The Field Health Services Information System

A Case Study

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Abbreviations used

BHS	Barangay Health Station
CDD	Control of Diarrheal Disease
CFC	CHO FHSIS Coordinator
CHO	City Health Office
CSP-TAT	Child Survival Program Technical Assistance Team
DOH	Department of Health (Philippines)
FHF	Field Health Facility
FHSIS	Field Health Services Information System
HIS	Health Intelligence Service
I/FTR	Individual/Family Treatment Record
LGC	Local Government Code
LGO	Local Government Official/s
LGU	Local Government Unit/s
MAS	Management Advisory Service
MCH	Maternal and Child Health
MW	Midwife
NCR	National Capital Region
OT	Output Table/s
PC	Personal Computer
PFC	PHO FHSIS Coordinator
PCO	PHO Computer Operator
PHN	Public Health Nurse
PHO	Provincial Health Office
RF	Reporting Forms; Reports/Forms
RFC	RHO FHSIS Coordinator
RHO	Regional Health Office
RHU	Rural Health Unit (Municipality)
SOT	Simplified Output Table/s
SumTab	Summary Table
TCL	Target Client List
USAID	United States Agency for International Development
WHO	World Health Organization

Executive Summary

The Field Health Services Information System (FHSIS) is the only information system for public health that is operational nationwide in the Philippines. It is a major component of the network of health information systems in the Department of Health (DOH), indirectly supporting and interrelating with the other systems in the network. There is no other information system in the government that equals the reach of the FHSIS, which extends to the very roots of the political/social structure, the barangays.

The FHSIS was originally designed to serve the needs of health service delivery managers of the DOH. With the implementation of the Local Government Code (LGC) in 1991, the responsibility for managing and providing health services was transferred to the local government officials (LGOs), and the system had to adjust accordingly, this time in order to serve the needs of the LGO rather than the DOH. While the elements of the system remain basically unchanged, the whole system must now be viewed in a new way, keeping in mind that its primary user and implementor is now the LGO, with the DOH merely providing technical support.

Fortunately, the designers of FHSIS gave primary importance to the design of the Target Client List (TCL) which, together with the reporting forms (RFs), has now become the principal database at the local government unit (LGU). With only a few modifications in the TCL and the RFs, it is now possible and in fact quite easy to process and produce reports at the LGU.

Considering the kind of environment within which it operates, it is fair to say that FHSIS is a sound system. Admittedly, it could have been a better system if more care had been given to its computerization.

This paper discusses the merits and demerits of the development thrust undertaken by the development teams; the work that has been done to keep the system technically correct and on course; and the effects of devolution on the system and its future directions. Finally, this paper includes recommendations regarding structure, computerization, leadership, and the government network.

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The need for a health information system

Systems in general, information systems in particular

A system may be defined as an array of interrelated parts unified by a common focus or a common objective. This paper is mainly concerned with organizational systems or systems that help organizations function, and the term "information system" will be taken to mean a particular kind of organizational system, the objective of which is to provide information to the different levels of the organization. In this paper the term "information technology" will be used to refer to the combination of various hardware, software, procedures, processes, materials, equipment. and facilities that enables information to flow in the information system.

While there are different types of information systems, a good information system should be able to provide information that is timely, adequate, and disseminated effectively and efficiently. The kind of information system would be determined by the kind of technology -- or combination of various technologies -- that best generates, transmits, processes, packages and disseminates the information that moves within the organization. Another determining factor would be the manner by which the data is processed -- entered, aggregated, manipulated, produced -- at the different levels within the organization. Are the processes, for instance, computerized or are they manually done? Or, do they use a combination of both? The processing may in fact be manual at the lower levels -- at the barangay and municipal -- and computerized at the higher levels -- provincial, regional, and national.

Systems for a national health organization

During the time that the Field Health Services Information System (FHSIS) was being developed, the Department of Health (DOH) identified three priority areas of action: (1) the formulation and implementation of an efficient response to the main causes of mortality and morbidity; (2) the provision of adequate attention and resources to the machinery responding to health problems; and (3) the establishment and maintenance of a climate conducive to health-oriented policies and programs.

Having identified these priorities, the DOH then directed its efforts toward the institution of various systems that will serve the DOH in its capacity as a national health organization. Specifically, the DOH : (1) established disease control systems and systems for service delivery programs; (2) strengthened the system of the government health network and the system of the private health-care providers network; and (3): set up systems for pursuing multi-sectoral action for health advocacy, regulation and coordination. Finally, the DOH focused its efforts on restructuring itself to be able to make these health systems work.

The FHSIS is an information system that was developed primarily to support the disease control and service delivery programs of the government health network. Because they are interrelated, the FHSIS also indirectly supports the other health systems in the DOH.

Reporting in the DOH in the 70s and the 80s

Prior to the FHSIS, specifically during the 1970s and part of the 1980s, the mode of reporting at the DOH went thus: Data were submitted monthly by each reporting unit, in the form of Health Information System reports or HIS reports. These reports were then consolidated at various reporting levels: at the Rural Health Unit (RHU), which received reporting forms from the Barangay Health Station (BHS), the Provincial Health Office (PHO), and the Regional Health Office (RHO). Final consolidation was done by the Health Intelligence Service (HIS), which produced an annual Health Statistics Report. In the process of consolidation, new and consolidated reports are submitted to the next higher unit, but mostly without any validation of the data submitted nor feedback given to the reporting unit which was the source of the data. The most that lower level units got in terms of feedback on the data that they submitted was the final annual report where, it was assumed, all the data had been included and consolidated. Because validation of the data coming from the various levels was seldom done, the

reliability of these reports could not be established. Finally, it also seemed that the information system as a whole did not have any bearing on the management of the facilities.

The volume of reports involved was also a problem. The midwives were the ones who implemented all the programs of the DOH at the BHS, and by itself, this was already a formidable task. All this of course spawned a commensurately formidable volume of reports, which the midwife also had to prepare and submit. Apart from the HIS reports which were required every month, there was a mandatory health facility record called a Daily Dispensary logbook, which recorded information about patients seen and medicines dispensed. In addition to this, there were also other reports that the midwives prepared and submitted for the different health programs. There were attempts to simplify the reporting system but they were unsuccessful, partly because the DOH central office did not follow them up.

A survey undertaken to determine the number of reports prepared, sent out, or submitted by each health facility or office showed the following:

Source	Number of reports prepared
BHS (Barangay Health Station)	71
RHU (Rural Health Unit)	50
DHO (District Health Office)	49
PHO (Provincial Health Office)	49
RHO (Regional Health Office)	52
National	41

In filling up the reporting forms, the midwives had to record all health services delivered within the month for which the report is being prepared. This required going through the Daily Dispensary logbook which is kept in the facility, as well as various other lists drawn up to identify patients or clients. Gathering all the relevant data from the various documents was of course time-consuming, and the midwife had to physically isolate herself and devote fully three to four days just to complete the reports before the cut-off date of the month. The fact that the midwife had continuing service delivery tasks was not taken into consideration, therefore no allowance was made for the midwife to accomplish the required reports. The reliability of the data was also a problem. The midwife's report that was submitted to the Rural Health Unit (RHU) relied solely on the records that the midwife herself prepared, and the nurse at the RHU had no other basis for validating the data.

The need for making the system useful in decision-making

The HIS, in short, was just essentially a system of reporting. Attempts to make it a tool for decision-making proved futile as it did not measure up to tests conducted to evaluate its integrity as an information system. The DOH management wanted a more reliable database for an internal planning system it had long wanted to put into operation, and eventually they decided to undertake the task of improving the information system itself. There was also increasing pressure coming from the health sector and a host of international health agencies for the government network to provide health information.

An information system in the works

Clearly, there was a need for a good health information system. Between 1976 and 1982, and even afterwards, there were attempts to set up a more rational information system that would orchestrate all the reporting and give the midwives some breathing space in their work. However, these attempts did not prosper beyond the design stage. The Manila regional office of the World Health Organization (WHO) took an interest in the problem and in 1987 went as far as conceptualizing a health information system and negotiating with the Department of Health for its development. The present information system -- the FHSIS -- was developed primarily because of a grant provided by the United States Agency for International Development (USAID) to the WHO in 1988 to continue what it had started in 1987. Thus began the development of the present FHSIS, and by April 1990, it was implemented nationwide.

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The FHSIS and its components

*"There are five component activities
that together comprise the FHSIS :
recording, reporting, data entry,
processing, and the production and
dissemination of output tables."*

Programs covered by the FHSIS

The Department of Health has a network of information systems, and the
FHSIS was conceived as a major component of this network. FHSIS is, in
particular, a facility-based system that was designed to provide basic
information for the health service delivery activities of the following
programs:

- Maternal and Child Health (MCH), which includes Pre-natal Care,
  Post-partum Care, Expanded Program on Immunization (EPI), and
  Control of Diarrheal Diseases (CDD)
- Nutrition
- Family Planning
- Tuberculosis
- Malaria Control
- Schistosomiasis Control
- Leprosy Control
- Dental Health
- Environmental Health
- Vital Statistics, which includes Natality, Mortality, and Population
- Notifiable Diseases
- Logistics

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Objectives of the FHSIS

The FHSIS has the following objectives :

1. To provide summary data on health service delivery and selected program accomplishment indicators at the barangay, municipality/city, district, provincial, regional, and national levels;
2. To provide data which, when combined with data from other sources, can be used for program monitoring and evaluation purposes;
3. To provide a standardized, facility-level database which can be accessed for more in-depth studies;
4. To ensure that data reported are useful and accurate and are disseminated in a timely and easy fashion; and
5. To minimize the burden of recording and reporting at the service delivery level in order to allow more time for patient care and promotive activities.

The component activities of FHSIS

There are five component activities that together comprise the FHSIS : recording, reporting, data entry, processing, and the production and dissemination of output tables.

Recording

Two basic records are kept in the health facility: the Individual/ Family Treatment Record (I/FTR) and the Target Client List (TCL).

The I/FTR documents the patient's consultation with the health personnel. It is a record of the patient's symptoms/ complaints and the corresponding diagnoses, treatments, and dates of encounter with the health provider. Some programs have their own recording specifications, but each facility is encouraged to maintain a file for each individual/family as part of the system. The TCL, on the other hand, is a facility-based ledger which records health services rendered to specific patients, referred to as "clients", "targets", or "eligibles". The TCL serves several purposes :

1. To help the health service provider plan and carry out patient care and service delivery;
2. To facilitate the monitoring and supervision of service delivery activities;
3. To report services delivered; and
4. To provides a clinic-level database which can be accessed for further study.

The Client Lists maintained by the health facility are:
1. Target Group List for EPI
2. Target/Client List for Children 0 to 59 months
3. Target/Client List for Nutrition
4. Client List for Prenatal Care
5. Client List for Postpartum Care
6. Client List for Family Planning (Non-surgical Methods)
7. List for TB Symptomatics
8. Client List for TB Cases under Short Course Chemotherapy (SCC)
9. Client List for TB Cases under Standard Regimen (SR)
10. Client List for Leprosy Cases

Specific instructions for recording data in the TCLs are found in the FHSIS Manual of Procedures.

Reporting

In the FHSIS, data and information are transmitted from one reporting unit to another primarily through the FHSIS reporting forms (RFs). The majority of the RFs are prepared and submitted either monthly or quarterly. There is one RF that is prepared weekly, there are several that are prepared annually, and a few that are prepared upon the occurrence of specific events. In addition, the FHSIS RF also records services that are not "client"-specific and therefore cannot be found in the TCL. A list of FHSIS RFs and their schedules of submission can be found in Annex A, together with a sample of some of the RFs.

The RFs have boxes for tallying the services that have been provided during the period for which the report is being prepared. This tally box facilitates the recording and transfer of accurate data. Complete guidelines for filling up the FHSIS RFs are also found in the FHSIS Manual of Procedures.

RFs are filled up by all midwives (MWs) in the Barangay Health Stations (BHS) and then submitted to the Public Health Nurse (PHN) for validation and batching. After that, the RFs are submitted to the Provincial Health Office (PHO). The midwife, however, does not submit her RF until she has copied the data in the RF onto a Summary Table (SumTab) which she keeps in the BHS or health facility. This SumTab then becomes the midwife's database in the facility.

Sample pages of the SumTab can be found in Annex B.

Data entry and processing

The PHO is the processing node of the of the FHSIS. It receives all the RFs from the rural health units (RHUs) of municipalities and from the city health offices (CHOs) of component cities in the province. A designated Provincial Computer Operator (PCO) in the PHO enters the data into computers, using DOH-developed software. The RFs submitted to the PHO serve as the source document for data entry. When the PCO enters the data in the PHO computers, the newly-entered data automatically updates and consolidates all previous records of each public health program on a year-to-date basis. The PCO then submits soft copies (diskettes) to the Regional Health Office (RHO) for its further consolidation and processing. The CHO submits directly to the RHO.

Production and dissemination of Output Tables

After all the data from all the RFs have been entered, the Provincial Computer Operator (PCO) produces the Output Tables (OTs) using computers and printers located in the PHO or the CHO. Since the OT is the product of the software using current data, it is a mirror of all the data submitted by the different reporting units. In addition, it also includes calculations that are automatically made by the PHO computer, based on predetermined and pre-defined indicators.

Copies of the OT are given to all District Health Offices (DHO) and Rural Health Units (RHUs) for the use of health managers in monitoring, supervision, and management. The RHO likewise produces consolidated OTs from the PHO diskettes for its own use in monitoring, supervision and management. Technical coordinators at both the PHO and the RHO levels are also given copies of the OTs.

FHSIS and the LGC

The FHSIS was originally designed to assist the health service delivery managers of the DOH. Because of the passage of the Local Government Code (LGC) in 1991 and the projection of its full implementation by 1993, the focus of the reporting system had to shift in part.

Under the LGC, the management and provision of health services was transferred to local government officials (LGOs). Consequently, the FHSIS now serves the LGO rather than the DOH manager. While the elements of the system remain basically unchanged, the system must now be viewed in a

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new way, keeping in mind that its primary user and implementor is now the LGO, with the DOH merely providing appropriate technical support.

Under the LGC, it has become more necessary than ever that the elements of the FHSIS all operate at the local government unit (LGU). Fortunately, the designers of the FHSIS gave primary importance to the design of the TCL, which has now become the principal database at the LGU. With only minor modifications in the TCLs and the RFs, it is now possible and in fact quite easy to process and produce reports at the LGU, sometimes even without involving computers at all.

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Developing the FHSIS

Determining the information requirements

The DOH has several public health programs, and the FHSIS was designed primarily to serve the information needs of these programs. It was essential, therefore, that the information requirements of these programs are determined right from the start of the development of the FHSIS. An information requirements analysis was undertaken by various program personnel, the managers of DOH, the regional offices and the personnel of health facilities. Part of this effort was a number of workshops that were held to determine the needs of program managers. Unfortunately, the program managers themselves did not attend these workshops and instead sent proxies. Some proxies were not in a position to make commitments for the programs, others could not be specific with their requirements, while still others changed their requirements at every meeting. In many cases, different proxies attended different meetings, thereby losing continuity. When a consensus was finally made and the system design was finalized, some program managers aired complaints about the system, including its data requirements aspect. Some of the reasons given were : they were not consulted; these were not the requirements that they submitted; these were insufficient, etc. This was particularly frustrating for those who developed the system, especially since the complaints were aired when the system had already reached the implementation stage. Needless to say, a single seemingly innocuous complaint could very well mean a tremendous amount of additional work for earnest systems personnel.

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Designing the Target Client List (TCL)

Prior to the FHSIS, there was a Daily Dispensary logbook that was maintained by the midwife as a record of daily activities. With the FHSIS, one objective was to provide the midwife with the tools that she would need not only for health service delivery but also for planning and management. The idea was to tap the existing facility-based logbook and use it for monitoring and maintenance of clients/patients; taking off from this, a Target Client List (TCL) was designed, and it replaced the Daily Dispensary logbook. The midwife now used the TCL to keep track of the different clients per program, referred to as "targets", including the corresponding range of interventions that she had to render to each of them.

The TCL was designed as a facility-based record, and the original intention was to keep it at the health facility at all times. However, the midwife's catchment area is seldom limited to only one barangay, and it has now become a practice for the midwife to carry the TCL with her in all her visits to the barangays in her catchment area. It is indicative of the value that the midwife attaches to the TCL and of the midwife's dedication to her profession that she carries the TCL over long distances despite its weight. Tales abound about the things midwives have done in order to protect the TCL like a precious belonging in all sorts of situations involving fires, floods, capsized *bancas*, and other calamities.

Designing the forms

It used to be the practice of the midwives to fill up the old HIS forms during the last few days before the cut-off date of the period for which the report was being made. The sources of her data were in far-flung locations, and it was a struggle for the midwife to put all the data together, relying on her memory alone, trying to summon up a month's worth of impressions and mental notes in filling up the report forms to be submitted to the RHUs and the PHO. It was not surprising that there were gaps and errors in the data.

Not so with the new FHSIS reporting forms (RFs). The RFs were designed so that they can be easily filled up immediately after service is rendered. The midwife simply ticks off the box corresponding to the service rendered, and at month's end she simply counts all the ticks to get the number of services rendered. This way, the midwife cannot but come up with an accurate report of her performance at the health facility. Filling up RFs simply involve ticking off items on some, while others can be only be filled up after referring to the TCL. In any case, the ticks in the boxes are totalled at the end

of the month and the forms sent to the RHU for validation or to the PHO for data entry. In some instances, especially for programs without TCLs, the RFs serve as the data-gathering instruments of the system.

Including the ITR and the FTR in the system

The BHSs and the RHUs are medical facilities in the first place, and it is only right that they maintain records of services rendered to specific patients. The record for a single patient is referred to as the Individual Treatment Record (ITR), and it contains all the information regarding consultations and diagnoses relaxed to the individual patient, as recorded by the midwife at the health facility. In some areas, the ITRs of family members are kept in one folder, which is then referred to as the Family Treatment Record (FTR).

The designers of the FHSIS considered the ITRs and the FTRs an important part of the system, for indeed they are also records of service delivery for the health facility, although on an individual basis. In fact, the data in the ITRs and the FTRs contain vital information that in most cases may not be found in the RFs.

Testing the system

To test the feasibility of the TCL and the various RFs, the designers of the system first tested them in a few municipalities in Laguna. The feedback that they got was positive, as the midwives found the TCL and the RFs workable. It must be noted, however, that during these tests, computerization had not yet been introduced. Revisions were made on the basis of the feedback already received, and plans were made to conduct further testing in a larger testing area, beyond Laguna. Manuals were also prepared at this point.

To test the system further and gauge its acceptability even better, the designers of the system tried out the system in two regions in Luzon : Region 4 and Region 7. It was at this point, while these tests were ongoing, that the program managers complained that the data solicited by the forms for their programs were not what was needed by the programs. Additional workshops for the program managers were held to deal with this problem, and meanwhile, testing was temporarily put off while all the forms, guidelines and manuals were revised and updated. When testing of the system was resumed, it was considered as part of system implementation for the two regions. Thus, it is in a sense correct to say that Region 4 and Region 7 implemented FHSIS as far back as June 1989. In October of the same year, the system was also tested and implemented in Regions 1, 2, and 3.

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Training

There were three levels of training for the FHSIS. Level 1 was for the training of trainors, Level 2 was for the training of regional staff, and Level 3 was for the training of public health nurses, midwives, and other health workers. Level 1 involved the training of 22 people; Level 2 involved 146 people; and Level 3 involved the training of all the midwives nationwide, numbering approximately 15,000. Level 3 was of course the most intensive because the participants were the people who will actually use the system. It could not be helped that during the training sessions, more issues came to light and more clarifications had to be made. In a sense, the training sessions doubled up as testing sessions, but it all contributed to improving the system further.

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Computerizing the FHSIS

System requirements and computerization

One way to gauge whether a system satisfactorily meets the user's requirements is to look at the way the users react to the outputs of the system. In the case of the FHSIS, these are the computer-generated Output Tables (OTs). When the printouts of the computerized OTs first came out, it became apparent right away that the users had not been sufficiently appraised about what to expect from the system. The users went over the output tables line by line, and they pointed out several faults. According to them, the definitions of some entries did not tally with actual facts, some formulas were wrong, there were extraneous columns and rows, and there was too much unessential data on percentages.

It was clear that the people who were responsible for the initial efforts at computerizing the system did not fully understand the requirements of the users. It was almost as if the programmers simply included items arbitrarily, without consulting the ultimate users about what they needed or preferred.

One hallmark of a well-designed computer output is that it is easy to see the purpose or possible use of almost every item that was included. In the case of the OTs, there were items that did not seem to have a purpose and it was hard to see the reason why they were included at all.

It must also be pointed out that the process of producing the OTs use up resources -- money, materials, and manhours -- and the more items there are for processing, the more resources are required and used up. This is another reason why the OTs should include only the items that are actually needed by the users.

Finally, except for some figures expressed as percentages, the OTs did not

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do much more than just reproduce the data submitted. This was probably because the OTs were produced with no specific use in mind.

Why computerize?

Considering the numerous faults in the results of the first attempts at producing computer-generated OTs, it might be useful at this point to review the reasons for computerizing the FHSIS in the first place.

First, the amount of data that had to be processed was so voluminous that there was no choice but to computerize. There are 16 monthly reporting forms, 5 quarterly reports, 7 annual reports, and anywhere from 13 to 84 items in each reporting form. The monthly reports alone require an average of two weeks for the Provincial Computer Operator (PCO) working full-time, just entering the data for all the health facilities in the province. This does not yet allow for the fact that additional manhours are required during the months when the quarterly reports have to be encoded.

Second, computerization would enable the DOH to manage and use its database better. With computerization, data are stored electronically and accessed easily and quickly; data can also be analyzed and handled easily and quickly, and in various ways; also, data can be more easily protected and secured.

Third, there are numerous and various users of the system and conventional methods of data processing, production and reproduction can no longer measure up to the demand for output tables. It has become an urgent necessity for offices to be technologically capable of storing data so that future data requirements -- whether for additional entries, corrections, further manipulation, production of OTs, or just simply reproduction -- can be easily done.

Definitely, computerization was necessary for the FHSIS.

Databases

For the FHSIS, data are in a sense raw material, content, and output. Databases are requirements of the system, components of the system, and at the same time results of the system, and they are found in the various levels of the DOH organization. These databases are :

1. *The database at the level of the Field Health Facility (FHF)*. This could be at the BHS, the RHU, or the outpatient department (OPD) of a hospital. The database at this level essentially consists of data found in the Family/

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Individual Treatment Record (F/ITR) and the Target Client List (TCL). These are mostly raw data, and are particularly useful for specific facility-based special studies. Most important, these are the data that are the basis of all the reports generated by the FHSIS. Also included in this database are the Summary Tables (SumTabs), which contain all the monthly and quarterly data for the health facility.

2. *The database at the level of the Provincial Health Office (PHO)*. This database basically consists of :
(a) the Reporting Forms (RFs) that are submitted monthly by the FHFs, unless they are returned to the FHF;
(b) encoded data from the RFs, which form the computerized database;
(c) the Output Tables (OTs), which could be in the form of printouts from the computerized database, or in the form of computer files in diskettes.

3. *The database at the level of the Regional Health Office (RHO)*. The database at this level is usually computerized, and it is here where data from all the provinces in the region are consolidated and summarized. Soft and hard copies of provincial reports -- diskettes or printouts -- are also part of this database, together with other tables that result from various analyses, researches, and special studies.

4. *The database at the Central Office (CO)*. This is first and foremost a consolidation of all the data from the provinces, primarily for purpose of processing and producing national reports. However, this database can also be accessed and utilized to serve other kinds of information requirements as defined by other users of the data. The provinces and the regions submit soft copies -- on diskettes -- of reports, which are kept by the Management Advisory Service (MAS), the DOH office responsible for computerization. Eventually however, these reports should be kept by the Health Intelligence Service (HIS), which is the unit that functions as the system manager. The CO database also includes other databases that result from analyses, researches, and special studies, all of which form a network with other existing databases both within and outside of the DOH. Its size and the relative complexity of the requirements of its users are two of the more obvious reasons for computerizing the CO database.

5. *Program databases*. This is not being done at present, but program databases can be created for storing and processing data for the different users of program information.

The databases in the BHS, the RHUs and the OPDs of hospitals are mostly non-computerized databases while the databases in the PHOs, RHOs, and at the MAS and the HIS at the central office are mostly computerized. Database maintenance therefore involves a combination of any one or all of the following:

1. Computerized and non-computerized updating of data.
2. Conversion of non-computerized databases to computerized databases.
3. Upgrading of databases by replacing an existing computer-based system with another system.
4. Upkeep or cleaning of files (e.g., purging of files) in the various databases to prevent system degradation.

The provinces are the principal processing units of the system, and the PHO is the main processing node. The PHO is the converging point for all the data of the entire province, and it serves as the repository for the diskettes that are submitted by the all health units in the province. Data entry, data processing, and the production of reports are all done at the PHO, as well as distribution of data and information to the rest of the network, using the PHO as the base. Accuracy in recording and reporting is the principal concern of the BHSs, the RHUs, and the OPDs of hospitals; accuracy in encoding data and processing information is the principal concern and particular accountability of the PHOs with respect to the whole national network of the FHSIS.

Needless to say, the databases and the processing nodes of the system need high quality management. Unfortunately, this was not the case for the FHSIS. Until only recently, even the responsibility for the management of the system was not very clear. For a while, the MAS assumed the responsibility for the management of the system, particularly during the computerization and programming stage. Afterwards, problems arose and it looked like responsibility for the system had been transferred to the HIS. Then again, it also seemed that full and final responsibility rested in the office of the Chief of Staff, who would take charge during particularly problematic times.

This was all very confusing, as demonstrated by other specific situations. For example :

1. It was difficult to pinpoint a single person who could answer all, or at least most, of the questions regarding the system. Questions regarding recording and reporting procedures were referred to the HIS, while questions regarding computerization were referred to the MAS. People who were doing the inquiries could not help thinking that they were just

being given the runaround.

2. The HIS was not consulted during the process of computerization regarding specific definitions, requirements, the indicators and the formulas for computations.

3. The output tables were in general faulty and confusing because they were unilaterally designed by the MAS, without consulting the HIS and the program managers about the format.

4. Inspite of being perceived as the manager of the system, the HIS Director had to defer to the MAS Director much of the time.

It seems that a solution had been found when the present National Coordinator of FHSIS was appointed by the HIS Officer during the 1992 and 1993 reorganization of the DOH.

The Output Tables (OTs)

The Output Tables (OTs) are one manifestation of the lack of coordination between MAS and HIS. From an observer's point of view, the OTs look like they were designed simply on the basis of the data elements found in the RFs, and were not really the result of a systematic analysis of the requirements of the users. Indeed, the OTs did not look like they were the result of consultations and negotiations with the public health program managers and personnel. The program managers and personnel were requested to cooperate and participate during the early design stage of the OTs, but they did not take this seriously. After the OTs had been fully developed, program personnel were again consulted but by then it was too late -- or at least, quite difficult -- to accomodate comments and suggestions. Thereafter, more problems cropped up during the production of the final OTs. Program managers complained; MAS and HIS both denied responsibility for the situation; MAS committed to produce another version of the OTs to accommodate the complaints aired. In the end, at least five versions were made of the computer software producing the OTs.

The OTs that finally resulted from all this were not fully satisfactory either. For one thing, the OTs merely reproduced the data submitted by the facilties, with the addition of some aggregate data. This was not much of an accomplishment for computerization, in the sense that this was something that the DOH units and health facilities could very well do even without computerization. It was quickly apparent that the OTs were expected to facilitate data analysis and add information that can help in activities such as planning, decision-making, resource allocation, and supervision. It was a

good thing that the HIS undertook the development of the Simplified Output Tables (SOTs) to streamline the present OTs. The SOTs need some more fine- tuning, but they are a step in the right direction. More work needs to be done in simplifying and integrating the various OTs.

Subcontracting

There was an offer to develop the software, from the people who originally designed it in the WHO. This offer was refused and the reason was that the MAS believed it was capable of developing the computer programs for the FHSIS. Also, the MAS wanted to further develop the capabilities of its own staff. In the end, however, MAS hired another government agency to do the computer programming work. The three months that was originally allotted for developing the software stretched to fourteen months, and debugging the system took another three to six months. Several versions of the software had to be produced in response to the many technical and content problems that surfaced with the release of each version. A tremendous amount of time, opportunity, and money was expended before the MAS finally admitted that it had taken on more than it could handle.

It is a well known fact that even with money already at hand, government agencies cannot subcontract services easily because of the usual problems concerning bidding, COA rules, late payments, and red tape in general. A group like the WHO may also have problems with bureaucracy, but it might have been in a better position to subcontract experts in the field of computerization and thereby save a considerable amount of the time in developing the software. It might have been better if MAS had decided to simply focus on remaining on top of the project by accepting the offer of WHO to develop the computer programs. Then it would have been the problem of WHO to find ways and means for solving the problems that cropped up during the development of the software. Since MAS had no experience in developing large-scale systems, precious time for an urgent project had to be used up while MAS learned on the job.

Backup systems

The FHSIS did not have a backup system. For a nationwide information system, this is a very serious problem, especially since there is always the possibility of breakdowns in the computer systems in the provinces. In fact, this is exactly what happened; all provinces suffered computer breakdowns at one time or another, and the fact that most provinces did not have the

capability to repair their own systems made the problem all the more serious. There were some cases where the local units were able to undertake the repair, but this was only in urban areas where there were computer technicians. In most cases, the provinces either had to wait for the MAS to send someone to repair their systems, or they sent their computers to the MAS for repair. In any case, this took a long time and meanwhile, no OTs could be produced or distributed to the DHOs and the RHUs. Program coordinators in the provinces had to extract their data directly from the RFs and make the consolidations themselves. When the computers were eventually restored to working order, the provincial computer operator (PCO) first had to input all the data from the previous months before entering the data for the present month. This multiplied the work of the PCOs many times over since they had to deal with computers that bogged down several times a year. In the case of one province, the computers were out of order eight months out of twelve within one year of operation. If there had been a backup system, much of the delay and additional work that result from computer system breakdown would have been avoided. Clearly, there was a more than sufficient argument for the FHSIS to have a backup system, and this point should be included and emphasized in the FHSIS Manual of Procedures. Futhermore, the backup system should be part of the setup in all levels of the FHSIS.

Programming for the system

Computerizing the FHSIS involved the development of the computer program that would make computers produce what the users of the system required. Unfortunately, MAS did not seem to have a clear idea of the requirements of the users when it undertook the task of computerizing the system. It did not have an appropriate overall internal plan nor did it have any sort of blueprint to present as a guide for subcontractors. The whole effort did not seem to follow any particular strategy. The HIS did not help because it was not consulted, and it did not voluteer its assistance because it might have been considered an encroachment into the territory of the MAS. It did not help either that the HIS felt that MAS did not think highly of the HIS staff.

It was clear that MAS was not sufficiently up to the task of computerizing the system, and it was therefore not able to take effective control of the the whole process. It was slow in debugging the system, and it allowed itself to be caught in a long iterative process with the subcontractor that it hired. There was even a point when it seemed that MAS simply wanted to finish

the work just to be able to present something, even if it would entail a lot of work afterwards, just to iron out the kinks.

One thing that can be said for the MAS though, is that it was always willing to make changes to make the work of the computer operators easier. The programming work may have lacked coherence and direction as a whole, but it cannot be denied that the MAS Systems Analysts and Programmers exhibited admirable persistence in developong one version of the software after another, all towards making the work of the PCOs in the field easier.

Directions and leadership

If the problems that plagued the computerization effort of the FHSIS were to be narrowed down to the most prominent, these would be the problems regarding direction and leadership. In the case of the FHSIS, there was a System Manager (SM) on one hand who did not assume full responsibility and did not seem to have full authority, and there was a Computerization Manager (CM) on the other hand who kept assuming more and more responsibility. There was such a confusion in leadership that when word got around that the DOH was undertaking a major computerization project, the CM herself actually assumed that she had overall command. It was only when problems became so overwhelming that the CM confronted the fact that she was not actually the manager of the system, and the SM for her part had to ask for the support of the DOH Undersecretary and Chief of Staff. The SM allowed things to run out of control by not taking sufficient charge and allowing other people to dictate the course of things and afterwards denying any responsibility when problems occurred. There was also an unfortunate lack of understanding regarding how the system worked on the part of the SM, who seemed to think that once training was completed and the forms distributed to all the provinces, the system would simply take off and operate on its own.

By definition, the System Manager was the manager and the one in charge of the system. She should have been the one responsible for charting the course of the system, and she should have been in charge of defining the users of the system and determining a host of other details such as the information requirements, the processing mode to be adopted, the responsibilities of the other people in the system, the data elements, the way data would be gathered, how data would be generated, and how, when and where they should be recorded. She may require the assistance of consultants who can help in clarifying issues and supporting her decisions,

but it must be clear that they cannot in any way dictate the actions she can take.

As for the Computerization Manager, it should have been clear that her responsibility was only for a portion of the whole system effort and that she was doing this in her capacity as a subcontractor to the System Manager. She should have taken direction from the SM, and her responsibility should have been clearly confined to developing the computerization of the system and delivering the results on time.

Logistics

The MAS is the unit in the DOH which is responsible for the acquisition, installation and maintenance of all hardware and software for the Department, and the responsibility for the hardware and software requirements for FHSIS also fell upon MAS. There were complaints from the provinces about the equipment that they received, including complaints that the equipment was "second-hand", or that they were "lemons", etc. The MAS also did not have enough expertise in matching the technology with the requirements of the users. On the whole, however, it is fair to say that the MAS did a good job.

Planning for contingencies

The need for a good maintenance program focused attention on the fact that the MAS was also not very successful at anticipating developments and planning accordingly. Up to now the responsibilities of the PHO are still not clear and they have not been defined beyond calling on the RHO-RCO and the MAS when there are problems. When a computer breaks down it often takes months before simple repairs are done, and no preparations are made for the resulting buildup in computing work. There is also not much preparation for the consequences of important developments, such as devolution for example. With devolution, it would be expected that most if not all of the computers in the system would be turned over to the LGU; surely, this is something that is going to affect the way the system was originally set up and the way it is operating now.

Technical skills

The work involved in the computerization of the FHSIS requires several skills, which include systems analysis, hardware/sotware development/

management, database management, user coordination, programming, and information analysis, to name only a few. MAS only has programmers and two or three analysts on its staff; it does not have anyone who can read and interpret system requirements, and it has no experience with large-scale systems prior to FHSIS.

There is one systems analyst in the MAS who worked on upgrading her skills to meet FHSIS requirements, but apart from this admirable but isolated case, the MAS can only be grateful for the hardworking RCOs in the region without whom computerization in the field could not have been sustained. Indeed, the RCOs can be truly credited for making up for the shortcomings of the MAS in the field.

Although the MAS staff undergo seminars for upgrading their skills, previous hands-on experience is still essential, especially for large-scale systems like the FHSIS. As it is the system had to suffer a major delay while the MAS staff acquired the necessary skills and knowledge. It is unfortunate that after skills training and upgrading, it is hard to keep the MAS staff from leaving the organization and seeking better job opportunities. This is another thing that the MAS has to contend with, and one way of preparing for this is to train staff extensively. Otherwise, the technical skills capability of the MAS will deteriorate and lag behind current developments and continually changing requirements.

Maintenance

MAS maintains an in-house unit for trouble-shooting problems in the computer system, but aside from these, it has not come close to building a reliable and extensive maintenance network that can service the needs of the computer systems at the PHOs. It is mainly because of the network of RCOs and their hard work and dedication to the job that the system has managed to overcome breakdowns and continue to operate. It seems that relying on the MAS for maintenance services has not worked well.

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Installing the FHSIS and mobilizing the people

Planning

There are no records to show that extensive planning went into implementing the FHSIS. What the records show are dates of activities and budgets; there is nothing that rationalizes activities or ascribes responsibilities. In fact, oral instructions were the basis of many activities, from the testing of forms and the TCL in Laguna and Regions 4 and 7; the redesigning of forms after the testing period; the reformulation of manuals of procedures; the training of midwives; and the orientation seminars for MHOs, RHO staff, and others. A committee called the Technical Working Group (TWG) was put in charge of several aspects of the FHSIS, and its authority emanated from the Undersecretary and Chief of Staff. However, it seems that ever since the implementation of the system, the person who won the day was the person with the loudest voice in the group. In the case of the FHSIS, this was the WHO representative. The WHO representative had good development and systems sense, but the group members did not always carry out the agreements reached. More often than not, MAS proceeded with what it thought was the correct thing to do, no matter what the consensus was in the TWG.

Definitely, there was no serious planning in the FHSIS implementation and there was no one person orchestrating all the activities -- until late 1990 when the CSP Resident Advisor for IS prepared a Management Plan for FHSIS.

Producing the forms and the TCL

It was agreed that the WHO team would take charge of printing the TCL and the report/tally forms. It must be pointed out that again, the most vocal

and the most assertive personalities predominated. WHO took command of the finalization of the TCL and the forms, the process of bidding, the acquisition of supplies, the printing, and the quality check of the finished products. This was a step in the right direction -- had the DOH been made responsible for all these, production would have taken longer, and may have even extended beyond the 1990 implementation date. DOH took over the areas of freight and distribution of materials to the RHUs and the BHSs.

Disseminating information

Information dissemination involved the production of output tables and their subsequent distribution to users. As designed, the OTs have different levels of aggregation at the PHO, the processing node: a) the provincial totals which have as elements the districts and the hospitals under PHO supervision; b) the district totals whose elements include the district hospitals and the RHUs; and c) the RHU totals which have as elements the BHS. Distribution of course depends on aggregation. A copy of the RHU totals goes to the MHO, DHO, and PHO; the copy of district totals goes to the DHO and PHO; and the copy of provincial totals goes to the PHO and the RHO. The latter also receives the diskette.

However for much of 1991 and early 1992, many provinces produced only the PHO and DHO copies. The RHU did not see a copy of its BHS breakdown. The reason given was lack of continuous forms (or computer paper). Only with the arrival of enough supplies were RHU copies with the BHS breakdown produced.

Notwithstanding the production of the OTs, its features became an issue. One of these was the format. Because of the number of data that had to be cramped into the OT, some OT became formidable, bearing several pages and many unnecessary columns and rows. This was directly the result of the lack of coordination among MAS, HIS, and the programs. Compounding the problem of use was the smallness of the font used for printing. Users literally had to wade through gray matter to finish the OT. Then distribution became a problem. In some provinces during the early days of production, only the PHO received a copy. When it became apparent that the only recognized reporting tool was the FHSIS, the provincial program coordinators demanded a copy for themselves. Since then, the program coordinators became the resident critics of the OT calling the attention of the provincial computer operator and FHSIS coordinator (who is often also a program coordinator) for any perceived deficiency of the OT. A positive outcome of this was the assumption by program coordinators of the

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responsibility of validating data in reporting forms submitted by the RHU. This way the OT also became the responsibility of the program coordinators.

Logistics

The success of any information system hinges on the availability of the materials needed to record, report, store, produce, and disseminate data and information. And for a national system like the FHSIS, success is vital. For this reason, during the FHSIS installation/ implementation phase all the data recorders and generators -- the RHUs, the BHSs and the OPDs of reporting hospitals -- were each provided TCLs and one year's supply of reporting forms. A set of summary tables was later added. The PHO, or the processing node, was given continuous forms of different plys and sizes, printer ribbons, and diskettes. Initially these computer materials were in short supply, but MAS was later able to give the PHOs stock good for one and half to two years. There was also an agreement to have HIS provide these materials until the end of 1994 (one and half years of implementation). Almost all -- if not all-- of the provinces were already providing themselves with the needed supplies by 1992 when the budget for these was directly suballotted to them. In 1993, with the health services' total devolution to the LGU, the picture changed. Provinces running out of supplies could not go to the LGU for them as the LGU itself did not have funds. (The LGU could not even pay salaries on time.) The HIS then decided to continue for 1993 providing the supplies for recording and reporting work.

Installing the software

After a version of the computerized system was developed, the MAS staff fanned out to all the provinces to install this. The installation of the original version included hands-on orientation and took at least three days of person to person instruction given by the MAS staff. Succeeding installations took less time and some could be undertaken by the regional computer operator. The same procedure was followed when the computers for the cities were distributed. (Only 20 cities were given computers.) Up to this time the cities and towns of NCR do not have computers because bidding needed to be redone. As soon as these computers arrive, the newest version of the system will be installed before the PC is set up in the city and the municipal health offices. Meantime, the towns and cities of NCR input and process their data at MAS.

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Mobilizing the people

To implement FHSIS, several groups were mobilized. On the recording and reporting level, the midwives were mobilized. It is relevant to remember here that a new reporting system was replacing that which the midwives had used for more than a decade. Certainly there was some resentment over the change. But it is also relevant to note here that local health workers are a respectful and disciplined species of government personnel: they would always give the leadership the benefit of the doubt. They submitted to a training and orientation program on the new system which detailed why they can benefit from the system and what these benefits will be.

But one thing was not made clear to the midwives. They were not told that computerization had not been synchronized with their own implementation activities. They were instead told that computerization would solve all their reporting problems and that they need not keep a copy of their reports because an output table would be sent to them after they submit their reports. The trainors (who did not know what to expect from computerization) did not anticipate the computer breakdowns and software installation delays. It therefore happened that long after the midwives began submitting their reports, the computer program that would feed their data into the computer had not even been developed. The midwives had in fact been reporting for nine months before the first version of the software was installed -- the same software which within a few weeks had to be revised because of bugs. When the OTs did not come as promised, the midwives developed jitters. A central fear had to do with not having a single copy of data on their performance! And a central disappointment had to do with the promised benefits that did not materialize. As a remedial measure, the midwives began retaining a copy of their reports in the BHS/ RHU. Hence, the amount of needed supplies doubled.

The other major group mobilized for FHSIS was the computer operators. This group was essentially a new one since there were no known computer operators in the province before FHSIS. MAS proceeded in this manner: First it asked the PHOs as early as 1989, to send to Manila or to the regional office two from their staff for computer training. Training was completed, after which the PHO staffers were sent back to their original jobs. When the time came to train computer operators for FHSIS, MAS issued another call for computer training assuming that those it had trained in 1989 would come. The assumption proved erroneous. Many of those who responded were strangers to computer basics and were therefore trained in the same fashion as the earlier batch. Since this training was an intensive one, the participants

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were expected to perform FHSIS in their offices immediately upon their return. But to everyone's surprise, many participants were not allowed to do FHSIS full-time, and had to divide their time between FHSIS and their former functions. To compound the problem, there was no plantilla position for a computer operator in the province, a situation which exists up to now and is expected to become worse during devolution. The FHSIS computer operator therefore exists only because the PHO and CHO managements deem it a vital function of the office, which in the end is a subtle acceptance of the importance of FHSIS.

Other groups mobilized were the FHSIS coordinators at the provincial, city, and regional levels. These coordinators are often program coordinators themselves. In all of this, the Public Health Nurse at the Rural Health Unit plays a pivotal role in ensuring the integrity of data from the source. It is the PHN who validates the entries made by the midwives in their reporting forms. The PHN undergoes the same training given to the midwives, and although she does not have the title of FHSIS coordinator at the RHU, she, in effect, functions as such.

Consultation

From time to time HIS calls for consultative sessions with the Regional FHSIS Coordinators (RFC) to discuss operations or technical and content issues. The consultative meetings serve as the venue for airing and solving various problems of the system. It is always a welcome affair. In some of these meetings, the program managers aired their problems and made themselves available for consultation. Invariably in these meetings, computerization was a main issue.

Add to this, the RFC sponsors a consultative meeting in the region where the participants are the PFCs, the CFCs, and the public health program coordinators of the region and provinces. The PFCs and CFCs then pass on the results of these consultative meetings with their PHNs and midwives.

These meetings have been found effective in providing solutions to particular problems at every level and in finding creative suggestions to improve the system.

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Issues concerning structure

The HIS

The Health Intelligence Service (HIS) is the national manager of the system. Before the FHSIS, field reports of the public health system were consolidated by HIS. Its Director in fact has had extensive training on information systems and statistical methods, but the HIS staff was made up mainly of statisticians plus a few doctors who were supposed to perform epidemiological functions. When FHSIS was implemented, the whole office focused all its activities and personnel on the system, with its epidemiological functions absorbed by the Field Epidemiology Training Program (FETP). Occasionally a few staffers were tapped to produce the annual health statistics report. But the HIS -- except for the computerization phase of the system -- remained the workhorse of the system. It farmed out most of its people as facilitators for training programs (all levels) in the regional offices. It ensured that all ledgers and forms were sent to the field offices for the implementation of the system despite difficulty of tapping budget funds to push things. And the HIS staff at one point was doing menial jobs because outside perception was that it could not do more than that. It was at this time that the Director of MAS managed to upstage the HIS Director and took over the system. When it was evident that computerization was becoming the main problem of the system, and when the problems of FHSIS had become too big to handle, the MAS Director finally acknowledged that the HIS Director was the rightful manager of the system.

The problem of HIS then and now is that it is perceived as weak. Indeed except for a handful of individuals who have initiative and are technically adept, the rest of the staff can do with much upgrading. For this reason, HIS has been generally ignored. Through the efforts of the CSP Resident Advisors who helped upgrade the staff through one-on-one sessions, HIS

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staff have picked up.

But the effort had not been enough. HIS still needed to redirect its efforts toward restructuring itself to meet the requirements of FHSIS. For this purpose, a CSP Resident Advisor prepared in 1990 an FHSIS Management Plan spelling in detail the direction and processes HIS had to undertake to prepare itself for FHSIS. This Management Plan contained: (a) the detailed functions of HIS in pursuit of FHSIS management; (b) the capabilities that need developing in HIS to support FHSIS; (c) a training program to develop these capabilities; and (d) the resources required to implement these details. Not all items in this Management Plan were implemented.

The HIS went through difficult times, and the morale of its staff went on a roller coaster ride through 1991 and 1992. There were at least three waves of reorganization that swept the office purportedly to improve its operations (including FHSIS) and upgrade the staff, but all came to naught. In the meantime, FHSIS was suffering from neglect. In this regard, the presence of regional coordinators proved beneficial. During the turbulent periods in the Central Office HIS, they kept the system stable. This proved that the operators of the system were reliable, and that the system itself worked.(It should be noted that it was also during this time that devolution was being effected.)

OPHS and the Programs

FHSIS was instituted to provide summary information on health service delivery and selected accomplishment indicators with the end view of helping to manage the country's public health programs. The system is therefore owned by the Office of Public Health Services (OPHS); that is, OPHS is the primary user and the main body that determines the requirements of the system.

However, program managers were behaving to the contrary. Their attitude toward FHSIS was combative. At one time they seemed ready to sabotage FHSIS! They insisted on asking for other data requirements from the field despite previous agreements that only FHSIS data would be used. This position resulted in field personnel thinking that FHSIS was a heavy burden heaped on them. Since field personnel nearly always do as the people above them ask, they ended up being taken advantage of and indeed burdened.

However, in regions where the leadership and program coordinators would insist on requiring the field personnel to gather FHSIS data alone, Central Office programs would desist from requiring non-FHSIS data. A

clear case of a double standard. This also shows that some Central Office programs create a slew of requirements that could only be called flimsy.

This situation would not have arisen had the programs taken FHSIS seriously during the design stage. As it was, they sent representatives during the requirements-analysis stage who could not even decide on the program requirements. As a whole, some of the programs were tentative and inconsistent about their requirements causing undue delay in the development of the system. By the time they realized that the FHSIS was a serious matter, it was too late. The OT were already being produced, but these did not contain the information the programs were used to receiving because of the simple reason that they had not stated them as requirements.

It is said that the behavior exhibited by the program managers over FHSIS is the same behavior they have shown through pre-FHSIS days. Then, they did not tolerate field personnel questioning why programs would need the data they asked for. Now, they were out to sabotage FHSIS because, with this system, they were being subjected to a rational framework that disciplined their management of both field data and field personnel.

But this is just one side of the story. There were program managers who supported FHSIS and came away feeling betrayed when FHSIS could not produce the reports they needed. This was particularly true during the first few months of implementation because of the delay in the development of the computer software. These program managers could not afford the wait and went directly to the field units to require data -- including non-FHSIS data. The situation created chaos in the field. Finally the Undersecretary/Chief of Staff had to issue a statement that only FHSIS data could be required from the field. Some programs ignored this just the same.

It took devolution to temper the situation. As program influence lessened during devolution, programs could not be as insistent as they had been. It also helped that the FHS and the various programs entered into a series of dialogues to rationalize the OT and produce a more streamlined OT [10 columns or less, compared to the old 20, 50, 60]. The result of this collaboration was the set of Simplified Output Tables (SOT). The exercise also showed how the relationship with the programs should be cultivated further to bring them to the stage where they can feel real ownership (not management)of the system. (Management of the system is altogether a different issue.)

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Regional Offices

The regional offices are effective nodes of field supervision and technical assistance in the DOH hierarchy of service delivery. In FHSIS, they perform the same role. They are the model users and operators in the whole system structure. The regional FHSIS feel, so to speak, the whole range of system uses because it is the regions that are responsible for service delivery, for providing the technical means to carry out service delivery, and for informing their public that service delivery is being carried out. It is also the regions that have a feel of the right way to operate the system so that all needed data can be generated, processed, and used. It is the regional offices, therefore, that are pivotal in the evolution of the system -- not the program offices in the Manila. This is particularly true of devolution. And yet the practice remains: the regions do as they are told.

The region has an FHSIS coordinator (RFC) who is usually a program coordinator himself/herself. He/she is a key focus of FHSIS activity in the region, or an area covering provinces and cities. He/she is in the best position to orchestrate the system's operations and utilization. The RFC's effectiveness, however, is highly dependent on the capability of the processing nodes; that is, on the well-being of hardware and software present in the provinces. This means that once the computers in any of the provinces are down, the RFC has a problem. This is where individual RFC creativity comes in. Through means available to the RFC, he/she has to ensure the unimpeded flow of information.

In this task the RFC gets able support from the regional computer operator (RCO) who makes sure hardware and software in the provinces are well enough to operate and when they aren't, makes certain the office gets help from MAS and other appropriate sources.

The RFC and RCO in tandem hold the FHSIS together. In the devolved state, the regional office shall continue to provide technical assistance to the field units through their local governments. This will not be difficult because through time the RHOs have cultivated working relationships with the field units and have struck cordial notes with LGOs.

Provincial Offices

As the processing node of the system, the PHO is the only place where raw data are entered and processed and where information in output tables are produced. Without the PHO, the electronic database of the system could not have been established.

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A modus vivendi has evolved in the PHO. Where previously the FHSIS coordinator and the computer operator were made solely responsible for the system, now the locus of responsibility has widened. Realizing that FHSIS has become the official system, program coordinators have now assumed responsibility for content or the quality of data. They validate data for accuracy and consistency before the PCO can enter the data. They also study the OTs before these are sent out, analyzing the data for reasonableness. PHO program coordinators have actually produced OTs manually during computer breakdowns.

This is a development in the right direction.

The RHO program coordinators also perform the same validation work on any OT coming from the province. But there are problems here. One, the position of PHO computer operator does not exist in its plantilla. It looks like there is even less of a chance to effect this in the devolved state. Although there exist a number of computer operator items in the LGU, these cannot be tapped into by the existing PCO. Two, the PCO has multiple assignments outside of his FHSIS work. This unnecessarily taxes the PCO and could result in low productivity and inefficiency. Three, the maintenance of the hardware/software under devolution is an open question. With devolution all PHO equipment -- including its hardware/software -- are practically owned by the LGU. What kind of maintenance arrangement can be made? Who shall shoulder the cost? Although the Central Office is assuming all costs at the moment, this cannot last long. Eventually the PHO and the LGU must come to an agreement on maintenance and personnel. This is a development DOH, through HIS, must watch. Conditions may differ from province to province or city to city.

Municpalities/BHS

The Rural Health Unit (RHU), together with its satellite Barangay Health Stations (BHS), remains the FHSIS nest of data and information and the focal point of dynamic data generation and storage. The RHU Public Health Nurse continues to play a critical role in ensuring the accuracy and consistency of data coming from the field. Indeed FHSIS will always rely on the faithfulness of the health workers -- midwives, nurses, physicians, barangay health workers -- in following the procedures for recording and reporting.

In early 1991, when the system had been implemented a few months, monitoring teams were sent throughout all the regions. The happy discovery was that compliance with procedures was already high: Health workers of

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275 out of 282 facilities monitored were faithfully following the procedures. Two years later, in early '93, monitoring was carried out in six regions, and the findings showed that all health workers monitored knew the procedures by heart.

It is also heartwarming to note that health workers will faithfully continue the system even with direct supervision shifting from the DOH to the LGU. Their only request is that they be provided with TCL ledgers and reporting forms because they are not sure if the LGU can provide these supplies.

Leadership/Management

Strong, forward-looking, decisive and capable management is required for FHSIS. A national system deserves no less. Good management is expected at every level of FHSIS operations. The Coordinators at the regional and provincial levels and the PHN at the municipality and city levels are expected to exercise leadership and management.

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FHSIS and devolution

Perceived effects of devolution

It is best that FHSIS is being devolved to the local government units. For this ensures that the system spreads where it can be useful to the LGOs. This means also that FHSIS can be upgraded to directly serve the decision-making functions of local government managers. And because the system is immediately usable, LGOs can enjoy its benefits at once. LGOs need only review the SOTs and determine what are useful and what else needs to be inputted for the system to cater to their requirements. The RHO RCO can adapt to these requirements.

Reportedly, some sectors are worried about devolution. They worry about LGOs dumping the system and instructing midwives to stop submitting reports. Even outside the agreement signed by the Secretary of Health and the Secretary of Interior and Local Government stipulating, among other things, the continuation of the reporting system, the system on its own has merits and can be supportive of LGO work. To be effective the LGO will need FHSIS.

A more thorough discussion of the way FHSIS supports devolution is found in CSP Monograph No. 4 "FHSIS: Its Role in Decentralizing Health Services in the Philippines".

Plans

Because FHSIS supports devolution, the system must be upgraded to cater to specific requirements of LGOs. The plan to do this shall consist of:
- Analysing information requirements of LGOs that overlap with health;
- Designing a system that can meet these requirements at the LGO level.
  Since it will be impractical at this time to design a system for each LGU,

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the designer should produce a system that is common to all LGUs and which can then be fine tuned by the RFC and the RCO to LGU needs;

- Developing the common system with allowance for individualized requirements; and
- Testing and installing both common and individualized systems.

The Central Office can help design, develop and install the common system, while the RFC/RCO can take charge of customizing the system. The task may not be difficult because customization will happen only at points of contact with the health system (FHSIS). This system can be effected manually, especially if the interface system in the LGU is manual.

The development of procedures and the training of LGU staff will also be undertaken. To do this, the DOH can organize a team composed of staff from the Central and regional offices, and coordinate activities with the Local Government Assistance and Monitoring Service (LGAMS). As a first item in the agenda, the team must meet with LGOs to determine their requirements.

Promotions

Promoting FHSIS among the LGOs may not be an easy task for the following reasons: (A) LGOs, for all their sophistication, may not be familiar with an information system solely geared to service a single sector -- in this case, health. (B) Even LGOs conversant with information systems may not be appreciative of a presentation of achievements based on public health programs even if this reflects performance by facilities. (C) LGOs concerned with their own needs particularly with resources, may not find immediate use for the FHSIS presentation of information. They may want to subject the OTs and the SOTs to further analysis and crosstab these with area/resource-specific data before they deem them useful.

Despite these problems, many of the RFCs proceeded with familiarizing LGOs with the system before the elections [as early as late 1991 anticipating the devolution], and then again after the elections when a new set of LGOs was in place. Feedback from the RFCs and PFCs show that the response was overwhelming. Presently, the RFCs and the PFCs are familiarizing the LGOs with the details of the system and how they can relate the system's outputs to the current range of information needs of the LGO.

There is hope that the Local Health Board (LHB) representative will be the primary promoter of the system to the LGOs since it is the LHB representative who sits more often with the LGOs. The RFCs and the PFCs

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on the other hand can brief the LHB rep on FHSIS information.

The best way to promote FHSIS, however, is to show FHSIS information on a map of the locality. This will prove to LGOs that with FHSIS, at a glance they can synthesize health information with say, demographic/ economic/ political information. This tool may not be far off because a prototype is already being developed. Once this system is available, selling FHSIS may find smooth sailing.

FHSIS and the future

Conclusions/Lessons learned

Despite the problems, FHSIS is a feasible system. It can deliver and it will. The health workers will make sure that it delivers so long as logistics keep coming. Nowhere in the government system can one find an information system that reaches to the very roots of the political/ social structure of the country: the barangays. If the LGO realizes this he can make use of FHSIS to his advantage. It is also to the advantage of the DOH that it makes sure FHSIS delivers.

Systems development is an arduous task. Developers have a limited source of energy and resources so these must be optimized. Furthermore, especially in a governement setting, nobody is really sure what would come next. FHSIS development is an example. While the DOH was yet learning basic lessons in rational reporting from a new system, came the Local Government Code which totally shifted the focus of the very reporting that is being rationalized. But DOH had no choice.

It so happens that being a facility-based system, FHSIS generates the bulk of its inputs from the local communities themselves. It would then be not too difficult to simply redirect these inputs for the use of the LGO.

But there are conclusions/lessons that can be drawn from the ongoing FHSIS experience which can be summarized into: credibility, comprehensiveness, conciseness, and coordination.

FHSIS continues as a system because the Public Health Nurse at the RHU validates the data being submitted by the midwives. This is the foundation of FHSIS credibility. HIS and the RFC andRCO in the RHO should make sure that this is maintained. Despite the claims of some coordinators to the contrary, FHSIS data will continue to maintain and in fact strengthen its integrity if the PHN continues to validate. But of course rational credibility

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should be maintained at all levels of the system. The inability of HIS, for instance, to provide quality feedback information to programs (and in the very immediate future, to LGOs) gnaws into this credibility and must be checked.

In the desire to be comprehensive, the programs submitted a shopping list of indicators. To the mind of the developers the long list simply indicated lack of understanding as to what the program really aimed to do. A clear program can define its goals in a single or two parameters. Perhaps **comprehensiveness** and **conciseness** should always go in tandem, but not only with respect to indicators. They also apply to computerization (in determining requirements), in SOT production, in providing LGO information, in preparing analysis, etc.

Coordination, or the lack of it, has been a recurring theme in this paper. Much has been said about it. But it must be emphasized that coordination speeds up things, smoothes over relationships, realizes the true meaning of system, provides a gateway to creativity, and establishes the network of cooperation, among others.

The FHSIS plan

Since FHSIS has been the de facto public health information system for the DOH, there is need in the very near future to accomplish the following:
1. Decide immediately what irreducible minimum set of indicators would be required of the system at the central level, at the regional level, and if it can be decided, at the provincial, city, and municipal levels as well.
2. Thereafter simplify further the system's various components that interface with the data generators and information users. This involves the TCL and the reporting forms at the BHS and RHU levels and the output tables at the PHO, LGU, and RHO levels.
3. Provide the PHO the necessary technical and content capabilities to be able to design subsystems that respond rapidly to LGO information requirements at both the municipal and provincial levels. This means equipping the PHO system with the necessary tools and training the appropriate personnel. Personnel do not have to be required to be computer programming proficient. User-friendly software tools are already available and the RCO is there to lend a hand at all times.
4. Embark on enhancing the present software to include statistical analysis and information quality management. Right now, the system simply does data entry, processing [addition, some percentage computations, layouting], and production [printing output tables which are basically

mirror images of data submitted]. It does not yet have the capability to crosstab data-of-so-many-months with data-of-so-many-programs which will be required of the system soon given the database that it has built.

5. Develop the system's innate capability to use multi-media for presenting data to LGOs: maps, graphics, etc.

This is an initial listing of the things that have to be done to make FHSIS more responsive to its users.

Since HIS is responsible for all these, the DOH must therefore support HIS in its plans

1. Initiate the Department-wide discussion on the irreducible (and non-expandable) minimum set of health indicators DOH shall expect from the field, so that the source of data -- the midwife -- who integrates all public health programs in the facility, can submit data also in an integrated way not on a per program basis.
2. Redesign and simplify the system accordingly.
3. Develop its technical and subject capabilities, as well as upgrade the skills of regional, provincial, city and municipal FHSIS operators and users so that they may all respond to the system requirements and LGO demands for information.
4. Develop the framework for analyzing FHSIS data; develop the tools, software and procedures to perform this analysis; and train its staff and that of the regions, provinces, cities, and municipalities.
5. Develop the framework for information utilization at the various levels of users.
6. Test the databases that have been established at various levels to determine their reliability.
7. Embark on system upgrading to include capabilities for multi- media presentations of FHSIS information.
8. Reorganize itself to improve its service delivery.
9. Equip itself with the necessary technology to undertake analysis and assessment of public health situation for the DOH.
10. Develop, or spearhead the development of, non-routine population-based information systems for the DOH to augment FHSIS data (which are routine and facility-based).
11. Connect with other government institutions in sharing FHSIS data and operating the network of data/information exchange and utilization.

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Leadership

Leadership must be established in FHSIS as it covers many levels and involves many functions. However decisive and quality leadership cannot be established overnight. To be effective, FHSIS leadership must:

1. Be forward-looking: Be mindful of future requirements; be anticipatory, not lagging behind in forceful recommendations to DOH management; be proactive not reactive.

2. Be quality oriented: Information and knowledge being the wealth of an organization, the leaders must insist on accuracy, consistency and comprehensiveness. To do this effectively leaders must grasp what is really needed better than anybody else.

3. Be value driven: Recognize to what extent information increases the credibility of the DOH, how much the information produced by the system influences the direction health care should take, and how effective indicators measured by the system input are to the assessment of the well-being of the nation.

4. Be results seeking: Strive to meet what was promised and be obstinate about expecting outputs delivery when due.

5. Be thorough in outlook: Understand that analysis is an expected activity in the system, and that those who lead must therefore make sure that the framework and reasons for analysis are well-established; that the tools for analysis are learned and in place; and that all requirements are anticipated well in advance.

6. Be conscientious of linkages: Know that FHSIS cannot exist alone and that it cannot operate without dependence on other systems which are part of the health network. Therefore the leadership must examine the areas where cooperation must be sought and interconnection effected to enhance the value of the system's information.

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Recommendations

Following are some recommendations that the DOH can consider in its continuing implementation of FHSIS.

Recommendations regarding structure

1. To coordinate all the activities and requirements of the system, the DOH should continue to assign the management of the FHSIS to the HIS.
2. To cope with the new demands on the system, the DOH should modify the mandate of HIS to include both routine and non-routine information systems and the analysis and assessment of health data.
3. The HIS should be supported in its efforts to upgrade the technical capability of its staff.
4. The RFC and the RCO should be retained and made the nucleus of an information management group in the region. They should form a network with the HIS, together with other regional information management groups.
5. The skills of the PFC and the PCO should be constantly upgraded through capability-building activities sponsored by the RHO and HIS. The PHO should also be provided with tools that will enable it to respond to LGO information requirements.
6. The MHO, PHN, and MWs should be given refresher courses from time to time, to update them on FHSIS processes, keep them in touch with FHSIS developments, and provide them with information regarding the tools available to them in their support of LGOs.
7. The HIS, the RHO and the PHO should always make their resources available to LGOs.

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Recommendation regarding computerization

1. HIS should continue looking for ways to improve the software used in processing FHSIS data.
2. HIS should have the responsibility for managing the computerization activities of the system, with the assistance of MAS as the primary subcontractor for computerization. MAS should undertake the computerization in close coordination and continuous consultation with the HIS.
3. HIS, not MAS, should monitor all computers in the field and should be responsible for informing MAS about maintenance problems.

Recommendations regarding leadership

1. The incumbent National FHSIS Coordinator should be retained and supported, as he is in a position to chart the course of FHSIS.
2. The OPHS programs, IPS, MAS, LGAMS, PCU, and other offices that have working relations with HIS should support the National FHSIS Coordinator in the task of managing the system, and they should give him the resources needed to continually improve the system.
3. DOH management should require a regular updating from the HIS leadership regarding FHSIS performance; it should also require the HIS to regularly test the framework for analysing and assessing the state of the nation's health.
4. DOH management should provide HIS with a clearly defined framework for analyzing and assessing the state of the nation's health.

Recommendations regarding the government network

1. The DOH should let other government agencies use and access information from the FHSIS database, and the HIS should be equipped with the technology to make this possible.
2. The DOH should use and access information from the databases of other government agencies, and the HIS should be equipped with the technology that will enable it to do so.
3. The DOH should support the efforts of the government to establish a communication network among the different agencies -- including the regional, provincial and city offices -- by offering its resources and supporting the development and maintenance of this network.

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Annexes

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Annex A

FHSIS Reports/Forms (RFs)

Upon occurrence of event
FHSIS/E-1   Notification of Death Form
FHSIS/E-2   Maternal Death Report
FHSIS/E-3   Perinatal Death Report

Weekly
FHSIS/W-1   Weekly Report of Notifiable Diseases

Monthly
FHSIS/M-1   Monthly Field Health Services Activity Report
FHSIS/M-2   Monthly Natality Report
FHSIS/M-3   Monthly Mortality Report
FHSIS/M-4   Monthly Laboratory Report
FHSIS/M-5   Monthly Dental Health Service Report
FHSIS/M-6   Family Planning Subsidized Surgical Procedure Report
FHSIS/M-7   Monthly Social Hygiene Clinic Activity Report

Quarterly
FHSIS/Q-1   Quarterly Field Health Services Activity Report
FHSIS/Q-2   Quarterly Dental Facility Inspection Report
FHSIS/Q-3   Quarterly Report of Environmental Health Activities
FHSIS/Q-4   Quarterly Report of Malaria Control Activities
FHSIS/Q-5   Drugs and Supplies Quarterly Status Report
FHSIS/Q-6   Laboratory Supplies Quarterly Status Report

Annual
FHSIS/A-1   Annual Catchment Area OPT Tally Sheet & Summary Report
FHSIS/A-1   Annual Catchment Area Population Survey Form
FHSIS/A-2   Annual Catchment Area Population Summary Report
FHSIS/A-2   Annual Catchment Area OPT Form
FHSIS/A-3   Annual Household Environmental Sanitation Report
FHSIS/A-3   Annual Environmental Household Survey Form
FHSIS/A-4   Annual Nutrition Report: Food Supplementation

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Annex B

Sample Pages of a Summary Table (SumTab)

FHSIS SUMMARY REPORT

FUNC. CODE	TARGET	JAN	FEB	MAR	APR.	MAY	JUNE	JULY	AUG.	SEPT	OCT.	NOV.	DEC	TOTAL	% Acc.

FHSIS SUMMARY REPORT

EPI	TARGET	JAN	FEB	MAR	APR.	MAY	JUNE	JULY	AUG.	SEPT	OCT.	NOV.	DEC	TOTAL	% Acc.

FHSIS SUMMARY REPORT

RE NATAL CARE	TARGET	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOT
Visit Normal 1st														
2nd														
3rd														
Risk 1st														
2nd														
3rd														
Risk Referred 1st														
2nd														
3rd														
Visit Normal 1st														
2nd														
3rd														
Risk 1st														
2nd														
3rd														
Risk Referred 1st														
2nd														
3rd														
Visit Normal 1st														
2nd														
3rd														
Risk 1st														
2nd														
3rd														
Risk Referred 1st														
3rd														

ATAL CARE	TARGET	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP
Visit Normal 1st										
2nd										
3rd										
Risk 1st										
2nd										
3rd										
Risk Ref 1st										
2nd										
3rd										

Annex C

Samples of Simplified Output Tables (SOTs)

E P I ACCOMPLISHMENT REPORT						
		(Region or Name of Province or Municipality)				
AREA	IMMUNIZATION GIVEN TO OTHER AGES				CHILDREN OVER 1 YR COMPLETELY IMMUNIZED	BCG SCHOOL ENTRANTS GIVEN IMMUNIZATION
	BCG	DPT3	OPV3	MEASLES		
	NO YTD	NO YTD	NO YTD	NO YTD	NO YTD	NO YTD
(1)	(2)	(3)	(4)	(5)	(6)	(7)

			QUARTER			
(Region or Name of Province or Municipality)						
IMMUNIZATION GIVEN TO OTHER AGES			CHILDREN OVER 1 YR COMPLETELY IMMUNIZED	BCG SCHOOL ENTRANTS GIVEN IMMUNIZATION	CHILDREN 0-1 GIVEN HEPA B3 IMMUNIZATION	CHILDREN 0-1 GIVEN VIT A DURING MEASLES IMMUNIZATION
DPT3	OPV3	MEASLES				
NO YTD	NO YTD	NO YTD	NO YTD	NO YTD	NO YTD	NO YTD
(3)	(4)	(5)	(6)	(7)	(8)	(9)

PRE-NATAL ACCOMPLISHMENT REPORT						
		(Region or Name of Province or Municipality)				
AREA	POPULATION OF PREGNANT WOMEN	PREGNANT WOMEN SEEN (1ST VISIT)		% OF 1ST VISITS IN THE 1ST SEMESTER OF PREGNANCY		PREG SEEN PRE
		NUMBER YTD T P '3 5	% ACCOMP YTD Col 3/ Col 2	NUMBER YTD	% ACCOMP YTD Col 5/ Col 3	NUMBER YTD
(1)	(2)	(3)	(4)	(5)	(6)	(7)

				QUARTER			
(Region or Name of Province or Municipality)							
PREGNANT WOMEN SEEN (1ST VISIT)		% OF 1ST VISITS IN THE 1ST SEMESTER OF PREGNANCY		PREGNANT WOMEN SEEN ON THEIR 3RD PRE-NATAL VISIT		PREGNANT WOMEN WHO HAVE TT2+ IMMUNIZATION	
NUMBER YTD	% ACCOMP YTD Col 3/ Col 2	NUMBER YTD	% ACCOMP YTD Col 5/ Col 3	NUMBER YTD	% ACCOMP YTD Col 7/ Col 2	NUMBER YTD	% ACCOMP YTD Col 9/ Col 2
(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)

Annex D

Proposed HIS Structure

Proposed mandate and functions of the Health Intelligence Service (HIS), to be renamed Health Assessment and Statistics Service (HASS)

Office of the Chief of Staff

Health Assessment and Statistics Service (HASS)

Mandate

HASS shall provide services related to routine and non-routine health statistical and information systems and the health status assessment of populations in support of the development and implementation of health programs by the Department of Health and its various partners in local government units, other government agencies and the private sector.

Health Statistical System Division	**Health Analysis and Assessment Division**
• develops plans, programs, standards and operational techniques for the strengthening of routine field health and hospital information systems and the development and implementation of non-routine statistical activities such as surveys, rapid assessments and community-based disease surveillance • collects and processes data on vital health statistics • implements a health "weather station" to feel the pulse of the nation on specific health issues • provides technical assistance, consultative and advisory services to LGUs, field health units and other sectors on the operations of the health information systems • conducts training of health personnel on data collection techniques and methodologies • coordinates with NSCB and other government agencies and private sector for data collection activities • performs other functions as may be provided by law	• analyzes all data and information produced by the health statistical system and packages them for various users • provides technical assistance, consultative and advisory services to LGUs, field health units and other sectors on data analysis and utilization • conducts training of health personnel on data analysis techniques and methodologies and data utilization • coordinates with various users from the DOH and other government agencies and the private sector for their data/ information requirements • produces and disseminates health status and assessment reports • produces and publishes surveys, rapid assessments and "weather station" results and health sector accomplishment reports • performs other functions as may be required by law

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