

# **Restructuring and Strengthening Existing Routine Health Information Systems (RHIS): Issues and Ideas**

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## **Purpose of the Presentation**

The purpose of this presentation is to challenge the participants of the meeting with one view of a number of key issues pertaining to national and international efforts to foster the practical and sustainable development of routine health information systems. These issues include improvement of data use for case, facility, and community health management. It is hoped that this presentation will generate debate and further ideas for improving national RHIS development and international cooperation, during the meeting and later, within the Routine Health Information Network.

## **Premise**

It is suggested that examples of successful, sustainable routine health information systems (RHISs) development efforts are rare. Some measures of success and sustainability could include:

- 1) two years after the major system improvements are implemented, 80 percent of service units are recording and reporting according to the new system formats and procedures;
- 2) service staff are better able to perform their service and management functions with the use of the new system';
- 3) policy makers and program managers are asking for data for evaluation and planning purposes; and
- 4) any new computer applications are being maintained and improved by permanent staff in the services or in local service bureaus.

In addition, it is suggested that the increasing amount of international cooperation and funding being devoted to health information system improvement in developing and transition countries is largely ineffective, sometimes even disruptive and counterproductive. That being said, such aid is rarely refused because of the "benefits" that accrue to participating national staff, both financial and professional.

## **Issues**

The writer has had the opportunity to participate in health management and health information system development activities in developing and transition countries for more than 30 years. Much of that experience focused on the evaluation of service and information system performance in a wide variety of settings. Along with such evaluations came efforts to develop and apply methodologies and processes for improving the subject health services and their management procedures, and systems of information support. In the last 10 years of this writer's, career much effort was devoted specifically to assessing and strengthening national health information systems. These numerous assessments have led to an all-too-familiar list of problems and underlying causes, such as those provided as an attachment to this paper.

The following is an attempt to generalize and discuss these issues in a manner that helps to identify some of the key factors that contribute to the difficulty of enhancing health information systems and using the resulting data.

*Despite the rapid growth of requirements for data recording and reporting in national health services, the effective use of routine data is not increasing.*

No phenomenon has been cited more often than the increase in recording and reporting data of many types from government health facilities. In many cases, these data are reasonably reliable and complete, at least at the outset, following the implementation of a new or revised information system. Despite the availability of data, there is not much evidence that the data are used. Why not?

There are many reasons, and they vary to some extent among countries. This observer supports the following explanations.

- Much of the content of registers and records in health facilities is placed there by managers and statisticians from higher levels of the system who think they need these data for monitoring and supervision purposes. Many of these registers are designed by staff who have never worked in the reporting facilities. The choice of data for collection is well intended, but it often does not support the tasks that the service provider must perform, first for the care of individual patients, or for efficient management of the facility.
- A related problem is that the tasks and functions assigned to service providers and managers are not specified adequately and procedures are not adequately defined. This lack of clarity of tasks and procedures is worsening as health reforms progressively decentralize management responsibility and authority for decision making to the facility and district levels. Additionally, many health administrations devote most of their training and supervisory attention to clinical tasks. The important functions of monitoring community health situations, events, and trends are not adequately supported with procedures and formats, and local-level decisions and actions are not spelled out adequately.
- Extensive emphasis is placed on the importance of correct and complete recording and reporting. Considerable inservice training is provided in the proper completion and submission of reports, and service units are monitored for timely and complete reports. The result is that considerable reporting takes place, but since little of the information results from or is fed into managerial processes and “action-taking”, the data remain largely unused.
- A more recent phenomenon results from the devolution of health service units from the government health system as seen under health reform. In such situations, staff function primarily through payments from client fees and neither the government nor the staff are clear about the requirements related to standard recording and reporting. If the government still pays for certain services to be performed, such as detection of infectious diseases and vaccination, then it has the right and responsibility to require reports on these activities, at least to enable payments to be made.

#### *The dilemma of the denominator*

Under-registration of births and deaths, particularly maternal and infant deaths, persists in many countries. There are various causative factors, both cultural and economic. These include: dysfunctional civil registration systems and the fact that clients use private care or no care. The result is a scarcity of good information on the size and distribution of the population being served, particularly critical target groups such as newborn infants and pregnant women.

A common response is to undertake periodic or continuous household and population enumeration for planning and monitoring purposes. This, of course, results in different (and, one hopes, improved) population data. But censuses invariably lead to inconsistency in reported population growth rates and service coverage figures. While these efforts seem to make sense for health service management purposes, they may undercut the civil registration system, unless a means by which births, deaths, and migration as measured by the health services can be communicated to the Civil Registration Office.

*Record and register revision and inservice training are overused and ineffective*

As we review past and ongoing health information development efforts, we always see two types of development activities. The first is a review and revision of basic records, registers, and report formats at the various health facilities. The second is inservice training of staff to encourage the use of new recording formats. Sometimes the format revision results from nothing more than the visit of an international expert who fails to find what he or she is looking for in the basic records and, therefore recommends a revision. National information system working groups also induce format changes to demonstrate the results of their efforts. However, these efforts normally take place in the capital, and fail to reflect the context of service delivery and operating conditions. Most often, revisions are made because the central health information unit wants to implement certain summaries and annual statistical reports, whether or not there is a need or demand for these statistics. Sometimes new records and registers are introduced purely because a donor agency asks for them to monitor the use and effectiveness of its resources. These requests often duplicate existing records.

Inservice training is an attractive activity from various points of view. It seems logical to system designers as an approach to change and improve recording and reporting practices. Staff members appreciate the opportunity to take a break from their routine tasks, visit another site, and receive a per diem. Normally, such training is delivered in a very traditional style, with lectures and individual exercises. Participants are impressed with the need to produce an information product with some accuracy and timeliness. Less often are they engaged in actually using the data they generate for patient care and facility management. External assistance organizations are fond of these types of training activities because they can use their budgets for "direct technical cooperation" and enumerate resulting products and "beneficiaries."

*Comprehensive, integrated health information systems never seem to work for long.*

We have participated in and observed many RHIS development projects that attempted to address all or most health service data requirements and deficiencies. While these types of projects were more common some years ago, they persist to this day, often encouraged by ambitious donors wishing to support major system improvements. Incentives for designing integrated information systems may also include the desire to foster integrated health services.

Increasingly, services that were administered by specialized programs are being integrated into a comprehensive package of services, particularly at the periphery. The extent to which the data for these services can and should be integrated into comprehensive recording and reporting formats depends on how service and program management is to be carried out. Sometimes the desire to demonstrate integration, or the central health information units' desire to consolidate information into multipurpose databases produces problems for program and data management. Too often we find infectious disease data recorded and reported through multiple channels: to the central program manager and to a central information unit. The data invariably differ, requiring extensive staff time to correct reports. The timeliness and accuracy of reporting suffers as a result.

Additionally, the integration of data from different types of services into a database intended to serve many different managers, often fails to serve any. Such systems frequently use selected indicators when program managers need case-based data to analyze trends and make projections. Some progress is being made in consolidating indicators from various programs into summary presentations for senior management. However, it is not clear how useful such presentations really are except that they give an impression that a "data culture" exists.

*There are risks to placing the responsibility for directing RHIS development and maintenance, including reporting systems and computer applications in the hands of statisticians, epidemiologists, and computer specialists located in a centralized health management information unit*

Who should manage the design, implementation, and maintenance of routine health information systems? It is not uncommon for Ministries of to create centralized HIS units staffed with statisticians, epidemiologists, and computer specialists. While this seems a good way to get on with the difficult task of developing improved health information systems, it often contributes to many of the problems noted above.

Central information units are usually responsible for maintaining the databases required for producing the annual health statistics and other routine reports that the Administration often equates with information for decision making. Such data systems and their units tend to be self-perpetuating, as well-intended staff members strive to improve the completeness and timeliness of the data, whether or not they are useful for health services and programs. These units are also given responsibility for preparing the many reports requested by international agencies complete with an increasing large array of standard health indicators.

The creation of centralized health information units often results in:

- Records and reports designed to provide data to the central level, with less concern about the data needed for case and community management.
- A system is designed primarily for completing annual reports and statistical series.
- Failure to facilitate the collection of data required at service facilities for planning, budgeting, supply management, surveillance, quality control, and other critical routine functions.
- The design of registers and records by HIS unit staff that may preclude the opportunity to reinforce standard clinical performance through the use of patient records and registers.

One benefit of the centralized health information unit is its potential to reduce duplication in recording and reporting. There is a tendency to invent new reports without checking what already exists. But even with a central HIS unit, preventing new and duplicate reports is difficult and many at the district and facility level where staff members are already overburdened with recording and reporting. Perhaps the underlying cause of such spurious reporting requirements is the failure of the central HIS unit to adequately coordinate and share the data they are receiving with various offices and programs.

*Focusing on "decisions" as the object and purpose of routine health information is not always possible or helpful*

Traditionally, information systems analysts approach the design of HIS by asking managers what decisions they make and what information they need to make them. While this sounds logical, it was not a useful approach for business and industry. It also does not work well in the health sector. First, "health managers" find it difficult to identify the explicit decisions they make, along with the data needed to make them. Second, in the health sector, practically everyone is a manager of something, and to enumerate all of these managers' decisions and corresponding data requirements is difficult, to say the least. The work of public health services may be defined better in terms of processes and functions related to systems and procedures. Many systems and procedures generate and require data for their effective performance.

Thus, rather than discreet decisions, health service delivery and management normally requires continuous processing that generates data initially for the tasks at hand, and additionally, as needed for arranging the support required for service delivery. These support processes include: laboratory diagnosis, drugs and other supplies, actions required by the community, and by higher levels in the system and in other sectors, such as food safety, water, and sanitation. This said, it is obvious that certain

events or trends must be triggers for taking action such as an upward trend in enteric or sexually transmitted diseases in a certain locality, or an avoidable maternal death.

*The more important routine health service and public health functions are often underemphasized in RHIS developments*

Three of the more important public health functions are monitoring population dynamics through birth and death registration, monitoring infectious disease trends and outbreaks through disease surveillance systems, and monitoring environmental factors affecting health. Rarely are these information subsystems given priority for development.

Similar to other interventions in public health, the development of routine health information systems is not blessed with unlimited resources. As a result, the choice of data collected should reflect needs that are most critical for enabling the national health Administration to carry out its defined functions. Rarely is such priority setting done in a manner that defines the more essential public health responsibilities. Further, most countries are engaged in health sector reform that often includes decentralization of authority and management responsibility to regional and local levels. Staff at these levels must plan, manage, and control functions that were formerly performed at higher levels. All of these functions require information. However, defining essential information requires clear definition of the tasks and procedures for performing these functions. Unfortunately, it is often information systems designers who propose the data required for the new functions to be carried effectively without the clarity of defined administrative tasks and procedures.

*The advent of the health indicator movement*

In recent years, no health management concept has received more promotion and support than the health indicator. While "indicators" are an important element of RHIS development, they have often been misused, and implementing them is often problematic. One would like to believe that health status and system performance can be monitored effectively at all levels, community, facility, district, national, regional, and global, with a selection of carefully defined indicators, most of which must derive their data from routine recording and reporting. Many of the issues listed here would seem to be resolvable through the use of indicators. Recording and reporting should be reduced, and managers should be able to monitor and control without having to look at very much data or perform further analysis.

International agencies also saw great potential usefulness in health indicators. These agencies can deliver apparently sound technical advice for improving health information and its use, while simultaneously promoting their own policies, programs, and strategies, and creating a basis for comparing countries' progress toward "global goals.".. This indicator promotion has no doubt served the purpose of global monitoring to some extent (if the country data can be believed). Whether international indicator promotion has benefited national health information systems varies with the source and method of introducing recommended indicators. When global strategies, programs, and technologies are widely accepted by countries as being a high priority, technically correct, and cost-effective, the proposed indicators are likely to benefit the national monitoring and management of these programs' performance. But there have been many examples of indicators being defined by agencies for promoting aspirations and analytical approaches that have not been proven cost-effective. While countries may attempt to satisfy such international reporting requirements, their submission often results from central-level estimation exercises, with the resulting data not taken seriously and not used to influence national health policies, strategies, and services. Production of this indicator data becomes the price to be paid for membership in the international organization. Perhaps the worst sin of all is the continuing tendency by some agencies to promote the generation of composite indexes, those magic numbers through which a whole host of factors can be boiled down to one index and then used to rank countries from best to worst or vice versa.

Inside countries, the choice and definition of national health indicators has become a common exercise, often supported by external agencies. The amount of national self-determination in the choice and definition of health indicators varies, as does the flexibility and usefulness of the resulting indicators. Even when indicators are determined locally, technically sound, useful and feasible for routine reporting, much effort is often required to implement them. In the push for indicator-driven RHIS design, it should not be forgotten that many services continue to require case-based data management and transaction processing of services and support systems. Sound indicators and their monitoring do not serve all information needs, and unsound indicators create a huge waste of time at all levels.

### *The charm and the curse of the computer*

Computerization has its own set of challenges to remain relevant, useful, and sustainable. About the only thing that can be said with certainty about computerization, and its contribution to the management, is that it will increase. The tremendous potential benefit of computerization in the public health sector, while beginning to be achieved, remains largely unfulfilled. Text and graphics processing, database management, data presentation, routine and ad hoc analysis, and data communications are the principal uses of the computer in the health field. But access to the Internet and the vast information it offers is fast overtaking all other uses.

One thing is certain, national health administrations in developing and transition countries need no inducement to computerize. How many times have we visited health institutions that are using newer hardware and software than we have back in our home offices? Staff skills, at least for individual applications, have expanded rapidly within health programs and services. Spreadsheet, database, project planning, and flowcharting expertise abounds. The question is whether these uses of the computer enhance health program performance through improved program management.

Much of their hardware and software have been received as part of cooperative projects, so most developing countries have a difficult time maintaining any kind of standardization. Most donors must procure from vendors in their own country or cope with restrictions on country of equipment origin. Often the cooperative project includes technical assistance for application development and training, which takes the choice of software out of the hands of the recipient. It may also deny the ultimate user much participation in design and development of the computer applications. In many cases, the computer applications are imported from other countries or from the collaborating organizations in the belief that economies can be realized by using existing software applications that just need to be adjusted for local use. How many times have we seen such efforts to apply existing computer applications fail? How many times have we seen new applications development that is designed and carried out by foreigners fall into disuse shortly after the foreign partners leave, usually because national staff have not participated enough in the design of the package and its programming to (1) believe in the approach, and (2) be able to maintain and develop the system further?

Another common constraint on computer program and system sustainability is the high turnover of computer-literate staff, because of their marketability in the private sector, for much higher salaries, once they gain computer skills in the public sector.

Still another problem is the inexperience of both foreign and native computer system developers in data systems management. Developers often blithely develop databases with far more content than is needed, and certainly more than can be maintained routinely with the data entry staff available. We seem to forget that routine data entry requires data entry clerks who either don't exist or are too few in number to handle the rapidly expanding workload. Even when data entry is decentralized to regions, districts, or local institutions, database maintenance and data communications are always a challenge.

Despite these difficulties, computerization in the health field will expand and become increasingly useful, aided by the type of experience sharing that this network can provide.

*The international development community seems unable to learn what works and that doesn't for facilitating effective technical cooperation in support of sustainable routine health information system development*

Many of the issues mentioned here involve technical cooperation. The group assembled here for this meeting should be able to cite examples of more and less effective external technical cooperation, especially those who represent national health administrations. We hope the group discussions that follow can elicit both the positive and less positive results of technical assistance in routine health information systems.

To help get that discussion started, we will share a few observations from recent experience.

- RHIS technical assistance (experts) fail to acknowledge the complexity and difficulty of RHIS development and the time it takes to design, test, and implement major systems.
- TA projects must produce "deliverables" within limited periods of time, which forces too much foreign involvement, thereby reducing sustainability.
- There is a failure to realize that every task performed by a foreigner, no matter how expert she or he may be, is a task not performed by a national and, therefore, not likely to be learned, accepted, and sustained.
- Ensuring national involvement and control is particularly difficult in HIS and computerization efforts because specialists in this field tend to have "do-it-yourself" personalities (for a variety of good and bad reasons).
- Most TA projects in health have some sort of requirements for, or impact on, routine health information systems. As the degree of external specifications and design of the reporting system increases, their compatibility with what already exists decreases. This fragmentation of approach is exacerbated by the common practice of having TA projects of the various development partners dispersed across the country, each with its unique reporting system.
- Not unexpectedly, programs with the most resources tend to attract more national support, which may push smaller, yet technically sound, projects aside. Collaboration and cooperation among cooperating agencies (CAs) in the HIS field is not better, and is often worse than in other types of health projects. This may be due to the absence of international strategies that sometimes exist in other health program subjects such as TB control, safe motherhood, and child health.
- As with other types of projects, national health administrations and program managers will accept just about any type of cooperation offered that includes financial, travel, material, training, or employment possibilities, even if the technical approach is inappropriate.

### **Some proposals for addressing these issues**

The themes and presentations of this workshop should provide us with a wealth of examples of how to overcome some of these issues. We have heard some already, and more will follow in this session. I would like to share a few ideas that address some of the issues above. Some of these ideas have been tried out with success; others are still untried, but their potential is intriguing.

*Addressing the problem that little effective use is being made of routine data*

Can we do more to engage clinical specialists and community and public health experts in the process of record, register, and report design, with the purpose of increasing the relevance of the recorded data for the management of the patient and the community health situation? Such registers, records, and reports can thereby reinforce proper clinical and management procedures.

### *Improving the data on the population being served*

Household enumeration of the population being served is becoming more common as a way to keep abreast of births and deaths occurring in the community, to update the size of target groups such as newborns and pregnant women, and to monitor their coverage with targeted services such as immunization. Such birth and death information can be shared with the civil registration authority.

### *Innovative approaches for strengthening routine health information systems and increasing staff capabilities to use data*

Most projects would benefit from engaging service staff and managers in actual data analysis, service strategy design, and problem-solving activities, using existing data. Examples of such activities that we have supported for this purpose include:

- clinic performance and data assessments;
- assessments and design of disease surveillance systems;
- practical service and program evaluations;
- program and service performance monitoring, and profile construction;
- implementing "health watch" functions;
- constructing and maintaining geographic displays of the health situation, service performance, and resource distribution;
- analyzing and presenting indicators of health service access, quality, and equity;
- developing and applying community, household, and target group enumeration techniques; and
- undertaking team problem-solving efforts.

### *Increasing data functionality and the effectiveness of centralized HIS units*

It should be possible to design improved -finding and case management, at the expense of having to maintain a few more forms and consolidate indicator data at levels above service delivery. This implies leaving much data system design with the responsible service programs, and developing basic reporting requirements with the involvement and guidance of clinical and public health specialists.

HIS units' focus should be on networking program and service data to enable more sharing and less duplication, assembling indicator data from the one source that is most likely to have them right, and preparing useful, management-oriented statistical and indicator presentations for monitoring implementation of national health policy, programs, and services.

### *Data for routine functions*

Instead of seeking to define "decisions" and the data they require, why not try to define and describe the functions, procedures, and tasks to be carried out at the various service levels? These service processes generate and require the data that make up our RHIS. The problem lies in the difficulty of defining such functions and processes when the clinical managers and administrators have failed to do so during the process of health system reform. This type of systems and procedures design should be carried out by clinical and administrative system experts, supported by information systems people. We need improved tools and methods to help procedures description efforts. This process approach to data system design should use "signals for taking action" that embraces the concept of data for decision making, particularly in the near-term, and unplanned actions in response to unexpected health situations.

### *Address health functions that are currently underserved with information support*

Can we begin to foster the identification of essential functions for protecting the health of the population? It should be possible to begin to invest in data systems for monitoring those conditions and functions, such as monitoring population target groups and coverage with essential services; monitoring critical



environmental conditions such as safe water, sanitation, and food safety; and providing effective surveillance of risk factors and infectious diseases.

The increasing tendency to decentralize health services management demands that we develop methodologies to facilitate the definition of processes and tasks that are being decentralized to district and facility levels. As service units become devolved from government health services, it is necessary to clarify the continuing recording and reporting requirements that must be continued to fulfill the government's responsibility for monitoring the health and service situation.

#### *Living with the health indicator movement*

We should strive to identify and maintain a modest list of nationally relevant health and service indicators that are drawn from important facility-based data that, when summarized, deliver additional information of value at the facility and district level, and that are useful at the policy level to enable managers to monitor health trends and service performance more easily.

#### *How to ensure relevancy, utility, and sustainability from by computerizing routine health information systems*

Can we revert to a tried and true maxim: don't touch the computer until the recording, reporting, and data use are proved effective within a manual system?

Further, can we insure that all systems design and development, including applications programming, is done by nationals, either staff in the health administration or from domestic consulting firms?

In addition, we must plan for the data entry workload expected from implementing the fully computerized system.

Finally, it is useful to begin to provide the products of computerization to service managers early in the development process and to seek their guidance for subsequent applications development.

#### *How to enhance the value and effectiveness of international cooperation in RHIS development*

Can we use this network to begin sharing the positive experiences from international support in RHIS development, as identified by the national managers of these developments? Can this network begin to devise and promote a "code of ethics" in RHIS cooperation, designed to prevent problems of nonsustainability?

### **Conclusion**

#### *Can we move toward some general principles in national RHIS development and cooperation?*

In the past, we may have been tempted to come too quickly to the formulation of general principles of national health information system development. Yet, it would be helpful if we could agree on some basic principles that we all could support, because we feel that their application will help others avoid the problems and difficulties we have encountered.

Perhaps a short list of possible principles of RHIS development would not be inappropriate at the end of this paper.

- Place the design and enhancement of patient and facility registers and records in the hands of national clinical and public health experts.
- Use action learning-by-doing processes to enhance the use of existing data by service staff and managers at all levels, rather than traditional training workshops aimed at satisfying reporting requirement.

- Increase use of central health information units more to foster the sharing of health information received from the various national health programs, and less to design service registers, records, and reports to be processed through comprehensive, integrated reporting systems.
- Foster the definition of national essential health functions, processes, and tasks as the basis for health system management, as well as the national health information system.
- Ensure that any health indicators for national and international monitoring draw on routine data known to be necessary for facility and community management.
- Recognize that any task performed by a foreign expert is one that is not performed or learned by national staff, and reduce the direct technical involvement of such experts in RHIS development in favor of national management of the design and implementation processes.
- Build RHIS improvement efforts into health service and support system projects, and avoid health information system projects.
- Enable the sharing of RHIS design and implementation tools, methods, and practices through the RHINO network.

## **Attachment 1**

### **Common RHIS Problems (Generalized from Actual HIS Assessments)**

1. Requirements for data recording and reporting by service staff are excessive.
2. Much of the required data are not used in case management and public health tasks.
3. Excessive recording and reporting burden decreases attention to service tasks.
4. Large amounts of data accumulate at all levels of the health system, few of which are analyzed and used.
5. Service staff and health policymakers and program managers are not aware of the practical usefulness and strategic importance of the data currently being recorded and reported, or the procedures for data use have not been established.
6. Indicators have not been defined clearly for use by service staff. Often they are a response to international reporting requirements.
7. Demographic data are frequently wrong or unknown, making it difficult to develop rates, ratios, and proportions.
8. Data routinely reported by health services are considered of dubious quality (with regard to timeliness, validity, and completeness), so they are not relied on.
9. Problems of data quality often relate to the lack of consistent case definitions and other standards.
10. Data on the health of those without access to services or on those who use private sector services are not routinely available.
11. There is increasing use of general and special purpose surveys, often supported through international cooperation. Such surveys collect data that should be available through routine reporting systems, and as such, should further lessen reliance on the routine data.
12. In many countries, the birth and death registration and disease surveillance systems do not function adequately, which adversely affects many planning, monitoring, and action-taking functions for which the national health administration is responsible.
13. Despite considerable investment in computers and data processing, inadequate use is made of computers for better management and communication of health data.
14. That being said, efforts to enhance computerization often are undertaken by external agencies and staff, which makes it difficult for the resulting applications to be maintained in the recipient country.
15. There is often a lack of coordination in data collection, data maintenance, and reporting, which results in inconsistency, gaps, and duplication in data and the resulting information.
16. Analysis and reporting of and feedback on health data and information from the central level to service levels are rare and not well prepared.
17. The organization of health information systems development and management is often affected adversely by frequent change of leadership, few and frequent loss of qualified staff (to the private sector), and varying styles and types of international cooperation.