

## INTEGRATED HEALTH INFORMATION SYSTEMS IN TANZANIA: EXPERIENCE AND CHALLENGES

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### ABSTRACT

Health is a serious development issue. The perceived link between health and development has been articulated in much of the policy and academic literature resulting in many initiatives to introduce integrated health information systems at the local level. Despite huge investments made in this direction, these systems have not made any radical impact on the delivery of healthcare for local communities. Drawing on empirical work in Tanzania, we argue that this has been because of the adoption of a narrow, managerialist perspective of “integration”. We propose instead an interpretation of integration from a variety of standpoints; development studies, management, and sociology. According to this approach, it is not just data that is integrated, but ways of working and the social relations which support the health information systems at global, national and local levels. In our discussion section, we broaden the scope of integrated health information systems to consider the integration of not just management information but also epidemiological data.

### 1. INTRODUCTION

Issues of health service provision are central to any discussion of development. In Africa a disease such as malaria is estimated to cost African countries more than 1% of their GDP (UNICEF 2000) and has been classified as one of the biggest impediments to poverty alleviation (WHO, 1997; Gallup & Sachs, 1999). Health care provision in so-called “developing” countries is usually provided in collaboration with national authorities, international aid agencies and NGOs. In order for donors to have direct control over the funds, support has traditionally been organized as standalone vertical programmes to address specific health systems. But these separate programmes have led to duplication of funding, wastage of resources, and lack of coordination in terms of controlling for specific diseases. The international donor community has recognized this and there is a global trend backed by the World Bank and the WHO towards integrating stand-alone programmes at the local level in order to coordinate efforts to delivery healthcare to local communities (Chilundo & Aanestad, 2003).

A major attempt in this direction was the 1978 WHO Alma Ata Declaration (WHO, 1978) which produced a global “Health For All by 2000” vision through equitable access to basic health services in developing countries called the primary care approach. A key role in this approach was delegated to the development of health information systems to improve allocation of resources and the setting up of priorities (WHO, 1994; Lippeveld et al., 2000; Sandford et al., 1994). A decentralized approach was advocated for these systems in order to bring decision-making closer to the communities that might benefit from health services and to improve accountability of the health department. The district was identified as a focal geographic unit for integrating multiple health programmes and their information systems. The hope was that this type of integrated system could collate health indices covering total numbers of people in an area affected by a particular disease. A comparison of immunization coverage across districts in a region, for example, would then enable resources to be directed to areas where there is poorest coverage and to diseases which are most prevalent in a geographic area.

But apart from isolated pilot experiments, efforts to introduce integrated health information systems at the local level have not had any substantial and long-term impact (Atkinson et al., 2000; Shaw, 2002; Heeks, 2005; Mosse & Byrne, 2005; Kimaro & Nhampossa, 2005). The impetus to introduce these systems has been driven by a managerial rationale of efficiency, which has not taken into account the intrinsically political nature of the health sector. This politicization occurs at various levels – from the donor community, to the ministries within the country, to the local political milieu within which health workers operate. Hence, any system based on integration on purely managerialist grounds would tend to be subverted by the reality of long-standing political structures.

Our paper focuses on information systems and health sector reform in Tanzania – where three of the authors have experience of interacting with the implementation of health information systems. The country has a long legacy of launching control programmes but not much progress has been made to eradicate diseases. To facilitate informed local decision-making, the Tanzanian government has implemented a Health Management Information System (HMIS) to supply each level of the health sector with the necessary information in a timely and accurate manner. However, six years since its inception, the HMIS is still not delivering on its promises. Members of the Ministry of Health have been frustrated by the difficult process of implementation with data that is at best merely collected and reported upwards with little attention directed to improving the effectiveness of health care.

The scope of this paper is to describe some of the key administrative, political, sociological and epidemiological issues that need to be faced during the process of implementing integrated health information systems through our experience in Tanzania. While the rationale for integrating data sets from various disparate health programmes is clear, we propose a broader notion of integration that includes not only integration of data, but also integration of administrative decision-making practices, policy imperatives local contingencies and health priorities. We begin by tracing the theoretical underpinnings behind the concept of integration from a managerialist standpoint then try to understand the relevance of this concept when it is applied to health sector reform in a country like Tanzania. Our empirical section describes the intensely political nature of health sector reform in Tanzania at both macro and micro levels. At the macro level, individual donor agencies have intervened and appropriated the reform agenda in a piecemeal fashion without any integration in terms of strategy or vision. At the micro level, this relates to social and political forces which influence the day-to-day provision of healthcare in a situation of inadequate provision and distribution of resources. Our analysis then links the evidence to issues raised in the theoretical section supporting our argument for a broadening of the concept of integration

beyond mere data sets. As a point of discussion and further research, we consider the epidemiological rationale for integrating health information systems for supporting effective health policy-making.

## **2. WIDENING OUR UNDERSTANDING OF 'INTEGRATION'**

In this section, we review the concept of integration from three different perspectives: development administration, management and sociology. Development administration forms the fundamental institutional context within which public sector reforms in key economic sectors take place. A management perspective provides the rationale for the introduction of business case models to improve efficiency within the public sector. A sociological perspective becomes important because the nature of the social environment is likely to be a critically important factor in the realization of public sector reform projects.

### **2.1 The Concept of Integration from a Development Administration Standpoint**

The concept of integration is increasingly considered by international development agencies to be a core element of health sector reform agenda. From the 1970s, the role of integrated area planning began to receive increasing policy attention. This was part of an effort to coordinate the plans of different sectors in order to maintain an integrated view of a problem area or domain rather than each agency seeking approval from its headquarters before going ahead with an activity. This integration was targeted at the local level because this was the level at which accurate and relevant local data could be obtained in order to improve coordination between various agencies that were operating under separate ministries but nonetheless were working towards common development goals.

However, in practice, this proved to be a difficult objective. While policies were launched to grant more resources and decision-making powers to local planning bodies, experience has revealed that the bureaucracy in developing countries has been resistant to enacting these policies with higher levels of the administrative hierarchy reluctant to devolve decision-making powers and resources to lower levels (Rondinelli, 1993; Peterson, 1998; Bossert, 1998). As Bossert (1998) argues, this reluctance to fully engage with decentralization has afforded little increase in 'decision space' for local-level administrative bodies in terms of planning and implementing development programmes. Much depends upon the existing social and political structures in the local planning area. For example, even within a single village, there were likely to be divisions on the basis of caste, class or clan with each group pressing for more say in decision-making. Where there were major inequalities at the village level as in many developing country regions, decentralization of decision-making powers has actually served to reinforce power structures rather than acting to integrate the priorities of all sections of the local community (Bhatt, 1987). These experiences have resulted in caution in adopting decentralization as an end in itself with greater care needed to design and evaluate such a policy for its ability to achieve broader objectives of health reform within local communities. Socio-cultural traditions of administrators have acted as a serious impediment for enabling decision-making at the local level. Traditional deference to authority, reluctance of lower-level officials to disagree openly with superiors, and vestiges of colonial behaviour created conditions under which staff of agencies operating at the local level felt reluctant to use even the limited authority granted to them. Under these circumstances, the introduction of foreign assistance programmes merely served to justify the activity of outside agents as new forms of dependency were introduced in which mobilizers became the new elite while local officers became locked into a system over which they had little control. Indeed, the public sector reform agenda actually served to downplay the role of the local political and cultural process in supporting interventions

(Harriss, 2001). The need for local politics to be sustained and nurtured for effective health sector reform is emphasized by several authors through empirical work – for example, by Braa & Hedberg, (2002) through their experience with the Health Information Systems Project (HISP) in South Africa and by Atkinson (2002) through her research on the critical role played by informal practices and cultural norms in decentralized health systems in NE Brazil.

## **2.2 The Concept of Integration from a Management Standpoint**

Integration has been an important priority within the organizational reform agenda, particularly within the field of information systems, for several decades. This was the case first with inter-organizational systems research using EDI technologies to transmit electronic messages to improve the interface between customers and suppliers within an organization, and later with BPR strategies which aim for a radical change and restructuring of business processes. Already from early studies, the issue of asymmetrical relationships and exchanges between players was raised in the literature. Later, ERP systems were built around complete business processes thought to represent best practice in industry in an increasingly global, volatile and competitive market environment. But the politics of BPR efforts was commonly identified as a barrier for the success of these programmes (Willcocks & Smith, 1995; Galliers & Swan, 1999) and failure stories were found in the literature exposing issues such as dissonance between managerial and user needs (Davenport, 1998; Hanseth et al., 2001). However, the issue of integration is still of major significance in the information systems field as large MNCs consisting of several subsidiaries are increasingly bringing together companies with different business cultures.

Integration is considered to be an important concept in the current public sector reform agenda. In the development arena, there has been a global trend backed by the World Bank and the WHO towards the integration of standalone programmes into large sector programmes often named SWAp – sector-side approach programmes – that aim at rationalizing and improving the coordination of external assistance and national government programmes (Schreuder, 2002). The politics of integration gains even more relevance in the domain of health information systems as evidenced by Monteiro (2003) who provides a critical assessment of the logic of health systems integration in the Norwegian context. He discusses the considerable effort made in the country towards achieving a tighter integration of the large number of information systems in health care provision but emphasizes a number of productive roles for non-integration, for example in enabling duplicate versions of a data set to exist but tailored for usage by different groups such as for administrators and clinicians. In the context of developing countries, there have been many efforts to implement a sector-wide approach in the health care sector with the aim of pooling donor grants into one common account instead of accounts tied to specific programmes. The aim is that subnational levels of government would be more in control of allocating donor funds across a variety of sector-specific programmes according to local priorities. But the problem has been that developing country governments have lacked the capacity to manage funds in an integrated manner (Brown, 2001; Pappaioanou et al., 2003). While the concept of integration continues to influence the launching of health sector reform initiatives in developing countries, many authors have argued that this approach to reform actually leads to the institutionalization of control mechanisms stifling autonomy of decision-making at the local health unit level (Atkinson et al., 2000; Cooke, 2001; Chilundo & Aanestad, 2004). Moreover, the priorities of health workers at grassroots level are very different. For example, Atkinson et al. (2000) in their study of district health systems in Northeast Brazil describe varying rationalities of health personnel. They found that the primary objective for the rural clinician is to tend to patients and these workers would rather spend as much time and resources as possible on

patients rather than on papers and form-filling. This priority may conflict with the mandate of integration imposed by public sector reform policy prescriptions. Consequently, evidence reveals how many rural health workers pay lip service to form-filling and management procedures because they have little autonomy to modify reporting systems and to introduce locally relevant indicators. In a case study of HISP in South Africa, Jacuzzi et al. (2005) argue that while standardization is deemed a necessary management perspective to harmonize and integrate information, the actual implementation of the standards at the local level often demands flexibility and adaptation. Their case study shows how integration is not just a reform to be enacted but rather a continuous change process where the local organization needs to reflect upon and proactively interprets its own way of working.

### **2.3 The Concept of Integration from a Sociological Standpoint**

Social and systemic integration is considered an increasingly important concept in modern sociology. This type of integration is concerned with the orderly or conflicting relationships between actors or social parts and can be traced back to the work of Lockwood and other early sociologists (Domingues, 2000). This sociological view of integration becomes relevant for us as we try to understand how data can be integrated across departments and hierarchical levels in a health information systems initiative.

A fundamental debate in earlier literature which concerned the nature of the social world has been driven by two positions: individualistic and holistic (Hollis, 1994). While individualists believe that all action and change is based upon the behaviour of individuals, holistic accounts support the view that individual behaviour and social change is the product of macro social structures beyond the capacity of individuals to alter (Porpora, 1989). Sociologists of that time focused on the difficulties of analyzing these two aspects of society emphasizing that society as a whole cannot be reduced to people.

Over the years, there continues to be a debate concerning the extent to which differences between the social and the systemic can be attributed to differences merely in the scale of social practices. On the one hand, some sociologists argue that any linkage between the two denies the independence of the social from the systemic (Archer, 1996; Mouzelis, 1997; Domingues, 2000). On the other hand, an increasing number of writers have worked on conceptualizing social theory in terms of understanding how actions of individuals in their daily lives shape or are shaped by the wider structures within which this action takes place. Structuration theory was an attempt to develop a middle ground between the two positions defined above focusing on the manner in which interactions at the micro level of individuals and groups become established (or not) as routinized practices over time and serve as macro structures which in turn enable or constrain human action and interactions (Jones, Orlikowski & Munir, 2004; Walsham & Han, 1990; Madon & Walsham, 1995).

The focus on action that is provided by structuration theory is also provided by the relational perspective (Archer, 1995; Bhaskar, 1998). This approach, stemming from Marx, and adapted by critical realists, holds that structure and agency are linked through a series of relations which are relatively enduring and can therefore be studied. Structure and agency are seen as dependent upon each other for existence, yet they also operate autonomously and independently of each other. According to this group of theorists, it is possible to trace the interaction of structure and agency through time – something which is quite difficult for structuration theory according to which structures exist in the ‘minds’ of people and which manifest in their actions (Archer, 1995; Rose, 1998). Adopting this relational stance in a paper on the role of social theory in IT & Development, Smith & Madon (2007) argue that the outcome of any intervention is dependent on the configuration and dynamics between various players which brings into play a multitude of power relations and negotiations. Their

paper traces these interactions through time by describing a longitudinal study of IT in development administration reform in India and how, despite the rhetoric of decentralization, the dominance of the central government prevented any beneficial outcome at the district level in terms of IT usage for improved planning. However, this domination laid the seeds for change as the state and district authorities began to assume a stronger position in their power relations with the central government (Smith & Madon, 2007).

We summarize the main argument of this paper. The concept of integration has been a fundamental basis for the development of health information systems in developing countries as a means of improving the provision of healthcare to communities. However, the way in which the 'integration' manifesto has been propagated so far has been largely in terms of managerial integration of functions and data. We propose that a wider conception of integration would be useful for understanding the way in which these systems can really make a difference on the ground. In this section, we have briefly reviewed the concept of integration from three points of view: developmental, managerial and sociological. Each perspective sheds new insights into the challenges of introducing integrated health information systems in developing countries.

### **3. METHODOLOGY**

The ideas for this paper have emerged from several years of research carried out by two of the authors on health systems reform in Tanzania. One of these researchers is also a senior health policy adviser to the Tanzanian Government for the control of one particular vertical health programme and the implementation of an information system to improve its effectiveness. Over time, a growing realization for the decentralized planning and management of health care resulted in the Tanzanian government introducing HIMS at the district level which is the focus of this paper.

The study involved both primary and secondary data collection. Information regarding donor activity in the health sector in Tanzania was obtained from secondary literature in the area of health policy and development. Information regarding the organization and management of the vertical control programme was obtained through reports and discussions with the Tanzanian National Institute for Medical Research (NIMR) and the National Lymphatic Filariasis Elimination Programme in Dar es Salaam (NLFEP). Information regarding the implementation of the HIMS was collected by one of the authors over the period of August 10th to Aug 30th 2003 in Tanzania with logistical and research support from NIMR. A variety of evaluation reports from the period 2000-2003 were consulted including a draft report of the Health Research for Action (HERA) 2000 HMIS review and NGO documents regarding health sector projects undertaken in Tanzania.

Primary data collection consisted of six formal semi-structured interviews during which extensive notes were taken that written up as soon as possible after the meeting. The researcher was prohibited from using a recording device during the interviews, and those interviewed remain anonymous. The interviews included two senior members of the central office of the Ministry of Health conducted at the central offices in Dar es Salaam. They were chosen due to their direct involvement with the HMIS. One interview was conducted with a NIMR researcher who was chosen due to his experience in the field. The last three interviews were conducted on-site at three district hospitals in the District Medical Officer's office. During the interviews, a NLFEP staff member was present. This staff member provided translation services for one of the interviews. Two districts were chosen based on logistical constraints and recommendations from a senior member of the Ministry of Health (MoH) to reflect at least one district that is thought to be performing well and another that is performing

poorly. The third district was chosen strictly for logistical reasons. One informal interview was conducted with a NLFEP staff member with extensive experience in rural village contexts. The unplanned interview consisted of a spontaneous 30-minute discussion, much like a semi-structured interview, only without copious note taking. Immediately following the interview the information was written up as fully as possible. The interviews focused on a general set of topics; the role of the HMIS in work processes, opinions held by users of the HMIS, performance/accuracy of the HMIS, problems/issues during implementation. They also focused on the perspectives of those involved with the HMIS at the Ministry of Health, the district level, and the health facilities. The themes which emerged from the data collection served as a point of departure for analysis. Tentative hypotheses which derived from the conceptual framework developed for the study were 'tested' using the themes which emerged from the data collected in the field.

#### **4. UNDERSTANDING HEALTH SECTOR REFORM IN TANZANIA**

This section tells the story of the unfolding events surrounding health sector reform and the HMIS. This is related in three sections. The first part presents the policy and institutional context within which health information systems are implemented in Tanzania. The second part discusses the influence of aid donors on health systems in Tanzania. The third part describes the implementation of the HMIS.

##### **4.1 The Policy and Institutional Context of HMIS**

Tanzania is one of the world's poorest countries where 92% of the poor are rural-poor (Tibandebage and Mackintosh 2001:38). Politically, it is a stable democratic country with a fairly well enforced rule of law, but almost non-existent controls on corruption (Burki 2001:10). Tanzania is divided into 25 administrative regions that are subdivided into 113 districts that are further subdivided into divisions, wards, and villages (UNESCO 1999). With a population upwards of 34 million as of 2000, there is great ethnic diversity with over 130 different tribes (CIA 2003). After national independence in 1961, Tanzania experienced relatively rapid economic growth and improvements in the equitable provision of health services (IDRC 2001). The economic downturn of the 80's adversely affected health service provision, and led to a reversal of many of the social development gains made in the 20 years prior (Chiduo 2001). In November 1993, the MoH engaged in health sector reform with the stated goal of improving the health and well-being of all Tanzanians (Mapunda 2001). This included furthering the process of decentralization begun in 1983 to devolve management and budgetary control to the district level (Chiduo 2001) where they would theoretically have better access to local information necessary to make better informed planning decisions. It was hoped that the system would also create accountability through increased community participation resulting in improved quality of health service provision (Hutchinson 2002: 2).

In organizational terms, the administration of the public health sector in Tanzania is complex (Burki 2001:11). The MoH is the "main coordinating body for health information in Tanzania" (HERA 2000:5). The regional level is responsible for health service delivery, and for coordinating activities in the districts, including the HMIS (HERA 2000:5). At the district, the District Medical Officer (DMO) coordinates activities in the health sector (IDRC 1999a). He is also chairman of the District Health Management Team (DHMT) which is responsible for health service delivery within the district (HERA 2000:5). At the community level are Village Health Workers (VHW) who constitute the "lowest level of health care delivery in the country" (Tanzania 2003).

## 4.2 The Influence of Aid Donors on Health Systems in Tanzania

Donor agencies play a significant role in shaping the outcomes of health reform agenda in Tanzania. In Tanzania, the provision of general health services has mainly been the responsibility of the government. The primary goal was to improve health by addressing the main socio-economic determinants of diseases such as lack of education and deprivation (Abdallah et al., 2002; Masaiganah, 2004). Health strategies in the country were reflective of the Alma Ata community health care approach and public resources were primarily directed at vulnerable groups in society (Masaiganah, 2004). The funding required for health care in the country was immense and therefore became highly politicized. Cueto (2004) argues that aid was given for these programmes within the context of the cold war and therefore employed as a diplomatic tool for securing alliance.

At the end of the cold war, a new era of marketization dawned as the guiding framework for donor aid for health programmes (Cueto, 2004). The unrealized goal of the Alma Ata declaration created a vacuum for an alternative approach – selective primary health care which was directed towards addressing a region's most severe public health problems (Magnussen et al., 2004). From an epidemiological perspective, the approach stratifies population health needs and therefore concentrates on eradicating specific "prioritized" diseases. For instance, in Africa, the children's immunization initiative towered as a flagship medical intervention (Weeks, 2000). While the general health approach argues for a basic level of public health service for all, selective primary health care maintains that there is a need for specific campaigns targeted at breaking the mutual reinforcement of disease and poverty (Gonzalez, 2005). The new approach focused on interventions which were discreet and could easily be measured. From an economic viewpoint, funding for these programmes became conditional on factors such as good governance, liberalization policies and structural adjustment programmes in order to steer monetary and fiscal policies of recipient countries in directions that reflect donor preferences (Cornia, 2001). Agencies justify and defend their spending by predefining clear objectives with definite means for evaluating programmes. Consequently, donors have tended to operate in silos with a high propensity towards product-based output.

In many cases, however, these activities of donor agencies are misaligned with the expressed needs of recipient countries. In Tanzania, donor preference for discreet projects is evidenced by the excessive number of uncoordinated vertical programmes each of which require different reporting and auditing formats. An increase in the number of donors in the country therefore implies a need to manage the web of complex donor requirements and networks which further strains Tanzania's already overstretched resources. Tanzania's Assistance Strategy was developed with a view to harmonizing donor funding with the government's own vision. The suggested framework for coordinating donor activity was to pool donor funds into a "health sector basket fund" to be managed by the Tanzanian government. However, one of the central problems identified with the framework was the lack of capacity of the central government to manage the funds efficiently (Hobbs, 2001).

## 4.3 HMIS Implementation

The HMIS is the logical extension of an earlier data collection system that had attempted to integrate a myriad of vertical data reporting programmes. With support and co-financing from major donor agencies, the earlier system was further developed and successfully pilot tested in the Mbeye region. Version 1 was introduced nationwide between 1994 and 1997. The original planning for design was done by the MoH, a major Danish donor agency, and the major vertical health programme stakeholders. The goal of the HMIS was to "optimize the performance of health services at all levels of administration through the provision of

necessary and sufficient information needed by the health managers to monitor, evaluate and plan their activities” (HERA 2000:3). This requires a system that is integrated, decentralised, functional, and reliable (HERA 2000:3-4).

The very first software implementation was done entirely in English. It was soon realized upon testing that the users’ English skills were not sufficient and resources were spent translating the software into Swahili. Even a cursory inspection of the skill sets of the systems’ users would have revealed the inappropriateness of this design decision. The pattern of top-down design and implementation continued in the design and implementation of version 2, which was launched in 1998. Despite known reporting problems, the changes made were purely technical in nature such as switching from the old data base software to a newer different version (HERA 2000:79). At the health facilities, data collection is done by hand with monthly tabulations being made in the 12 HMIS booklets. These booklets consist of forms and registers, where the registers are pre-set algorithms for data processing. The health facilities (hospitals, health centres, and dispensaries) “record data on their activities, including attendances, diagnoses, drug use and treatment, in [HMIS] registers” (HERA 2000:5). Further information was recorded by the village health workers (VHW) who also completed one HMIS booklet and reported to the district level. Quarterly, the compiled information was sent up the institutional hierarchy where at each stage it was compiled and ultimately the Head Office produced a national health abstract (HERA 2000: 6). At the time the fieldwork was undertaken, an evaluation study which had been conducted in 2000 was the last official review of the HIMS. According to this review, most workers at the facility level regarded the HMIS registers as a useful tool and “a success” as shown below in Table 2 (HERA 2000:8).

On the surface, those interviewed revealed a faith in the HMIS and that, despite minor flaws, there was indeed nothing intrinsically wrong with the concept of the system itself. Given appropriate resources, they believed they could slowly make progress, “tackling problems one at a time”. However, the HERA evaluation exercise was more a political exercise than a true reflection of the situation. Despite the positive perspective, the national village registers at the community level were “frequently not kept up to date, and it appears that health facility workers in many areas also paid little attention to the information obtained from the villages” (HERA 2000:8). There was also a general distrust of the accuracy of the data which was a common trend across all those interviewed. This ranged from the data being “all rubbish”<sup>1</sup> to “lots of questions about the data” to “not quite sure that the data is accurate”. During supervision sessions, the MoH interviewees reported having witnessed doctors or nurses who do not carry HMIS forms with them during their rounds. They believe that at the end of each month the health workers hazard a guess at the appropriate data and fill in the HMIS books accordingly. Frustration was evident with those interviewed at the MoH who felt they were going “round and round” trying to solve the problem but couldn’t make any progress. Through primary data collected by one of the authors, we got to know about a whole host of social, political and cultural issues masked by the intervention. Below we tell three stories to provide a snapshot of such issues:

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<sup>1</sup> Quotations gathered from interviews will be without a citation. Where relevant the general details of position held by the interviewee are given.

<b>Problem</b>	<b>Solutions</b>
<b>HERA – Evaluation</b>	
Information seen as a burden	Training, technical support, improve tools, adaptable registers to support local needs
Inadequate access to data	Promote data collection, cascade system, re-write software, more training
Poor preparation of data for use	Improve information sharing, more user-friendly forms, training, develop quality control
Weak analysis of data	Training, link data collection and analysis to planning and evaluation
Some information by-passing decision-makers	Involve multiple stakeholders (including community), create awareness, improve data use for community planning
Poor capacity for decisions	Assess capacity at all levels, peer reviews and supervision to encourage planning and decision-making based on data, training
Low initiative for using data	Strengthen supportive supervision and feedback, training, link performance and funding
Central HMIS unit not able to contribute effectively	Develop information strategy, re-organise data flow, assess technical capabilities
<b>Interviews</b>	
Non-user friendly software	New software
Poor capacity for decision	Training
Work intensive registers	Simpler registers, training, computers
Low incentive	Decentralisation, training

Source: (HERA 2000:115-122) and 2003 Interviews

**Table 2: Main Problem Areas of the HMIS and Proposed Solutions**

#### 4.3.1 Story 1: Corruption

The extent of corruption in Tanzania and its health sector has been fairly well documented (Burki 2001:10; Tibandebage and Mackintosh 2001). Issues related to corruption, however, are neither mentioned in the evaluation nor did those interviewed believe that it played a significant role in the HMIS performance. One story, that could not be independently corroborated, did emerge from one interview as to how corruption may impact the HMIS. In rural settings there is an understanding that one has to pay “extra charges” to get “good service” or medicine. This bribe may be presented as a necessity payment – for example, the doctor explains that she bought the medicine herself because she knows that it is an important medicine for the village and the government did not provide it.

This can adversely affect the HMIS in two ways. First, the HMIS could be perceived as a top-down control mechanism as well as signalling administrative change. If this were the

case, disregard for the system itself would be expected as it would threaten those who have a stake in maintaining the current system. Second, if a patient is turned away due to corruption, the data in the HMIS will not accurately reflect the disease burden in the area.

However, given this corruption why don't people complain? One explanation is the mismatch between the organisational structure of the administration, and the local community. While the district office should take responsibility for corruption at the lower level health facilities, one district worker interviewed admitted that he had never heard of any such complaints. One explanation is that if a village member has a complaint, the 'traditional' method of resolving disputes is to go to the community leader. The community leader has, in fact, the ability to demote the doctor. However, the doctor can bribe the community leader to avoid sanctions and maintain his monopoly position.

#### 4.3.2 Story 2: Undermining Authority

A district level interviewee related this story. The Civil Service Reforms require that health care facility workers in management positions have achieved a certain level of education. Before the reforms, Rural Medical Aids (RMA) were in charge of health facilities including having responsibility for the HMIS. They also received the original HMIS training. During reforms, they were being replaced by new young Assistant Clinical Officers (ACO), generally straight out of school. The RMA who are losing their positions of authority feel threatened by the health sector reforms. Consequently, the RMAs have been known to be uncooperative and undermine the job of the new ACO. One way they can re-assert their authority and undermine the ACO is to sabotage the HMIS<sup>2</sup>.

#### 4.3.3 Story 3: Perceptions of Performance

This story came out in a district level interview. Since the inception of the HMIS, data collection has been mandatory while data quality ranged from good to poor. While the inaccurate behaviour was often excused due to the burden of data collection, what seemed less understood was a resultant incentive mechanism. Since health care workers know that funding is increasingly need based, there is no incentive to revise numbers downward, even if it were more accurate. Furthermore, now that the MoH is trying to link DMO and RMA performance assessment with HMIS output, there is an incentive not to show a major increase in any one particular disease. There is a disincentive to record data properly because the potential disparity would highlight past improprieties (MoH, 2002).

Thus, HMIS performance has been mixed depending upon the context of implementation. At the same time, some interviewed at the district level believe that the data do represent "at least a trend" and that the HMIS is an "important resource for planning". In terms of district performance, there is also variety of performance levels, although the majority is perceived to still have many problems including some districts that have never reported.

### 4.4 A 'Successful' District

One rural district seems to have performed well above the norm, according to those interviewed at the MoH. Their HMIS performance is mirrored by an overall series of health improvements that were "stunning" with no equivalent improvement in nearby districts (Economist 2002). When asked why this district did better, the response was technical; donor support, more funding, better transport, etc. The successful district was indeed heavily favoured over most other districts in terms of donor influence and aid. In 1997, the Tanzanian

<sup>2</sup> Apparently the MoH has instituted a training programme that allows ACOs to achieve accreditation for the RMA position.

Essential Health Interventions Project (TEHIP), was launched involving the Government of Tanzania, the International Development Research Centre, and other donors (Holmes 1997). But apart from resources, the project was conducted in a participatory and bottom-up manner. For example, one aspect of the TEHIP project was a focus on “health seeking behaviours” (IDRC 2000). The idea is based on the assumption that “household behaviours may both influence the very nature of DHMT planning process and in turn will be affected by DHMT plans” (IDRC 2000). To accomplish this they instituted a participatory action research (PAR) module that included DHMT members, district community development staff, research assistants, and module leaders with the goal to create an “effective procedural framework from communicative actions towards health development ...” (IDRC 2000).

Other actions taken under TEHIP were the introduction of Rapid Assessment Procedures and capacity-building attempts focused on “obvious areas of weakness” including training in computer techniques (IDRC 1999a,b). The presence of donors and extra funds enabled the district to take some of its own initiatives. One initiative was the introduction of a cascade system – “decentralization within decentralization” which resulted in the creation of 13 health centres that supervise the progression of health facilities and work hand-in-hand with village health workers with frequent home visits and supportive feedback (Muhe 2002:18-19).

These health centres collect information from lower health facilities and are supposed to be responsible for their own planning. The process of planning done at the health centres has evolved through trial and error. Using a technique learned from the Institute of Iringa called Focal Group Discussion, an experiment was carried out to carry out planning activities with the major stakeholder groups such as the VHW, traditional healers, and health facility workers. In the beginning, community leaders were also included in the focal group discussions, but pre-tests revealed that the dynamic was not conducive to open discussion. Now the community leaders are included in another meeting with the facility centres, but not in the group discussions.

## **5. UNDERSTANDING ‘INTEGRATION’ FROM A WIDER THEORETICAL STANDPOINT**

In this section, we reflect on our understanding of the HMIS in Tanzania by drawing on our wider conception of integration.

### **5.1 Integration from a Development Administration Standpoint**

The ideology of integrated area planning as espoused in policy directives from the 1970s onwards was based on the assumption that local administration would have the requisite authority to coordinate activities of various local government departments involved with healthcare. However, the health structure in Tanzania continued to operate according to conventional lines of accountability and according to traditional cultural norms of hierarchy. This structure provided little opportunity for integration neither in terms of coordinating health priorities nor in terms of synthesizing health concerns with other poverty-related indices.

An important element for integrating various development priorities is the availability of relevant and accurate data. Much of the information produced under the HMIS was unreliable and workers tended to place little value on its usage for planning. For example, evidence reveals that the national village registers at community level were typically not kept up-to-date and health facility workers placed little importance on using this information for grassroots planning and implementation tasks. By contrast, the generation of indicators from the TEHIP pilot project involved participation from village health workers.

One of the key objectives of the Alma Ata declaration was to provide more equitable healthcare delivery to local communities (WHO, 1978) and integrated health information systems were seen as important catalysts to achieve this. However, our evidence reveals that the HMIS only tended to mask inequities in the local community. For example, Story 1 reveals how the doctor has a privileged position in society and has institutionalized the practice of paying 'extra charges' for good health service. But this negates the principle of equity since only those who can afford to pay would be able to obtain treatment and would have data recorded excluding other people who do not come forward. This would not give a comprehensive picture of health status.

## **5.2 Integration from a Managerial Standpoint**

The three stories presented in the previous section are predicated on a more fundamental clash between the managerialist focus on procedures and efficiency and the highly personal nature of African bureaucracies and their authority structures. For example, according to the management information system, the normal recourse for a user who would like to report corruption would be to take it up with the district. This, however, at least according to one district interviewee, has never happened because of the dominance of the village leader who is the de facto judge and jury on such matters.

Integration from a management point of view requires that all different stakeholders of the information system be given a voice to express their priorities. The quest for managerial integration is often at odds with the priorities of local health workers as revealed in the case study. An example of this relates to the performance management indicators established by the MoH and the incentive for local health workers to present a picture of 'good health status' among in the area governed by its jurisdiction. We can compare this imposition of indicators from the Central Government to the approach adopted in the TEHIP pilot. Here, integration was attempted through the introduction of a participatory action research module which included the establishment of various channels of communication for different groups. The emphasis on integrating various layers of the health apparatus was also reflected in the cascade system initiative. At the same time, the TEHIP pilot reveals how integration may not always be relevant in all situations, for example, in the case of the purposeful non-integration of community leaders in the focal group discussion.

One of the challenges of integrating foreign assistance programmes has been the weak administrative capacity within developing countries. For example, our evidence shows that despite the policy mandate of strengthening local capacity to manage funds from donors, Tanzania faces difficulties in coordinating the Health Sector Basket Fund. In reality, new forms of dependency are being created with donor representatives typically locking the country into particular health programmes and procedures.

## **5.3 Integration from a Sociological Standpoint**

With the launch of HMIS, it was envisaged that data would be integrated at district level and passed upwards for reporting to the state and central government levels, the rationale being to include information of relevance at all levels of the administrative hierarchy. However, evidence points to the fact that the social relations that exist between the various levels of the health structure remain skewed in favour of central and state governments with local health facilities marginalized within the overall health structure in the country. There was very little integration possible at this time between the way in which health workers functioned at the micro social level and the bureaucratic system. In one of the less successful districts, the VHW refused to attend a community meeting because they are "embarrassed" by their ability to answer questions and critiques levelled at them. By contrast, in the successful district

efforts are made to integrate VHWs into the health structure creating prospects for some degree of shaping of health planning and policy making by micro social practices. In the pilot, local health workers became heavily involved in health centre planning, understood the importance of their position, and were thought to be proud to be in that role. This process has resulted in the reshaping of the VHW's self-identity and work practices towards something that he or she has reason to value. By engaging in the cascade process, the new health centres have established more contact with local communities. For example, the use of techniques such as rapid assessment procedures and focal group discussions meant that there was a high level of sensitivity to local ideas and priorities. The realization that the community leader should attend a separate meeting and not take part in these discussions is a local adaptation to a very specific cultural issue intended to support existing social relations at the community level.

In this section, we have advocated that a wider understanding of integration is of value for the study of integrated health information systems in developing countries.

#### **5.4 Integration from an Epidemiological Standpoint**

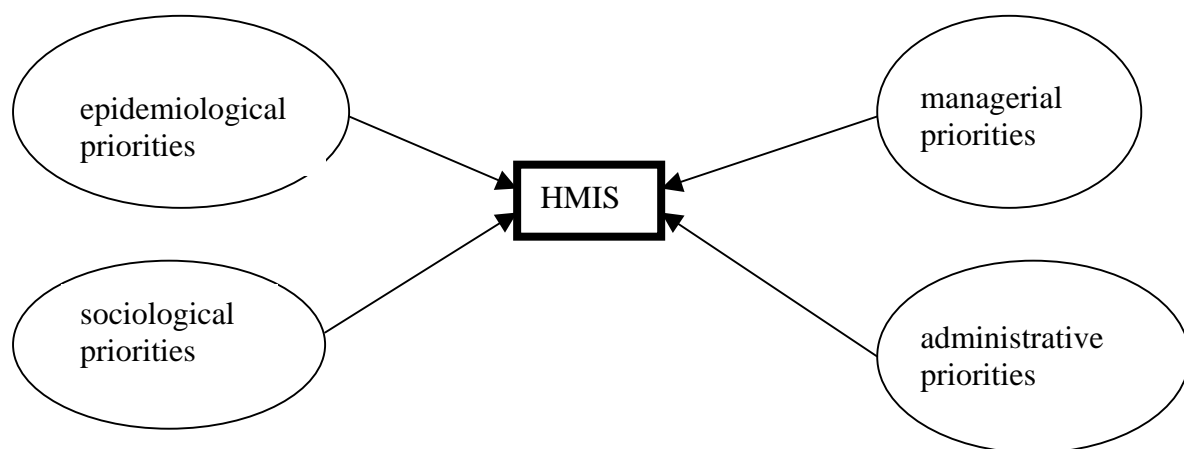
In the final part of this section, we argue that for health information systems to provide a valuable input to decision-making, there is need for integrating epidemiological data. This discussion finds support from our general understanding of health information systems rather than from the data collected.

From an epidemiological standpoint, the need for integration primarily stems from the recognition that the overall disease burden in a population or community arises from the occurrence of multiple co-existing diseases and health conditions that together underlie the total mortality and morbidity in any given population. Integrating epidemiological data will therefore be the first step towards the development of integrated "joined-up" approaches to disease control via the provision of information on the mix of diseases occurring in different local populations (Unger et al. 2006). Several advantages are thought to accrue from integrating such data specifically: 1) development of common treatment strategies, e.g. better targeting of multi-agent drugs to needed populations, 2) addressing of common exposures and risk factors, e.g. vector control to simultaneously reduce diseases such as malaria and lymphatic filariasis, malnutrition, and environmental exposures, 3) better incorporation of the externalities of treating one disease, e.g. where treatment of one disease may lead to both positive and negative effects on other co-occurring diseases, e.g. reducing parasitic diseases leading to both increased allergic diseases and negative effects on HIV and vaccinations, and finally 4) reduction of redundancy in health activities by better integration of specific disease control programmes leading to more efficient healthy delivery and strengthening of the health system (Unger et al. 2003).

Epidemiological data integration at the district level will help localized evidence-based health planning and hence the trend towards decentralization in health (Bossert, 1998; Dobrow et al. 2004). Such empowerment of local decision-making, accountability and needs-based policy development is thought to be key towards increasing both efficiency and equity. Integrating the current HMIS data on specific disease and health conditions at the district level has been used in Tanzania for undertaking situation analyses and budget allocations. This has led to a better targeting of funds and health delivery to priority diseases and health conditions, but experience indicates that a key requirement is to build capacity at the district level in conducting epidemiological assessments, undertake community needs analysis, evidence-based planning, and monitoring and evaluation, for sustaining this activity. From an epidemiological point of view, there is also a need to consider the spatial dimension of diseases and health conditions. The argument here being simply that even if the prevalence of

a disease is low in any particular locality, there is still need to control the disease because of spill over effects, e.g. vaccinations to achieve control of a infectious disease requires coordinated intervention over the whole country. This indicates that an integrated HMIS is required to both meet the needs for decentralized planning as well as facilitate coordinated planning at a higher administrative level, i.e. provide decision support at multiple health administrative levels. At the same time, integrating disease control in developing countries may also be an overtly administrative agenda which may not coincide with epidemiological boundaries applicable to the control of diseases. Chilundo & Aanestad (2004) provide an interesting critique of the notion of integration of vertical disease-specific health programmes in Mozambique. These authors study a reform programme which endeavours to integrate separate vertical disease-specific programmes in Mozambique. The reporting and monitoring of these programmes are organized differently in terms of which data elements are collected, to whom and how frequently they are reported. Chilundo & Aanestad (2004) address the practical challenges related to the integration of diverse information systems and argue that the specificities of diseases is a topic rarely addressed by the management ideology that frames and sets parameters for how public sector reform projects should be implemented. The diseases towards which the programmes are targeted are different with regard to the way they spread, their incidence and prevalence, their social consequences, and the organization and effect of its treatment.

In this section, we have advocated that a wider understanding of integration is essential for the study of health information systems in developing countries. The final section of this paper draws some implications for policy.



**Figure 1: A Conceptual Framework for Health Policy-makers in Developing Countries**

## 6. IMPLICATIONS FOR POLICY

We have argued in this paper that without a concerted effort to match managerial objectives with other key administrative, socio-political and epidemiological priorities, integrated health information systems will lead to little tangible benefit in terms of improved healthcare in Tanzania. The conceptual framework we propose below in Figure 1 could be used to sensitize policy-makers involved with health reform in developing countries.

This framework allows us to consider some of the policy implications which derive from our analysis as follows.

- (1) **Administrative:** There is a need to reformulate the health structure in Tanzania if integration at the local level is really the intention. The district needs to be provided its own 'decision space' in order to collect and analyze data that may cut across various health programmes and ministries (Bossert, 1998). This would mean a redistribution of power to the district both in terms of resources and in terms of human capacity. Qualitative indices related to health management need to be devised at this level and recognized by higher authorities as legitimate indicators for policy and planning. As a corollary to the above, local administrative capacity needs to be strengthened in order to inculcate a sense of responsibility and self-worth amongst staff at all levels with due rewards for initiative-taking. Policy development here also needs to take account of the need to better align and manage local-global priorities. For example, at the state government level, capacity building becomes crucial in order to coordinate donor funds and negotiate objectives and evaluation criteria with external agencies.
- (2) **Sociological:** New systems of social inclusion need to be nurtured at the village level. It is clearly not enough to have a policy mandate for decentralization (Bossert, 1998). There is a need to first of all gain an understanding of the existing social structures in place and then to carefully interpret to what extent and through which means participation of marginalized groups can be made possible. This would necessarily involve right from the start various government ministries in discussions concerning the HMIS system: the health ministry, the information technology ministry, and the ministry responsible for local development and poverty alleviation.
- (3) **Managerial:** It is necessary to ensure that the HMIS is designed and developed in a flexible manner to ensure that there is room for shifting priorities in health policy and planning. When new modules are introduced in the system, these should be piloted in a participatory manner rather than launched at a country-level. This approach to systems development has been adopted by Korpela *et al.* (2000) in the context of the health sector reform in Nigeria. Ongoing evaluation of the HMIS needs to be carried out, preferably by a third party. However, this evaluation should not be based on outcomes or deliverables, but in terms of processes of change. For example, the TEHIP success can be analyzed to a greater depth in order to identify why the project has been successful and what lessons have been learnt which could be carried forward to other districts.
- (4) **Epidemiological:** The integration of an HMIS with analytical tools for assessing disease burdens and spread and resource allocation algorithms has been an ongoing concern expressed by NIMR in Tanzania. Furthermore, another increasingly important perceived need is to enable the successful integration of epidemiological data from vertical programmes. However, policy-makers involved with health reform programmes implicitly work with rational western-based biomedical models. Atkinson (2002) argues that policy approaches are needed which combine elements from applied biomedical science and social sciences.

## 7. CONCLUSION

This paper has described the experience of implementing integrated health information systems in Tanzania. From the perspective of the authors, it does not appear possible to overcome the current impediments in health sector reform with purely top-down managerialist imperatives. Our paper identified that apart from a managerialist rationale, the

concept of integration can be viewed from different theoretical standpoints such as from a development and a sociological perspective. Above all, we have tried to broaden the concept of 'integration' as applied in health interventions in developing countries to include not only integration of data and management procedures, but also integration of socio-political and cultural mindsets of community members, local health workers, government and donor communities. Finally, we point to the pressing need to consider ways of integrating epidemiological data into current health information systems in order to provide a useful input for healthcare planning in developing countries. This broader conceptualization of integration helps us to identify crucial administrative, socio-political and epidemiological priorities. We recognize that the policy implications we have derived require funds and other resources which are lacking within developing countries. Given the primacy of donor funding, this also means that improving healthcare in developing countries requires flexibility on the part of donor agencies not to demand an overtly managerial agenda from national governments, but to use resources to address the administrative, sociological and epidemiological priorities which surface when introducing integrated health information systems in these countries.

## 8. GLOSSARY

ACO	Assistant Clinical Officer
DHMT	District Health Management Team
DMO	District Medical Officer
HERA	Health Research for Action
HMIS	Health Management Information System
HISP	Health Information Systems Project
MoH	Ministry of Health
NIMR	National Institute for Medical Research in Tanzania
NLFEP	National Lymphatic Filariasis Elimination Programme
RMA	Rural Medical Aids
TEHIP	Tanzanian Essential Health Interventions Project
VHW	Village Health Worker

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