to inform discussion and decision making • new data accuracy checklist for self-assessment	• revised data collection registers and forms for primary care facilities and introduced new ones for hospitals (T) • training manual on data collection registers and forms developed (T) • training manual developed for assessing data quality and

Year	Partners	Scope	Adaptation of PRISM Tools	Assessment Results	Interventions[5]
		pilot and its feasibility to scale up • evaluated the pilot DHIS in 48 facilities within 4 districts		of data quality used by 30%	information use (T) •district software application for data entry, analysis and report generation developed (T) • a national action plan for scaling-up of the DHIS developed and widely disseminated (O)
Paraguay					
2006-2007	Ministry of Public Health and Social Welfare (MSPYBS), Institute of Social Welfare (IPS), Military Health Unit, Police Health Unit and General Directorate of Statistics, Surveys and Censuses (DGEEC)	• initially applied OBAT in a sample of 98 health facilities • later on used the remaining PRISM tools to assess HIS status in 101 facilities from central level, 9 regional directorate, IPS, military health and police health facilities		• data quality, 53% - only 2 regions score slightly higher than zero (below 15%) for data accuracy - four regions higher than zero for timeliness of data (between 80% - 85%) - data integrity ranges from 18% to 85% in six regions • information use, 26% • scored only 7% for competencies to carry out relevant tasks - knowledge of logic and importance of collecting data, 13% - only 0.2% have skills required to review data quality - only 6% have problem solving skills • huge gap between the perception on organization promoting culture of information and actual use of information - 70% believe that management promotes information use, but below 10% uses information	• introduced new methodologies to strengthen the health information subsystem for vital statistics. (T) • designed health service information sub-system including data entry records, procedures manuals, training staff. (T) • developed courses related to data analysis using SPSS, Epi-info and coding with ICD-10 (B) • partnerships formed with local training institutes to train staff (B) • implemented infrastructure and technological interventions for the national HIS: - installed DIGIES at central level (T) - created data center with web connection (T) - established internet network in the regions and installed computers (T) - MoH developed webpage (T)

Year	Partners	Scope	Adaptation of PRISM Tools	Assessment Results	Interventions[5]
					- Agreement signed between MoH Paraguay and the Ministry of planning of Brazil to use their public portal (T) • started pilot testing of new data collection tools for the Health Service Information Sub-system (T)
Peru					
2008-2009	MoH, Institute of Statistics and Computer Since, The Health Policy Initiative and PAHO	• Conducted an assessment of determinants of information system involving 247 facilities in 12 regions and four health directorates	Developed additional tools to capture technical quality of data (the transmission of data, transmission of databases, live birth and death statistical reports	• data quality, 48% - data omission, 6.5% - coding omission, 4.3% - records with inconsistencies, 3.7% - errors in CIE -10 coding, 14.1% - records with discrepancies, 19.5% • 31.3% gap between self-perception and real knowledge - 73.3% acknowledge importance of data quality, but only 35.2% have skills to review quality of data - self-perceived data completion competency (73.6%) but observed competency is only 46.1% - data analysis skills, 36.6% - competency in use of information, 29.6% • 27% of staff trained to carry out HIS tasks • 19% of health facilities have data recording manuals	• conducted workshops to develop local action plans at facility level (O) • developed 247 local action plans to strengthen HIS (O) • Integrated HIS in the Cuzco Region operational plan for 2009 (include develop surveillance system, conduct assessment of health status as a planning and management tool, improve quality and timeliness of information (T) • developed HIS reporting software to obtain accurate data on maternal mortality, malnutrition, and disease indicators. The Huancavelica Region got awarded for this work. (T) • HIS reporting system established

Year	Partners	Scope	Adaptation of PRISM Tools	Assessment Results	Interventions[5]
					to facilitate data analysis (T) • technical committees and working groups established at regional level (O) • provide computers and installed servers at regional level (O)
Rwanda					
2012	MoH, CDC, and MSH/IHSSP	• assessed performance of Rwanda's RHIS and skill level and perception of health workers vis-a vis RHIS management • assessment covered 5 districts, 5 district hospitals, 15 health centers, and 15 villages	Applied the PRISM diagnostic tool and facility/office checklist. These are complimented by locally developed tools: a district administration assessment and focus group questionnaires.	• Data quality level in health facilities, 73% - Data accuracy, 66% - Presence of guidance on data management procedures, 49% - Data processing, analysis, and transmission, 68% • Level of information use was found at 70% - Information display/ dissemination, 38% - Familiarity with indicators, 60% - Promotion & use of health information, 55% • facilities received supervision, 79% • 65% reported receiving feedback mainly though coordination meetings and supervisions.	Recommended interventions: • Improve data accuracy especially at CHW level. • Prepare and disseminate procedures and directives on data management (T) • Provide trainings in data quality assurance, data analysis skills, indicators definition and comparing indicators over time. (B) • Enhance the feedback mechanism (T) • Provide HMIS materials such as registers, computers and LAN (T)
Senegal: CESAG RHIS courses 2009					
2008 - 2010		• provided training aimed at developing skills to carry out a process to improve RHIS performance, including			• trained 43 health staff from 15 countries • as part of the training participants acquired practical skill in conducting RHIS assessment through field level

Year	Partners	Scope	Adaptation of PRISM Tools	Assessment Results	Interventions[5]
		assessment, analysis, planning and implementing solution and evaluation			practice
South Africa: Identifying Performance Level and its Determinants					
2006		• assessed performance of existing DHIS in two districts as part of RHIS course provided by University of Pretoria		• data accuracy, 45% • information use, 65% • high perception of promotion of data quality check (83%), problem solving (76%) and use of information (78%) coupled with high level of confidence in performing HMIS task • reported low level of competencies in checking data quality (0.6%), problem solving (12%) and use of information (28%) • limited understanding of the determinants of poor performance among staff and management • no coordination and harmony within the different components of RHIS	• district made data quality check a priority (T) • district made revision of organizational processes for in-service training and supervision (O)
Timor Leste					
2010	MoH	• applied PRISM tools as training instrument to train health facility staff on improving management of RHIS • as part of the training participants conducted an		• low level (15%) of data accuracy at facility level, but very high (95%) at district level. • data quality check not performed at facility level • 50% of facilities provided complete reports while data completeness is low at district level • only two districts meeting the national 85% target for timeliness • no feedback mechanism at facility level • generated data are not used for decision making • lack culture of promotion of information with only 50% of the facility are communicating targets	• supportive supervision tool developed focused on improving data quality (O)

Year	Partners	Scope	Adaptation of PRISM Tools	Assessment Results	Interventions[5]
		assessment of RHIS in 10 facilities and 4 District Health Offices		• no HIS manual and cumbersome reporting format • data burden, around 4,000 data items collected at each facility level • lack of data entry software • information systems not integrated • low level of supervision • HIS supplies, like register and forms, are adequately available in 80% of health facilities • Shortage of staff and networking materials (telephone, internet, electricity) no training	
Uganda: Harmonizing and Integrating HIV/AIDS Information					
2004	National Resource Information Centre (NHIRC), USAID	• strengthening HMIS at district level and improve HIV/AIDS service information • surveyed 120 facilities in 12 districts of the six regions to identify gaps in HMIS performance as well as in HIV/AIDS information		• HMIS performance: 42% data accuracy, 41% information use and zero completion rates • timeliness rate between 5% to 91% at district level • indicated gap between perception of organization promoting use of information (72%) and data quality as well as competence in checking data quality and use of information (5.5%) • supervision (78%) not accompanied with feedback (43%) • minimum HMIS capacity building for staff, only 9% trained • 40% of health centers understaffed • electricity available in 61% of the health centers • HIV/AIDS service information (VCT, PMTCT etc) are not captured	• HIV/AIDS service indicators integrated into revised monthly reporting forms and facility registers (T) • trained facility and district staff on the revised forms in 56 districts (T) • data entry and analysis software developed and introduced in 7 districts (T) • transferring data electronically from district to NHIRC piloted in 30 northern districts (T) • training manual on HMIS data quality and data use training manual developed and training held (T&O) • data accuracy assessment check list using LQAS developed and

Year	Partners	Scope	Adaptation of PRISM Tools	Assessment Results	Interventions[5]
					trainings for 6 district offices(T) • Supportive supervision strengthened (O)
Uganda: Evaluation of PRISM Framework					
2007		a) investigated reliability and validity of the PRISM instruments b) investigated the validity of the PRISM conceptual framework by assessing organizational, technical and behavioral determinants of RHIS performance	Questions that capture culture of information included in the second round assessment	• record keeping for pneumonia cases and ANC improved substantially (47% to 74% and 48% to 69% respectively) • when record keeping improved data accuracy was found to be lower than that of 2004 • PRISM tools are reliable for assessing RHIS tasks self-efficacy, motivation and promotion of a culture of information • PRISM proved tools sensitivity and suitability to assess changes over time (between 2004-07) • the gap between self-efficacy and RHIS task competencies narrowed as self-assessment by health workers increased • promotion of culture of information found significantly related with motivation, RHIS tasks self-efficacy, RHIS tasks competence, job satisfaction and use of information	
Zambia					
2012	EU and MoH	• Used PRISM framework analysis looking at the factors that affect performance of Zambia HMIS		Technical • the technical aspect of the HMIS was found satisfactory - a mix of paper based and electronic data flows from facility to the central level - HMIS design is generally good - **i**ndicators and datasets are defined - procedure manuals prepared	Recommended interventions: • develop data warehouse (T) • strengthen the use of data at district level using the problem solving approach (T&B) • coordinate the current process of data use for planning, monitoring and PA (O) • upgrade M&E Unit to focus on

Year	Partners	Scope	Adaptation of PRISM Tools	Assessment Results	Interventions[5]
				• cumbersome and time consuming HMIS due to lack of standardized and aligned data collection tools and increased number of indicators • data collection tools and data sets are not synchronized • organizational framework, such as roles and responsibilities, not clearly captured in the procedure manual • delay in data transmission as there are 80+ data entry points • low staff capacity to perform DHIS tasks Organizational • No directorate exclusive to HIS to coordinate HMIS activities in MoH • absence of M&E plan, no designated directorate to coordinate M&E • shortage of skilled staff within the HMIS Management Unit, no HMIs training plan • decentralized information management structures are not in place • HMIS is not sufficiently integrated into the MoH planning guidelines and cycles Behavioral • Routine data hardly used, no demand for quality analyzed data by program managers • Lack of standardized HMIS data audit protocols • Training does not focus on HMIS problem solving • Gap between perceived and actual competence to perform HMIS tasks	data quality assurance, analysis, reporting and dissemination (O) • strengthen use of information - monthly self-assessment by the staff at all levels based on analysis of routine data - quarterly monitoring of district and facility action plans - harmonization and revision of the planning handbooks and tools • develop comprehensive operation plan that include HMIS Unit, ICT Unit and M&E Sub-directorate (O)

Year	Partners	Scope	Adaptation of PRISM Tools	Assessment Results	Interventions[5]
Costa Rica					
2009		OBAT			

Annex 2: Questionnaire

Inventory of PRISM Tools Application

(Use of PRISM tools and interventions for RHIS performance)

Guiding Questions

- What is your role (past/present involvement) in relation to PRISM Tools?
- In which country and when did you apply the tools?
- What information were you able to gather?

Lessons learned

- Who are the partners/audiences engaged in the use of PRISM tools?
- How well are the tools received by partners/ host country?
- Explain how PRISM tools were modified to adopt to host country context/circumstances
- What were the key findings in terms of tools usefulness and gaps?
    - What were the main strengths of the tools
    - What were the limitations highlighted
- Has any follow up action taken to improve the tools?
- Did the PRISM assessments lead to interventions? If so, what kind of interventions?
- If yes, was an evaluation done using the PRISM tools and comparing baseline and end-line?

Future engagement areas

- What efforts are made to promote PRISM framework?
- What needs to be done to expand the use of PRISM tools and interventions?
- What opportunities are there to apply PRISM tools in your intervention areas?
- Will the tools be applied fully or partially? Which ones would fit to the program you are engaged in?
- How would they need to be adapted?

- What suggestions would you have for future use of the tools?