

## Executive Summary

The Health Information System (SIS) is mixed and highly fragmented, and different subsectors are not integrated. Agents from the public subsector (Ministry of Public Health and Social Welfare – *Ministerio de Salud Pública y Bienestar Social*, MSPyBS), Military and Police Health, Social Security (Social Security Institute – *Instituto de Previsión Social*, IPS), and the private subsector are involved in the SIS, which is led by MSPyBS.

Since 2000, MSPyBS has implemented diverse efforts to redesign the SIS establishing – by Resolution No. 401/07/00 – a Committee, with the objective of readjusting the Information System in order to meet needs. This initiative was not successful. In September 2005, the Institutional Committee was reactivated and a first assessment of the status of the SIS was carried out at MSPyBS, through interviews at two levels: General Directors at the Central Level and Regional Directors.

In May 2006, as a result of a joint mission by PAHO/USAID MEASURE Evaluation and an agreement with national authorities Paraguay was included in the joint project to strengthen the SIS, expecting that this proposal would allow complementing and orienting decisions relating to redesign and priority setting. The Inter-institutional Technical Health Team was established, led by MSPyBS, and an assessment of the National Health System was carried in Paraguay through application of the Tools of Analysis and Monitoring of the Metric Health Network. Based on the assessment, guidelines for a strategic plan have been developed to strengthen the SIS. The plan will be used as the basis for a National Strategic Plan.

With the aim of further assessing some relevant aspects of the system with participating organizations, the decision was made to apply PRISM (Performance of Routine Information System Management) Tools, which examine the performance of Information Systems identifying key technical and organizational aspects and factors which determine behavior that can be used to develop interventions in order to address identified gaps.

PRISM Tools have been applied in two stages: The Organizational and Behavior Assessment Tool (OBAT) was applied in 2006, and the remaining Tools were applied in July-September 2007. Results from applying the latter, as well as key conclusions and recommendations to improve identified deficiencies, are included in this report.

## Methodology

The Survey sample includes 101 health facilities: 85 facilities which report to MSPyBS and 16 health facilities from the Social Security Institute (IPS), Military Health, and Police Health.

All 18 health regions in the country were divided into zones according to common characteristics regarding population, health indicators, resource availability, etc. Thus, one or two health regions were selected from each zone, depending on the number of facilities. A specific number of health facilities was then selected according to the complexity level of each one of them and their inclusion in the health network in the selected region or district. Regional Directors at the MSPyBS Central Level, Program Managers, Regional and Hospital Directors, Statisticians, etc. and also, heads of Health Posts and Clinics, have been interviewed.

PRISM Tools have been applied to obtain data on performance of information systems. Different information systems have been mapped in order to gain a general perspective and explore existing links between them.

## Primary Conclusions

- Overall, **SIS Data Quality** is low.
- Coverage of information from the MSPyBS Health Information System, measured through the indicator of Integrity, is relatively good; however, information is not opportune in most regions.
- The primary problem that has been observed is lack of data precision, that is, SIS information generating processes are very weak in health regions.
- Some aspects causing problems with data quality are the following: Use of different forms to gather information, lack of human resources, lack of training, lack of or insufficient financial resources, lack of supervision of the Information System.
- Overall, **SIS Data Management** is very poor in health regions. Many errors are made when recording data, and Regional Directorates only provide very little follow-up and supervision of the SIS. In addition, there is a lack of or insufficient computer equipment, furniture, and office space for the SIS department.
- **Use of SIS Information** differs significantly among health facilities and Regional Directorates in health regions. While SIS information is used to a certain extent at Regional Directorates, health facilities hardly use it at all.
- Data collecting and reporting is not carried out with the required frequency at health facilities, or facilities do not receive any feedback from Regional Directorates to promote improvement.

- Scores for Deployment of the information that has been generated (updated indicators, mapping the area of coverage, overview of demographic information, etc.) at health facilities are very low – 7% for most of them.
  - The two quality elements of Analysis and Discussion have scores of zero for health facilities in health regions – that is, overall, data are not analyzed at this level, with the exception of a few facilities. Regular meetings are not held to verify data quality or make decisions based on statistical reports.
  - Most Regional Directorates do not carry out supervision visits to health facilities with the aim of evaluating SIS performance with staff from health facilities.
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- SIS information is only used to a certain extent at Regional Directorates in health regions. Scores for Data Collecting and Reporting are relatively high, while scores for Deployment and Analysis are low in most health regions. Scores for the elements of Discussion and Decision-Making are zero in most health regions.
  - Overall, resource availability for the SIS is insufficient. However, this varies significantly among different levels. Resources are generally available at the MSPyBS Central Level to carry out tasks relating to the SIS. Nevertheless, resources are insufficient in some Directorates.
  - More than 60% of health facilities do not have the minimum required equipment to carry out SIS tasks, only 43% have computers, and 35% have printers.
  - 54% of the health facilities have regular telephone lines. Most of these telephone lines are located at Regional Directorates and Hospitals. Only 4,6% have Internet access – mostly Regional Directorates.
  - The status of information archives is medium to poor. Forms and supplies required to prepare records, reports, and patient records are not available at 68,3% of the polled facilities. 52% stated that they had run out of forms in the past 12 months.
  - Multiple information subsystems have been identified. Most of them do not have a mission statement, specific purposes or objectives, or financial resources, and a manual or guidelines for data collection do not exist. They use a list of indicators but very few have developed guidelines to calculate and interpret them.
  - Coverage of information subsystems only includes public health services, except for the Vital Statistics Subsystem.
  - SIS schedules and information flows are not complied with for different reasons. One of the main reasons is the distance between health facilities and lack of resources for transportation.
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- **SIS Management** at MSPyBS is weak. Overall, scores for all dimensions are low (under 17%), particularly for Finance, with an average of 1,2%, followed by Quality (8,9%) and Training (8,1%).
  - Management has one of the lowest scores as well. The SIS does not even have a mission statement, in most health facilities an updated organization

chart showing roles relating to the SIS does not exist – neither do documents regarding SIS performance monitoring.

- Virtually none of the financial management criteria are complied with, finances are managed at a higher level, and it was not until 2007 that a budget was established for SIS.
- The Social Security Institute (IPS) uses an information system with a different objective than the MSPyBS system, with a key focus on use of services by users and information relating to types of clients, beneficiaries, etc. Therefore, some Tools do not adjust to IPS and thus, results can not be compared with results from MSPyBS.

### **Recommendations**

- To improve skills for data collecting and interpreting and use of information;
- To update data collection forms through joint efforts by different health subsystems, based on basic priorities and indicators;
- To improve supervision and feedback mechanisms, with a focus on verifying data quality and use of information;
- To promote an information culture;
- To develop an integrated health information system which can gradually integrate different health subsystems from MSPyBS, as well as other subsectors, such as IPS, Military and Police Hospital, etc.

**FINAL REPORT**

**APPLYING PRISM TOOLS:  
PERFORMANCE OF THE HEALTH CARE SYSTEM  
MANAGEMENT IN PARAGUAY**

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## A. Glossary

Precision	In terms of data quality, this refers to consistency of data transmitted between different levels within the health information system (SIS); for example, between patient records at a facility and the SIS monthly statistical overview at the top level.
Data	Unprocessed figures.
Data quality	The extent to which SIS data are consistent, timely, complete, and relevant.
Evaluation	Measurement of the extent to which program objectives are met or not met.
Evidence-based decision-making	An administrative approach based on the use of quantitative data to inform decisions relating to efficient resource management.
Health information system (SIS)	A system that contributes specific information to support decision-making processes at each level within an organization.
Indicator	Specific measurable data that indicate progress toward achieving objectives.
Information	Data that have been processed and interpreted, have a meaning, and can be used by decision-makers.
Integrity	In terms of data quality, this refers to SIS coverage and the extent to which forms are completed correctly; that is, that no data are missing.
Information generation process	A process through which SIS data are transformed into information, which will be used in decision-making processes. It includes the following steps: defining information needs/indicators, data collecting, transmitting, processing, and analysis. In addition, administrative

aspects that have an impact on the process are included, as are resources and organizational norms.

PRISM conceptual framework

PRISM (Performance of Routine Information System Management) is a model to understand factors that guide SIS performance. It uses a framework including three sections (determining technical factors, organizational factors, and factors relating to behavior). The purpose of the model is to help SIS professionals assess needs, plan strategies, and develop improvement processes.

SIS Performance

The effectiveness of a health information system, defined in terms of data quality and use of information.

Strategy

A method, a set of actions and/or processes required to meet an objective.

Target

A specific measurable figure to be achieved for a specific indicator, as part of an objective or goal (example: 90% of reports are prepared in a timely manner).

Opportunity

In terms of data quality, this refers to the extent to which SIS data are updated and available when required, and are submitted in a timely manner, according to established timelines.

Use of information

Use of information occurs when the decision-maker is specifically aware of a decision and its alternatives and takes into account information that is relevant to the decision-making process.

## **B. STUDY OBJECTIVE**

To carry out an assessment of the National Health Information System together with health facilities through application of Performance of Routine Information System Management (PRISM) tools, with the aim of identifying areas of opportunity to strengthen the system.

## **C. SAMPLE**

The survey sample included 101 health facilities, distributed as follows: 85 health facilities (central level and nine regional directorates reporting to the Ministry of Public Health and Social Welfare [MSPyBS] ), 16 health facilities reporting to the Social Security Institute (Instituto de Previsión Social [IPS]), Military Health, and Police Health.

Before selecting the sample, staff from the General Planning Directorate of MSPyBS established zones in the country's 18 health regions, according to common characteristics regarding population, health indicators, resource availability, etc. One or two health regions were selected in each zone, depending on the number of facilities they include. A specific number of health facilities were then carefully selected according to their complexity level and ensuring that they belonged to the health network in the selected region or district.

Annex 1: Sample Distribution

## **D. TECHNICAL TEAM**

A work team was established at the beginning of June 2007 to carry out the study, including individuals with wide experience in different aspects relating to surveys, particularly in the health sector: planning, execution, supervision, processing, and results analysis. In addition to the consultant, the team included a fieldwork coordinator, three technical staff working in the field as fieldwork supervisors, and one staff member in charge of data processing (data entry and consistency of the data base).

Prior to forming the work team, a workshop for the team's technical staff was held in Cuernavaca, Mexico, in September 2006. Training materials were handed out and used during the workshop. Copies of the materials were made after the workshop and handed to each team member to read and analyze, with a key focus on the tools: questions, levels where they should be applied, etc.

Once this had been done, relevant adjustments were made to questionnaires in two basic aspects, which will be mentioned later on in this report.

Team members have been responsible for the entire process. The process can be summarized as follows:

1. adapting the tools
2. preparing the interviewer's manual
3. first application of PRISM tools in an MSPyBS health service network in the central department
4. adjusting questionnaires and the interviewer's manual based on results from the previous activity
5. training interviewers
6. follow-up and supervision of fieldwork
7. preparing reports about fieldwork

## E. ADAPTING PRISM TOOLS

Tools that have been used in Paraguay are the tools that were discussed during the workshop on SIS Performance Improvement and Use of Information to Manage Health Systems, carried out in Cuernavaca, Mexico, in September 2006.

Tools have been adapted to theoretical structures of the MSPyBS health service networks in Paraguay.

Codes have been established for each tool to facilitate the team's understanding and internal organization, as follows:

Code	Questionnaires
A1	Data Quality, Central and Regional Level
A2	Use of Information, Central and Regional Level
A3	Data Quality, Health Facilities
A4	Use of Information, Health Facilities
B1	General Perspective of the Routine Information System
B2	Profile of the Health Information System
B3	Facility/Office Checklist
D	SIS Management Evaluation Tool

Once the first version of questionnaires or tools had been finalized, they were tested in a health service network in the central department in order to make the required adjustments to questions.

Annex 2. Final PRISM Tools [ANNEX 2 not found]

## **F. INTERVIEWER'S MANUAL**

A manual was prepared to provide adequate training for interviewers. The manual includes the following topics: objective of the survey, different areas of the survey, planning fieldwork, interviewer's responsibilities, methods and techniques to help facilitate interviews, information recording methods, basic concepts and definitions, general and specific instructions to complete the questionnaire, etc.

Annex 3. Interviewer's Manual [ANNEX 3 not found]

## **G. FIRST APPLICATION OF PRISM TOOLS**

PRISM tools were applied for the first time at one of the health service networks in the central department, including health facilities with different complexity levels in the districts of San Lorenzo and Fernando de la Mora, which report to the XI Central Health Region. This was carried out July 2-6, 2007.

The work team interviewed relevant staff at San Lorenzo Regional Hospital, Fernando de la Mora District Hospital, the José María Godoy Health Center in Fernando de la Mora, health posts in Tayuazapé and Barcequillo in San Lorenzo, and relevant staff at the regional directorate of the central department.

In addition, relevant staff were interviewed at specialized hospitals, including the National Anti-Rabies Center and the General Children's Hospital (Niños Mártires de Acosta Ñu), both located in the city of San Lorenzo.

Based on this experience, the required adjustments were made – to questionnaires and the manual, and to planning, the schedule, and distribution of work load for the teams of interviewers.

## **H. TRAINING AND SELECTION OF INTERVIEWERS**

Nine individuals were selected as interviewers in July 2007.

The following criteria were used to select interviewers: six individuals with wide experience as interviewers and full-time availability to travel within the country; and three MSPyBS employees with sufficient knowledge of health services, so that one of them could be included in each work team to complement the team. Unfortunately, however, for several reasons, three MSPyBS employees were not available. Therefore, the team ended up including seven professional interviewers and two MSPyBS employees.

Training for interviewers was carried out July 7 and 9, 2007 (Annex 4: Training Schedule). The methodology included theoretical and practical lessons. The following topics were addressed during theoretical lessons:

- a detailed presentation of the project: objectives, expected results, financing, study universe, fieldwork methodology, etc.; and
- developing objectives for each question from the tools and the interviewer's manual, which basically addresses the importance of the interviewer's work, methods and techniques which help facilitate interviews, and information recording methods.

Practical lessons included role-play exercises to practice interviewing, which were carried out by participants. It should be noted that experiences from trainers applying the tools were useful in carrying out interview role-play exercises with interviewers during the workshop.

Evaluation by interviewers was based on observing if participants completed the tools during role-play, and participants' performance and their ability to apply the tools and carry out interviews.

Mastery of the Guarani language was established as a requisite for applicants, since Paraguay is a bilingual country (Spanish and Guarani are spoken).

## **I. FIELDWORK STRATEGY AND DEVELOPMENT**

The coordinating team was located at a central office, which served as a meeting place and as a place to share materials with work teams.

### **1. Work Teams**

Three fieldwork teams were established, each composed of a supervisor and three interviewers. One of the three interviewers in two of the teams was an MSPyBS employee. A vehicle with a driver was available for each team to carry out fieldwork.

### **2. Methodology to Apply PRISM Tools**

Data were collected through use of three main tools classified under assessment, reviewing the information system and facility checklist, and evaluation of the information system management, at the levels established by MSPyBS that were used during fieldwork. The survey was developed through observation, revision, and direct interviews.

Annex 5: PRISM Tool Application Levels

### **3. The PRISM Tools:**

#### **3.1. Assessment Tools**

The assessment tools determine the current level of performance of the SIS. They include two primary tools called data quality and use of information, which have been applied at different levels within the health service network. The two

primary tools are divided into four questionnaires, according to facility and role, as follows:

Code	Questionnaire	Facilities
A1	Data Quality	MSPyBS Central Level, Regional Directorate, and IPS Central Level
A2	Use of Information	MSPyBS Central Level, Regional Directorate, and IPS Central Level
A3	Data Quality	Regional Hospital and lower levels
A4	Use of Information	Regional Hospital and lower levels

### 3.2. Review of the SIS, Facility/Office Checklist

This tool helps understand the structure of the existing information system. The facility checklist (national level and lower) helps understand what resources are available and what is the status of the information system at directorates, offices, and facilities. Heads of facilities are polled. In addition, for B2, Profile of the Health Information System, staff members in charge of each system were interviewed.

This aspect is divided into three questionnaires as follows:

Code	Questionnaires	Facilities
B1	General Perspective of the Routine Information System	MSPyBS Central Level, Regional Directorate, and IPS Central Level
B2	Profile of the Health Information System	MSPyBS Central Level, Regional Directorate, and IPS Central Level
B3	Facility/Office Checklist	All levels

### 3.3. SIS Management Evaluation Tool

This tool is used to measure the level of maturity of the SIS structure. It is applied through observation during visits of the facilities and interviews with key relevant staff members at each facility.

Code	Questionnaires	Facilities
D	SIS Management Evaluation Tool	MSPyBS Central Level, Regional Directorate, Regional Hospital, District Hospital, and IPS Central Level

## 4. Fieldwork Development

Fieldwork began on July 10, 2007 at lower complexity levels (health oosts and health centers) in the health regions of Central, Asunción, and Villa Hayes. Higher complexity levels were visited later on, according to a previously established route map.

Interviewers observed interviews carried out by supervisors during the first week, with the aim of gaining more interviewing experience. In addition, interviewers were accompanied by coordinators during this period. Coordinators were in charge of follow-up and work supervision.

The field coordinator was in charge of distributing to supervisors a list of facilities to be visited and the corresponding questionnaires, according to schedule and work load. In addition, she gave the supervisors copies of the notes submitted to regional directorates or officials at specialized facilities informing them about the work and asking for cooperation to receive interviewers and requesting that they inform officials at health facilities that report to them.

Interviewers used a report sheet for each facility during fieldwork to record situations encountered during interviews to complement data collected through the tools, in order to gain a wider perspective. Report sheets were completed on a daily basis and given to the supervisor.

#### Annex 6: Report Sheet of Visits to Each Facility

In turn, supervisors used a Supervisor's Overview Sheet – which helped to learn about the status of each facility – and the completed PRISM tool.

#### Annex 7: Supervisor's Overview Sheet

During the first two weeks, fieldwork was carried out in Asunción and the departments of Central and Presidente Hayes. In the remaining weeks, fieldwork was executed in more remote departments (Cordillera, Amambay, Itapúa, Caaguazú, Concepción, and Ñeembucú), with final visits carried out at the MSPyBS Central Level.

Fieldwork had a total duration of eight weeks. The final interviews were carried out at different directorates at the MSPyBS central level. All interviews scheduled for the sample were completed.

### **5. Interviews Carried Out According to Type of Tool:**

#### **5.1. Data Quality (A1) and Use of Information (A2). Applied at the Regional Directorate.**

Tools A1 and A2 were applied at the regional directorates in the sample: Asunción XVIII, Central XI, Presidente Hayes XV, Cordillera III, Caaguazú V, Itapúa VII, Amambay XIII, and Ñeembucú XII. The respective directors were interviewed, sometimes together with the staff member responsible for regional statistics. In addition, tools were applied in 10 directorates at the MSPyBS central level.

**5.2. Data Quality (A3) And Use of information (A4). Applied at Regional Hospitals and Lower Levels.**

Tools A3 and A4 were applied at the following facilities:

<b>Facility</b>	<b>Number of Interviews</b>
Regional Hospital	8
District Hospital	9
Health Care Center	16
Health Post	24
Clinic	4
Indigenous Hospital	1
Mother-Child Hospital	2
Specialized Hospital	7
Specialized Center	4
IPS Central Hospital	1
IPS Regional Hospital	4
IPS Peripheral Clinic	2
IPS Health Post	7
IPS Health Unit	2
<b>TOTAL</b>	<b>91</b>

Tools were applied without any problems in public health facilities reporting to MSPyBS. This was not the case in specialized hospitals and centers, and facilities reporting to IPS, because they use a different system to keep records in terms of specifications of types of services and disaggregating diagnostics. In addition, the information flows they manage differ from the ones that have been established for the MSPyBS Health Information System.

**5.3. General Perspective of the Routine Information System (B1) and Profile of the Health Information System (B2)**

Tools B1 and B2 were applied at the central level and in the following directorates: Asunción XVIII, Central XI, Presidente Hayes XV, Cordillera III, Caaguazú V, Itapúa VII, Amambay XIII, and Ñeembucú XII. Tool B1 was applied for directors or staff members in charge of statistics. Tool B2 was applied for staff in charge of each information system.

**5.4. Facility/Office Checklist (B3)**

This tool was applied in its entirety at all facilities that were visited.

### 5.5. SIS Management Evaluation Tool (D)

This tool was applied at central level directorates, regional directorates, regional hospitals, district hospitals, and at the IPS central hospital and regional hospitals.

The tool was applied without any inconveniences. However, it is important to point out that, in three districts, facilities that had been included in the sample as “district hospitals” did not comply with complexity levels for this category and lacked resolutions. Therefore, they were categorized as “health centers,” and one of them as a “mother-child hospital,” after receiving confirmation from health officials and directors from the regional directorate. The tool was not applied in these cases.

## J. SITUATIONS OBSERVED DURING FIELDWORK

Similar situations, as encountered or described by directors or heads of facilities during fieldwork, are summarized below:

- ❖ While an established flow chart to transmit data exists at MSPyBS, facilities submit reports according to particular situations in each facility (for example, distance or lack of communication with directors of higher-level facilities).
- ❖ Staff who are in charge of collecting data and preparing statistical reports are not necessarily statisticians in most of the visited facilities but are the heads of facilities, program managers, or their assistants. They generally expressed that they were not adequately trained to prepare reports, which is just one of their daily tasks (obstetricians, nurses, assistants, or staff in charge of assets).
- ❖ Managers of such programs as the Expanded Immunization Program (Programa Ampliado de Inmunización – PAI), the TB Program (Tuberculosis – TBC), The Perinatal Information System (Sistema de Información Perinatal – SIP), the Food and Nutrition Program (Programa de Alimentación y Nutrición – PROAN), etc., prepare independent monthly reports and submit them to heads of programs at the central level.
- ❖ Some directors, statisticians, or staff in charge of preparing statistical reports have expressed that they take reports home to store them because they fear that reports might get lost, since facilities are unsafe, or no room exists to store reports.
- ❖ One person at a facility expressed that he works together with a community council, led by the local mayor. The council provides the required supplies and hires staff for the statistics department at the facility.

- ❖ In most of the facilities, directors rotate frequently. Most of the interviewed directors had only held that position for a short time.
- ❖ Regarding information recording, it was observed that unified criteria to record pregnancies of less than four months do not currently exist. Criteria to record the pregnancy stage differ. Some establish pregnancies of 15 weeks as "under 4 months pregnant," for others it is 16 weeks, 17 weeks, and so on, up to 21 weeks of pregnancy. Therefore, results cannot be compared.
- ❖ Overall, staff in charge of collecting data and preparing reports commented on the obstacles they face regarding patient records: nurses usually do not complete forms correctly, and this causes problems when recording data. Consequently, the type of consultation and resulting diagnosis are not included in the records.
- ❖ No appropriate room is available for statistical report archives in statistics offices (in those cases where a statistics office exists). Reports are stored on shelves, in boxes, and on desktops and, therefore, are not kept orderly.
- ❖ A general comment made by staff in charge of preparing reports has been the lack of feedback from higher levels. In addition, the topic of the information system is not addressed during visits by higher-ranking staff.
- ❖ In the interior of the country, statistical reports that should be submitted to a higher level on a weekly basis are submitted by telephone due to the lower cost of telephone calls compared with the cost of sending reports to the regional directorate.
- ❖ Regarding specialized centers and hospitals, some had not established a statistical report format. Staff in charge of statistics mentioned the importance of designing forms that adjust to information needs at specialized facilities. Some facilities do submit reports on service provision and morbidity, but staff generally believe that these reports are insufficient and do not reflect reality at their facilities.
- ❖ While most of the general departments at the MSPyBS central level are located within the same physical space, the departments generally do not communicate effectively with each other. In many cases, reports from facilities are not submitted in a strictly timely manner or in an appropriate format.
- ❖ The Directorate of Health Surveillance (Dirección de Vigilancia Sanitaria), which is in charge of regulating use of prescription drugs, had only received eight reports for two months, out of a total of 18 health regions that should have submitted reports.
- ❖ The information system in use was guided more by persons in higher-level positions than by established rules

- ❖ Facilities from the IPS submit reports to regional IPS offices or the central level IPS. In most cases, established transmission channels are disregarded.

## K. RESULTS ANALYSIS

### 1. Analysis of Health Regions

The PRISM tool that was applied to evaluate data quality and use of information is called the SIS performance evaluation tool.

**Data quality** analyses are carried out using mostly tables and graphs relating to quality of the generated data and quality in data management. Elements analyzed for data quality are precision, opportunity, and integrity; and the elements that are analyzed for data management quality are data recording, transmission, and processing.

In addition, results from errors when comparing patient records with monthly reports submitted to higher levels are presented, with the aim of evaluating quality of information that is based on patient records.

**Use of information** at SIS health facilities and regional directorates is analyzed through five elements. Elements observed at health facilities are data collecting and reporting, information deployment, analysis, discussion, and interaction with the regional directorate. The same elements are analyzed for regional directorates, except for the element of interaction, which is substituted by the element of decision-making.

Information that is selected to measure performance of information systems corresponds to the following indicators:

- a) first-time consultations during the year, ambulatory patients (N+R);
- b) number of visits of women who are less than four months pregnant;
- c) first-time family planning consultations; and
- d) development and growth control; and e) patients who initiate diabetes control.

#### 1.1. Data Quality

PRISM tools evaluate data quality through three elements: precision, opportunity, and integrity.

As can be observed, some elements could not be calculated in several health regions due to different situations at regional directorates regarding availability – in printed or electronic format – of the SIS monthly reports for the requested months (May and June 2007), which was the information used to calculate indicators.

<b>TABLE 1. DATA QUALITY IN HEALTH REGIONS</b>			
<b>Health Region</b>	<b>Precision</b>	<b>Opportunity</b>	<b>Integrity</b>
Concepción	Undetermined	0	Undetermined
Cordillera	29	90	94
Caaguazú	14	95	76
Itapúa	0	0	19
Central	0	0	88
Amambay	Undetermined	0	Undetermined
Ñeembucú	0	0	85
Presidente Hayes	0	82	25
Asunción	0	91	0

Overall, it has been observed that the quality of SIS data at regional directorates is poor. According to measurement standards that have been defined by the PRISM tools, scores for most health regions are 0 for all three considered elements because they did not reach minimum acceptable error levels for indicator measurement (see Annex 8).

When analyzing the considered data quality elements separately, it can be observed that only two health regions have scores above 0 for precision and four health regions have scores above 0 for opportunity. However, most of the health regions (six) have scores above 0 for integrity.

Nevertheless, it is important to mention that health reports could not be examined in some health regions in order to record them in the tools. As a result, these health regions show a score of 0 in the results. Among some obstacles that have been faced are the following: reports from computer data bases could not be examined due to lack of supplies to print them (in the case of Asunción), with a resulting score of 0 for this health region; and the Central Health Region scored 0 because monthly reports could not be examined – neither in printed nor in electronic format – since no staff has been assigned the task of preparing reports and, thus, the requested reports were not available.

In other cases, manual records for the reports are not available because data from the reports are entered into computer programs and the original reports are sent back to health facilities (in the cases of Concepción and Amambay) without making printed copies of the original reports due to lack of resources. Therefore, it was not possible to obtain a score for the indicators of precision and integrity in the above mentioned health regions.

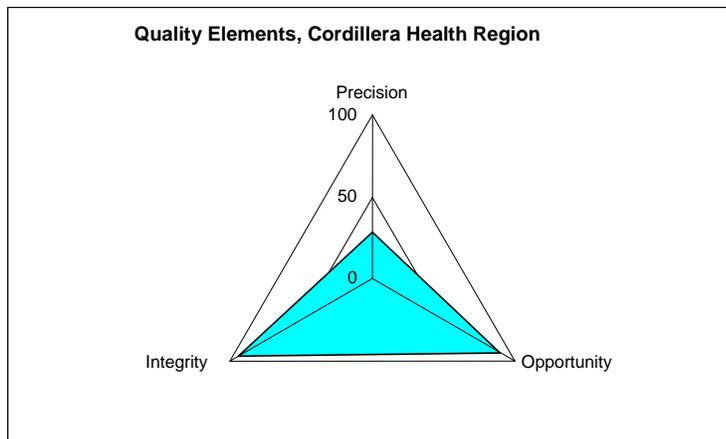
Only two health regions, Cordillera and Caaguazú, have achieved scores above 0 for all considered quality elements, and the Presidente Hayes Health Region

has achieved scores above 0 for two elements (opportunity and integrity). Therefore, it is possible to analyze them through the following graphs:

### 1.1.1. Cordillera Health Region

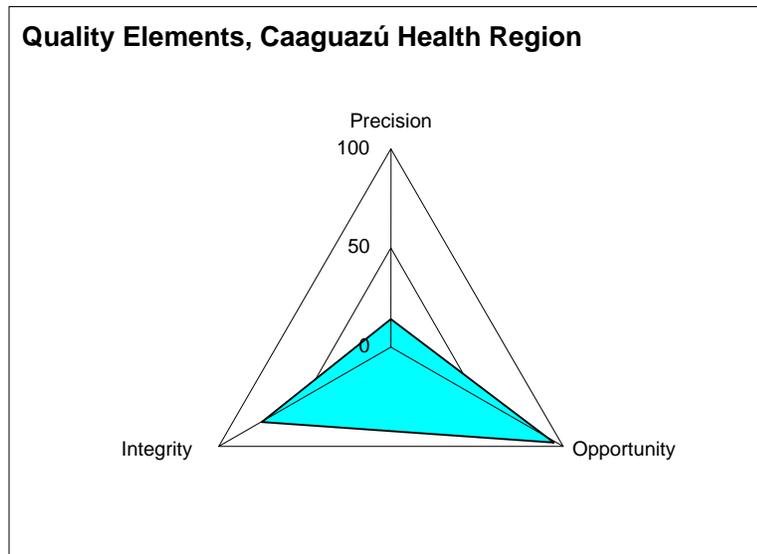
If data quality is acceptable for all angles, the triangle should be an equilateral triangle, with scores close to 100.

In the Cordillera Health Region, a poor level of precision can be observed (29%). However, percentages for integrity and opportunity are high. This indicates that, while the region shows an appropriate level of information coverage and submits information in a timely manner, the quality of information is insufficient since data records or reports do not comply with established minimum quality standards.



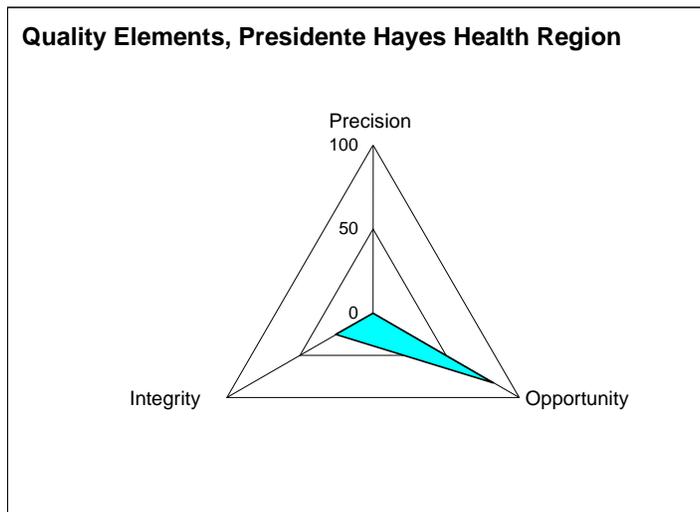
### 1.1.2. Caaguazú Health Region

The Caaguazú Health Region also shows a very low percentage for precision (14%) and a medium percentage for integrity (76%). However, the percentage for opportunity is high (95%). In addition, this region has the same deficiency in information generation as the Cordillera Health Region.



### 1.1.3. Presidente Hayes Health Region

In the Presidente Hayes Health Region the situation is even less favorable: A score of 0 for precision as established by the tool, since results reports could not be examined on computers. Integrity has a score of 25%, and opportunity has a relatively high score of 82%.



### 1.2. Use of Information

SIS data management is measured through errors made during data management – from data recording and transmission to data processing. Thus, for **data recording**, the error level accepted by PRISM as valid for the indicator is 5% or less. For **data processing** the following is considered: error percentage when comparing monthly reports and data bases should be 10% or less and error magnitude in data entry should be 0,5% or less, for both elements, to achieve a score above 0.

For the **data transmission** indicator, at least 70% of the monthly reports submitted by health facilities should be stored at regional directorates. In addition, at least 70% of health facilities should submit their reports before or by the established deadline. Scores for data transmission are above zero and are relatively high in most health regions.

According to the above, results for data management in all nine polled health regions – measured through the three elements – are presented and analyzed below.

<b>TABLE 2. DATA MANAGEMENT IN HEALTH REGIONS</b>			
<b>Health Region</b>	<b>Recording</b>	<b>Transmission</b>	<b>Processing</b>
Concepción	0	Undetermined	Undetermined
Cordillera	17	83	100
Caaguazú	0	100	50
Itapúa	17	0	0
Central	0	75	0
Amambay	0	Undetermined	Undetermined
Ñeembucú	0	75	0
Pte. Hayes	0	50	0
Asunción	0	75	0

Overall, data management is very poor in health regions. According to measurement standards established by PRISM tools, scores for most health regions are 0 for two of the three considered elements (recording and processing), since health regions did not reach minimum acceptable error levels for indicator measurement. It should be highlighted that a score of 0 does not mean that elements – recording, transmission, and processing – do not exist. It only means that they did not reach the above described standards established by PRISM.

A high score for data transmission can be observed for Caaguazú (100%) and a relatively high score in four additional health regions: Cordillera, Central, Ñeembucú, and Asunción. Presidente Hayes shows a medium score (50%), and Itapúa shows a score of 0. No scores could be established for the Concepción and Amambay health regions due to the reasons described above.

Regarding data recording, only two health regions have scores above 0 – Cordillera and Itapúa (17%). In addition, most health regions have a score of 0 for data processing, except for Cordillera, with a high percentage (100%) and Caaguazú, with a medium percentage (50%).

While virtually all health facilities record data for SIS, results for this element are 0 or low due to the high number of errors between ambulatory patient records and reports based on the records, and also because of the number of items that should have been completed but were left blank in monthly reports that were examined at health facilities.

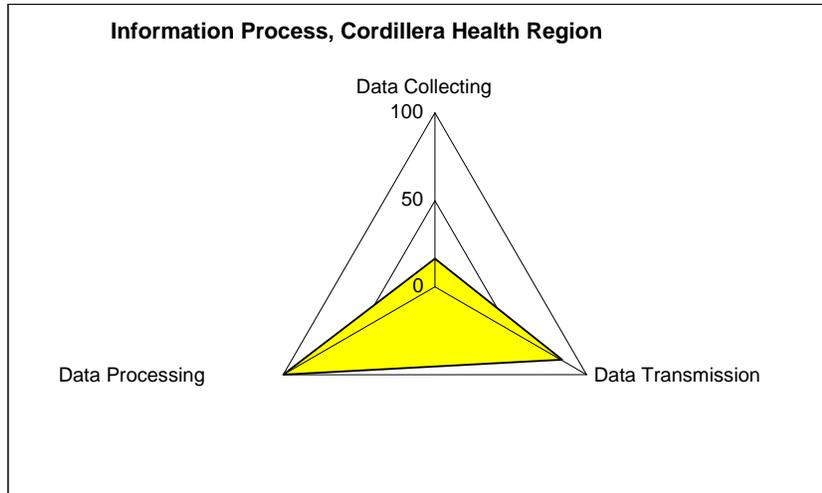
Regarding data transmission, scores of 0 or low scores are basically a result of the low number of monthly reports submitted by health facilities that were available at regional directorates, as well as lack of records of dates when these reports were received and the low number of facilities submitting information by established dates.

Only one of the health regions, Cordillera, has achieved scores above 0 for all quality elements, and the Caaguazú Health Region has achieved scores above 0 for two elements (transmission and processing). Results for both health regions are analyzed below:

### **1.2.1. Cordillera Health Region**

For the Cordillera Health Region, a very low percentage can be observed for data recording (17%); that is, a high number of errors were found when comparing data from ambulatory patient records and reports based on these records, and a high number of items had been left blank in monthly reports. This confirms that data quality is very poor.

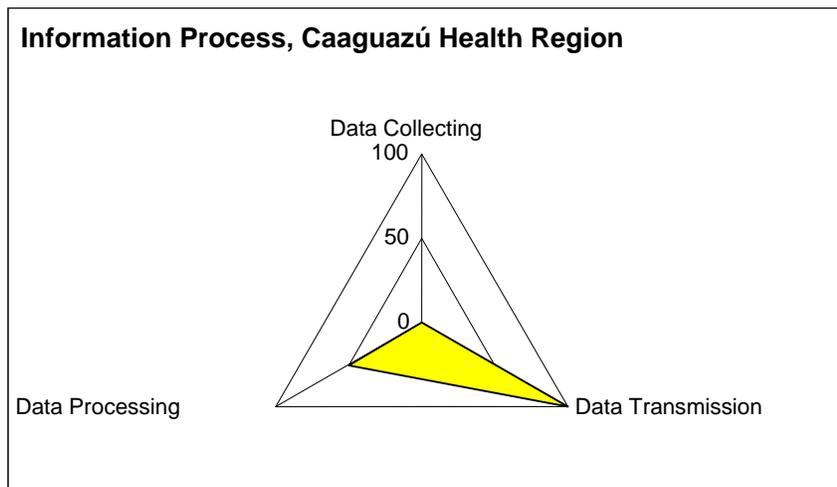
However, percentages for transmission and processing are high. This shows that this health region has low error percentages in data processing based on monthly reports. In addition, an archive of at least 70% of monthly reports from health facilities exists, and many health facilities submit reports to the regional directorate before or by the established deadline.



### 1.2.2. Caaguazú Health Region

In the Caaguazú Health Region the score for data recording is 0; that is, error percentages found when comparing ambulatory patient records and reports based on records, as well as items left blank, are above 5%.

On the other hand, the data processing score is low (50%) but the percentage for data transmission is high (100%); that is, all monthly reports for the observed months had been submitted by health facilities, and polled facilities had submitted reports by the established deadline.



## 2. Analysis at a Facility Level

### 2.1. Data Quality

The next section analyzes errors found when comparing patient records with monthly statistical reports for the months of May and June, which were examined at health facilities during application of PRISM tools.

Error percentages are calculated by dividing the number of data recorded incorrectly by the total number of recorded data that should have been included under an item. Incorrect data recording is defined as the lack of concordance between patient records and SIS reports (an error margin of 5% is considered acceptable for this model).

Results are used to calculate the elements of data quality and use of information.

**TABLE 3. ERROR PERCENTAGES BETWEEN PATIENT RECORDS AND MONTHLY REPORTS**

Health Region	First Visits in the Year, Ambulatory Patients (N+R)	Number of Visits of Women Who Are under 4 Months Pregnant	First Visits for Family Planning	Control, Development, and Growth	Diabetes Control
Concepción	58,3	25,0	25,0	75,0	66,7
Cordillera	60,0	30,0	40,0	30,0	100,0
Caaguazú	71,4	42,9	50,0	78,6	85,7
Itapúa	100,0	57,1	71,4	92,9	78,6
Central	81,3	56,3	71,9	84,4	75,0
Amambay	100,0	50,0	70,0	80,0	90,0
Ñeembucú	100,0	28,6	42,9	85,7	57,1
Pte. Hayes	92,9	35,7	100,0	78,6	71,4
Asunción	50,0	71,4	71,4	71,4	85,7

The table shows high error percentages between patient records and monthly reports. A minimum error of 25% can be observed for all items corresponding to the Concepción Health Region in two items: number of visits of women who are under 4 months pregnant, and first-time family planning consultations; and error levels of up to 100% in Cordillera (diabetes control), Itapúa, Amambay, and Ñeembucú in first-time visits of ambulatory patients (N+R) in the year, and Presidente Hayes (first-time family planning consultations). It is important to mention that the maximum accepted error level for PRISM tools is 15%.

## 2.2. Use of Information

### 2.2.a. Health Facilities

Results for use of information levels at health facilities in all nine polled health regions, measured through five quality elements, are presented in the table below.

<b>Health Region</b>	<b>Data Collecting and Reporting</b>	<b>Deployment</b>	<b>Analysis</b>	<b>Discussion</b>	<b>Interaction with Regional Directorate</b>
Concepción	75	11	0	0	0
Cordillera	75	22	0	0	60
Caaguazú	67	7	0	0	0
Itapúa	50	15	0	0	0
Central	50	7	0	0	7
Amambay	42	7	0	0	0
Ñeembucú	50	7	0	0	0
Pte. Hayes	50	4	0	0	7
Asunción	50	30	0	0	13

Use of SIS information at health facilities in health regions is almost 0. Regarding the quality element relating to data collecting and reporting, data are not collected with the required frequency, or health facilities do not receive any feedback from regional directorates. Most health facilities show percentages of up to 50%, with a maximum percentage of 75% in Concepción and Cordillera regions. The health region with the lowest percentage for data collecting and reporting is Amambay (42%), which is also the one with the lowest number of health facilities.

This quality element, data collecting and reporting, has the highest score compared to the other quality elements that were observed, where results differ significantly. Thus, percentages for deployment of generated information (updated indicators, mapping the area of coverage, overview of demographic information, etc.) at health facilities are very low – 7% or less for most health facilities. Cordillera is the health region with the highest percentage, only 22%.

The two quality elements of analysis and discussion have a score of 0 for health facilities in health regions, that is, data are usually not analyzed at this level. However, it is important to mention that a few health facilities do analyze their data.

Regarding discussion of data, regular meetings are not held at health facilities in order to verify quality of data or make decisions based on statistical reports –

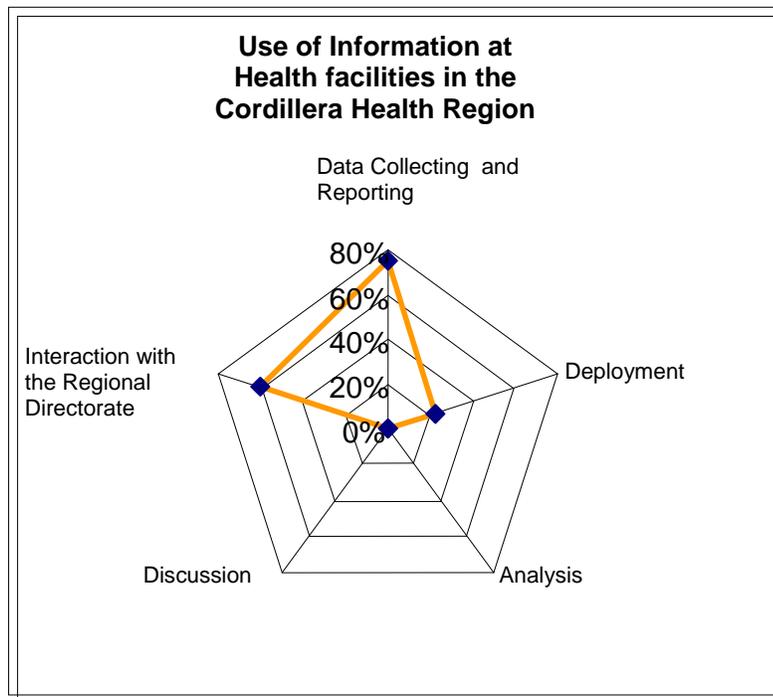
such as trends in use of services by patients, data relating to diseases, and lack of medical supplies, among others.

As for the last quality element, interaction with the regional directorate, results show that most regional directorates do not carry out supervision visits to health facilities with the aim of evaluating SIS performance with staff from health facilities. Health regions with scores above 0 are Presidente Hayes and Central (7%), Asunción (13%), and Cordillera (60%). Cordillera is the health region with the highest level of interaction between health facilities and the regional directorate.

Graphs of health regions including three quality elements with scores above 0 are analyzed below.

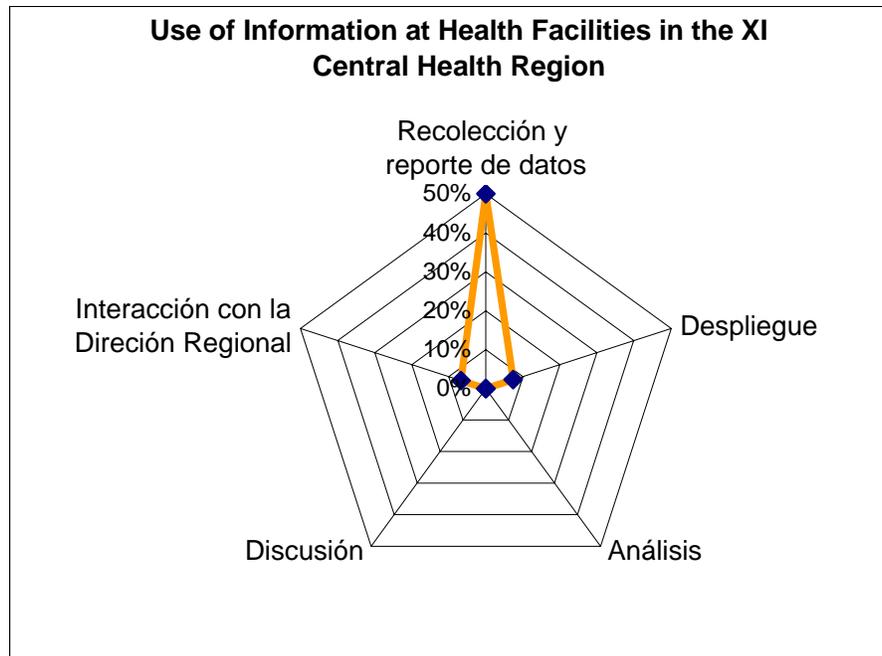
### 2.2.a.1. Cordillera Health Region

In the Cordillera Health Region, scores for data collecting and reporting and for interaction with the regional directorate are medium, the score for information deployment is low, and scores for Information analysis and discussion are 0.



### 2.2.a.2. Central Health Region

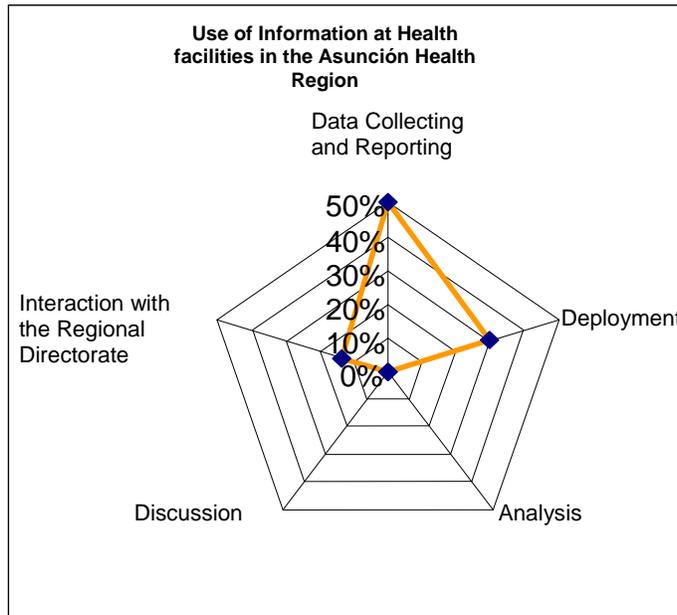
In the Central Health Region, the score for data collecting and reporting is relatively low (50%). However, it is higher than the score for the other two elements, with scores above 0 – these are information deployment and interaction with the regional directorate (7%). Scores for analysis and discussion are 0.



[Translation of text in graph above, clockwise from top: Data Collecting and Reporting, Interaction with the Regional Directorate, Discussion, Analysis, Deployment.]

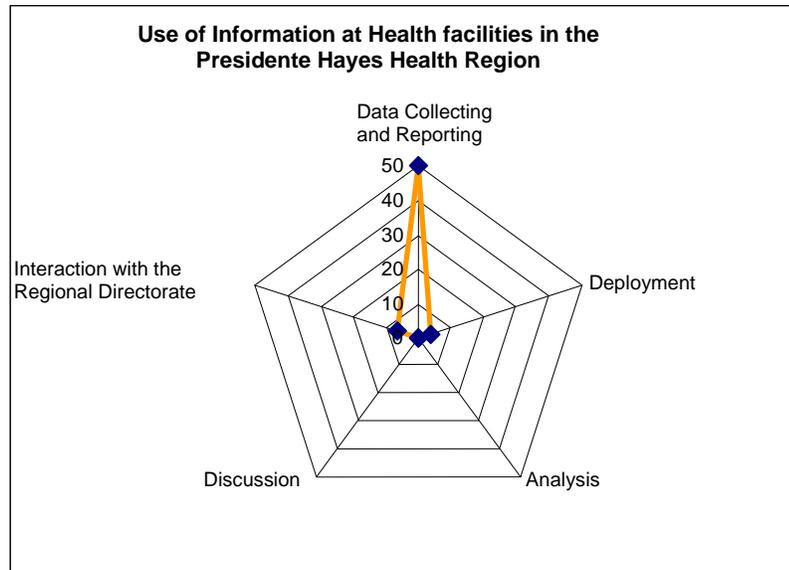
### 2.2.a.3. Asunción Health Region

In Asunción, the score for data collecting and reporting is relatively low (50%), with a score of 30% for information deployment and 13% for interaction with the regional directorate. Scores for analysis and discussion were 0.



#### 2.2.a.4. Presidente Hayes Health Region

Of the four health regions analyzed in the graphs, Presidente Hayes showed the lowest scores. Data collecting and reporting scored 50%, as did the other health regions. However, scores for information deployment and interaction with the regional directorate are below 10%. Scores for analysis and discussion are 0, as are scores for these elements for all polled health regions.



#### 2.2.b. The Regional Directorate

Results for use of information levels in all nine polled health regions, measured through five quality elements, are shown in the table below.

Health Region	Data Collecting and Reporting	Deployment	Analysis	Discussion	Decision-Making
Concepción	89	60	67	0	0
Cordillera	100	80	67	0	0
Caaguazú	100	100	67	33	25
Itapúa	33	20	0	0	0
Central	56	40	50	11	25
Amambay	89	30	50	0	0
Ñeembucú	33	20	67	0	25
Pte. Hayes	89	20	0	0	0
Asunción	89	40	33	0	0

Use of SIS information by directorates in health regions is medium. For some elements, such as data collecting and reporting, a relatively high score can be observed, while scores are low for information deployment and analysis in most health regions. On the other hand, scores for elements of discussion and decision-making are 0 in most health regions.

Data collecting and reporting is 100% in Cordillera and Caaguazú and is relatively high in four other health regions (Concepción, Amambay, Presidente Hayes, and Asunción). Health regions with low scores are Central (56%), Itapúa (33%), and Ñeembucú (33%).

Information deployment levels (updated indicators, mapping the area of coverage, overview of demographic information, etc.) at regional directorates are low, except for Cordillera (80%) and Caaguazú (100%). Scores for the other health regions range from 20% to 40%.

Information analysis in health regions is medium, the highest score being 67% in four health regions, while two health regions have a score of 0, and the score for Asunción is no higher than 33%.

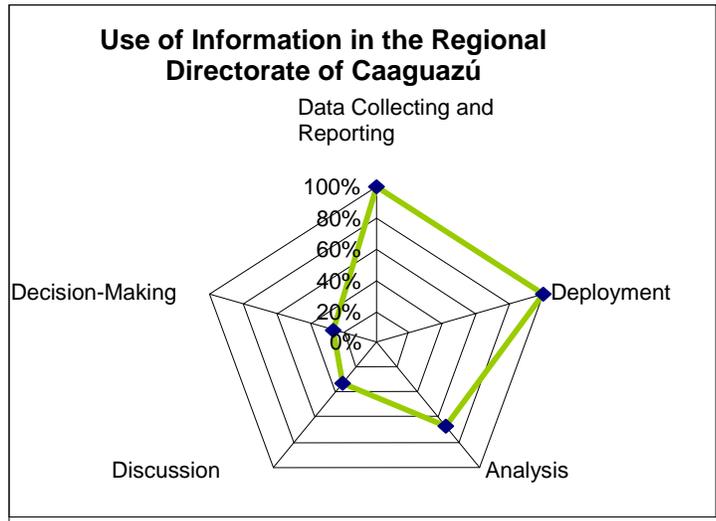
Almost all directorates in health regions showed a score of 0 for the element of discussion, except for Caaguazú (33%), and Central (11%) – however, both of these are very low scores.

The last element that was considered is decision-making, with scores of 0 for all but three directorates in health regions: Caaguazú, Central, and Ñeembucú, all with a score of 25%. This means that health regions did not develop an action plan, based on SIS findings.

Based on results for use of information by regional directorates, graphs from health regions with scores above 0 have been analyzed for at least four of the observed quality elements.

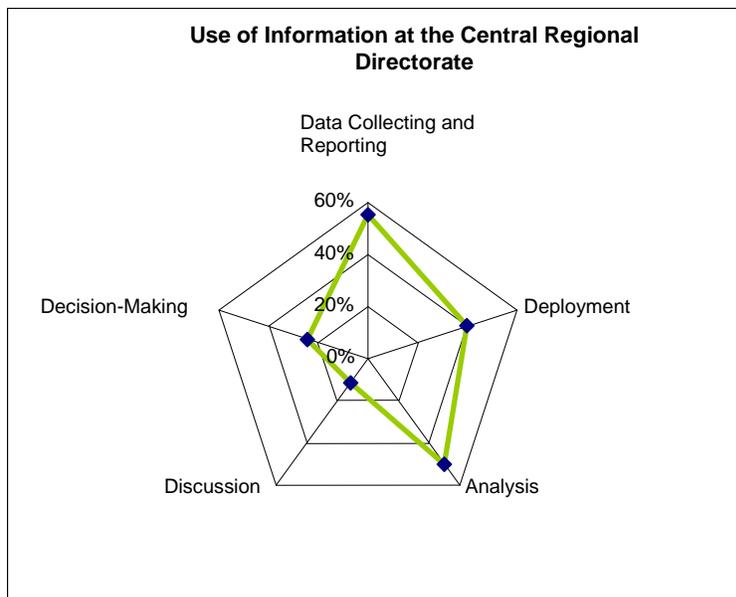
### 2.2.b.1. Caaguazú Health Region

In the Caaguazú Health Region, scores for data collecting and reporting and for deployment were high (100%). However, the score for data analysis was medium (67%) and scores for discussion and decision-making based on SIS information were low.



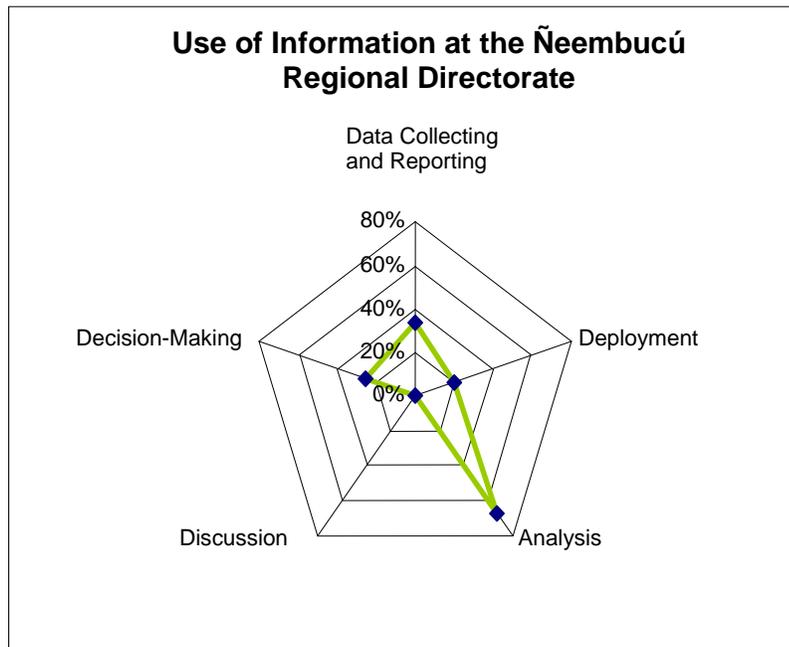
### 2.2.b.2. Central Health Region

In the Central Health Region, all elements have scores above 10% but below 60%, which means that the use of information level is low. The elements with the lowest scores are discussion (11%) and decision-making (25%).



### 2.2.b.3. Ñeembucú Health Region

In Ñeembucú, the use of information level is very low, as are scores for the other elements, particularly discussion with a score of 0. However, analysis has a score of 67%. Despite being a medium score, it is one of the highest scores of all health regions.



### 3. Resource Availability

Resource availability for the SIS has been measured through the tool called unit/office checklist, which basically indicates which resources are available and what is the status of the information system at the MSPyBS central level and at health facilities.

Resources are usually available at the MSPyBS central level for roles relating to the SIS. However, officials at some directorates indicated that resources were insufficient, mainly regarding the number of available computers and printers.

Table 5 shows that more than 60% of health facilities do not have the minimum equipment required to implement roles of the SIS. Only 43% of polled facilities have computers, 35% have printers, 20% have **UPS**, and 43% have calculators.

On the other hand, 54% of the health facilities have regular telephone lines. However, many of them are located at regional directorates and hospitals, and some at health centers. Health posts and clinics usually do not have access to regular telephone lines.

Only 4,6% of facilities – a few regional directorates and one specialized hospital – have Internet access.

<b>TABLE 5. RESOURCE AVAILABILITY IN HEALTH REGIONS (REGIONAL DIRECTORATES, HOSPITALS, CENTERS, HEALTH POSTS, AND CLINICS)</b>		
<b>Hardware</b>	<b>How many are in good working order?</b>	
		<b>Facilities (N=70) %</b>
a. Computer (hardware: CPU, HD, RAM, OS)	0	56,9
	1	21,5
	2 or more	21,5
b. Backup drives (for example, diskette, CD, Zip)		32,3
c. Printer	0	64,6
	1 or more	35,4
d. Fax modem	0	67,7
	1 or more	32,3
e. UPS	0	80,0
	1 or more	20,0
f. Electricity generator	0	76,9
	1 or more	23,1
g. Telephone line	0	46,2
	1	40,0
	2 or more	13,8
h. Radio & Telephone	0	86,2
	1	13,8
i. Internet access		4,6
j. Calculator	0	56,9
	1	32,3
	2 or more	10,8

Permanent access to electricity is almost generalized (92,3%), power supply by an electricity generator exists in 76% of the facilities and in almost all regional directorates, and in hospitals and specialized centers. Thus, availability of electricity is not a problem. While some facilities have expressed that interruptions in power supply can cause problems, interruptions in power supply are only due to unfavorable weather conditions, mostly at health posts. Only 26,2% of the SIS offices are air-conditioned.

<b>TABLE 6. SERVICE AVAILABILITY AT FACILITIES</b>	
	<b>Facilities</b>
a. Continuous electricity supply	92,3
b. Air-conditioning at facilities	40,0
c. Air-conditioning at SIS offices	26,2
d. Water supply availability	84,8

The status of information archives is medium to bad; that is, records and reports are not filed and stored appropriately. This is one of the reasons why, in many

cases, data were not available to allow verifying precision of data and use of information.

68,3% of polled facilities do not have the forms and supplies in stock that are required to complete records, reports, and patient records. Fifty-two percent expressed that they had run out of forms in the past 12 months; in 45% of the cases this was because the MSPyBS central level did not supply forms, in 42% because no resources were available to make photocopies of forms, and in the remaining 13% due to lack of planning to foresee needs in a timely manner.

In fact, monthly forms for service provision and morbidity reports are recycled because regional directorates do not supply blank forms, and financial resources are not available at facilities to print new forms and store previously recorded data. The same occurs with daily visit summary forms in some cases. Visits that had been recorded for the previous months are erased and forms are reused the following month. Therefore, in these cases, verifying visits from previous months has not been possible.

It should be mentioned that resources are obtained through self-management at some facilities. Some staff use their own resources to make copies of forms or carry out additional activities – such as raffles – to be able to cover expenses.

#### **4. Analysis at the Central Level, Ministry of Public Health and Social Welfare**

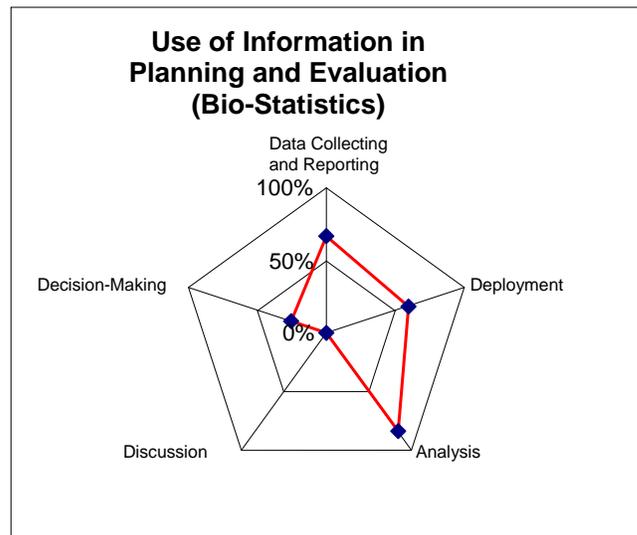
As in regional directorates, the three PRISM tools – assessment tools (data quality, use of information), SIS revision (facility/office checklist), and SIS management evaluation – were applied at the central level of the Ministry of Public Health and Social Welfare. However, since results from applying the data quality and use of information tools do not adjust 100% to roles and activities of the MSPyBS central level departments, this document only includes results from the use of information tool for some of the departments within MSPyBS.

Directorates and programs at the MSPyBS central level were polled (see list in Annex 9). Results from applying the assessment tool – use of information measured through data collecting and reporting, deployment, analysis, discussion, and decision-making – in the departments that gather information from health regions and, thus, where tools adjust best – albeit with some limitations – are analyzed below.

#### 4.1. Bio-Statistics Department

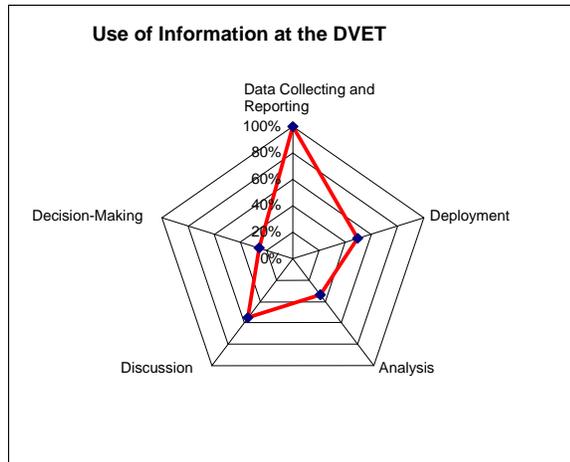
The Bio-Statistic Department, General Directorate of Planning and Evaluation (DGPyE), at the central level concentrates a high volume of data about vital statistics, health statistics, hospital statistics, and mandatory notification from all 18 health regions within the country.

Overall, the use of information level at the department is low; the percentage for data collecting and reporting is 67%, that is, reports are not prepared with the required regularity, are not updated, and in most cases no feedback is provided by subsystems managed by the department. Deployment, which primarily refers to an updated presentation of information that has been generated, had a score of 60%. However, the data analysis level was relatively high (83%), while discussion was non-existent; that is, no routine meetings were held in the department to review SIS management. In addition, the decision-making level based on results from the SIS was low.



#### 4.2. Directorate of Transmissible Disease Surveillance

At the Directorate of Transmissible Disease Surveillance (DVET), data collecting and reporting is high (100%). However, scores for the other observed elements were low (under 60%), particularly decision-making (25%). Nevertheless, it is important to mention that regular meetings are held to review SIS management – discussion (56%) but no official minutes of meetings are kept.

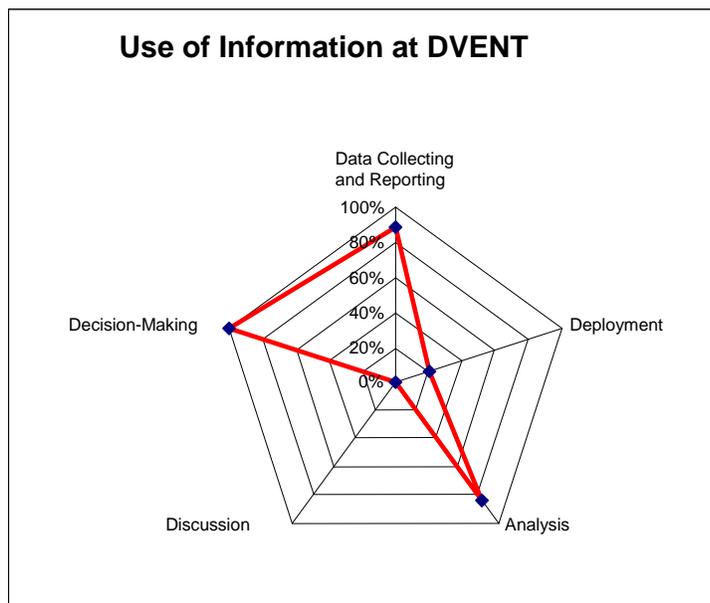


### 4.3. Directorate of Non-Transmissible Disease Surveillance

The Directorate of Non-Transmissible Disease Surveillance (DVENT) includes programs such as diabetes, accident and violence control, tumors, smoking and respiratory diseases, ocular health, opiodism, pesticides, and the National Institute of Cardiovascular Disease Prevention (Instituto Nacional de Prevención Cardiovascular [INPCARD]).

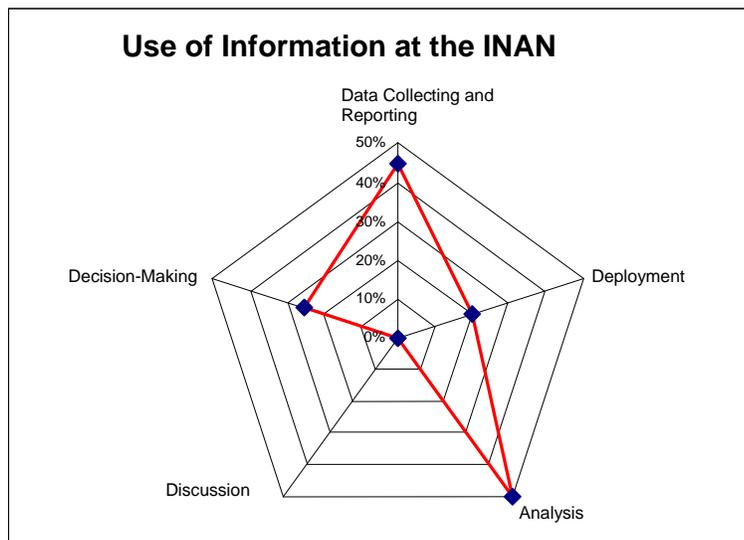
At DVENT, scores for data collecting and reporting and results analysis are relatively high. However, the score for information deployment is low and the score for discussion is 0.

The score for decision-making is 100% at this directorate; the directorate is based on information and, therefore, develops its action plan based on SIS findings.



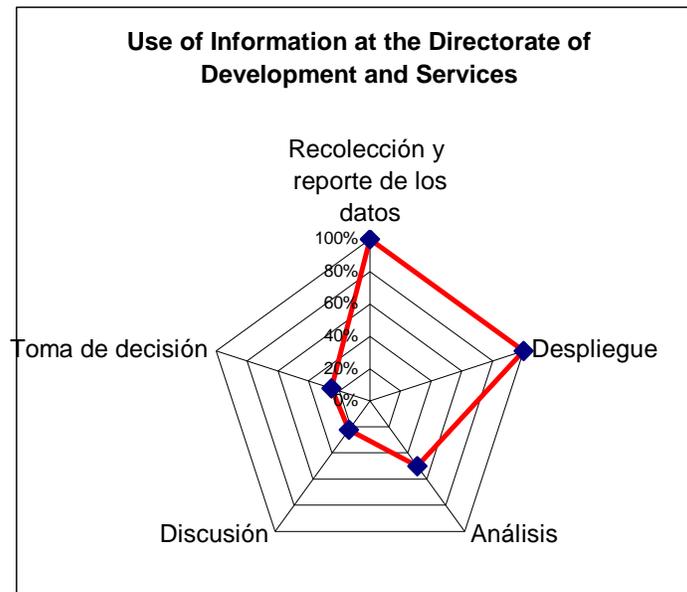
#### 4.4. National Food and Nutrition Institute

At the National Food and Nutrition Institute (Instituto Nacional de Alimentación y Nutrición [INAN]), the score for use of information was low. Overall, the scores for observed elements were not higher than 50%. Data collecting and reporting (44%) and analysis (50%) have the highest scores. The score for deployment, which primarily refers to an updated presentation of the information that has been generated, is only 20%; and discussion has a score of 0. In addition, the score for decision-making based on SIS results was low, only 25%.



#### 4.5. Directorate of Development and Services

At this directorate, which is responsible for management control at MSPyBS, data collecting and reporting has a score of 100%, as did information deployment, which primarily refers to an updated presentation of the information that has been generated. However, scores for data analysis (50%), information discussion (22%), and decision-making based on SIS results (25%) were low.



[Translation of headings in graph above, clockwise from top: Data Collecting and Reporting, Decision-Making, Deployment, Discussion, Analysis]

#### 5. Description of the Health Information System in Paraguay

This section discusses the flow of information from a medical clinic, health post, health center, district hospital, and regional hospital to regional directorates and the central level of the ministry of health.

Multiple information subsystems were identified (see Annex 10). Most of the subsystems did not have a mission statement, specific purposes or objectives, or financial resources. In addition, each subsystem used different forms for data collecting, and a manual or guidelines for data collecting did not exist.

Virtually all subsystems used a list of indicators. However, very few had established guidelines to calculate and interpret indicators – such as the Expanded Immunization Program (Programa Ampliado de Inmunizaciones [PAI]) and Vital Statistics (Estadísticas Vitales [SSIEV]).

Information subsystem coverage only includes public health services, except for SSIEV, which includes private health facilities.

SIS schedules and information flows had been established; however, they were not complied with for various reasons. One of the main reasons was the distance between a health facility and its immediate superior facility; another was lack of resources for transportation.

## **6. SIS Management**

In order to measure the level of development of the SIS management structure and identify areas which need to be improved, the SIS management evaluation PRISM tool was applied.

SIS management is defined as “the presence of mechanisms to manage roles and resources of the SIS to achieve an improved performance of the SIS.”

Management roles of the SIS measured by this tool include management, planning, training, supervision, finance, and use of SIS performance/quality improvement tools.

The management dimension of the SIS is measured through presence of a mission statement; a technical, administrative, and management structure; an updated organization chart; presence of a person in charge of the SIS at high-level management meetings; and existence of a list of distribution and documentation of dissemination of statistical reports.

The planning dimension was measured through existence of a report on analysis of the SIS status for the past three years and a five-year plan for the SIS at health region levels and superior levels, as well as existence of established objectives for the SIS at a medical unit level and superior levels.

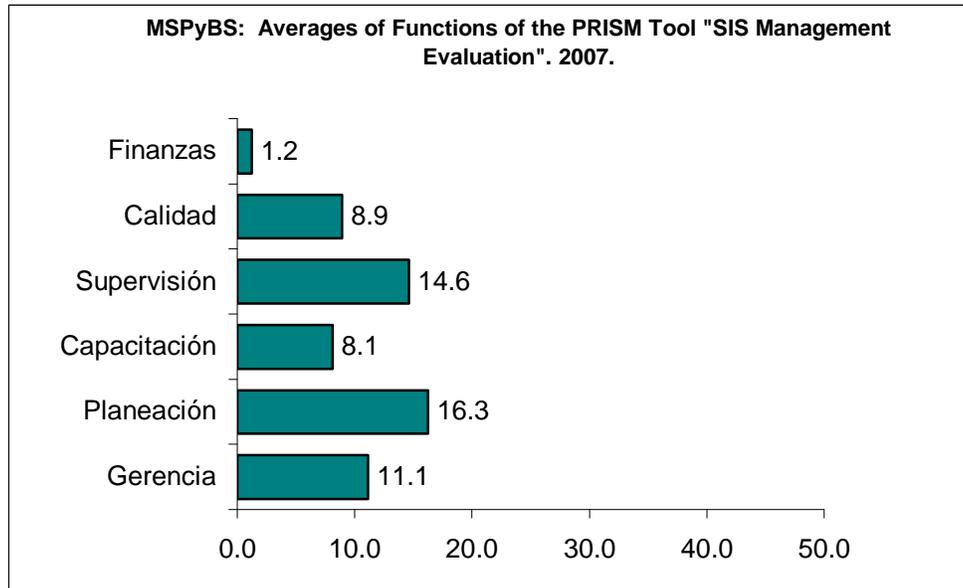
Use management was established through the tools of SIS performance/quality improvement, and through availability of SIS standards at facilities and higher levels.

The training component was determined through existence of SIS training manuals, on-the-job training mechanisms, and a schedule of planned training activities.

The management level of supervision was measured through existence of a list of supervision actions, a schedule for supervision visits, and preparing supervision reports.

Financial mechanisms were measured through existence of an SIS expense record, fund-raising mechanisms for the SIS, SIS financial reports, and a long-term financial plan to support SIS activities.

Results from applying the SIS management evaluation tool at higher levels of MSPyBS are indicated below:



[Translation of text in graph, from top down: Finance, Quality, Supervision, Training, Planning, Management]

The graph shows that SIS management at MSPyBS was weak. Overall, scores for all dimensions were low (below 17%), particularly finance, with an average of 1,2%, followed by quality (8,9%) and training (8,1%).

In addition, management had one of the lowest scores. It has been shown that SIS did not even have a mission statement; and in most facilities an updated organization chart did not exist. In addition, documents regarding performance monitoring of the SIS were not available.

The score for finance shows that virtually none of the financial management criteria were found. Finances were managed at a higher level; and it was not until 2007 that a budget was established for SIS, and that the National Health Information System (Sistema Nacional de Información en Salud [SINAIS]) was established. Health regions and facilities do not have a say regarding the SIS budget.

## 7. The Social Security Institute

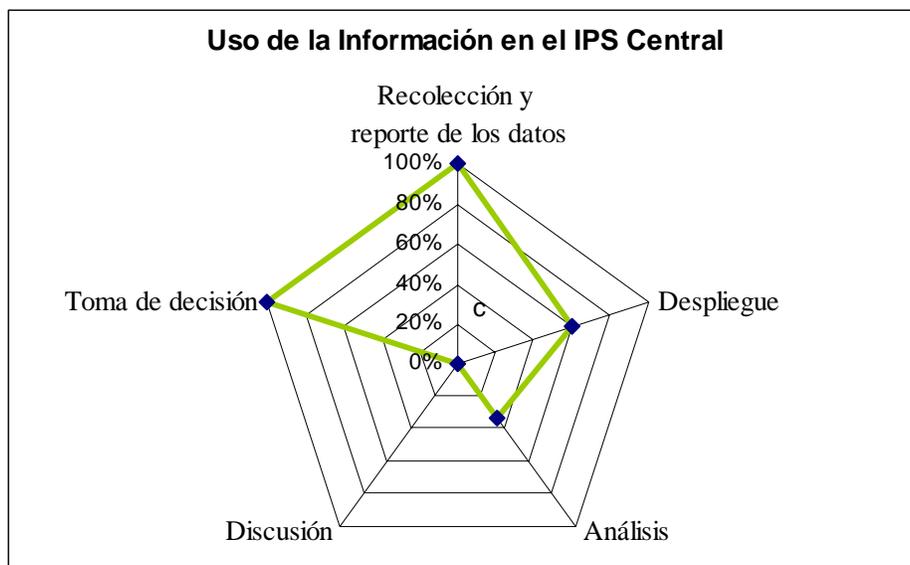
PRISM tools were applied at the Social Security Institute (Instituto de Previsión Social [IPS]). However, the information system at this institute had a different objective than the MSPyBS information system, with a key focus on use of services by users and information relating to types of clients, beneficiaries, etc. Therefore, some tools do not adjust to IPS and thus, results were not analyzed. In addition, it is important to mention that – due to the same reason – results cannot be compared with results from MSPyBS.

The IPS information system was based on its computer program, and indicators from the information system are not consistent with indicators from the ministry.

Implementation was limited – for now – to the IPS central level, the central department, and some hospitals and health units in other regions in the country. Therefore, sufficient information could not be collected for analysis at a facility level.

Results that could be analyzed are indicated below:

### 7.1. Use of Information

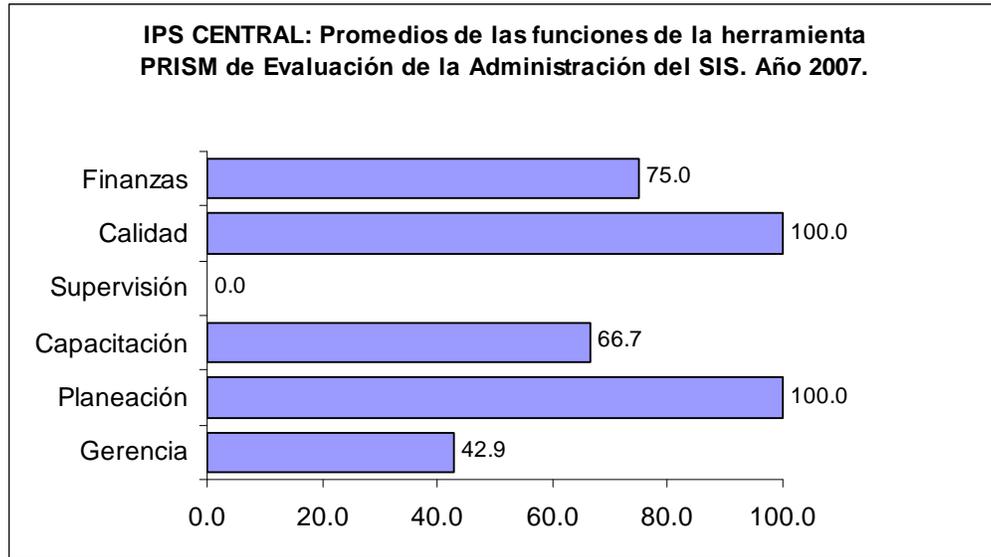


[Translation of captionst in graph, clockwise from top: Data Collecting and Reporting, Decision-Making, Deployment, Discussion, Analysis.]

The use of information level at IPS is medium. Data collecting and reporting at central IPS was 100%. However, the score for information deployment, which primarily refers to an updated presentation of the information that has been generated, was only 60%; and the score for information analysis was low (33%).

Information discussion had a score of 0; that is, regular meetings were not held at IPS to review SIS management. However, decision-making based on SIS results had a high score (100%).

## 7.2 SIS Management



[Translation of heading: CENTRAL IPS. Averages, SIS Management Evaluation PRISM Tool. 2007. Captions from top down: Finance, Quality, Supervision, Training, Planning, Management]

Scores for the dimensions of SIS management at central IPS were relatively high, particularly quality and planning, which had a score of 100%. The dimension of finance had an average of 75%, followed by training, with 66,7%.

Management has one of the lowest scores (42,9%), and the score for supervision was 0; that is, no list of supervision actions, a schedule of visits, or supervision reports exist.

## L. CONCLUSIONS

Overall, it has been observed that SIS data quality is poor. According to measurement standards established by the PRISM tools, scores from most of the health regions were 0 for all three elements considered (precision, opportunity, and integrity) since they did not reach minimum acceptable error levels for indicator measurement.

Coverage of information from the MSPyBS SIS, measured through the indicator of integrity, was relatively good. However, information was not opportune in most regions; that is, SIS information was not available for decision-making in a timely manner. But the key problem observed was lack of precision of data; that is, a significant weakness exists in SIS information generation in health regions and, therefore, quality of information is very poor.

Some of the causes of problems relating to data quality were: use of different forms for data collecting, overlapping in contents from different forms, and obsolete forms. This causes work overload for staff members in charge of SIS at facilities and, therefore, has a direct negative impact on the quality of generated information. Other causes that affect data precision were related to lack of human resources, lack of training, lack of or insufficient financial resources, as well as lack of supervision of the information system.

Overall, SIS data management in health regions was very poor. Despite the fact that virtually all facilities recorded data for the SIS, results for this element were 0 or low because of the high number of errors found when comparing ambulatory patient records and reports based on the records, in addition to the number of items that should have been completed but had been left blank in monthly reports. The same situation had been observed regarding processing, with high error levels in data entry.

Regarding data transmission (the third element considered), scores of 0 or low scores were mainly caused by the low number of monthly reports submitted by facilities that were available at general directorates, as well as a lack of records of dates when reports were received and the low number of facilities submitting reports by established deadlines. This shows that follow-up and supervision of the SIS by regional directorates were insufficient.

Some aspects causing problems in data management were overall lack or insufficiency of computer equipment, furniture, and office space for the SIS at facilities.

Use of SIS information differed significantly among health facilities and regional directorates. Use at facilities was almost non-existent, while information was used to a certain extent at regional directorates.

Data collecting and reporting was not carried out at the required frequency at health facilities, or facilities did not receive any feedback from regional

directorates to promote improvement. Nevertheless, this element had the highest scores in comparison with other quality elements observed. Scores for deployment of the information (updated indicators, mapping the area of coverage, overview of demographic information, etc.) were very low at health facilities – 7% for most of them.

The two quality elements of analysis and discussion had scores of 0 for health facilities in health regions – that is, overall, data were not analyzed at this level, with the exception of a few facilities that did analyze their information. Regular meetings were not held to verify data quality or make decisions based on statistical reports (trends in use of services by patients, data relating to diseases, lack of medical supplies, among others). Regarding the last quality element, interaction with the regional directorate, it has been observed that most regional directorates do not carry out supervision visits to health facilities with the aim of evaluating SIS performance.

Use of SIS information at regional directorates in health regions is medium. Scores for some elements – such as data collecting and reporting – were relatively high, while scores for deployment and analysis were low in most health regions. Scores for the elements of discussion and decision-making were 0 in most health regions.

Overall, resource availability for the SIS was insufficient; however, this varies significantly among different levels. Resources were generally available at the MSPyBS central level to carry out tasks relating to the SIS. Nevertheless, officials in some directorates expressed that resources were insufficient, primarily in terms of access to computers.

Regarding health facilities, more than 60% did not have access to minimum required equipment to carry out SIS tasks, and only 43% had computers, 35% had printers, 20% had UPS, and 43% had calculators.

On the other hand, 54% of health facilities had regular telephone lines. However, telephone lines were mostly located at regional directorates and hospitals; health posts and clinics generally did not have access to this service. Only 4,6% had Internet access – mostly regional directorates and one specialized hospital.

The status of information archives was medium to poor. That is, patient records, data records, and reports were not filed and stored appropriately. About 68,3% of polled facilities did not have forms and supplies in stock, forms that were required to complete records, reports, and patient records. Fifty-two percent had run out of forms in the past 12 months. In 45% of these cases, this was because MSPyBS central level had not provided blank forms; in 42% no resources were available to make photocopies of forms; and in the remaining 13%, needs had not been foreseen in a timely manner.

Multiple information subsystems were identified. Most did not have a mission statement, specific purposes or objectives, or financial resources. In addition,

each one of the subsystems used different forms for data collecting, and a manual or guidelines for data collecting did not exist. Typically, a list of indicators was used, but guidelines to calculate and interpret them had not been developed.

Information subsystem coverage only included public health services, except for the vital statistics subsystem, which included private sector facilities.

SIS schedules and information flows were not complied with for different reasons. One of the main reasons was the distance between a health facility and its immediate superior facility; another reason was lack of transportation resources.

SIS management at MSPyBS was weak. Overall, scores for all dimensions were low (below 17%), particularly for finance, with an average of 1,2%, followed by quality (8,9%), and training (8,1%). Management had one of the lowest scores as well, and the SIS does not even have a mission statement. In most health facilities, an up-dated organization chart showing the roles relating to the SIS did not exist, nor did documents regarding SIS performance monitoring. Virtually none of the financial management criteria were complied with, finances were managed at a higher level, and it was not until 2007 that a budget was established for SIS and that the National Health Information System (SINAIS) was established. Health regions and facilities did not have a say regarding the SIS budget.

The Social Security Institute used an information system with a different objective than the MSPyBS information system, with a key focus on use of services by users and information relating to types of clients, beneficiaries, etc. Therefore, some tools did not adjust to IPS and, thus, results cannot be compared with results from MSPyBS.

## M. RECOMMENDATIONS

A National Health Information System does not exist in Paraguay. The system at MSPyBS is weak and does not have access to human resources or financial resources that are required to achieve a good performance.

Based on the results and conclusions from applying the PRISM tools, the following recommendations are made:

- ❖ Improve skills relating to data collection and interpretation and use of information through development of a training curriculum, training of trainers, and training SIS staff at each health facility in the different areas.
- ❖ Update data collecting forms through joint efforts by different health subsystems, based on basic priorities and indicators, with the aim of reducing the work load of staff members who are in charge of the SIS at health facilities.
- ❖ Improve supervision and feedback mechanisms, with a focus on verifying data quality and use of information, as well as comparing indicators among health facilities. This requires developing feedback guidelines for regional directorates and relevant directorates at the MSPyBS central level, creating supervision lists to verify data quality and use of information, and training all supervisors from all health regions on use of supervision lists.
- ❖ Promote an information culture by using existing communication channels to share success stories relating to use of information – such as reports about the positive impact of feedback, sending directives, preparing newsletters, etc. Establish mechanisms to publish experiences regularly in official publications or through other media.
- ❖ Develop an integrated health information system that, depending on resource availability, can gradually integrate different health subsystems from MSPyBS as well as other subsectors, such as IPS, Military and Police Hospital, etc.

## N. ANNEXES

### Annex 1. Sample Distribution

REGIONES SANITARIAS	MSPyBS	DR	H.R.	H.D.	C.S.	P.S.	H.E.	C.E.	DISP.	H.M.I.	C.I.	IPS	TOTAL
1 CONCEPCION		1	1	1	2	1	0	0	1	0	0	2	9
2 SAN PEDRO													
13 AMAMBAY		1	1	1	0	2			1			2	8
14 CANINDEYU													
3 CORDILLERA		1	1	1	2	1	0	0	0	0		1	7
4 GUAIRA													
5 CAAGUAZU		1	1	1	2	2	0	0	1	0		3	11
6 CAAZAPA													
8 MISIONES													
9 PARAGUARI													
12 NEEMBUCU		1	1	1	1	4	0	0	0	0		2	10
7 ITAPUA		1	1	2	2	2	0	0	0	0	0	1	9
10 ALTO PARANA													
11 CENTRAL		1	2	3	4	5	3	2	0	0	1	2	23
15 PTE. HAYES		1	1	0	2	3	0	0	1	0		0	8
16 A. PARAGUAY													
17 BOQUERON													
18 CAPITAL	10	1	0	0	2	2	4	2	0	1	0	3	25
<b>TOTAL PAÍS</b>	<b>10</b>	<b>9</b>	<b>9</b>	<b>10</b>	<b>17</b>	<b>22</b>	<b>7</b>	<b>4</b>	<b>4</b>	<b>1</b>	<b>1</b>	<b>16</b>	<b>110</b>

**MSPyBS:** Ministerio de Salud Pública y Bienestar Social

**DR:** Dirección Regional

**HR.:** Hospital Regional

**H.D.** Hospital distrital

**C.S.** Centro de Salud

**P.S.** Puesto de Salud

**C.E.** Centro Especializado

**Disp.** Dispensario

**H.M.I** Hospital Materno Infantil

**C.I** Clínica Indígena

**IPS:** Instituto de Previsión Social

[Translation of text in table above:

### HEALTH REGIONS

**MSPyBS:** Ministry of Public Health and Social Welfare

**DR:** Regional directorate

**HR:** Regional Hospital

**HD:** District Hospital

**CS:** Health Center

**PS:** Health Post

**CE:** Specialized Center

**Disp:** Clinic

**HMI:** Mother-Child Hospital

**CI:** Clinic for Indigenous Populations

**IPS:** Social Security Institute

**COUNTRY TOTAL]**

## Annex 4. Training Schedule

### TRAINING WORKSHOP FOR INTERVIEWERS APPLYING PRISM TOOLS AT HEALTH FACILITIES IN THE REPUBLIC OF PARAGUAY

**Location:** Colegio Privado Pa i García, Ciudad de Luque

**Date:** July 7 and 9, 2007

#### TRAINING SCHEDULE

Day 1: Saturday 07/07/07		
TIME	TOPIC	LED BY:
08:00 - 08:15	Participant registration and distribution of materials	
08:15 - 09:00	Presentation on Study and PRISM Tools Logistical and administrative aspects of the Survey	Lic. Nimia Torres
09:00 - 09:40	Developing Tool A1 (Data Quality)	Ilsa Palacios and Héctor Arévalos
09:40 - 10:30	Developing Tool A2 (Use of Information)	Rafael Aquino and Nimia Torres
10:30 - 10:50	Break	
10:50 - 12:00	Developing Tool A2 (Use of Information), cont.	Rafael Aquino and Nimia Torres
12:00 - 12:40	Practice Applying Tools A1 and A2	Sonia Garrido, Ilsa Palacios, and Rafael Aquino
12:40 - 13:00	Feedback on Lessons Learned and Evaluation of Training Activity	Héctor Arévalos and Sonia Garrido

Day 2: Monday 09/ 07/ 07		
TIME	TOPIC	LED BY:
08:00 - 09:00	Developing Tool A3 (Data Quality)	Sonia Garrido and Rafael Aquino
09:00 - 10:00	Developing Tool A4 (Use of Information)	Héctor Arévalos and Ilsa Palacios
10:00 - 10:15	Break	
10:15 - 11:30	Developing Tool A4 (Use of Information), cont.	Héctor Arévalos and Ilsa Palacios
11:30 - 12:10	Practice Applying Tools A3 and A4	Sonia Garrido and Rafael Aquino
12:10 - 12:40	Feedback on Lessons	Nimia Torres and Ilsa Palacios
12:40 - 13:30	Lunch	
13:30 - 14:00	Developing Tool B1 (General Perspective of the Routine Information System)	Nimia Torres and Rafael Aquino
14:00 - 15:00	Developing Tool B2 (Profile of Health Information System)	Lic. Nimia Torres and Ilsa Palacios
15:00 - 16:00	Developing Tool B3 (Facility/Office Checklist)	Rafael Aquino and Sonia Garrido
16:00 - 16:40	Developing Tool D (SIS Management Evaluation Tool)	Lic. Nimia Torres and Héctor Arévalos
16:40 - 17:00	Technical Aspects to Consider when Carrying Out Interviews	Sonia Garrido
17:00 - 17:30	Final Evaluation of Learning	The entire team

**Annex 5. PRISM Tool Application Levels**

HEALTH FACILITIES	PRISM TOOLS:							
	A. Assessment Quality and Use of Information				B. SIS Review. Facility/Office Checklist			D. Management Evaluation
	A1	A2	A3	A4	B1	B2	B3	D
Central Level – MSP	X	X			X	X	X	X
Central Level – IPS	X	X			X	X	X	X
Health Region –MSP	X	X			X	X	X	X
Regional Hospital – MSP/IPS			X	X			X	X
District Hospital			X	X			X	X
Health Center – MSP/ Health Units – IPS			X	X			X	
Health Post - MSP/IPS			X	X			X	
Clinic –MSP			X	X			X	
Specialized Hospital – MSP			X	X			X	
Specialized Center – MSP			X	X			X	

## Annex 6. Report Sheet of Visits to Each Facility

### REPORT ABOUT VISITS TO EACH FACILITY OF THE MINISTRY OF PUBLIC HEALTH AND SOCIAL WELFARE

Date of visit: \_\_\_\_\_ Interviewer: \_\_\_\_\_

Health Region: \_\_\_\_\_

Facility: \_\_\_\_\_

A. Interview (Situations which occurred before, during and after):

B. Reports, Records, and Forms (Aspects observed such as: Format, denominations, status, availability, variety, order, and other):

C. IT (Equipment availability, task organization, etc):

D. Facilities (Infrastructure):



## Annex 8. Scores to Analyze Facilities, Regional Directorates, and MSPyBS Central Level

### Análisis de Establecimientos

Nro.	Indicadores	Puntaje			
		0	1	2	3
3	% de informes mensuales con errores en el ítem 1	<70%	<80%	<90%	>=90%
4	% de informes mensuales con errores en el ítem 2	<70%	<80%	<90%	>=90%
5	% de informes mensuales con errores en el ítem 3	<70%	<80%	<90%	>=90%
6	% de informes mensuales con errores en el ítem 4	<70%	<80%	<90%	>=90%
7	% de informes mensuales con errores en el ítem 5	<70%	<80%	<90%	>=90%
8	% de ítems de datos completados en el informe mensual	<80%	<90%	<95%	>=95%

### Análisis de las Direcciones Regionales y MSP

Nro.	Indicadores	Puntaje			
		0	1	2	3
1	Cobertura de Unidades del SIS	<80%	<90%	<95%	>=95%
2	% de	<70%	<80%	<90%	>=90%
3	Monitoreo de	NO	YES		
4	% de	<70%	<80%	<90%	>=90%
5	% de	<90%	<95%	>=95%	
6	Magnitud de	<70%	<80%	<90%	>=90%

[Translation of text in tables above:

#### Analysis of Facilities

Score

No.

Indicators

% of monthly reports with errors in Item 1

% of monthly reports with errors in Item 2

% of monthly reports with errors in Item 3

% of monthly reports with errors in Item 4

% of monthly reports with errors in Item 5

% of items completed in monthly report

#### Analysis of Regional Directorates and MSP

Indicators

Score

No.

Coverage of SIS Units

% of

Monitoring of

% of

% of

Magnitude of]

[Please note that this text appears incomplete. It was not possible to access the tables above to see the complete text. Translator's Note.]

**Annex 9. A List of Polled Facilities, Directorates, and Programs at the MSPyBS Central Level**

**PRISM TOOL INTERVIEW**

**Data from Polled Facilities at the MSPyBS Central Level**

No.	General Directorates	Directorates and Programs
1	<b>PLANNING AND EVALUATION</b>	<b>Bio-Statistics</b>
2		Vital Statistics
3		Health Statistics
4		Hospital Statistics
5		Mandatory Notification
6		<b>Monitoring and Evaluation Programs</b>
7		<b>Documentation Center</b>
8		<b>National Health Information System (<i>Sistema Nacional de Información en Salud - SINAIS</i>)</b>
9		<b>Non-Transmissible Diseases (DVENT)</b>
10		INPCARD – Cardiovascular Diseases
11		Diabetes
12		Accident and Violence Control
13		Tumors
14		Smoking and Respiratory Diseases
15		Ophidism
16		<b>HEALTH SURVEILLANCE</b>
17	<b>Health Facilities and Related Facilities</b>	
18	<b>Radiology Safety and Nuclear Protection</b>	
19	<b>SENASA – Transmissible Disease Surveillance - Vectors</b>	
20	<b>DVENT – Transmissible Diseases</b>	
21	<b>Expanded Immunization Program</b>	
22	<b>Dengue Fever</b>	
23	<b>Leishmaniasis</b>	
24	<b>Chagas Disease</b>	
25	Schistosomiasis	
26	Rabies/Zoonosis	
27	<b>Control of Professionals and Health Facilities (DCPyES)</b>	
28	<b>SENASA</b>	<b>DOSAPA Management</b>
29		San Lorenzo and Asunción Statistics
30	<b>HEALTH PROGRAMS</b>	<b>General Directorate</b>
31		Family Planning
32		IMI – Supply Flow
33		Epidemiologic Surveillance of Mother-Child Health ( <i>Vigilancia Epidemiológica de Salud Materno Infantil – VESMMN</i> )
34		Breastfeeding
35		Perinatal Information System ( <i>Sistema de Información Perinatal -</i>
36		

48	<b>NATIONAL HEALTH SURVEILLANCE DIRECTORATE (DIRECCION NACIONAL DE VIGILANCIA SANITARIA)</b>	<b>General Directorate</b>
49		Facility Subsystem
50		Cost Subsystem
51		Dispatch Subsystem
52		Subsystem of Records
53	<b>NATIONAL FOOD AND NUTRITION INSTITUTE (INSTITUTO NACIONAL DE ALIMENTACIÓN Y NUTRICIÓN)</b>	<b>General Directorate</b>
54		<b>Nutrition Surveillance</b>
55		Food and Nutrition Surveillance System ( <i>Sistema de Vigilancia de Alimentación y Nutrición – SISVAN</i> )
56		Micronutrient Surveillance
57		Nutrition Prevention Program
58		<b>Food Surveillance</b>
59		<b>Laboratory</b>
60		<b>National Food Program (<i>Programa de Alimentación Nacional - PROAN</i>)</b>
61		<b>General Directorate</b>
62		Oral-Dental Program
63	Safe Blood Program	
64	General Directorate of Nursing	
65	Directorate of Medical Supplies	
66	Directorate of Obstetrics	
67	General Directorate of Regions	
68	Directorate of Hospitals	

**PRISM TOOL INTERVIEW**  
**Data from Polled Facilities, by Health Regions**

No.	Health Region	Health Facility	Type of Facility
1	<b>ASUNCION</b>	XVIII Dirección Regional	Regional Directorate
2		Centro de Salud N° 11	Health Center
3		Centro Comunitario Club de Leones (Barrio San Vicente), ex C.S. Ciudad Nueva	Health Center
4		San Juan Bautista	Health Post
5		Barrio Nuevo	Health Post
6	<b>CENTRAL</b>	XI Dirección Regional	Regional Directorate
7		Luque	District Hospital
8		San Lorenzo	Regional Hospital
9		Mariano Roque Alonso	District Hospital
10		Hospital del Indígena San Roque González de Santa Cruz	Hospital for Indigenous Populations
11		Areguá	Health Center
12		José María Godoy	Health Center
13		Nueva Italia	Health Center
14		Valle Pucú	Health Post
15		Caacupemí (Fdo. de la Mora)	Health Post
16		Tayuazapé	Health Post
17		Barcequillo	Health Post
18		Lomai - Guarambaré	Health Post
19	Cumbarity - Villeta	Health Post	

20	<b>CONCEPCION</b>	I Dirección Regional	Regional Directorate
21		Concepción	Regional Hospital
22		Horqueta	District Hospital
23		Belén	Health Center
24		Yby Yau	Health Center
25		Arroyito (Ruta V) de Horqueta	Health Post
26		Pasiño	Clinic
27	<b>CORDILLERA</b>	III Dirección Regional	Regional Directorate
28		Caacupé	Regional Hospital
29		Eusebio Ayala	District Hospital
30		Itacurubí de la Cordillera	Health Center
31		Piribebuy	Health Center
32		Cabañas	Health Post
33	<b>CAAGUAZÚ</b>	V Dirección Regional	Regional Directorate
34		Coronel Oviedo	Regional Hospital
35		Caaguazú	District Hospital
36		Carayaó	Health Center
37		Raúl A. Oviedo	Health Center
38		Cayguá Cocué	Health Post
39		Santa Catalina	Health Post
40		Zayas Kue	Clinic for Indigenous Populations

41	<b>ITAPÚA</b>	VII Dirección Regional	Regional Directorate
42		Encarnación	Regional Hospital
43		Coronel Bogado	District Hospital
44		Maria Auxiliadora (Tomás R. Pereira)	Health Center
45		Fram	Health Center
46		General Delgado	Health Center
47		San Antonio Ypecurú	Health Post
48		San Dionicio	Health Post
49	<b>ÑEEMBUCU</b>	XII Dirección Regional	Regional Directorate
50		Pilar	Regional Hospital
51		Alberdi	District Hospital
52		General Diaz	Health Center
53		Lomas	Health Post
54		Guazú Cua	Health Post
55		Isla Umbú	Health Post
56		Tacuaras	Health Post
57	<b>AMAMBAY</b>	XIII Dirección Regional	Regional Directorate
58		Pedro Juan Caballero	Regional Hospital
59		Bella Vista	Health Center
60		Potrero del Sur	Health Post
61		San Roque	Health Post
62		San Isidro Labrador	Clinic
63	<b>PDTE. HAYES</b>	XV Dirección Regional	Regional Directorate
64		Villa Hayes	Regional Hospital
65		Benjamín Aceval	Health Center
66		Gral. Briguez	Health Center
67		Remansito	Health Post
68		Chaco-í	Health Post
69		Cadete Pando	Health Post
70		Colonia Qoom Toba	Clinic for Indigenous Populations

**PRISM TOOL INTERVIEW**  
**Data from Polled Facilities:**  
**Hospitals and Specialized Centers**

No.	Geographical Area	Health Facility	Type of Facility
1	<b>ASUNCIÓN</b>	Tropical Medicine Institute*	Specialized Hospital
2		Medical Emergencies	Specialized Hospital
3		Military Health*	Specialized Hospital
4		Police Hospital*	Specialized Hospital
5		Central Public Health Laboratory *	Specialized Center
6		Quemado National Center	Specialized Center
7		Trinidad Mother-Child Hospital	Mother-Child Hospital
8	<b>CENTRAL</b>	General Children's Hospital	Specialized Hospital
9		Limpio Mother-Child Hospital	Mother-Child Hospital
10		Hospital for Cancer Patients - Capiatá*	Specialized Hospital
11		Itaugúa National Hospital	Specialized Hospital
12		National Anti-Rabies Center *	Specialized Center
13		Center for Rehabilitation from Surgery*	Specialized Center

\* Have not been included in analyses because the information generated by them does not adapt to PRISM Tools.

**PRISM TOOL INTERVIEW**  
**Data from Interviewed IPS Facilities**

<b>Geographical Area</b>	<b>Health Facility</b>	<b>Type of Facility</b>
ASUNCION	Central Hospital	Central Hospital - IPS
	12 DE JUNIO Peripheral Clinic	Peripheral Clinic - IPS
	Boungermi Peripheral Clinic	Peripheral Clinic - IPS
CENTRAL	Capiatá Health Post	Health Post - IPS
	Guarambaré Health Post	Health Post - IPS
CONCEPCIÓN	I.P.S. Concepción	Regional Hospital - I.P.S
	Horqueta Health Unit	Health Unit - IPS
CORDILLERA	Eusebio Ayala Health Post	Health Post - IPS
CAAGUAZÚ	Cnel. Oviedo Regional Hospital	Regional Hospital - IPS
	Caaguazú Health Unit	Health Unit - IPS
	Juan Manuel Frutos Health Post	Health Post - IPS
ITAPÚA	Fram Health Post	Health Post - IPS
ÑEEMBUCÚ	Pilar Regional Hospital	Regional Hospital - IPS
	Alberdi Health Post	Health Post - IPS
AMAMBAY	Pedro J. Caballero Regional Hospital	Regional Hospital - IPS

## Annex 10. A List of Registered Information Subsystems

No.	INFORMATION SUBSYSTEM	ACRONYM
1	ACTIONS IMPLEMENTED BY NURSING DEPARTMENT	–
2	NATIONAL ANTI-RABIES CENTER - ZONOSIS	–
3	CHAGAS' DISEASE CONTROL	–
4	DISORDERS DUE TO IODINE DEFICIENCY	DDY
5	DENGUE FEVER	–
6	DIABETES	–
7	DIRECTORATE OF SEXUAL AND REPRODUCTIVE HEALTH	SSR
8	STATISTICS - IPS	
9	OBSTETRIC EMERGENCIES	
10	PATIENTS LEAVING HOSPITAL	–
11	SCHISTOSOMIASIS	–
12	REPORT ON USE OF SUPPLIES	IMI
13	MONTHLY LABORATORY REPORT	–
14	CHILDBIRTH KIT	–
15	BREASTFEEDING	–
16	LEISHMANIASIS	–
17	LEPRA	LEPRA
18	HOSPITAL ADMISSIONS	–
19	MANDATORY NOTIFICATION	–
20	OBSERVATORY OF VIOLENCE AND LESIONS BY EXTERNAL CAUSES	–
21	DISPATCH DEPARTMENT	–
22	PHARMACEUTICAL FACILITY DEPARTMENT	–
23	COST SUBSYSTEM DEPARTMENT	–
24	MALARIA	
25	CERVICAL PATHOLOGY	PAP
26	PREVENTION OF CARDIOVASCULAR DISEASES	INPCARD
27	PRODUCTIVITY (OBSTETRICS)	–
28	EXPANDED IMMUNIZATION PROGRAM	PAI
29	PROGRAM FOR COMPREHENSIVE CARE OF CHILDHOOD DISEASES	AIEPI
30	TB PROGRAM	TBC
31	TUMOR PROGRAM	–
32	NATIONAL ADOLESCENTS' PROGRAM	–

33	NATIONAL PROGRAM OF NUTRITIONAL ASSISTANCE	PROAN
34	NATIONAL CHILDRENS' PROGRAM	—
35	NATIONAL BLOOD PROGRAM	—
36	SYSTEM/REGISTER OF SANITATION ACTIONS	—
37	ORAL-DENTAL HEALTH	—
38	MENTAL HEALTH	—
39	OCULAR HEALTH	—
40	RADIOLOGY SAFETY AND NUCLEAR PROTECTION	—
41	SERVICE PROVISION AND MORBIDITY	BIO
42	MANAGEMENT CONTROL SYSTEM	SCG
43	STUDY MANAGEMENT INFORMATION SYSTEM	CITOMS
44	EPIDEMIOLOGIC SURVEILLANCE SYSTEM	EPI-INFO
45	PERINATAL INFORMATION SYSTEM	SIP
46	NATIONAL HEALTH INFORMATION SYSTEM	SINAIS
47	SYSTEM OF NUTRITION FOR CHILDREN UNDER 5 YEARS OF AGE	EPI-NUT
48	FOOD AND NUTRITION SURVEILLANCE SYSTEM	SISVAN
49	VITAL STATISTICS SUBSYSTEM	SSIEV
50	SMOKING	—
51	FOOD SURVEILLANCE	—
52	PESTICIDE SURVEILLANCE	—
53	EPIDEMIOLOGICAL SURVEILLANCE OF MOTHER AND NEWBORN HEALTH, MORBIDITY, AND MORTALITY	VESMMN
54	SEXUALLY TRANSMITTED INFECTIONS AND HIV	VIH/ITS

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**APPLYING THE  
ORGANIZATIONAL AND BEHAVIOR  
ASSESSMENT TOOL (OBAT)**

**RESULTS**

**PARAGUAY – APRIL 2007**

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## I. Introduction

This document presents results from applying the Organizational and Behavior Assessment Tool with health service providers who are involved in developing the Health Information System in Paraguay.

The OBAT<sup>1</sup> Tool, which is part of the PRISM<sup>2</sup> Framework developed by MEASURE Evaluation and John Snow, Inc., has two key objectives: 1) To assess the role of technical, behavior, and organizational factors in performance of the Health Information System (*Sistema de Información en Salud – SIS*); and 2) To develop strategies to address gaps and weaknesses identified through the Assessment.

Regarding the “**Role of Behavior Factors in SIS Performance**”, OBAT assesses knowledge and skills of persons in charge of implementing the Routine Health Information System (RHIS), including problem solving, the level of motivation of persons in charge of implementing the RHIS, and effectiveness of reward systems. Regarding the “**Role of Organizational Factors in SIS Performance**”, OBAT assesses strengths and weaknesses of an information culture promoting the following values: An emphasis on data quality, use of information, evidence-based decision making, problem solving, feedback from civil servants and community members, a sense of responsibility as well as empowerment and accountability, use of RHIS information, and transparent promotion criteria.

The Assessment provides a general perspective of the SIS<sup>3</sup>, deepening the existing assessment and creating an opportunity to learn and to improve different components of the SIS.

The Interinstitutional Technical Team, coordinated by the General Planning and Evaluation Directorate (*Dirección General de Planificación y Evaluación*) of MSPyBS, was in charge of reviewing and adapting the OBAT, applying the Tool, processing data, and analyzing results.

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<sup>1</sup>Organizational and Behavior Assessment Tool; Andwer Aqil, MD, MCPS (Psych), MHP, Dr PH; Dai Hozumi, MD, MPH; Theo Lippeveld, MD, MPH.

<sup>2</sup>Performance of Routine Health Information System Management

<sup>3</sup>Health Information System (*Sistema de Información en Salud*)

## II. Background

The Ministry of Public Health and Social Welfare (*Ministerio de Salud Pública y Bienestar Social* – MSPyBS) designed and implemented a Health Information System in 1992. However, components of the SIS are not integrated and implementation is facing many obstacles. While a Committee was established to redesign the SIS in the year 2000, this effort was not successful.

The topic of the Health Information System was taken on again in September 2005 and Resolution S.G. N° 401/07/00 was recovered. The Committee was reactivated to redesign the Health Information System (Resolution S.G. 764/12/09/05). The Committee carried out an assessment of the status of the SIS at MSPyBS through surveys carried out at two levels: General Directors at a Central Level and Regional Directors. Results from surveys have been used as a platform to redesign the SIS, recognizing the importance of integrating work with the other subsectors.

In February 2006, MSPyBS received a proposal to strengthen the SIS in Paraguay, as part of the AIS/PAHO<sup>4</sup> cooperation strategy for the SIS and within the framework of the PAHO<sup>5</sup>-USAID<sup>6</sup> Paraguay Project.

Within this framework, MSPyBS received a visit from the Joint PAHO/USAID MEASURE Evaluation Mission in May 2006. As a result of the work session and consultations with authorities and stakeholders a joint work program was established. National authorities considered that the visit was opportune and agreed with technical staff from the Mission that Paraguay should be included in the joint project to strengthen the SIS, since MSPyBS was in the process of carrying out an assessment of the SIS, and the proposal would allow complementing and orienting decisions relating to redesign and priority setting. To this effect, an Interinstitutional Technical Team was established, led by MSPyBS and including representatives from the Social Security Institute (*Instituto de Previsión Social* – IPS), Military Health, Police Health, and the General Directorate of Statistics, Surveys, and Censuses (*Dirección General de Estadística, Encuestas y Censos* – DGEEC) (Resol. S. G. N° 478/21-06-06).

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<sup>4</sup> Health Analysis and Information Unit (AIS) / Pan American Health Organization (PAHO)

<sup>5</sup> Pan American Health Organization

<sup>6</sup> United States Agency for International Development

Representatives from the Interinstitutional Technical Team (MSPyBS, IPS, DGEEC) participated in a workshop on “Performance Improvement in Management of the Routine Health Information System (*Sistema de Información Rutinaria en Salud – SIRS*)” that was held in Cuernavaca, Mexico, in September 2006. Participants learned about and gained experience in applying different PRISM Tools.

Between August and October 2006, 5 workshops on Assessment have been held, applying the first SIS Analysis and Monitoring Tool proposed by the Metric Health Network (*Red Métrica de Salud – RMS*). Results from application of the Tool have allowed establishing guidelines for a Strategic Plan to strengthen the SIS, which have been used as a foundation to develop a National Strategic Plan.

With the aim of deepening the assessment of the RMS, two workshops on Application of the Organizational and Behavior Assessment Tool (OBAT) – which has been developed by MEASURE Evaluation – were held in December 2006. Methodology and results from the workshops are presented below.

### III Methodology

#### 3.1 Type of Study

The Study is *Descriptive, transversal* and temporarily, *prospective*.

#### 3.2 Study Conditions

The questionnaire called Organizational and Behavior Assessment Tool (OBAT) – developed by the MEASURE/JSI Group – has been adapted and applied to gather information. In addition, the PRISM <sup>7</sup> conceptual framework has been used. The framework describes performance indicators for Health Information Systems, including three components: *Technical, Behavior, and Organizational Component*. Based on this conceptual framework and existing “technical” Assessment Tools, this document proposes an Assessment Tool to explore organizational and behavior performance indicators for an Information System<sup>8</sup>.

The advantage of this Assessment Tool is that it identifies strengths and weaknesses in performance of Health Information Systems and in addition, explores performance correlates.

The Assessment provides a comprehensive perspective of the existing information system, thus creating opportunities to learn and to improve various components of the information system. This document presents a standardized methodology to assess organizational and behavior factors that have an impact on performance of Routine Health Information Systems (RHIS).

The goal of the Workshop was applying OBAT in order to deepen the assessment of the existing Health Information System.

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<sup>7</sup> Lafond, A. et al. (2003) PRISM Conceptual Framework, RHINO, South Africa.

<sup>8</sup> Organizational and Behavior Assessment Tool; Andwer Aqil, MD, MCPS (Psych), MHP, Dr PH; Dai Hozumi, MD, MPH; Theo Lippeveld, MD, MPH.

### 3.2.1. Measurement and Analysis<sup>9</sup>

25 indicators have been established to measure and analyze data collected through the Organizational and Behavior Assessment Tool – OBAT. Indicators are distributed under five components.

#### I. Promoting an Information Culture

- Data Quality
- Use of Information
- Evidence-Based Decision Making
- Problem Solving
- Feedback
- Responsibility
- Empowerment and Accountability

#### II. Organizational Factors

- Perceived Resource Availability
- Management Support
- Knowledge of Performance Criteria
- Promotion Criteria
- Reward System

#### III. Perceived Self-efficacy regarding Implementation of SIS Tasks

- Calculating
- Preparing Graphs
- Interpreting
- Analyzing
- Use of Information
- Motivation

#### IV. Observed Competence regarding Implementation of SIS Tasks

- Calculating Percentages and Indexes
- Data Recording
- Explaining Data
- Use of Data

#### V. Competence regarding Importance of SIS Tasks

- Knowledge of the Importance of Recording Information
- Knowledge of Methods to Review Data Quality
- Problem Solving Skills

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<sup>9</sup> Fortalecimiento del Desempeño del Sistema de Información de Salud. Beatriz Plaza, MEASURE Evaluation, Ramón Martínez, AIS/PAHO.

### 3.2 Universe, Sample, and Sampling

A sample of 90 institutions was selected out of a total of 849 institutions reporting to MSPyBS (Table 1).

While the total number of IPS institutions is unknown, 8 facilities reporting to IPS, 1 Military Health Facility, and 1 Police Health Facility were included in the sample.

**TABLE 1**  
**Institutions Reporting to the Ministry of Public Health and Social Welfare**

FACILITIES	TOTAL FACILITIES	SAMPLE	
		FACILITIES	%
Central Level	1	1	100
Regional Staff	18	10	56
Specialized Mother-Child Hospitals, Specialized Centers	20	10	50
Regional Hospitals	17	10	59
District Hospitals	30	15	50
Health Centers	116	19	16
Health Posts	647	25	4
<b>Total</b>	<b>849</b>	<b>90</b>	<b>11</b>

Source: Biostatistics Department

*Stratified Sampling* was carried out by dividing the 17 health regions in five strata. Each stratum included three health regions, except for the first and the second stratum, which included four health regions each. The 17th Health Region (Alto Paraguay) was not included due to the distance between this region and the capital city, which involves a high cost per participant. Health facilities from each stratum were selected randomly (Table 2).

**TABLE 2**  
**Distribution of Health Regions by Stratum**

STRATUM	HEALTH REGION	HEALTH CENTERS	HEALTH POSTS
Capital Region	Asunción, Central, Pte. Hayes, Boquerón	4	5
Central Region	Cordillera, Guairá, Caazapá, Paraguari	4	5
Northern Region	Concepción, San Pedro, Amambay	4	5
Southern Region	Itapúa, Misiones, Ñeembucú	4	5
Eastern Region	Caaguazú, Alto Paraná, Canindeyú	4	5
<b>TOTAL</b>		<b>20</b>	<b>25</b>

Source: Random sample of facilities.

#### 3.4. Informants by Hierarchy Level and Subsector

In order to identify organizational and behavior factors that affect the SIS in Paraguay, the Tool was applied with health service providers – *informants from different hierarchy levels* – including General Directors, Health Program Managers, Regional Directors, Heads of District Hospitals, and Heads of Health Centers, Nurses, Obstetricians, Statisticians, Auxiliary Staff from Regional and District Hospitals and Health Centers, as well as Heads of Health Posts reporting to MSPyBS and staff in similar positions in the other subsectors.

An oriented selection process was implemented to choose staff at different health facilities according to hierarchy, ensuring participation of heads of selected institutions and staff responsible for SIS within institutions (Table 3).

**TABLE 3**

Distribution of Informants by Subsector and Hierarchy Level

HIERARCHY LEVEL	MSPyBS	IPS	MILITARY HEALTH	POLICE HEALTH	TOTAL
General Directors	9	0	0	0	9
Directors (Regions, Regional Hospitals, District Hospitals, Health Centers)	39	10	0	0	49
Statisticians	45	0	2	3	50
Nurses, Obstetricians	14	0	0	0	14
Biostatistics Staff	20	0	0	0	20
Staff in Charge of Vital Statistics	8	0	0	0	8
Heads of Service Facilities	20	10	8	7	45
Heads of Health Posts	25	10	0	0	35
Other	10		0	0	10
<b>TOTAL</b>	<b>190</b>	<b>30</b>	<b>10</b>	<b>10</b>	<b>240</b>

Source: List of Workshop Participants

The low number of informants from the IPS, Military Health, and Police Health is due to the fact that very few persons are involved in information systems in these institutions.

### 3.5 Workshop Participation

A summary of the number of persons invited to attend workshops, workshop participants, and distribution of informants who have applied the Tool is presented below (Table 4).

**TABLE 4**

Distribution of Participants and Informants by Workshop

WORKSHOP	DATE	PARTICIPATING INSTITUTION	INVITED	PARTICIPANTS		HAVE APPLIED THE TOOL	
				TOTAL	%	TOTAL	%
1	13/12/06	MSPyBS, MILITARY HEALTH, POLICE HEALTH	120	76	63	74	97
2	14/12/06	MSPyBS, MILITARY HEALTH, POLICE HEALTH	120	85	71	78	92
<b>TOTAL</b>			<b>240</b>	<b>161</b>	<b>67</b>	<b>152</b>	<b>94</b>

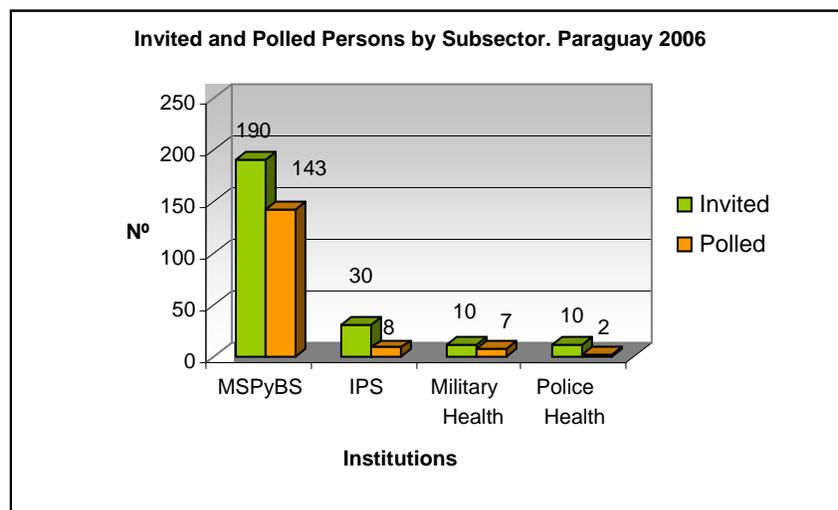
Source: List of Workshop Participants

A total of 240 *informants* were invited, 120 for each workshop. Invitations were sent to staff at the Central Level, 17 out of 18 Health Regions, and other specialized facilities reporting to the Ministry of Health, as well as staff from the Social Security Institute, Military Health, and Police Health. 67% of persons who had been invited participated; 94% of them applied the Tool and responded appropriately during the 2-day workshop.

63% of invited persons attended the first workshop, and 97% of them applied the Tool and submitted the Survey. Participation at the second workshop was 71%, and 92% of participants applied the Tool and submitted the Survey.

Graph 1 presents a summary of informants who applied the Tool by subsector.

**GRAPH 1**



Source: OBAT Survey, Paraguay. 2006

Given the importance and the need to learn about organizational and behavior aspects of persons in charge of the SIS at IPS<sup>10</sup> more information was required, in addition to information gathered during the 2 workshops. Therefore, the IPS representative from the Interinstitutional Technical Team was asked to gather more information, and *eight additional surveys* were obtained.

<sup>10</sup> Social Security Institute (*Instituto de Previsión Social*)

### 3.6 Tool Adaptation

One of the tasks carried out by the Interinstitutional Technical Team before applying the Tool was reviewing and adjusting each one of the variables included in the Tool to promote a better understanding of the questions in all regions within the country.

Key adjustments included: Name of each facility, type of facility, redefining positions, participants' educational level. No questions were added to the ones already included in the Tool (see Annex I).

### 3.7 Method

Two workshops were carried out for health service providers from four subsectors – MSPyBS, IPS, Military Health, and Police Health – to apply OBAT in Paraguay.

Three work groups were established at each workshop, after presenting objectives regarding application of the Tool and a methodology to complete the Tool. Groups were established considering hierarchy and region or institution where participants worked, in order to avoid participation of several members of the same institution in one group. Each group was led by a coordinator who acted as an observer. Each participant received a printed questionnaire, to be completed anonymously.

Each workshop lasted 3 hours, and the average time for applying the Tool was sixty minutes.

Once the Tool had been applied open questions were coded, following instructions from the OBAT Manual provided by MEASURE Evaluation at the workshop on Strengthening the SIS that was held in Cuernavaca, Mexico.

The software used for data entry was provided by MEASURE Evaluation and consists of an Excel sheet where indicators are calculated automatically.

Data were then entered by staff from the MSPyBS Biostatistics Department. Indicators were calculated automatically once data had been entered. Some mistakes were identified in formulas during review of the sheet and before analysis. Mistakes were corrected according to the formulas to calculate each indicator that are described in the OBAT Manual. For example, one of the mistakes was: "Motivation" should include the variables BC1, BC2, BC3, BC4, BC5, and BC6, but the sheet included some variables that differed from the above mentioned.

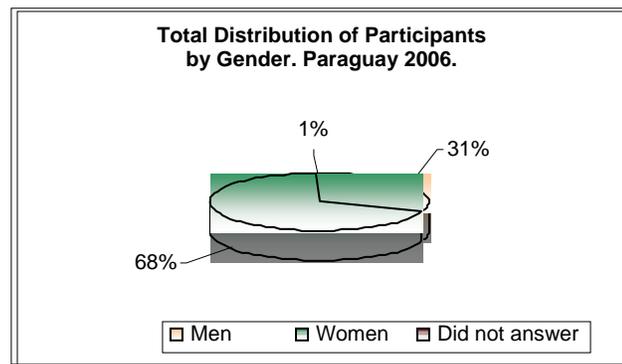
## IV. Results

Some characteristics of informants are described below.

### 4.1 Characteristics of Informants

Distribution by gender of participants who completed the Survey shows a predominance of *women* (68%) compared to men (31%) (Graph 2).

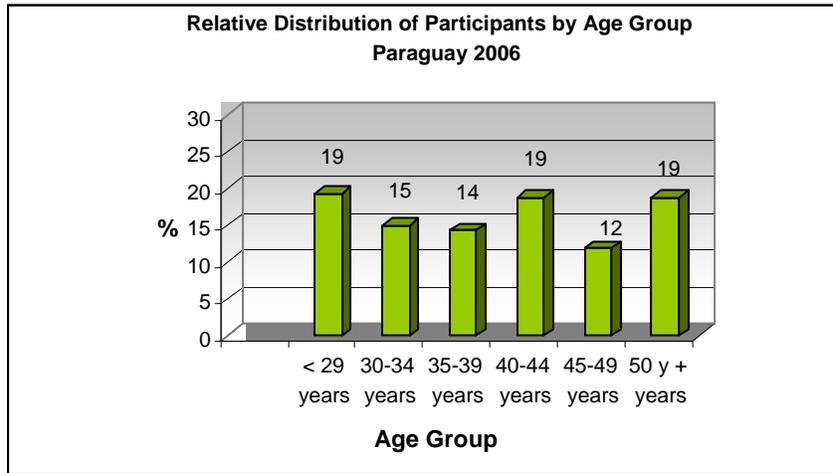
**GRAPH 2**



Source: OBAT Survey, Paraguay. 2006

The average age of informants is 40 years, with a minimum age of 18 and a maximum age of 69 years. Distribution by age groups shows that a quite heterogeneous population is involved in SIS development: 19% are younger (under 30 years of age), 29% are 30-39 years old, 31% are 40-49 years old, and 19% are 50 years of age or more. This shows a that a quite young population is involved in SIS development (Graph 3).

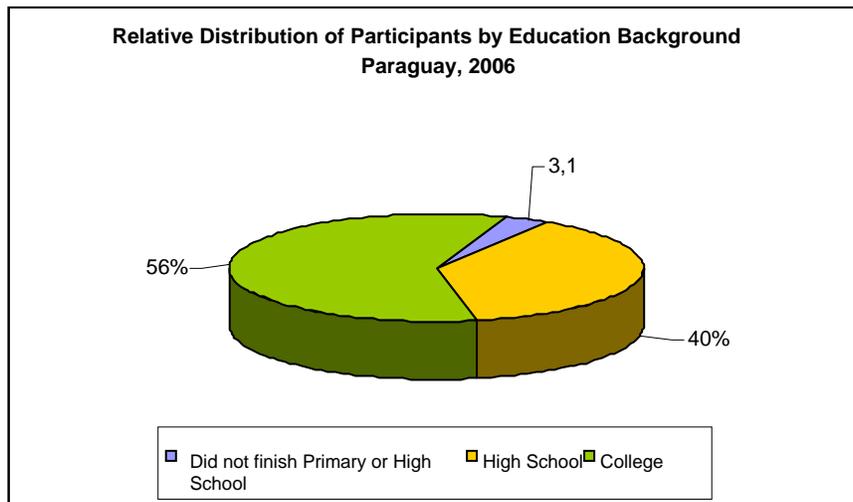
**GRAPH 3**



Source: OBAT Survey, Paraguay. 2006

Regarding education background of informants included in the Survey, 4% have finished primary school or have not finished high school, 40% have finished high school, and 56% are college graduates, 18% of whom expressed that they hold a graduate degree (Graph 4).

**GRAPH 4**



Source: OBAT Survey, Paraguay. 2006

Regarding distribution of the number of informants according to area of involvement in the Information System, the graph shows that out of 160 staff members that completed the Survey, 50% are in operations, 33% in manager positions, and 9% are users (Table 5).

**TABLE 5**  
**Distribution of Informants by Area of Involvement in the SIS**

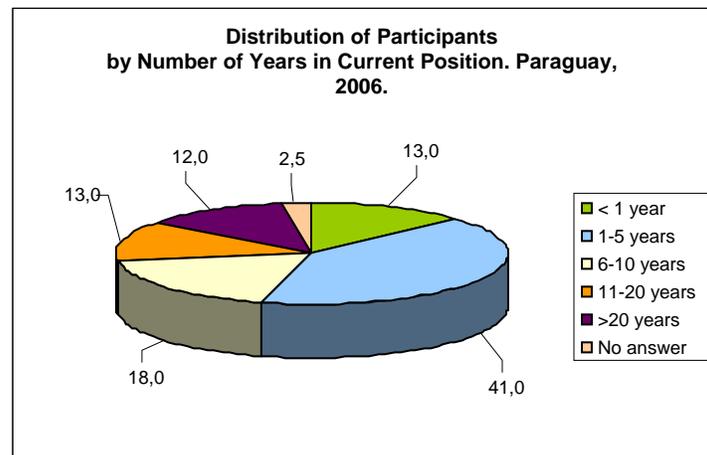
Area of Involvement	Nº	%
Operations	80	<b>50</b>
Manager	52	<b>33</b>
User (*)	15	<b>9</b>
Did not answer	13	<b>8</b>
<b>Total</b>	<b>160</b>	<b>100</b>

(\*) Community members who use health services or use information.

Source: OBAT Survey, Paraguay. 2006

13% of informants have held their current positions for less than one year, 41% have held their positions for 1-5 years, 18% for 6-10 years, 13% for 11-20 years, and only 12% have held their positions for more than 20 years (Graph 5).

**GRAPH 5**



Source: OBAT Survey, Paraguay. 2006

## 4.2 Key Measurement Results

Key results from the Survey are analyzed below in terms of the *technical, organizational, and behavior* factors that have an impact on SIS performance.

Regarding formal training in tasks relating to SIS management, 48% of informants answered that they have not been trained at all and 49% stated that they have been trained (3% did not answer).

Regarding satisfaction level of informants with their job, 72% of informants who completed the Survey stated that they are satisfied or very satisfied with their job, 16% are somewhat satisfied, 3% are neither unsatisfied nor satisfied, 5% are not satisfied or very unsatisfied with their job, and 3% did not answer (Table 6).

**TABLE 6**  
**Participants by Level of Satisfaction on the Job**

Satisfaction Level	Nº	%
Very unsatisfied	2	1
Somewhat unsatisfied	2	1
Not satisfied	5	3
Neither unsatisfied nor satisfied	5	3
Somewhat satisfied	26	16
Satisfied	90	56
Very satisfied	26	16
Did not answer	4	3
<b>Total</b>	<b>160</b>	<b>100</b>

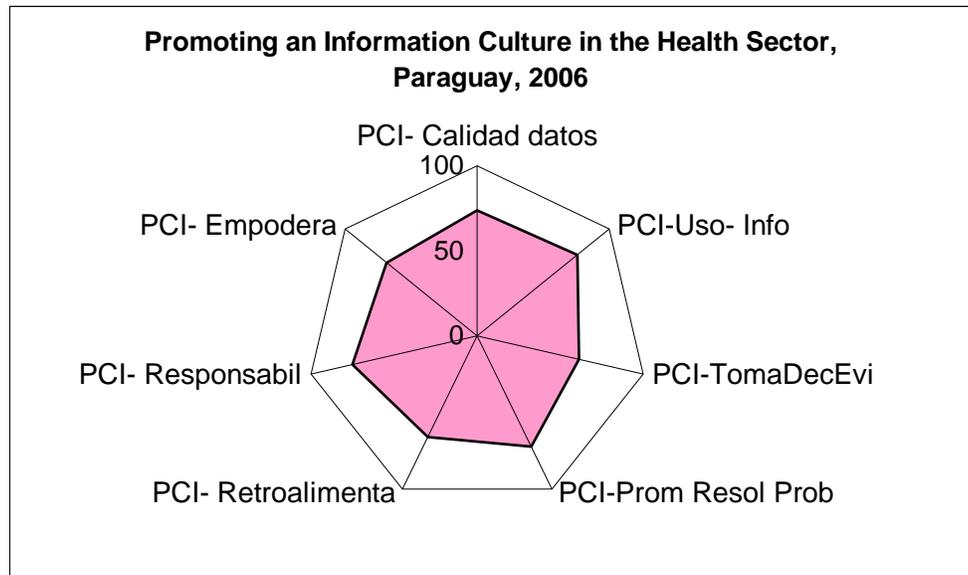
Source: OBAT Survey, Paraguay, 2006

### 4.2.1. Promoting an Information Culture

This component is evaluated through seven indicators: *Data Quality, Use of Information, Evidence-Based Decision Making, Problem Solving, Feedback, Responsibility, and Empowerment and Accountability.*

Under this component, the indicators with the highest percentages are: Use of Information (75.6%), Responsibility (75.2%), Data Quality (73.8%), and Problem Solving (72.5%). Indicators with the lowest percentages are: Evidence-Based Decision Making and Feedback (Graph 6).

**GRAPH 6**



Source: OBAT Survey, Paraguay, 2006

[Translated text from graph: PIC-Data Quality PIC-Accountability PIC-Use of Information PIC-Responsibility PIC-Decision-making PCI-Feedback PCI-Problem Solving]

(Translator's note: PCI = Promoting an Information Culture)

**The “Data Quality” indicator** has been obtained from the answer to the question “Managers in your institution highlight data quality in monthly reports”. The result (73.8%), shows a relatively high level of data quality.

**The “Use of Information” indicator** has been developed based on answers to the following aspects of the Survey: Managers in the institution use SIS data for health management, to establish goals, and for follow-up; colleagues in the work unit believe that data collecting is an important task; they use data to plan and monitor established goals; health centers receive instructions to make data available to monitor their established goals and make significant efforts

in carrying out tasks relating to health information systems. The Assessment shows a percentage of 75.6% for Use of Information – one of the highest percentages under the Promoting an Information Culture component.

Under “**Evidence-Based Decision Making**” the following aspects have been analyzed: Decisions within the institution are based on individual preferences, instructions from managers, evidence and facts, political interference, strategic objectives, health service needs in the community, cost-related aspects, considering all alternatives and their consequences, SIS data for health management. The average for this indicator is 61.3% - the lowest percentage under the Promoting an Information Culture component.

The “**Problem Solving**” indicator has been developed through the following aspects: In the health service institution staff can collect data to identify the underlying cause or causes of a given problem, develop appropriate criteria to select an intervention for a given problem, develop appropriate results from a given intervention or decision, and assess if objectives have been met or the expected results have been achieved. The Assessment shows an average of 72.5% for the perceived ability of staff to solve problems.

The perceived “**Feedback**” indicator has been developed through the following aspects: In your health service institution managers seek feedback from relevant persons, discuss conflicts openly to resolve them, seek feedback from the community in question. The average for feedback is 66%.

The “**Responsibility**” indicator has been developed through analysis of the following aspects: In your work unit, your colleagues carry out tasks with honesty, are always on time, help each other to serve users and the community, feel committed to improving the health status of the population, do not accept bribes (they make a living with the salary they earn), establish appropriate and feasible goals regarding their performance, are told that their effort makes a difference in improving the health status of the population, usually keep records of their actions, and always tell the truth. Analysis shows that 75.2% of SIS staff perceive that the above characteristics are present in their colleagues, thus strengthening SIS development.

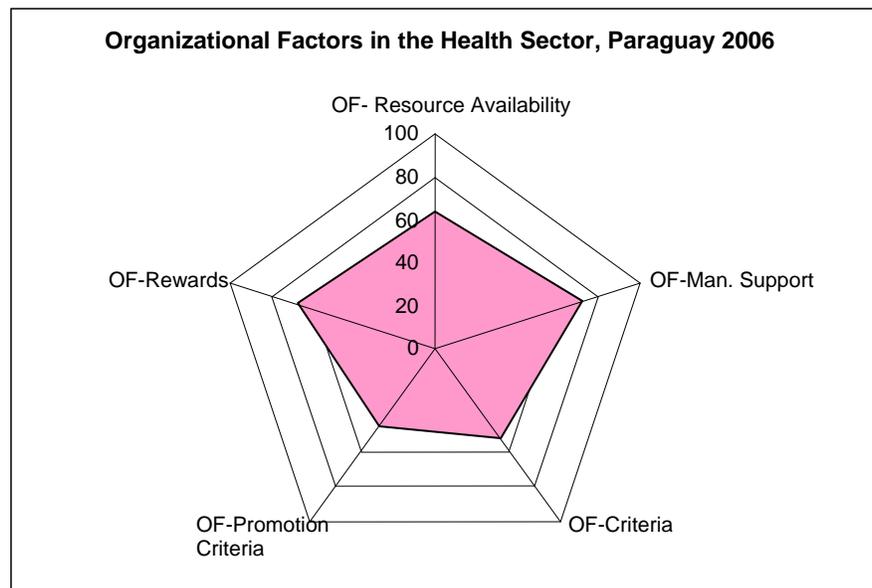
The “**Empowerment and Accountability**” indicator has been developed through analysis of three aspects: In your work unit, your colleagues have the authority to make decisions, have to

be accountable for their performance, and feel guilty if they do not reach established goals or achieve an established performance level. The average for this indicator is 68.5%.

#### 4.2.2. Organizational Factors

Five indicators have been considered to analyze organizational factors: *Perceived Resource Availability*, *Management Support*, *Knowledge of Performance Criteria*, *Promotion Criteria*, and *Reward System* (Graph 7).

**GRAPH 7**



Source: OBAT Survey, Paraguay. 2006

Under this component, Management Support, the Reward System, and Perceived Resource Availability produced the highest percentages. On the contrary, Promotion Criteria and Knowledge of Performance Criteria produced the lowest percentages.

**“Perceived Resource Availability”** has been assessed through the following aspects: In your work unit, your colleagues are appropriately trained to carry out tasks relating to management of the health information system, have access to the required forms and instruction manuals to carry out SIS tasks, and health services receive feedback in a timely manner

regarding monthly reports submitted by them. Resource Availability as perceived by staff is 63.8%.

**“Management Support”** has been developed through the following aspects: Managers in your institution promote teamwork, are open to different perspectives, listen to staff members' ideas and concerns, allow disagreement before making a decision, are interested in meeting users' needs. Analysis of the above described characteristics shows that 72.2% of staff involved in the SIS perceive that they are supported by management.

**“Knowledge of Performance Criteria”** has been assessed through the answer to the following question: Are you told which are your annual performance criteria? If the answer is Yes, they are asked if criteria include an objective evaluation of the following aspects: Improving effectiveness of the information integration process, improving opportunity, consistency, and validity of data, transparent criteria for career advancement exist, and work ethic and values are emphasized during staff meetings. The average for informants' perception regarding Knowledge of Performance Criteria is relatively low (52.1%).

**Perceived “Promotion Criteria”** is measured through the following aspects: In your work unit, your colleagues believe that promotions are based on merit, and transparent criteria for career advancement exist. This indicator produced one of the lowest averages under Organizational Factors (44.8%).

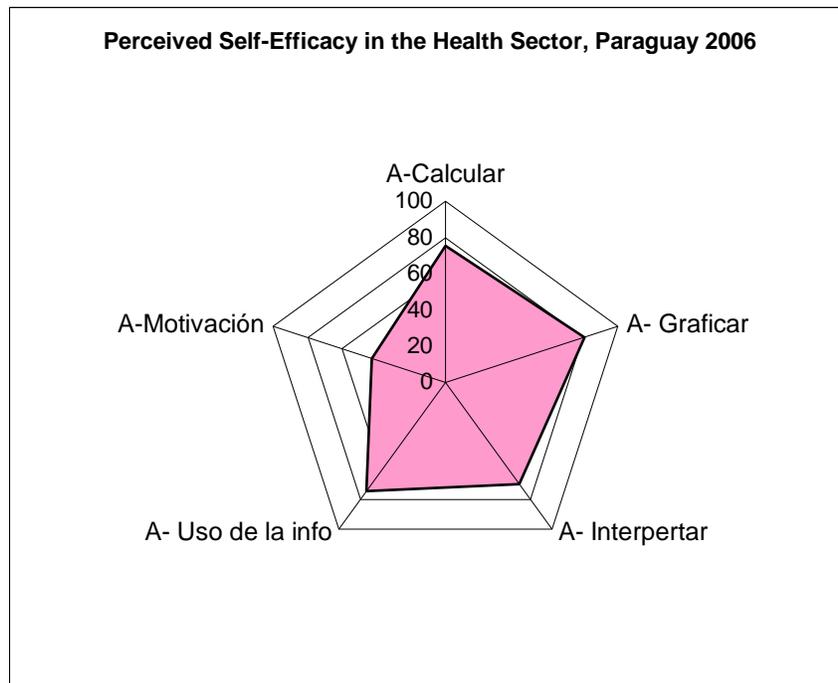
Assessment of perception relating to **“Reward System”** has been developed based on the question: Do colleagues in your work unit recognize your good work? The average for this is 67.8%.

#### **4.2.3. Perceived Self-Efficacy regarding Implementation of SIS Tasks**

This component has been assessed considering six indicators: Perceived Self-efficacy in Calculating, Preparing Graphs, Analyzing, Use of Information, and Motivation.

Informants perceive that they are capable of preparing graphs (80.4%), reviewing (79.5%), calculating (75.5%), using information (74%) and, to a lesser extent, interpreting data (69.2%). On the other hand, they have expressed that they are not very motivated (42.7%) to carry out tasks relating to the SIS (Graph 8).

GRAPH 8



Source: OBAT Survey, Paraguay. 2006

[Translated text from graph: S-Calculating S-Motivation S-Preparing Graphs S-Use of Information S-Interpreting]

(Translator's note: S = Self-Efficacy)

**Self-efficacy in “Calculating”** refers to the question if informants perceive that they are capable of correctly calculating percentages and indexes. **Self-efficacy in “Interpreting”** asks the following question: Did you identify any trends in the data? If the answer is Yes or No, explain why. The Assessment shows that 69.2% of informants perceive that they have the ability to calculate trends based on data from bar graphs.

**“Data Review”** has been assessed through the following statements: I am able to correctly prepare the monthly report for the health service facility, and I am able to verify if data are precise.

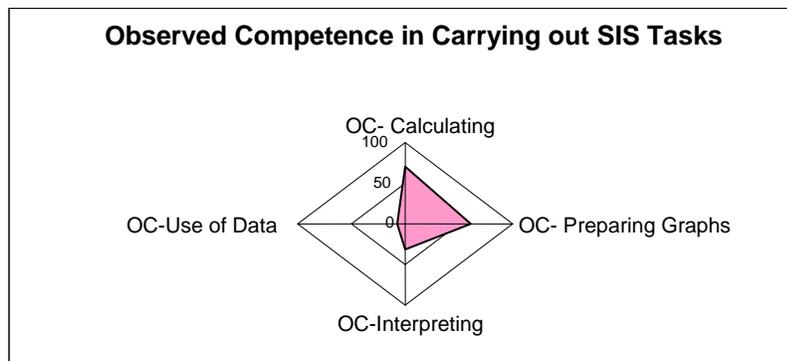
**Self-Efficacy regarding “Use of Information”** has been assessed as the ability to use data, identify gaps, establish goals, or prepare reports.

To identify **Perceived Self Efficacy regarding “Motivation”** the following aspects have been analyzed: I do not feel motivated to gather information that is not used in decision-making; gathering information bores me; I believe that gathering information is a valuable task; gathering information makes me feel that data are required to monitor performance of health services; gathering information makes me feel that I am being forced to do this; my colleagues and/or bosses recognize the importance of gathering information. The Assessment shows that 42.7% of informants have a low level of motivation.

#### 4.2.4. Observed Competence in Implementation of SIS Tasks

Evaluation of the competence in carrying out tasks relating to SIS for health management is related to the ability to calculate percentages and indexes, and to record, explain, and use data (Graph 9).

**GRAPH 9**



Source: OBAT Survey, Paraguay. 2006

OC=Observed Competence

To assess **competence regarding “Calculating”**, the Survey includes an exercise requesting informants to make different types of calculations. For example, “Calculate the percentage of pregnant women who receive antenatal health care services in the district, the index of malnutrition, and the number of children suffering from malnutrition”. 69.8% of informants calculated correctly.

**Competence in “Preparing Graphs”** has been developed through the following exercise: Prepare a graph bar to illustrate vaccination coverage by year. The resulting observed competence shows that 61.9% of informants know how to prepare graphs.

When informants were requested to “interpret data”, that is, to explain the graph bar and to state if they found any trends in the data, it has been observed that only 32.2% of informants are able to interpret data.

To assess **competence in “Use of Data”** informants were asked to mention at least one way to use conclusions at different levels, that is, at health centers, at a local and/or community level, and in policy-making. This indicator shows an average of 7% of informants using information generated by SIS correctly.

#### 4.2.5. Observed Competence versus Self-Perceived Competence

Significant differences have been observed between informants' perception of their skills and their real skills when comparing results from informants' self-perception regarding data management with results from observed competence in carrying out tasks relating to the health information system. This can be clearly seen in percentages for Data Interpreting (69.2% for Self-Efficacy vs. 32.2% for Observed Competence) and Use of Data (74% for Self-Efficacy vs. 7% for Observed Competence) where differences are more significant (Table 7).

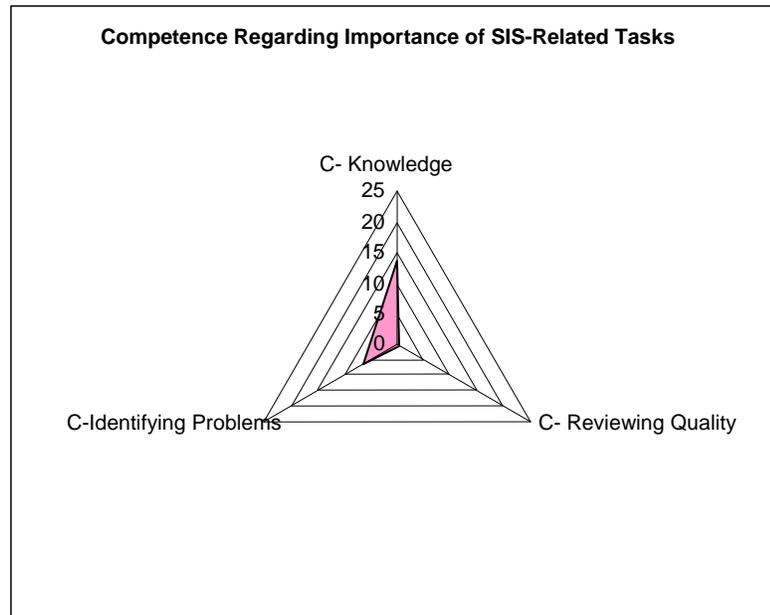
**TABLE 7**

Confidence Level	Calculating	Preparing Graphs	Interpreting	Use
Self-perceived Competence	75.5	80.4	69.2	74.0
Observed Competence	69.8	61.9	32.2	7.0

Source: OBAT Survey, Paraguay. 2006

#### 4.2.6. Competence Regarding Importance of SIS Tasks

This component has been assessed through three indicators: Knowledge of the Logic and Importance of Collecting Monthly Data, Knowledge of Methods to Review Data Quality, and Problem Solving Skills (Graph 10).

**GRAPH 10**

Source: OBAT Survey, Paraguay. 2006

The “**Knowledge of the Logic and Importance of Collecting Data**” indicator has been developed through the following aspects: Competence to establish reasons to collect monthly data about diseases, vaccination, and why data about the focus area population are required. The result (13.5%) shows a quite low level of Knowledge of the Logic and Importance to Collect Data.

To assess “**Knowledge of Methods to Review Data Quality**” informants were asked to describe at least three ways to review data quality (open question). This indicator shows that only an average of 0.2% know how to review data quality. This is the lowest percentage in the entire Assessment.

The average for observed competence in “**Problem Solving Skills**” is 6%.

#### IV. A Summary of Indicators by Component

A summary of average results for OBAT components is included below (Table 8).

**TABLE  
8**

<b>SUMMARY OF INDICATORS BY COMPONENT</b>		<b>Median by Indicator</b>	<b>Median by Component</b>
<b><i>Promoting an Information Culture</i></b>			<b>70.4</b>
1	Data Quality (S3)	73.8	
2	Use of Information	75.6	
3	Evidence-Based Decision Making	61.3	
4	Problem Solving	72.5	
5	Feedback	66	
6	Responsibility	75.2	
7	Empowerment and Accountability	68.5	
<b><i>Organizational Factors</i></b>			<b>60.1</b>
8	Perceived Resource Availability	63.8	
9	Management Support	72.2	
10	Knowledge of Performance Criteria	52.1	
11	Promotion Criteria	44.8	
12	Reward System	67.8	
<b><i>Self-Efficacy</i></b>			<b>70.2</b>
13	Self-efficacy in Calculating	75.5	
14	Self-efficacy in Preparing Graphs (Variable SE	80.4	
15	Self-efficacy in Interpreting	69.2	
16	Self-efficacy in Reviewing	79.5	
17	Self-efficacy in Use of Data	74	
18	Motivation	42.7	
<b><i>Observed Competence</i></b>			<b>42.7</b>
19	Calculating Percentages and Indexes	69.8	
20	Data Recording (C2a)	61.9	
21	Explaining Data (OC-Interpreting)	32.2	
22	Use of Information	7.0	
<b><i>Competence in the Importance of Tasks</i></b>			<b>6.6</b>
23	Knowledge of the Importance of Gathering Monthly Information	13.5	
24	Knowledge of Methods to Review Data Quality	0.2	
25	Problem Solving Skills (Probsol)	6	
OBS:	Logic = Rationality		

## VI. Conclusions

Based on the assessment of organizational and behavior factors the following conclusions can be formulated.

✓ For “Promoting an Information Culture“, the Assessment shows an average of 70.4%. Three of the indicators produced percentages below average: Feedback, Empowerment and Accountability, and Evidence-Based Decision Making, and therefore, need to be addressed most urgently. On the other hand, the indicator with the highest percentage under this component is "Use of Information" and the one with the lowest percentage is "Evidence-Based Decision Making". This is somewhat contradictory since use of information is assessed mainly for decision-making, and the expectation would be that informants' opinion or perception regarding both indicators is consistent.

✓ The percentage for “Organizational Factors“ is somewhat lower (60.1%), which can be defined as medium. This is a fundamental factor for the quality of data generated by the SIS. Management Support, Reward System, and Perceived Resource Availability produced percentages above average. On the contrary, Promotion Criteria and Knowledge of Performance Criteria produced the lowest percentages. The latter have a negative impact on motivation levels of SIS staff.

✓ The “Self-Efficacy“ component shows a global average of 70.2%. Staff in charge of the SIS perceive that they are capable of preparing graphs, reviewing, calculating, using information and, to a lesser extent, interpreting data. On the other hand, they stated that they *do not feel very motivated* to carry out tasks relating to SIS.

✓ Regarding “Observed Competence“, a significantly lower percentage (42.7%) has been observed than percentages for the previous components. When analyzing them, perceived competence is lower, primarily for Use of Data and Interpreting Data.

✓ One of the components with the lowest percentage is “Competence in the Importance of Carrying Out Tasks” – an average of 7%. Informants expressed that they have practically no knowledge of methods to review data quality, insufficient problem solving skills, and insufficient knowledge about the importance of gathering monthly information.

### 6.1. Strength

- Staff involved in developing the SIS are quite heterogeneous; however, close to 80% are young or under 50 years of age. This means that they will not retire anytime soon and can be trained in order to achieve better results.

### 6.2. Weaknesses

- Lack of promotion criteria and motivation mechanisms within institutions for staff involved in the SIS.
- Human resources with low levels of motivation regarding their roles.
- Few trained human resources involved in the SIS.
- An information culture is not promoted in institutions regarding aspects such as: Empowerment, Feedback, Evidence-Based Decision Making.
- Lack of motivation by staff; they should be empowered to make evidence-based decisions.
- Staff involved in the SIS have few skills relating to tasks such as: Knowledge of the importance of collecting data, methods to review data quality, and problem solving skills.

## VII. Recommendations

To promote an information culture by increasing dissemination of available information, and to ensure data quality.

To seek strategies for use of information, decision-making, and accountability based on data provided by the SIS at a local level where data are collected.

To strengthen diverse organizational aspects; especially, perceived resource availability, knowledge of performance criteria, promotion criteria.

To develop a legal framework that provides incentives for staff in charge of the Health Information System.

To implement appropriate policies to establish performance criteria and promotion criteria for SIS staff, in accordance with resource availability.

To implement training/education action plans oriented toward improving skills and motivating staff in charge of SIS management; to provide follow-up on staff tasks on a permanent basis.

To strengthen the process of analysis and use of information through ongoing training of staff in charge of the SIS at all levels in the Health Subsector.

To develop a (Specialized) Training System for SIS staff; particularly on Epidemiology, Biostatistics, and Information Management.

To develop training plans and to implement immediate and sustainable strategies to train SIS staff in data management and problem solving skills.

ANNEX



Ministerio de Salud Pública y Bienestar Social



Pan American Health Organization



**MEASURE**  
*Evaluation*

## Organizational and Behavior Assessment Tool

(To be completed by staff at all levels)

Thank you for your help and cooperation in completing this questionnaire in a self-applied manner by circling the answers.

Please write:

Beginning time \_\_\_\_\_ Finishing time \_\_\_\_\_ Duration: \_\_\_\_\_

ID0. Name of institution where you work:

1. MINISTRY OF PUBLIC HEALTH AND SOCIAL WELFARE
2. SOCIAL SECURITY INSTITUTE
3. MILITARY HEALTH
4. POLICE HEALTH
5. OTHER \_\_\_\_\_

IDI. Name of Facility or Health Service Institution where you work

\_\_\_\_\_

ID2. Health Department or Health Region

\_\_\_\_\_

DD1. What is your position?

1. Director, Central Level
2. Head of Department, Central Level
3. Regional Director
4. Hospital Director (General or Specialized Hospital)
5. Director, Regional Hospital
6. Director, District Hospital
7. Head of Health Center or Health Unit
8. Head of Health Post
9. Regional Statistician
10. Statistician, Regional Hospital
11. Statistician, District Hospital
12. Statistician, Health Center or Health Unit
13. Support Staff, Regional Level
14. Other (specify): \_\_\_\_\_

DD2. In which way or at which stage are you involved in the Information System?

1. Operations
2. Management
3. User

DD3. At which level are you working in your institution?

1. Central
2. Departmental or Regional
3. District

DD4. What is your age?

DD5. Gender:            1. Male            2. Female

DD6. Education Background

1. Primary School
2. Basic School
3. Middle School
4. High School
5. College
6. Other (specify) \_\_\_\_\_

DD7. How long have you held your current position (specify if years or months): \_\_\_\_\_

DD8. Have you received formal training in tasks relating to management of information systems?

(Information gathering, presentation, and analysis)

0. No

1. Yes

We would like to know your opinion regarding certain tasks relating to the information system in your institution. There are no right or wrong answers, only an expression of your opinion. The scale refers to an assessment of the intensity of your opinion and goes from "Never" (1) to "Always" (5).

- |             |                 |
|-------------|-----------------|
| 1 Never     | 4 Almost always |
| 2 Rarely    | 5 Always        |
| 3 Sometimes |                 |

In your opinion, to which extent are the following statements true, on a scale from 1 to 5?

In your institution, decisions are based on

D1. Personal preferences	1	2	3	4	5
D2. Instructions from managers	1	2	3	4	5
D3. Evidence and facts	1	2	3	4	5
D4. Political interference	1	2	3	4	5
D5. Strategic objectives	1	2	3	4	5
D6. Health service needs of the community	1	2	3	4	5
D7. Cost considerations	1	2	3	4	5
D8. Considering all alternatives and their consequences	1	2	3	4	5
D9. Data from the Health Information System	1	2	3	4	5

In your institution, your bosses

S1. Promote teamwork	1	2	3	4	5
S2. Seek feedback from relevant persons	1	2	3	4	5
S3. Highlight data quality in monthly reports	1	2	3	4	5
S4. Are open to other perspectives	1	2	3	4	5
S5. Listen to ideas and concerns from staff	1	2	3	4	5
S6. Allow disagreement before making a decision	1	2	3	4	5
S7. Are interested in meeting users' needs	1	2	3	4	5
S8. Discuss conflicts openly to resolve them	1	2	3	4	5
S9. Seek feedback from the community in question	1	2	3	4	5
S10. Use data from the information system to establish goals and for follow-up	1	2	3	4	5

In your work unit, your colleagues					
Carry out tasks with honesty	1	2	3	4	5
Are always on time	1	2	3	4	5
Help each other to serve users and the community	1	2	3	4	5
Feel committed to improving the health status of the population	1	2	3	4	5
Do not accept bribes (they make a living with the salary they earn)	1	2	3	4	5
Establish appropriate and feasible goals regarding their performance	1	2	3	4	5
Feel guilty when they do not reach established goals or performance levels	1	2	3	4	5
Their good work is recognized	1	2	3	4	5
Believe that data collecting is an important task	1	2	3	4	5
Believe that promotions are based on merit	1	2	3	4	5
In your work unit, your colleagues					
Use data to plan and monitor established goals	1	2	3	4	5
Are appropriately trained to carry out tasks relating to management of the information system	1	2	3	4	5
Have access to the required forms and instruction manuals to carry out SIS management tasks	1	2	3	4	5
Health service facilities receive feedback in a timely manner regarding monthly reports	1	2	3	4	5
Health service units receive instructions to make data available to monitor established goals	1	2	3	4	5
P16. Are able to collect data to identify the underlying cause or causes of a given problem	1	2	3	4	5
P17. Are able to develop appropriate criteria to select an intervention for a given problem	1	2	3	4	5
Are able to develop appropriate results for a given intervention or decision	1	2	3	4	5

Are able to assess if goals or results have been achieved	1	2	3	4	5
Have the authority to make decisions	1	2	3	4	5
Are told that their effort makes a difference in improving the health status of the population	1	2	3	4	5
Are accountable when performance is deficient	1	2	3	4	5
Usually keep records of their actions	1	2	3	4	5
Always tell the truth	1	2	3	4	5
Make significant efforts in carrying out tasks relating to management of health information systems	1	2	3	4	5
Motivation					
BC1. I do not feel motivated to gather information that is not used for decision-making	1	2	3	4	5
BC2. Gathering information bores me	1	2	3	4	5
BC3. I believe that gathering information is a valuable task	1	2	3	4	5
BC4. Gathering information makes me feel that data are required to monitor performance of health services	1	2	3	4	5
BC5. Gathering information makes me feel that I am being forced to do this	1	2	3	4	5
BC6. My colleagues and/or bosses recognize the importance of gathering information	1	2	3	4	5
BC7. Gathering information makes me feel that I need to be trained on data collection, analysis, and presentation	1	2	3	4	5

JC1. To which extent do you feel satisfied with your job, on a scale from 1 to 7, from Very Unsatisfied (1) to Very Satisfied (7)? (Circle your answer)

1. Very Unsatisfied
2. Somewhat Unsatisfied
3. Not satisfied
4. Neither Unsatisfied nor Satisfied
5. Somewhat Satisfied
6. Satisfied
7. Very Satisfied

A1. Are you told which are the criteria to assess your performance each year?

0. No                      1. Yes

If the answer is Yes, do criteria include an objective assessment of the following?

A2. Improving effectiveness in the information integration process                      0. No                      1. Yes

A3. Improving opportunity, consistency, and validity of data                      0. No                      1. Yes

A4. Transparent criteria for career advancement exist                      0. No                      1. Yes

A5. Work ethics and values are emphasized during staff meetings                      0. No                      1. Yes

U1. Mention at least three reasons for collecting monthly data on the following:

A. Diseases

- 1.
- 2.
- 3.

B. Vaccination

- 1.
- 2.
- 3.

C. Why is it necessary to have data about the population?

- 1.
- 2.
- 3.

U2. Describe at least three ways to review data quality.

- 1.
- 2.
- 3.

Dr. Pérez read a recent local report about data quality which caused him to be very concerned. “I need to do something”, he said to himself. He paced the room while he reflected upon the next steps in order to improve data quality. After a while he calmed down and prepared a written Action Plan. Please describe how Dr Pérez identified the problem and what are the key actions that Dr Pérez should have included in his Action Plan to improve data quality...

PSa. Identify the problem

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---

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PSb. Key actions

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.

This part of the questionnaire addresses perceived self-efficacy in implementation of tasks relating to the Health Information System. A high level of perceived self-efficacy indicates that the person feels able to carry out the task, and a low level of perceived self-efficacy means that skills can be improved through training. Please rate your self-efficacy in percentages to indicate the extent to which you feel capable of carrying out actions relating to health management information systems.

Rate your self-efficacy for each case with a percentage from the following scale:

	0	10	20	30	40	50	60	70	80	90	100
SE1. I am able to correctly prepare the monthly report of the health facility	0	10	20	30	40	50	60	70	80	90	100
SE2. I am able to verify if data are precise	0	10	20	30	40	50	60	70	80	90	100
SE3. I am able to correctly calculate percentages and indexes	0	10	20	30	40	50	60	70	80	90	100
SE4. I am able to record data by month or year	0	10	20	30	40	50	60	70	80	90	100
SE5. I am able to calculate trends based on data from bar graphs	0	10	20	30	40	50	60	70	80	90	100
SE6. I am able to use data to identify gaps	0	10	20	30	40	50	60	70	80	90	100
SE7. I am able to use data to establish goals	0	10	20	30	40	50	60	70	80	90	100
SE8. I am able to use data to prepare reports	0	10	20	30	40	50	60	70	80	90	100

Please solve the following problems about calculating percentages, indexes, and recording results from interpretation of information.

C1. The approximate number of pregnant women is 340. Antenatal health services have recorded 170 pregnant women. Calculate the percentage of pregnant women who are receiving antenatal health services in the district.

C2. Findings show that total vaccination coverage for children between the ages of 12-23 months is 60%, 50%, 30%, 40%, 40% for 1997, 1998, 1999, 2000, and 2001, respectively.

