

A Decentralized Information System for the Monitoring and Evaluation of Maternal and Child Health/Family Planning Program Performance

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Introduction

Aware of the lack of relevant, timely, and reliable information for the planning, management, and evaluation of health programs, since 1986, the Morocco Ministry of Health (MOH), with the assistance of numerous international donors (USAID, WHO, UNFPA, UNICEF, European Union), has made efforts to restructure the National Health Information System. The Ministry of Health was strongly committed to the development of a health information system that serves as a tool for decision makers at all levels of the health service system to effectively plan, manage, and evaluate health programs. This effort was part of a broader health system reform effort to decentralize health services management, after the creation in 1996 of 16 regions, to an intermediate level between national and provincial levels.

Within the restructuring process of the National Health Information System, the Family Planning/Maternal and Child Health (MCH/FP) information subsystem, which is the focus of this paper, received special attention, and serves as a model tool for decentralized decision making and monitoring and evaluation of MCH/FP health programs. The MOH charged the Studies and Health Information Service (SEIS), in collaboration with the Directorate of Population (DP), the Directorate of Epidemiology and Disease Control (DELM), and the Division of Informatics and Methods (DIM), with restructuring the National Health Information System.

In the 1980s, there was an early attempt at computerized data collection for the National Health Information System that was centralized at the national level. In this system, the health facilities submitted monthly summary reports to each provincial manager, and the provinces aggregated these summary reports manually and submitted them for data entry at the national level (dBASE data entry

program, SPSS-PC for analysis). Despite these early efforts, by the mid-1990s the maternal and child health information system was affected by four sets of problems: (1) the poor quality and incomplete nature of data produced by the routine collection system; (2) the fragmentation of data collection systems, too often organized vertically rather than by priority programs; (3) delay in the availability of information at all levels; and (4) insufficient use of available data for planning, management, and evaluation of services. The Ministry of Health (MOH) planned to tackle each of these issues, emphasizing integration of the routine health information system and information management capacity building at the peripheral level. The MOH's effort has been supported by USAID and its contractor, John Snow, Inc., as well as by other international donors, who provided financial and technical assistance.

Restructuring the Health Information System

Three concerns of the MOH guided the restructuring of the information system: (1) to promote use of information to improve service quality; (2) to integrate data collection from different MCH/FP programs by facilitating a holistic approach to child and reproductive health; and (3) to introduce new programmatic focuses, such as integrated management of childhood illnesses (IMCI) and management of obstetric emergencies.

Restructuring activities were implemented in three phases, which occurred mostly in parallel: (1) revision of data collection instruments; (2) development of a computerized MCH/FP data entry and analysis system; and (3) training of managers at regional and provincial levels in the use of data for decision making.

Concurrently, a study was undertaken in 1998 on the quality of MCH/FP data collected in health facilities to identify critical weaknesses in the production and use of routine data. The study was conducted by a multidisciplinary MOH team, composed of representatives of the DP, SEIS, and the Inspector General of the Health Ministry, in collaboration with a WHO/ Geneva consultant and JSI. The study confirmed the persistence of several problems identified at the beginning of the Project, such as imprecise data collection and the lack of use of information at local level.

Revision of data collection instruments

One of the features of the MCH/FP data collection system in first-level health facilities was a multiplicity of registers, daily forms, and reports. This situation was the result of developing vertical data collection systems for each program in the 1970s and '80s. Consequently, the immunization program (PNI), diarrheal disease program (PLMD), acute respiratory infection program (PIRA), nutrition program, (PNT), maternal health (PSGA), and family planning program (FPP) each had its own set of instruments. Transmission procedures were also very confused. In addition to transmission of data to the SEIS, the service for centralizing all of the health information, reports were conveying data directly to the national programs through parallel transmission channels. Although at the beginning of the 1990s, program managers, in collaboration with the SEIS, agreed on a list of essential program indicators, the multitude of data collection instruments continued and constituted a demotivating workload for service providers in health facilities.

In 1997, several working groups were set up to adapt the data collection instruments (DCS, including forms and registers) to the needs generated by the integration of reproductive and child health programs and new approaches to child health and maternal health: Emergency Obstetric Care (EOC), and Integrated Management of Childhood Diseases (IMCI). These working groups were composed of key staff representing the relevant programs, SEIS, and JSI resource persons. Following a series of meetings, the following decisions were made:

- Maintain the DCS of family planning services.
- Restructure DCS linked to child health to better respond to the needs of the IMCI approach.

- Restructure the DCS of obstetrical services.
- Simplifying MCH/FP data transmission procedures by creating a monthly report in booklet form that would contain all the MCH/FP data of a health facility.
- Conduct operations research on the decentralization of epidemiological surveillance.

Child health data collection

The IMCI approach, which was introduced in Morocco in 1996, promotes integrated care to each child entering an MCH unit, through evaluation of all potential health issues and exploiting preventive care opportunities. The multiplicity of existing data collection instruments was an impediment to this approach. Indeed, a survey of data collection instruments for the four child health programs showed that there were 13 information instruments: five registers, three daily forms, and five monthly reports. After several months of consultation between managers of the different child health programs and managers of these programs at SEIS, an integrated information system was developed for child health. This made it possible to record in a single document all the curative and preventive care provided to any child under age 5. The 13 original information forms were reduced to four:

- integrated daily child health activity register,
- register for the national vaccination program,
- daily PNI activity form, and
- integrated monthly child health activity report.

Maternal health data collection

The maternal health data collection system was revised to address the information needs of the new emergency obstetric care strategy. The following registers and tools were revised: (1) the delivery register, which was transformed into an obstetric register, permitting recording of obstetrical complications during pregnancy, childbirth, and postpartum; (2) the monthly obstetric activity report; and (3) the monthly pre- and postnatal report.

All the monthly reports of the MCH/FP programs were grouped into an integrated MCH/FP report, in the form of a booklet, to be sent out monthly. A user's guide, or instruction manual, for the new registers and a new monthly report were also developed that explained how to fill out each form and register, and provided standard definitions for each variable and indicator.

After developing the new instruments, a pretest was initiated in the Souss-Massa-Drâa and Méknes-Tafilalet regions for the integrated child health data collection system, and in the Taza-Al Hoceima-Taounate and Fez-Boulemane regions for the maternal health data collection system. The MCH personnel of the health facilities and the Provincial Ambulatory Health Care (PAHC) staff of these regions were trained to use the new system. Following field visits by Ministry of Health and JSI staff, the different reports were revised several times until a final version was obtained that responded to the needs of the majority of information users at different levels of the system.

The new DCS were approved for generalized use throughout the country at the beginning of 1999, and a first stock was printed by the MOH's Division of Information, Education and Communication (DIEC). Later, cascaded training of the personnel of all of the health facilities was organized, first in the USAID-funded provinces and later in the other provinces funded either by other international donors or the Ministry of Health. Following a memo from the Secretary General in January 2000, all the Moroccan provinces officially began using the new forms and registers..

Development of a computerized MCH/FP data entry and analysis system

One of the explanations for the poor use of information by peripheral managers was the centralized processing and analysis of routine data. The central level was not able to provide feedback to the periphery within acceptable timeframes. As a result, health service providers and managers limited data

transmission to the central level, without much regard for quality. The trend toward decentralized management of health services in recent years opened the door to a change in management of the health information system and gradually prepared managers at regional and provincial levels to begin processing and analyzing data themselves.

In the first phase, therefore, it was decided to implement a computerized and interactive system that provided peripheral managers with easy access to 20 MCH/FP performance indicators. This application (“SNISSTAT”), developed with technical assistance from Tulane University under the USAID EVALUATION Project, was DOS-based (Clipper) and used provincial-level data entered at the SEIS, as well as 1994 census figures, and certain indicators from DHS surveys. This made it possible to produce tables, multiple graphs, and maps for each indicator over a period of five years (1992 to 1996) and for the different levels (national, regional, and provincial). The system could also be linked to an Internet-based interface, called the *Electronic Chartbook*. However, data produced by this application were often criticized by peripheral managers, who alleged that the data were obsolete, incomplete, or did not reflect how provinces actually performed.

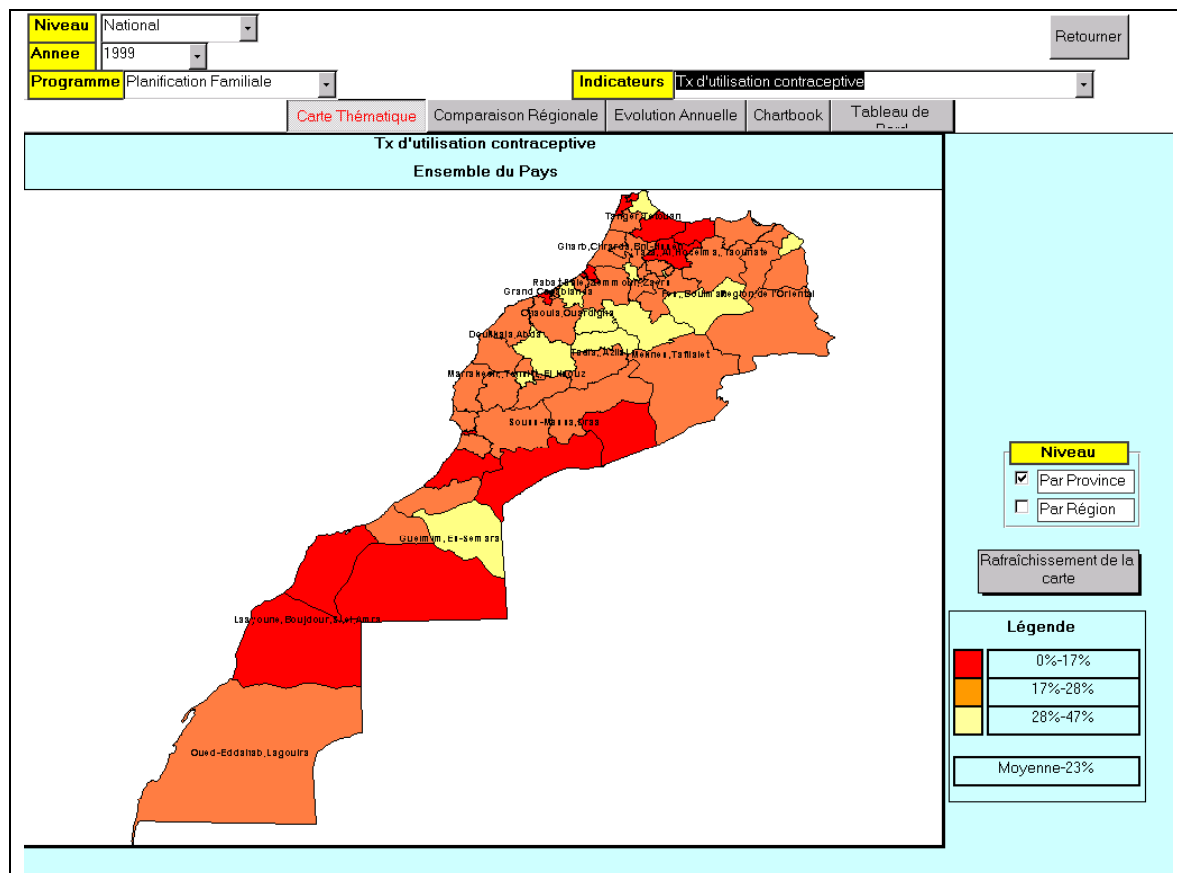
Designers decided to decentralize data entry to the provincial level based on the following objectives: (1) improving the quality of MCH/FP data collected at the peripheral level; (2) encouraging the use of data at regional and provincial levels; and (3) reducing delays in data availability at central and regional levels. A computerized entry and processing system for MCH/FP and curative data at the provincial level were developed between 1998 and 2000. This application, called *système SMIPF*, was developed using Microsoft Access and VBA (Visual Basic for Applications), with technical assistance from John Snow, Inc., in close collaboration with future users from central and peripheral levels. It permits central program managers and peripheral health services managers to monitor MCH/FP service performances on an immediate basis.

A preliminary version of the application was installed experimentally in 1999 in all of the provincial ambulatory care offices of the Méknes-Tafilalet and Souss-Massa-Drâa regions. During the testing period, the users made several comments on the application to the developer. These suggestions were eventually incorporated into the different modules.

In addition to the data entry module, the application has several feedback or decision support modules.

One of these is the graphics module. This module, using an active-X control, Graphics Server (<http://www.graphicsserver.com>), allows decision makers at the peripheral and the central level to interpret numerous MCH/FP variables and indicators visually, through a series of line graphs, pie charts, and histograms. The system functions at the peripheral and the central level so that indicators can be graphed for a health center, province, region, or national level. The system also allows automatic generation of numerous graphs and is linked with a Microsoft Word document that explains the source and method of calculation of each of the indicators.

The application also has a geographic module that was developed using another Active-X control, Map Object LT (<http://www.esri.com>). This allows decision makers to visualize any indicator geographically by region, province, or commune/Health Center catchment area.



The final version of the *système SMIPF* was handed over to the MOH in June 2000 and is now installed nationwide. At the end of 2000, more than 90 percent of all provincial offices were entering MCH/FP data using the new application. Data processing and analysis possibilities of this system are noted in the box below.

***Système SMIPF* Application: Data Processing and Analysis Possibilities**

- Define the list of Health Centers and the target populations in each province.
- Enter the data for MCH/FP program and curative services by CS based on monthly reports.
- Produce summary reports on program performance.
- Transmit data by e-mail to SEIS and/or regional managers.
- Calculate the major MCH/FP program indicators, and present them in tabular, graphic, or geographic form.
- Make a detailed analysis of the MCH/FP data by health center, province, region, and national level.
- Develop a chartbook by province, region, or national level.

Selected MOH central computer managers have been trained to troubleshoot the *système SMIPF* application. All central and peripheral statistical technicians and program facilitators were trained in using the data entry module of the application with the help of training modules that were developed and validated by MOH and JSI managers. A core group of trainers was created and trained to address future

in-service training needs of provincial technicians, and to solve potential installation/upgrading problems of the application and data transmission.

Training in data use

While changes were taking place in data collection computerized data processing and analysis tools, the project team made a sustained effort to strengthen the capacity of managers at the central and peripheral levels to use information for better management and delivery of MCH/FP services.

Between 1995 and 1997, the EVALUATION project organized several training sessions in program evaluation techniques and the use of indicators for program management at the central and provincial levels. This training was targeted mainly at provincial-level statisticians and program facilitators. With the creation of the new regions and the new approach to regionalized management of health services, central MOH staff, with technical assistance from JSI and Tulane University, organized workshops for provincial health managers on the use of MCH/FP routine data in program planning and management in four regions. During each workshop, participants were asked to prepare a regional chartbook, thus practicing the techniques they learned during the workshop. These chartbooks enabled health service managers to identify major problems and proceed with problem-solving actions. A problem identified in this way often required an in-depth, more qualitative investigation to find operational solutions. With Tulane University assistance, training in qualitative research was organized for the Souss-Massa-Drâa region.

Last, in the context of the decentralization of MCH/FP services and in collaboration with DELM, the project supported the pilot-testing of a Regional Epidemiological Observatory (ORE) in the Souss-Massa-Drâa region. Its objective was to strengthen provincial and regional capacity to manage epidemiological information for decision making and action at local and regional levels. Training in epidemiological surveillance of provincial managers was organized, a computerized early warning system was developed in collaboration with local managers, and dissemination of epidemiological surveillance data was initiated through a printed newsletter.

Strengths and weaknesses

The information system restructuring has been a beneficial but operationally complicated process.

The effort to restructure the routine MCH/FP information system has doubtless contributed greatly to the sustainability of programmatic achievements and the institutionalization of the decentralized management of MCH/FP services. The integration and simplification of several data collection instruments and monthly reports will decrease the workload of service providers and help them to use a holistic approach to case management.

The *système SMIPF* application, which allows provincial and regional managers to enter, process, and analyze MCH/FP data themselves, will have a doubly beneficial impact on the decentralized management of MCH/FP services. By enabling peripheral levels to proceed with a rapid and targeted analysis of the major performance indicators, increased use of information for MCH/FP management decisions is expected. In addition, the improved use of information will motivate managers and service providers to collect better-quality data and transmit them within adequate timeframes. The availability of timely, quality information at the central level, in turn, will improve use of information by national program managers. The feedback modules were finalized only recently. Thus, further training efforts are required to ensure a better understanding of the enormous potential of the *système SMIPF* application.

It is worthwhile to note that information system restructuring is a complex endeavor. While a consensus-building process ensures ownership and sustainability, it makes restructuring time-consuming, which can lead to other problems. In this case, during the long field-testing period, the SEIS received monthly report in two different formats (old and new). Coexistence of these two different monthly report formats

generated data entry problems with the new application and caused confusion related to the data available to national-level program planners and managers. Another issue that has caused major problems during the pilot phase of restructuring is the stock-out of DCS. All future users should be warned that the large-scale restructuring of the routine information system is very complex and can seriously disrupt, at least temporarily, the smooth running of health information system.

Creating an information culture is a long-term behavioral intervention.

From the very beginning, the major objective of the health information system was to improve the use of MCH/FP data generated by the system for decision making at all the levels. Although health information system restructuring did transform the system into a more relevant, reliable, and rapid information production tool, it did not lead automatically to better use of the information.

For five years, several activities had been undertaken to convince the managers of programs and peripheral health services, and, through them, the service providers, that information can lead to action. To achieve this, training was designed in the form of exercises in MCH/FP data analysis that would help participants identify problems and propose solutions. The planning and implementation of small projects, based on an in-depth analysis of the regional situation of MCH/FP services, was particularly revealing for most of the participating managers, and even engendered enthusiasm in some of them. However, these exercises also revealed managers' lack of confidence in the existing routine information system, over which they never had control. Also, most managers believed that it was useless to undertake actions based on information, as long as they did not have sufficient control over the use of resources. It is hoped, therefore, that the creation of decentralized management structures at the regional level, including control over the new decentralized data processing and analysis system, will motivate peripheral managers to make better use of the information and will gradually establish a genuine "information culture."

Computerized data processing requires both capital and recurrent investments.

The Ministry of Health, with donor assistance, has made major investments in the acquisition of high-performance computer equipment and the training of managers from all levels in its use. Despite these efforts, most MOH key staff and decision makers, at both the central and peripheral level, do not use this information tool well. In effect, few use the available software daily for planning and management tasks, and few use e-mail as a communication medium to plan meetings or transmit data or reports. All too often the computer sitting on the desk remains a mysterious object, a status symbol, and an end in itself. Again, this observation reflects a problem of attitude and behavior. To achieve a positive result, the MOH should invest in preservice and in-service computer training for all MOH senior staff, both medical and administrative.

Another danger threatening the computer pool is its rapid decline into dysfunction without continued maintenance of both hardware and software. The amount of equipment to be maintained has increased enormously, and the needs expressed by the different users at the central and peripheral levels have become so vast that they exceed the capacity of the DIM, especially when they requires going to the four corners of the country. The maintenance function of the computer pool should be rapidly decentralized, therefore, by outsourcing if necessary.

Recommendations and future perspectives

On the basis of this analysis, we would like to finish by proposing a few recommendations and future perspectives on the sustainability and institutionalization of the health information system as a management tool for MCH/FP services:

- **Consolidate the restructured information system.**

Many efforts are still required to ensure that the MCH/FP data produced by the new information system are reliable, complete, and timely, and that MCH/FP information is used for decision making at all levels. There must be a continuous supply of data collection forms and registers, and especially of an integrated monthly report form. Ultimately, the regions themselves could become responsible for the production of registers and forms. All the relevant central departments should provide continued support to the regions and provinces to resolve problems that might arise with the use of the *système SMIPF* and to motivate and raise the awareness of managers about the importance of information for MCH/FP service management.

- **Proceed with further integration and decentralization of routine health information system management.**

The process initiated to integrate and decentralize management of the routine health information system must continue. For example, the effort to decentralize the management of epidemiological data undertaken on a pilot basis by the project through the Souss-Massa-Drâa regional epidemiological observatory, should be extended throughout the country. Both MCH/FP and epidemiological data should become part of an integrated health services database at provincial and regional levels. Operations research is required to identify the most appropriate mechanism to achieve this result.

- **Strengthen the capacity to use computer technology as an information management tool.**

To optimize MOH and international donor investments in computerization of health services management, sustainable mechanisms must be created to ensure maintenance of the computer pool and to train health personnel in its use.