Health Information

Defining essential information needs and indicators
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The management capabilities and performance of a health system can be improved by strengthening the information system it uses. This involves determining the strengths and weaknesses of the health system itself and focusing on its least functional areas. The first step is to analyse services so as to ascertain requirements for information and indicators, with particular reference to the management of clients, health units and the health system as a whole.

Until recently, data and information analysis and presentation were primarily performed at the national level. Increased financial constraints and a growing concern for decentralization and democracy have led to improved access to information across the spectrum of health care management. In most countries, unfortunately, information systems have not kept pace with decentralization and consequently do not meet the requirements of local health professionals and services.

It is evident that the definition of information needs and indicators requires consensus-building among all the actors involved in collecting data and using them. It is necessary to take into account the concerns of both the users and the providers of services. Sets of indicators for the health sector have been proposed by United Nations agencies, bilateral donor organizations, and nongovernmental organizations. However, it is essential for each country to develop its own indicators so that, in addition to satisfying international reporting requirements to the greatest possible extent, they help to ensure:

- adequacy for fostering the necessary action at client, facility and national level;
- ownership of the end product;
- the institutional capacity of the country using them.

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Framework for definition

A main goal of the health-for-all policy is to develop national health systems that function at a satisfactory level while solving the most important problems. Management should give special attention to elements of health systems that are not functioning properly. Information systems should be geared primarily to indicating where bottlenecks are occurring and monitoring attempts to clear them. The following framework is proposed for defining information needs and indicators.

The first step is to analyse priorities, service responsibilities and the critical resources of the health system. In order to define requirements for information in a health system one has to start by analysing the functions of its different management levels. It is desirable at this stage to have a full analysis spelling out the functions and activities at each level of the health service. If this is not feasible, however, a less comprehensive analysis can provide the functional orientation needed to define important information requirements, setting out the following:

- priority health problems;
- national goals and strategies;
- essential services for the prevention and management of priority problems;
- critical resources for the provision of essential services;
- important management processes needed for planning, monitoring and controlling services and resources.

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Some information needs for patient/client management

- Identifiers: name, address, sex, age, information on other family members, socioeconomic status of family.
- Follow-up on risk episodes: including vaccination status.
- For women: number and ages of children, contraception, illness during pregnancies and postpartum.
- Important episodes of illness: especially chronic illness, HIV infection, infants’ perinatal problems, childhood diseases.
- Risk factors and allergies.

Even in the absence of a complete functional analysis it is possible for national working groups to confirm priority health problems and the required services and resources, through reasonably brief group processes conducted at various levels in the system.

The second step is to use this analysis as a basis for identifying information needs and selecting indicators.

Identifying information needs

Routine health information systems should support the following types of management function.

- Patient/client management. In peripheral health services, as provided at health centres, most information gathered on individual clients is used for decision-making about them. It is of value in helping to ensure the continuity, integration and comprehensiveness of care, and determines the quality of data used at other levels.
Health unit management. At the facility or district level, the following types of information are recognized:

- aggregated data from the client level;
- population-based and internal management data from the health unit.

Health system management. Information needs vary with the degree of decentralization. At the national level, the requirements of policy formulation and strategic planning should be met. At the regional level, information should contribute to the technical and logistical support of districts and strategic mid-term planning. At the district level the primary consideration is to satisfy operational needs for measuring the functionality of the district health system.

Selection of essential indicators

In routine information systems an indicator may be defined as measuring the status of an important variable and permitting the measurement of changes in it over time. An indicator does not describe a situation in its entirety; it may only suggest what a situation is or give a clue to an unmeasurable phenomenon. For example, data collected in a health centre on diarrhoea represent only a fraction of the cases occurring in a community.

Indicators are quantitative measurements, generally including a numerator and a denominator, although some measure only a number of events and have only a numerator. The denominator is most often the size of the target population at risk for an event. Indicators that include a denominator are useful for monitoring change over time and for comparing areas. At the level of the health centre, and sometimes at that of the district, an indicator may be more meaningful if presented as an event, that is as a numerator only, than as a proportion or rate. This is especially true for rare but important events, such as maternal deaths or cases of haemorrhagic fever or meningitis.

Classification of indicators

The following classes of indicator can be distinguished. All of them can disclose the extent of equity or inequity.

Indicators of determinants or contextual factors refer to conditions that influence health or contribute to or are precursors of disease, such as population characteristics, socioeconomic conditions, behavioural factors, environmental conditions or other risk factors, some of which may be the subjects of health interventions.

Input indicators reflect health system resources needed to carry out service activities. Essential subcategories include finance, human resources, infrastructure, technology and supplies.

Process indicators monitor the performance of activities. Among the attributes considered are the quality and efficiency of services and support activities, and their acceptability, for instance culturally or ethically.

Output indicators measure the immediate results of processes or activities, including the number of services performed
or people served and the population coverage.

- **Outcome** indicators measure long-term effects, including changes in the health status of populations and those determinants and risk factors which are the subjects of intervention. In this category are the incidence and prevalence rates of specific diseases, death rates attributable to specific diseases, overall age-specific death rates, and the prevalence of risk factors such as smoking.

In order to illustrate the basis for these categories, one may consider a situation in which mothers have a low level of awareness of the value and sources of immunization. This constitutes a determinant that should be addressed by the immunization programme. An input of educational material, equipment, vaccines and trained staff can be progressively applied to vaccination activities (process). This raises coverage or output and consequently reduces morbidity and mortality from immunizable diseases (outcome).

### Characteristics of Reliable Indicators for Monitoring and Action

The process of selecting indicators can be helped if the following questions are answered.

**What subject matter should be covered by the indicators?** Indicators should be chosen which reflect a country’s most important health problems, their determinants, and the main health service responses to the problems.

**What are the indicators supposed to measure?** Defining what an indicator is supposed to measure can be more difficult than one might expect, since the meaning must be unambiguous to all health personnel. Does it really measure what is intended? For instance, what is measured by the caesarean section rate in a hospital? Is it the quality of care provided in the maternity unit? Is it the effectiveness of the referral system between health centres and the hospital? Is it the greed of obstetri-

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**Some Information Needs for Health Unit Management**

- **Data on utilization and coverage of curative and preventive services**
  - Absolute numbers of clients receiving particular services.
  - Proportion of population at risk receiving a service.
  - Continuity of care.
  - Referral.
  - Actual and perceived quality of care.
  - Community access.
  - Catchment details, including population size, age and sex distribution of population, population at risk for particular ailments, vital statistics on births and deaths.
  - Important health events, including maternal deaths and cases of infectious disease.

- **Resource management data**
  - Human resources.
  - Material resources.
  - Pharmaceuticals, vaccines and contraceptives.
  - Maintenance of equipment and facilities.
  - Finance.
  - Unit costs.
cians who suggest caesarean sections for women who do not need them?

**What is the cost and feasibility of collecting data?**
For some indicators the cost of collecting data would be high and the decision not to do so is easy to make. However, in other cases it is less easy to decide because the cost has to be weighed against the benefits of collecting the data. In most countries, for instance, routinely measuring life expectancy at birth is not feasible at any level of the health system, since it requires the collection of data that are normally available only from decennial censuses over a long period. It would be extremely costly to attain the level of organization needed for this purpose. Life expectancy at birth is therefore highly unlikely to be on the list of indicators for a country, whereas notification of infant or maternal deaths may well be an important trigger for action at the district and community levels. The data required for an indicator should be generated through routine services and should be of value for their management.

**What decision or action is to be taken on the basis of the indicator?** In other words, what is the relevance of the indicator? An indicator is useful if decisions based on the measurements taken contribute to improvement in the work of health personnel and consequently in the effectiveness and efficiency of the system. No indicator should be defined which is not used in connection with taking action.

In one country, health centres were asked to report the number of cases of gastritis on a monthly basis, even in the absence of both a specific diagnostic test and any known outbreaks of the condition. No rational decisions could be made in the light of the information generated, since there was no effective treatment for the condition. The information was not immediately or potentially useful to health staff.

**Does the indicator show changes in a situation?**
This is a question of specificity. For example, the infant mortality rate is not a specific indicator of the effectiveness of health care because it is influenced by many determinants, among them the socioeconomic conditions of households and the care given by mothers.

**Is a change shown by the indicator a true change in a situation?** In other words, what is the sensitivity of the indicator? For instance, one would expect the percentage of infants receiving appropriate vaccinations to be a sensitive indicator, since its value changes readily after campaigns encouraging women to bring their children to facilities for immunization.

**Is the indicator ethical?** It would be unethical, for example, to adopt an oral health indicator of decayed, filled and missing teeth based on a survey conducted in an area where no dental services were available.

**Making indicators operational**
Once an indicator has been accepted as appropriate it has to be further defined in order to make it operational. This is done by answering the following questions.

**What are the sources of the data?** Where can the required data be found? Who will be
responsible for their collection? What method of collection will be used?

For measles vaccination coverage the data of the numerator, i.e., the number of children aged under one year who are vaccinated, can be obtained from the cards of individual children or family folders, or from a registry, while the denominator, i.e., the number of children aged under one year, could come from the last local household survey or census in the catchment area of the health centre concerned. It is important that the recording or collection of the data at its source should serve a need for decision-making or action at the same level.

**What should be the frequencies of collecting data and processing and analysing the indicator?** The frequency of data collection should be determined by the urgency of the decision to be made or the speed of change in the measured variable. For example, financial and stock indicators usually require close monitoring, and data are usually collected comparatively frequently for this purpose.

An indicator such as measles vaccination coverage can be processed every six months or annually. The analysis of vaccination data too frequently, for instance monthly, is inappropriate because coverage can be affected by external factors such as the illness of a nurse or adverse weather. On the other hand, if data were collected only after long intervals an excessive burden would be placed on health centre personnel and the quality of the data would be greatly jeopardized.

**Who will use the indicator and how?**
The indicator should first be analysed and used for decision-making by the staff collecting and reporting the data. The specific action to be taken on the basis of the indicator should be confirmed and the decision criteria should be recorded in clinic or managerial procedures.

**What is the relation between an indicator and a target?** It is a common practice to set targets because the gap between measurement and objective helps decision-making. Thus targets are normally set in districts for the number of children in a new cohort aged under one year which must be fully immunized within a year. However, not all targets can be expressed as indicators.
What is the threshold of the indicator which should trigger action? The determination of a threshold for an indicator can help decision-making. Health staff should determine thresholds in accordance with national standards or local needs and resources. An example is the weight-for-age or weight-for-height cut-off point that signals severe malnourishment in a child.

What is the nature of the action or decision once the indicator reaches its threshold value? Clearly, action is necessary if benefit is to be derived from the indicator. A severely malnourished child, for example, might receive an examination in order to determine the cause of the condition, and the mother might be given information on feeding. If there are several such cases in a community a supplementary feeding programme might be set up.

Group processes for use in guiding national indicator selection have been devised and applied at the national policy, central programme and district service levels for the two steps proposed above and for identifying essential indicators related to priority health problems, services and resources (1). Indicators of proven usefulness have been listed (2).

The proposed framework for defining essential information needs and indicators should help to produce a balanced set of action-oriented priority indicators that satisfy well-established criteria. The consensus-building approach should ensure ownership of the end products and strengthen the development of health information systems in support of health systems in their entirety.

References


An earlier article dealt with the development of an action-oriented health information system in support of the whole health service (1). A further article to be published in World Health Forum will be on the use of information.