“Let me emphasise this again that as a movement we must attain a deep understanding of this technological revolution so that we are able to take correct decisions with regard to what we have to do”
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Dedication

This work is dedicated to my late grandmother, uncle and aunt who all passed away while I was pursuing my studies in Cuba. May their souls rest in peace. To my mother, brothers and sister, thank you for being the pillars of my strength at all times. I am your “Pride” today. We shall together enjoy the fruit of my labour.
Acknowledgements

First and foremost I would like to thank my Creator and giver of life for sustaining me for the past three years here in Cuba. I would also like to thank my wife Thulisile and my son Thulane, for allowing me to be their non-resident husband and father while studying here in Cuba. They are thanked for the constant encouragements, support and understanding.

To the Khanyi family, thank you for opening your home and hearts for me, your psycho-socio-economic support will forever be appreciated by me and my family. In the same breath, the staff members of the South African Embassy are thanked for their unrelenting support and encouragement. My professors and tutors at CECAM are also thanked for the work well done.

Last but not least, I would like to thank the South African National Health department, World Health Organization and Cuba for availing this opportunity for me to come and study here in Cuba.
Chapter 1:

Study background

1.1 Introduction and literature review

In the past half of the 20th century, remarkable growth occurred in the preventive, diagnostic, treatment and rehabilitative technologies shown to be efficacious in preventing and treating disease and injury. Management of health care services has become increasingly complex as scientific basis for health care has grown. Complexity also arises from the multiplicity of decision makers involved in health services. (1)

Decisions about whether to seek preventive or symptomatic care are generally made by individual persons; the health care provider makes choices about diagnostic, treatment, and rehabilitative options, and, ultimately, the patient is expected to accept the provider’s recommendations and adhere to the prescribed regimen.

In the broader context of the health care systems, managers must make budget and staffing decisions that affect availability and access to services. Public and private purchasers have become a primary force in the cost containment because of their decisions on the scope of coverage provided to their constituencies. Similarly, health insurers have to decide what services are covered, how much to pay for the services, and how much patient will pay out-of-pocket. Also, health insurers increasingly are being
held accountable for the quality of care provided to their enrolled populations. These decisions affect access to services and financial burden of health care on the family.

In a perfect world, all decision makers would have access to complete information and could use this information to make “best” choices for themselves, their patients, and their communities. A central role for the health information in health services management is to collect data that will after being processed provide managers and decision makers information needed for better management of their services. A major challenge is to provide information so that it can be used by all decision makers, from the highly sophisticated to those with a more limited understanding of health care. (1).

Accurate, complete, secure patient information is essential to the delivery of safe, effective, and reimbursable health care. Health care organizations rely on Health Information Management (HIM) for the assurance that patient information meets regulatory, compliance, and accreditation standards. While this is not new, the means by which HIM is accomplishing these objectives is changing drastically and transforming the profession. (2)

Whether delivered in conversation, captured in a set of hand-written notes, or stored in the memory of a computer, the same basic principles govern the way information is structured and used in decision making. (3).

According to Clancey (1995), information is constructed by people in a process of perception; it is not selected, noticed, detected, chosen or filtered from a set of given,
static, pre-existing things. Each perception is a new generalization, a new construction.

Despite the central importance of information, the words we use to describe what we know about the world often become entangled. Terms like data, information and knowledge are often used interchangeably in common speech. (5)

E. Coiera (1997), states that each of those terms mentioned in previous paragraph has a precise and distinct definition in the information sciences. He further clarifies that a simple way to conceptualise the difference between these terms is to think of a hierarchy of meaning. The hierarchy starts with raw data at the bottom, moves up through information, and ends at the top with knowledge. Data consists of facts, information is processed data and knowledge in this context defines general relationships between different kinds of data. (3,13).

In most cases, the important changes in the social, political and economic spheres in the western societies influence the evolution of healthcare services worldwide. In addition to the demographic changes, the increase of healthcare costs and the opening of new markets, healthcare technologies have become the central role in managing health services. (6,7,9).

Health information is an essential element in decision making. The provision and management of healthcare institutions constitute a complex company that depends to a great extent on the information for a variety of clinical and administrative decisions. (10, 19)
According to Pan-American Health Organisation- PAHO, health informatics can be defined as a combination of techniques and methods that make it possible to compile, store, retrieve, distribute and handle data with the aid of computers. (42).

The transference of the uses of the computers in the attention of health of the countries developed to the countries developing is a very delicate subject that not always it has received the attention that deserves, especially on the part of enthusiastic salesmen or consulting companies. The crossing of a system from a country to another one, without an exhaustive analysis of the situation and the necessities of the receiving country, often leads to the installation of an ineffective system and, consequently, to the waste of resources and the frustration of the users. (2,6)

An important field for the application of health informatics in the management of healthcare services and health programs is in districts and rural places. (3).

The applied computer science help to take advantage of the technology to provide information in effective form based on the costs. The strategic policy for the application of health informatics in health must reflect the means in which they will take to the practice. In addition they must be appropriate for the degree of technological development of the country, be fitted to the human and financial resources available and often rely on the terms imposed from outside. (12)
“Most of the initiatives of reforms of the sector health they have been based on the universal set of health for cost-benefit, a set of interventions standardized in public health, the containment and recovery of costs, the decentralization of the administration and the operation of the services of healthcare, the recognition of the function that carries out the private sector and the inter-sectorial character of the interventions in health”. (12).

Therefore, the new health information systems must be concentrated in the local level; it is there where the healthcare impact most of the population and where most data and information that is needed for the action at the levels regional and national is collected.(18).

According to PAHO the Primary Health Care (PHC) constitutes more than 70% of organized health care. In addition, most of the activities of primary prevention, (for example, the vaccination), and secondary (for example, the health examinations) are made in this level of care. Also, the education of the patient, (for example, maintenance of health, nutrition, etc.), and it is in this level where it is more effective. (41,42).

According to PAHO firstly, in the first place "it is necessary to integrate the information in three directions:

- local integration of the information; for example, a medical information system for professionals or centers of health services,
- vertical integration between the levels primary, secondary and tertiary health care; for example, for the transfer of patients to other levels of the health system or their reference to their original point of first attention;

- horizontal integration of healthcare system with other sectors of the social and economic structure; for example, social welfare, education, work, communication and other organizations, etc. (41,42)

The computers are useful, and sometimes essential, to canalize this current of information. The use of computers for the communication between different levels of healthcare can help to improve the quality of healthcare provision. (3,4,7).

### 1.2 Work already done on the problem

Recent trend shows countries have demonstrated improved capability in health service planning, disease surveillance and evaluation of health services. This may be the result of better trained managers who have used information in an effective manner for health actions. Countries in the Region (WHO-Africa Region) are fully aware of the importance of information support in the delivery of health services. However, due to resource constraints and lack of specific technical know-how, there are delays in some countries in formulating national strategies to improve the data collection system to meet the challenging needs of the health care system. With the advent of information technology in health, some countries are actively pursuing technology to disseminate medical
information to improve accessibility of health care services for people particularly in the rural areas/islands through teleconsultation and teleeducation. (24).

According to MRC, (Medical Research Council) (2004), the vision of National Health Information System for South Africa (NHISSA) is the development of an integrated national health information system, which provides information to support patient care and management decision making at all levels of the healthcare system. Furthermore, in practice this requires the integration of data from multiple electronic and manual information systems. While progress has been made in coordinating these multiple information requirements, some of the essential building blocks for effective data integration from multiple systems still require further development. (23).

Effective data integration also require a clear understanding of and agreements about the data and information flows, within and between the multiple components of the South African healthcare system. Clarification of data flow requirements allows for streamlining of data collection at service delivery level, while ensuring that information needs of multiple and sometimes competing information users (including service providers themselves; district, provincial and regional authorities; vertical programme managers; and managers of special programmes such as Tertiary Service grants) can be met as effectively as possible. (23).
1.3 Shortcomings or gaps in the work already done

The compilation and analysis of data, timeous reporting and use of consistent, up-to-date health information, are all key aspects of health care planning and management. In keeping abreast of the transformation of the South African Health care system to address the existing huge inequities, it is essential that relevant and adequate information is made available to monitor and evaluate the implementation of the Department of health’s programmes. From the work already done, it is clear that every health worker collects data routinely, but most never uses it to improve health services. (23, 30, 31)

There is also a lack of consensus in the definition of data content standards, reaching agreement on data flow and support functions relating to information management. (24)

In a study conducted in Mpumalanga Province recently, it was discovered that the standard policy for the submission of information causes major delays in the flow of information and it increases lag of time. The previous month’s information is submitted in the middle of the current month and arrives at the national level at the end of the current month. This slow flow of information influences the quality of information needs and the decision making processes of managers negatively. (30, 31).
1.4 The purpose of the study being reported

On 27 April 1994, the new South African government inherited fourteen (14) independent health departments: one for each of the ten (10) black homelands and one each for the whites, brown (mixed descent) and Asian communities and one for the black Africans living and working in the so called white South Africa. Health resources used to be unabashedly skewed in favour of services for the white community. Chief among the priorities of the new government was to merge these separate bureaucracies and operational systems to create a single, deracialised national health system, something the rulers were able to achieve with remarkable success. (26).

South Africa’s health care system, made up of very distinct and separate private and public sectors, has undergone a number of changes since 1994. The private sector, administered largely by health insurance schemes, boasts a high concentration of medical specialists, together with the state-of-the-art medical facilities. Private sector health care is a growth sector in an otherwise declining or stagnant economy. The public health care sector, which is mainly government subsidized, serves the bulk of the population but is less well maintained. (50).

Furthermore, it is reported that 40% of all South Africans live in poverty, with 75% of this group living in rural areas where health care services are least developed. In the last few years, however, the government has invested substantially in the basic primary health
care facilities in rural areas. The core of the government’s health care policy is to eventually provide health care that is affordable and accessible to all. (50, 53, 54).

In their evaluation and analysis of the NHISSA after 10 years, MRC (2004) indicated that further explorations need to be done in the definition of the data content standards, reaching agreement on data flows, ensuring ethical handling of patient information and other functions related to information management. (23).

In responding to the dilemma of NHISSA and the health care system in South Africa, the researcher studied the Cuban health information flow, which start from data collection at the smallest unit; family doctor until at the level of decision makers. The study presented here is responding to the objectives set and the question of whether the health information system from a socialist country, in this case Cuba; can be applied in a country with mixed economy for decision making.
Chapter 2

Methodology

2.1 Study design

The study was conducted using qualitative and descriptive methods to research the revolution of the Cuban health system since 1984 when the smallest unit of primary health care- family doctor concept, was introduced.

The researcher used a guide which had themes and sub themes to accumulate information from the presented papers by the Cuban government or scholars regarding the data flow, the use thereof and the decision made from the family doctor until at the policy level. Since South Africa has most of its population in rural areas, the researcher compared the introduction of the family doctor in the Cuban Public health system and the various forms of primary health care delivery methods used in the South African health care system.

Areas covered in the review were: information needs and quality of available information for programme planning, predetermining outcome factors of decisions, major concerns that confront decision makers, data collection, storage and analysing tools, the kinds of data that lead to development, information needs of decision makers, data collectors, utilisation of health information services, barriers and constraints to information utilisation, effects of local conditions in health service management, utilisation of health
information in decision making and programme planning, organisational structure and identification of key personnel in information services. The Cuban Public Health model was reviewed for these purposes. Also, minimal unstructured interviews were conducted in order to further understand the policies as applied on daily bases.

2.2 Setting and sample

The sample of the study consisted of Cuban Year books reports since 1984 until 2004 and documents presented by scholars in Cuba, OPS/PAHO-WHO or relevant organisations regarding the progress of the Cuban health system since 1984. These were used concurrently with the papers and documents presented or written regarding the development of the South African health system since the dismantling of “apartheid” system and the dawn of democracy in 1994.

2.3 Exclusions

The study excluded the information gathered in South Africa before the 1994 democratic elections since the health care system was racially based before that. It also excluded the private healthcare sector processes as applied in South Africa and mainly focused on the public healthcare system as provided by the government.
2.4 Variables and their measurement

The sample consisted of Cuban Year books reports since 1984 until 2004 and a random sample of papers from scholars in Cuba, PAHO-WHO or relevant organisations regarding the progress of the Cuban health system since 1984 as well as documented evidence of the South African Health system since 1994.

2.5 Research procedure

The study had two folds aims; one for academic purposes, where the approval to do the project was granted by CECAM, where the researcher was studying and secondly for designing a framework for a unified health information system in South Africa.

2.6 Ethical considerations

The proposal for the study was submitted to CECAM and permission was granted to conduct the study.

2.7 Data analysis

Notes from documents and presented papers were transcribed into the computer programme and the examined with a systematic search for words, phrases and concepts that were then developed into themes. Information maps were also developed manually to
identify key themes and topics. The themes were further analysed in order to check for patterns and trends in the data and also the recurring themes from the data were identified and grouped according to their similarities and their differences.
Chapter 3:

Findings

3.1 Description of the sample

A descriptive investigation was conducted to identify processes and procedures used by the Cuban Public Health Ministry to collect, store and analyse data for decision making and monitoring and evaluation of health programmes and progress. The study included review papers, annual reports and relevant documents published by various sources. It also included papers and reviews of the South African health information system since 1994.

3.2 Description of the study findings

The findings are hereby presented following the themes and sub-themes as identified by the investigator during the research process.

3.2.1 Background characteristics of the materials used.

Health Care Information System and Monitoring and Evaluation must be seen as a long-term socio-cultural, political, economic and technical development process with short-term practical and functional solutions and applications that works. On January 4, 1984,
Cuba introduced a Primary Health Care model called Family Doctor and Nurse Plan. Since its inception, many review papers and documents were written to track its progress and its impact both in data collection and decision making at all levels of health services.

On the other hand, Primary Health Care was formally introduced to South Africa from April 1994 as the driving principle for health care provision with the implementation of two policies, namely, “Free health for pregnant mothers and for children under the age of six years as well as universal access to Primary Health Care for all South Africans”. As a means to track the progress and impact of the services provided, the National Health Information System of South Africa was formally introduced in 1996 to collect, store and analyse data for decision making purposes. Annual reports and papers were presented or written to that effect. These papers and those presented in the evaluation of the Cuban Public Health Information System (Sistema de Información Estadística de Salud Cubano) served as the sample for his thesis.

3.2.1 Data collection, storage and analysis tools

One focus area of the study was the methods used to collect and store data as well as the tools used to analyse the data collected.

3.2.1.1 South Africa

It emerged from the study that the most important source for health care service delivery is the District Health Information System (DHIS), which has been accepted nationally by the National Health Information System of South Africa (NHIS/SA) as the standard
source of health care data in all provinces. The DHIS is built around a comprehensive index of public health care facilities and administrative organizations (i.e. the municipality, district and provincial hierarchy). This structure is an extremely useful data source in itself, and includes reference data such as location, type of facility and descriptive data such as contact details, the number of beds and the available public utilities. Private health facilities are included although this is not comprehensive as these entities are not obliged to submit the routine data to public health providers.

The routine data collected at service point is classified as Minimum Data Set (MDS) and/or Essential Data Set (EDS). The public health sector has implemented a flexible routine information system based on the MDS at all administrative levels, and these data sets, along with organizational structure, comprise the District Health Information System. The term flexible is used because each administrative level, while providing the minimum data needed for the level above, is free to add data elements and indicators considered essential for their local environment. It also means that MDS should be reviewed and revised regularly to ensure that every single datum element collected actually is being used for decision making and/or for monitoring and evaluation.

The data is manually collected (paper-based system) at facility level using forms and registers. However, in some of the progressed districts, routine data is captured electronically. The Minimum Data Sets are divided into the hospital MDS and PHC MDS. The current national MDS for both the Primary Health Care and the hospitals was implemented in 2000.
Historically, South Africa has suffered under the same “burden of data collection” as most other developing countries. On the one hand, a multitude of top managers, politicians, programme managers, researchers, and donor’s agencies had over the years gradually increased the amount of data collected – most of that data is really never used for decision making or any action. While staff often view this as “punishment” from up high, excessive data collection and reporting is also often defended by staff because they view it in part as a way of showing the authority what they are doing on the ground.

The current data collected is summarized on monthly bases and the summaries are sent to the health district offices were storage, collation, aggregation and complete analysis of the district data is done. To date South Africa does not have legislation or an act regulating the National Health Information System; this is only a unit established under a policy for monitoring and evaluation of health services impact and progress, which is why for no apparent reasons some private institutions had stopped to submit their routine data to public health administrators.

3.2.1.2 Cuba

Although the research was confined to the period dating from 1984 to 2004, it is important to note that historically, Cuba in 1976 introduced in their law an article 76, Act no.1323 of 1976, which refer to the establishment of the State Committee of Statistics which is currently called National Office of Statistics for the Ministry of Economics and Planning. This committee was responsible to revise the methods and to review the state organs that are involved in the collection of data.
Health Statistic Information System (el Sistema de Información Estadístico de Salud-SIEC de Salud) is one of the subsystems of the Health Statistic System of the country. This organ of state is tasked with the collection, flow and processing of data to generate information that can be used in the decision making.

Generally, the users agree that for the data to be useful it need to be collected on time and that it should have element of analysis, evaluation, comparison and control in order to be used for decision making. The Health Statistic Information System has seventy-one system which collect data as specified. Each system has a category, for example morbidity, period of collection, that is, whether monthly or daily, etc., and different variables like gender, age, cause, etc. Furthermore, for each system it is specified as to when to submit the daily collected data.

3.2.2 Information needs and the quality thereof

One focus area of the study was the identification and analysis of information needs. This was done comparing the progress in the last 20 years of the Cuban Public Health in comparison with the National Health of South Africa in the past 10 years.

3.2.2.1 South Africa

From the literature studied for this investigation, Health Information units are expected to deal with clinics, hospitals, research data and information. For the purpose of planning
and decision making, managers need both internal and external data to meet their needs. The internal data needs is adequately met by the both the district and provincial health information units. The same however cannot be said about the external data because the services are rendered by private practitioners, clinics or hospitals which are not obliged to report their activities to the public health providers.

At the district level there is always large volume of information as compared to the province or even national information units. This is not surprising when it is considered that information content narrows with high level aggregation at provincial level, a deliberate strategy to reduce system and information overload at this level.

The information quality and accuracy still poses a great challenge. However, from the study it emerged that some measures have been put in place to improve the quality. Information managers use fax and telephone to assemble outstanding data, and thus addressing the incompleteness of the data. Currently, it is reported that the data input coverage of 2000 and 2001 is above 95% for all provinces except one. The other strategy used by information managers to check the quality of data is by employing the validation tool incorporated in the DHIS software. Some however prefer to use a more comprehensive approach of visiting the facilities to monitor data collection and to conduct training.

With regard to information needs for management of health services, indicators are developed with programme coordinators at national and provincial levels. The DHIS
software also allows managers at district or local level to add their own data element as needed. The new approach in terms of health needs for managers is that integrated planning is needed at all levels of government.

3.2.2.2 Cuba

The Statistic Information System in Cuba is organized in three functionalities to reach the information needs of users, namely: National Statistic Information System (Sistema de Información Estadístico Nacional- SIEN), which is tasked with the collection, tabling and validation of data for National Statistic Office. For example, birth statistics, this unit will collect and validate the data from health facilities and then process it for submission to National Statistic Office and its dependents. The subsystems of SIEN will then submit the amplified data to different sectors for socio-economic and policy activities.

The other system is called Complimentary Statistic Information System (Sistemas de Información Estadísticos Complementarios- SIEC) which is found in each organ of the Central Administration of Cuban State. For example, SIEC of Health, SIEC of Education, etc. and each of these produce statistic for that sector of government.

The last system is called Local Statistic Information System (Sistemas de Información Estadísticos Locales- SIEL) which is designed to respond to territory or local needs. It needs approval of the superior levels of statistics collectors. These systems are inter-related for the purpose of planning and management of services in broader terms.
3.2.3 The kinds of data that lead to development

Some data can be traced over a period of time to determine growth and development of healthcare system. Prior to 1997, in South Africa abortion services for example were not easily accessible. The investigator extrapolated data from the Cuban system on abortions for the first ten years after the introduction of the family doctor/nurse model and compared it with the data from the first eight years of the implementation of the Choice of Termination of Pregnancy Act of 1996 which came into effect in 1997.

### Historical abortion statistics and live births, South Africa

<table>
<thead>
<tr>
<th>year</th>
<th>live births</th>
<th>abortions, legal</th>
<th>abortions, abroad</th>
<th>miscarriages</th>
<th>abortion ratio</th>
<th>abortion %</th>
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<td>2001</td>
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<td>2002</td>
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<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
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<td></td>
<td>Data for the year 2002 was reported as incomplete</td>
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<tr>
<td>2003</td>
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<td>70,758</td>
<td></td>
<td></td>
<td>87</td>
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<tr>
<td>2004</td>
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<td>Data for the year 2004 was reported as incomplete.</td>
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### Historical abortion statistics and live births, Cuba

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<tr>
<th>Year</th>
<th>Live births</th>
<th>Abortions, legal</th>
<th>Abortions, legal plus illegal</th>
<th>Miscarriages</th>
<th>Abortion ratio</th>
<th>Abortion %</th>
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<td>166,582</td>
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<td>1986</td>
<td>166,049</td>
<td>160,926</td>
<td></td>
<td></td>
<td>969.1</td>
<td>49.2</td>
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<td>46.0</td>
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<td></td>
<td></td>
<td>607</td>
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#### 3.2.4 Flow of information from local to national level

The flow of information is directly linked to the issue of meeting information needs of managers and the quality of information. As health systems are shaped like combs, information flows in different directions. From the South African perspective, the first unit of information collection is the clinic while the Cuban one is the Family doctor/nurse surgery. The Cuban model is based on the duo of the doctor nurse working together to
form a Basic Health Team, which provides comprehensive medical attention and consistent health assessment to a defined population, aimed at 120 families per team.

The family is the core unit of care, but this also includes individual, community and physical environment. The team also relies on the information collected by a Basic Work Group which consists of an intern, pediatrician, obs-gynae, psychologist, biostatistician, nursing coordinator and a social worker. Two instruments are used to collect and disseminate data to the other team members, namely, neighbourhood health assessment; designed to identify, analyse and find solutions for health problems, with active participation of the community, while the continuous assessment and risk tool is aimed at organizing and developing comprehensive medical care. The data collected at this level is the passed on to the territory or region level until all that is at the National Statistic Office as prescribed by the law.

On the other hand, the flow of data in South Africa is different. Health care providers, usually nurses at clinics, mobile or fixed, community health centres and hospitals collect data and sent summaries to Health Information managers usually based in the hospital of a defined municipality. These managers capture the data into the DHIS system and sent it to the District Information Manager who in turn do the further aggregation of the data before sending it to the provincial level, here further aggregation is done for the province and the data is passed on to national information unit. Each province has its own policy regarding the submission dates of the information from one level to the other. The information chain delays the flow and timeliness of information.
3.2.5 Utilisation of information in decision making

Planning and decision making are usually intertwined processes. The decision making process is more complex than the routine data collection. It is affected by many different components. It is thereof worth noting that from the investigation, it was discovered that the two countries has different approaches in the use of data for decision making purposes. The family doctor and nurse and the Basic Work group in Cuba are the primary users of the information collected through the tools designed.

The information is also used to contribute to the national policies of health in each territory. It also contributes to design strategies and plans for the execution of the said policies. The same information is also used for research, teaching, evaluation, development of programmes, monitoring and management purposes. From the study conducted it also emerged that the smallest unit of data collection daily uses the data for service delivery.

On the other hand the health care providers at the clinics or hospitals in South Africa collect data for “other people” in the hierarchy. The nurse who usually runs the clinic for example cannot take decisions based on her observation of data collected. Recommendations are made to clinic coordinators, who further recommends to the nurse manager, who in turn recommend to the management team who will then report to the district manager, who will in turn recommend to the provincial management and finally the decision might be taken depending on the type of data submitted.
Decisions on health matters do not include the community or the family as is the case with Cuban primary healthcare approach. The community is usually involved in mass campaign. The legacy that data is collected for “faceless” people still persists in other sectors or districts.

3.2.6 Major concerns that confront decision makers

One of the major inhibitors or constraints that confront decision makers is the shortage of resources. The collected data cannot suffice alone if there are no equipments for processing the data collected. The technological advances cannot answer the questions asked if there are no human resources.

The bottleneck in the flow of information is a major challenge in the use of data collected. The inaccuracies and incompleteness often pose a major concern in processes such as budgeting and planning of health services. In South Africa for example, from the investigation, sometimes clinics run out of essential drugs because of poor planning as a result of the use of incomplete data for planning. At times, the health service management team is more concern with administrative issues than health related issues. Labour unrest and work related disputes are usually attended at the expense of the health related issues. Sometimes the data collected at health service facilities is used for politically motivated speeches by members of the community structures which usually taint the image of that facility. In some instances for example, data elements such as nurse clinical workload
was not constantly collected because of fear of labour unrest were the utilization rate was low or high.

The Cuban system did not reveal many constraints as the providers of services are placed and employed by the government and not the individual hospitals or polyclinics. Therefore, health service providers are daily faced with the decisions as demanded by their work rather than the need for profit or gain.
Chapter 4:

Discussion, recommendations and conclusions

4.1 Summary of major findings and discussions

It has become apparent on the basis of the data collected from the reviewed papers and documents that for proper health services management, decisions should be based in the context of what is known, what is available when and is needed.

The decision making process in health service management should be based on the data collected and the information synthesized from that data. This report reflects on the processes as followed in Cuba and South Africa from the point of data collection to the health information utilisation in decision making. In the process of examining the concept of health service management from data collection to health information management in decision making in this study, a number of issues emerged from the investigation and these constitute the basis for the discussion. The data collated reflected on issues such as data collection, storage and analysis tools; information needs and the quality of data collected and reported, flow and timeliness of data, the kinds of data that lead to development, the use of information in decision making as well as perceived constraints and concerns that face decision makers.
4.1.1 Data collection, storage and analysis tools

The adoption of DHIS by all provinces in South Africa is a positive step in the unification of the health information management systems. It is also worth noting that in first ten (10) years after the birth of democracy and the integration of the previous health administrations into a single National Health Department, much work is still needed to bring equity and health services to all. (21,26,31)

The DHIS is built in such a way that it can be adapted to serve local needs in terms of data collected which can also serve as a basis for informed decision making at local levels. The management teams can decide on the data elements to be added above the Minimum Data Sets as agreed nationally. (52,54)

Instruments used to collect data also influence the decision making process. In terms of the community healthcare services, neighbourhood health diagnosis and continuous assessment and risk evaluation as applied in the Cuban Family Doctor / Nurse model proved to be successful in improving the health of families and individuals within the community. (36, 37, 42)

4.1.2 Data flow and timeliness

Data flow and information dissemination were also identified as other areas that impact on the quality of information and informed decision making processes. The studied
documents and papers revealed that networking at both technological and human level will improve the timeliness and flow of data and information from the lowest to the uppermost levels in the provinces and country. It also revealed that lack to poor trained personnel at facility level influence the data float that is usually observed at different levels. The introduction of DHIS, and if well managed, will help in unifying the flow because it is difficult to manage data if it is submitted from different directions and at different times but for the same report or decisions. (31)

The lack of standard policy in all provinces affects the data submission rates at the national levels. Some reports in the annual health reviews are still reflecting incomplete data. (22,54).

The introduction of regulations and laws on the establishment and management of statistics in Cuba helped in the flow and management of data. It also helped in the timely submission as well as integration of all state organs which needed health related information for planning and decision making. (48).

4.1.3 Information needs and the quality of data

The quality of information: accuracy, completeness timeliness, accessibility and consistency in flow were not positively appraised in most papers studied. The reasons written by different authors vary from poor submission, missing data element, provinces or municipalities not implementing the DHIS to brain-drainage to private sectors (31, 51).
The study revealed that not all information needs are met by the current Health Information System. This is also highlighted in the fact that the DHIS is being constantly adapted and is also made available as a free source for the user to adapt it (54)

The need for external information could be resolved by establishing an information unit that is linked to an Internet and a library. The unit should have system for routine health data, surveillance and research information system (31, 58)

4.1.4 The kinds of data that lead to growth

Mother and Child Health programmes are worldly prioritised in primary health care. One of the components of this programme is the access to abortion services. This is usually a point of argument for human rights groups such as the pro-life and planned parenting.

The investigator extrapolated data from Cuba and South Africa to compare the implementation and impact on the health of the mother. For the year 2000, it was reported by WHO that maternal mortality ratio (maternal deaths per 100,000 live births) for Cuba is 33 while for South Africa was 230 per 100,000 live births (22,23,36)

While comparing the data for induced or legal abortions for whatever reasons, Cuba’s abortion ratio and percentage of abortion ratio are extremely higher than in South Africa. This is not surprising given that in South Africa there are a number of objections and
problems around the implementation of termination of pregnancy (TOP) especially around moral objections. Many healthcare providers have conscientious objections to TOP. Some health workers have displayed hostile attitude towards those involved in TOP. (22, 23, 54).

4.1.5 Utilisation of information in decision making

The data revealed that decision made by health managers and service providers differ from simple task oriented to complex management processes, which may include other stakeholders like local governments. These differences dictate the information source that is relevant for the decision to be made. It is clear from the data that simple programme oriented decisions can be informed by the routine data collected and stored in the information system at the local level to provincial unit, despite its flaws and limitations. This thereof suggests that health information in decision making do not apply to all types of problems requiring decisions. In this instance routine data can be used to make informed decisions at local level. (31).

As indicated before in this report, when it comes to the use of data or information in concrete and specific decisions that must be made, the level of data aggregation is questionable. Therefore, complex decisions, because of their very nature, are conducted under risk and uncertainly. (21, 22, 55).
The Cuban model is more advanced in that the data is used for service at the community level and is directly linked to the national policies. Routine data is not only sent up to higher levels, but is used for implementation, monitoring and evaluation of both the healthcare providers and the health programme. (35, 39, 40).

The study further revealed that simple decisions can be informed easily and successfully by routine data collected in the clinic or hospital, while complex decisions demand more information than routine data. Either way, health management information is utilized in decision making despite its flaws. Comprehensive research and reviews with other countries like Cuba needs to be conducted in order to resolve the problem of providing information necessary for complex decision making. The establishment and integration of health information system like the National Statistic Office in Cuba need to be explored.

4.1.6 Major concerns and constraints that face the decision makers

The investigation revealed that decision making in South Africa is hierarchical and bureaucratic. This is influenced by the bureaucratic nature of the government system. Different decisions are taken at different levels. (31).

As alluded in the report, under limitations, the government is divided into three spheres of government namely, national, provincial and local government. Each of these spheres provides certain health services.
In terms of decision making, service providers and junior managers at lower level have little to no power or authority in decision making, they can only recommend and inform, and decisions have to be taken at higher levels. Although the data indicated that routine data can be used to make simple decisions, in such cases, service providers and junior managers’ decisions need to be approved by a senior manager at local level.

Lack of resources also poses a threat to decision-makers. Inadequate information or incomplete information put the decision at risk as decisions are taken under uncertainty. (31).

4.2 The general meaning of the findings and their relation to previous work

The study clearly revealed that Government is committed to providing basic healthcare as a fundamental right. To improve the quality of services and consistency of their availability, a comprehensive package of PHC services has been developed and costed, and is being progressively implemented in all health districts, now realigned with the new municipal boundaries. By April 2003, free PHC services were provided at about 3 500 public health clinics nationwide.

It further revealed that if lessons from the previous studies were to implemented, much can be improved in terms of data collection and linking information generated to decision making in managing health services. It further highlighted that in a global village lessons from other countries can be of great value when coming to information systems. The
surveillance system implemented in a country like Cuba can further help in the streamlining and unification of Health Information Management System as envisaged by NHIS/SA.

Health reforms should also include legislation that regulates Health Information sharing by all health service providers. Local government should be engaged through service agreements to provide a more comprehensive service and to report data as requested on time.

4.3 Limitations

The study has been limited by the papers studied as no direct interviews were held with collectors, processors and users of the data and information produced from both countries. The decision makers for health services in both countries are also on different levels. In South Africa, District Councils, local municipalities, provincial departments and even National Health department are either autonomous or semi-autonomous. Each of these spheres of government has its own role in the provision of health services. For example in some provinces, local municipalities provide only promotive, preventive and environmental health services while the districts provide curative, rehabilitative and emergency health services and the province provide for hospital services.

The constitutional definition of municipal health services is considerably narrower than the primary care package of services. Local government will therefore have to be
engaged through service agreements to provide a more comprehensive service. The collection and flow of data will be adversely affected in such instances and the decision making process for managing health services will also be affected.

4.4 Ways further research can overcome these limitations

It has become apparent on the basis of the study conducted that it is necessary to explore ways of collaborating with other countries of the third world to improve the ways and means of collecting data. Although South Africa has semi-autonomous spheres of government, collaboration or intertwining with some municipalities within Cuba can help in improving the data collection processes and streamlining the format for collecting data. Funding should be made available for inter-country traveling for researchers from both countries to compare notes and to verify data collected in each investigation.

4.5 Implications for the practice- socio-economic and legal aspects

The study revealed that for managers to manage health services adequately and effectively it starts with the process of data collection. It further revealed that for socio-economic reasons and value for money, there should be a significant shift of resources towards supporting the development, maintenance and support of Health Management Information Systems (HIMS). This should include efforts to enhance the integration of HIMS, patient-based system, clinical and non-clinical system as well as establishment of other system such as social services, education and economic information system.
An integrated system of all information systems should be created as it is with the National Statistic Office in Cuba where the data from different sectors is synchronized for socio-economic and educational purposes and planning. The legal aspects and access to the information should be regulated to ensure that it is used for the purpose that it is requested for and not for any other malicious intent.

In general, the investigation revealed that in South Africa there is almost a unanimous agreement on the long term vision for Information Systems in health: that Information Technology should be used to monitor, evaluate and improve the health of every person throughout his life. There are efforts done currently to integrate planning and management perspective using the data and information collected. A unified approach will definitely need a unified data collecting and processing information system.

4.6 Conclusions

The process of data collection cannot be divorced from the decision making process in the management of health services. Flawed processes and late submissions of data adversely affect the proper planning of services. It is important to note that health information management is the key in the provision of health services.
From the investigation conducted, it is clear that the Cuban primary health care took an upswing stature with the introduction of Family doctor/nurse duo in 1984. The data collected by these service providers was locally used to improve the health of the community and the families served. The same data and experiences were replicated in the whole country to ensure coverage of at least 120 families by this team.

Cuba use manual or computerised and mixed method to collect data from health facilities. The information is generated from the data collected is used at the point of collection for planning of services, research and training of other health providers and the information is sent towards higher levels for further use for territorial or regional planning.

As indicated above, government is committed to providing basic healthcare as a fundamental right. To improve the quality of services and consistency of their availability, a comprehensive package of PHC services has been developed and costed, and is being progressively implemented in all health districts, now realigned with the new municipal boundaries.

From the investigation it was also discovered that since its inception NHIS/SA was tasked with the creation of an information system which will be universally used within the borders of South Africa to collect data, process it, analyse and report the information generated for proper health care service management. The vision has been to develop an integrated national health information system, which provide support for patient care and management decision making at all levels of the healthcare system.
In answering the question of **whether a health information system from a socialist country can be used in a country with a mixed economy and a healthcare system which is public and private based**; the investigation revealed that in a country with progressive constitution like South Africa, the way to manage effectively health services would be through Private- Public Partnership approach. 

In public health facilities, policies should be developed to reinforce data reporting and collection by all healthcare providers. Managers at lower levels should be given a leverage to use the data for their daily activities and functioning of healthcare facilities. These should however be monitored and evaluated to ensure that service interruptions do not occur.

Taking a leaf from the Cuban model, the investigation came to the conclusion that healthcare services can be universally provided if the collected data is used within the context of where it is collected and for what reasons unlike if it is collected for programme managers at a certain level of healthcare delivery system. The Cuban health information system can be successfully incorporated in the NHIS/SA projects to help collect and analyse data at the point of collection by those who collect the data.

### 4.7 Recommendations from the findings

It is imperative to note that health care Information Systems and monitoring and evaluating should be viewed as a long term socio-economic, cultural, political and
technical development process with short term practical and functional applications that actually work.

It is recommended that health services decision makers both within the Health department and outside should look for integration and synergistic effects while maintaining an environment that promotes innovation. A unified and synchronized Data Sets and Minimum Indicator Sets for both hospital and Primary health Care services should be developed and agreed upon by all health care services providers in all spheres of government.

There government should seek for ways to expand collaboration efforts with sister countries in the South like Cuba in developing monitoring and evaluation systems. Such efforts should include intellectual exchange through teaching and learning in institutions of health related technology in both countries as well as exchange programmes of experts from government sectors. Local municipalities intertwining can also be explored in health issues especially in the area of data collection and management thereof.

There government should also introduce a law which will regulate the collection of health related data and the reporting thereof; stipulating also what data should be reported by private practitioners and institutions for proper planning of public health services. National Health Information System of South Africa in collaboration with Statistic South Africa should be tasked with the work of establishing and integrating information
systems that will include other sectors such as education, labour, economic and social development.

The principle of local use of information should be encouraged for both service renders and managers at all levels of service provision. Regular feedback to facilities from information managers is recommended if services rendered are to be information based.
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APPENDIXES

Abbreviation:

DHIS- District Health information System
EDS- Essential Data Set
HIM - Health Information Management
HIMS- Health Information Management System
HISP - Health Information System Project
IMCI - Integrated Management of Childhood Illnesses
MDS - Minimum Data Set
NHIS/SA- National Health Information System of South Africa
OMS- Organización Mundial de Salud
OPS- Organización Panamericana de Salud
PAHO- Pan- American Health Organization
PHC – Primary Health Care
SIEC- Sistema de Información Estadístico de Salud
SIEL- Sistemas de Información Estadísticos Locales
SIEN- Sistema de Información Estadístico Nacional
TOP – Termination of Pregnancy
WHO – World Health Organization