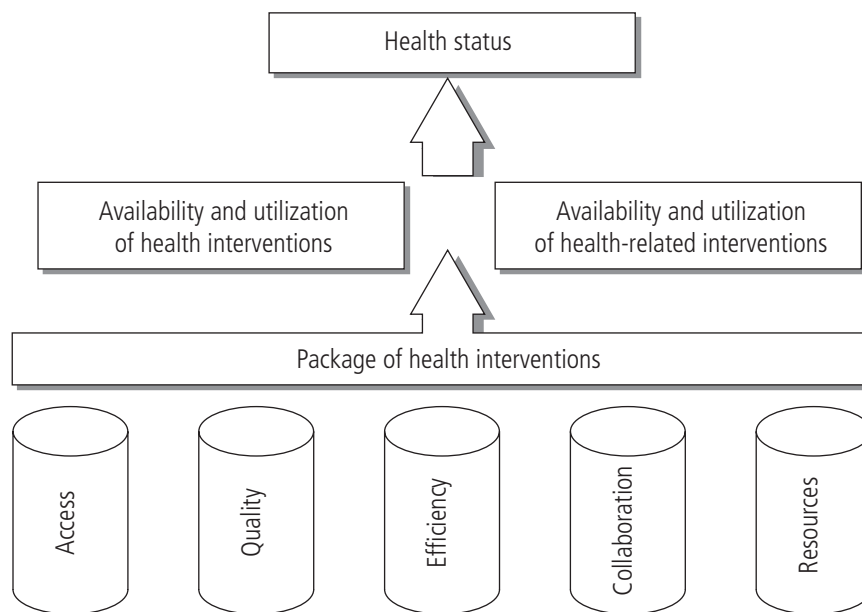Fig. 1. **Conceptual framework for health sector reforms and information**



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weak and its use, particularly in policy-making, is infrequent. Several efforts undertaken to strengthen health information have not taken into account any general framework for designing the information system.

The paper by Shaw describes efforts to correct the multiplicity of data sets in South Africa, especially at the periphery, without describing an overall framework for how this is to be achieved. Even though the process reported has reduced the data set to 100–150 elements and 80–120 indicators, the numbers still appear too large to manage effectively. An overall vision of health information needs in the context of health development is important even at the district level beyond programme managers. The current wave of health sector reforms and health system strengthening will require this broader context for the development and standardization of health information.

In Ghana, a conceptual framework for health sector development (health sector reforms) helped to generate indicators for health information (see Fig. 1). This framework allows data required for policy development, priority setting and programme performance measurement, as well as monitoring and evaluation, to be determined in the sector as a whole. Sectorwide indicators that fell into three main categories were agreed upon; 20 indicators are collected and used at all levels, which does not exclude the use of more indicators at any level.

The three categories of indicator concern: health status, including mortality and morbidity; programme output, covering programme performance in public health and clinical care interventions as well as health-related indicators such as enrolment at school; and systems development, in which a package of five cross-cutting areas of access to care, quality of care, efficiency in the use of resources, collaboration with other sectors (communities, other providers of care, other ministries and donors ) and financing of care is determined. Indicators in the first two categories are easily developed but are more difficult to define in the third category, where methods of data collection are also difficult as the indicators do not lend themselves to routine service statistics and surveys may be needed.

The impact of the process adopted in the South African experience is commendable, as it appeared to influence other districts, the regions and national levels. Its impact at the global level is not indicated but, given that global initiatives and donors have major information requirements, a process that links with global development is important.

With this in view, the Health Metric Network initiative is timely. Particularly welcome is the development of a simple framework to define the scope of the health information system. The framework should serve as a diagnostic tool for evaluating the state of a country's health information system, a road map for developing plans for improvement, and a process for monitoring and evaluating progress. Its application at the country level should build on experiences such as that described in South Africa. ■

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## A data warehouse approach can manage multiple data sets
Jørn Braa[1]

Development of essential national indicators and data sets — or national *standards* — is regarded as the key issue in country health information system reform. Most countries, however, fail to achieve this goal. The reasons are: fragmentation (difficulty in reaching agreement on standards across health programmes); focus on reporting rather than on use of data and information; constantly changing needs (e.g. with regard to HIV/AIDS); and standards that are "cast in stone" (software and paper tools are difficult to change).

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Despite these problems, South Africa has managed to develop national standards that are flexible enough to "absorb" local innovations and changes over time. The following points may help to explain why this is so.

- The "hierarchy of standards" ("information needs" in Shaw's figure) has been a powerful tool to negotiate a balance between the national needs for control with the local (e.g. province or health programme) needs for flexibility or more data. While all health units are required to collect and report the core national data, they are at the same time allowed to collect their own additional data.
- Use of information is highlighted by linking data sets to targets and indicators.
- The flexible approach to standards following the hierarchy makes it easy to absorb and implement changes over time; there is no "final" data set. Local innovations are allowed for and may eventually be included in the national data set.
- The flexibility of the South African District Health Information System (DHIS) database application is crucial to managing the ever changing national and local data sets. Data elements, indicators and data sets are added, edited and managed by the health services themselves, thus making it possible to manage multiple data sets at district level. This "data repository" or "warehouse" approach may be a key to how the lessons from South Africa could be applied in other countries.

Over the years, I have been involved in efforts to apply the South African lessons in many countries. It has not been easy. National health information system databases and reporting formats tend to be rigid and unable to respond to changes, thus leading to fragmentation of the system. The HIV/AIDS programmes are currently aggravating this situation.

So what can be done? Current efforts to establish integrated data sets in contexts as different as Addis Ababa (Ethiopia), Botswana, Zanzibar (United Republic of Tanzania), Andhra Pradesh (India) and Ho Chi Minh City (Viet Nam) may provide some answers. Here data sets from all or most programmes are combined and streamlined by sorting out overlaps, gaps and inconsistencies. Following the South African district data warehouse approach, the combined essential data set is then further improved and reduced by focusing on the need-to-know indicators. Programme-specific software applications are linked electronically to the DHIS, thus providing a shared data repository. The objective of integrating all indicators relevant to the Millennium Development Goals has proven important in building consensus.

Purists may argue that the data warehouse approach based on flexible standards advocated here is violating the spirit of the South African *minimum* essential data set approach, by taking a combined — *maximum* — data set as the point of departure. It may, however, be the most appropriate way to apply the South African indicator-driven approach in a situation increasingly dominated by strong programmes and multiple uncoordinated data sets and software applications. ■

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# The data set must focus on service quality

Jens Byskov[1] & Oystein Evjen Olsen[2]

The paper by Vincent Shaw highlights some of the long awaited practical approaches to ensure relevance and use of health information systems in developing countries. The South African experience he recounts is very relevant as current "best practice". It is a very important step forward in the simplification and integration of programme areas and routine services into a shared essential set of routine data. The cohesion of health services and the whole system will be much strengthened by such a shared data reference and information base.

The essential data are still to be selected by programme managers, however, even though the definition of the data set emanated from the district level. It is not shown how the data will be turned into useful information that will assist in planning and monitoring at all levels of the health system. The examples taken from the nutrition programme and the Expanded Programme on Immunization only exemplify health status (outcome) and service provision (output) data.

In the section on specific programme surveys, resource and staff availability are mentioned as well as service quality. It is worrying that these are not shown to be included in an essential routine data set, as it is extremely important that an essential data set allows production and sharing of information on health management. It is also not shown whether quality of care will be viewed from both provider and user perspectives and whether user views on service priorities and other qualitative data are included.

In Shaw's figure, the column of information used by the national level on a routine basis within the triangle of information should be seen as the core data on facility performance that must be shared in an accessible database for the whole health service and other parts of the health system, and be available for sharing with users and the public.

The information needs triangle could also be depicted as service quality at the bottom, supervision and coordination needs at the intermediate level, and policy needs at the top. The main focus of the data set must be on service quality, with less emphasis on supervision and coordination and even less on policy. Service quality must relate to health management, service output and outcomes as viewed from both the provider and the user sides.

The number of data elements and indicators still seems to be high in relation to similar elements in the core part of the health information system in other African countries and may indicate a still limited degree of compromise and shared focus between the levels and programmes. A stronger emphasis is needed on the iterative nature of the health information system, and not so much on annual or quarterly "reporting". We need to move away from a culture of reporting to a culture of using the data for ourselves — facilities or districts first — on a continuous basis. Benchmarking and quality assurance processes exemplify some useful frameworks for continuous use of data. ■

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