

P. Garner, T. Harpham, & H. Annett

Information support for urban primary health care

Excessive centralization and other pitfalls encountered in many health information systems are examined below in the light of experience gained during an urban slum improvement project in a developing country.

Low-income groups in cities of developing countries often have poor health and limited access to health services. In response to this, slum improvement projects have been set up with primary care as a major component, possibly based on health centres covering the needs of populations in defined geographical areas. There is usually a strong preventive emphasis, community health workers being used to promote and communicate basic health messages and to assist in the organization of primary care activities. Examples include the Kampung Improvement Project in several Indonesian cities and slum improvement projects in Lusaka, the Zambian capital, and in Calcutta, Hyderabad, Indore, Visakhapatnam and Vijayawada in India.

The management of the health components of these multidisciplinary urban projects has rarely been evaluated and there has been little discussion about health information systems on which management decisions can be based. Experience in rural areas suggests that projects may be in danger of generating

data rather than realizing health care activities (1). As health information systems become rapidly institutionalized, poor planning may lead to unwieldy arrangements that are difficult to change.

The slum improvement project forming the background to the present article concerns a Third World city with a thriving industrial economy, a population of some 800 000, and 170 slums. The project was developed by a donor government working in conjunction with the municipal corporation. The objective was to raise the level of health, education and community life. The proposed health indicators were infant mortality and morbidity rates, nutritional status, especially among children, and birth rates, all of which were to be determined by means of household surveys.

Primary care was focused on health centres, each serving up to five slums. A part-time honorary medical officer was appointed to each of these units, where there was also an assistant midwife. In each of the slums a community health worker, who received an honorarium from the project, was responsible for organizing health activities for approximately 1000 people. Coverage increased each year as more honorary

Dr Garner and Dr Harpham are with the London School of Hygiene and Tropical Medicine, Keppel Street, London WC1E 7HT, England. Dr Annett is with the Liverpool School of Tropical Medicine, Liverpool, England.

medical officers, assistant midwives and community health workers were employed. It was intended to cover 45 slums in the first year, 105 in the second and all 170 in the third. The project was run by a director and a health manager, who were aided by an assistant manager, a clerk, a computer programmer and a part-time public health consultant.

Health information system

The community health workers and assistant midwives spent up to three months preparing dossiers on families. The files were held at the primary care centres.

When it became apparent that access to the files during immunization or outpatient clinics was more difficult than had been anticipated, the health workers introduced an information system in which there was a register for each activity. Thus there were up to ten registers in each centre, listing children under one year of age requiring immunization, pregnant women requiring antenatal care, couples eligible for family planning services, and so on.

The health managers, advised by an overseas consultant, collated the information collected from each slum by the community health workers, doctors and assistant midwives. An attempt was made to measure various indicators, among them those reflecting mortality and fertility. This package was decided by the medical officers, managers and health consultants involved in the project, and consisted of 74 separate pieces of information.

The system was implemented after training workshops had been held for the health staff. By the second year of the project these people were completing forms monthly and supplying them to the project manager's

office. However, in the absence of the requisite personnel and technology the 7770 pieces of information obtained each month from the 105 slums covered had to be filed away unanalysed.

At this stage the system was assessed. Health managers considered that the main problem was a failure to computerize the

Health impact evaluation based on routine observational data should probably be excluded from health information systems on the grounds of unreliability, bias and cost.

information. However, the problems were clearly broader than this: a large proportion of health workers' time, in particular that of the community health workers, was being spent on completing forms; the accuracy of the data was doubtful; and the information was not being used for decision-making at local or municipal level. The basic reasons for the failure of the system were that too many data were being collected and that the handling of information from primary health care workers was too centralized. The honorary medical officers at the primary care centres had no specific training in public health or management, and the monitoring and supervision of health workers had not been delegated to them.

Evaluation and modification

One of the main technical problems leading to the overloading of the system was the inclusion of demographic data such as monthly numbers of people migrating in and out, and of data on infant, perinatal,

adult and maternal mortality and on stillbirths. Evidently a decision to measure the impact of the project by way of the system had been made at an early stage, even though the original proposal had been that a sample survey should be used for this evaluation.

In the first stage of rationalization, indicators such as the number of households with latrines, which it was inappropriate to record monthly, were excluded. Data redundancy and duplication were eliminated; for example, total births and total deliveries were asked for. Ambiguous and complicated variables were excluded, such as the number of children aged one year who were fully immunized and whose mothers had received all antenatal immunizations. Some parameters were modified so that they conformed to the state requirements for primary care, thus relieving community health workers of the task of filling in separate sets of forms for the government. A second round of rationalization was conducted using a formal evaluation tool (see box).

Management of the slums was then decentralized to four regions, in each of which the managers met the health workers monthly to review activities. These meetings both bolstered morale and improved the participation of the doctors in monitoring and supporting the activities of the community health workers and assistant midwives. A programmer was employed to take charge of data entry in the simplified system.

Of course, the modification of such a complicated system was unlikely to produce a perfect result. The number of indicators was reduced and responsibility for those that remained was divided between the community health workers, assistant midwives and honorary medical officers.

Rationalization of indicators in a health information system

Step 1: each proposed indicator is reviewed with respect to:

- the information required to derive it;
- how the information could be collected, who could collect it, and how easy collection would be;
- the likely accuracy of the information, given the mode of collection;
- how the indicator would be used in decision-making at local and project level, given the accuracy of the information;
- the potential value of the indicator in decision-making.

Step 2: the indicators are ranked.

Using the above analysis, each indicator is scored from 0 to 5 with respect to three variables: ease of collection, accuracy, and value to managers. The scores for the three variables are summed and the indicators are ranked.

Step 3: unsuitable indicators are eliminated.

High-scoring indicators are retained and low-scoring ones are eliminated.

However, true devolution of decision-making and data collation was not achieved, and the centre remained in control. The project staff may still consider that the main function of the system is to provide accountability to superiors, notably the donor agency.

Lessons

The case study demonstrated the problem of a health information system led by data rather than by the need for data on which to base decisions.

The managers considered that the system should measure the impact of the project. The proposal that formed the basis for funding by the donor organization included indicators such as infant mortality which could be used for the evaluation of objectives. Although it was intended that these indicators were to be determined by means of a sample survey, at some stage it was decided by the people responsible for implementation, in consultation with technical advisers, to include them as components of the system. This meant that a large additional amount of demographic information had to be collected.

In the drive to improve the lot of the urban poor, objectives were defined only in terms of impact measures (changes in mortality, fertility and nutritional status). This induced the implementers to include these measures in their health information system, making it into one of demographic surveillance. However, health impact evaluation based on routine observational data should probably be excluded from health information systems on the grounds of unreliability, bias and cost (2). The data are difficult to collect accurately, are rarely useful in planning, and, even if precisely collected, are unlikely to show any effect of intervention.

There is some value in reporting infant or maternal mortality in slums as part of the process of auditing how deaths might be avoided. If managers wish to use this time-consuming method they should assist health workers to investigate deaths with a view to uncovering deficiencies in the service provided.

Donors should be specific about what to include in and exclude from health information systems, and, in partnership with recipients, should develop process indicators to measure and monitor the implementation of projects. These indicators should be simple to measure and should give an idea of how well the systems are functioning. They can be collected during managers' facilitating and monitoring visits or by health workers themselves as they assess and manage their own work.

Donors and managers should realize that routine data need not be comprehensive. Data collection methods should be appropriate to the requirements for information. The best approach involves routine collection of certain data, intermittent collection of other information, and occasional surveys, rapid appraisals, and small-scale operational research.

The use of family health files proved too unwieldy and was abandoned. Coverage by registers was clumsy, and, once the baseline study was over, health workers rarely added families to registers. The registers were not

Donors should be specific about what to include in and exclude from health information systems, and, in partnership with recipients, should develop process indicators to measure and monitor the implementation of projects.

checked by independent validation surveys, and the information collected monthly on births, deaths and migration indicated that the data were incomplete. It is not known whether all households in given areas were included by the community health workers who were responsible for them.

The present study touches on the emerging problem of population-based health information systems in urban primary care projects. In rural district health systems, where populations may be stable, the population-based systems that are often used

Health information systems should focus on the activities of health workers, not on measures of coverage.

in maternal and child health clinics and in outpatient care are time-consuming and may be impractical. The transfer of these systems to urban areas is inappropriate. Urban people tend to be more mobile and to have potential access to many more health service outlets than people in rural areas. Thus the accuracy and validity of registers held by urban health centres is likely to be poor.

While the improvement of primary health care coverage is clearly a priority, the establishment of population-based information systems is not. Registers of target groups for activities such as immunization and family planning are often erroneously considered to be population-based, yet in reality they almost always indicate actual users of services. Health information systems should focus on the activities of health workers, not on measures of coverage. If there is a need for denominator data in the catchment areas of a health service they can be obtained by household enumerations at intervals of one to three years. Coverage can also be examined indirectly. Thus the ratio of triple vaccine (third dose) to triple vaccine (first dose) gives a good indicator of compliance

in respect of the completion of a vaccination schedule. Antenatal coverage can be examined by comparing antenatal registration with the births registered in clinics over a year. The registration of births can be assessed in relation to expected births as calculated from national crude birth rates and estimated populations in particular catchment areas.

In the urban context, moves towards the holding of health information by clients themselves are likely to prove advantageous in terms of efficiency and simplicity. Such moves should be accompanied by simple enumeration by health workers of their activities. If data are held in people's homes, information is accessible to whichever health worker is consulted. Furthermore, it becomes possible for ad hoc surveys to be conducted at outpatient departments or in the community if managers wish to examine particular matters, such as vaccine coverage.

The initial plan was that management, together with information collation and interpretation, should be centralized. However, given the number of slums and health workers participating in the project, this was not viable. In the urban setting, the geographical accessibility of primary care units to the centre means that managers are less likely to delegate decision-making to the local level. However, as in the present case study, a lack of delegation can be expected to produce a huge upward flow of information that could not be analysed or used. It is therefore important at an early stage in projects to devise a form of decentralized management, with consolidation and use of information at the local level and a comparatively limited flow to the centre of data relevant to management control and planning.

The health information system was intended to be as comprehensive as possible.

Agreement between health workers, managers and consultants was reached by the addition of indicators, a traditionally uncontroversial activity. It was relatively easy to find reasons for collecting particular indicators, but reviewing the feasibility of the system as a whole was not initially considered. As indicated previously, the system did not at first meet government expectations about data to be obtained from primary care projects.

The managers felt that the failure of the system initially was due to inadequate programming and computer resources. Clearly, however, computerization could not have reduced the time spent by health workers in collecting information.

* * *

The present case study illustrates problems of health information related to impact measurement, unwieldy family files, undue

centralization of data collation, excessive numbers of health indicators, incompatibility with existing health information systems, and computerization seen as a panacea. Steps should be taken to support appropriate health information systems rather than ones that are excessively elaborate. □

Acknowledgement

Dr Garner and Dr Harpham are funded by the United Kingdom Overseas Development Administration's support of the Urban Health Programme at the London School of Hygiene and Tropical Medicine.

References

1. **Opit, L. J.** How should information on health care be generated and used? *World health forum*, **8**: 409–438 (1987).
2. **Van Norren, B. et al.** Simplifying the evaluation of primary health care programmes. *Social science and medicine*, **28**: 1091–1097 (1989).

Health and development: inseparable partners

Health is an essential objective of development. The capacity to develop is itself dependent on health. These two aspects of health and its links with development are now emerging with greater force and clarity. Health status cannot be traded off against economic gain. There is a better understanding of the crucial contribution of health to economic activity, to improvement of the human condition and, through these, to all the processes of development. The achievement of appropriate health objectives is therefore an important measure of the effectiveness of development strategies.

— *Health dimensions of economic reform*. Geneva, World Health Organization, 1992, p. vii.