Round Table

Health information system reform in South Africa: developing an essential data set

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Abstract Health services are increasingly under pressure to develop information systems that are responsive to changing health needs and appropriate to service objectives. Developing an essential data set provides managers with a clearly defined set of indicators for monitoring and evaluating services. This article describes a process that resulted in the creation of an essential data set at district level. This had a significant impact on neighbouring districts and resulted in the development of a regional essential data set, which in turn helped to influence the creation of a provincial and then national essential data set. Four key lessons may be drawn from the process. The development of an essential data set both requires and can contribute to a process that allows the reporting requirements to be adjusted over time in response to changing circumstances. In addition, it contributes to (and requires) the integration of programme reporting requirements into a coherent information system. While the case study describes a bottom-up approach, a top-down consultative process is advocated because it establishes a framework within which information needs can be reviewed. Lastly, the use of surveys can aid efforts to keep the essential elements to a minimum. In conclusion, the development of an essential data set contributes to strengthening health services because it necessitates dialogue between programme managers and defines indicators to be monitored by them.

Keywords Information systems/organization and administration; Health status indicators; Data collection/methods; Community health services; Delivery of health care; Program evaluation/methods; South Africa (*source: MeSH, NLM*).

Mots clés Système information/organisation et administration; Indicateur état sanitaire; Collecte données/méthodes; Service public santé; Délivrance soins; Evaluation programme/méthodes; Afrique du Sud (*source: MeSH, INSERM*).

Palabras clave Sistemas de información/organización y administración; Indicadores de salud; Recolección de datos/métodos; Servicios de salud comunitarios; Prestación de atención de salud; Evaluación de programas/métodos; Sudáfrica (*fuente: DeCS, BIREME*).

الكلمات المفتاحية: نُظُم المعلومات، مؤشرات الوضع الصحي، جمع المعطيات، طرق جميع المعطيات، الخدمات الصحية المجتمعية، إيتاء الرعاية الصحية، تقييم البرامج، طرق تقييم البرنامج، جنوب أفريقيا. (المصدر: رؤوس الموضوعات الطبية، المكتب الإقليمي لشرق المتوسط).

Bulletin of the World Health Organization 2005;83:632-639.

Introduction

Increasingly, information systems for monitoring health services are being scrutinized for their appropriateness and ability to provide meaningful information to managers (*1–4*). The vision of the District Health Information System (DHIS) developed in South Africa is "to support the development of an excellent and sustainable health information system that enables all health workers to use their own information to improve coverage and quality of health care within our communities" (*5*). According to the basic principles of the DHIS, it supports the district-based primary health care approach, collects essential data used to calculate indicators, encourages decentralized use of information by health workers, includes all service providers at all levels, and integrates with and supports other information systems.

Over the past 10 years, a comprehensive primary health care information system has been developed in South Africa. One of its key elements is an essential data set, which may be defined as a set of the most important data elements, selected from all primary health care vertical programmes, that should be reported by health service providers on a routine basis, with the aim of being able to generate indicators that monitor the provision of health services in an integrated manner. An essential data set is thus important in that it contributes to the principles listed above and facilitates decentralized use of information by health workers because their monitoring needs are clearly defined.

There are two key messages in this definition, contained in the linked concepts of integration and an essential data set. Programme managers (e.g. coordinators of the Expanded Programme on Immunization (EPI) and programmes for women's health, HIV/AIDS and sexually transmitted infections, and tuberculosis), in an effort to ensure that all angles of service delivery are taken into consideration, often require a very large amount of information for their specific programmes. Their primary concerns are their programme needs, and little attention is given to the means of collecting the information or

the needs of other programmes. The requirements of various programmes may duplicate each other, and the vertical reporting of this information often requires separate data collection tools. As a result, the health worker is faced with a myriad of books and forms, all used to collect information for specific managers, but with little integration and no vision of its use at the local level. Experience has shown that the larger the number of data elements to be reported upon, the poorer the quality of the data (6, 7).

The creation of an essential data set is based upon two key principles: limiting the routine reporting requirements for primary health care and hospital services to a set of 100–150 data elements, enabling the calculation of 80–120 indicators; and integrating the reporting requirements of various programme managers, so that their needs are contained within the set of essential data elements and indicators.

This article describes a process that resulted in the creation of an essential data set at district level. This had a significant impact on neighbouring districts and resulted in the development of a regional essential data set, which in turn helped to influence the creation of a provincial data set.

Developing an essential data set at district level

In a remote district in the northern part of the Eastern Cape Province, the district management team found that the data collected by the clinic staff seemed inappropriate for the adequate management of services. Until then, data had been submitted to the head office on a routine (quarterly) basis, but no feedback was ever received. The requirements for data submission had been determined by head office staff many years earlier and had not been revised to accommodate recent changes in the priorities for health service delivery.

The decision to review the data collected at facility level took place in 1994, when the "new" South Africa was requiring an increasingly decentralized management structure and greater transparency in terms of access to information and health statistics. In addition, the focus had shifted significantly from a hospicentric health service to a health service orientated towards primary health care.

The district team evaluated all the services that they were providing, and identified data elements or indicators that would accurately monitor these services. This exercise included a process of evaluating existing data elements being collected. For each data element that health workers wanted to be included, they had to answer the questions: Why do we want to collect this information? How will we use it? The answers should underpin the need to monitor the integrated strategic plan for the district. If the health workers could not come up with a reasonable answer to either of the questions, the data element was discarded or reformulated so that the questions could be answered.

A long list of data elements and their associated indicators was developed. Then began a process of whittling away at the list until about 70 elements remained, which were considered the most essential data elements required to calculate about 75 indicators. This set of indicators was small enough to allow management to focus on the key aspects of service provision, yet was large enough to monitor services across all programmes. It provided management with an integrated system for assessing services. Along with the data elements and indicators, a set of data collection tools was developed.

Box 1. **An essential data set must be able to accommodate changes over time**

There were a number of important modifications that came about as a result of the process of establishing an essential data set. One example that highlights how experience influenced the development of the data set hinges on the data elements collected for antenatal services. Two of the antenatal indicators were:

- antenatal coverage (first antenatal visit divided by the expected number of pregnancies in the women of childbearing age);
- average antenatal visits per antenatal client (first antenatal visit plus follow-up antenatal visit divided by the first antenatal visits).

The district management team found a very high antenatal coverage rate in the district (112% for January–December 2000); with an average of three antenatal visits per antenatal client, it was apparent that the pregnant population was able to access the required services. The next step was to seek to improve the quality of services by first determining the percentage that accessed the services within the first 20 weeks of pregnancy and, if necessary, increase it. The team's gut feeling was that a very low percentage actually accessed services in the first trimester. Hence a new, more specific indicator was introduced and the existing data element "First antenatal visit" to be split into: "First antenatal visit within first 20 weeks of pregnancy" and "First antenatal visit after 20 weeks of pregnancy".

Managing upwards: the district influences the region

As the district implemented the new system, adjoining districts came to learn about the new data set and its efficiency. Gradually, pressure from other areas within the region to implement the same data set mounted; as a result a regionwide consultative meeting was convened, at which the district data set was assessed and adapted to accommodate the needs of the region. This, in turn, resulted in the region approaching the province to reduce the number of indicators being reported upon; finally, after some time, the province approached the national administration, and in June 2002 a national workshop adopted an essential data set for the country.

Important lessons learned from this process
Reporting requirements must be able to change over time

Changing needs of patients require changing reporting requirements, as evidenced by the emergence of the HIV/AIDS epidemic and increasing access to antiretroviral therapy. In the case of the HIV/AIDS epidemic, managers at the central level have generally been responsive to the needs of patients and the reporting requirements of donors. The reality is, however, that these managers operate from positions of power and are able to impose reporting requirements even if they have not been well thought through. Managers at facility level may have a better grasp of the needs of patients, but they have less influence in making these needs known. The result is that once reporting needs have been defined, they remain cast in stone.

Reviewing reporting requirements requires a broadly consultative process between managers of different programmes in order to ensure that duplication is avoided. This is not easy to achieve.

As managers use information, their understanding of its meaning improves and their demands become more sophisticated. Bodart & Shrestha (8) describe four types of indicator

(count, proportion, rate and ratio). Our experience has shown that managers are initially most comfortable identifying count indicators (e.g. number of patients with hypertension). They should be encouraged to look beyond this, however, to identify how they would use this count indicator to improve service delivery. This often leads to the development of indicators which bring in another data element as the denominator, creating one of the other three indicator types. Box 1 provides an example from which it can be seen that an atmosphere needs to be created where the review of reporting requirements is acceptable, even the norm. This needs to be the case both at the central and the peripheral levels.

Programme reporting requirements must be integrated in order to ensure the development of coherent information

There should be agreement among programme managers to adhere to the principle of developing an integrated data set. In the absence of this, health workers at the facility level are likely to have to cope with uncoordinated and often duplicate demands for information that will result in their being distracted from their primary function — providing health services. An example would be where the nutrition programme requires reporting on the number of children under five years of age attending the clinic, number of children weighed, and number of children with malnutrition. In order to be sure that facilities report on these elements, the programme develops a data collection form specific to its needs. At the same time, EPI requires reporting on children attending under two years of age, and

immunizations given to them (BCG, DPT1-2-3, OPV1-2-3, etc.). It also develops a report format specific to its needs. Both these programmes are targeting the same population group, without considering that, from a health care worker's point of view, the child who needs to be immunized also needs to be weighed and given vitamin A, and in the clinic it is the same health worker who provides all these services. Adopting an integrated approach would ensure that systems are developed which complement each other and are appropriate to the manner in which services are delivered.
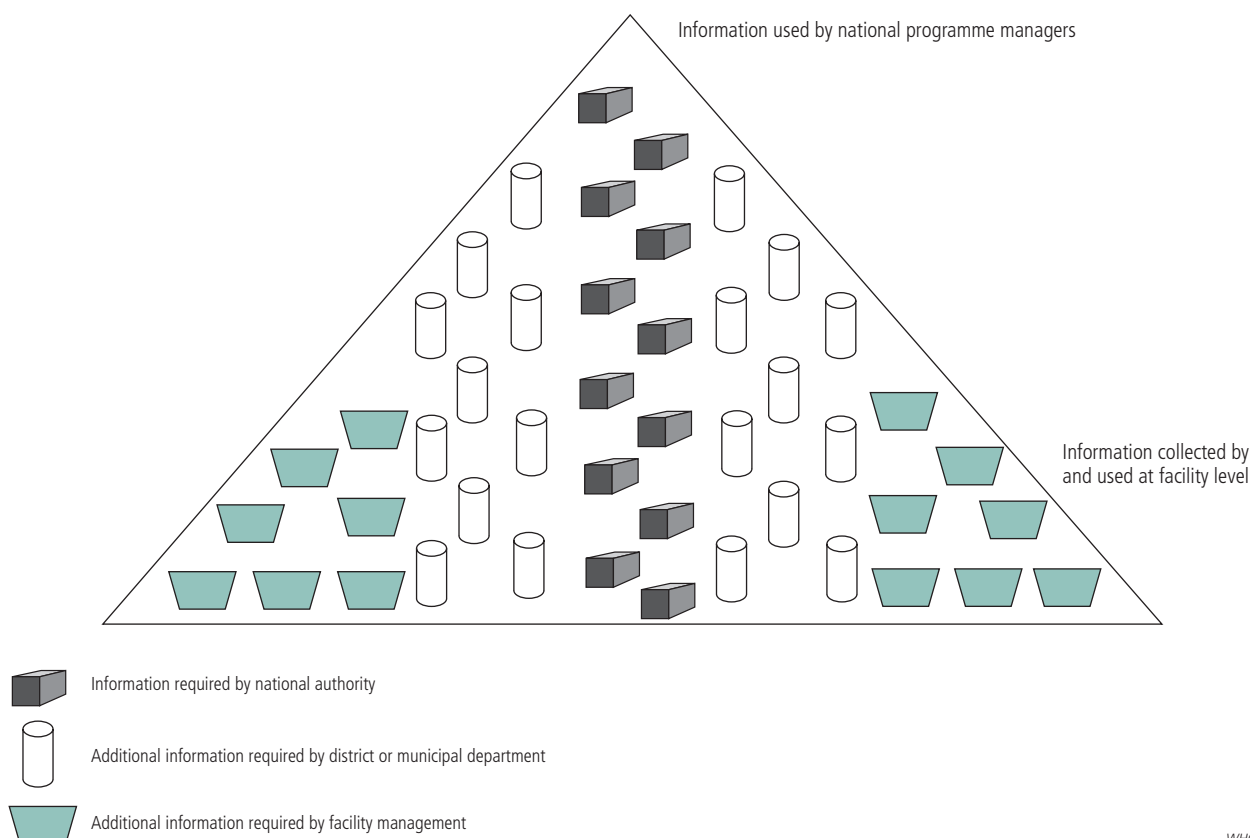
An integrated data set also provides managers at facility and district alike a clearly defined target to work towards, both in terms of collecting and using the information.

A top-down consultative process establishes a framework for review

The creation of an essential data set for South Africa began as a bottom-up process. Decentralized districts are often less bureaucratic in nature than central systems, and more responsive to the changing needs of patients. As a result, they are able to see the need to revise reporting requirements and are able to effect a change reasonably easily. It is also easier to bring different programme managers together at district level, to ensure integrated reporting.

A more strategic position to adopt, however, would be for a national ministry to take it upon itself to facilitate the development of an essential data set for the country. A concept in support of this process is a hierarchy of information needs (5, 9).

Fig. 1. **The hierarchy of information needs**

Information used by national programme managers

Information collected by and used at facility level

■ Information required by national authority

▮ Additional information required by district or municipal department

▱ Additional information required by facility management

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A hierarchy of information needs operates at the following levels.

1. A national ministry determines an essential data set — this is the minimum reporting requirement for all facilities and health service providers in the country.

2. The next level of management (a region or province) adds indicators that they believe they should collect in order to be able to manage their services efficiently (e.g. in the example in Box 1 the original indicator was split in order to obtain more detailed information).

3. A district management team adds to the regional essential data set indicators they believe are important to manage their services (e.g. a district wants to improve the supervision process in clinics, so monitors the percentage of planned supervisory visits undertaken).

4. A facility develops an essential data set which includes indicators from the ministry, region and district, as well as their own indicators (e.g. if facility staff want to confirm that they carry an increasingly large workload of patients from outside their official catchment area, they develop an indicator "Percentage head count attendances from outside the catchment area"). The type of information important for a facility management committee, and possibly for a district, is not necessarily relevant at the national or regional levels.

Applying the concept of a hierarchy of information necessitates adherence to the principle of only transmitting the information that is required to the next level. With the advent of computers, and patient-based information systems, the temptation to transmit all the information through to all levels must be resisted.

Additional information can be collected through specific programme surveys

In order to ensure that the essential data set is limited in size, it is necessary to provide programme managers with an alternative mechanism for collecting programme data outside the routine reporting system. This is done by using surveys.

Surveys should be used to gather information that will complement the routine reporting. As some indicators do not change much over time, they do not need to be reported on monthly — they could be collected annually or quarterly through the use of surveys. Typical contents of a survey questionnaire would be questions about quality of care, availability of equipment, staffing and budget allocations. Surveys can be used creatively to strengthen health services. For example, it may be that in order to reduce the cost of surveys, a three-year rolling plan is developed, ensuring that each year a third of all facilities are surveyed: all are surveyed over the three-year period. A survey data set would contain core information that is common to all the years, and additional information could be changed from year to year according to need.

Conclusion

Developing an essential data set provides managers with a clearly defined set of indicators for monitoring and evaluating services. The process of developing an essential data set can strengthen the health services and the health information system because it requires coordination of reporting requirements among programme managers, and the creation of a framework for reviewing information needs over time. Applying the concept of a hierarchy of information needs allows each level within the health service to develop its own data set, while still responding to the needs of the central administration. This encourages the use of information at a local level because each level has been involved in determining the indicators and data elements that are collected. Annual surveys can be used to complement routine reporting, enabling the essential data set to be kept to a minimum. ■

Résumé

Réforme du système d'information sanitaire en Afrique du Sud : mise au point d'un jeu de données essentielles

Les services de santé sont de plus en plus incités à développer des systèmes d'information réagissant à l'évolution des besoins sanitaires et répondant aux objectifs de service. La définition d'un jeu de données essentielles fournit aux gestionnaires une série d'indicateurs clairement définie permettant de surveiller et d'évaluer les services. Le présent article décrit un processus aboutissant à la création d'un jeu de données essentielles au niveau du district. Cette opération a eu un impact important sur les districts voisins et a conduit à la mise au point d'un jeu de données essentielles pour la région, processus qui, à son tour, a contribué à l'élaboration d'un jeu de données essentielles à l'échelle de la province, puis du pays. Quatre enseignements peuvent être tirés de cette expérience. La mise au point d'un jeu de données essentielles nécessite un processus permettant d'ajuster les exigences de notification au cours du temps en réponse à l'évolution des circonstances, processus auquel elle peut en même temps contribuer. En outre, elle facilite (et impose) l'intégration des exigences de notification des programmes dans un système d'information cohérent. Bien que l'étude de cas décrive une démarche partant de la base, un processus consultatif descendant est préconisé car il fixe un cadre dans lequel les besoins en information peuvent être analysés. Enfin, la réalisation d'enquêtes peut contribuer aux efforts pour limiter le plus possible le nombre d'éléments essentiels. En conclusion, la mise au point d'un jeu de données essentielles participe au renforcement des services de santé car elle implique un dialogue entre les directeurs de programmes et la définition d'indicateurs que ces derniers doivent surveiller.

Resumen

Reforma de los sistemas de información sanitaria en Sudáfrica: desarrollo de un conjunto de datos esenciales

Los servicios de salud se encuentran sometidos a una presión cada vez mayor para desarrollar sistemas de información sensibles a las nuevas necesidades de salud y apropiados para alcanzar los objetivos fijados. Un conjunto de datos esenciales puede dotar a los administradores de un abanico claramente definido de indicadores para vigilar y evaluar los servicios. En el presente artículo se describe un proceso que permitió crear un conjunto de datos esenciales a nivel de distrito. Ello tuvo importantes repercusiones en los distritos vecinos y condujo a desarrollar un conjunto de datos esenciales de ámbito regional, lo cual influyó a su vez en la creación de un conjunto de datos esenciales provincial y más tarde nacional. Cabe extraer del proceso cuatro importantes lecciones. El desarrollo de un conjunto de datos esenciales exige y al mismo tiempo puede favorecer un proceso que permita ajustar

las necesidades de información con el tiempo en respuesta a la evolución de las circunstancias. Además, propicia (y requiere) la integración de los requisitos programáticos en materia de presentación de informes en un sistema de información coherente. Mientras el estudio de casos describe un enfoque ascendente, aquí se preconiza un proceso consultivo descendente, pues así se establece un marco en el que pueden analizarse las necesidades de información. Por último, la utilización de encuestas puede ser una ayuda para reducir al mínimo los elementos esenciales. En conclusión, el desarrollo de un conjunto de datos esenciales contribuye a fortalecer los servicios de salud porque requiere que haya diálogo entre los gestores de los programas y define los indicadores que éstos deberán vigilar.

ملخص

مائدة مستديرة إصلاح نُظُم المعلومات الصحية في جنوب أفريقيا: إعداد مجموعة المعطيات الأساسية

تعاني الخدمات الصحية من تزايد الضغوط عليها لإعداد نُظُم معلومات صحية تتسم بالاستجابة للاحتياجات الصحية المتغيِّرة وللأغراض الملائمة من الخدمات. ويتيح إعداد مجموعة المعطيات الأساسية للمديرين مجموعة من المؤشرات المحددة تحديداً واضحاً لرصد ولتقييم الخدمات. وتصف هذه الورقة عملية انتهت بإعداد مجموعة المعطيات الأساسية على مستوى المقاطعة. وقد كان لهذه العملية تأثير واضح على المقاطعات المجاورة وأدت إلى إعداد مجموعة المعطيات الأساسية على صعيد المنطقة، والتي ساعدت بدورها على التأثير لإعداد مجموعة المعطيات الأساسية على صعيد الولايات، ثم على الصعيد الوطني. وهناك أربعة دروس مستفادة من هذه العملية. ويتطلب إعداد مجموعة المعطيات الأساسية عملية تسمح بتعديل متطلبات الإبلاغ مع مرور

الوقت، وتساهم في تلك العملية نفسها للاستجابة للظروف المتغيرة. وبالإضافة إلى ذلك فإن هذه العملية تساهم في إحداث التكامل بين متطلبات الإبلاغ في البرامج وبين نظام متسق للمعلومات، كما أن هذه العملية تتطلب ذلك التكامل أيضاً. ورغم أن الحالة المدروسة تصف أسلوباً ينطلق من القاعدة ويتجه للقمة فإن ما ينصح به هو إتباع عملية تشاورية تبدأ من القمة وتتجه للقاعدة، لأن ذلك يرسخ إطاراً يمكن أن تراجع الاحتياجات من المعلومات ضمنه. وأخيراً يمكن لاستخدام المسوحات أن تقدم المساعدة للجهود المبذولة للمحافظة على العناصر الأساسية في حدها الأدنى. وبالنتيجة فإن إعداد مجموعة المعطيات الأساسية يساهم في تعزيز الخدمات الصحية لأفا تجعل الحوار ضرورياً بين مديري البرامج كما أفا تحدد المؤشرات التي ينبغي عليهم رصدها.

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