

# **Development of a National Health Information System in Papua New Guinea**

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## **Introduction**

Health information systems development has been a priority for the Government of Papua New Guinea (GoPNG). Like most governments GoPNG has always had access to some information for monitoring its health services. However, its information systems were relatively inefficient and functioning below their potential. This paper describes developments that took place between 1994 and 2000 to improve the availability and use of health information. It considers three aspects (i) development of standardized reporting system (ii) integration of information systems (iii) improvements in the use of information.

## **Development of a Standardized Reporting System**

*Health Information Systems in 1994* Papua New Guinea's health information systems had existed since before independence in 1975. They were initially concerned with providing information to program managers at national level. After decentralisation of health services to provinces in 1983 there was an increased demand for information from provincial health managers so that they could plan and monitor health programs. This led to the introduction of computers in selected provinces for the calculation and display of indicators as part of a 'Management Support for Provinces Programme' which also included training and support in health planning and management (Newbrander and Thomason, 1985).

After decentralization provinces became responsible for managing their own information systems. Some provinces made adequate provision for stationary, training and supervision. Others did not. Several provinces revised their information systems and by 1994 various differences emerged in the data that each province collected (for example, an HS1 form in one province could look very different from an HS1 form in another). Consequently it became difficult to analyze or interpret information on a national scale; data for some indicators used different definitions or was not collected by every province. Because of these difficulties the GoPNG embarked on a program to standardize its health information systems with the assistance of the Asian Development Bank.

*Designing the National Health Information System* System design began with the formation of a task force to review existing systems and make proposals for a standard system. The review process took more than a year. Almost every province was visited to get an understanding of the range of systems in place and obtain the opinions of a variety of stakeholders. Discussions were held with health workers, managers, other government departments and donors. In addition one district which was visited on a monthly basis to get an in depth understanding of the functioning of rural health services and the role of information.

The major change advocated by the task force was to combine several systems into a single integrated system consisting of a folded sheet of A3 paper. Instruments were also designed to collect relevant data such as tally sheets, daily summary books, and monthly analysis books. These represented the minimum amount of stationary that would be needed to support data gathering. Health facilities would still require registers, patient record cards and other materials but it was not affordable to purchase these on a national scale.

*Field Testing* Owing to financial constraints, testing was restricted to a single province. Further testing would have been valuable, but much was learnt from testing in a single site. Although the system was considered superior there was a need to take greater account of health workers behaviour when filling in forms. For example, some staff recorded asthma as pneumonia because there was no separate category for the disease. By adding a category of "Other respiratory", which is not particularly useful on its own, it was possible to obtain more reliable information on pneumonia, a leading cause of death in Papua New Guinea.

*Implementation* It was recognized that implementation had to be accompanied by training if health facility staff were to understand and adopt the new system. This prevented the system being introduced simultaneously in all health facilities. Instead the system was introduced progressively over a period of twelve months. Most provinces started using the new system within two months of training. Follow-up visits were made to the first provinces to check the system was functioning as intended. Thereafter implementation was intensified and follow-up was reduced. Provinces were provided with sufficient stationary to last 2.5 years although it soon became obvious that larger quantities would be required.

*Computerization* Papua New Guinea had begun using computers to analyze health information at provincial level in 1987. Computer software was updated to support the new data collection formats. Software was intentionally kept similar to previous versions to minimize the need for retraining.

## **Integration of Information Systems**

*Integration Within the Health Sector* At the same that improvements were made to the health information system, attention was given to strengthening other components of the health management information system. A national inventory of health facilities was undertaken to obtain information staff, building and equipment and other utilities. A common coding system was introduced to all DoH information systems. This coding scheme enables data from one system to be easily related to others and allows health service inputs to be linked to outputs.

*Integration With Other Sectors* Efforts were also made to integrate health sector information systems with other sectors. Each facility was traced to the nearest census unit. This allows health sector information to be linked to other sectors since a similar scheme is used by other government departments to identify the location of schools, telephone services and other infrastructure. It is also useful because the longitude and latitude of every census units was known for most provinces and it became possible to determine how many people live at a certain distance from different types of facility.

### **Improvements in the Use of Information**

Efforts to improve the supply of information were accompanied by initiatives to improve the use of information at all levels of the health system:

*Health Facility Level* During implementation of the National Health Information System health workers were provided necessary tools and training to record and analyze data. This included the provision of a 'Health Center Record' which is a booklet that summarizes the work of a health center, allows a comparison of time trends and provides a permanent record of activities.

*Provincial Level* Existing strategies for analyzing and summarizing data were reinforced by revising computer software to yield enhanced data presentations which helped interpretation of data. Provincial health officers were also offered training in the use of information during implementation the National Health Information System and during an annual training workshop.

*National Level.* Information use had become weak at national level after decentralization, partly because of the difficulty in obtaining a national data set. It was considered important to provide leadership in the use of information and to provide feedback so that provinces could put their performance into perspective by comparing it with other provinces. Initially the analysis was confined to an annual booklet on Family Health Indicators. By limiting the analysis to a small area of activity where data were readily available, and considered important, the publication could be prepared in advance of an annual meeting of provincial health managers where the performance of individual provinces was publicly disclosed. Such feedback helps to a create an sense of accountability amongst health managers. It also appeared to have a positive impact on the quality and completeness of reporting. Reporting rates rose from 73% in 1994 to 91% in 1999. Together with advances in integrating systems this allowed more comprehensive analysis to be undertaken. Hence, information was used as a major element in setting priorities for the National Health Plan for 1996-2000. Improvements in information systems also enabled the Department of Health to conduct a timely review of the National Health Plan at its mid-term in 1998.

## Conclusions

### *Improving the Supply of Information*

*Design* If revision of information systems is required then widespread consultation is necessary to ensure the design is appropriate. It will also be important to set realistic goals for a revised system; the system should pay particular attention to the capacity of health workers to collect and use the required data. In many cases the new system will not be very different to existing systems, but simply more clearly defined. This will make it easier for health workers to adapt to the new systems, reduce the need for major retraining and ensure consistency in time series.

*Testing* - Any new information system needs to be tested on a small scale before being implemented nationwide. This can give greater understanding of health workers behavior and help to detect potential problems at an early stage.

*Implementation* - Information systems developments are more likely to be successful if they are accompanied by training. In Papua New Guinea this involved training members of staff from every health facility in the country. While such intensive training raises the costs of implementation these can easily be justified by the prospects of long term improvements in availability of information.

### *Increasing the Demand for Information*

*The Value of Data Analysis* The GoPNG has benefitted from establishing a National Health Information System which has been adopted by all its health facilities. While the value of introducing a standard health information system should not be understated, too much emphasis can be placed on revising data collection systems and designing the perfect information system. In doing so the more important task of analyzing, assimilating and disseminating information can be ignored. There is often enormous potential to use existing information to provide meaningful analysis which can influence decision-makers at all levels of government. Data analysis, even from imperfect systems can stimulate greater interest in information which can improve the quality and completeness of reporting and encourage a more methodical approach to planning and monitoring services. It can also reveal whether major revision of information systems is necessary and what areas are most in need of strengthening.

*Creating a Culture of Information Use* It is hoped that lower levels of management will use the information for planning and monitoring health services, and it is at this level that information can have the greatest impact on the efficiency and effectiveness of health services. There are several ways that local level use of data can be encouraged but our experience suggests the uptake of many initiatives is variable. An important way of developing the periphery is by setting a good example at the top. If senior management actively seeks information and is seen to use it then the importance of information is reinforced throughout the health system. In Papua New Guinea senior management ensured that information played an important role in developing and monitoring the National Health Plan. Information has also been used to defend the position of the health sector in inter-departmental negotiations and to persuade donors to conform to government priorities. A further use has been to summarize health statistics according to provinces and electorates and

ensure their widespread circulation, including to parliament. Such a presentation is not only of interest to health managers but to a wider audience who wish to see accountability amongst public servants and politicians. It gave a readily observable purpose for the health information system and helped to legitimize requests for data. Moreover, when data is used by leaders and actively disseminated it creates an more encouraging environment in which to develop information use amongst middle management and peripheral health workers.

### **Management of Information Systems**

Many of the problems experienced by Papua New Guinea were due to a lack of central coordination of information systems and a failure to manage the system. Our experience suggests it is beneficial to ensure that all system developments are coordinated by a single body at national level which carries representation from a variety of health programmes and senior management. Such co-ordination and representation helps to ensure that adequate attention is given to all sub-systems and that they work together as an integrated whole.

Information systems also need active management if they are to succeed. Procedures need to be established for data collection, reporting, follow-up of missing reports, data quality control, data summary and providing feedback. Financial and logistical support is also needed for a minimal set of stationary, training, freight/postage, communications and periodic upgrading of computers and software. Our experience suggests that support for information systems must emanate from national level otherwise funding of systems is insecure and systems are liable to collapse. Moreover, tasks necessary to support information systems are best managed by a single unit rather than being split amongst separate programmes as this ensures greater consistency in approach.

### **References**

Newbrander WC, Thomason JA (1988) Computerising a national health system in Papua New Guinea. *Health Policy and Planning*. 3: 255-259.