Using Information for Health

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This chapter considers a number of implementation issues in respect of the key interventions undertaken in the past two years as part of the national district health information systems strategy. Findings are based on the knowledge and experiences of stakeholders, service and programme managers and health providers involved in the national rollout of the District Health Information System (DHIS). The national rollout process has a two-pronged approach: building capacity and developing infrastructure.

The aim of the District Health Information System is to enable facility and district level health care providers to use locally generated information to improve coverage and quality of health services. The extent to which systems and structures developed at district level are supported by strategic policy development and planning at national level are explored in terms of how they impact on mechanisms to monitor quality and efficiency of service delivery.

While recognising that the integration of hospital information systems within the DHIS forms part of a broader implementation strategy, this chapter focuses on the public sector Primary Health Care services at district level.

A strategy for monitoring the progress of implementation in terms of three levels of information systems development is described. The utilisation of data sources in policy development and planning at national level is measured against application of data in operational management at district level.

Achievements to date are reflected in the establishment of systems and structures that support DHIS implementation at district level. Challenges are described and recommendations for the development of sustainability are addressed.

Introduction

Participation in decision-making to make the delivery of health care responsive to local needs is an integral part of the Primary Health Care approach. The goal of improved planning and monitoring as part of the transformation of the health system meant that information had to be brought into the realm of local health care providers. The Strategic Framework for the Department of Health (1999 – 2004) notes that the health sector needs 'a culture of quality and efficiency throughout the health care system'.[1] This is only possible if mechanisms are developed to measure progress made through strengthening management skills in the use of information to monitor health status and health care services. There has to be a shift in focus from workload indicators to the development of health status indicators.

Health Information Systems Programme (HISP)

Initiatives to develop an integrated district health system driven by an integrated health and management information system (DHIS) were facilitated by the Health Information Systems Programme (HISP), a collaborative project driven by the University of the Western Cape (UWC). On completion of a three-year pilot project in the Western Cape the HISP model (comprising training methods, data handling processes and software tools) resulted in the development of a co-ordinated strategy following acceptance and endorsement as the national model by the National Health Information Systems Committee of South Africa (NHISSA) in the latter half of 1999.

The HISP approach to the development of a DHIS, is based on a six-step implementation model:[2,3]

- Step 1 – establishment of district information teams
- Step 2 – performance of an information audit of existing data handling processes
- Step 3 – formulation of operational goals, indicators and targets
- Step 4 – development of systems and structures to support data handling
- Step 5 – capacity building of health care providers
- Step 6 – development of an information culture.

While the initial phase of the project focused on the development of processes that would facilitate implementation of a district based health and management information system model, the project is currently addressing issues regarding institutionalisation and sustainability.

The rollout process

The national rollout process has a two-pronged approach. The first is aimed at building the capacity of health care providers to generate and use information for local action, the second at developing the infrastructure needed to support implementation of the DHIS.

Building the capacity of health care providers

The national rollout of the DHIS aims at developing a culture of information use amongst health care workers through the development of knowledge and skills in data handling in order to create locally relevant information for use in the management of district level health programmes.

A series of formal and informal training courses, supported by ongoing workshops has been conducted at district level in all nine provinces. District and facility level managers, district information officers and data capturers have been targeted for training.

Generic information systems training course

Training contextualises information systems within a broader health and social development perspective. The training incorporates both generic and computer software skills. Front-line data handlers are enabled to develop skills in aspects of data handling. Service and programme managers are provided with orientation to the rationale for health information systems as the tool to focus on the analysis, interpretation and use of information.[4]

Software Training

Software training has been targeted at data entry clerks and information officers. Emphasis has been placed on the importance of good quality data, regular validation checks, and setting of minimum and maximum ranges. Short courses in computerised district health information systems have exposed health managers to the use and benefit of the software as a tool to generate tables, graphs, maps and reports needed for management decision-making.

‘Superusers’, a group of health care providers and information officers with substantial experience in using the software, have been identified in each province. These cadres will form the nucleus for supporting sustainability of software development at a provincial level.

Achievements

“A spotlight in the darkness”, a quote from a participant, encapsulates the enthusiasm and excitement that these training courses have generated. Training programmes, based on principles of adult learning and sensitive to service-related issues use real, local data in exercises and assignments to facilitate development of concrete knowledge and skill in data handling. The gradual ownership of data and development of a culture of information use is evidenced by improved data quality and a post-training commitment to improve practice.

Challenges

The lack of organisational infrastructure and poor management support to implement change in work settings hamper the application of skills learned. Management buy-in of the process, strengthened by targeting management cadres for training, should result in the development of dedicated information systems posts, formalisation of job descriptions and allocation of time and resources for development and application of data handling and use of information skills.

Development of infrastructure

Provinces are grappling with the development of co-ordinated systems and structures to support data handling at district level. Progress is slow, but steady. The appointment of information officers at regional and/or district level is regarded as a key strategy to support the development of data handling systems and structures.

In provinces where dedicated posts for these cadres have been created, the quality of data and regular presentation of tables, graphs and reports to facility, district and provincial management has improved considerably over the past year. There is ongoing discussion as to their roles and responsibilities and how this cadre can best be utilised to support the DHIS.

Data collection

Essential Data Set

In 1999 a national Primary Health Care Essential Data Set consisting of 49 data elements was approved. In the past two years, all nine provinces have developed Essential Data Sets (also known as minimum data sets) for Primary Health Care.[5] These Essential Data Sets have been implemented flexibly, enabling facilities and districts to add their own data elements to suit local needs. There is regional variation in terms of the data elements collected, i.e. some districts may collect different data elements to other districts but all collect the minimum required by the provincial and national levels.

All provinces are expected to submit these data routinely to the national Department of Health. Data are captured in all health districts in the country. The national average Data Input Coverage[a] has increased from 33% in 1999 to 94% for 2001 as can be seen in Table 1.[6]

a Data Input Coverage, defined as the percentage of expected data received, is based on the expected PHC total headcount of each district. The traditional method of estimating completeness of data submitted to higher levels based on a facility reporting rate, did not take into account the facility size. Thus mobile and satellite clinics carried the same weight as large Community Health Centres.

Table 1: Provincial Essential Data Sets and Data Input Coverage for 2001

	Essential Data Set	Calendar Year 1999	Financial Year 2000 - 2001
Eastern Cape	76	99%	100%
Free State	79	No data	93%
Gauteng	371	No data	96%
KwaZulu-Natal	79	Pilot areas	89%
Mpumulanga	120	60%	91%
Northern Cape	94	70%	95%
Northern Province	60	No data	88%
North West	91	Pilot areas	98%
Western Cape	97	99%	99%
South Africa	49	33%	94%

Source: HISP software

Most provinces are using Essential Data Sets with between 60 and 100 elements. Gauteng has amalgamated many data sets, with no facility collecting over 371 elements. Mpumulanga has recently reduced their data set from 380 to 120 elements. Experience has shown a negative correlation between number of essential data elements and data quality – the larger the data set the poorer the quality of data collected.[6]

The development of a national data dictionary with standardised data element definitions has led to greater consistency between provinces and can be regarded as a key mechanism to facilitate inter-provincial standardisation and improvements in data quality. The data dictionary, available with the HISP software, is readily accessible to facility and district level health providers.

A lot of additional health data are being collected by health facilities and sent up to a variety of departmental clusters at higher levels. This includes surveys and *ad hoc* requests from vertical programmes both provincially and nationally, resulting in a substantial amount of vertical data available at national level. However, there are currently poor mechanisms to facilitate sharing of this data between vertical health programmes and national and provincial health departments. Mechanisms at provincial and national level to analyse the data and generate useful reports to provide a clear picture of the health status of South Africa are in development.

The development of district based health status indicators is a slow and difficult process. Health status indicators[b] are conceptually difficult to understand. Difficulty experienced in developing relevant district level indicators is exacerbated by both the lack of clearly formulated health status indicators at provincial and national levels and the lack of accurate facility and district level catchment population denominator data.

The measure of improved coverage and quality of health services is determined by its impact on health outcomes and health status. The traditional assessment of coverage provides information on the people who attend health services – utilisation rates. True coverage should determine to what extent health services are meeting the needs of the whole community – catchment population.

Census data have been made available to all provinces in various age, gender, race and socio-demographic permutations from the national Department of Health. Provincial offices further distributed these data. However, these data are seldom available in a format that is easily accessible and usable for operational management at district level. The Municipal Demarcation Board provided population figures for local municipalities. These figures are not age cohort appropriate for use within the health sector.

Using the growth estimate formula provided by Statistics South Africa, it is possible to make annual mid-year adjustments of the population figures. The potential exists to break down these catchment populations into appropriate gender and age cohorts for use in monitoring coverage and quality of health services at both district and facility levels.

Numeracy skill among health workers is generally weak. A review of data reflects a lack of understanding of basic epidemiological principles. The concept of rates as per 100, 1000 or 10 000 is poorly understood as demonstrated by the submission of data in excess of 100%. The lack of access to and understanding of population-based denominator data has resulted in headcount being commonly used to evaluate aspects of service delivery and activity. This is aggravated by the demand from service and programme managers for raw data rather than indicator based data. This makes meaningful comparisons between facilities, districts, regions and provinces difficult.

b Health status indicators provide both direct and indirect measures of coverage and quality of health service delivery and serve as a valuable tool in the management and planning of health services at both local and national levels. Service and programme managers at both provincial and national levels have initiated mechanisms to explore development of appropriate indicators. The challenge lies in balancing local initiative with the need for standardisation that will facilitate inter-provincial as well as national and international comparison.

Data collection tools

Most provinces have made substantial progress in standardising data collection tools within provinces since 1999. Regional variations exist within provinces.[5] Anecdotal evidence suggests that progress made on both standardisation of data collection tools and improvements in terms of physical size, design and layout is reflected in improvements in efficiency of data collection and data quality.

Data sources

Data sets may be classified in terms of their application to the health sector:

1. Population data
2. Health status indicators
3. Quality indicators
4. Efficiency indicators
5. Semi-permanent data.[c]

A review of common data sets available to the health sector and their application is provided in Table 2. This list is not complete.

c Semi-permanent data refers to data that are stable and change infrequently. This may include population data and facility organisational data (ie. facility size, staffing numbers and categories, power and water supply details)

Table 2: Common Data Sets and their Application to the Health Sector

Application	Data Sets	Type	Data Sources
Population data	Census Data	Regular Survey – 5 yearly	Statistics South Africa
	Vital Registration	Routine – triggered by births & deaths	Dept. of Home Affairs
	October Household Survey	Regular Survey - annual	Statistics South Africa
Health Outcome and Status Indicators	SA Demographic & Health Survey	Regular Survey – 5 yearly	Dept. of Health
	Notifiable Diseases	Routine – triggered by diagnosis of specified diseases	Dept. of Health
	Tuberculosis (TB)	Routine – quarterly	Dept. of Health
	Termination of Pregnancy (TOP)	Routine – monthly	Dept. of Health
	Antenatal HIV Survey	Regular - annual	Dept. of Health
	Qualitative & Quantitative surveys · STD · PMTCT · Nutrition	*Ad-hoc* surveys	Dept. of Health Variety of organisations
Service quality indicators	Client Satisfaction Index Survey	Regular survey	Dept. of Health
	Facilities Survey	Regular survey – 2 yearly	Health Systems Trust
Efficiency indicators	Essential Data set – Hospitals and Primary Health Care	Routine - monthly	Dept. of Health
Semi-permanent data	Clinic Audit Survey (EC)	Regular survey – annual	MSH (Equity Project)
	Primary Health Care Services Survey (EC)	Regular survey - annual	MSH (Equity Project)
	PERSAL (Personnel)	Regular	Public Sector Services
	FMS (Finance)	Regular	Public Sector Services

Policy development and planning must be based on population, health and service data in order to plan for effective service delivery. Many data sets are available in the health sector, yet evidence for the use of information in management decision-making processes remains anecdotal rather than documented in reports and publications. A review of data sources has revealed that while information is available it is generally not accessible. The mix of information that is available to health managers is often inappropriate, difficult to understand and is generally accessed through interim, preliminary annual reports. In principle, while the output of these data sources should form the foundation of policy development, experience has shown that their actual use in the planning of service delivery is limited.

Routine data sets provide both direct and indirect measures of coverage and quality of health service delivery. Regular health surveys provide statistical profiles of urban and rural communities. The link between socio-economic, demographic and health indices is well established. Census data provide catchment populations from which target populations can be derived. Provincial comparisons of survey data (South African Demographic and Health Survey, October Household Survey, Annual Antenatal HIV Seroprevalence Survey) provide useful benchmarks for setting national and provincial targets with regard to indicators such as immunisation coverage, infant mortality and child morbidity and mortality.

Problems experienced in accessing raw and aggregated data may be traced back to the organisations involved in the collection, preparation and manipulation of these data sets. The use of organisational gate-keeping that limits access to information is an important inhibitor to the effective use of the data. The Promotion of Access to Information Act (Act 2 of 2000)[7] clearly places the responsibility to facilitate access to information within the public domain with the national Department of Health. A variety of structures, such as the internet and government intranet are being developed.

Data Capture

Provinces have computers to facilitate electronic data capture at regional, district or sub-district level. While variation exists, most provinces capture data at district or regional level and consolidate at provincial level. A number of provinces have moved to sub-district level data capture.

While data handling is still largely paper-based, in practice there is gradual computerisation of health facilities, with facility-based capture of data from tally sheets and registers.

The appeal of the DHIS software, a locally developed application system, lies in its user acceptance. The strategy of introducing computers is in itself a 'powerful attractor', but initial enthusiasm towards learning about computers will dissipate unless linked to actual use of data locally for local management.[d] The high profile given the HISP software application with its associated training and support, has given rise to a situation where computers are commonly (albeit misguidedly) regarded as the central component of information management. Many managers do not appreciate that computer software is merely a tool to facilitate data processing and access to information for management decision-making.[8] Consequently, inadequate attention is given to the process issues that facilitate sustainability.

d C Hedberg, HISP, University of the Western Cape, Cape Town, personal communication

Achievements

Data are captured electronically at district or regional level for all health districts in the country. While data quality is still problematic, there has been steady improvement in the past year. The HISP software contains the most complete and up-to-date public health facility list for the country. Subsets of data collected as part of routine PHC data, such as data elements related to the EPI programme, can be extracted for specific use by programme managers at national level.

The software, initially developed for monthly Primary Health Care data, has been expanded to include quarterly TB data, emergency medical services, environmental health and the hospital essential data set. Service Release 2, due for national implementation in the early part of 2002 includes mid-year population estimates and the ability to 'switch' between old health districts and the new demarcation boundaries.

Data processing

Data quality

There has been a slow, but steady improvement in data quality over the past year. While data quality in many districts remains weak, the ongoing training and support provided for improving the quality of data collected has had a positive effect. There is an increased awareness of the importance of good quality data for effective health management at district level and this awareness is slowly filtering down to facility level. Many districts are actively checking data quality on a routine basis, manually and through running validation checks once data have been captured. The setting of minimum and maximum ranges for routine data collected at facility level serves as a trigger for health providers doing regular data quality checks.

Data analysis

Traditional mechanisms for monitoring coverage and quality of service delivery at facility and district level are exacerbated by poorly developed operational targets and changing management structures. Services tend to be evaluated in terms of workload, using raw data headcount figures rather than converting raw data into information for monitoring services in terms of coverage and quality, using health status indicators.

The lack of clearly developed health outcome and status indicators associated with limited access to relevant catchment population data, weak numeracy skills and a poor culture of information use are factors that limit district and facility level analysis of routinely collected PHC data.

Facility level health providers are being encouraged to use analysed data in the presentation of hand-drawn graphs, but meaningful interpretation of locally analysed data remains weak. Raw, aggregated data remain the most

common format requested by management for decision-making presentations at facility, district and provincial levels.

Presentation of Data/Information

Format

In districts where training and support has been provided, facility level health providers, service and programme managers and information officers, have been encouraged to explore the development of regular reporting mechanisms using table, graph and report formats that can be readily and easily used for local decision-making. This in turn impacts upon improved data quality.

Experience has shown that data tables are not user-friendly and are seldom used, due to data overload. Yet, tables remain the most common format for reporting routinely collected raw data at both facility and district level. The use of tables to present analysed data is limited.

The display of routine data in the form of hand-drawn graphs on facility walls is an important criterion in the annual District Health System Competition. Facilities have been encouraged to display analysed data in graphs. Many facilities are now displaying graphs relating to Maternal, Child and Womens' Health and TB.

Quarterly and annual reports are requested by most local authorities and many health programmes. While reports are regularly submitted, support is needed to develop tailored reports that will facilitate interpretation and use of information at local level. A reading of district and provincial annual reports submitted during the past year demonstrates the gradual shift from reporting aggregated raw data tables to information reflecting analysis and interpretation of health status indicators in areas where training has occurred.

Data Flow and Feedback

The traditional model of a centralised, one-way data flow is still prevalent. While duplication occurs between local authority and provincial services, all facility level routine PHC data are submitted via districts to regional and provincial levels. Data flow between district, provincial and national offices currently remains largely one-directional to vertical programmes at national level. However, mechanisms to facilitate development of a streamlined, two-way flow of information that would facilitate feedback to the point of data collection have started to be implemented at district level. The positive spin-offs have been an increased awareness of the importance of good quality data and formalisation of strategies to facilitate regular discussion on data quality and trends in health care indicators around coverage and efficiency of service delivery. Health providers are becoming increasingly informed about trends in health service delivery at district level and are in a position to

participate in using information for local level decision-making.

Despite attempts to streamline data flow, the lack of structured feedback mechanisms between facility, district, provincial and national levels has limited the use of information produced by current data sources. The translation of strategic planning into the operational planning at lower levels occurs with limited access to relevant information. Lack of access to information and poor skill in utilising this information are a challenge for service managers.

Use of Information

Regular review of data

The idea that information use is central to effective health management is not questioned. Yet, anecdotal evidence suggests that while district level managers regularly discuss information and use routine data in the review of operational plans, use of information for local level decision-making is limited. While many district level service and programme managers state that they use information in the discussion of health related issues, few examples of how health information informs action in decision-making are available.

Motivation for more staff, budgetary re-allocation and adapting of targets in operational plans are examples given, but specifics are hard to come by. Evidence suggests that while data are needed and useful when implementing new programmes or adapting existing strategies, the use of routine data in operational management is limited. This supports the call for establishment of small essential data sets and regular reporting timeframes at district level that will support ongoing operational management. North West Province has developed a comprehensive approach to health management, incorporating financial and human resource data. A monthly review of raw data and quarterly review of operational plans relating to 'all management issues' is conducted at district level.

While information enables managers and service providers to make linkages between health status indicators and quality of service delivery, the reality is that health managers struggle with making sense of data. When data are examined, seemingly reliable data are often questionable and of doubtful relevance.

Buy-in by top management is essential for the sustainable development of the DHIS. Where the DHIS has, to date, not been seen as a strategic priority, the lack of full commitment by management at many levels has been a major obstacle to effective implementation. The low priority accorded the DHIS must be seen against the dominance accorded hospital information systems in terms of finance, manpower and technical resources. It is estimated that district level health information systems receive less than three percent of the provincial budget allocation for health information systems, with the balance going to hospitals.[d]

Conclusions

Achievements were realised by focusing primarily on the processes involved in development of the human and organisational component rather than technical products. Successes included the creation of district level data based information systems and structures, development of practical training courses that focused on skills and understanding of information management and, less tangibly, a sense of ownership and a culture of information.[3]

Identified threats to sustainability at district level and large scale application are influenced by the failure of top and middle management to support strengthening of a district based information system. This support includes the allocation of human and financial resources. The slow pace of creation of decentralised district health systems with delegated authority to act on available information is also a problem.[3] While the scarcity of staff trained in data analysis and interpretation has limited the effectiveness of health information systems, unless attention is focused on constraints within the system, the prioritisation of health information systems reform by policy makers and health managers can have limited impact.[3,4,8]

The optimistic suggestion that implementation of an action-led district information system will itself support district development and promote Primary Health Care awareness by establishing a culture of local analysis and use of information in order to identify and follow progress towards local targets within a Primary Health Care approach has had limited success. Reality has indicated that managers seldom seek information and once given it, are at a loss as to how to deal with it. Thus training also needs to include support for managers who need to use the information.

Organisational change in job function and responsibility is needed in order to institutionalise streamlining of the systems and processes created to implement, maintain and sustain a DHIS. The shifting of resources that include the appointment of appropriate levels of staff responsible for all aspects of health information issues is a first step, leading to organisational changes regarding post structures and adjustments to job descriptions. The infrastructure to support this function/person needs to be put into place. This includes appropriate computer hard- and software, accessories (printers etc.), email and ongoing technical support.

At each level of the system, there is a need for 'DHIS champions' – people who are committed to action-oriented information systems and are able to be drivers of the system. Unless the DHIS is 'seen to be owned' by local role models, information will always be seen as a chore performed for 'other people' and not as an integral part of district development. It is this development of a locally driven information culture that is the key to sustainable development.

Recommendations

The main recommendations reflect the challenges that must be addressed in order to support development of institutionalisation and sustainability:

1. Develop infrastructure to support organisational change
    - Promote buy-in from top and middle management into the process through training and support in the use of information
    - Formalise appointment of information officers at district level to drive the process
    - Develop nationally agreed standardised data definitions for all routine data collected
    - Development of appropriate reports for use in the local management of health services
    - Formalisation of improved feedback mechanisms
    - Development of mechanisms to facilitate improved data quality
    - Development of accurate age cohort district and facility level catchment population data
    - Development and standardisation of appropriate health outcomes and status indicators.
2. Build capacity of health care providers
    - Target service and programme managers for training
    - Expand training initiatives to target facility level health care providers
    - Develop provincial capacity to support training initiatives – train-the-trainer courses
    - Develop appropriate training and reference materials, especially case-studies that provide success stories and can serve as benchmarks of successful practice
    - Develop skill in data analysis, report writing, interpretation and use of information
    - Provide ongoing training and support, especially with regard interpretation and use of information.

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