

**THE APPLICATION OF INFORMATION AND  
COMMUNICATION TECHNOLOGIES IN THE MANAGEMENT  
OF HEALTH INFORMATION BY DOCTORS AND NURSES IN  
SELECTED GOVERNMENT HOSPITALS IN YAOUNDE,  
CAMEROON.**

by

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As the candidate's supervisor, I have/have not approved this thesis/dissertation for submission.

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DECLARATION OF ORIGINALITY

I, **Flora Nah Asah**, hereby declare that the content of this thesis is my own original work, unless it is specifically indicated to the contrary in the text.

This dissertation has not been submitted for any other degree to any other university.

_____	_____	_____
Signed	Name	Date

## DEDICATION

This work is dedicated to my brother,

**S**tanley

and his wife

**B**renda.

Your support and understanding has been my inspiration  
throughout my period of study in South Africa.

## ABSTRACT

Doctors and nurses in most developing countries lack access to adequate health information, that is, the lifeblood for the delivery of quality health care services. This problem is further compounded by the fact that correct techniques and equipment are not applied to provide access to reliable health information. Based on previous literature, it is assumed that information should be managed in the same way capital, labour and human resources are managed so that healthcare providers and medical professionals should be able to have relevant information to assist them in their daily activities, to help them to learn, to diagnose and to save lives. Relevance and reliability are paramount in meeting health information needs. A number of studies have shown that the application of information and communication technologies (ICTs) in the management of health information is a prerequisite to wider accessibility and availability of relevant health information.

Health information management is the continuum of processes in managing health-related information. It is composed of the use of technologies (computers, hardware, software and telecommunication), personnel (trained information specialists), and the allocation of financial resources to achieve the major goals of the organisation such as a hospital. The aim is to collect, process, store, retrieve and disseminate adequate health information to the right person, in the right form, at the right time.

This study investigated the application of ICTs in the management of health information by medical professionals in six selected government hospitals in Yaoundé, Cameroon. The basis of the study was that through the effective application of ICTs in the management of health information, relevant and timely information would be made available to medical professionals. It was the researcher's view that unless we understand the importance of information in the development of the health system, and apply the use of ICTs in its management, the delivery of health care services will constantly remain poor.

Data was collected from six government hospitals in Yaoundé through a self-administered questionnaire given to nurses and medical doctors. The data collected from 141 medical professionals [doctors and nurses] were presented, using descriptive statistics in the form of frequency distribution and percentage.



The findings of the study revealed that medical professionals are dissatisfied with the major method of information exchange activities, that is, face-to-face interaction with colleagues. In addition, the study found that health information is captured, processed and stored manually. This is very detrimental to medical professionals, because relevant information is not always available when needed. The study found that the barriers to adequate information exchange activities were lack of information support services, irregular distribution of information and poor co-operation and collaboration among medical professionals.

The study also revealed the non-availability of ICTs and Internet resources and lack of basic computer skills. Consequently, there is low utilisation of ICTs by medical professionals and limited information needs are being satisfied. Medical professionals unanimously favoured the application of Internet services or an electronic health information resource to supplement the current method of managing and accessing health information. Lack of training on the use of computers and Internet resources were the main factors that hinder the use of ICTs by medical professionals. The study concluded by calling on directors of hospitals, medical professionals and the Ministry of Health Officials to provide ICTs and Internet resources to medical professionals and provide them with basic computing skills and training. It further called for the recognition of information as an important resource for national development and called for formulation of a national information policy. With an information policy, information needs would be clearly defined and the provision of information services throughout the country would be regulated. In addition, medical professionals must create a free-flow of information and constant communication outlet to exchange and disseminate local health information. The high demand for basic training on the use of ICTs could be provided through in-service training or refresher courses.

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Flora Nah

## LIST OF ABBREVIATIONS AND ACRONYMS

AAAS	American Association for the Advancement of Science
AHILA-Net	Association for Health Information and Libraries in Africa
AISI	African Information System Infrastructure
AHIMA	American Health Information Management Association
ARPAnet	ARPA network
BMJ	British Medical Journal
CamFido	Cameroon Fido Network
CAMNET	Cameroon Network
CAMTEL	Cameroon Telecommunications
CENADI	Centre National du Développement Informatique
CDHS	Cameroon Demographic and Health Survey
CD-ROM	Compac Disc Read Only Memory
CME	Continuous Medical Education
DHC	District Health Centre
DOS	Disk Operating System
E-mail	Electronic Mail
ENSP	Ecole Nationale Supérieure Polytechnique
FCFA	Franc Communauté Financière Africaine
FTP	File Transfer Protocol
GCNET-Cam	Global Communication Network, Cameroon
GDP	Gross Domestic Product
GTZ	German Agency for Technical Co-operation
HealthNet	Health Network
HI	Health Information
HIF	Health Information Forum
HC	Health Centre
ICTs	Information and communication technologies
IDRC	International Development Research Centre
IM	Information Management

INASP	International Network for the Availability of Scientific Publications
ISBN	International Standard Book Number
ISP	Internet Service Provider
LAN	Local Area Network
LISA	Library and Information Services
MD	Medical Doctor
MoPH	Ministry of Public Health
MTN	Mobile Telephone Networks Limited
NICI-Cam	Plan Nationaux de l'infrastructure de la Communication et de l'Information
NL	National Library
OCEAC	Organisation pour la lutte Contre les Endémies en Afrique Centrale
ORSTOM	Institut Français de Recherche Scientifique pour le Developpement en Cooperation
OSI	Open Systems Interconnection
Popline	POPulation Information online
PM	Prime Minister
SBIG	Subject-Based Information Gateway
SCECSAL	Standing Committee of Eastern, Central and South African Librarians
SCM	Société Camerounaise de Mobiles
SNDP	Sustainable Development Networking Programme
SOSIG	Social Science Information Gateway
TCP/IP	Transmission Control Protocol/Internet Protocol
UNDP	United Nations Development Programme
UNECA-CASRDC	United Nations Economic Commission for Africa, Central Africa Subregional Development Centre
UNESCO	United Nations Educational and Cultural Organisation
UNICEF	United Nations Children's Fund
USSR	Union of Soviet Socialist Republics
URL	Uniform Resource Locator
VSAT	Very Small Aperture Terminal
WAN	Wide Area Network

WHO	World Health Organisation
WWW	World Wide Web

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# CHAPTER ONE

## INTRODUCTION

### 1. INTRODUCTION

This chapter discusses the rationale for information management and the need to use information and communication technologies (ICTs) to enhance health care delivery. It outlines the problem statement of the study, research objectives and questions, purpose of the research, justification for the research, assumptions, limitations and scope, as well as the definition of key concepts.

It has been widely recognised that information, like other economic resources (capital, labour and human), needs to be managed to assist the organisation to increase productivity, competitiveness, performance and decision-making. It has gained currency in recent years, as shown by the spate of articles and papers (for example, Akhtar and Melesse (1994); Kanamugire (1994); Boon (1992); Rasmussen (2001); Wijasuriya (1998)). In addition, Cronin (1985b:120) stressed the need to apply new and improved strategies to manage information if organisations are to obtain maximum satisfaction.

As a result of the new recognition given to information, a need for more effective techniques for its management and control has been created. The literature reflects information management (IM) as a product of growing importance in the daily activities of human beings. In addition, information management is revealed, among other things, as a result of the need for, and awareness of, treating information as a resource. It therefore warrants serious attention in terms of the implementation of management techniques. The literature also considers information management as a response to, and a search for, solutions to cope with the problem of information proliferation (Cronin 1985b:122; Fairer-Wessels 1997).

Information management has many definitions and it is unrealistic to find a single definition that covers the entire spectrum of the perception and practice of information management (Lewis and Martin 1989:229).



Similarly, the term is occasionally inverted to read “management information” which appears to have the same meaning, although the emphasis is on “information for management”. In some cases, the term information technology is also used, which further serves to confuse (Barry 1996).

The term information management emerged in the USA during the early 1980s. It is frequently and loosely used to cover subjects dealing with database management (Best 1988:13). It was also realised that information management is often used interchangeably with information resource management (IRM) (Wilson 2003:270; Fairer-Wessels 1997:95). Information resource management is concerned with effective handling and application of information to improve the quality of decision-making, as is IM. Information management is loosely applied to the task of overseeing the integration of computer-based, and paper-based, internally or externally derived information, from a range of sources, to support the functions of the organisation (Best 1988:13).

The general consensus is that IM is regarded as an umbrella term, with IRM viewed as part of IM, or as the information entities upon which IM is focused (Burk and Horton 1998). However, IM and IRM have become important as a response to organisational information problems and as improved strategies to effectively manage information. That is, as a means to get the right information at the right time in the right form to the right person (Hill 1998:1). Such a process has the potential, when implemented, to improve organisation effectiveness and reliability of decision-making (Mukangara 2000:2). In the present study, the term information management refers to the acquisition, processing, storage, retrieval and dissemination of data and codified information relevant to effective decision-making, in order to achieve the goals of the organisation, of which the government hospitals are no exception.

Cronin (1985a:105) holds that in order for organisations to have timely information, the application of new and improved techniques is necessary. Tools such as ICTs would enhance information management and accelerate development (Rowley 1998). The ICT tools provide a new paradigm for generating, exchanging and providing multiple accesses to information. The technology can be used, among other things, for Web publishing, distance education, public relations, posting announcements, question-and-answer services, mediating group discussion fora, news services, electronic mail (e-mail), organising meetings, holding virtual conferences and providing access to databases (Kaniki 1999; Chisenga 1997; Kwankam 2002).

Information and communication technologies refer to a diverse set of technological tools and resources used to communicate, create, disseminate, store and manage information in order to enhance information management

(Adeya 2001:3). These technologies have emerged as a result of the digital convergence of computer technologies, telecommunication technologies and other media communication technologies. The developed nations have undergone massive upheaval in terms of ICTs and information has been made available to more people than at any time in human history (Cronin 1985b:120; Behrens, Olen and Machet 1999). As a result, the increasing complexity of decision-making and the increasing pressure for instant answers to compound problems have demanded more sophisticated information handling systems and software and expert systems for diagnosis in every sector of human endeavour (Cronin 1985a:106). In the field of health and medicine, for example, the use of ICTs has brought about "virtual medicine" and "telemedicine" concepts. Patients located in remote areas are able to have access to medical experts located thousands of kilometres away. Isolated medical institutions and practitioners are able to treat patients better by communicating with colleagues and researchers in other medical institutions or countries. Furthermore, patients' records are kept in electronic format, making them easier to retrieve and update, thus saving the doctor's and the patient's time (Chisenga 1997; Klecun-Dabrouska and Cornford 2000).

In the developed countries, the application of ICTs has facilitated the provision of, and accessibility to, information and knowledge. However, in the developing countries, access to and provision of valuable information leaves much to be desired (Wijasuriya 1998:61). The gap between the developed and the developing countries in terms of information provision and accessibility is dramatic (UNECA 1999). In the health sector, for instance, the gap is about fifteen years. As a result of lack of information, medical professionals in many developing countries are starved of information and knowledge and their patients suffer and die as a result of ignorance and poor medical practices (Pakenham-Walsh, Smith and Priestley 1997).

In Africa, the United Nations Economic Council and the World Health Organisation, to name a few, have called on African governments and Ministers of Public Health to apply ICTs in the health sector to complement the provision of basic health services to mitigate the shortage of medical professionals and health workers due to the brain drain. Even worse, is the AIDS epidemic, which reduces further the availability of trained medical professionals through staff death and increases the demand for care (UNECA 1999; Pakenham-Walsh 2003). As a result, numerous initiatives (both locally and foreign initiated) are underway aimed at exporting information from the developed to the developing countries. Furthermore, the unstable political and economic structure of African societies, poor telephonic infrastructures and high illiteracy rates, have hindered the provision and accessibility of literature (in both print and electronic format) generated in the developing countries (Kanamugire 1994:99). Another major challenge is the complex nature of the information sent to health workers in the developing countries (Musoke 2000; Apalayine and

Ehikhamenor 1995). Stilwell (2001:42) points out that information needs to be repackaged and presented in an appropriate manner and in a meaningful way to satisfy its users. The role of ICT, particularly computers in information management, is paramount (Rowley 1993:113).

At this point, it is necessary to note that this study focuses on the application of information and communication technologies (ICTs) in the management of information in government hospitals in Yaoundé. This is because one of the vital functions of the State is the provision of social services, which includes the provision of adequate health care services to all its citizens. The provision of health care services is everyone's right. Unlike the private and philanthropic or mission hospitals, government hospitals and health care services are the concern of every member of the community. Furthermore, the budget for building government hospitals comes from the National Treasury, which is taxpayers' money.

## **1.1 BACKGROUND TO THE PROBLEM**

The proverb goes "Health is Wealth". The prosperity of a nation lies undoubtedly in the well-maintained state of health of the people, who are the primary wealth of a nation. Health, as a state of complete physical, mental and social well-being, has not only been the common concern of users, but also of the suppliers of health services, who may be politicians, administrators or healers. The latter includes physicians, nurses, midwives, community workers and traditional practitioners (Dhongade 1990).

Although most governments recognise the importance of adequate health facilities and services, in Africa the health status of the majority of the people and the level of health care remains a source of discontent and in some cases total dismay (UNICEF 1995). In Cameroon, for example, in the absence of ICT infrastructure and skills to manipulate the tools, adequate health policy, no proper information support services, coupled with obsolete health facilities in most hospitals, the working conditions of medical personnel are very degrading, so too is their performances (Ministry of Public Health 2001:34). According to Ngufor (1999), medical personnel are faced with frustration as a result of low salaries, no motivation, inadequate equipment and no source of reliable information to enhance effective performance of their activities. Ngufor (1999) points out that working under such conditions has led to inadequate medical diagnoses, poor delivery of health care and lack of information on treatment and medicine.

In every country, the provision of information services is the responsibility of the state and this is usually guided by information policy. Information policy is a set of public laws, regulations, and policies that encourage, discourage, or regulate the creation, use, storage, and communication of information. It also outlines the management and control of information, as well as information centres and library services and defines the information needs of the users (Weingarten in Rowlands 1996:14; Zulu 1994:89). From the researcher's experience in Cameroon, there is neither an information policy nor an information framework regulating the creation, storage, communication and access to information. This situation is made even worse by the non-availability of ICT infrastructure (computers and Internet services), lack of skill, training and knowledge on the use of ICTs and lack of information support services such as libraries. Although there are some information centres and library services in Cameroon, most of them do not have running budgets, or subscribe to any international journals. They depend solely on books donated to the library. Although the lack of library services does not relate to the use of ICTs, it has a bearing on the availability of and access to relevant information. For example, a well-resourced and equipped medical library could act as a focal point for information management throughout the nation.

In Cameroon, particularly the health sector, the provision of health information services has been almost totally ignored. For instance, the Central Province, with Yaoundé the capital, has a population of 2 356 627 inhabitants, of whom 477 are medical doctors and 1 654 nurses. There are 14 medical and paramedical training institutions and 348 health facilities (Ministry of Public Health 2001) but the province has only one medical library and one hospital library (Andong 2002). It was explained that neither of these libraries have running budgets and that while both have Internet connections, connectivity is very slow due to saturated telephone lines. Furthermore, the computers are frequently out of order and the books are outdated (Andong 2002).

In the hospitals in Cameroon, data collection and reporting is done manually and in a haphazard manner. There is no standard method of recording and reporting data from health facilities. This was confirmed by Bunge (1996) in his evaluation of provincial level health management information in Cameroon. Hassan (1997) in his study of an information retrieval system for health care services described a similar situation in Somalia. The authors explained that data capturing forms were too numerous, they took too long to complete and there was no way to harmonise the data. Even worse was the fact that the data had to be recorded manually (Bunge 1996; Hassan 1997).

In the hospitals whenever information is needed for planning and monitoring, considerable efforts and time are needed to analyse, process and communicate the precise information. According to Bunge (1996), since the forms are too



many, there is no way to harmonise the data and very little is being done to encourage the use of computers to process and analyse data captured. Most often data is poorly captured.

Transmitting and/or communicating information is done in a rudimentary manner. Since there are no ICTs, data collected at health units is aggregated and collated at district level and then transmitted to provincial and national level by fax or by physically assigning somebody to hand-deliver the information. In areas with poor communication infrastructure, such as fax, the postal service is used. Such information might take between four to six weeks to arrive at the central level.

In using health information data may accumulate at higher levels of the system, particularly at the central (ministry or national) level, but little is analysed and fed back to the districts. Little attempt is made to present the information in a form that is readily understood at either the district or sub-district levels.

In Cameroon, the health facilities are set up in levels. The first, second and third levels are referral hospitals, situated in the urban and major cities. These hospitals have more medical doctors and specialists, leaving the rural areas, where more than half of the population lives, with poor health facilities (health centres and clinics). Patients are referred to the referral hospitals in the cities for intensive and specialised medical services. However, these patients are faced with two major problems. Firstly, it is expensive to travel to the referred hospitals and secondly, in the course of travelling they are exposed to another danger, namely road accidents. This might aggravate the already poor state of their health or might even lead to their death.

By virtue of their profession, medical personnel perform very crucial duties because their services have a direct effect on the lives of individuals. There is no room for trial and error, as the outcome might be very drastic, such as the loss of life. In this regard, they are in constant need to up-date their knowledge and be informed and aware of the latest discoveries in their fields. In Cameroon, medical professionals work under miserable conditions, as the hospitals and health centres do not have the necessary basic equipment and there is no access to basic information. Furthermore, there is no in-service training, or clearly defined programmes for continuing education or refresher courses (Ngufor 1999; Ministry of Public Health 2001). As a result, there is lack of information about equipment (ignorance and negligence), and poor diagnoses and treatment.

For example, about ten years ago, a family member of the researcher had stomach pains and went for a medical check-up. The doctor informed him that the symptoms manifested were similar to those of gastritis and medication was prescribed. In the past five years, he has been moving from one doctor to another and has been on a wide range of medication for the same ailment. In June 2000 it was diagnosed that the gastritis has manifested into an ulcer and it was recommended that he should be operated upon. Two months later, he had an opportunity to travel to the United States. While in the United States, he decided to seek medical care. After medical examination, the doctor asked that a colonoscopy scan be done. The result proved that the patient had neither gastritis nor an ulcer. The stomach pains were caused by an allergic reaction after eating certain food. This is just one among possibly many cases of poor diagnoses in Cameroon as a result of the poor health care services, poor infrastructure and lack of reliable information.

Although modern ICTs hold great benefits for management of information, in Cameroon, medical professionals seem to be lagging behind in terms of using certain technologies and medical practices. Njongmeta and Ehikhamenorr (1998:17), in a study of health information needs and services in Cameroon, pointed out that 63.2% of health personnel are very unfamiliar with CD-ROMs and 53.6% do not know how to do an online search.

Medical professionals (doctors and nurses) are trained to cure the sick and provide medical advice to society. In the absence of health information (info-structure) and equipment (infrastructure), the big question posed by many Africans is "how well or adequate are medical professionals able to perform medical services and provide medical assistance to the society?"

## **1.2 STATEMENT OF THE PROBLEM**

It is evident from the above discussion and from the review of literature (Chapter Two) that information is an important resource for development and plays a crucial role in the quality of services provided by medical professionals. It is also evident that appropriate implementation of ICTs in the management of health information provides access to relevant information, to the right person and at the right time and most importantly, leads to better performances. Despite these emphases, in Cameroon, medical professionals work under very poor conditions, and this impacts on their performance.

Based on general observations and the existing literature it may be argued that the poor performance of the medical professionals in Cameroon could be attributed to the poor management of health information in the hospitals and

health clinics in which they work. This in turn could be attributed to the following:

- ◆ Lack of ICT infrastructure
- ◆ Lack of ICT skills and knowledge
- ◆ Lack of access to basic health information.

It is these aspects relating to the management of health information which constitute the problem which the present study sought to investigate.

### **1.3 THE PURPOSE OF THE STUDY**

The purpose of this study was to investigate and establish the extent to which medical professionals in government hospitals in Yaoundé, Cameroon, apply information and communication technologies (ICTs), to enhance the delivery of health care services. It also examined the current state of health information, if any, in the government hospitals in Yaoundé.

### **1.4 OBJECTIVES OF THE STUDY**

In order to achieve the above purpose, the following objectives were identified:

1. To describe the information sources available to medical doctors and nurses in the government hospitals in Yaoundé, Cameroon.
2. To investigate how information is captured, stored and exchanged among medical doctors and nurses in the government hospitals in Yaoundé, Cameroon.
3. To examine the ICT equipment and networks available to medical doctors and nurses in the government hospitals in Yaoundé, Cameroon.
4. To establish the level of Internet skills of medical doctors and nurses in government hospitals in Yaoundé, Cameroon.
5. To examine the Internet training and development needs among medical doctors and nurses in the government hospitals in Yaoundé, Cameroon.
6. To present recommendations on how ICTs could be utilised to improve the management of health information among nurses and medical doctors in the government hospitals in Yaoundé, Cameroon.

## 1.5 RESEARCH QUESTIONS

The above objectives lead to the following research questions:

1. What are the current sources of information at the disposal of medical doctors and nurses in the government hospitals in Yaoundé, Cameroon?
2. How is information captured, stored and exchanged among medical doctors and nurses in the government hospitals in Yaoundé, Cameroon?
3. What ICT equipment and networks are available to medical doctors and nurses in the government hospitals in Yaoundé, Cameroon?
4. What sort of Internet skills do medical doctors and nurses in the government hospitals in Yaoundé, Cameroon have?
5. What sort of Internet training and development needs do medical doctors and nurses in the government hospitals in Yaoundé, Cameroon have?
6. What recommendation can be put forward to improve the use of ICTs in the management of health information among nurses and medical doctors in the government hospitals in Cameroon?

## 1.6 SIGNIFICANCE OF THE STUDY

The significance of the study is based on the need to stress the importance of information to medical doctors and nurses and the need to apply ICTs in the management of information within hospitals and clinics. Information is the *sine quo non* of the development of health professionals and a vital asset of any health system (Pakenham-Walsh, Smith and Priestley 1997). It plays a crucial role in health care delivery and should be managed properly. Furthermore, the study sought to up-date the status of ICTs, as well as their applicability in health care delivery in Cameroon. The findings of this study will help to inform the hospital directors as well as donor agencies in Cameroon of what their recipients of health information resources and technologies expect of them when they want to make donations or offer assistance. This could bring some positive change in policies, as the recipients' actual needs in respect of health information resources and technologies would take priority.

As mentioned in the statement of the problem, the extent of the utilisation of ICTs by medical doctors and nurses in developing countries in general and Cameroon in particular is one of the most important areas where relevant literature is still lacking. This is because the introduction of ICTs for the management of health care delivery is



still in its infancy, implying also that not much research has been done. This exploratory study could , therefore, kindle an interest for further research.

Another anticipated outcome of the study will be to provide recommendations for the formulation of guidelines which, if properly implemented, will enable the government and, in particular, the Ministry of Public Health of Cameroon to establish mechanisms for providing ICTs to medical professionals in an organised manner to enhance access to relevant information.

## 1.7 JUSTIFICATION FOR THE STUDY

Health is an important indicator of human development and information is a vital asset of any health system (Pakenham-Walsh, Smith and Priestley 1997). For information to be made available to the right person at the right time and in the right format, it should be managed and ICTs such as computers and the Internet resources should be used in the management of health information. This is due to the fact that the utilisation of ICTs in the management of health information offers fascinating opportunities that might improve the health sector and facilitate the delivery of services, thus improving the state of health of the citizens.

The major benefit of ICTs lies in their flexibility for interaction and the ability to reach a wide range of communities. In the health sector ICTs could be used to improve health information management and the quality of health services significantly. ICTs could be used in transferring of diagnostic information to specialised centres, medical education research, and improving the effectiveness of health services, among others. These points have been elaborated below.

### 1.7.1 Transferring of diagnostic information to specialised centres

Rural communities suffer from a lack of primary care physicians or specialised healthcare professionals. The chronic shortage of doctors and mid-level practitioners in the rural areas may be reduced in the near future. Information and communication technologies such as telemedicine present considerable opportunities to narrow the expertise gap in rural areas. The introduction of telemedicine services will reduce the need for referrals and will narrow the expertise gap in the rural areas and ensure that specialist's skills are equitably provided to all parts of the country (UNECA 1999; Klecun-Dabrouska and Cornford 2000).

Furthermore, ICTs in the health sector would replace paper-based operations with flexible electronic resources and will

complement the provision of basic health services. In turn, this would lead to cost reduction and effectiveness in terms of timely delivery of services. ICTs have a role to play in improving the effectiveness of the health sector as a whole by maximizing the use of scarce knowledge and limited resources and facilities. These modern tools could bring life-enhancing knowledge to people in ways they can use, when and where they need it (Séror 2000; Nair and Prasad 2002).

### **1.7.2 Medical education and research**

Medical knowledge is a dynamic and fast-growing area. It is estimated that more than 360 000 articles are published yearly in medical journals worldwide. The average medical library in the United States has about 3000 journals in its collection. The Yaoundé Medical Library which is situated at the Yaoundé Medical School and is the sole medical library in the city, does not subscribe to any international medical journal. Furthermore, the shift in medicine from intuition, unsystematic clinical experience and patho-physiological rationale, as a ground for clinical decision-making, to evidence-based medicine with emphasis on the examination of evidence from clinical research has heightened the need for up-to-date information. This has led to an urgent need for medical researchers and practitioners to have access to a wide collection of information and to apply formal rules of evidence in evaluating clinical literature in every activity done (UNECA 1999). Evidence-based medicine (EBM) is an approach to health care that promotes the collection, interpretation and investigation of valid, important and applicable patient-reported, clinically observed and research-derived evidence. The best available evidence, moderated by patient circumstances and preferences, is applied to improve the quality of clinical judgments (Lewis, Urquhart and Rolinson 1998:282).

Lack of access to information by health care professionals and medical students means that they are not only having difficulties in keeping up with the magnitude of medical literature and medical guidelines for practice, but have been completely pulled away from each other in terms of sharing experiences and evidence.

New medical knowledge is being developed and distributed on the Internet with universal access and open distribution. Al-Shahi, Sadler, Rees and Bateman (2002) point out that the Internet could serve as a continually updated repository of current knowledge for medical professionals and students. According to the authors, there are relevant health information resources distributed free-of-charge on the Internet. The British Medical Journal (BMJ) is one of a number of resources disseminating electronic health information free-of-charge to all less developed countries.

Due to poor telephone infrastructure, using CD-ROM technology is another way to disseminate health information to keep health professionals informed and abreast with the latest developments in their fields. Many international

organisations such as Popline, Medline, ExtraMED, to name a few, have documented good health practices and references on CD-ROM and these are distributed to developing countries either free-of-charge or at a minimal fare. With CD-ROM, the user needs a personal computer with a Windows 3.1 operating system or higher and a CD-ROM player (Pakenham-Walsh, Smith and Priestley 1997).

Another threatening factor to medical research and education is the high cost of books. In Cameroon, as in many African countries, most parents cannot afford a good textbook (Ngufor 1999). For medical students, the situation is worse, as the sole medical library has not subscribed to any international medical journal and survives basically on outdated books in the form of donations. The Internet could be very useful, as it provides online and up-to-date medical journals and magazines. These journals can be downloaded, with permission of the editors, and duplicated for use by the students and medical professionals for academic purposes only.

### **1.7.3 Improving the effectiveness of health services**

As noted above, patient data is captured and recorded manually in the health system in Cameroon. That is, patient records, bedside data and laboratory reports that cater for demographic movements between health centres to provincial hospitals are done manually. Manual systems are prone to enormous inaccuracy that hinder the effective flow of information and impede the integration of healthcare delivery, administration and research. A well-designed computer-based hospital information system could have a substantial impact on the cost and quality of services. Computer-based patient records are becoming vital for doctors, nurses and other health professionals such as pharmacists and even to lay individuals who move frequently and those with complex medical conditions. Computerised records facilitate multiple accessibility and data and information can be disseminated faster to doctors and laboratories from a central system (Shepherd, Zitner and Watters 2000).

### **1.7.4 ICTs deployed in the fight against HIV/AIDS**

The HIV/AIDS pandemic is recognised as being the most devastating in history. At the end of the year 2000, 36.1 million adults and children were living with HIV/AIDS and in that year there were three million adult and child deaths due to HIV/AIDS (Dricoll 2001). In view of the enormity of the pandemic and the urgent need to make the best use of resources and tools available, the use of ICTs are seen as one major, potential tool, among others, in the global mobilization and response to the pandemic. In studies done on the use of ICTs in the fight against HIV/AIDS, the results reveal that ICTs play substantial roles in carrying information and messages to all those affected by the disease

and to the government and practitioners coping with the alarming health and economic situation resulting from the disease (Dricoll 2001; Nkoyock 2002; Du Guerny, Gillen, Nicholson and Hus 2001; Madou 2001). The Internet, for example, offers relatively low cost access to information and knowledge for those working on the problem, to those who are suffering from the disease and its effects, and to those who need to take preventive actions. Therefore, providing ICTs to medical professionals in Cameroon will enable them to join the rest of the world in the fight against HIV/AIDS.

### **1.7.5 Health information portal**

A portal is a doorway, entrance, or gate; especially one that is large and imposing. It can also be an entrance or means of entrance: a portal of knowledge (Shepherd, Zitner and Watters 2000). The purpose of an information portal is to deliver comprehensive and unified access to a heterogeneous collection of information sources through a secure access layer. It could logically be linked with the concept of information flow. A health information portal allows users to select and receive information relevant to their interest and roles, with respect to the various levels of security to ensure information is accessible, yet protected, and allows collaborators or users to share valuable information in a simple and effective manner. It also provides a medium to establish a common metadata repository, ensuring consistency in understanding information and it is capable of linking numerous disparate information resources across the Internet through a browser (Kohn 2002).

According to an old African proverb, “when a knowledgeable old person dies, it is said a library has disappeared” (IDRC 1998). This is because the knowledgeable person has tacit knowledge and experiences that cannot be easily codifiable. In the health sector, the potential of new ideas arising from the store of knowledge in any healthcare organization is practically limitless. People search for best practices because they expect best practices to help them succeed in their day-to-day work (Strawser 2000:74). The development of health information portals in hospitals facilitate the linking of all knowledge and information assets and make them easy-to-use by all medical professionals and even by lay individuals. Since the practice of medicine, to some extent, involves repetitive activities health portal would facilitate the tapping of tacit knowledge.

## **1.8 GENERAL ASSUMPTIONS OF THE STUDY**

Information is not an end in itself, but a means to better decision-making in policy design, health planning management, monitoring and evaluation of programmes and services, including patient care, teaching and research, thus improving the overall health services' performance. The assumption is that through the use of ICTs, relevant data,



once available, will be transformed into useful information which, in turn, will influence decision-making; secondly that such information-based decisions will lead to a more effective and appropriate use of scarce resources through better procedures, programmes and policies.

The researcher assumed that if ICTs are provided and proper mechanisms are in place, with the necessary skills, this would facilitate the delivery of health care services as the right information would be made available to the right person at the right time. Successful implementation of ICTs would depend on how decision-makers perceived the importance of information and the use of ICTs to facilitate health care delivery.

## **1.9 SCOPE AND LIMITATIONS OF THE STUDY**

The following section deals with the scope and limitations of the study.

### **1.9.1 The scope of the study**

The study focused on health information and how information is being managed by medical professional to support decision-making towards providing adequate health care services. It also looked at the applicability of ICTs to capture, retrieve and disseminate relevant health information among nurses and medical doctors in the government hospitals in Yaoundé. The study was confined to government hospitals in Yaoundé, Central Province of the Republic of Cameroon. It did not include the private and mission hospitals or government hospitals in other parts of the country.

The focus of this study was on government hospitals. Unlike the private and philanthropic or mission hospitals, government hospitals or health care services are the concern of every member of the community. Furthermore, and as mentioned, the budget for building these government hospitals comes from the National Treasury, which is taxpayers' money. The focus was on medical professionals (medical doctors and nurses), because this group of personnel are the potential users and managers of health information in hospitals.

### **1.9.2 Limitations of the study**

Information and communication technologies (ICTs) is an umbrella term used to describe complex hardware and software, linked by a vast array of technical protocols. In this study, the term ICTs refers to the use of computer(s) and computer auxiliaries, such as CD-ROM facilities and electronic databases, and the Internet facilities and/or resources to capture, retrieve and disseminate information among nurses and medical doctors in government hospitals in

Yaoundé, Cameroon. Due to time and financial constraints, the research was concentrated in Yaoundé and was limited to a number of government hospitals. The hospitals involved in this survey were those from levels one to four of the medical setup in Cameroon. See table 2.4.

The major constraint was the lack of an up-to-date list of medical professionals in the General Hospital, Central Hospital and the Teaching Hospital. This led to the difficulty of determining a representative sample. Thus, the researcher had to use the available samples at hand. Kerlinger (1986:120) argue that in the absence of a probability sample, one takes available samples at hand. In this case, it was the list of medical professionals on duty during the months of September to November. This was the period for the data collection phase. Results from social science research where there is a lack of a representative sample have been disputed but through the use of informal discussions with medical officials and investigations of activities at these hospitals, the results obtained from this study provided insight into the problem under investigation.

## **1.10 OPERATIONAL DEFINITIONS OF KEY TERMS**

In this study the terms used are defined as follows:

### **1.10.1 Data**

Duffy and Assad (1989:7) state “data are text, images and numbers in their raw form. Once processed and presented in a particular situation, they may become information”. In this study, the term data relates to the above definition, that is, data are facts; they are raw materials that can be used to create information.

### **1.10.2 Information**

The term information and data are used interchangeably. The *Oxford Advanced Learner's Dictionary* (1989:64) defines information as, “... facts, told, heard, or discovered (about somebody, something); give, pass on, receive, obtain, seek, find, collect, etc. information (on/about, somebody/something). The *American Heritage College Dictionary* (1993) defines information as “... a collection of facts or data: statistical information”. Duffy and Assad (1989:7) state that “information is data that has been processed and presented in such a way that they are relevant in a decision-making situation”.

From another perspective, Montviloff (1990:7) provides a more elaborate definition of information:

Information is some meaningful message transmitted from source to users. In this process information may be stored in information products and systems organized for the purpose of providing a memory in numerical, textual, sound and image forms. Information may also be communicated through interpersonal channels. The source may be documentary material, institutions or people.

The definition of Montviloff provides greater meaning for this study. However, in the present work, information refers to ideas, facts and data that have been processed, organised and disseminated to the potential user, for decision-making.

### 1.10.3 Knowledge

Hawes and Hawes (1982:126) define knowledge as the aggregate of facts, information and principles that an individual has acquired through learning and experience; formal education seeks to raise the level of knowledge systematically. Therefore, knowledge may be described as the *know-how* to perform certain tasks and functions.

Probst, Raub and Ramhardt (1998:24) provide a more detailed definition of knowledge, which has been adopted for this thesis:

Knowledge is the whole body of cognitions and skills which individuals use to solve problems. It includes both theories and practical, everyday rules and instructions for action. Knowledge is based on data and information, but, unlike these, it is always bound to persons. It is constructed by individuals, and represents their beliefs about casual relationships.

Knowledge encompasses both tacit and explicit knowledge (Padley 1999). Tacit knowledge is developed and internalized by the knower over a long period of time and incorporates so much accrued and embedded learning that its rules may be impossible to separate from how an individual acts (Davenport and Prusak 1998). Explicit knowledge is codified and expressed as information in databases, books and policy manuals.

### 1.10.4 Information accessibility

The *Harrods Librarian's Glossary* (1995) defines the term access along three levels:

1. A devise or method whereby a document may be found
2. Permission and opportunity to use a document
3. The approach to any means of storing information, e.g. the index, bibliography, catalogue, computer terminal.

Saracevic and Wood (1981:42), on the concept of accessibility of information, note that:

... in order to be used, information must be not only available some place or the other, it must be directly, intellectually and physically accessible to users as well. To make the available information also accessible, information systems must:

- ◆ Intellectually process such information, analyse, index, classify, organise...
- ◆ File, format, or package the information...
- ◆ Disseminate the information: circulate, provide selective dissemination of information (SDI) services, answer questions, etc.

For the purpose of this study, information accessibility relates closely to all of the above points. That is, the extent to which health information is made available to the potential users; medical doctors and nurses, as well as the methods used to provide or disseminate health information.

#### **1.10.5 Information availability**

Culnan (1985), quoted in Mukangara (2000:15), states "that a person's information gathering behaviour is a function of the information discovered to be available". In this study, the phrase "information availability" refers to health information and resources being accessible and relevant for use by potential users.

#### **1.10.6 Information management (IM)**

Davenport and Prusak (1998) defines IM as a structured set of activities that comprise the way an organization captures, processes, uses and disseminates data and codified information, to produce reliable information and make it available whenever a need arises to facilitate decision-making.

Fairer-Wessels (1993:35-37) refers to information management as:

the management of the information process. It is the interaction of members of the organisation with information resources and supporting technologies to assist the activities, for decision-making and analytical purposes with the emphasis on the value of the information used. IM is a process that uses techniques to effectively and efficiently manage information resources and assets from internal and external sources for decision-making in order to achieve the aims and objectives of the organisation.

The United States Office of Management and Budget (1994:37907) has provided a similar but more elaborate definition:

the planning, budgeting, manipulating and controlling of information throughout its cycle, "that is from its creation or receipt, through its processing, distribution, storage, retrieval, use and ultimate disposition".



Information management in the present study relates to all of the above, that is the overall management and control of the investment in information within any organisation. Information management is a prerequisite to the availability and accessibility of health information for decision-making and, above all, better health care delivery.

#### 1.10.7 Information and communication technologies (ICTs)

The term ICTs is also referred to as information technology (IT). The first recorded use of the term *information technology* was by Leavit and Whistler in 1958, in the *Harvard Business Review* (XXXVI41/1): "The new technology does not have a single established name. We shall call it *information technology*" (Keary 2000:868). Harrods Librarians' Glossary (1995:357) provides a description of ICTs, as follows:

ICTs are currently used to replace the older "IT" and the briefly fashionable "C&IT" is used to express the combination of computing hardware and software with the capabilities of communications networks that provides new opportunities for teaching, learning and training through the delivery of digital content. The expression is used particularly in an educational context.

Easingwood's description is useful in defining ICTs:

the recent change in terminology from IT to ICT reflects a subtle yet distinct change in approach to what the use of the new technologies really means. The former term suggested that there was a one-way flow of information, with the user being a passive recipient of material displayed on the screen. The adding of the word "communication" implies a more dynamic interaction between the user and the world of information contained beyond the computer screen. As a result, the computer has evolved from being a teaching machine, a tool to support learning and ultimately into a means of instigating communication from a local to a global scale (Easingwood 2000:45).

Feather and Sturges (1997:220) define ICTs:

as the electronic technologies for collecting, storing, processing and communicating information. There are two main categories: those which process information, such as computer systems; and those which disseminate information, such as telecommunication systems. The term can generally be understood to describe systems that combine both.

Senn (1997:14) defines IT as comprising three interlocking components namely, computers, communication networks and know-how. According to Senn:

- ◆ Computers are electronic systems that are being instructed to accept, process, store and present data and

information.

- ◆ Communication networks are sets of stations, consisting of programs and information that are linked together as a system that transmits and receives data and information.
- ◆ Know-how is the validity of an information technology and depends on the knowledge of the users.

For the purpose of the study, the term information and communication technologies (ICTs) is an umbrella term used to describe complex hardware and software, lined by a vast array of technical protocols. In this study, the term ICTs refer to the use of computer(s) and computer auxiliaries, such as CD-ROM facilities and electronic databases, and the Internet facilities and/or resources to capture, retrieve and disseminate health information.

#### **1.10.8 Health**

Committees of Professional Development (2000) describe health as everything from birth to death and wellness to illness. It also includes a state of complete physical, mental and social wellbeing.

#### **1.10.9 Health information**

Dixon (2002) defines health information as all the data and information related to a person's medical condition. It comprises all data, both internal and external (clinical, epidemiological, demographic, financial, research, reference, and coded), and includes the patient's medical history and physical examination, reports of X-ray and other laboratory tests, diagnosis and treatment plans, reimbursement information, allied health notes, medications, doctors notes/orders and nurses' notes generated by a hospital or health care facility.

#### **1.10.10 Health information management (HIM)**

"Health information management is the continuum of practice concerned with health-related information and the management of the information system to collect, store, process, retrieve, analyse and disseminate information related to the research, planning, provision, financing, and evaluation of health care services" (Weber State University 2000).

#### **1.10.11 Decision-makers**

In government, decision-makers are top officials within the executive and legislative branches, as well as the bureaucracy (including planners, administrators, and managers). In particular, decision-makers are those who are responsible for the formulation, implementation and administration of government policies and programmes.

In this study, decision-makers refer to the Minister of Public Health and his immediate subordinates, the Directors of hospitals, the Provincial Delegates of Public Health, the District Officers of Health, nurses and medical doctors, and the Executive members of the Management Committees of the hospitals.

#### **1.10.12 Health information management functions**

The HIM functions are to design and to manage health information systems. They include the organisation, analysis and technical evaluation of all health records, according to established standards, to assist in resolving problems that affect the care and treatment of patients. Health information management functions comprise identifying, evaluating, compiling, maintaining and using various types of administrative and health information and statistics from internal and external sources (Weber State University 2000).

#### **1.10.13 Health Information Manager**

*Weber State University* (2000) defines a health information manager as an individual who performs tasks related to health information management and the systems used to collect, store, process, retrieve, analyse, disseminate and communicate that information, regardless of the physical medium in which information is maintained.

In addition, he or she accesses the uses of information and identifies what information is available and where there are inconsistencies, gaps and duplication in health data sources. He or she ensures that the health information resources are effectively and efficiently managed, to help the organization fulfil its mission and achieve its goals and objectives.

### **1.11 ORGANISATION OF THE REMAINDER OF THE THESIS**

This work is divided into six chapters. Chapter Two focuses on the context of the study, with emphasis on the general

profile of Cameroon, the health sector and its set-up, followed by the information sector, including the telecommunication and Internet services in Cameroon. Chapter Three is a review of the literature. It discusses the importance of information as a resource for management, various health information sources and ICT as tools to manage information, with particular emphasis on health information. Some initiatives under way towards the globalisation of health information and challenges faced in the application of ICTs in Africa are also discussed. Chapter Four describes the research methodology, research design, data collection tools and the population of the study. Chapter Five presents, interprets and discusses the research results and, finally, conclusions and recommendations arising from the study are made in Chapter Six.

## **1.12 SUMMARY OF CHAPTER ONE**

This chapter commenced with a general introduction to the entire thesis. It dwelt on the importance of information and the need to have it properly managed. It examined the need to apply ICTs in the management of health information. The problem statement and purpose of the study were then provided. This was followed by the research objectives and concomitant questions and the study's significance and justification. Finally, a list of the assumptions underpinning the study, the scope and limitations of the study and the definition of key terms used in the study were included.

The problems and objectives identified above do not operate in a vacuum. At this point, it is necessary to have a broader understanding of, or to contextualise, the environment (Cameroon) under consideration. This is done in the following chapter.

# CHAPTER TWO

## CONTEXT OF THE STUDY

### 2 INTRODUCTION

From the background to the problem highlighted in section 1.1 above, one cannot deny that the scarcity and non-utilisation of appropriate ICTs by medical professionals in hospitals and health clinics have contributed enormously to the prevalent poor healthcare delivery throughout the country. In order to better understand the *status quo*, of the context within which medical professionals operate, it is necessary to give an in-depth examination of the sectors concerned. This Chapter will thus provide profiles of Cameroon, the information sector, the telecommunication infrastructure( with particular emphasis on the telephone and Internet sectors) and the health sector.

#### 2.1 COUNTRY PROFILE

Cameroon is a central African country, situated at the end of the Gulf of Guinea. It has a total surface area of 475 440 km<sup>2</sup> and a population estimated in 2000 at 15 million (51% female and 49% male), representing a population density of 31 inhabitants/km<sup>2</sup>. The official languages are English and French, and there are more than 200 local languages (vernacular) and about 230 ethnic groups distributed throughout the country. It has an annual growth rate of 2.7% and life expectancy at birth is 59 years (Ministry of Public Health 2001:15).

The bulk of the population lives in rural areas. However, there is growing urbanisation, as urban dwellers now represent 45% of the entire population with a high concentration in Douala, the economic capital with a population of 1.6 million and Yaounde, the administrative and political capital with approximately 2.4 million inhabitants. Other provincial capital towns have more than 100 000 inhabitants. The youthfulness of the population constitutes an undeniable asset as well as a challenge in the domain of health promotion. The Infant Mortality Rate (IMR) varies from region to region and is very high in some parts of the country. The IMR is estimated at 15.3 and 13.5 per 1000 in the North and Far North Provinces, respectively. This is due to the high prevalence of malaria in these provinces (Ministry of Public Health 2001:15). Through the use of adequate information and appropriate ICTs, health information could be transferred to the northern Provinces of Cameroon to help curb the high infection-rate of malaria.



Administratively, Cameroon is divided into 10 Provinces. The Provinces are divided into Divisions and Divisions are divided into Sub-divisions. There are 58 Divisions, 53 Sub-divisions and 269 Administrative districts. A Governor heads each province, while a Senior Divisional Officer heads each Division, and a Divisional officer heads each Sub-division.

As of 1997, Cameroon's Human Development Indicator (HDI) was 0.536, giving it the 134<sup>th</sup> position out of 174 in the World. Cameroon's Human Poverty Indicator (HPI) is 38.5%, as the citizens are affected by poverty. From the income standpoint (monetary poverty threshold), 50.5% of Cameroonians are poor, 31.4% are middle income and 18.1% are considered rich. The monetary poverty threshold stands at CFA 148 000 per year, while "rich" households have a per capita income of more than CFA 296 000 per year (Ngufor 1999; Ministry of Public Health 2001:6).

Epidemiologically, there is prevalence of infectious and parasitic diseases throughout the nation, as in most other Sub-Saharan African countries. However, the incidence of certain illnesses, such as high blood pressure, diabetes mellitus and various cancers is high. Moreover, some diseases that had considerably diminished are now on the rise, for example tuberculosis and African human trypanosomiasis (AHT). The HIV/AIDS prevalence among the sexually active population was 11% in 2000, representing a twenty-two-fold increase from 0.05% in 1987. The number of persons living with HIV is estimated at about 937 000 and one out of nine sexually active Cameroonians is HIV infected. In Cameroon, the main causes of HIV transmission is through unprotected sexual intercourse (90%) and mother-to-child transmission stands at 10%. About 43% of HIV-positive persons are aged between 15 and 34 years.

Studies have stressed the role of the Internet as an important tool to fight HIV/AIDS (Dricoll 2001; Nkoyock 2002; Du Guerny, Gillen, Nicholson and Hus 2001; Madou 2001). In Cameroon, without reliable information resources and little if any Internet access for health professionals, it means that they are largely left out from the rest of the world, with regard to the management of the HIV pandemic and other diseases.

Educationally, Cameroon is one of the countries in Sub-Saharan Africa with a high literacy rate. As education of Cameroonians is one of the major responsibilities of the government, as reflected in its literacy rate of 74% (80.3% men and 67.6% women) in 1998. The country has two educational systems, namely a Francophone system and an Anglo-Saxon system, depicting the bilingual nature of the country. As of 2001, the statistics of educational institutions were as follows: 994 nursery schools, 13 312 primary schools, 924 Secondary General Education colleges, and 296 Secondary Technical and Professional Education institutions. It also has six state-owned universities, one Catholic University, serving the whole of central Africa and 18 private institutions of higher learning, of which eight fall within the



range of university standards (Nkoyock 2002). Having looked at a general overview of Cameroon, the following section examines the information sector in Cameroon.

## **2.2 INFORMATION SERVICES/ INFRASTRUCTURE**

Atherton defines information infrastructure as "the national capabilities for making knowledge and information accessible for the transfer of information and knowledge and therefore for putting knowledge to work..." (UNESCO 1977). The infrastructure has several components: users of information, physical resources, including libraries, archives, and other information centres, or documentation units, and skilled information workers (UNESCO 1974).

Although information is increasingly being recognised as a critical resource for national development, in Africa provision and accessibility to information resources leaves much to be desired. All people need information and knowledge to improve the quality of their lives. This, in turn, implies resource allocation commensurate with needs, not only for education, literacy, economic development, health services and other key sectors, but also for information support, which must now also be regarded as a key sector, if real progress is to be achieved and sustained (Wijasurija 1998).

Effective provision of information resources nation-wide is greatly facilitated by an infrastructure of information services and a telecommunication infrastructure capable of acquiring, accessing and delivering appropriate information resources through network facilities and services to the end-user, whenever and wherever required within the country. This implies resource allocation commensurate with need, both in terms of capital and recurrent budgetary allocation, as well as manpower support. Without such an organisational base, with linkages that reach out to the furthestmost corners of a country, effective delivery of information services or access to sources of information are likely to prove difficult (Wijasuriva 1998:61).

### **2.2.1 Information Sector**

While developing countries are moving into being information conscious societies, there appears to have been little growth in the information sector in Cameroon even after 30 years of independence. From personal observation, the information sector seems to have been "ignored". According to Chateh (1993:136), Cameroon has no information framework and the provision of information is dominated by foreign agencies and diplomatic services (Chateh 1993:163).

The following section looks at the media landscape that comprises audio, visual and print. It then examines library services and the telecommunication system of the country.

**2.2.1.1 The Media**

At present, the media landscape is undergoing changes, owing to the democratisation of the sector. Cameroon has a national radio station, which broadcasts nation-wide. There are 10 provincial stations and other frequency modulation stations which make up the public audio media. The private sector runs six rural stations and several frequency modulation stations. The country has a national television channel, which broadcasts in English and French nation-wide, with very poor reception in some rural areas. Due to the poor images there are some private television channels and several foreign cable television distributors (Ministry of Public Health 2001:3).

In terms of the print media, Cameroon has a national daily general information paper, published in English and French, with several private newspapers and magazines. There is little press freedom. The national daily paper, named *Cameroon Tribune*, is highly censored, to suit the political gymnastics of the government. Hardly ever do you see Cameroonians buying and reading the paper. However, it is the most widely distributed newspaper in Cameroon. This is due to the fact that a certain percentage of tax known as Cameroon Radio and Television (CRTV) tax is deducted from the salary of every civil servant. Part of this tax is paid to the State-owned printing press for the production of the *Cameroon Tribune*. Therefore, every civil servant is entitled to a copy. There are some private newspapers, but they operate under stringent conditions, without press freedom.

**2.2.1.2 Information services and types of libraries**

Cameroon is one of those African countries which has strongly clung to the "oral tradition" (Chateh 1993:163). Accessibility and availability of information, such as the print media, is very poor. As far back as 1960 until the early 1990s, the provision and promotion of information services such as libraries, have been done by the colonial rulers (Britain and France) and international agencies (Germans and Americans). In the French-speaking parts of Cameroon, the French established "*bibliothèques de brousse*" (rural libraries) which served as reading centres for the French administrators. Meanwhile the British, in the English-speaking parts of Cameroon, ensured that every secondary school had a library (Chateh 1993:163).

#### **2.2.1.2.1 The National Archive and the National Library (NL)**

Cameroon has one National Archive and one National Library, situated in Yaoundé. They were created by a Presidential Decree No. 65-DF-412 of 17 August 1996 (Ngotobo 2002). The National Archive exists only on paper. That is, the building is dilapidated and no activity is going on at present.

The National Library is under the auspices of the Ministry of Culture. It has the following sections: Acquisition and Legal Deposit, Classification and Cataloguing, and National Bibliography. By 1990 it had 20 000 books, 130 periodical titles, and 150 reports, which were mostly donations made by the French Government. "Service Central du Livres et des Bibliothèques" (Book and Library Services), co-ordinates the activities of the National Library (Chateh 1993; Forgewa 2002). Although the decree clearly stipulates the functions of the National Library, which among other things is the creation of a National Bibliography, no volume of the National Bibliography has been created.

During the researcher's visit to the library site, she was informed that the library was not open to the public, because it was undergoing reorganisation and renovation. However, the evidence from personal observation seems to suggest that the library has been completely forgotten for quite some time now. The building and equipment appear to have been abandoned and grass has taken over the entire building. The books were packed in cartons on the shelves and window shutters were full of dust and cobwebs and frogs had invaded some of the rooms.

The Ministry of Culture controls the activities of the National Library, while a Director heads the library. Its running budget (if there is any) is controlled by the Ministry of Culture. Unfortunately, in Cameroon, culture is one of those sectors to which little attention is given. As a result, the National Library has no autonomy, either financially or in terms of its activities. The staff (a Director, one Librarian, a Secretary and a guard) are civil servants who are victims of continuous movements, transfers and reforms taking place in the Ministry of Public Services. Presently, there is a bill tabled in the National Assembly seeking for its full and complete autonomy. Until this bill has been signed, the National Library will not function like one.

#### **2.2.1.2.2 School Library Services**

In the French-speaking parts of Cameroon, school library services were created for the colonial masters while in the English-speaking parts, every secondary school owns a library. Although some are fairly small in size and holdings, they are able to satisfy the needs of the students and teachers (Chateh 1993).

#### **2.2.1.2.3 Public Library Services**

The creation of public libraries in French-speaking Cameroon was revamped in 1986 and an agreement was signed by the Governments of Cameroon and France with a view to creating public library awareness to French-speaking Cameroonians. As a result, a public library has been created in Yaoundé and a project is underway to create public libraries in each provincial and municipal town throughout the country. It is worth mentioning that the books in the Yaoundé Public Library are donated by the French Government and are in the French language only (Forgewa 2002).

The creation of libraries in the municipalities has been resisted by the Councillors. According to the Councillors, libraries do not bring in any revenue to the Council's coffers but at the end of the month, the Council is responsible for the salaries of the library staff, as well as for the running costs of the library. As a result, this has hampered the progress of the project. However, a campaign to create awareness and educate the public with regard to public libraries is at present taking place nation-wide (Forgewa 2002).

Public library services are also promoted by foreign agencies and these libraries include the British Council Libraries, American Cultural Centres, German Cultural Centres and the French Cultural Centre (which has the largest library in Yaounde). The Cameroon Educational Resource Committee (CEREC) helps to distribute books by identifying viable libraries and sending them books upon request (Chateh 1993).

#### **2.2.1.2.4 Academic and special library services**

Every institution of higher learning (universities, professional schools and colleges) has a library, with very small holdings, to serve the needs of the students. Academic libraries and/or special libraries are among the oldest types of libraries in Cameroon. Although it is said that every institution has its own library these are often merely information centres where technical reports are stored. Most often, researchers and other writers keep their important documents in their closets under lock and key. For example, in the Ministries, copies of reports or official documents are circulated to various chiefs of services and these documents become their personal belongings. The prominent special libraries are those of the United Nations Information Centre and the World Bank. These libraries serve workers, researchers and are also open to post-graduate students.

Having examined the library and information sector, the next section looks at the shortcomings of the sector.

### **2.2.1.3 Shortcomings of the library and information sector in Cameroon**

The library and information sector is still at grassroots level. This could be attributed to the following:

#### **2.2.1.3.1 Lack of a national information framework**

Due to the lack of a national information framework, the information sector experience a high rate of pirating or plagiarism, as the copyright law has been dormant since its creation. It is very common to see stolen, mutilated and used books sold at very low prices along the streets. Thus, the quality of library and information services available in Cameroon is very poor.

#### **2.2.1.3.2 Lack of employment**

There is no motivation or enthusiasm on the part of librarians and information providers. Until 1991, the poor information service was attributed to a lack of qualified librarians and information providers as secretaries or office clerks were appointed to perform the duties of librarians. In 1991, the Advanced School of Mass Communication created a department for the training of librarians and information workers. It is worth mentioning that since the graduation of the first batch of students in 1995, the Ministry of Public Services has not been able to employ these graduates. As a result, most of them are forced to work in jobs other than those involving library and information work.

#### **2.2.1.3.3 Lack of an information culture**

From experience, there appears to be little or no culture on the use of information to support decision-making. Furthermore, there appears to be little or no sharing and dissemination of information in government offices. The information culture which does exist is dominated by high information secrecy.

#### **2.2.1.3.4 Lack of information support activities**

This deals with the manner in which information is circulated and disseminated, that is the publication of journals, newsletters and magazines. There are no locally published journals or magazines in Cameroon. As a result, researchers and university lecturers would prefer to keep the results of their research inside their closets, while others would have theirs published in a foreign country rather than in Cameroon.



#### **2.2.1.3.5 Poor library infrastructure and services**

The libraries shelves are full of outdated books and this is due to the fact that libraries do not have any running budgets. According to Andong, the librarian of the Yaoundé Medical Library, at the beginning of the academic year, the University of Yaounde I allocates millions of FCFA (Franc Communauté Financière Africaine and, in English, Franc African Financial Community) as outstation allowances, but allocates nothing for the running of the Medical Library (Andong 2002). With no running budget, the Library relies on donations in the form of books. To explain the manner through which books are donated, Carolyn Sharples, manager of International Campus Books stated that, "her organisation would not accept books that are more than five years old" (Kale 1994). International Campus Books is a project of Book Aid International that distributes medical books to developing countries.

Since library services are supported by former colonial rulers, their books do not support the information and educational needs of local readers. For instance, in Cameroon public library activities are financed by the colonial masters (French and the British) and the content of books reflects their influences. There is nothing about Cameroon (Forgewa 2002). However, despite the problems listed above, all is not hopeless as far as library services are concerned. Cameroon has recently introduced the ISBN (International Standard Book Number) system and there is a recognition of the need to address the information policies in Cameroon. Education campaigns are under way aimed at creating awareness and educating the public on the importance of information and encouraging the use of libraries among Cameroonians. A series of workshops and forums have been held, including the National Forum for Book Policy in Cameroon in early 2002. This Forum brought together researchers, editors, authors, booksellers and officials from printing companies. It was at the end of this Forum that a bill was tabled in the National Assembly requesting full autonomy for the National Library (Ngotobo 2002).

Having examined the library and information services and the different types of libraries, the following section deals with the telecommunication infrastructure of Cameroon.

### **2.3. TELECOMMUNICATION INFRASTRUCTURE AND INTERNET SERVICES**

This section deals with telecommunication services such as telephones and the Internet. It begins with a brief description of the type of services.



### **2.3.1 Brief overview**

In Cameroon, like other African countries, access to telephone and Internet services is very low. This is due to the poor and outdated telecommunication infrastructures, coupled with unreliable and saturated networks. These factors, among others, have hindered the provision of good Internet services and accessibility of electronic information via the Internet (Chisenga 1999). Due to poor and outdated telecommunication infrastructures in Africa, the UNESCO statistics shows that in the entire African continent there are 14 million telephones fewer than Manhattan or Tokyo. Most networks are analogue and concentrated in the capital or major towns, where only 10% of the population lives (Panos 1998). The teledensity also varies from one country to another. In South Africa, the teledensity is around 35 per 1000, while countries like Niger and Mali have less than two telephone lines for every 1000 people. In Cameroon, the teledensity is 5.4 lines to every 1000 people (International Telecommunication Union 2001; UNESCO 2000).

### **2.3.2 The Telecommunication Infrastructure**

With the issue of globalisation, some changes have taken place in the telecommunication sector in Cameroon. In June 1990, INTELCAM, the state-owned institution in charge of the administration and development of international telecommunication installations, was privatised. The Telecommunications Regulatory Agency was established. As a result, the telecommunication sectors were distributed to two public enterprises: CAMTEL, for fixed telephone services, and CAMTEL MOBILE, for cellular telephone services. The two enterprises took over the telecommunication activities of the Ministry of Post and Telecommunications (AISI [African Information Society Initiative] 2000).

#### **2.3.2.1 Mobile Telephone Systems**

At present, Cameroon has two mobile operators, CAMTEL and CAMTEL MOBILE. CAMTEL deals with landline telephone services and CAMTEL MOBILE with mobile telephone services in Cameroon.

In June 1999, a mobile telephone licence was granted to two private enterprises, SCM (Société Camerounaise de Mobiles) and MTN (Mobile Telephone Networks Limited) and they went operational in 2000. By January 2000 when the first mobile telephone service went operational, it has about 5 000 subscribers. In March of 2001, when the second service started, the number of subscribers rose to 140 000 (International Telecommunication Union 2001).

MTN is a South African company. It became operational in Cameroon in 2000. By November 2000, MTN had over fifty thousand (50.000) subscribers. Its counterpart SCM, is a cellular company of France Telecom origin, which was introduced to Cameroon in January 2000. As of November 2000 it had over 100 000 subscribers. Both operators provide cellular services to the main towns country-wide and also to the small towns between the big towns (International Telecommunication Union 2001).

### **2.3.2.2 Landline Telephone System**

Fixed telephone services are administered by CAMTEL. It operates a telephone network, made up of trunk infrastructure and transmission links. CAMTEL provides services in 37 of the country's main towns. It has over 120 cable networks, about 80 of which are rural networks connecting subscribers to concentrators, and 45 telephone exchanges, 28 of which use crossbar technology.

The transmission links are mainly analogue and the network has 140 000 subscriber lines. Plans are underway to change the analogue system to digital exchanges. So far, CAMTEL has about 98 000 subscribers already connected to digital exchanges. The total number of subscribers is about 238 000, with an overall saturation rate of approximately 67%, coupled with poor services limited to the main cities and no telephone services in the rural areas (UNECA-CASRDC 2001).

CAMTEL is presently undergoing privatisation, by which 51% of the company's capital will be held by the private sector. It is estimated that when it is privatised, which is imminent, the number of fixed telephones will rise to about 175 000 subscribers over a period of four years (International Telecommunication Union 2001).

### **2.3.3 Computer-based electronic communication**

Before 1992, Cameroon was still using the traditional media devices (press, radio, television), based on the star model. But computer-based electronic communication was introduced in Cameroon by international initiatives such as HealthNet, CamFido, Rio Cameroon and Sustainable Development Network (SDN) (Lot, Nashipu and Bollo 1997; AAAS 1996; Afrol.com 2002). Each of these initiatives will be discussed briefly. All these projects except the SDN ended in 1998, when Internet services were launched officially in Cameroon.

### **2.3.3.1 Pioneer computer-based communication in Cameroon**

#### **2.3.3.1.1 HealthNet**

HealthNet Cameroon started in April 1993 by an American non-governmental organisation called SatelLife. The purpose was to facilitate the exchange of health information with other countries, as well as among health workers in Cameroon. The HealthNet communication system was Fido-based and uses the Zmodem protocol. SatelLife polls HealthNet Cameroon by telephone once a day. It offers on-site searches of CD-ROM databases and remote bibliographic searches through BITNIS, using Grateful Med software (Afrol.com 2002).

#### **2.3.3.1.2 CamFido**

CamFido was a network established with the assistance of the CABECA Project based at PADIS/UNECA, Ethiopia. It was set up in Cameroon in October 1994 with the assistance of the Centre for Health Technology (CHT). While CABECA took care of the initial charges for acquiring modems, software, and consultancy pertaining to setting up the network, CamFido-CHT provided the host computer used as the server, as well as accommodation and telecommunication facilities, including the international direct dial telephone line. Unlike HealthNet, which was limited to health personnel, CamFido is geared towards promoting electronic connectivity and also to promote information exchange in all spheres of life. Both networks (CamFido and HealthNet) had a Fido-based host and the mail is routed on regular telephone lines twice a day. CamFido's gateway was in London and HealthNet in the United States of America (Afrol.com 2002).

#### **2.3.3.1.3 Sustainable Development Network**

Sustainable Development Network (SDN) is sponsored by the UNDP and it is the focus and starting point for co-operative networks in Cameroon. The network has moved into full Internet connectivity through leased lines.

#### **2.3.3.1.4 Rio Cameroon**

The Rio network started in Cameroon in 1992 and was sponsored by ORSTOM . The objective of the network was to encourage direct relations between the research laboratories in Cameroon and those of other countries of the north and south, to facilitate the development of the Franchophone scientific community and to disseminate information. The main service offered by Rio was e-mail, with file transfer of all types (AAAS 1996).

All the networks were located in the same institution, the Advanced National Polytechnic (ENSP), Yaoundé. HealthNet and CamFido were pack-and-forward systems. They operated from the same office and were managed by the same technicians. E-mail (including the transfer of all data files) remains the main activity of the networks. With the exception of some limited connectivity between Healthnet and CamFido, all networks were practically isolated.

The networks encountered some major shortcomings such as:

- ◆ slowness of the system due to poor telephone lines
- ◆ limitation of the operating system.

**2.3.3.2 Drawbacks of the pioneer networks**

**2.3.3.2.1 Slowness of the systems due to poor telephone lines**

Electronic mails were dumped only twice daily and the network suffered from delays due to poor and saturated telephone communication. Even worse was the fact that connectivity to the server was restricted only to subscribers within the capital city, Yaoundé.

**2.3.3.2.2 Limitation of the operating system**

The communication software BITNIS of HealthNet and CamFido was based on DOS (Disk Operating System). DOS is not compatible with most modern software, was not user-friendly and had limited features when compared to Windows. CamFido and HealthNet remained the “mother” electronic service in Cameroon until 1998, when full Internet service became operational.

**2.3.3.3 Internet Services**

Internet services were introduced in Cameroon in 1992 but were officially launched by the Prime Minister (PM) in 1998. At present, Internet services are available in six of the country's ten provinces. The provision of Internet services became a public concern only on 10 February 2001, during the Head of State's traditional message to the youth

on the eve of the Youth Day celebration in Cameroon. In his speech, President Biya, talked about ICTs and globalisation and explained the need for Cameroonians to join the rest of the world in the application of ICTs in their activities. This was, in fact, the first time the President talked about the need for ICTs in Cameroon, nine years after it was launched by the PM. He further called on his government and ministers to formulate a working document with all the necessary requirements to provide ICTs to Cameroonians. A commission was appointed to carry out a feasibility study, identify the different sectors and stakeholders, the type of resources (human and financial) and the infrastructure needed to ensure adequate Internet installation and applicability in the country. The first draft of the feasibility study is being considered at the Presidency (UNECA-CASRDC 2001:5). Presumably, this plan will serve as the national policy for ICT services in Cameroon.

#### 2.3.3.3.1 CAMNET Network

CAMNET is managed by CAMTEL. It is the only authorised access provider. However, Cameroon has about 49 Internet Services Providers (ISPs) and it also provides Internet services via the CAMNET network. CAMNET has about 5 000 subscribers, with access via the switched telephone network. The CAMNET network consists of two nodes, installed in Douala and Yaoundé and has several access points in other towns. The table below depicts the distribution of Internet services and providers in Cameroon (Nkoyock 2002; UNECA-CASRDC 2001).

The 49 ISPs offer Internet facilities for both official and business purposes. They are engaged in the following services: cyber café, Internet access to small businesses, hosting and designing of Websites, construction of small networks, Web publicity and Internet connectivity. There are no fixed or unique price scales. The prices range according to ISPs:

**Table 2.1 Distributors of Internet services in Cameroon**

Field	No. of Operators	Institutional Operators
Fixed telephone	1	CAMTEL
Mobile telephone	2	SCM, MTN
Internet access providers	1	CAMTEL
Internet services providers (ISPs)	49	CAMTEL, CENADI, ICCNET, GCNET, etc.
Private installers	21	/
Traffic termination	1	/
Paging	1	/
Trunked systems	1	MTN
Space segment access providers	1	CAMTEL

**Source:** International Telecommunication Union (2001)



**Table 2.2 Internet charges**

Activities	Prices in FCFA
Surfing	200 FCFA – 1 400 FCFA per hour
Construction of Websites	25 000 FCFA monthly
Hosting of Websites	35 000 FCFA monthly

**Source:** UNECA-CASRDC (2001)

The management of the Internet network is done by CAMTEL, via its fixed telephone services. The nodes have a capacity (speed) of 1MB and have the following: two servers, four routers and a firewall interconnected through an Ethernet network with a capacity of 10MB. One server is used for the administrative management and the other for the management of e-mails, Web and FTP (File transfer protocol) (UNECA-CASRDC 2001).

**2.3.3.3.1.1 Problems encountered by CAMTEL**

The drawbacks of CAMTEL are similar to the problems encountered by other networks in Africa. Among these are:

**2.3.3.3.1.1.1 Slowness of the network**

This is the duration between access and retrieval of information. The slow speed is due to low bandwidth, poor telephone infrastructure, saturated lines and obsolete equipment.

During the initial implementation of telecommunications in Cameroon, no provision was made for the Internet. This, in fact, has had a negative impact on services. For instance, individual users have a restricted modem speed of 28kb, while institutions have a 64kb capacity. Unfortunately, this speed (capacity) cannot be increased due to the poor telephonic services. Although there is a possibility of having subscribers connected via the “backbone”, this is only limited to subscribers within Yaoundé and Douala. However, CAMTEL is implementing VSAT (Very Small Aperture Terminal) to increase its capacity (UNECA-CASRDC 2001).

**2.3.3.3.1.1.2 Lack of equipment and human resources**

Suffice it to say that it is the skills of human beings which also contribute to a successful network. Lack of trained manpower is a serious limitation on the network. In Cameroon, due to lack of equipment and human resources, the



landline and Internet systems use the same equipment and are managed by the same people (UNECA-CASRDC 2001).

#### **2.3.3.3.1.1.3 High cost of Internet services**

Due to poor telephone communication, saturated lines and limited bandwidth, the cost of Internet services is very high. Thus, accessibility is limited to the few rich people and many are left with no access.

However, in spite of the above problems, some government ministries have designed and hosted their Websites, such as the Ministries of Communication, National Education, External Relations, the Prime Ministry and the Presidency. These Websites are used purposefully to disseminate information to the external world. In some of these ministries there are no computers and only the Webmaster knows what has been hosted on the Website. He alone knows the URL (Uniform Resource Locator) address to the site (Afrol.com 2001; UNECA-CASRDC 2001).

As noted above, Internet access is very limited. For example, the University of Yaounde I, offers limited access of 30 minutes per week to the staff. The Medical Library of the Faculty of Medicine has Internet facilities for medical students, but the system is very slow and this is coupled with frequent breakdowns. The Catholic University for Central Africa and "Institut Siantou", a private college, have equipped cyberstations with nine computers each, for students at minimal rates (Afrol.com 2000).

In Cameroon, the Internet is mainly used by international agencies (UNDP, UNESCO and UNICEF) and some private individuals. The international organisations are raising Internet awareness amongst Government, the private sector and civil society. UNESCO and the American Cultural Center have organised awareness sessions amongst journalists and librarians. UNICEF promotes Internet relay chat for young people, especially among children and parliamentarians. ICCNET, a private ISP, is supporting Internet awareness initiatives among women's NGOs. Some initiatives to provide schools with Internet facilities such as Mon Ecole sur Internet and SDNP (Schoolnet) are underway at present. There are also multipurpose telecentres and cybercafes in the major city centres, providing Internet access privately. The most commonly used Internet Service is electronic mail (Afrol.com 2002).

Cameroon, like most African countries, is struggling to keep up with the advancement of ICTs to bridge the digital divide. Much has to be done to improve the services and, most importantly to extend accessibility to the rural communities, where more than 55% of the total population lives.

## 2.4. HEALTH SECTOR

Cameroon's health policy is based on the Reorientation of Primary Health Care, as adopted during the Bamako Conference in September 1987, and which went operational in Cameroon in 1992. The main aim was to revive the health systems, placing special emphasis on mother and child health. The health policy, reorientation, has instituted cost recovery on essential drugs and operational activities in public health units and encouraged community participation in terms of self-reliance in health matters. It highlighted the inseparable link between health and development with respect to human rights, such as the right to information and to individual integrity (Ministry of Public Health 2001:17-21).

### 2.4.1 Organisation of the health care system

The Constitution of Cameroon of 1996 provides for the decentralisation of the health sector. This entails the delegation of authority to decentralised local bodies empowered to manage and operate their respective health services. The health care is based on Primary Health Care, with full participation of the population. It aims at providing quality health care services to all, at an affordable cost. The district health facilities enhance the partnership between the State and the community. This partnership is expressed as co-financing, co-management and community participation in the management of health services and problems (Ngufor, Asaah and Bangué 1997).

The health sector is organised into three levels, with administrative structures, health units and dialogue structures. The first level is the central level, made up of the central services of the Ministry of Public Health and the National hospitals. The second or intermediate level is composed of the Provincial Delegations of Public Health and the Provincial hospitals. Finally, the peripheral level comprises 143 Health districts and 1 689 Health areas (Ngufor 1999). Table 2.3 outlines these structures.

**Table 2.3 - The administrative structure of the health sector**

<b>Level</b>	<b>Administrative structures</b>	<b>Functions</b>	<b>Healthcare structures</b>	<b>Dialogue structures</b>
Central	Services in the MoPH	Policymaking, formulation of concepts, policies and strategies. Co-ordination and regulation	Referral General Hospitals, University Teaching Hospital and Central Hospitals	Boards of Directors or Management Committees
Intermediate	Provincial Delegations	Technical support to health districts and programmes	Provincial Hospitals	Provincial Special Fund for Health
Peripheral	Health Districts and Health Areas	Implementation of programmes	District Hospitals, Sub-divisional Medical Centres and Health Centres	DMC, DHC, HC, MC

Source: Ministry of Public Health (2001:22)

The country's pluralistic health system allows a large and diverse public, private and traditional medicine sectors to co-exist. The health sector comprises government health facilities and international partners. The private health sector is divided into lucrative (private-for-profit), non-lucrative (not-for-profit), and private voluntary health structures (religious denominations, various associations and non-governmental organisations). The latter comprise the following:

- ◆ Catholic: 179 health institutions, of which eight are hospitals.
- ◆ Protestant: known under the association of FEMEC, 163 health institutions, of which 28 are hospitals.
- ◆ The Ad Lucem Medical Foundation (La Fondation Medicale Ad Lucem): seven hospitals and 11 health centres (Nkoyock 2002:37).

Traditional medicine, being an ancestral component, is gaining ground in the country. Although there is no national policy, the Ministry of Public Health is endeavouring to have this sub-sector integrated into the administrative set up of the MoPH. So far, the government has set up a Medicinal Plant Research Centre, known as the Institute of Medical Research and Study of Medicinal Plants (IMPM) (Ministry of Public Health 2001:23).

Generally, the public health sector contributes to about 83% and the private sector 17% of health services. International partners provide support in the development of the health district system and in the implementation of priority programmes (Ngufor 1999; Ministry of Public Health 2001:25).

In order to bring the private and public sectors together in the 10 provinces, health care services are directed, monitored, co-ordinated and supervised by a Ministry of Health Officer and the Provincial Delegate of Health. While at the divisional hospitals, the Health Delegate oversees the activities of the hospitals, as well as the rural preventive and curative health services, that comprise the district hospitals and the specialized and basic health centres (Ngufor, Asaah and Bangué 1997).

**2.4.2 Administrating and financing health facilities**

In the health sector, the Ministry of Public Service and Administrative Reforms recruit civil service workers. The Ministry of Economy and Finance pays their salaries and they are effectively employed in the MoPH. That is, issues of professional and career progress are handled in the Public Service and the MoPH is in-charge of the professional practices and ethics of the medical professionals. The Ministry of Economy and Finance addresses salary-related matters. The major drawback of this situation is that reforms or actions taken by each of these ministries invariably touch on health personnel (Ngufor 1999). The financing of health facilities is divided among the state, household and committees. The following section will look at those concerned with the financing of health services.

**2.4.2.1 State**

The Constitution of Cameroon recognizes health as a fundamental right for all Cameroonians. Although the Constitution regards health as a fundamental right, this is hardly reflected in the allocation of the country's national budget. According to data from the Ministry of Economy and Finance, the budget for 1996-97 was FCFA 1 113 billion, of which 3.3 per cent was spent on health, and 5.8 per cent and 0.2 per cent were spent on education and social welfare, respectively. In 1998-99, the national budget was FCFA, 1 230 billion of which 2.4 per cent was spent on health, while 7.4 per cent was spent on education and 0.2 percent on social welfare (Ngufor 1999).

A good number of health structures are decrepit and either need to be rehabilitated or destroyed. While several health structures have a wide range of equipment, much is non-functional and obsolete. According to the Ministry of Public Health (2001:28), two provincial hospitals do not have a radiology unit; three provincial hospitals do not have a delivery room and six provincial hospitals do not have a resuscitation table for newborns. The deteriorating nature of health facilities, the devaluation of the FCFA in 1994, coupled with the slash in salaries of civil servants in 1992-93, have created an unhealthy working environment for health personnel (Ngufor 1999).

#### **2.4.2.2 Household**

The money collected from the payment for essential drugs, consultations, and for other procedures carried out in hospitals, has been used to revamp activities in the public hospitals such as the recruitment of additional staff according to available vacancies. External assistance (cash or material) and donations is also sought from private enterprises, NGOs and philanthropic organisations.

#### **2.4.2.3 Committees**

The management committees of the hospitals are democratically elected and they comprise representatives of the population, according to the health catchment areas and health districts. Members of the committee are called upon to manage the health problems of their localities, in conjunction with health personnel (Director of the hospital and the medical staff). The committee is involved in the identification of health problems, their priority setting, implementation of identified strategies, supervision and monitoring of health activities and evaluation of programmes and their implementation.

At the provincial level is the Provincial Special Funds for Health (PSFH) to provide a provincial “superstructure”. It is composed of representatives of health districts democratically elected to ensure the management of health problems throughout the province.

### **2.4.3 Structure of health facilities**

The health facilities have been classified into seven categories, arranged in descending order. Table 2.4 illustrates the categorisation.

The first level hospitals are the fourth referral point and are the best equipped in terms of equipment and infrastructure. These hospitals are created by a Presidential Decree and have most of the medical specialists. Each has an administrative council appointed by the President. A director oversees the daily activities of the hospital and is answerable to the administrative council. The administrative council is composed of representatives from all the ministries, health professional associations and from the population.



**Table 2.4: Levels of government health facilities**

Level No.	Type of hospitals	Referral point	No. of Hospitals
1	General Hospitals	4 <sup>th</sup> Referral	3
2	Central Hospitals	3 <sup>rd</sup> Referral	3
3	Provincial Hospitals	2 <sup>nd</sup> Referral	9
4	District Hospitals	1 <sup>st</sup> Referral	130
5	Sub-divisional medicalised health centers		97
6	Integrated health centers		1164
7	Mobile Health services		

These hospitals have full autonomy and the proceeds received from their activities are used to recruit personnel and to maintain equipment. Although they are state-owned institutions, they do not have a right to a state budget. The state provides financial assistance in the form of subvention and donations. They are allowed to seek external assistance. These hospitals support the training and research in the country. There are three of these hospitals in Cameroon - two in Yaoundé and one in Douala.

The second level hospitals, also known as central hospitals, are the third referral points. There are three of such hospitals throughout the country. The Ministry of Public Health appoints the management committee and there is a director to oversee the day-to-day activities of the hospitals. These hospitals are entitled to a state budget and patients are attended to at very minimal fees. Like the first level hospitals, proceeds are used to up-lift the activities of the hospital. The medical personnel, support staff and workers of these hospitals are civil servants, paid by the State (Ministry of Economy and Finance).

The third level hospitals or second referral are the provincial hospitals. They are situated in all the provincial capitals. They are directly under the auspices of the Provincial Delegate of Public Health. The management committees and the "superstructures" assist in the management of these health facilities. The committee is headed by the Director of the Provincial Hospitals' who is appointed by the Minister of Public Health.

Levels four or first referral hospitals are district hospitals. They constitute the interface between the population and the health service. A district hospital is composed of one or more non-integrated health centres to support the integrated health services. The district hospitals serve as the first level referral point for patients from the health centres.



Levels five and six comprise of health areas and centres. Each district is divided into health areas and each health area is supposed to have a population of 8 000 to 10 000. The seventh level of health service is the mobile health service. This service is not operational, although it is mentioned in the hierarchical structure of the health sector.

In order to assist the MoPH and the health structures, the pharmaceutical sub-sector improves the accessibility of drugs to the population. It is made up of community pharmacies in health centres and provincial drug centres to stock and supply essential drugs to the peripheral facilities. At the central level, there is a national essential drug supply centre, charged with the importation and distribution of essential drugs to the provinces. There are also the private for-profit pharmacies, dealing in brand label pharmaceuticals. The health sector also has a quality control laboratory for the study of the quality of drugs (Ngufor 1999). The table of health facilities and hospitals excludes the private and missionary hospitals and clinics.

#### **2.4.3.1 Training and continuing education of health personnel**

Cameroon officially has two Faculties of Medicine and Bio-medical Sciences, of which only one is functional. This trains General Practitioners and Specialists (Surgery, Gynaecology-Obstetrics, Public Health, Paediatrics, Internal Medicine, Anaesthesia and Intensive Care, Clinical Biology, Radiology and Morbid Anatomy), as well as nursing officers. Training in some former paramedical disciplines (Health Technology, Physiotherapy, Medical Imaging and Pharmacy) has been suspended. The same applies to the training of local Health Administration Personnel, Dieticians and Nutritionists. Specialists from the areas of Pharmacy, Dental Surgery and Biomedical Engineering and Technicians continue to be trained abroad. Medical doctors and other specialists trained abroad have not been easily employed and integrated into the Ministry of Public Services (Ngufor 1999).

Yaoundé has 48 training institutions for paramedical personnel. These institutions are unevenly distributed throughout the country. For example, there is one training school to 129 751 inhabitants in the South West Province, as against one training school to 839 750 inhabitants in the Far North Province.

#### **2.4.3.2 Evaluation of health care services in Cameroon**

There is no national in-service training policy and supervision is the only strategy for continuing medical education. However, some health personnel, especially those in the public services, take part in in-service training courses

through workshops, conferences and seminars, both within and outside the country. These types of training initiatives do not improve the functioning of a specific health structure, as the impact is hardly felt in the field.

A Directorate of Human Resources Management is in charge of evaluation and supervision of health services. This service is situated in the MoPH and supervision and evaluation is done as follows: A supervision tool was created for all personnel performance at all levels of the three-phase health scenario in Cameroon. According to the structure, supervisors from the central level supervise the regional staff twice yearly. The regional teams supervise the district personnel four times a year and the district teams supervise the health centre personnel once a month (Ngufor 1999).

#### **2.4.3.3 Professional ethic**

Discipline is rigorous in the private sector due to "hire and fire" practices. However, there is a total attitude of laissez-faire in the public hospitals. Due to the low salaries received by medical doctors and nurses, their attitude toward work has been that of complete laxity at all levels of the health pyramid. Holistic health is no longer a subject of emphasis among health personnel. Thus there is a reduction of consultation time per patient, preceded by long queues and waits in front of consultation offices. In addition, there is absenteeism and lateness at work, indicating a lack of assiduity and professional consciousness (Ngufor 1999).

#### **2.4.3.4 Professional associations and standards**

Health personnel are organised into professional associations. In Cameroon, the statistics of the medical professionals stand as follows: 2 169 medical doctors (both general and specialists), 6 424 state registered nurses (laboratory technicians and midwives), 230 pharmacists and 48 training institutions. In theory, each association has a code of ethics that must be respected during practice. Other professional association are:

- ◆ The National Medical Association of Cameroon which is the main organisation of physicians in Cameroon. According to the code of medical ethics, all medical doctors trained in Cameroon and/or abroad are expected to register with this association before practising medicine. But this has not been the case because there are many doctors who are practising and are not members (Ngufor 1999).

- ◆ The Association of Paramedical Personnel covers nurses, midwives and laboratory technicians, of all grades. Other professional associations include the Association of Pharmacists and the Association of Dental Surgeons.

## 2.5 THE WAY INFORMATION IS MANAGED IN THE HOSPITALS AND HEALTH FACILITIES

Information management, that is the manner in which information is collected, stored, processed, retrieved and disseminated between medical professionals in the health facilities in Cameroon, is inefficient. Within hospitals, data is collected manually and stored in notebooks and/or ledgers. Hospitals and health centres collect data in isolation. There is no centralised system in place to monitor the collection of data.

The “Public Health Activity Form and Table of Morbidity-Mortality” (PHAF) is the main source of reporting data in health centres and hospitals. These forms are filled out by various sections and departments of the hospitals. They are often too long and have to be filled out manually by nurses every month and often the same data is recorded in the different sections.

Medical professionals make good use of informal sources rather than the formal sources of information (Njongmeta and Ehikhamenor 1998). In term of disseminating information, they use personal interactions on a daily basis, as well as workshops, conferences and seminars.

The mode of disseminating information among health centres, provincial delegations and to the MoPH, is done by sending physical messages through people who happen to go in that direction. Also popular is the use of courier services by people who were officially designated to carry mail between offices, while in most cases they do have other errands as well. There is no electronic mail and limited use of faxes. Radio is mostly used for sending voice messages, especially to the remote areas where the telecommunication infrastructure is very poor. In the MoPH, almost all secretariats and directors' offices have at least two computers used solely for data processing (that is for typing correspondences). No hospital use computers to capture and process health information.

In 1989, through the assistance of GTZ (German Technical Co-operation) in Cameroon with MoPH, an agreement was signed to computerise the “Public Health Activity Form and Table of Morbidity-Mortality” (PHAF) that could serve the entire nation. Six years after its implementation, an evaluation study was done to find out the extent to which the data collected enhanced decision-making. The results revealed that there was insufficient evidence to prove that

information from the system was used for decision-making. This is partly due to lack of commitment from the central government to provide additional funding for the maintenance of hardware and software equipment, as the hardware was outdated. There was a lack of trained personnel to maintain the hardware and software (Bunge 1996).

## **2.6 SUMMARY**

Chapter Two was divided into four broad sections. It commenced with the profile of Cameroon. The second section dealt with the information sectors. The third section looked at the telecommunication and Internet services in Cameroon. The health sector and health structure was dealt with in section four. The shortcomings of each of these were described.

# CHAPTER THREE

## REVIEW OF THE LITERATURE

### 3. INTRODUCTION

The health sector is one of those areas in human development that has been drastically affected by the use of ICTs. Unfortunately, not much has been documented on the applicability of ICTs for the management of health care delivery. The literature research (including the literature reviewed in this Chapter) was done using packages such as South Africa Bibliographic and Information Network (SABINET), South African National Bibliography (SANB), Humanities Citation Index, Science Citation Index, Social Science Citation Index, Library Literature (LL), Humanities Abstracts, Dissertation Abstracts Ondisc, the EBSCOhost Web and National Information Services Corporation (NISC). It was also done on-line using packages such as British Medical Journal (BMJ), Eletronic Journal on Information Systems in Developing Countries (EJISDC), Elsevier Gateway to Science, LISA and AHIMA. Also contacted were librarians working in medical libraries and in Yaoundé and Pretoria and those working in other health related information centres such as the WHO Libraries in Yaoundé, Pretoria and Geneva. As indicated in Chapter One, little literature was found on the application of ICTs for the management of information in the health or medical setting in particular. The literature reviewed in this Chapter thus deals with general aspects of information management and ICTs of which the health sector is not excluded.

This chapter reviews literature from other African countries on the following: the importance of information and the health sources at the disposal of medical professionals; ways health information in managed, with particular emphasis on health information dissemination; initiatives and projects engaged in disseminating health information in Africa and the difficulties encountered; and, finally, Internet applications in Africa.

In the course of the discussion of this chapter, the researcher intends to use mostly Uganda, Zimbabwe, Mozambique and, in some cases, Cameroon, for illustration. This choice is dictated by their being the only countries she was able to come across with literature on the above issues.



### 3.1 INFORMATION AS A RESOURCE

In the past 40 years, the volume and complexity of information generated and digested by organisations has increased to a level that requires new and improved techniques and the implementation of a corporate information strategy (Cronin 1985b:123). This is due to the fact that information has always been considered as a free and inevitable by-product that is always available when needed. Although information may be freely available, it may not seem freely available because someone has to pay for its production, storage and access. As stated by Cronin (1985a:106):

It costs money to produce information (the scientific and technical literature is produced at considerable cost to the taxpayer and private industry); it costs money to store information (whether in reports on shelves, in dusty archives, on microfiche, in data-banks or on optical discs); it costs money to add value to information (by indexing, abstracting, reformatting, validating, integrating, etc.); it costs money to distribute information (whether electronically, manually, or vocally).

Cronin (1985) emphasised that it does not suffice to say information is a vital resource. This is because information is not an end in itself, but a means to better decisions in the delivery of health care. That is, its value is embedded in the decision-making processes, otherwise its value is latent. Very often, the expression, “information is a crucial resource for development” is used. This phrase signifies the importance of information and also emphasises that information needs proper management. Rosenberg (2001:11), Rasmussen (2001:12) and Moore (1989:70) point out that what is vital is for organisations to acknowledge the importance of information as the lifeblood of every society, as it increases competitiveness and efficiency, improves resources allocation, and is a prerequisite to the delivery of quality health care. This change in approach is reflected in the following statement of the National Health Services of the UK (NHS/DHSS 1982) in Moore (1989:70):

Information is the life-blood of health service management. Without it, resource allocation degenerates into a process of bazaar bargaining, control is a fiction and the planning of resources has to rely on myths and hearsay.

Ironically, the above statement is not from an information specialist. Instead, it was made by a group of health management practitioners in the NHS (National Health Service) of UK. The statement, according to Moore (1989:70), meant that the health service was searching for better ways to exploit and to improve the use of information as a tool in effective health management. As a result, NHS went ahead to break down management processes into a number of tasks such as information specialist and computer specialist and employed trained managers with information skills.

An important message of Moore is that organisations are moving from do-it-themselves, in terms of handling information, to one which relies on the employment of an information specialist, with specific trained skills. This has led to the recognition that information management is not something that anyone can do, but rather a complex set of activities which requires well-developed skills and understanding. Additionally, it recalls specialised education and training, as well as specific personal characteristics, attitudes and knowledge of information and communication technologies (ICTs). Vickers (in Eaton and Bawden 1991:164) states that for there to be IM, organisations should recognise that information is a vital resource like land, capital and labour.

The concept is difficult to apprehend and it can be difficult to make the entire organisation accept the idea. Eaton and Bawden (1991:165) provided a detailed explanation of the relationship between IM and information. They argued that “information is a resource, in the sense that it is of vital importance to the organisations, by virtue of its importance to the individuals within them”. The individuals, according to Eaton and Bawden, are decision-makers such as medical professionals, who are the potentials users of health information in the health sector. Therefore, if information is a resource, organisations should recognise its importance by identifying it and attending to its management processes (Eaton and Bawden 1991:164). By so doing, organisations will develop an information-oriented approach that considers information as a productive element that contributes to the overall performance of the organisation such as a hospital. The information management processes, that is to capture, store, exchange, exploit and disseminate information are crucial elements to achieve successful results in the delivery of health services, planning, monitoring and the evaluation of services, including patient care, in hospitals. Furthermore, recognising information as a vital and valuable resource also requires proper management techniques linked to corporate management strategy planning of an organisation such as the hospital. For this will ensure that adequate health sources are available and relevant information is provided to medical professionals at all times. It will also ensure that information is effectively disseminated and exchanged from all service delivery points in the hospital.

Having looked at information as a vital resource, the following section discusses the importance and impact of health information.

**3.2 IMPORTANCE AND IMPACT OF HEALTH INFORMATION TO ENHANCE HEALTH CARE DELIVERY**

The underpinning concept is that if organisations recognise the importance of information, it will be properly managed and reliable and timely information will be available, to support decision-making. In the health sector, Musoke

(2000:196) observed that information is used by health professionals to improve their understanding of a problem so that they can select an alternative solution that has a higher probability of succeeding than if they made a decision without having the information. Thus information is a prerequisite for effective decision-making and for the enhancement of health care delivery and also to empower the society. This view was supported by Sauerborn (2000:33), who argued that good data, once available, will be transformed into useful information which, in turn, will influence decisions; that such information-based decisions will lead to a more effective and appropriate use of scarce resources through better procedures and programmes, the execution of which will lead to a new set of data which will then stimulate further decisions. Thus, information is needed from a variety of sources to contribute to decision-making or to solve a particular problem.

Musoke (2000:169) identified five areas in which health providers use information: clinical work, information dissemination, decision-making, administration and detection. However, having the right information at the right time for the right person is no guarantee that it will be used for decision-making. Bunge (1996:92), in a study of the development and evaluation of a provincial level health management information system in Cameroon, found that although the information system produced reliable and adequate information, there was insufficient evidence to prove that the information from the system was used for decision-making. Similarly, Charles Lindblom, in Cronin (1985a:106), affirms that planners and managers often arrived at decisions on the basis of partial, marginal, or easily comprehensible information, rather than as a result of a thorough, rational and systematic appraisal of all options and possible outcomes. This (largely unconscious) approach he termed "disjointed incrementalism". Cronin (1985a:106) adds that, in an ideal world, human beings would aspire to perfect synoptic rationality, which he refers to as an unattainable goal. In practice, people rely on "best estimation", hunches and ad hoc decision-making. The question is then asked: what can be done to improve the flow, control, analysis and synthesis of information for decision-makers, so that even their hunches would be informed ones? Inadequate information policies, poor content and lack of access are some of the difficulties encountered. Sauerborn (2000:33) explained that much of the material sent to decision-makers is unprocessed or, if processed, unanalysed or, if analysed, not read or, if read, not used or acted upon. Only a minuscule proportion, if any, of the findings actually affect policy. This view is supported by Bunge (1996:5), who stated that data collected from hospitals is too old to be useful, or incorrect or irrelevant, due to the high level of aggregation, and most often not used at all. That is, information is not action or problem-solving oriented or presented in a clear and easy-to-understand form. Stilwell (2001:48) stressed the necessity of making information available in an appropriate format, so that it should be meaningful to potential users, for information has a potential value when used.

Taylor, in Mukangara (2000:57), gives a concrete explanation of the decision-making process. He states that institutions make decisions for two main reasons. Firstly, the processing of information is a vital aspect of human behaviour, so much so that information in its entire guise is a critical input to the decision-making process. Secondly, through decisions, institutions and human beings adapt to the changing environment, allocate limited resources and maintain their survival. He explains that, while human beings may be reluctant decisions makers, decisions will continue to be made whether or not we really want to make them.

Another point of interest is the impact of information. Chisenga (2000:178) stated that information holds great promise for mankind and it is going to have an impact on all areas of human endeavour. Both the current and future impact of information have been, and are still being, documented and discussed by a number of institutions and by individuals such as the US Information Infrastructure Task Force, former US Vice President, Al Gore, the African Regional Symposium on Telematics for Development and many others. Along the same line, Thapisa (2000:170) affirms that information is an essential pre-requisite to management and development ventures. Therefore there is a need to have access to a wide range of information.

By virtue of their profession, doctors and other healthcare workers, wherever they are, have much to gain from keeping up to date with medical research and development. But it is often very difficult to have access to information. In the rich and developed countries of the world, doctors are overloaded with information, while in many poor southern countries doctors have little or no relevant information to learn from. Godlee, Smith and Horton (2000) felt that information underpins the learning, research and debate which drive a country forward. Access to information is essential for describing and understanding the deficiencies of the present, building visions of a better future, developing practical ways of achieving these visions and educating and inspiring those who must shape the future. Although information exists, in some cases medical professionals will need some additional information beyond what they already have, in order for them to perform their services effectively. In the absence of such information, decision-making might result in ineffective performance. This being the case, management of information, which includes access to and provision of information is a vital function to enhance access to relevant information. Information management can be achieved when financial resources, as well as trained information specialists and proper infrastructure, are put in place. Although this seems possible in developed countries, to many African countries, policy-makers have still to recognise the value of information, let alone provide the necessary support, finances and infrastructure.



The provision of information and the smooth functioning of information services will be possible only when decision-makers recognise the importance of information as a resource. Neelameghan (1981:7) draws attention to the fact that in the developing countries information policies do not exist and, if they do, they are inadequate to support the promotion of IM and provide information. Akhtar and Melesse (1994:314) noted that the general lack of appreciation for the value of information, as illustrated in the almost non-existence of national information policies, and the recurrent, inadequate financial resources allocated to information systems and networks development, has severely deterred the use of information to solve Africa's socio-economic and developmental problems. Neelameghan (1981:6) explained that, despite the vital character of information vis-à-vis development and planning, very few national development plans have a chapter on information, nor even a separate budget line for their information activities.

Another important value of information is its contribution to social and economic development and self-sustainability. Rosenberg (2001:11) analogically describes information as a vital national resource for development, as follows:

A healthy and prosperous community cannot survive without an adequate supply of clean water; so, too, no modern economy and no modern society can function without a reliable flow of quality information.

Information will enable citizens to make informed decisions about their health and well-being and thus decrease the utilisation of health care resources (Akhtar and Melesse 1994:314; Mabawonku 1998:128). To the medical professional it is the sine qua non for professional development, the lifeblood and the most vital asset of any healthcare system (Pakenham-Walsh, Smith and Priestley 1997). Menou (1993) states that the alleged key role of information in development is based upon the following: potential information users are capable of rational choices based on cost-benefit analysis or similar logical processes; there is perfect access to information and information has no cost. In developing countries, information has not yet played its role in development. Various reasons why information has not done so have been put forward and discussed. They include the fact that decision-makers and government have refused to acknowledge the role of information as a basic resource. Instead, it is considered a luxury. In another words, a balanced view of information as a resource is not achieved. This is illustrated in the under-developed information sector, poor communication infrastructures and no running budget to support IM services (Boon 1992:70).

The quality of existing information services is such that they cannot yet make an effective contribution to information provision for development (Oswitch 1990:30). In the literature, reference is made to the problems of a lack of communication infrastructure to disseminate information. According to a study on the use of ICTs in the health sector in Mozambique, Braa (2001) revealed that transmitting information within the health services required the sending of



physical messages via the individual from the district levels to provincial and central levels. In other words, an individual who happens to be going in the right direction is asked to deliver information. Similarly, in Vietnam, the same method was used. In the Ministry of Public Health in Vietnam, paper documents were hand-delivered from district health centres to provincial levels to be forwarded to the Central level for processing and decision-taking (Shrestha and Bodart 2000:130). Ironically, after processing, the decision taken will not be sent back early enough to the lower level. The outcome is that information to support decision-making often arrives very late. The essence of information is that it should be made available to the user timeously. Accurate, timely health information is an indispensable tool and an essential precondition for effective and responsive decisions by medical professionals to support their daily tasks. Therefore examining the types of health information at the disposal of medical professionals is necessary.

### **3.3 HEALTH INFORMATION SOURCES AVAILABLE TO MEDICAL PROFESSIONALS**

Having discussed the role of health information to medical professionals, it is necessary to look at the various sources where medical professionals could obtain the information they might require. Health professionals, due to the imperatives of health care and the different cases manifested in human beings, at times need to make very important decisions, since they deal with the health and lives of people. Therefore, they should have a plethora of health resources to support their decisions. The information this class of professionals need is in monographs, reports, bibliographies, journal reports and electronic sources generated locally and internationally, from both informal and formal sources (Osiobe 1986:177). Patrikios, in Kale (1994), stated that monographs (books) are those commonly used. She lamented the fact that the books available to medical professionals are out-dated and obsolete. This view was supported Andong (2002). From observation and informal discussion with the Librarian at the Yaoundé Medical Library, the researcher was made to understand that since the library has no running budget the books in the library have been donations from WHO, World Bank and UNICEF. Unfortunately, most of the books are very old. Boon (1992:71) affirms that information from international information brokers seldom satisfy the needs of specific users.

Another aspect to be noted is the content of the books. That is, whether the information is of any relevance to its users. In a study on information and its value to health workers in rural Uganda, the findings revealed that information obtained from books to health workers is irrelevant and ineffective. By this they meant that the information is either too technical or too advanced. One of the respondents wrote "some of the books are too technical" some include very advanced equipment (this was in reference to management of heart diseases) which are not available here ... so, the information in the former is not understood, while that in the latter is not applicable ... (Musoke 2000:196). As to the irrelevance of health information, a doctor in Uganda stated that "information in some of the textbooks we have on paediatrics in

public health, internal medicine and pathology is not relevant in our current tropical health situation because they were written in the West ... the focus is not on tropical medicine" (Musoke 2000:198-199). A similar view is shared by Apalayine and Ehikhamenor (1995:372) that in Ghana health information available to medical professionals is irrelevant. As a result, according to the authors, health professionals completely lost interest in searching for information. The irrelevance of health information available to medical professional is based on the fact that policy-makers and planners have not considered information as a vital commodity for national development. The end result is that most African countries do not have an information policy or a guiding framework to regular the provision of health information to its users (Apalayine and Ehikhamenor 1995:368; Neelameghan 1980:6). Hence no adequate IM and information services are available in these countries. Cameroon is an example of a country where information provision is done in a haphazard manner. As a result, medical professionals end up with out-dated books that are not used because they do not satisfy their information needs (Andong 2002; Patrikios 1995:94).

Carloyn Sharples in Kale (1994) explained that as a donor, her organisation, Campus Books International, would not accept medical books that are more than five years old, as donations. She stressed that before books are sent out they are screened by personnel with appropriate expertise. Campus Books International is a project run by Book Aid International. It annually sends about half a million books, periodicals and printed information to 65 countries, worldwide. These are books donated by other organisations to Book Aid International. Certain (2002:173), explained that the books donated by the World Health Organisation (WHO) to health personnel in developing countries, through the Blue Trunk Library (BTL) project, were quite useful. The evaluation of the BTL project was done by the National Co-ordinator of the project. There is a need to evaluate these books from the user's point of view. The Blue Trunk Library is a project run by WHO. It is a collection of medical books donated to health personnel working in rural areas.

Another issue of concern is the culture of some Africans towards the use and acquisition of books. Before the coming of the written word in Africa, the oral tradition was used and to get rid of the oral tradition has been difficult (Chateh 1993:163). This culture might have contributed to the manner in which books are used and bought in some African societies. According to Nwafor (1984:364) and Patrikios (1995:94), university students are compelled to read for one and only one reason – pass their examinations and the teaching methods applied seem not to be to equip the student with the skills to find information for him/herself but for him/her to be able to regurgitate what the lecturer had taught. Blackwell Sciences, a publisher at the forefront of disseminating information to developing countries, recounts some experiences relating to the acquisition of information in developing countries: books are sold for about half the normal price; the cost of subscribing to journals is too high; information about the market for books and journals is inadequate

because of poor market research; medical doctors are unwilling to pay for information and expect it to be supplied free, whereas, in other cases, information sent free is not highly valued (Kale 1994). According to the representative of the publishers, although the purpose is to disseminate health information free, the prices these books are being sold for in most African countries is to recover publisher costs and not to make a profit.

Of importance is the type of sources medical professionals prefer to consult or read. Since most of the books are irrelevant and in some cases out-of-date, doctors and nurses usually opt for journals (Osiobe 1986:181). Unfortunately, subscriptions to journals are very high, because of devaluation and inflation and, as a result, most libraries and information providers have reduced their subscriptions to journals (Patrikios 1995:94). Cameroon, for example, does not subscribe to any journals (Adong 2002). According to a study on the use of information sources by faculty staff in Nigeria, it was realised that there is a relationship between health professionals' reading habits or choice of reading and their field of speciality. The researcher further observed that health professional would prefer scientific and technical journals, followed by monographs (Osiobe1986:181). In a similar study by on a clinician's search for information, it was confirmed that there is a significant relationship between specialisation and the use of formal and informal sources. The researcher stated that clinicians tend to use more informal sources than formal ones (Friedlander 1973:67). Another study that points to the influence of specialisation on the use of information sources is that of Stinson and Muller (1980:143). The researchers reported that physicians in general practice regularly prefer pharmaceutical representatives as information sources. Patrikios (1995:94) explained that although journals may be the lifeblood of researchers, as the delivery of health information is often measured in terms of access to journal literature, the teaching process and good practice at clinics and hospitals depend heavily on books and manuals. The need for core collections of reference and textbooks is a priority for those who deliver health services and for decision-makers. Nonetheless, the preference for different sources of health information by medical professionals is of interest in the provision of information. In the absence of a needs assessment study, this preference could be considered a basis for the provision of information to nurses and doctors (Stinson and Muller 1980).

Although information needs assessment is very important in the provision of information services, very few information providers actually do carry out an information needs assessment study. The reasons are that information providers are simply too lazy to conduct assessments and there is a genuine lack of staff, financial resources and time. Another factor is lack of knowledge of information needs assessment techniques and difficulties encountered in developing simple but reliable methodologies for collecting data (Kaniki 1994:9). On the contrary, Cooper (1971) and others declared that "information needs" were a psychological state, not a visible object or complex of symbols and therefore



was not something that was directly observable. They dismissed information needs assessment studies as weak or largely a waste of time. Along the same lines, Gabor Kapocs, as cited in Kale (1994), opines that medical professionals are of various categories and levels and that, even if an information needs assessment is done, determining their different level of needs would be quite problematic, as these needs change over time and space. Although there is a debate on the relevance of needs assessment studies before information is provided, they are absolutely crucial in the present information age. They will, among other things, help satisfy the information needs of those who will use the information. According to Apalayine and Ehikhamenor (1995:370), an individual will frequently consult a particular source because the information obtained will be useful in meeting his or her needs. Therefore, being aware of the information habits of medical professionals will serve as a guiding tool to decision-makers and planners to minimise the use of limited resources. After discussing the different sources, the following section looks at how information should be managed so that relevant information is made available timeously.

While the non-utilisation of health information has been attributed to the out-of-date and obsolete nature of information, the issue of lack of local health information and poor health information outlets is of great importance. Most hospitals and ministries of health do not have a local magazine or journal, let alone subscribe to an international journal. Andong (2002) stated that the library of the Faculty of Medicine in Yaoundé, which is the sole medical library in Yaoundé, does not subscribe to any medical journal and the hospital does not produce or publish any local journal. The situation is similar to many other information providers in Africa since many libraries do not have running budgets and thus are unable to purchase a single subscription. The lack of local information (content) in developing countries according to Gabor Kapocs, (in Kale 1994) has been attributed partly to the fact that Africans themselves do not write and therefore having access to health information that is relevant to the African context would be difficult. The author explained that Africans should be willing and encouraged to write and publish on health issues relating to their countries or environment. From their writings, it would be easier for the international community and foreign publishers to understand their information needs. Unless this is done, providing relevant health information will be difficult.

Van Brakel (1996:200) stated that information can be disseminated either formally or informally. The formal methods include paper-based media, such as published research reports, conference proceedings, journals and monographs. Informal dissemination is personal contacts such as electronic communication, theses, dissertations and journals and verbal discussions between scientists or, at the most, small group activities. "The role of dissemination stands out as an essential characteristic of science. Without communication, there is no science" (Osburn 1989:227). Science can only take place when theory or discovery is either validated or invalidated by the scientific community. Given the above,

Osburn stressed that if African medical professionals need adequate information that would be relevant in the African context, African authors should be encouraged to write (Osburn 1989:227). Higo (1980:22) lamented the fact that while there are enough writers in Africa they are experiencing major difficulties in publishing locally. Thus, they would prefer to patronise international journals and publishers. Nwafor (1984:358-63) outlined the problems as follows: inflexibility of government regulations (censorship) that is infertile for the germination and flourishing of scholarly and creative writing. This is coupled with the high cost of printing by local printers, the poor quality of locally published books and journals, and the delays in printing and distribution. As a result, the volume of information and sources in circulation is very limited and the prices of books published internationally become very expensive to the local market. The volume of information could be increased through government intervention. According to Nwafor (1984) governments of Third world countries have a major role to play in the promotion of a viable reading and book society. Emenyonu as quoted in Nwafor (1984:364) pointed out that "... what is needed is a change in government attitude towards the book industry, a reorientation that will make the governments aware and fully conscious of the important place of the book in the national development plans". He further called on governments to back initiative programmes such as setting up paper mills. As a result of this, Book Development Councils in countries like Ghana, Nigeria, Singapore, Fiji, to name a few were established. These are worth emulating by other African countries such as Cameroon. Zell in Nwafor (1984:365) suggested that the government can still do more such as giving preferential treatment to the book industry in their import regulations, financing the necessary research into finding local substitutes for the materials used in paper manufacturing, encouraging the creation of national bibliographies and above all, formulating a national policy on library and information services. With an adequate policy, it is more likely that information in the forms of books, journals and magazines, will be generated, published and disseminated flexibly and regularly.

Sustainability and the quality of the end products is also another issue of concern. Nwafor (1984:361) explained that although the indigenous market is becoming interested in the book market, the end-products have not been without blemish. There are journals and magazines that have never gone beyond volume 1 number 1, or literally have every line of every page error-ridden, not to talk of the unusually very long delays that precede their publication and distribution. However, the use of electronic publication, through the Internet, eliminates the publication costs. Shepherd, Zitner and Watters (2000) stated that, through the use of ICTs such as Web portals, intranet and electronic publication, articles, conference papers and proceedings could be published. This would eliminate the cost of publication and would be faster, less expensive and widely accessible. In the health sector, for example, articles, conference proceedings and results of research projects could be published on a hospital's portal. Intranet publication is faster, less expensive and has wider accessibility.



### 3.4 THE EMERGENCE OF INFORMATION MANAGEMENT

Information management (IM) draws from a variety of concepts and disciplines. For example, in the business world the emphasis is on the use of technology to produce results; in information science the focus is on information retrieval, use, testing, evaluation and characterisation of information systems; and in engineering it is on the architecture (Rowley 1996). For the purpose of this research, IM, as earlier stated, comprises the way information is captured, analysed, distributed and used in an organisation. The activities are grouped into what is called information management processes. Therefore, IM is aimed at the acquisition, processing, organisation, storage, retrieval and dissemination of information.

Information management originated in the USA in the early 1970s, as a result of the work of the National Commission on Federal Paperwork. The aim was to seek a reduction in the cost incurred by organisations in satisfying the demands for paperwork by Federal bureaucracies. Despite the impetus provided by the Commission, the idea of IM did not receive much attention from the government and organisations (Wilson 2003:270). Due to the advent of the information age/information society, the resulting exponential growth of information and the enormous shift in occupational ratios, IM has become a “response to, and a search for new and improved means of controlling the information explosion, the increasing complexity of decision-making and also to recognise information as a valuable asset in the problem-solving process” (Cronin 1985a:105).

As noted in Chapter One, information management is composed of the following activities: processing, generation, storage, retrieval and dissemination. Processing is converting, analysing, computing, and synthesising all forms of data or information. Generation deals with organising information into useful forms, whether as numbers, text, or visual images. Storage and retrieval involve the process of retaining and locating information and part of this involves copying and storing data and information for further transmission to other users. Finally, transmission is the process of distributing, disseminating or diffusing information over a communication network.

#### 3.4.1 Health information management

As indicated earlier, IM is a “response to, and a search for new and improved means of controlling the information explosion, the increasing complexity of decision-making and also to recognise information as a valuable asset in the problem-solving process”(Cronin 1985b:120). In the health sector such as hospitals, the practice of IM is done in a rudimentary manner. In most health sectors in Africa, data is captured manually on official forms or on ordinary papers.

In Guinea-Bissau, for example, there are no official forms and any piece of paper is used and in Malawi, data sheets are used which have two attached copies (Bunge 1996:9-11). Because the forms are so many, about 30 sheets, data collecting officers need to take a day off each month to complete the forms. Even worse, the forms have to be filled-in twice due to lack of carbon paper and duplication of the same data on different forms is very common. Due to lack of skills and knowledge in capturing the information, data collecting officers find it difficult to harmonise the forms to suit their environment. Instead, they spend much time recording the same information over and over. At the end of the day, there is an overabundance of information collected which, when made available to decision-makers, is often too old to be useful, or incorrect or irrelevant due to high levels of aggregation (Bunge 1996:11).

Normally when data is captured, it has to be processed and analysed. Bunge (1996) describes that when data is captured it is sent to the central office (Ministry of Public Health) for analysing and processing. In the central office, these data were hardly processed or analysed. Instead they were stored in some dark storeroom and are often not accessible. Since little information is processed or analysed it is difficult for medical professionals to make decisions. One of the major obstacles that hinder the processing and analysing of health information is the lack of adequate tools such as computers. Since there are so many forms, processing the data manually is time consuming (Bunge 1996:15). Cronin (1985a) stressed the need to use adequate equipment such as ICTs to facilitate the process of information management. By using ICTs (computers, CD-ROM and the Internet) relevant information will be obtained which will produce excellent and maximum benefits for decision-makers (Senn 1997:25).

Of importance is the manner in which health information can be effectively communicated and disseminated. Information can be communicated formally, through paper-based media, and informally, through personal contact. Paper-based media consists of research reports, journals, conference proceedings and monographs. Information contained in these sources is controlled by sophisticated bibliographic databases, which are made available via international or national hosts or vendors. The informal communication sector is geared towards personal contacts between scientists or, as is most common, small group activities and electronic communications (van Brakel 1996:200-201).

In the hospitals and health centres, informal communication (face-to-face interactions) is the most common means to communicate, access and disseminate information among medical professionals (Njongmeta and Ehikhamenor 1998:15). According to Chen and Hernon (1982:95) this class of professionals rely on this means (face-to-face interaction or telephone communication) to communicate, access and disseminate information because they found their colleagues most helpful and also, the information obtained is satisfactory to their needs. Unfortunately, the conventional methods

such as face-to-face interaction have some limitations. For example, for face-to-face communication, medical professionals have to be present at the same time. Although telephone communication could enhance informal communication, due to the poor financial situation, most health facilities cannot afford adequate telephone infrastructure.

Through the use of ICTs, information can be transferred from one location to another. The effective use of ICTs can improve the flow of health information in the following; health research, the formulation of health programmes, to support decision-making and for the advancement of health services. This could be done through the creation of a central system, with computers and communication software. The central system will enable medical professionals to liaise with each other in an electronic discussion via e-mail. Furthermore, health information captured on the network could be accessed immediately and decisions will be taken faster than in a manual environment. In addition, health information can be easily processed, analysed and stored electronically. Single messages can be disseminated electronically to numerous recipients, who make up an identifiable interest group. Wilson and Smith, in Wilson (2000:198), point out that "the creative use of computer technology is one of the most promising means of improving the quality, timeliness, clarity, presentation, and use of relevant information" to improve health care delivery.

Although the application of ICTs in the management of health information holds numerous advantages to its users, in many African countries environmental and socio-political factors, such as poor telecommunication infrastructure, lack of adequate policies, lack of trained technicians (human resources) and financial constraints, to name a few, are impediments to the effective application and utilisation of ICTs in the management of health information. The following section looks at the use of ICTs and its services/resources. It also looks at some ICT pioneer initiatives in Africa, with emphasis on projects or initiatives dealing with health information management. Unfortunately the initiatives described below are involved mostly with the dissemination of health information between the developed countries and the less developed countries, rather than on the dissemination of information within the developing countries themselves.

### **3.5 THE USE OF ICTs TO MANAGE HEALTH INFORMATION**

The emergence and convergence of ICTs have increasingly played a vital role in local, national and international socio-economic transformations. ICTs are tools used in the production, storage, access, distribution, transmission and use of information (and indeed data and knowledge). They are a range of technologies: computers with the various peripherals and software, radio, television, digital cameras and so on. They also include telecommunication technologies such as telephone, both analogue and digital, cellular telephone and satellites (Kaniki 1999). Other technologies, like networks and/or linkages between and among several systems and computers in the form of the Internet, are also part of ICTs. The

emergence of these technologies and their integration have resulted in the “easy production, easy distribution, and easy access and usage of information as long as various preconditions such as the necessary technologies and the ability to use and maintain them are available” (Kaniki 1999).

Although ICTs provide exciting opportunities for health information management, a study by Driscoll (2001) on the use of ICTs in health reveals that the general technological and infrastructural development in many African countries is a great hindrance to optimal research and communication. In most parts of Africa, access to ordinary telecommunication is a challenge. Fax and other electronic facilities are generally inadequate. In an assessment of ICTs for the health sector in Benin (Driscoll 2001), the researchers mentioned that in some villages there is virtually no electronic communication occurring anywhere and most people have been completely cut off from access to the information which originates elsewhere in the world and in others, some people have telephone services and a few have simple radio systems. In a related study on the actual and potential usage of ICTs at district and provincial levels in Mozambique, the findings revealed that computers and the Internet are rapidly being used at the provincial capitals and major districts by the health sector. But the major problems identified were the lack of ICTs skills and education and poorly developed networks (Braa 2001).

### **3.5.1. Computers, computer networks and the Internet**

#### **3.5.1.1 Computers**

The introduction of mini and personal computers have allowed individuals to network and share information resources (LaMorte, cited in Setegan 2002:33). In the health sector, the use of computers can enhance and expedite data processing and the presentation of information, which is the major frustration among health professionals and decision-makers. It reduces the time required for processing data, as well as the burden involved in the manual capturing, manual generating and manual disseminating of data and information. Wilson (2000:199) stressed that the use of computers is one of the most promising means of improving the quality, timeliness, clarity, presentation and use of information for health care management. It greatly reduces the time required for processing data at the district, regional and national levels, as well as the number of errors inherent in the manual process; develops decision-making support tools for planning increased services, coverage and logistics; manages the data for monitoring the attainment of the targets and objectives of health programmes; and trains health personnel through computer-based interactive tutorials for self-instruction and continuing education.



### **3.5.1.2 Computer networks**

Computer networks and telecommunication networks bring together numerous computers to communicate and share data and other resources. There are two main types of computer networks based on geographical coverage: local area networks (LANs) and wide area networks (WANs) (Rowley 1996:104). A LAN links computers, terminals, printers and backing storage devices over a limited geographical area. The aim of a LAN is to manage information and share resources such as processors, disk storage, printers and communication gateways among a group of users. A device, called a node, is connected to the network by direct cable in the form of twisted wire cable, coaxial cable or fibre optic cable. In a WAN, computers are linked via telecommunication links to communicate with one another regardless of their location. Such telecommunication systems may include digital telephone, microwave, satellite dish and radio or physical data transmission media such as twisted copper wires or cables, coaxial cables and fibre optics. The LANs and WANs can be connected in an all-embracing network. This all-embracing network of computer networks and computers is known as the Internet. In this thesis, the type of network to which the author makes reference is the Internet.

### **3.5.1.3 The Internet or Information Superhighway**

The Internet or simply the Net is the “global connectivity via a mesh of networks based on the TCP/IP [Transmission Control Protocol/Internet Protocol] and Open Systems Interconnection (OSI) protocols” (Rowley 1996:109). The TCP/IP and OSI are standard protocol suites that facilitate connectivity or communication among computers. The standardization and subsequent adoption of the protocol suites was one of the major developments of the Internet from a single network of four computers (ARPnet) to an amorphous global net (Luyn 1999 cited in Setegn 2002:34).

#### **3.5.1.3.1 Internet facilities and services**

The Internet has a wide range of facilities and services, which have developed widely over the years. These are discussed below based on, to mention but some, Chisenga (1997:18), Kaniki (1999), and Behrens (2000:2).

##### **3.5.1.3.1.1 Electronic mail (E-mail)**

E-mail technology allows users to create/compose documents (mails), attach files to the mails and send them to individuals or groups of individuals, i.e. recipients. It also permits the recipients to view and read, print or forward to others the mails and attachments that they have received.



#### **3.5.1.3.1.2 World Wide Web (WWW, the Web or W3)**

Created in 1989 by Tim Berners-Lee, the WWW has grown to be one of the most popular facilities of the Internet. It allows users to locate and view multimedia documents or pages with graphics, animations, audios and/or videos. The Web documents are created using the Hyper Text Mark-up Language (HTML), a Web document coding language and other Web authoring tools such as Java, JavaScript and ActiveX. This feature of the Web links documents to hypertextuality (text documents with links to other documents) and hypermedia (multimedia documents with links to other documents).

Clicking on hypermedia or hypertext link connects you to other documents on the Web. Accessing a document (site or page) on the Web is via an address or a URL (Uniform Resource Locator), using a browser. The URL is the name of the computer where the resource is stored and the location of the resource on the computer.

#### **3.5.1.3.1.3 Intranet**

Intranet is "an organisation's internal communication system using Internet technology" (Rowley 1998:194). Intranets are also known as an organisation's internal Website or "inner" Web, not connected to the global Internet. Access to the intranet is restricted to members of the organization. From the literature reviewed, two types of Intranet were identified: flat-content intranet and interactive intranet.

In flat-content intranets, files can be requested from the server, received by the client computer and viewed via the Web browser. Interactive intranets, however, are slightly more complex, offering more opportunities for two-way communication within an organization. Interactive intranets offer the following: e-mail, computer-based training and learning, video-conferencing and interactive services facilitated by "forms processing" and "mailto" HTML commands.

#### **3.5.1.3.1.4 Portal**

A Portal is an entry point to the Internet or a gateway to Web access. Portals offer services such as directories, search facilities, links to related Websites and e-mail access. There are different types of portals on the Internet: search engine portals such as Yahoo!, Internet Service Provider portals and subject portals. An example of the latter is the General Medical Council portal for doctors in the United Kingdom which is available at <[www.doctors.net.uk](http://www.doctors.net.uk)> (Al-Shahi et al., 2002).

#### **3.5.1.3.1.5 Subject guide**

A subject guide is also referred to as a subject tree or directory. It is a Website that hierarchically arranges a subject index of Web resources according to subject categories or classes and subcategories (Behrens 2000:34). Subject guides work like catalogues and contain links to the files they index and serve as a starting point to browse the Web. By clicking on the hyperlink, the user can surf on the subject of interest.

#### **3.5.1.3.1.6 Subject or thematic portals**

These are also known as subject-based information gateways (SBIGs) or quality controlled subject services. They are “subject entrances (clearing houses) to quality assessed Internet resources” (NetLab 1999:1). SBIGs focus on the coverage of specific subjects and aim at serving a particular community with similar information-seeking behaviour. The information or resources on SBIGs are selected by subject specialists, based on an officially published list of criteria, and they are indexed. The core activities (selecting, indexing) of SBIGs is not done automatically, as in the case of search engines (DESIRE Consortium 2000:2). One of the most popular examples of SBIGs is the Social Science Information Gateway (SOSIG). SOSIG provides relevant information and links to other resources on issues relating to social sciences (SOSIG 2000:1). Some health portals include the Scientific Electronic Library Online ([www.scielo.org](http://www.scielo.org)), Bioline International (<http://bioline.bdt.org.br>), and African Journals Online ([www.inasp.org.uk](http://www.inasp.org.uk)).

#### **3.5.1.3.1.7 ListServ (Mailing lists or Discussion groups)**

ListSers are specialized mailing systems through which information, ideas and experiences can be shared or ideas exchanged with others people who share a common interest. Individuals simply subscribe to the list to join the discussion and it is controlled by a moderator. Among them are AHILA-NET (Association of Information and Libraries in Africa) and WHO-HIF NET (World Health Organisation-Health Information Forum). Inquiries and any other messages that are deemed relevant are sent to the moderator who controls the flow of information between the list members.

#### **3.5.1.3.1.8 Telnet**

Telnet (remote login) enable users to log on to a remote machine and operate it. That is, to manipulate files on another system. For instance, one may log-on to a remote computer to search a library catalogue or one may be able to

access his/her computer at the work place from home or anywhere in the world.

#### **3.5.1.3.1.9 File transfer protocol (FTP)**

An FTP permits a user to transfer files from one computer to another. This is possible when the user has access to the system.

### **3.6 INITIATIVES TO DISSEMINATE ELECTRONIC HEALTH INFORMATION IN AFRICA**

From the literature, all of the above technologies and many others are being used to disseminate health information to medical professionals in developing countries. Most of these technologies and networks are partnered with organisations outside the African continent. The most significant health-related ICT initiative in Africa is HealthNet.

#### **3.6.1 HealthNet International**

HealthNet is a non-profit-making organisation of scientists and medical researchers administered by SatelLife. Healthnet has been implemented in 20 countries throughout Africa. HealthNet was conceived as a means of combating the isolation of health workers and their lack of access to information in the less developed countries. The network provides services such as e-mail, electronic medical publications and access to medical databases and conferences. Access to these sources is provided through telephone lines. In countries and areas where the telephone infrastructure is unreliable or does not exist, HealthNet uses satellite ground stations. Through a combination of telephone infrastructure and low earth orbit satellite technology, HealthNet facilitates rapid and low-cost communication between health workers in Africa and between them and their counterparts in other parts of the world (Edejer 2001). In addition to HealthNet there are other foreign-driven initiatives and partnership initiatives, for example AHILA-net.

#### **3.6.2 AHILA -Net**

This is an example of a foreign-driven electronic networking initiative. It has members throughout the continent and is based on an information discussion group. It offers electronic discussion services. AHILA member countries organise a general conference and workshops once every two years and it managed by an executive bureau. There are also initiatives between African organisations and foreign counterparts. An example is the Sister Library Programme, a partnership between the University of Zambia School of Medicine Medical Library and the University of Florida Health Science Centre Library. A continent-wide initiative is the MARA Project, based in Durban, South Africa (Driscoll 2001).

### **3.6.3 CD-ROM Technology**

Another tool used to disseminate health information to medical professionals in developing countries is CD-ROM technology. With CD-ROM, users are not connected to the Internet, nor do they use any telephone connection. It has a storage capacity of more than 200 journals with full text. Unlike using telephone when accessing information via the Internet, with the CD-ROM, all the user needs is a computer with about eight megabytes of RAM, 10 megabytes of hard disk space, Windows 3.1 or higher and a CD-ROM player. The technology also encourages multiple access (Kale 1994; Akbar 2002).

## **3.7 SHORTCOMINGS OF THE ABOVE INITIATIVES AND TECHNOLOGIES**

The above initiatives and technologies have immensely contributed to the transfer and dissemination of health information to the “starving” medical professionals in developing countries. However, there are some problems regarding electronic information. Among these are the dominance of information, lack of relevant information retrieval skills. These points have been explained in detail below.

### **3.7.1 Dominance**

Most of the articles indexed on the health databases Medline, British Medical Journal and Popline, to name a few, are from the developed countries and these are not always relevant to developing countries. The fear is that the exclusivity of Medline is a way for the developed world to keep control of information (Kale 1994).

### **3.7.2 Lack of information retrieval skills**

The aim of an electronic information system or database is to enable its users to have access to relevant information within the fastest time possible. Therefore, the users are expected to have the basic searching skills. Unfortunately, most medical professionals are not acquainted with the majority of the ICT tools and thus lack the basic retrieval skills. In Cameroon, it was found that the inability of medical professionals to access electronic information resources such as CD-ROM was due to their unfamiliarity with the technology as more than 63% of the respondents were unfamiliar with the use of CD-ROM (Njongmeta and Ehikhamenor 1998:15). Similarly, in Zimbabwe, due to lack of information retrieval skills, medical professionals were not ready to search for information electronically (Patrikios, in Kale 1994). In Bangladesh, a project to teach doctors on how to retrieve information on the CD-ROM has received resistance.

Although the doctors were enthusiastic to update their knowledge they were reluctant to use the services. It was realised that the doctors were concerned about publicly showing their lack of knowledge. That is, they feared that their reputation could be harmed if they were seen learning how to work on a computer at a public telecentre. However, there were comfortable having private training sessions on the use of ICTs (Akbar 2002).

### **3.8 INTERNET FACILITIES AS A TOOL FOR HEALTH INFORMATION MANAGEMENT**

Traditionally, medical professionals share ideas, discuss latest developments and issues of common interest via meetings, seminars and workshops, conferences and the publication of professional journals, newsletters and by personal contact. These conventional mechanisms are not always efficient as they place constraints on effective participation. For example, to have an effective face-to-face communication, those concerned have to be confined in the same building. Although telephone has enhanced face-to-face communication due to inadequate telecommunication infrastructure and congestion, it is difficult to contact a medical doctor in the rural areas. However, the use of e-mail, discussion groups and newsgroups provide alternative, faster and facilitating methods of sharing, exchanging of ideas and dissemination of health information. These facilities can be more accessible and more convenient and can be unified with other commonly used methods of communication such as fax and voice mail, by converting the messages into attachments (Al-Shahi et al., 2002).

Electronic mail can be used to discuss and share ideas and experience, for document exchange, co-ordination of network projects and the arrangement of meetings and general correspondence. Discussion lists and newsgroups offer a convenient forum for discussing and sharing of ideas of common interest among professionals in the same field.

The World Wide Web provides opportunities such as electronic publishing, information on various issues and events, the latest health innovations and the latest research on drugs and medical technologies. It also provides links to other Websites. The Internet and intranet promote participation, improve service quality, make planning more effective and become a means of empowering citizens (Bhatnagar 2000). A case study on the use of ICTs to support decisions by nurses, (Bhatnagar 2000) described that hand-held computers were given to nurses to maintain data on all the couples and their families to whom health and family welfare services were being provided. With the hand-held computers, nurses were able to up-date data and provide services through icon-based interaction. The experiment illustrated how ICTs could enable field workers to better plan their activities and monitor their performances effectively (Bhatnagar 2000).



Although the application of Internet services and resources in the management of information hold enormous advantages, its effective utilisation and application is hindered by certain factors. The following section looks at the factors that might hinder exploitation of the Internet as a tool for IM and other socio-economic and environmental challenges faced by some African states.

### **3.8.1 Factors that hinder the utilisation of Internet services in Africa**

The Internet services provide a number of opportunities for the management of health information. In Africa, with the exception of South Africa, very few health-related facilities are exploiting these facilities. The non-utilisation of the Internet, among other things, could be attributed to information anarchy and anatomy of dependence (Zulu 1994:80). These will be discussed below.

#### **3.8.1.1 Information anarchy**

On the Internet, there is an increasing proliferation of information on more topics than ever before (information overload) and an increasing production of information from a variety of sources, than occurred in the past (Internet anarchy). Due to the proliferation of information on the Internet, retrieving relevant information despite sophisticated search tools becomes difficult and time consuming. Even worse is the fact that no standard indexing method has been used to index the information (Ballantyne and Addison 2000:15-19). In order to solve these problems, Ballantyne and Addison (2000) suggested the need to co-operate. Co-operation on the Internet, as in any other information exchange and resource sharing system, can take one of the following forms:

- ◆ Self-standing, that is, I contribute to my system and I make it available. That is, an institution builds an information resource or system and makes it available under its conditions.
- ◆ Functional collaboration, that is I contribute to your system and you make it available or you contribute to my system or resource and I make it available. An organisation invites another to contribute to its information resources or system, following its own rules or conditions.
- ◆ Partnership, that is, we contribute to our system and we make it available. Several organisations agree to jointly produce an information resource or system. Each member contributes to the cost and each accepts ownership of the outcome (Ballantyne and Addison 2000:15).

#### **3.8.1.2 One-sided information flow**

Africa does not only rely on the developed world for finance, technology, food, weapons, human resources for her raw



materials, but also for information. Concerning information, a study on the collections of libraries and other information centres in Sub-Saharan Africa revealed that over 90% of the book stock and periodicals are imported from Western countries. Furthermore, Africa has little data about herself since about 90% of data on Africa resides on databases in the West (Zulu 1994:80). On the Internet, the exchange and dissemination of information is one way. Information flows from the north to the south. Africans have always been at the receiving end. That is, being in a position to import and consume predetermined content, rather than being a formulator, contributor, producer and exporter of content. The end result is that, most of African's information needs for education, science and technology, finance and planning, for national development, come from outside the continent. If African nations are to participate in the globalisation of information then Africans should become participators, producers and consumers otherwise the global changes taking place in the information industries will have severe implications for Africa (Chisenga 1999; Zulu 1994). The dissemination and exchange of information should bring about a two-way exchange of common values that can be shared, whilst allowing specific and universal cultures and technologies that have developed to merge and be enriched. Godlee, Horton, and Smith (2002) suggest that Africans need to be proactive. By proactive, they should also become publishers, exchanging and sharing information, rather than being consumers. As a means to solve the anatomy of dependence, Chisenga (1999) called on the development of local initiatives in establishing networks.

### **3.8.2 Factors that inhibit the application and utilisation of ICTs in Africa**

Computers have been in Africa since the 1960s -- therefore, computer technology is not a new phenomenon on the continent. The major problem with computer and related technologies in Africa is centred around the under-utilisation, lack of indigenous maintenance capability and their being of exclusively foreign origin. These and other factors concerning the application and utilisation of ICTs in Africa are discussed below. The application and utilisation of ICTs requires the existence of certain basic infrastructure. Among these are the following (Davies 1985:51):

- ◆ an adequate and reliable supply of electricity;
- ◆ a conducive computer environment;
- ◆ a good telecommunication infrastructure, and
- ◆ qualified human resources.

The degree of the severity of the above problems differs from country to country. However, if Africans are to contribute effectively to global information, the above problems have to be attended to and a number of strategies and initiatives have to be adopted by governments and information professionals. The political will of most African leaders and

governments to establish a viable global information infrastructure on the continent is also vital.

Information is relevant when it is used to enhance decision-making. Access to ICTs is meaningless to people unless they are able to use the information provided, in appropriate format, to support decision-making. The following sections discuss the major problems of ICT development in most African nations identified above.

#### **3.8.2.1 Adequate and reliable supply of electricity**

In order to use computers, there must be an adequate and reliable supply of electricity. In Africa, most countries do not have access to adequate electricity. For those who have, they are concentrated in the urban areas and the majority of rural areas are not connected.

#### **3.8.2.2 Conducive computer environment**

The Africa continent, most particularly Sub-saharan Africa, is situated within the tropics where the problems of dust, humidity, and heat are extreme. The problems of environmental control are compounded by the unreliable electricity supply that makes it difficult to maintain a conducive computer environment. As a result, the technologies (computers) suffer from regular damage (Zulu 1994).

#### **3.8.2.3 Telecommunication infrastructure**

Telecommunication infrastructure has a major role to play in the generation and dissemination of information. In most African states, telecommunication infrastructure is either lacking or poorly developed. With the exception of South Africa, very few African countries have modern digital and packet switching telecommunication facilities required for data transmission and, if they do, they are limited to the cities (Chisenga 1999; Jensen 1998). In Cameroon, most hospitals do not have reliable telephones lines. If they do, they are available at the provincial and national hospitals and limited to the General Directors' offices. For instance, to get to a doctor in case of an emergency, the nurse has to run from one end of the hospital to another.

The situation becomes even worse because the postal services in these countries leave much to be desired. They are unreliable and this makes document delivery within and between countries difficult. The absence of telecommunication and inadequate telecommunication infrastructure, coupled with the high costs of telecommunication equipment, makes

it difficult for institutions to establish electronic connectivity. Hospitals are no exception. This limits Internet connectivity to the few who have the necessary technology and are able to afford the high tariffs.

#### **3.8.2.4 Lack of qualified human resources**

Human resources facilitate the use of information technology. Here, two classes of workers are required: the information specialist and the technician to oversee the proper functioning of the equipment. Although it is true that information is indispensable for the effective management of an organisation such as a hospital, at the same time it is essential to have mature and widely deployed human resources and the technical infrastructure to facilitate the use of information and to maintain the technology in place. Without appropriate staff to properly manage the information and those to manipulate and maintain the technology, relevant information to support decision-making will not be available.

In most African countries, since the government has not perceived the importance of information, the training and encouragement of information workers/providers such as librarians are often under-estimated. In Somalia, information workers are characterised as untrained staff and in Cameroon, due to lack of information support jobs, trained information workers turn to work in jobs other than those involving information services (Andong 2002; Hassan 1997).

In most African countries, the IT equipment in place is imported from the developed countries, installed by the technicians from overseas and is maintained by expatriate manpower at a great expense to the national economies of already burdened African countries. There are few qualified IT engineers to service and maintain IT hardware and software. According to Zulu (1994:82), the few available trained indigenous manpower often migrate to Europe and America where they are offered better conditions of service.

The training required by these classes of specialists is more often than not, developed outside the continent and is expensive. As a result, some of the ICT initiatives are abandoned, while others are functioning poorly. In Cameroon, the GTZ and the MoPH project to computerise the process of data collection in the health sector was abandoned due to lack of trained personnel and lack of sufficient finances to support and maintain the running costs of the project. Similarly, in Mozambique, computer networks were poorly established and maintained due to a lack of qualified IT technicians (Bunge 1996:92; Braa 2001).

Besides being connected and having access to equipment and infrastructure, formal skills are required to use the technology. That is, technology can only be meaningfully used by a literate population. According to statistics from the International Literacy Day (2001) 49% of Africa's population is either semi-literate or illiterate. In the use of ICTs, most particularly among medical professionals, the situation is worse. In Bangladesh, Akbar (2002) reported that although the medical doctors and nurses were excited and aware of the advantages of using ICTs, one of their greatest challenges was lack of skills to effectively exploit these services and facilities as computer courses and training in other related ICT equipment was not part of the curriculum of medical studies. The problem of IT illiteracy is further aggravated by the fact that information intermediaries (librarians, documentalists) in Africa, who could play a major role to bridge the gap between ICTs and the illiterate end users, are not employed, and those who are employed are accorded low status and hence poorly rewarded.

In addition to the preceding factors that inhibit the utilisation of ICTs in Africa, the following are equally crucial: high cost of installation, lack of national information policies and lack of local content.

#### **3.8.2.5 High cost of installation**

Another major factor is the cost involved in acquiring the equipment, installing and maintaining it. According to Kanamugire (1998:137), the costs involved in investing in Internet connectivity and equipment, such as the acquisition of hardware and software, installation and maintenance, and recurrent costs for staff development, hinder Internet connectivity. These costs are the most challenging to the Ministry of Health. Most often donors support these costs, but the government must eventually adopt a more sustainable solution to ensure continuity of the system (Kleinau 2000:195). Fors and Moreno (2001) confirmed that most ICT projects, especially those that are externally funded, come to an end immediately after the initial investment due to lack of local government support. Godlee, Horton, and Smith (2000) emphasised the need to acquire sustainable funding so that in the absence of donor or external financial support the system will be able to survive.

#### **3.8.2.6 Lack of national information policies or framework**

Government policies are declarations of intent, to undertake actions in a given sector of the economy. Formulating a strong national information infrastructure provides the basis for planning and competent decision-making (Rasmussen 2001:12). A national information policy defines, among other things, a nation's information needs, what type of and how to acquire ICTs in order to harness its information resources. Most African countries do not have an information policy (Akhtar and Melesse 1994). A study conducted by the UN Commission for Science and Technology for

Development with 90 countries revealed that the factors that made the greatest differences in the diffusion and use of ICTs were leadership and organisational reforms. Lack of information policies can be attributed, amongst other reasons, to the Western dominance of information on the Internet. That is, the governments of most developing countries feel threatened by the content or the foreign origins of the information existing on the Internet. Thus, restriction on the use and accessibility of the Internet, as well as censorship of information published and disseminated via the Internet, are still common practices in some developing countries (Fors and Moreno 2001).

### **3.8.2.7 Lack of local content**

In the literature concerning ICTs, it is realised that there is a lack of indigenous information. As mentioned above, information available to health professionals is from the developed countries and is often irrelevant and obsolete (Patrikios 1995:94; Musoke 2000:200). This situation as described by Gabor Kapocs in Kale (1994) is attributed to the fact that medical professionals in Africa do not write. Therefore determining their information needs and disseminating the appropriate information is problematic and sending too much information could appear paternalistic, patronising and wrong (Kale 1994). The ideal situation is that medical professionals in African should write on local health issues.

Godlee, Horton, and Smith (2000) further explained that the health problems of the world are concentrated in the developing world and those who live with those problems have more to offer to each other than those who view them from the comfort of London or Geneva.

## **3.9 SUMMARY**

Chapter Three was a general overview of information as a resource and the importance of IM in the health sector. It examined the types of health information sources and the emergence of IM. It looked at the application of ICTs and their advantages as tools to disseminate health information. It highlighted some of the initiatives used to disseminate electronic health information in Africa and their shortcomings. Finally, it examined some of the hindrances that inhibit the application and utilisation of ICTs in most African countries.



# CHAPTER FOUR

## RESEARCH METHODOLOGY

### 4 INTRODUCTION

This chapter presents the methodology underpinning the study. The research design adopted, the data collection instrument used, the sample and sampling process and the analysis of the data are, amongst other issues, discussed.

#### 4.1 RESEARCH DESIGN

Research design necessitates the arrangement of conditions for the collection and analysis of data in a manner that aims to combine relevance to the research purpose, with economy in procedure (Selltiz, Wrightman and Cook 1976:90). Babbie (1992:89) defined research design as a layout strategy for discovering something, adding that:

Although the special details vary according to what you wish to study, there are two major aspects of research design. First, you must specify precisely what you want to find out. Second, you must determine the best way to carry out what you want to do (Babbie 1992:89).

The research was planned to gather and analyse data pertaining to the use of ICTs by medical professionals in the management of health information. Among other things, the study sought to determine the type of health information sources available to medical professionals and how often these information sources were used. It looked at the way health information was captured, stored and exchanged as well as the factors that impede information exchange at the hospitals. It sought to look at the availability of ICT equipment and infrastructures at the government hospitals. It also attempted to seek the type of ICT training acquired and required by medical professionals to enhance the management of health information.

Considering the nature of the research problem, the study adopted the survey research methodology (Terre Blanche and Durrheim 1999) as its principal research design to investigate the use of ICTs by medical professionals in the government hospitals in Yaoundé. According to Busha and Harter (1980:62), survey research is capable of collecting background information and hard-to-find data, where the researcher would have no opportunity to motivate or influence the respondents' responses. Saunders, Lewis and Thornhill (2000:94) correctly noted that the suitability of the survey methodologies when they observed that "they allow the collection of a large amount of data from a sizeable population in a highly economical way...".

Furthermore, the survey methodology was chosen as it permits the researcher to work independently and at her own time, to decide on an appropriate survey instrument to use and also gives the researcher the ability to be in more control over the research process. That is, the ability to decide when to design, to pre-test and administer the survey instrument.

The advantage of the survey method is that it generalises from a sample population so that inferences can be made about some characteristics, attitudes or behaviour of the whole population (Creswell 1994:11). It relies upon observation in the acquisition of data. The method is suitable for the present research because it can produce quantitative information about people's beliefs, opinions and characteristics and past and present behaviour (Neuman 1994:221). This is useful for the present research in drawing conclusions on the use of ICTs among medical professionals.

Survey methodology shares similar characteristics common to other research methods, but has some important differences. For example, survey research is used to collect contemporary data, while historical research is concerned primarily with past data (Powell 1997:58). It is also less rigorous than experimental research.

#### **4.1.1 Data collection instrument**

Powell (1997:117) states that questionnaires, interviews and observations are among the regular and conventional data collection instruments used in the social sciences. Interviews are structured and observations mean "to watch attentively in a scientific or systematic manner". In an observational study, the current status of a phenomenon is determined not by asking but by observing.

The main data collection instrument used in the present study was the questionnaire. Informal meetings, discussions and observations were used to collect supplementary data. The questionnaire is suited to study a large number of cases that are geographically dispersed.

Added to the above advantage, questionnaires also enable respondents to feel more at ease to answer questions even of a personal nature and they can afford to be more open and honest. Mailed questionnaires can remove or limit the element of bias, as observed by Bailey (1982:350), which can occur "...when an interviewer influences a person's response to a question through what the interviewer says, his or her tone of voice or demeanour."

As a popular research tool, the questionnaire was used to solicit information from medical professionals (doctors and nurses) who were required to provide answers to the same set of questions (Saunders, Lewis and Thornhill 2000:278). The questions reflected the research objectives and research questions of this investigation. Data on the major research areas as determined by the research questions and the research objectives were collected. The questionnaire was considered suitable for this research because it was geared towards establishing the respondents' awareness on the problem under investigation. In addition, the questionnaire is a valuable instrument, especially for a population that is literate. Such a population should be reasonably able to deal with the items contained in the questionnaire. In the present study, medical doctors and nurses completed the questionnaires. This was important for the study in that they were knowledgeable and professionally experienced. The researcher was thus confident that both these groups were capable of completing the self-administered questionnaires and providing useful and relevant information on the subject under study.

#### **4.1.1.1. Designing of the questionnaire**

Being unable to locate similar studies to adapt questionnaires already used, the researcher designed a questionnaire guided by the objectives and a review of the literature, as well as by a combination of other ideas gathered from the survey of information and communication usages and needs in health facilities (Irlam:2002) and the survey of the health information resource centre (Zielinski 2001). The questionnaire, consisting of 30 questions/items, was designed to collect the necessary data for the study (Appendix 1a). The questions/items were organised into six parts and the questionnaire was structured in the following order.

##### Section One: Questionnaire items 1 - 4

This section was intended to provide the researcher with basic general information on the population of the study. Such information is important because it provides important working knowledge of the respondents.

##### Section Two: Questionnaire items 5 – 6

This part provided the health information sources available and the manner in which information is captured and stored in the hospitals surveyed. The responses gave the researcher the extent to which information is managed to support decision-making.

### Section Three: Questionnaire items 7 - 13

The focus in this section was the medium used to exchange information and the obstacles medical professionals might encounter. These questions helped the researcher to understand the medium used to exchange information and solutions to overcome the problems they might encounter.

### Section Four: Questionnaire items 14 - 22

This section dealt with existing ICT equipment and their uses. These questions were important, as they provided the researcher with a broad view of the types of ICTs available at the disposal of respondents in the hospitals surveyed.

### Section Five: Questionnaire items 23 – 26

Part five covered the availability of Internet facilities, examined the uses of the Internet and also endeavoured to establish the awareness of the respondents regarding Internet resources. These questions helped the researcher to complement the information obtained in part Two.

### Section Six: Questionnaire items 27 – 30

Section Six looked at the skills, knowledge and training of the respondents, with regard to Internet facilities. These questions determined the type of skills and training needed by the respondents concerning the use of Internet resources.

#### **4.1.1.2 Structure of the questions**

The questions were both closed and open-ended, with closed questions forming the majority of the questions. The “Likert-style” format formed the basis of most of the closed questions. The “Likert-style” is a format that provides the respondents with a rating scale, that is to ask the respondents, for example, to strongly agree, agree or disagree with a particular statement (De Vaus 1986:88; Bailey 1978:358). The choice of the type of questions was influenced by many factors. Among them were the length of the questionnaire and the time constraints of the respondents. De Vaus (1986:86) cautions that where the questionnaire is long, people’s motivation to answer is low. Most often, closed questions are useful, since they take a short time to answer. By virtue of the nature of their jobs, medical doctors and nurses are busy and this was taken into consideration. The open-ended questions were used to provide the respondents freedom in framing the answers, in order to obtain more detailed information on the issues being investigated.

The questions were both closed and open-end, with closed questions forming the majority of the questions. The "Likert-style" format formed the basis of most of the closed questions. The "Likert-style" scale helps to develop more valid measure.

Finally, the questionnaire was originally written in English. Considering the bilingual nature of Cameroon, which is French-dominated, the questionnaire was translated into French (Appendix 1b). This was to accommodate the French-speaking medical professionals. The translation from English to French was done by translators at the Ministry of Public Health, Yaoundé, Cameroon.

#### **4.1.1.3 Informal meetings and observation**

Informal meetings and observation were conducted to seek more information and to obtain personal views on the problem. The researcher had informal meetings with directors, general supervisors, nurses, doctors, librarians and also the patients of the hospitals. She observed the actual state of health information and the application of ICTs in the hospitals during the distribution and collection of the questionnaires. This gave the researcher an opportunity to gather information that would otherwise have been impossible to obtain.

## **4.2 POPULATION OF THE STUDY**

At the time of conducting this study in September to November 2002, there were 11 government hospitals from levels 1-4 in Yaoundé. See Table 4.1. The study covered the government hospitals in Yaoundé and their medical professionals (medical doctors and nurses).

### **4.2.1 Sampling procedures and techniques**

Sampling is one of the most crucial steps in survey research. When doing research in developing countries, like Cameroon, Bulmer (1983:91) recognises the paradox of achieving an adequate sampling frame. In the present study, the researcher was faced with a situation in which, as emphasised by Gerry (1982:59), there was a working universe but it was impossible to construct a sampling frame. Both Kerlinger (1986:120) and Gerry (1982:59) suggested that, in such cases, non-probability sampling may be used. Non-probability sampling covers a variety of procedures and in effect, one takes the available sample at hand, on the ground that they are "representative" of the population. The following sections present the means upon which the population of this study was arrived at.



4.2.2 Sampling of government Hospitals

In Cameroon, government hospitals, health areas and centres are arranged hierarchically in seven levels. Levels one to four are hospitals, five and six are health areas and centres and level seven is the Mobile Health Service (MHS). At the time the study was done, the MHS was not yet operational in the country as it was introduced in the new organisation chart of the Ministry of Public Health in September 2002 (MoPH 2002).

Each level is different from the other in management and administration, the amount of financial support received from the State and so are the types of ICTs infrastructure available. Therefore, concentrating on a single level government hospital will not provide a broader picture. Thus, there was a need to survey hospitals in each of the four levels.

Table 4.1: List of hospitals and their levels in Yaoundé centre

Category	Types of Hospitals	Number
Level 1	Yaoundé Teaching Hospitals, General Hospital	2
Level 2	Yaoundé Central or Provincial Hospital, Jamot Hospital	2
Level 3	Military Hospital, National Social Insurance Hospital (CNPS)	2
Level 4	District Hospitals: Biyem-Assi, Cité Verte, Djoungolo, Efoulan and Nkolindongo.	5

From the table above, Yaoundé has 11 government hospitals from level one to four.

4.2.2.1 Reasons for selecting hospitals

From the 11 government hospitals as indicated above, the following criteria were considered in selecting the hospitals for the survey:

- ◆ Personal exploration and discussion with individuals in the MoPH.
- ◆ The size of the hospital, that is hospitals of the first three levels are very large in size and have many divisions, as well as medical specialists who, in turn, may reflect the ICT experiences; the number of ICTs equipment possessed by these hospitals
- ◆ The proximity of the hospitals to the researcher's base.

Thus, six government hospitals from the total of eleven were selected. See Table 4.2 below.

**Table 4.2: List of hospitals in the survey**

Level	Names of Hospitals	Number
Level 1	Yaoundé Teaching Hospital and Yaoundé General Hospital	2
Level 2	Yaoundé Central Hospital	1
Level 3	Yaoundé Military Hospital	1
Level 4	Biyem-Assi and Cité Verte District Hospitals	2
	<b>Total</b>	<b>6</b>

**4.2.3 Sampling of Medical professionals (doctors and nurses)**

The medical doctors and nurses are directly involved in the provision of quality care, promotional, preventive and curative health services, with the resources at their disposal, including the knowledge and skills acquired. These professionals were the units of population in the six hospitals except in the Military Hospital where only doctors were allowed to participate in the survey. According to the Director of this Hospital, there was low usage and knowledge of ICTs in the hospital and ICTs were mostly used by medical doctors.

A list of medical doctors was obtained from the office of the National Association of Medical Doctors in Cameroon. This list was considered appropriate because according to the code of medical ethics, all medical doctors trained in Cameroon and/or abroad are supposed to register with this Association before practising medicine in the country (Ngufor 1999). It was later realised that there are doctors who practice and are not registered with the Association. Therefore, this list was inadequate since it was not up-to-date.

The researcher contacted the “Surveillant Generale” or General Supervisor of each of the hospitals aimed at obtaining an up-to-date list of medical professionals in each hospital. From discussions with the General Supervisors of the General Hospital, Teaching Hospital and Central Hospital it was found that obtaining a reliable list of medical professionals in these hospitals was impossible, because it does not exist. To the General Supervisors, this was attributed to:

- ◆ The complex manner in which the health sector is administered, see (Section 2.4.2).
- ◆ Medical doctors hold more than one post of responsibility. For example, a medical doctor is appointed as director in one hospital and also the chief medical officer of the gynaecological unit in another hospital. Or the delegate of provincial health is also the director of the provincial hospital and the chief medical officer of one of the units in the provincial hospital.

- ◆ The time of the research was when student doctors were on internships in the government hospitals in Yaoundé. That is, they move from one hospital to another.

Considering the time constraints of the researcher and the necessity of the research, it was absolutely important for the researcher to have a "workable" population for the survey. The last resort was to use what was available (Kerlinger 1986:120). In this case, the lists of doctors and nurses on duty in each hospital during September and October were used.

Table 4.3 gives a breakdown of the number of medical professionals in each of the hospitals. There was a total of 325 medical professionals (175 medical doctors and 150 nurses) listed. They were divided as follows: General Hospital 120, Teaching Hospital 90 and Central Hospital 30. The Military Hospital and the two District Hospitals (Biyem-Assi and Cité Verte) are smaller in size and so was the number of medical doctors and nurses. The Military Hospital had only 25 doctors and the two district hospitals 20; five nurse and five doctors from each. With this population, the researcher went ahead and distributed questionnaires to all (doctors and nurses) who were available. See table 4.3 below.

**Table 4.3: Distribution of questionnaires to the different hospitals**

No.	Name of Hospitals	No. of questionnaires to Doctors	No. of questionnaires to Nurses	Total
1	Yaoundé General Hospital	70	50	120
2	Yaoundé Teaching Hospital	40	50	90
3	Yaoundé Central Hospital	30	40	70
4	Yaoundé Military Hospital	25	/	25
5	Biyem-Assi District Hospital	5	5	10
6	Cité Verte District Hospital	5	5	10
	<b>Total</b>	<b>175 (52.3%)</b>	<b>150 (44.7%)</b>	<b>325</b>

#### 4.2.4 Reasons for choosing Yaoundé

Yaoundé is the political and administrative capital of Cameroon. The town has all the government ministries and their ministers. It is also the place where all government policies are created and implemented. In 1972, Yaoundé became important due to its administrative structures and the city further received a substantial boost under the unitary structure that brought about increased bureaucratic centralisation. DeLancey and Mokeba (1990:208) opine that, due to the

unitary structure of government, it is very common to see civil servants from all over the country making a pilgrimage to Yaoundé to follow up the progression of documents in the various ministries.

Yaoundé is one of the cities with all the six operational levels of hospital. Therefore, in terms of feasibility and accessibility, and taking into consideration the duration of the study and the financial constraints involved, the researcher found Yaoundé the most suitable location to conduct the survey.

### **4.3 PRE-TESTING OF THE RESEARCH INSTRUMENT**

With advice of the researcher's supervisor and the contributions from lecturers in the Information Studies Programme of the Faculty of Human and Management Sciences at the University of Natal, Pietermaritzburg, who critiqued the survey instrument, the researcher was able to develop and refine the instrument before it could be pre-tested. Their professional advice contributed to the development of the survey instrument.

Immediately after the questionnaire was completed, it was pre-tested. Firstly, among the members of HIF-NET (Health Information Forum). HIF-NET is an electronic discussion group for medical professionals and health information providers who exchange ideas and experiences of common interest. The first draft of questionnaire was sent to 15 virtual members of the HIF-NET discussion group who had expressed their interest in the study. HIF-NET, being a forum for medical professionals and health information providers, would give the researcher a wider opportunity to receive comments, critiques and suggestions and exchange ideas on the problem under investigation. The members of the group were asked to examine the clarity, content validity and relevance of the questions. They were also requested to critically review the questionnaire and to provide opinions and suggestions. Several comments were made from the virtual members of HIF-NET. The major issues raised were the length of the questionnaire and possible difficulties with some ICT terminology such as Portal, Intranet, FTP, to name a few.

These comments were considered in developing another draft version that was distributed to three medical doctors, randomly selected from the Douala Polyclinic Hospital in Cameroon, for the same purpose. As virtual members, the medical doctors' major concerns were also the length of the questionnaire and the ICT terminology, which many medical professionals are not familiar with. Although shorter questionnaires are preferable to encourage more participation, the researcher considered that in order to collect the relevant data needed for the study, those questions had to be posed. For the ICT terminologies, possible definitions were provided. Furthermore, the three medical doctors were in complete agreement with the relevance of the study and the problem under investigation. They were very



pleased and indicated it was the first time they had come across such a study and hoped the results obtained would help improve the state of health information in the country.

The aim of pre-testing the questionnaire was to ensure that the respondents would not find it difficult to answer the questions and record the responses accordingly. The pre-testing also enabled the researcher to assess the validity of the questions and whether the data collected would be reliable. The questionnaire was duly amended and definitions of the ICT terminology were included (Section V of the questionnaire).

#### **4.4 DATA COLLECTION PROCEDURE**

Initially, the researcher contacted and discussed the research with some senior officials at the Ministry of Public Health. The issues discussed included the relevance of the study in relation to the state of health information and the application of ICTs in the management of health information in the country. The meetings were encouraging, as some officials were in complete agreement with the problem under investigation. Since these officials were medical doctors who had served in government hospitals they are conversant with the difficulties encountered by medical professionals as regard to access to information and the use of ICTs. They were supportive as they realised the necessity of such a study. In some cases, the researcher was allowed to have access to some official documents such as the Health Sector Strategy that is the core document of the health sector. These meetings also served as a clearance, in case there were difficulties during the data collection phase.

Authorisation to conduct the study was sought from the Ministry of Public Health, Yaoundé, on 27 August 2002 (Appendix 3). This was in reply to an introduction letter sent by the researcher's supervisor on 29 July 2002 (Appendix 2). The authorisation from the Minister of Public Health was meant to serve the following: enable the researcher to obtain authorisation from the directors of the hospitals to be surveyed -- that is to survey their medical staff; to enable the researcher to obtain information from any health institution (although practically it was not easy); and finally, it served as a tool to encourage collaboration and co-operation from the respondents in participating in the survey. A copy of the Minister's letter was attached to each questionnaire and the date when and where the questionnaire should be returned was also stated.

##### **4.4.1 Distribution and collection of questionnaires**

The survey method was supported by the use of self-administered questionnaires. Distribution was done as follows:



For the medical doctors in the hospitals, except the Military Hospital, the researcher enveloped each questionnaire and physically distributed them to the doctors during consultation sessions. With every doctor, she had to introduce herself and explain the objectives of the study before they accepted the envelope. Although an introductory letter was attached to the questionnaire, doctors claimed they were very busy and did not have time to read the introductory letter. In some cases, the doctors would only accept the envelope on condition that the researcher was present to explain certain ICTs terminologies they were not familiar with. In the Military Hospital, the Director did the distribution of the questionnaires.

In collecting the questionnaires from the doctors the same method that was used in distributing them was applied. In addition, the researcher hired two research assistants (seventh year medical students) to assist in collecting the questionnaires from the Teaching and Central Hospitals. For the Military Hospital, the Director instructed the doctors to return the questionnaires to his secretariat, from where the researcher collected them.

Questionnaires to the nurses were enveloped and handed to the General Supervisors in the hospitals who then distributed them to the nurses during one of their meetings. Once completed, the nurses returned the questionnaires to the office of the General Supervisors from where they were collected by the researcher.

#### **4.5 RESPONSE RATE**

In survey research, it is generally accepted that it is necessary to gain the people's cooperation so that they can provide the data that is required for the purposes of meeting the requirements of the study (Kerlinger 1986). Adequate data collected would enable the researcher to make meaningful generalisations about the group of people studied. The most discouraging problem in a mail survey is to ensure that the respondents are reasonably representative of the total population studied.

Of 340 questionnaires distributed, 150 were returned. However, 141 were deemed usable, as nine (2.6%) had not been completed adequately, with some having been returned with only the first page filled in. This gave a response rate of 41.47%. This compose of 76 (53.9%) and medical doctors 65 (46.1%) and the break down of medical doctors was as follows:

- ◆ General Practitioners 40 (28.4%),

- ◆ Obstetricians/gynaecologists eight (5.7%),
- ◆ Radiologists seven (5%),
- ◆ Internal Medicine four (2.8%),
- ◆ Cardiologists three (2.1%),
- ◆ Paediatricians one (0.7%),
- ◆ Surgeon one (0.7%),
- ◆ Ophthalmologist one (0.7%).

From the literature, high response rates of 70 percent can be achieved in mail surveys (Babbie and Mouton 2001:261) and the response rate can drop to as much as 50 percent. Owen and Jones in Saunders, Lewis and Thornhill (2000:158) observed that response rates in mail surveys can be much lower than 40 percent when they commented that "...for postal surveys a response rate of approximately 30 percent is reasonable." Bless and Higson-Smith (2000:109) also acknowledged that response rates with questionnaires can drop to an unacceptably low 20 percent.

It has been generally accepted that mail questionnaire do not largely guarantee a high response rate and many factors contributed to the low response rate (Bless and Higson-Smith 1995; Babbie 1998) including for example, the respondents never having received the questionnaire. In the present study, the low response rate could have been attributed to the unfamiliarity with the topic. For example, a nurse or doctor who has heard about the advantages of using a computer and Internet services but has never had the opportunity to do so would be reluctant to complete a questionnaire dealing with such an issue. The possible unfamiliarity with the topic could explain the intensiveness of the problems. Bulmer and Warwick (1983:150) point out that the non-familiarity of certain topics to the respondents is a major cause of refusal to complete questionnaires. Another reason is that doctors do not have personal offices and some may have left the completed questionnaires at home, or may have misplaced them. A third reason relates to the period in the year when the survey was conducted. The questionnaires were distributed during the months of September and October. This period of the year is a crucial period in Cameroon as it is the beginning of the academic year. This is also when transfers and appointments are made and medical doctors and nurses go on leave. Thus questionnaires which were handed to medical staff may not have been completed due to those staff movements.

Finally, and also impacting on the final response rate, were the nine questionnaires which were discarded because they were incorrectly and incompletely filled out. Weisberg and Bowen (1997:36) explained that such occurrences are very common with mail questionnaire and are beyond the researcher's control and contributes to the low response rate.

It has been acknowledged that an element of bias exists in all response rates that are short of a 100% success rate. Moreover, as the response rate drops below 100%, the sample population becomes less and less representative (Saunders, Lewis and Thornhill 2000:131). However, in view of the above reasons the response rate of 41.47% was considered acceptable by the researcher but it is acknowledged that the interpretation of the results and the generalisations to the survey population need to be done with caution.

## **4.6 DATA ANALYSIS**

The questionnaire was used to gather both quantitative and qualitative data. This data was used to meet the research objectives and to answer the research questions. Quantitative and qualitative analysis techniques were used to establish relationships between the data and the variables (Saunders, Lewis and Thornhill 2000:326). Hence, tables and charts were used to show the frequency of occurrence of variables and to determine their relationships.

### **4.6.1 Coding of Data**

Immediately after the questionnaires were collected, coding was done. The data was checked and cleaned of any errors before it was input in the matrix table using the SPSS software, popularly used to analyse quantitative data in the social sciences. Most of the data were recorded using the numerical values such as 1 and 2. Saunders, Lewis and Thornhill (2000:334) states that each variable for each case in a data set should be attributed a code. These codes were assigned to closed questions that required a "No" or "Yes" answer as well as for multiple response questions. Numerical values were assigned to each variable in the sequence they were arranged in the questionnaire.

Qualitative data was obtained from open-ended questions. The analysis of the qualitative data was done using content analysis. Content analysis is a systematic and quantitative analysis of the occurrences of words, phrases, concepts and the like, so as to analyse the expressed content, that is the inferences of the communication (Bailey 1978:226-7). In the case of this study, the open-questions were manually analysed and similar responses were grouped together to facilitate the counting of the frequency of occurrence of the similar responses.

## **4.7 Evaluation of the data collection instrument**

According to Bless and Higson-Smith (2000:125) it is complicated to know if the responses provided by the

respondents in a survey represent their actual behaviour or opinions. It has been emphasised that all one can do is reduce the possibility of getting the answer wrong. The way of assuring that the true behaviour or opinions on an issue under investigation are elicited is to pay attention to the reliability and validity of the research design.

#### **4.7.1 Reliability**

Reliability looks at how well the survey instrument can be used to obtain similar results on different occasions. According to Bailey (1982:68) this is known as consistency of performance of the research instrument. To Saunders Lewis and Thornhill (2000:100) it is called the deductive approach and is meant to determine whether the "... measure yields the same results on different occasions?"

Various techniques commonly used to test reliability are test-retest, equivalent forms reliability, and split-half, inter-scorer and internal consistency of measures. In the present study, the instrument used was the questionnaire and the technique used to test the reliability of question was item analysis.

Item analysis deals with internal consistency and here the researcher is interested in finding out how well the responses to each item correspond to the responses with the other items and to the test as a whole (Bless and Higson-Smith 2000:128). In the present study, before pre-testing the questionnaires expert opinion was sought by the researcher regarding the methodological weight of the instrument and the reliability of the questions items. The draft questionnaire was distributed to three members of the academic staff. These members were considered experts on methodology. All the experts commented on the fact that the questionnaire was long. After taking the comments into consideration the researcher reduced the number of questions from 40 to 30 through the elimination of duplicated questions, the combination of certain questions and the elimination of those items within the instrument which were not providing useful information about the subjects or which were actually confusing the data. By so doing, the researcher was able to remove the troublesome items from the instrument and replaced some of them thus increasing the overall reliability of the instrument.

#### **4.7.2 Validity**

Validity refers to how well the research instrument measures what it is supposed to measure and whether the findings are really about what they appear to be (Saunders, Lewis and Thornhill 2000:101). There are many different types of validity and the most important are: content, criterion-related, construct and face validity. As earlier stated, this

study used the questionnaire as the main data collection instrument and face validity was employed.

Face validity indicates the extent to which an instrument measures what it is intended to measure. According to Powell (1985:40), face validity is based on the opinion of subject experts who have been asked to evaluate the instrument. Before distributing the questionnaire, it was pre-tested firstly by the virtual members of HIF-Net and three medical doctors of the Douala Poly-clinic. This was done in order to ensure that:

- all items in the questionnaire related to the research objectives and questions,
- open-ended, closed-ended and scaled items were appropriate,
- ambiguity was avoided.

Powell (1985:40) states that when these aspects are taken into consideration during the construction of the measurement instrument (as was done in the present study), the validity (and reliability) of the instrument is increased.

#### **4.8 SUMMARY**

Chapter Four described the research methodology of the study. The study was conducted using the survey method. Self-administered questionnaires, informal interviews and observations were used to collect the required data. The units of analysis were medical professionals [doctors and nurses] from six government hospitals in Yaoundé. Also discussed in this chapter were the pre-testing of the instrument for data collection, the data collection and procedures and the analysis of the data. The questionnaires were distributed and returned during the months of September and October 2002.



# CHAPTER FIVE

## PRESENTATION, INTERPRETATION AND DISCUSSION OF RESEARCH RESULTS

### 5. INTRODUCTION

Chapter Five presents, interprets and discusses the results of the study. The purpose of the study was to investigate the application of ICTs by medical doctors and nurses in government hospitals in Yaoundé, Cameroon, to enhance the delivery of health care. In order to achieve the desired goals, the following research objectives were formulated.

1. To describe the information sources available to medical doctors and nurses in the government hospitals in Yaoundé, Cameroon.
2. To investigate how information is captured, stored and exchanged among medical doctors and nurses in the government hospitals in Yaoundé, Cameroon.
3. To examine the ICT equipment and networks available to medical doctors and nurses and in the government hospitals in Yaoundé, Cameroon.
4. To establish the level of Internet skills of medical doctors and nurses in the government hospitals in Yaoundé, Cameroon.
5. To examine the Internet training and development needs among medical doctors and nurses in the government hospitals in Yaoundé, Cameroon.
6. To present recommendations on how ICTs could be utilised to enhance the management of health information among medical doctors and nurses in the government hospitals in Yaoundé, Cameroon.

As mentioned in the previous chapter, the study was done using the survey method. A self-administered questionnaire was used as the main data collection instrument. Supplementary data was collected through informal meetings with directors and doctors of the hospitals surveyed. In addition, observations of some of the activities in the hospitals and discussions with the medical librarians of the General Hospital Library and Medical Librarian of the Faculty of Medicine also served as valuable sources of data. Two categories of population were studied, namely medical doctors and nurses.

After presenting some background information, the findings of the study are presented and discussed. The discussion is divided into six sections. The sections correspond with the objectives and research questions of the study, following the sequence in which the research questions are posed. For the researcher's convenience, sections two and three of the questionnaire have been merged.

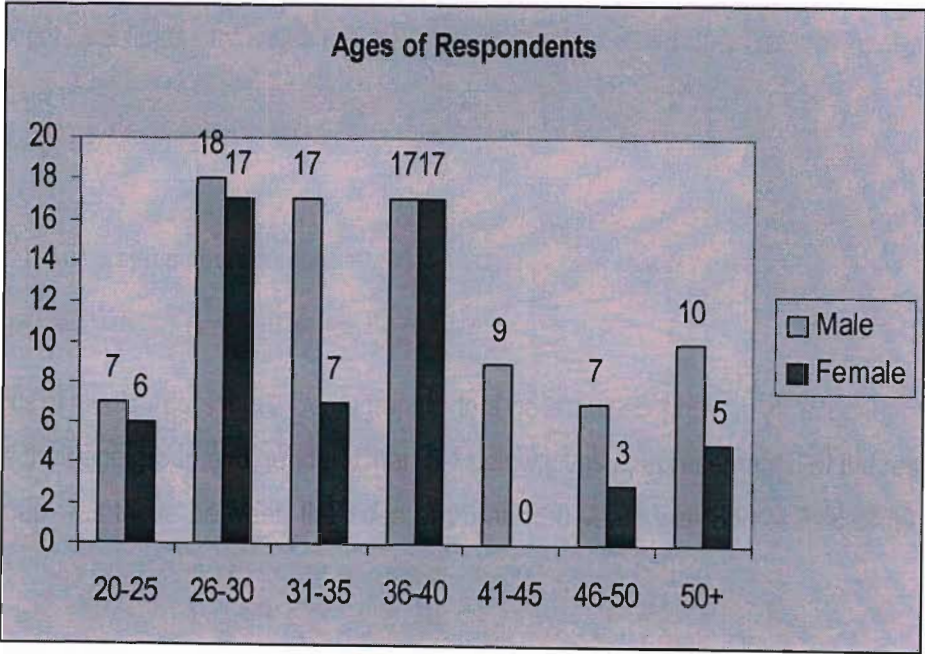
5.1 BACKGROUND INFORMATION

This section is divided into two parts. Firstly, it looks at the demographic data of the respondents and secondly at their services and professional status. The section is important, as it gives a picture of the population surveyed in terms of obtaining an overview of the problem under investigation.

5.1.1 Demographic characteristics

It was expected that the use of information and the application of ICTs would be affected by the demographic dynamics of medical personnel. Demographic data were thus sought from all respondents. Respondents were asked to indicate their age group and gender. Chart 5.1 below gives a representation of the responses obtained. The largest age group was those between the ages of 26 and 30 years with 35 (24.8%) of the respondents falling into this category. The results in the chart indicate that 85 (60.3%) were male and 56 (39.7%) female.

Chart 5.1: Distribution of respondents by gender and age groups



5.1.2 Professional status

This section looks at the different specialities or professions of the population surveyed. The field of health is wide and has a range of professions. The researcher's target population were medical professionals (nurses and medical doctors). Respondents were asked to state the service they were working in, as well as their professional status and field of speciality. Data on this section revealed that 76 (53.9%) were nurses and 65 (46.1%) medical doctors. Data from gender and profession were compared and the details are presented in Table 5.1. The overall results show that nursing was the dominant profession and that outside of the nursing, the general practitioners were the largest group. In terms of gender, males tended to dominate with the exception of nurses and paediatrics.

Table 5.1 Distribution of respondents by profession (N=141)

Profession	Gender	
	Male (%)	Female (%)
Cardiologist	2 (2.3%)	1 (1.7%)
General Practitioner	28 (32.9%)	12 (21.4%)
Internal Medicine	3 (3.5%)	1 (1.7%)
Nurse	37 (43.5%)	38 (67.8%)
Obstetrician/gynaecologist	7 (8.2%)	2 (3.5%)
Ophthalmologist	1 (1.2%)	/
Paediatrician	/	1 (1.7%)
Radiologist	6 (7.1%)	1 (1.7%)
Surgeon	1 (1.2%)	/
Total	85 (60.2%)	56 (39.7%)

5.1.3 Interpretation and Discussion

Interpretation

From the results obtained, it is widely noted that the gender distribution pattern within the hospitals surveyed is an issue worth discussing, as the males are in the majority general medicine as well as in most of the specialised medical areas.

Discussion

The preamble to the Constitution of the Republic of Cameroon, states that "[t]he State guarantees for all citizens of one sex or the other, the rights and liberties enumerated in the preamble of the constitution". It emphasises that

everyone has the right and the duty to work (Cameroon 1996). It seems therefore obvious that, in terms of policy, gender discrimination does not exist but, in practice, males dominate.

In Cameroon, recruitment into the medical and paramedical schools is open to candidates of both sexes and those who satisfy the conditions for admission are taken into the establishment on merit. According to Fonkwo and Meloni (1999:6), female personnel in the health field are not easily mobilised because, in a bid to protect the family, wives are supposed to stay at their husbands' place of posting. This contrasts with an observation by Standing (1997:6) that "front line health workers are disproportionately female". In Cameroon, the inability to mobilize this group of personnel tends to aggravate the shortage of staff in hospitals. It is worth noting that Cameroon is one of the few countries in which males work as "midwives", assuming duties of managing pregnancy and deliveries in health facilities in most parts of the nation, with the exception of Muslim zones (Ngufor 1999).

## **5.2 HEALTH INFORMATION SOURCES**

Health workers and medical professionals seek information to resolve problems and make wise (informed) decisions. Thus they are supposed to have up-to-date information to satisfy their needs. The general information needs of medical professionals can be defined as information that is necessary to meet their working requirements in order to enhance health care delivery.

To establish the general information needs of respondents, a number of issues were surveyed, including the type of information needed, extent to which information is used, health information sources and the form and format in which health information is captured and stored in the hospital.

### **5.2.1 Types of information needed**

Health information can be divided into Health Management Information (HMI) and Patient Management/care Information. The respondents were asked to indicate the type of health information often used in their daily activities. Options were given as Health Management Information (HMI), Patient Management/care Information, or both. Out of the 125 who responded, six (4.8%) needed health management information, 91 (72.8%) patient management/care information, while 28 (22.4%) were interested in both and 16 (12.8%) with no response. The respondents who indicated "both types of information" were heads of medical services who had to deal with management and administrative issues of their services, as well as taking care of patients.



## 5.2.2 Usage of health sources and frequencies

Respondents were asked to indicate the different health sources and the frequencies of using them for their daily activities. Nine health sources were provided, e.g. verbal interaction with colleagues, medical journals, medical bulletins and conference proceedings. To find out the frequency of use, a scale was used. The results given in Table 5.2 below shows that interaction with colleagues (informal communication) was the most used source with 32 (22.7%) of respondents using the source 21 to 30 times a month. This was followed by medical journals, bulletins and conference proceedings (formal communication) and electronic sources.

**Table 5.2: Health information sources and the frequencies of use (N=141)**

Frequency	1 to 5 times a month	6 to 10 times a month	11 to 20 times a month	21 to 30 times a month	Never	No response
Information Sources						
Conference Proceedings	30 (21.3%)	5 (3.5%)	2 (1.4%)	2 (1.4%)	92 (65.2%)	10 (0.7%)
Electronic discussion group	15 (10.3%)	16 (11.3%)	5 (3.5%)	3 (2.1%)	85 (60.2%)	17 (12%)
Hospital activities reports	26 (18%)	9 (6.4%)	1 (0.7%)	/	95 (67.3%)	10 (0.7%)
Interaction with colleagues	19 (13.7%)	21 (14.9%)	31 (22%)	32 (22.7%)	31 (22%)	7 (4.9%)
Internet	11 (7.8%)	21 (14.9%)	14 (9.9%)	/	89 (63.1%)	6 (4.2%)
Medical bulletins	26 (18.1%)	11 (7.8%)	3 (2.1%)	10 (7.1%)	76 (54%)	15 (10.6%)
Medical journals	34 (22.7%)	12 (8.5%)	11 (7.8%)	7 (5%)	66 (46.8%)	11 (7.8%)
Students' theses and/or dissertations	23 (15.9%)	11 (7.8%)	1 (0.7%)	/	95 (67.3%)	11 (7.8%)
Unpublished Departmental Reports	23 (16.3%)	3 (2.1%)	2 (1.4%)	/	100 (70.9%)	13 (9.2%)

Multiple responses were received

In order to determine the frequency of using the various health sources by the different professions, data from the various professions and the different sources of health information were compared. Table 5.3 provides detail of the results obtained. Nurses use interaction with colleagues more than medical doctors. In terms of using electronic resources, medical doctors use electronic sources more frequently than nurses. Surprisingly, the electronic sources are not fully utilised, that is not frequently used.



**Table 5.3: Usage of health information sources by profession**

Frequency	1 to 5 times a month	6 to 10 times a month	11 to 20 times a month	21 to 30 times a month	Never	No response
<b>Information Sources</b>						
<b>Conference Proceedings</b>						
Nurses	11 (14.4%)	2 (2.9%)	1 (1.4%)	2 (2.9%)	53 (69.7%)	7 (9.2%)
Medical Doctors	19 (29.2%)	3 (4.8%)	1 (1.6%)	/	39 (60%)	3 (4.6%)
<b>Electronic discussion group</b>						
Nurses	4 (5.3%)	6 (9%)	1 (1.5%)	1 (1.5%)	55 (72.3%)	9 (11.8%)
Medical Doctors	11 (16.9%)	10 (17.5%)	4 (7%)	2 (3.5%)	30 (46.1%)	8 (12.3%)
<b>Hospital activities reports</b>						
Nurses	8 (10.5%)	5 (7.2%)	/	/	56 (37.6%)	7 (9.2%)
Medical Doctors	18 (27.7%)	4 (6.5%)	1 (1.6%)	/	38 (58.4%)	4 (6.1%)
<b>Interaction with colleagues</b>						
Nurses	8 (10.5%)	11 (15.1%)	19 (26%)	16 (21.9%)	17 (22.6%)	5 (6.5%)
Medical Doctors	9 (13.8%)	8 (12.3%)	19 (29.2%)	14 (21.5%)	12 (18.4%)	3 (4.6%)
<b>Internet</b>						
Nurses	3 (3.9%)	5 (6.7%)	/	2 (2.8%)	59 (77.6%)	7 (9.2%)
Medical Doctors	7 (10.7%)	12 (18.4%)	/	10 (15.3%)	28 (43%)	8 (12.3%)
<b>Medical bulletins</b>						
Nurses	7 (9.2%)	6 (9.4%)	2 (3.1%)	10 (15.6%)	39 (51.3%)	12 (15.7%)
Medical Doctors	19 (29.2%)	5 (8.1%)	1 (1.4%)	/	37 (56.9%)	3 (4.6%)
<b>Medical journals</b>						
Nurses	13 (17.1%)	5 (7.5%)	8 (11.9%)	5 (7.5%)	36 (47.3%)	9 (11.8%)
Medical Doctors	21 (32.3%)	7 (11.1%)	3 (4.8%)	2 (3.2%)	30 (46.1%)	2 (3%)
<b>Students' theses and/or dissertations</b>						
Nurses	10 (13.1%)	2 (2.8%)	/	1 (1.4%)	58 (76.3%)	5 (6.5%)
Medical Doctors	13 (20%)	9 (15.3%)	/	/	37 (56.9%)	6 (9.1%)
<b>Unpublished Departmental Reports</b>						
Nurses	9 (11.8%)	/	/	2 (3%)	56 (86.1%)	9 (11.8%)
Medical Doctors	14 (21.5%)	3 (4.9%)	/	/	44 (67.6%)	4 (6.1%)

## 5.3 INFORMATION MANAGEMENT ACTIVITIES

This section examined how health information is captured and the format in which it is stored. It also looked at the services in-charge of disseminating health information in the hospitals surveyed, the methods used to exchange information and obstacles to effective health information exchange. Solutions to overcome the obstacles are discussed in this section.

### 5.3.1 Methods used to capture and the format in which health information is stored

One of the major objectives of information provision is to ensure that relevant and timely health information is captured, stored and made available to all health workers, who need it in connection with their work, to keep them informed and knowledgeable. This, in turn, improves the quality of decision-making and health care delivery. In this regard, respondents were requested to indicate the method used by the hospital to capture health information. Out of 139 respondents who answered this question, a surprisingly high number, 108(76.5%) captured information manually, 13 (9.2%) electronically and 18 (12.7%) used both methods. That is, manual and electronic. There were two (1.4%) no response.

Once information is captured, it has to be processed and made available to the right person at the right time and in the right format. Information captured electronically could be easily manipulated (managed) and properly stored. When information is stored on electronic format it could be access quickly and has multiple outlets, compared to information in manual format. Respondents were asked to indicate in what formats health information is stored in the hospital. Out of the 135 respondents who responded to this question, 116 (82.2%) indicated that information is stored in notebooks or ledgers, 4 (2.8%) used either hard disk or diskettes, 15 (10.6%) used both the notebooks and hard disk, and 6 (4.2%) no response. In the absence of a computerised health system, health information is captured and processed manually and stored in notebooks and ledgers.

Respondents were further asked to indicate which department or service in the hospital is in-charge of disseminating health information. A list of options consisted of the following: library or information centre, hospital archives, statistical department, the office of the general supervisor and "other". Of the 130 respondents who answered this question, 76 (53.9%) mentioned the library. However, they did not mention the name of the library. Three (2.1%) said the hospital Archive. The Archives in the hospitals surveyed store medical records and files of patients. Six (4.2%) mentioned the Administrative Service and three (2.1%) the Statistical Department of the hospital. Surprisingly, 21 (14.8%)

respondents indicated that they were unable to name a particular service, as information in the hospital is disseminated haphazardly.

In analysing the “other” option, the following results were obtained: 12 (8.5%) said they get information from the Medical Representatives (Medical Delegates), 5 (3.5%) from the Provincial Delegation of Public Health, two (1.4%) from seminars, workshops and conferences and OCEA, respectively, two (1.4%) from the radio and television and 11 (7.8%) no response. Medical representatives play a significant role in disseminating information.

### **5.3.2 Information exchange activities**

In order to keep abreast with the volume of scientific literature (information), there should be some sort of information exchange, or sharing of activities. According to Cronin (1985b:120), a new article is published in a medical journal every 26 seconds. Consider what this means in terms of keeping up to date. It is impossible for any single library or information centre to do so and therefore, the exchange of information among medical practitioners, both within and beyond the hospital, is very essential.

One of the objectives of the study was to propose recommendations to improve the management of health information. Before proposing any recommendation, it is necessary to understand the current information exchange activities. To this end, several questions were designed to identify the existing information exchange activities and the mechanisms used by the medical professionals.

#### **5.3.2.1 Methods used to exchange information**

Respondents were asked to indicate the ways used to exchange information within their service and beyond. A list of methods used to exchange information was provided. To find out the respondents' frequencies of exchanging information, a frequency scale was provided. Table 5.4 gives a detailed description of the responses obtained. Just as the culture of accessing information is still practised in a rudimentary fashion, so, too, is the way in which information is exchanged or shared among medical professionals in the survey. The results obtained revealed that interaction with colleagues, one-to-one and to two-or-more, was the most frequently used information exchange method among medical personnel. Surprisingly, workshops and/or seminars and conferences were not frequently used. However, it is very rare to have workshops or seminars and conferences on a monthly basis. Of interest is the non-utilisation of electronic communication (electronic discussion groups and the Internet). Electronic communication has

revolutionised the way information is being exchanged throughout the globe. But the results reveal that this tool is less frequently used the medical professionals in the survey.

**Table 5.4: Methods of exchanging health information and the frequencies of use (N=141)**

Frequency	1 to 5 times a month	6 to 10 times a month	11 to 20 times a month	21 to 30 times a month	Never
<b>Methods of exchanging information</b>					
Conferences	45 (21.9%)	12 (8.5%)	/	/	84 (59.5%)
Electronic discussion group(s)	9 (6.3%)	5 (3.5%)	/	/	127 (90%)
Face-to-face interaction (one-to-one)	18 (12.7%)	24 (17%)	48 (34%)	11 (7.8%)	40 (28.3%)
Face-to-face interaction (to two-to-more)	19 (13.4%)	27 (19.1%)	42 (29.8%)	6 (4.3%)	47 (33.3%)
Interest groups	15 (10.6%)	4 (2.8%)	2 (1.4%)	/	120 (85.1%)
Internet	19 (9.2%)	3 (2.1%)	11 (7.8%)	1 (0.7%)	107 (75.8%)
Workshops /seminars	45 (26.9%)	13 (9.2%)	3 (2.1%)	/	80 (56.7%)

**5.3.2.2 Satisfaction with the methods used to exchange information**

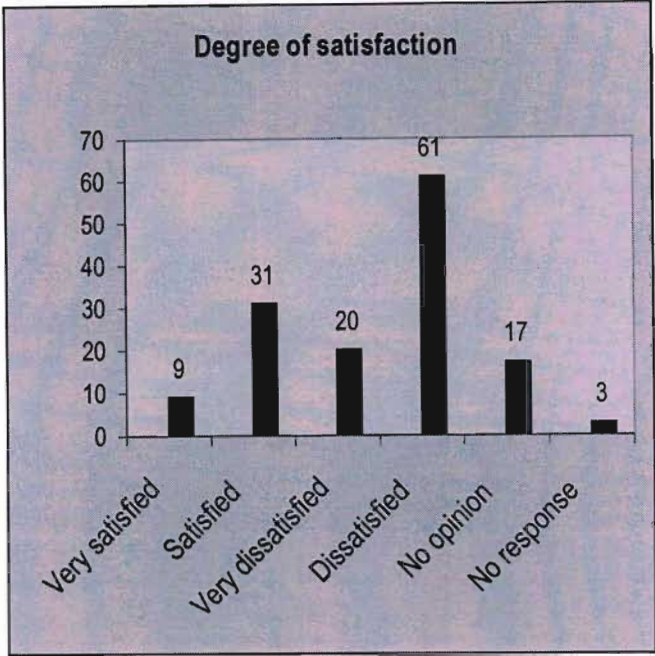
For proper planning, it is important to evaluate the current methods used to exchange information in terms of members' (users) satisfaction, review the problems faced in the existing method and determine whether or not introducing the new or supplementary method is necessary. It was therefore important for the study to establish the levels of satisfaction of the medical personnel with the current methods of information exchange activities.

**5.3.2.3 Degree of satisfaction**

The respondents were asked to rate the extent of satisfaction with the ways information is exchanged. A scale of "very satisfied", "satisfied", "no opinion", "dissatisfied" and "very dissatisfied" was provided. Out of 138 respondents who answered, the majority 81 (57.4%) were either dissatisfied or very dissatisfied with the method used to exchange information. See Chart 5.2 below.



Chart 5.2: Degree of satisfaction with the method used to exchange information



5.3.2.4 Factors that hinder information exchange activities

Respondents were also asked to indicate the factors that hinder the process of exchanging information among health professionals. A list of options was provided and respondents were allowed to select more than one response.

The results in Table 5.5 indicate that the main factors that hinder the exchange of information among medical professionals are lack of information support services 57 (80.2%), irregular distribution of information 52 (73.2%) and poor co-operation and collaboration among medical professionals 49 (69%).

Table 5.5: Factors that hinder health information exchange activities (N=141)

Factors	Frequencies and %
Lack of information support services and activities	57 (40.4%)
Information distribution activities are no regularly done	52 (36.8%)
Lack of co-operation and collaboration among staff	49 (34.7%)
Lack of finance to subscribe for journal	27 (19.1%)
Lack of relevant information	25 (17.7%)
Information overload	6 (4.2%)
Poor packaging of information	6 (4.2%)

Multiple responses were received.



5.3.2.5 Solutions to overcome problems of information exchange.

To assist the researcher provide recommendations to the problem of information exchange, respondents were asked to propose measures that could be taken to overcome or solve these problems. Being an open-ended question, and with respondents providing more than one solution, content analysis was used to quantify the responses. The results are presented in Table 5.6 below.

**Table 5.6: Suggestions to overcome the problems of health information exchange activities**  
**(N=141)**

Categories of responses	Frequencies and %
Train and encourage the use of ICTs among medical personnel.	67 (47.5%)
Information on conferences, workshops and seminars should not be restricted to a particular group of medical staff.	58 (41.1%)
Organise regular inter-departmental meetings and forums, whereby medical staff would be able to meet colleagues and share their experiences in an amicable way.	57 (40.4%)
Provide a service to oversee Professional Continuous Education and this should be obligatory.	55 (39%)
Provide a common computer room with Internet facilities.	54 (38.2%)
Provide an independent service in charge of information management, which should be an integral part of the hospital.	32 (22.6%)
Improve communication channels in the hospital.	30 (21.2%)
Create a library with Internet access and subscribe to electronic journals.	27 (19.1%)
Create awareness of the importance of information.	27 (19.1%)
Waiver tax on medical material and equipment.	19 (13.4%)
Increase subvention and subsidies to government hospitals.	19 (13.4%)
Create a local health databank and encourage local researchers to publish their findings.	18 (12.7%)
Reduce the cost of Internet services.	16 (11.3%)
Create an electronic database for the health system.	11 (7.8%)

Multiple responses wee received.

A long list of 14 solutions indicates the magnitude and variety of the problems. From the list (table 5.7), the largest number of respondents 67 (47.5%) suggested training and encouragement in the use of ICTs among medical staff. Fifty-seven (40.4%) proposed the organisation of regular interdepartmental meetings and/or forums, whereby medical staff from the various services within the hospital would have an opportunity to meet with colleagues, exchange ideas and experiences and network in a calm and amicable atmosphere. Furthermore, 58 (41.1%) mentioned that information about conferences, workshops or seminars should be made available to everybody and not restricted to a particular group of staff. Fifty-four (38.2%) each suggested the creation of a common computer room with Internet

facilities in the hospital and 55 (39%) requested the creation of a separate department or service in charge of Professional Continuous Education (PCE) and it should be obligatory.

### **5.3.3 Interpretation and Discussion**

#### **Interpretation**

This section looked at how information sources are used and how information is managed. That is captured, stored and exchanged. It also looked at the obstacles to information exchange and provided possible solutions. The results obtained reveal that the respondents need information for their daily activities. Medical professionals rely on interaction with colleagues (informal communication) as the main source of information. The results further reveal that nurses would prefer interaction with colleagues than doctors.

The results further show that information at the hospitals surveyed is captured manually and stored on notebooks and ledgers. Since information is manually captured and stored on notebooks, it is poorly exchanged. Thus, interaction with colleagues (one-to-one and two-to-more) was the most frequently used information exchange method. The findings show that the respondents were dissatisfied with the current methods used to exchange information.

Factors that impede the exchange of information were lack of information support services, irregular distribution of information and poor collaboration and co-operation among medical professionals. Recommendations to resolve the information exchange problems were: provision of training to encourage the use of ICTs, organise regular interdepartmental meetings and forums among medical professionals to share and exchange ideas and experiences, improve on the method in which information on conferences and workshops is circulated and the provision of a common or central computer centre, equipped with computer and Internet facilities.

#### **Discussion**

Information is the lifeblood of effective health care delivery as relevant information is used to support decision-making. Therefore, providing access to adequate health information is a prerequisite to quality health care delivery. Despite the fact that the role of information to enhance health care delivery has been repeatedly emphasised (for example, UNECA (1999); Neelameghan (1980); Apalayine and Ehikhamenor (1995)), the use of information by medical professionals in the government hospitals surveyed is still practised in a rudimentary and old-fashioned way.

The results reveal that medical professionals need information for their daily activities and they rely on informal sources (face-to-face interaction with colleagues) as their main sources of information. From literature on the use of information sources, the reliance on informal sources could be due to the poor information sources and the lack of information services. The lack of information services and poor information sources could be attributed to the lack of recognising the vital role information plays in the development of a country through, for example, an information policy. In a country, a national information policy defines, among other things, a nation's information needs and how to acquire relevant information. Without such a policy the chances of a lack of relevant information sources and a lack of information dissemination outlets are that much greater.

The results also reveal that health information is captured manually and stored on notebooks and ledgers. Information captured manually if not transferred into an electronic format is often difficult to process and disseminate. Thus, it retards the decision making process as a result, decision can be compromised. Shepherd, Zitner and Watters (2000) explained that when health information is captured and stored manually, it is often difficult to obtain and unavailable for subsequent use at other locations. On the issue of the type of format to capture information, Stilwell (2001:48) stressed the need to use appropriate formats to package information.

Furthermore, there is no dedicated department or unit in-charge of providing information in the hospitals. In the absence of an information unit, information is obtained from various units and it is done haphazardly. The results from this section highlight the use of Medical Representatives as a source of information. In a study on the use of information sources, the researchers reported that among other findings, physicians in general practice regularly prefer pharmaceutical representatives (Stinson and Muller 1980:134). The following section looks at how health information sources are used and exchanged.

#### **5.3.3.1 Low usage of information sources and exchange of information**

In the present study, the culture of using information by medical professionals for their daily activities is low. See Table 5.3. Furthermore, the manner in which health information is disseminated and/or exchanged in the government hospitals surveyed is encapsulated in the following quote from one of the nurses. According to the nurse "...poor communication, poor collaboration between medical doctors, lack of co-operation and no team spirit, may be to hide their ignorance ..."? Although the findings indicated that medical professionals need information, the results showed that they rely mostly on face-to-face interaction with colleagues. Of interest is the fact that respondents do not

frequently use and exchange information, as columns from “1 to 5 times” and “6 to 10 times” a month (less frequently used) have the largest response rates on all the sources given (Tables 5.2 and 5.3).

The use of and the manner in which information is being exchanged by medical professionals was emphasised in Patrikios (1995:95). She explained that medical professionals (medical students) only use information when they have assignments and immediately after their studies or training, they do not come to the library any more. Patrikios' observations were confirmed by the findings of a later survey on health information needs and services in Cameroon (Njongmeta and Ehikhamenor 1998:15). In this study it was found that medical professionals in Cameroon would generally prefer to use informal sources such as face-to-face interaction with colleagues rather than the formal health information sources such as a library. Ngotobo (2002) stated the same pointing to the low use of library resources by medical students and medical professionals.

According to Musoke (2000:197), the low usage of library resources is due to the absence of relevant health information in the libraries. Osiobe (1986:179) also confirmed this observation in a study of the use of information sources by medical faculty staff in Nigeria. According to the study, specialised health information sources influence the use of information by health professionals. Therefore, by providing specialised journals, monographs, bibliographic and other electronic sources, increases the usage rate of health information by medical professionals. Friedlander (1970) and Strasser (1978) have also confirmed this observation in their studies on the use of information sources by physicians. Friedlander (1970) holds that there is a significant relationship between specialisation and the use of formal and informal sources and Strasser (1978) reported, *inter alia*, that the use of certain sources by medical professionals is affected by their professional specialisation. The researchers concluded that if specialised health information was provided it would influence medical professionals in the hospitals surveyed to use more formal sources of health information.

#### **5.3.3.2 Non-familiarity with library and information services**

Another factor that explains the low usage of health information sources by medical professionals is the non-familiarity with library services or activities. Even those who are familiar with library activities are not satisfied with the services offered and the type of information obtained. Apalayine and Ehikhamenor (1995:369) point out that due to non-familiarity with library activities medical professionals do not have access to adequate health information. Thus, they rely on interpersonal contacts with colleagues as their sources of health information services than libraries. The



situation described above is similar to that of medical professionals in the survey. That is, in the absence of adequate medical or hospital libraries and other information services, health professionals rely on face-to-face interaction with colleagues to obtain information.

#### **5.3.3.3 Lack of information outlets**

The present study revealed that there was a lack of health information outlets available to medical professionals in the hospitals surveyed. From informal discussions with the medical librarians at the Library of the Faculty of Medicine, Yaoundé, it was ascertained that the library does not subscribe to any international medical journals or magazines. The librarians also mentioned that the library lacks books, journals or magazines on health issues pertaining to Cameroon and the hospital does not publish any in-house journal or magazine. Due to a lack of these in-house information resources medical professionals lack relevant information. Andong (2002) explained that researchers would either prefer to publish in international journals while others would lock their reports in the drawers of their desks. Furthermore, the subscription fees for international journals are high which makes it impossible for the library to subscribe to them.

One major aspect of information, in general, and health information, in particular, is that it should be disseminated within and beyond individuals and organisations. This aspect of health information management is increasingly becoming the trend in the information world today. Organisations and individuals need to exchange, to co-operate and to network with one another in order to share whatever information they acquire, in such a way as to derive maximum benefit at lowest cost, without compromising autonomy, efficiency and accuracy (Uhegbu 1999:51). In Africa, and most particularly in the field of health, mobilisation of health information is very important considering the prevalent diseases on the continent.

From the literature on information outlets, van Brakel (1996:200) explains that there are two forms of information outlet, namely formal and informal. The formal includes paper-based media such as published research reports, conference proceedings, journals and monographs. Informal outlets are personal contacts such as electronic communication, theses and dissertations. Osburn (1989:227) felt that for information to be available to the users such as the medical professionals, it has to be written and communicated. The local community such as medical professionals in the hospitals surveyed should be encouraged to write, carry out local research and have their results published. Local initiative should be encouraged. For example, since the medical core in Cameroon is grouped under professional associations, each association could own an in-house journal or magazine and it is published regularly. By so doing, it



would help to facilitate the use and exchange of local health information. These journals and/or magazines could be published in other countries and this would allow medical professionals outside of Cameroon to know about the country. The above will contribute to increasing the volume of health information available to the medical professionals surveyed.

#### **5.3.3.4 Sustainability of information outlets**

Sustainability of the publishing of local journals and magazines has been a major drawback in the dissemination of information. This is due to the rigid information policy and high costs of production (cost of paper and printing) (Zulu 1994). However, with the use of the Internet services such as Intranet or portal the manner in which journals, magazines and conference proceedings are produced has been immensely modernised.

With these Internet services, information can be posted directly on to the organisation's portal or website. This eliminates the costs involved in publication. It is faster, less expensive and has multiple access. Furthermore, the Internet services have revolutionised the manner in which information is acquired and exchanged. From the present survey, face-to-face interactions on a one-to-one or one-to-two or more basis, is the most frequently used method to acquire and exchange information. According to Shepherd, Zitner and Watters (2000), the Intranet has modernised the use of face-to-face interaction. Web portals, intranets and communication software are effective and efficient ways for exchanging health information. These technologies have the advantage of facilitating the exchange of information and providing users with unlimited access to an organisation's databases. The creation of medical portal access across an intranet, rather than on the Web, would enhance the methods used to exchange health information among medical professionals. This is because the Intranet defines the view of each user and it is capable of providing access to information through a Web browser. With the intranet, processes can be defined for a particular user. This is very important in the hospital environment, as there will be some degree of privacy and confidentiality of patients' medical files and records. The Web or an internet-based portal provides the advantages of pull push and update.

Pull is the standard Web technology for viewing a Web document or information in the Web-accessible database. With pull, a nurse, for example, simply types in the URL (Uniform Resource Locator) and the requested page is downloaded from the targeted Web server to the client browser and is available the user. Here the server gives you only what you requested. Push, on the other hand, occurs when a Web server pushes information to the user's browser, even though there has been no specific demand for that information on the part of the user (Shepherd, Zitner and Watters 2000).

Push technology has been tested successfully for monitoring information in the medical environment such as the breakout of an epidemic. For instance, when the system receives any new health information, it pushes it directly to every medical professional. This is very useful to exchange ideas on the latest health developments and disseminate notices on conferences and workshops. With update, the medical professional is provided with updated health information or new knowledge of previous information held by the user.

The creation of a Web portal or Intranet service in the government hospitals surveyed, in addition to other uses, could be used as an efficient method to disseminate and communicate among medical professionals. Also, it would be used to enhance the exchange of information within and beyond government hospitals, enhance good co-operation and collaboration and encourage the spirit of teamwork.

#### **5.3.3.5 Satisfaction derived from the use of library and information services**

Although the reliance on informal sources of information has been attributed to the lack of information policy, this reliance according Warner, in Chen and Hernon (1982:17) is simply due to the satisfaction derived as a result of using the sources. It has been illustrated that the decision to use a particular information provider is, in large part, a function of the presence or absence of restrictions, prejudices, or limitations on access of all kinds that makes a certain information provider unavailable to any group. Warner in Chen and Hernon (1982:17) point out that these could be societal, institutional, physical, psychological and intellectual.

Societal barriers are those that hinder the availability of the resources necessary to satisfy needs within the social system. Institutional barriers are described as the incapacity and/or unwillingness of an institutional provider to deliver needed information to a certain type of seeker. Psychological barriers arise when the individual is unable to perceive his/or needs as information in nature, obtain needed information from appropriate providers, or accept the possibility that the information problems can be solved for psychological reasons. When an individual is unable to make contact with the appropriate information providers, due to some physical consideration, such as the absence of library stairs for a handicapped individual, these are physical barriers. Intellectual barriers are present when the individual lacks the necessary training and expertise to acquire information (Warner, in Chen and Hernon 1982). From the above explanation, Chen and Hernon (1982:83) argued that instead of judging the use and exchange of information by the type of information provider, it should be evaluated on the basis of the satisfaction derived.

Considering the present study, satisfaction with information exchange activities was quite low, as a majority of the respondents were either very dissatisfied or dissatisfied with the information exchange activities. In order to overcome the problems that inhibit health information exchange, provision of appropriate ICT equipment and training, equal dissemination of information on conferences and workshops, organised inter-department meetings, wherein medical staff would be able to share and exchange ideas in an amicable manner, were some of the suggestions put forward.

**5.4 ICT EQUIPMENT AND USAGE**

The present study sought to examine the extent to which medical doctors and nurses apply ICTs in the management of health information in order to enhance health care delivery. It was necessary to identify the existing ICT equipment available to medical professionals and the extent to which this equipment and these services were being used. To achieve this, a series of questions were asked. They included the type of electronic equipment at the disposal of the respondents and the use of computers inside and outside their work environment.

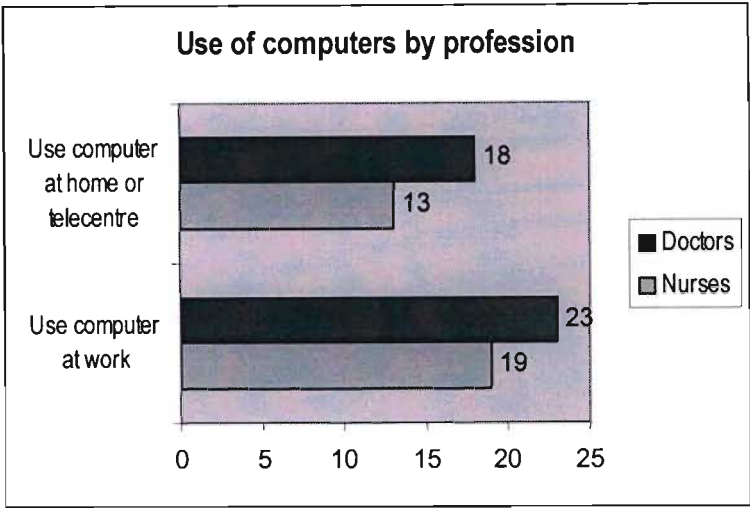
**5.4.1 Availability of electronic equipment**

Respondents were asked to state the different types of electronic equipment used for information management at their disposal. A list of equipment, which consisted of a fax machine, photocopier, telephone and, computer and CD-ROM, was provided. Of the 130 respondents who answered this question, 70(49.6%) have access to a telephone, 24 (17%) to a computer, 17 (12%) to CD-ROM, 9 (6.3%) to a fax machine, 10 (7%) to a photocopier and 11 (7.8%) no response. It is worth mentioning that the respondents who have access to a fax machine, computer, CD-ROM and photocopier were directors or sub-directors heading a department, or the general supervisor, or staff attached to a service within the hospital funded by an international agency such as UNICEF or UNFPA. Otherwise computers, fax machines and photocopiers are available in the hospitals surveyed at the secretariat of the director of the hospital and access to the equipment is restricted. Furthermore, the equipment is usually out of order. It is also worth mentioning that none of the hospitals in the survey have a common computer room or multi-media computer centre for their staff.

**5.4.2 Use of computers**

Respondents were requested to indicate whether they used a computer at work and, if not, if they used a computer at home or a private telecentre. Of the 73 respondents who answered this question, 31 (21.9%) used computers at the workplace, 42 (29.7%) used computers at home or private telecentre and 68 (48.2%) no response. Chart 5.3 below gives the break down of access to computers by profession.

Chart 5.3: Use of computers by profession



5.4.3 Reasons for not using computers and solutions to overcome the problems

The application of ICTs and related resources require the availability of computers, knowledge or skills and the willingness to use or learn how to use them. The 68 respondents who did not use computers either at the workplace or at home were asked their reasons for not doing so. A list of options was provided and respondents were able to tick more than one option. From the results, 17 (25%) revealed that they would like to use a computer but have not been granted the access, 15 (22%) did not know how to use a computer, 10 (14.7%) would like to use a computer but did not have one, 5 (7.3%) did know how to use a computer but lacked the time. Contrarily, 8 (11.7%) said working with a computer is reserved for the senior directors only, 5 (7.3%) do not know how to use a computer and would like to learn, 5 (7.3%) would like to use one but do not have the skills and 3 (4.4%) no response.

In the process of exploring possible reasons for not using a computer, the researcher wanted to know the perceptions of the respondents and possible solutions to the problems they faced, so that they could be used in the process of recommendation. The medical professionals were, therefore, asked to provide possible solutions to the problems faced.

Being an open-ended question, the responses obtained were categorised into four main points. Of the 68 respondents, 30(44.1%) opted for the provision of a general computer centre equipped with computers and computer auxiliaries in the hospital, at the disposal of all medical personnel, 20(29.4%) proposed that the hospital should provide

training on ICTs to all medical staff, 10(29.4%) suggested that basic computer courses should be introduced to paramedic and medical institutions and 8(11.7%) proposed that salaries of medical personnel should be increased so that they would be able to buy their own computers.

**5.4.4 Purpose of using a computer**

Having identified the types of electronic equipment, this section dwells on what the computers were used for and the computing skills of the medical professionals.

The 73 respondents who used computers were asked to explain what they used computers for. A list of possible uses was provided including an “other” option. Respondents were allowed to tick more than one response. As can be seen from table 5.7a below, 25(34.2%) said that at the hospital computers were mainly used for typing hospitals’ correspondence and only 2(2.7%) said computers were used for managing staff information.

**Table 5.7a: Reasons for using computers (N=73)**

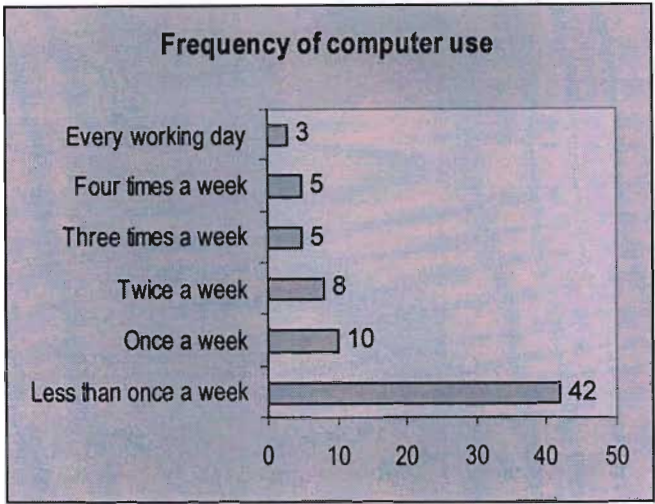
Uses of computers	Frequencies and %
Typing hospitals' correspondences	25 (34.2%)
Personal purposes	16 (21.9%)
Capturing and analysing patients' information	13 (17.8%)
Managing staff information	2 (2.7%)
Others: sending of e-mails and surfing on the Web	20 (27.3%)

Multiple responses were received.

Furthermore, the respondents were asked to state the frequency of computer use. Chart 5.4 below gives the results. Interestingly, over half of the respondents use computers less than once a week.



Chart 5.4: Frequency of computer use



5.4.5 Type of training acquired in the use of a computer

Those who used computers were asked if they had had any computer training. A list of the most frequently used software were provided and respondents were allowed to tick more than one response. The results are given in Table 5.7b. The results show that the respondents had received training on word-processing 30 (41%), and 5 (6.8%) had training on database management. It is worth noting that training was done on a personal basis. From discussion with the directors of the hospitals surveyed, there is no in-service training offered to medical professionals on the use of computers. Most often, directors allocate some funds from the hospital's budget to enable their secretaries to acquire training from an external computer training-centre. The cost for training, according to the directors, is too exorbitant for the hospital to provide to all its personnel.

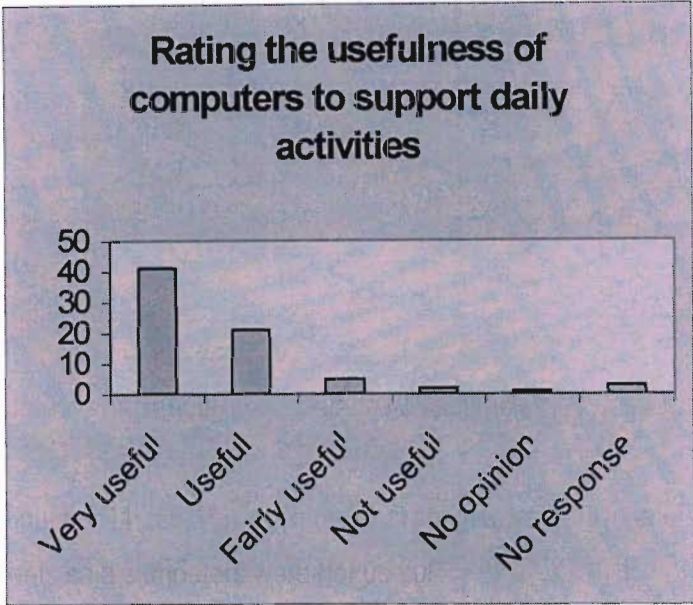
Table 5.7b: Basic computer training acquired (N=73)

Computer training	Frequencies and %
Word Processing	30 (45.2%)
Electronic mail and Internet/WWW	26 (35.6%)
Spreadsheet	10 (13.6%)
Database management	5 (6.8%)
No training	2 (2.7%)

Multiple responses were received.

In order to evaluate the importance of computers in their day-to-day activities, respondents were asked to rate the usefulness of a computer for supporting their daily work. The findings (see Chart 5.5) revealed that just over half of the respondents who used computers 41 (56.1%) declared that they were very useful. Surprisingly, despite using computers 2(2.1%) respondents said computers were not useful.

**Chart 5.5: Rating the usefulness of computers to support daily activities**



**5.4.6 Interpretation and Discussion**

**Interpretation**

The results obtained from this section show that in the hospitals surveyed, more than half of the respondents have access to a telephone and none of the respondents had their own personal computers. Medical professionals who do not use computers at work mentioned that they would like to use computers to support their daily activities but have not been granted access to those that are there. Those who have computers at their disposal were directors and senior staff members. Computers are mostly used for administrative purposes.

Furthermore, medical professionals who do not have access to computers at the work place have their private computers at home or use telecentres or “cybercafés”. It was also found that most of the medical professionals use computers less than once weekly. In terms of satisfaction with the use of computers, a majority of the respondents

were very satisfied and appreciated the usefulness of a computer to support their daily activities.

One of the reasons put forward by the medical professionals for the low utilisation of computers was lack of equipment and training. It was discovered that some medical professionals have acquired basic computer training on word-processing and other programmes, but that this training had been obtained on a personal basis. The major suggestion put forward to encourage and motivate medical professionals to use computers was the provision of a general computer centre equipped with computer auxiliaries.

## **Discussion**

The underpinning objective of this section was to examine the extent to which ICTs (computers and computer auxiliaries) were used in the management of health information. By ICTs, the researcher is referring to the use of computers and Internet resources, in capturing, processing and disseminating health information. Computers and Internet facilities offer their users numerous advantages such as speed, consistency, precision and reliability. Under the right circumstances computers have the capabilities to enhance efficiency, in the sense that they can store and process very large quantities of data and information and provide multiple access to timely, relevant, accurate and reliable information to planners, decision makers, administrators and health professionals.

The extent to which medical professionals are able to use computers has a potential bearing on the efficiency in their work. For example, the availability and use of computers that are linked with communication software makes it possible for computers to network with other computers, share and exchange ideas and resources and provide Web access. With such a network, medical professionals would be able to confer with each other by holding an electronic discussion via e-mail, or send a single message to numerous recipients who comprise an identifiable interest group.

The creation of a central network depends, amongst other things, on the medical professionals' ability and willingness to use computers comfortably. In terms of the potential of computers in the health sector, such as the hospital, Wilson and Smith, in Wilson (2000:199), point out that "the creative use of computer technology is one of the most promising means of improving the quality, timeliness, clarity, presentation, and use of relevant information" to improve health care delivery. Rowley (1993:113) added that the role of information technology, particularly the personal computers, as a means of facilitating information handling, is necessary to move straight into effective and appropriate solutions to some of the problems of information storage and retrieval. Because computers have the advantage of storing large amounts

of health data, quick updates and analyses of specific diseases or health facilities with graphs and trends can be provided.

Among others, Kanamugire (1998:137) cautions that one of the major factors that hinder the use of ICTs in some African countries are the costs involved in acquiring the equipment, both hardware and software, and its installation, connectivity and maintenance once provided. This is due to the fact that the equipment is manufactured outside the continent, ipso facto rendering it expensive. The cost involved in installing an adequate computer centre is often beyond the budget of most health institutions (Maele 2002:5). Besides being connected and having access to equipment and infrastructure, formal skills are also required (Chisenga 2000) and these skills are not imported.

The present study revealed that the hospitals surveyed do not have sufficient ICT equipment such as computers. Those that are available are reserved for senior staff members and mostly used for administrative purposes or activities. Furthermore, there is low usage of the computers that are available. It was therefore suggested that hospitals should provide training on ICTs to all medical staff in order to overcome the non-usage of computers by medical professionals. Although the results show a low usage of computers in the hospitals surveyed the vast majority of respondents appreciated the usefulness of a computer to assist them in their daily activities.

Some of the medical personnel have taken the initiative to train themselves. Furthermore, it was also observed that computers at the hospitals surveyed were, as mentioned, used mainly for administrative purposes. That is, computers are found at the secretariats of the director, or the office for the chief of administrative affairs. Meanwhile, some strategic offices, such as the hospital's statistic office, general consultation, pharmacy and reception, where the hospital's bills are paid, do not have computers. That is, the activities/operations done in these offices are done manually. As a result, simple operations often take longer than expected. For instance, at the Yaoundé Central Hospital, it is common to see long queues in front of the pharmacy and the general reception as people queue to buy medications and to pay their hospital bills. Below is an excerpt of informal discussions with a nurse and a patient lamenting their frustrations on the state of activities at the hospital.

...can you imagine that the Yaoundé Central Hospital, being one of the biggest hospitals in Yaoundé, has no computer in the pharmacy? From personal observation, an average of 100 people come to the pharmacy to buy drugs and the average number of medications bought by each person is three. The most frustrating process of my job is that for every medication, I have to establish a pro-forma invoice. That is why there is always a very long queue in front of the pharmacy at every moment of the day. Meanwhile, at the Ministry of Public Health, there are at least two computers in every director's office and another two at their secretariat for the secretaries to use, which are often used to play "solitaire games" (Ako 2002).



In another conversation with a patient who came to the hospital for consultation:

"...I arrived at the hospital at 7:00 am and it is getting to 10:00 am I have not been able to see a doctor. I was informed by the nurse attendant at the reception that my file has been carried to the archive. Unfortunately, the nurse who works at the archive is not available..." (Ngock 2002).

These activities could have been done efficiently and effectively with a computer (Wilson and Smith, in Wilson (2000:199)).

From the findings on the use of computers, two important issues emerged. Firstly, there is a lack of ICTs (computers and Internet resources) in the hospitals surveyed. Secondly, the question of computers being reserved for directors and/or senior medical staff is important. These issues can be attributed to the fact the hospitals' directors and officials have not yet acknowledged the importance of information, in general, and health information, in particular, as an important resource that should be made available to every individual and, most particularly, to the medical professionals. The presence of timely information would enable medical professionals and decision-makers make rational and wise decisions. Since the directors have not yet accepted information as an important resource to support decision-making, providing the necessary ICT tools to facilitate the management of information might seem difficult to accomplish.

## **5.5 INTERNET SERVICES AND FACILITIES**

The general assumption of this study is that computers and the Internet resources and facilities at the disposal of medical professionals will enhance the performance of services and facilitate access to relevant information for medical professionals to make adequate decisions. Existing Internet resources and facilities and the medical professionals' knowledge of the Internet were examined.

### **5.5.1 Computers connected to the Internet**

Respondents were asked to state whether the computer they used is connected to the Internet. Out of the 73 respondents who use computers, 29 (39.7%) responded positively, 27 (36.9%) negatively and 17 (23.2%) did not know whether their computers were connected to the Internet or not. Not being able to tell whether or not their computers were connected to the Internet portrays their ignorance of Internet resources and services. It is worth noting that the



respondents who stated that their computers were connected to the Internet are those who have access to computers at home or telecentre as none of the hospitals surveyed has an Internet service.

5.5.2 Use of Internet resources

This section examines the extent to which those medical professionals who have access to the Internet use Internet resources. A list of basic Internet uses was provided and the respondents were allowed to choose more than one. Table 5.8 indicates that Internet is mainly used for searching and accessing medical information.

Table 5.8 : Use of the Internet resources (N=73)

Uses of the Internet	Frequencies and %
Searching and accessing medical information	46 (63%)
Communicating with other colleagues via e-mail	43 (58.9%)
Surfing the Internet	29 (39.7%)
Multiple response were received	

5.5.3 Frequency of Internet use

One of the major obstacles in accessing electronic information sources is the lack of skills and knowledge on how to use these resources. In exploring the uses of the Internet, the researcher wanted to find out the frequency by which Internet resources were used. A list of Internet resources was provided and respondents were allowed to choose more than one resource. The results presented in Table 5.9 below revealed that the frequency of Internet usage by medical professionals was low.

Table 5.9: Frequencies of use of Internet resources (N=73)

Internet resources	E-mail	Internet	Intranet	Portal	Mailing List	FTP
Frequencies						
Less than once a week	15 (20.5%)	24 (17%)	5 (3.5%)	7 (5%)	10 (7.1%)	5 (2.1%)
Once a week	12 (16.4%)	21 (14.9%)	5 (3.5%)	5 (3.5%)	4 (2.8%)	3 (2.1%)
Twice a week	3 (4.1%)	7 (4.3%)	/	1 (0.7%)	1 (0.7%)	/
Three times a week	5 (6.4%)	1 (0.7%)	/	/	3 (2.1%)	1 (0.7%)
Four times a week	4 (6.8%)	6 (8.2%)	/	/	2 (1.4%)	/
Never	34 (46.5%)	14 (19.1%)	63 (86.3%)	60 (82.1%)	53 (72.6%)	64 (87.6%)

5.5.4 Factors that hinder the use of Internet resources

This section sought to find out the extent to which the barriers to Internet resources, reflected in the literature, existed in the surveyed hospitals. The researcher saw these as part of the conditions that could explain some of the general findings concerning the unavailability of electronic and Internet services in the government hospitals surveyed. A list of problematic situations one may encounter in accessing information on the Internet was provided to respondents and they were allowed to choose more than one situation. Two types of problems were identified: Institution- and personal-based. Institution-based problems are those that can be dealt with, internally, by the government of Cameroon. These problems could be attended to either by the Ministry of Public Health or by the Directors or Managing Committees of the hospitals. Personal-based problems involve the respondent. A letter in brackets has been used to indicate the type of problem.

The findings shown in Table 5.10 portrayed some of the major factors that inhibit medical professionals from using Internet services, namely lack of skills or training 80 (56.7%), lack of information support services 50 (35.4%) and slowness and congestion on the Internet was reported by 48 (34%). These factors are institutional-based. From the list, one personal-based problem emerged: lack of time mentioned by 30 (21.2%) of the respondents.

Table 5.10: Factors that hinder the use of Internet services (N=141)

Problems	Frequencies
Lack of skills on how to use the Internet (I)	80 (56.7%)
Lack of information support activities (I)	50 (35.4%)
Slowness and congestion of Internet services (I)	48 (34%)
Lack of time (P)	30 (21.2%)
Unreliable and poor telephone lines and service providers (I)	26 (18.4%)
Frequent electricity failure (I)	26 (18.4%)

Multiple responses were received

5.5.5 Interpretation and Discussion

Interpretation

This section examined the availability of Internet services and facilities. From the previous section, the findings on the availability of computers show that there are some computers. It is worth noting that these computers found at the hospitals are not connected to the Internet and thus, the Internet usage which does take place does so outside of the

hospitals. The results show that the main purposes of using the Internet were for searching and processing medical information and e-mail. The main factors that impede the use of the Internet services are lack of skills and training and lack of information support services.

## **Discussion**

Kaniki (1999) and other researchers stated that the lack of adequate training and skills, among other factors, are the major obstacles to effective application and utilisation of ICTs in most developing countries. This is due to the fact, as mentioned, that the equipment and software are imported and the costs of importation are very high. Therefore providing every office or service with a computer is beyond the budget of most organisations.

The situation in the government hospitals surveyed is well depicted by the observations highlighted above. The results on the use of Internet services reveal that there is low usage and the computers connected to the Internet were privately owned. The respondents mentioned lack of skills and training as some of the obstacles that impede the use of the Internet services. In term of skills, there is no in-service training offered to medical professionals. From an informal discussion with the directors, the costs incurred by providing computer training through external computing training centres are exorbitant and beyond the budget of the hospital to provide to medical professionals. Furthermore, with the low salaries of medical professionals, not many could afford self-training. Patrikios (1995:94) pointed out that the inability of medical officials, directors and decision-makers of hospitals in developing countries to provide ICT equipment and training to their personnel is due to their continual denial to acknowledge the fact that information is an integral part of the health development system and requires that training for, and delivery of, health information should be part of the health system. As a result of this, both ICT equipment and its training are not provided to medical professionals to facilitate decision-making to improve the quality of health care. This observation reflects what is happening in the Yaoundé Teaching and General Hospitals. From discussion with the Deputy Directors of both hospitals, they accepted that at the end of every financial year a certain amount of money is allocated for the purchase of hospital equipment and for the training of personnel. But the money is used mainly to purchase other medical and hospital equipment. When enquired how much is spent on the provision of ICT equipment (computers and auxiliaries, and Internet resources) and on the provision of training on the use of ICT equipment, they simply said nothing was spent. According to the researcher, if these directors were conscious of the important role played by information and the use of ICTs to enhance health care delivery, they would be providing the equipment.

Kaniki (1999), Chisenga (2000) and others have explained that the provision of ICT equipment requires a substantial amount of money which in most cases is above the running budget of many institutions in the developing countries.

Ballantyne and Addison (2000:15) explained that although the provision and installation of ICT equipment might be expensive, if properly installed and utilised, they could maximise scarce resources, as the goal of a network is co-operation and resources sharing for better service provision which in the long run might reduce certain repetitive operations and costs.

The survey also revealed that the non-usage of Internet resources, in particular, and other information services, in general, is due to the busy schedules and the nature of the job of the medical professionals. From an informal discussion with a group of final-year medical students of the Faculty of Medicine in Yaoundé, although there is lack of skills, their major hindrance is lack of time. Quoting from their experiences, medical professionals work round the clock. Due to the nature of their jobs they shuttle between the wards, consultation rooms, laboratories and the theatre. On a busy day, medical teams (nurses and doctors) could operate for eight hours. They further explained that medical professionals involved in research would certainly use the Internet to search for the latest health information on their research, unlike those working in the hospital. In addition to lack of time, the activities of a medical professional are repetitive. One of the student doctors emphasised “we doctors work with our hands and not with information” (Ndip 2002).

On the use of the Internet services, Shepherd, Zitner and Watters (2000) stated that an Intranet-based facility such as a portal could be used to enhance the tasks of a medical professional. The Intranet services could be used to monitor activities in the government hospital. For example, palm-held computers could monitor the different tasks of a nurse or doctor without him or her having to move from one ward to another. With an intercom or interphone system he or she could be signalled in case of an emergency. This would reduce the tasks of the nurse, who has to run from one section of the hospital to the others searching for the doctor on-call in the case of an emergency. It would also save the time and energy wasted by doctors shuttling from one ward to another and would give them some time to concentrate on their professional activities.

The survey results showed that there is no Internet usage in the hospitals but the medical professionals fully supported the idea of establishing Internet services. Identifying the type of training that could be offered to medical professionals is the focus of the next section.

## **5.6 INTERNET TRAINING**

The aim of this section was to examine the extent to which lack of Internet training affects the non-usage of Internet



by medical professionals. This section therefore explores the various Internet training required by the respondents surveyed. The researcher thought that medical professionals, not being information specialists, should have some basic knowledge or skills on how to use computers and Internet resources such as how to explore the Web, copy and attach files, send and receive electronic mail and use search engines to retrieve information from the Internet. A list of basic Internet activities was provided and the respondents were asked to indicate those activities they have had formal training in.

Table 5.11 depicts the results obtained. The respondents had some training on how to use the Internet. The findings revealed that more medical doctors have obtained Internet training as compared to the nurses (Chart 5.6) as, in all the options, medical doctors had the largest frequencies.

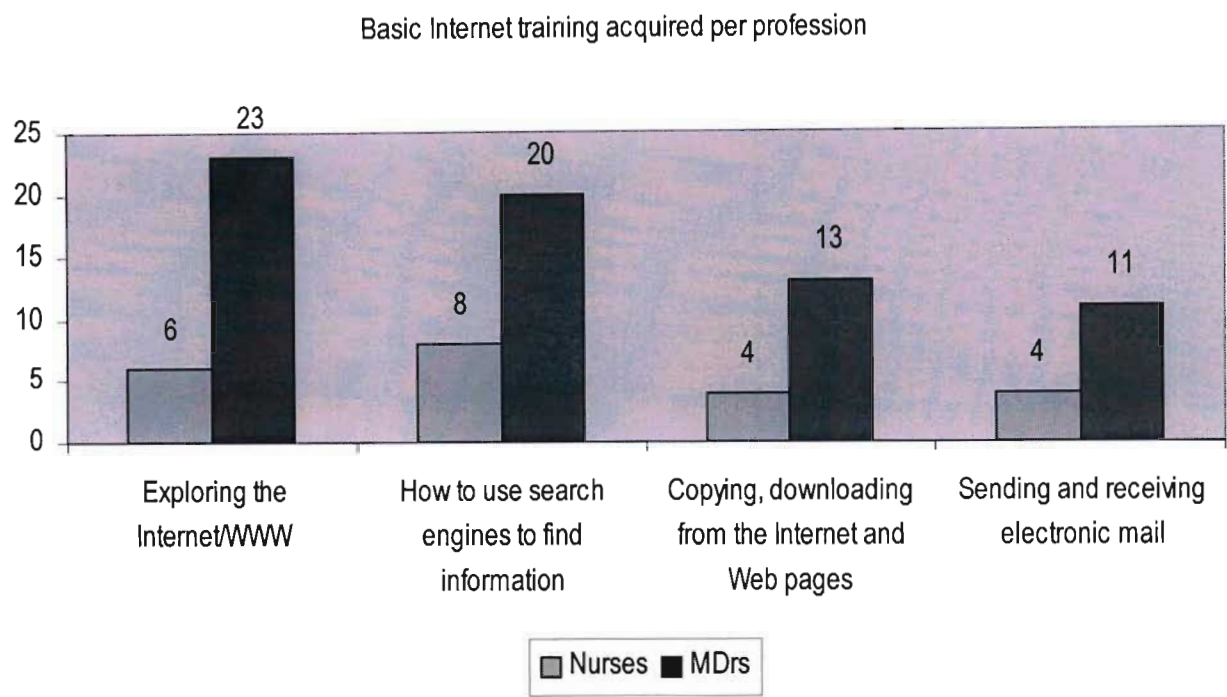
**Table 5.11: Basic Internet training acquired (N=141)**

Types of basic Internet training	Frequencies and %
Exploring the Internet/WWW	29 (20.5%)
How to use search engines to find information	28 (19.8%)
Copying, downloading from the Internet and Web pages	17 (12%)
Sending and receiving electronic mail	15 (10.6%)
No response	52 (36.8%)

Multiple responses were received



Chart 5.6 : Basic Internet training acquired per profession



5.6.1 Internet training needs

This section deals with the different Internet trainings needs of those surveyed. This is important, as it will give a picture of what sort of training is needed. This could be useful in developing an Internet training programme for medical professionals. A list of Internet facilities and resources was provided to respondents to indicate the areas they would wish to learn more or have some training in. Table 5.12 below shows that the most expressed need (64%) was a need for training relating to the WWW. The results generally indicate that there is a need for Internet training.

Table 5.12: Internet training required (N=141)

Internet facilities and/or resources	Frequencies and %
Internet/ World Wide Web (WWW)	65 (46%)
Portal or Subject Guide	54 (38.2%)
Intranet	51 (36.1%)
Electronic Mail	49 (34.7%)
File Transfer Protocol (FTP)	43 (30.4%)
Mailing List (Listserv)	39 (27.6%)

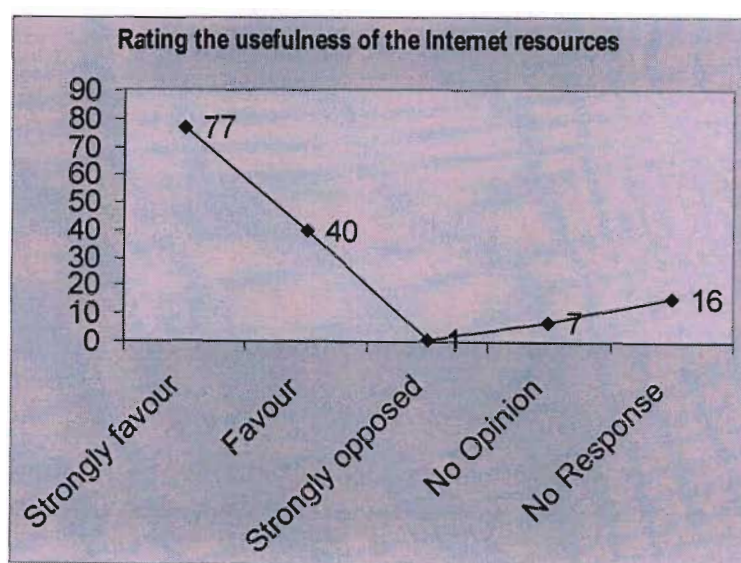
Multiple responses were received

### 5.6.2 Rating the usefulness of the Internet resources

Before introducing Internet resources to supplement the current methods of managing health information, the usefulness of the service to the users has to be known. The users (medical professionals) are the prime contributors of inputs necessary to conduct information exchange activities. The Internet should be within the interest, capacity and requirements of the users so that they can contribute to, and participate in, the service effectively.

In reviewing the opinion of the respondents on the usefulness of the Internet resources over half the respondents 77 (54.6%) were strongly in favour of use of the Internet resources. Chart 5.7 below.

Chart 5.7: Rating the usefulness of the Internet resources



### 5.6.3 Suggestions on the application of ICTs in the management of health information

Respondents were asked to provide suggestions on how to improve the application of ICTs in the management of health information. Content analysis technique was used to interpret the comments and suggestions. Table 5.13 gives the suggestions obtained.

Barriers to information and Internet accessibility and their uses have been categorised into three main groups. A= Personal factors B=Information source factors and C=Environmental factors (Macia-Chapula 1994). Table 5.13 shows

the list of 14 suggestions and/or comments provided. It illustrates the magnitude of the problems and the intensity of the situation under investigation.

**Table 5.13 : Suggestions on the application of ICTs to improve the management of health information  
( N=141)**

Suggestions	Frequencies and %
Provide regular training on ICTs to medical professionals	120 (85.1%)
Provide a general computer centre with Internet facilities to all medical staff	118 (83.7%)
Establishment a national framework	71 (50.4%)
Organise regular interdepartmental forums	67 (47.5%)
Organise workshops where medical personnel could meet and network.	67 (47.5%)
Introduce the teaching of computer skills to medical and paramedical institutions	63 (44.7%)
Equip medical and hospitals libraries with adequate ICTs resources and subscribe to more medical journals.	59 (41.9%)
Implement Continuing Medical Education and it should be obligatory	54 (38.3%)
Create awareness on the importance of using information among medical staff	43 (30.5%)
Improve communication channels.	28 (19.9%)
Create a separate unit in charge of information management in the hospitals or Ministry of Public Health	23 (16.3%)
Encourage local researchers and create more information dissemination outlets	20 (14.2%)
Computerise the Health Information System	14 (9.9%)
Access to Internet should be extended throughout the nation	8 (5.7%)

Multiple response were received

All 14 suggestions fall under category “C”, that is an environmental barrier. Environmental factors could also be infrastructure-based. These are problems or factors that could be resolved either by the Minister of Public Health or the Management Teams (directors) of the hospitals. Table 5.13 above shows that 118 (83.7%) proposed the provision of a general computer centre with ICTs facilities in the hospital at the disposal of all medical staff and 120 (85.1%) the provision of in-service training on the use of ICTs. Training has been one of the major issues throughout the study.

**5.6.4 Interpretation and Discussion**

**Interpretation**

This section looked at the types of Internet training already acquired and also the different types of training needed by medical professionals. The findings show that some medical professionals had acquired basic training on Internet exploration and how to use a search engine to find information. The findings also revealed that further training will be

required on the use of the Internet and WWW and on the use of the Portal and Subject Guide. Finally, the respondents fully appreciated the potential usefulness of the Internet services to improve the activities of medical professions.

## **Discussion**

Knowledge or know-how is necessary for the effective utilisation of Internet resources. According to Bunge (1996), the computerisation of the primary health information in Cameroon experienced many difficulties due to a lack of qualified technicians to properly control the system. A similar situation was experienced in Mozambique in the study of the actual and potential usage of ICTs in the health sector. According to the researcher, lack of ICT skills, lack of education and poorly developed infrastructure and networks of support were identified as some of the problems that hinder the actual usage of ICTs (Braa 2001). In the present study, numerous suggestions were made, including the need for continuous medical education or development and the need for the provision of regular training in ICTs. Although lack of continuous medical education or development was identified, it is worth mentioning that it is beyond the scope of this research to discuss this aspect in any detail. CME is an educational and learning activity which serves to maintain, develop or increase the knowledge, skills and professional performance of healthcare providers, to ensure the provision of quality services to their patients (The Academy of Medicine of New Jersey 2002). However, it is worth noting that through the use of Internet, medical professionals can gain access to the necessary knowledge with a simple click on a few keys of their computer from their offices or homes.

Continuous medical education is essential as it enables medical professionals to keep abreast with the trend of activities in their profession. Continuous medical education is a major drawback on health manpower in the Africa continent as medical professionals are the most important assets of any healthcare system. Therefore, they need to continually apply skills and knowledge which require continuous learning and improvement. Pakenham-Walsh (2003) pointed out that without learning opportunities, medical professionals and healthcare providers will develop increasingly a decline skills and knowledge, professional dissatisfaction, low moral, disillusion, lack of commitment, and reduced interest in their work. With the advent of ICTs, CME could be acquired via the Internet. The use of ICTs, most particularly computers and Internet resources are very essential as they are able to mobilise resources for capacity building to improve health infrastructure and management.

In the hospitals surveyed, there is no department or services in-charge of CME. According to Ngufor (1999), CME and training is attained by attending conferences, workshops and seminars. The issues dealt with at conferences and



workshops are not specific. Thus, they have little influence on the field of specialisation. The present study revealed that since there is no standard process to disseminate information, the medical professionals who have the opportunity to attend conferences and/or workshops tend to retain the product and outcome for themselves. These are the words of one of the nurses explaining the need for training:

“...since I obtained my nursing diploma, I have been working as a nurse for more than 25 years. I have not gone for any further training. The medical delegates tell us about new equipment and in the hospital new equipment are bought. We cannot use these equipment because we do not know how to operate them. The fortunate ones are appointed by the director to go for training on the use of specific equipment in the hospital. Unfortunately, information and skills obtained belong to them alone. A report of activities is prepared and presented to the director and nothing is circulated or shared among the other colleagues” (Pisoh 2002).

Regarding the availability and use of Internet resources from informal discussion with the directors and observation in the hospitals surveyed, it is evident that there are no Internet resources and/or facilities in the hospitals. However, those respondents needing access to the Internet would go to the private telecentres or cybercafes, or have their private Internet connection at their homes. Also, low usage was partly attributed to lack of training and skills. Thus, there is high demand for training on the use of Internet services and equipment by medical professionals.

Effective use of Internet resources requires adequate knowledge or skills to use the resources effectively. Lack of these elements (knowledge and training) have been emphasised in the literature as among the major causes of breakdown or inadequacies in the establishment and use of Internet and electronic information resources in Africa. Through the use of Internet, medical professionals can in fact gain access to ICT skills and training from their office or home computers and at their convenience. Today, there are CD-ROMS that provide basic computing skills such as INFOLIT. INFOLIT is a Joint Information Literacy programme run by the Universities of Cape Town and Western Cape in South Africa. It is used to raise the knowledge and awareness on the use of the Internet. In South Africa, INFOLIT is used to teach undergraduate students how to use the Internet (Asah 2001:14). Such a program could be installed on the health information central system in the government hospitals surveyed, for medical professionals to improve on their Internet knowledge. When the program is installed in the health information central system, medical staff will have multiple access.

From the data collected on the use of ICTs (computers and Internet resources) to improve the management of information, the respondents unanimously favoured the introduction of the Internet to supplement the current method in place (if any) to manage information in the hospitals surveyed. The suggestions put forward by respondents on the



application of ICTs in the management of health information are environmental or infrastructure-based. This portrays the state of information available to the medical professionals surveyed and confirms the fact that medical officials have not recognised the necessity and the importance of information as a prerequisite for the delivery of quality health care services. Providing basic ICT equipment in the hospitals surveyed and a service such as the Division of Information Management to oversee and to co-ordinate information in the hospital would lead towards proper management of information for medical professionals.

## **5.7 SUMMARY OF THE FINDINGS**

This chapter has presented, interpreted and discussed the findings of the study on the application of ICTs in the management of health information by medical professionals in six government hospitals in Yaoundé, Cameroon. The study revealed that the management of health information, which is the lifeblood of effective healthcare to medical professionals, is still practised in a rudimentary fashion, as there is a lack of access to information, fewer information communication outlets and poor health information service providers.

The study's findings consistently portrayed non-availability and under-utilisation of ICTs (computers and Internet infrastructure) and lack of computer and Internet training in all the hospitals surveyed. Information in the hospitals is captured and stored manually. Barriers to the use of ICTs were lack of training and lack of ICT equipment. This is solely attributed to the fact that health officials (directors managing hospitals) have not recognised the importance of information in the management of health service and that information is a support-tool to effective decision-making as good decisions would obviously enhance the quality of healthcare services.

The following chapter presents the summary of the main findings of the study based on the purpose and research questions of the study. Included also is the conclusion and recommendations for action and further research.

# CHAPTER SIX

## SUMMARY OF FINDINGS, CONCLUSIONS, RECOMMENDATIONS AND SUGGESTIONS FOR FURTHER RESEARCH

### 6 INTRODUCTION

The purpose of this study was to investigate the application of ICTs by medical doctors and nurses in government hospitals in Yaoundé, Cameroon, in the management of health information. Specifically, the study attempted to answer the following questions:

1. What are the current sources of information at the disposal of medical doctors and nurses in the government hospitals in Yaoundé?
2. How is information captured, stored and exchanged among medical doctors and nurses in the government hospitals in Yaoundé?
3. What ICTs equipment and networks are available to medical doctors and nurses in the government hospitals in Yaoundé?
4. What sort of Internet skills do medical doctors and nurses in the government hospitals in Yaoundé have?
5. What sort of Internet training and development needs do medical doctors and nurses in the government hospitals in Yaoundé have?
6. What recommendations can be put forward to improve the use of ICTs in the management of health information among medical doctors and nurses in the government hospitals in Yaoundé?

Data to serve the intended purpose and answer the research questions were collected from 141 respondents, using self-administered questionnaires. In order to supplement this data, additional data was collected through informal discussions with the directors of the six hospitals and librarians of the Yaoundé General Hospital Library and the Medical Library of Yaoundé, nurses, medical doctors and patients. Observations of some of the activities in the hospitals served as useful sources of additional information for the study. From the data and information obtained from the research instruments, the researcher was able to come up with the following findings in relation to each of the research questions posed by the study, as summarised below:

## 6.1 SUMMARY OF THE FINDINGS OF THE STUDY

The following sub-sections summarise the findings of the study, based upon the research questions of the study.

Research question number one: What are the current sources of health information at the disposal of medical doctors and nurses in the government hospitals in Yaoundé?

1. Respondents need information to support their daily activities.
2. The use of informal sources, in particular interaction with colleagues, were the main sources used to obtain health information by the respondents as there was no regular source of health information.
3. Nurses used interaction with colleagues more than medical doctors and medical doctors used electronic sources more frequently than nurses. Surprisingly, electronic sources which existed were not fully utilised.

Research question number two: How is information captured, stored and exchanged among medical doctors and nurses in the government hospitals in Yaoundé?

1. In all the hospitals surveyed, information was captured manually and stored in notebooks or ledgers.
2. Face-to-face interaction with colleagues (one-to-one and to two-or-more) was frequently used to exchange information. Findings in the present study indicated that, although medical professionals used interaction with colleagues as their main method to exchange information, a significant percentage were, in fact, dissatisfied with this method.
3. Numerous factors inhibited the exchange of health information and the three most frequently mentioned were: lack of information and information support services and activities, information not being regularly distributed and the lack of co-operation and collaboration among medical staff.
4. In terms of solutions to the problems relating to information exchange, the majority of respondents suggested that the hospitals should provide training on the use of ICTs to medical professionals and organise regular inter-departmental meetings and fora whereby medical staff could meet their colleagues to exchange and share experiences in an amicable manner. Respondents also suggested that Information about conferences and workshops should not be restricted to a particular group of medical professionals.

Research questions numbers three and four: What ICT equipment and networks are available to medical doctors and nurses in the government hospitals in Yaoundé and what sort of ICT training and development needs do medical doctors and nurses in government hospitals in Yaoundé have?

1. There is a pronounced shortage of ICT equipment and a low usage rate of ICT equipment that does exist in all the hospitals surveyed. Most especially, there is limited use of computers and Internet resources by medical doctors and nurses.
2. Due to non-availability of basic ICT equipment, there is limited skills and knowledge on the use of ICTs in the hospitals surveyed and only a small number of medical professionals have had basic computer and Internet training, implying that there is a great need for training.

Research question number five: What sort of Internet training and development needs do medical doctors and nurses in the government hospitals in Yaoundé have?

1. In the hospitals surveyed, there is a high demand for basic training on electronic mail, exploring the Web and to how to use search engines.
2. As a result of the respondents' dissatisfaction with the current state of health information, they unanimously favoured the provision of electronic health information, such as Internet resources, to supplement the current ways of accessing and exchanging health information.

Research question number six: What recommendations can be put forward to improve the management of information among nurses and medical doctors in the government hospitals in Yaoundé?

1. The respondents put forward the following recommendations:
  - ◆ The provision of regular in-service training on ICTs (computer and Internet facilities).
  - ◆ Creation of a common computer centre with Internet facilities.
  - ◆ Formulation of a national information framework.
  - ◆ Computerisation of the health information systems.
  - ◆ Organisation of regular interdepartmental fora for medical professionals.
  - ◆ Implementation of continuous medical education.
  - ◆ Encouragement of local researchers and the creation of information exchange outlets.

- ◆ Equipment of medical and hospital libraries with adequate ICT equipment and subscribe to specialised medical journals and magazines.

The above were among the major recommendations put forward by the respondents to improve the use of ICTs in the management of health information in the hospitals surveyed.

2. Recommendations of the researcher are made under section 6.3 below.

## 6.2 CONCLUSIONS

This study has shown the nature of one of the major problems faced by medical professionals in six government hospitals in Yaounde, Cameroon, namely, access to information and the use of ICTs in the management of health information. This is manifested in the following: lack of health information, shortage of ICT equipment and auxiliaries, low usage of ICT tools (computers and Internet resources), the lack of knowledge on Internet services. The non-availability of ICT equipment and low usage and connectivity of ICTs has a tremendous effect in the manner in which information is managed in the government hospitals surveyed as little amount of information is generated and fewer information needs are satisfied. Lack of adequate skills and knowledge on the use of ICT equipment point to the need to provide ICTs training to medical professionals.

The study further revealed that health information is captured, processed, stored and exchanged manually as there is limited ICT equipment such as computers. The computers that do exist are not used for the management of information. There is no Internet connectivity in the hospitals surveyed and low usage of Internet services generally by medical professionals (Internet usage which does take place, takes place outside of the hospitals). Hence, information is poorly captured, processed, stored, exchanged and used. Thus, information is not properly managed.

What also emerged from the study is that there are no laid-down principles to manage information and there is a lack of relevant health information due to a lack of health information activities. When health information is managed (captured, stored and exchanged or disseminated), this is mostly done on an *ad hoc* basis. In other words, information management by medical professionals in the surveyed hospitals in Yaoundé is a sort of “hit and miss” activity.

From informal discussion with nurses, it was revealed that there is no culture of teamwork and information sharing among the medical professionals and little access to and provision of information to the public in general. According to



the researcher, a culture with little or no teamwork or information sharing is characterised by high information secrecy.

Given the results obtained, it may suffice to conclude that the application of ICTs by medical professionals in the management of health information in government hospitals in Yaoundé is poor. In view of the research findings and ideas emanating from other studies examined during the review of related literature, the following specific conclusions are made.

### **6.2.1 The state of information and information management**

This study revealed a general absence of relevant health information and a lack of information activities. These situations, whereby medical professionals are constantly in desperate need of adequate information, do exist in other developing countries. Studies by Musoke (2000:196), Pakenham-Walsh (2003) and Apalayine and Ehikhamenor (1995:369) have confirmed similar experiences from other in developing countries. From these studies, and the present one, an interesting observation that emerged is the similarity of likely explanations for the poor state of health information in these hospitals.

One major explanation for the poor state of information is the lack of awareness of the importance of information in the development of Cameroon. As a result, information related activities are marginalised or sidelined from the country's budget. Thus, library and information services are poor and those that exist have deteriorated due to a lack of funds. An example at hand is the Medical Library of the Faculty of Medicine Yaoundé I that runs on an annual budget of 600 000 FCFA. This is approximately 1 000 US dollars, at an exchange rate of 1USD: 600 FCFA (Andong 2002). During informal discussion with General Directors of the hospitals surveyed, the researcher enquired what percentage of the hospital's budget is spent on information-related activities. Surprisingly, from all the directors, there is nothing allocated to information-related activities (provision of ICT equipment such as computers and auxiliaries and Internet connectivity) in their budgets.

Formulating a national information policy and ensuring its effective implementation is a sign of recognising the importance of information. Hence, the allocation of an adequate budget, the appointment of trained and qualified information specialists to manage and co-ordinate information related activities in the government hospitals will:

- ◆ enhance proper management of information;

- ◆ increase the processes of generating information;
- ◆ improve information support activities; and overall
- ◆ improve the quality of health care delivery.

### **6.2.2 The level of ICT use**

Another concluding observation that is important is the amount of ICT equipment (computers and Internet resources) for the management of information. In the hospitals surveyed, the study revealed a lack of ICTs and the level of ICTs usage was as a consequence low.

The advantages derived from the use of ICTs by medical professionals are numerous. Information management processes can be enhanced and this would increase both the quality and quantity of accessed information, empowering both organisations and people and improving the quality of health services provided.

Since there are limited ICTs available in the hospitals usage is low as earlier indicated. Thus the volume of information generated and exchanged is equally low. This implies fewer information needs are met. It could be concluded that unless the level of ICT equipment is increased to access and generate relevant health information, the quality of health care delivery in the government hospitals surveyed will not be what it should. The need to provide ICTs to medical professionals ranked second on the list of recommendations put forward by respondents to improve the management of information.

### **6.2.3 The level of ICT education and training**

Emerging from 6.2.2 above is the urgent need to provide ICT training to medical professionals in the hospitals surveyed. Effective use of ICTs presupposes that adequate training has been undergone. From the study, the findings revealed there is a great need to provide training on the use of ICTs to medical professionals. It is concluded, therefore, that training and education on the use of ICTs, are essential to guarantee the use of ICTs and Internet resources in order to provide relevant information and hence improve the quality of health care services among medical professionals in the hospitals surveyed. The need to provide ICT training and education to medical professionals ranked first on the list of recommendations put forward by respondents to improve information management. This indicates the magnitude of the problem.

## 6.3 RECOMMENDATIONS

The recommendations below are directed specifically at the following: Minister of Public Health, directors of hospitals, medical doctors and nurses and information professionals.

### 6.3.1 The need to provide ICTs equipment

ICT equipment (computers and Internet facilities) are crucial to support the management of information. The use of computer technology is the most promising means of improving the quality, timeliness, clarity, presentation, and use of relevant information to improve the health care delivery. Thus, computers are able to facilitate information capturing, processing, dissemination, storage and retrieval. With computers, information can be quickly updated and analysed. With Internet facilities, medical professionals will have access to the global wealth of health information. For example, as Africa is being threatened by the HIV/AIDS pandemic, with access to the Internet, resources can be more easily mobilised in order to curb the pandemic. Therefore, it is very important that ICT equipment and infrastructure should be made available to medical professionals to enhance the management of information at the hospitals surveyed, as it will increase the amount of information and medical professionals will be able to make informed decisions.

### 6.3.2 Educate and/or train medical professionals in the use of ICTs

The economic and social development of every nation is determined by the state of health of its citizens. In this regard, the manner in which health care services are provided should be of particular concern to the government. In addition, the practice of medicine, education and research in health is changing very fast, as new medications are developed with new discoveries emerging daily. Medical professionals need to be kept abreast with the latest development in their fields and the Internet provides access to the global information databases. The provision and utilisation of ICT equipments and infrastructure in the hospitals for example could be used to provide in-service training to medical professionals.

#### 6.3.2.1 In-service training

ICTs present new opportunities to enhance education and training as they have the potentials to overcome barriers associated with distance and interactive communication. As earlier stated, through the use of Internet, medical professionals can in fact gain access to ICT skills and training from their office or home computers and at their

convenience. Today, there are CD-ROMs that provide basic computing skills such as INFOLIT. Thus, such a programme can be used to provide in-service computer literacy training to medical professionals.

Alternatively, vocational institutions such as the medical and para-medical schools should expand their training programmes by introducing ICT related courses in their syllabi so that when these professionals start working, using ICT equipment would not pose any difficulty. A way to start is the creation of an information clearing-house.

### **6.3.3 Creation of an information clearing-house**

This is a “point of excellence”. It can be established at every provincial capital in order to maximise scarce resources. According to the researcher, it could be a centre with computers and other ICT equipment such as Internet services. The clearing-house could be the central system of the management of information activities throughout the country. Such a centre would network with medical and hospitals’ libraries and other health information services in the country, to facilitate the management of information. Since there is no one institution or body tasked with coordinating training of medical professionals, a clearing-house could co-ordinate the provision of ICT training.

### **6.3.4 Information policy**

As already noted, national information policies are not available in Cameroon. As a result, information needs remain undefined and the required ICTs to harness them are not defined. Furthermore, policy makers and medical officers have not perceived relevant, accurate and timely information as a vital element in the management of the health system. They consider information services as something “good” but not essential. The negative perception of information by medical professionals and policy makers should change if Cameroon’s information infrastructures are to be developed for the benefit of Cameroonians. The formation of information policies should play an important role in this regard.

### **6.3.5 Organise regular interdepartmental meetings for medical staff**

The medical field has so many professions and, in most cases, knowing ones colleagues is very difficult. It is necessary to organise regular interdepartmental meetings, whereby medical professionals could come together, socialise with one another and exchange ideas and experiences in an amicable manner. Regular meetings and fora will create an atmosphere of togetherness, collaboration, co-operation and good teamwork among medical

professionals. This should go towards facilitating the exchange of health information among medical professionals.

### **6.3.6 Increase and improve local communication outlets to medical professionals**

The study also revealed that materials available in hospital and medical libraries are either unreliable (e.g. out of date) or irrelevant (e.g. written for specialists working in tertiary centres in the USA). To have access to reliable and relevant information suitable for African environments, local writers and researchers should be encouraged to carry out local research and write and publish on health issues relating to their own environment. Since the costs involved in the production and distribution of local journals and books in most African countries are high, with the use of ICT (Internet and intranet) services, production and publication costs can be minimised as these materials could be hosted directly on the website or internal web. This would increase the volume of information generated, disseminated and exchanged. Hence, more information needs could be satisfied.

## **6.4 SUGGESTIONS FOR FURTHER RESEARCH**

The findings of this study have increased the stock of knowledge as it has provided a broad overview of the extent to which ICTs are used by medical professionals in the management of health information in government hospitals in Yaoundé. From these findings, fundamental strategies could be developed to enhance the management of information and could also be used to design computer training for medical professionals. Considering the fact that this study is the first of its kind to be conducted among medical professionals in Cameroon there is therefore still much research work to be done. Since the application of ICTs in the health sector is relatively new among medical professionals, the results obtained in this studies could be use as a starting point for further study, concerned with the following aspects:

- ◆ There is a need for a further study to identify factors or strategies that inhibit the introduction of ICTs by government hospitals in Cameroon.
- ◆ A study could be carried out to establish the feasibility of an integrated Internet-based information exchange for the government hospitals in Cameroon.
- ◆ Medical representatives (medical delegates) appear to be an important source of health information for medical professionals. Therefore a study could be done to develop an adequate strategy to disseminate information by medical representatives.



- ◆ A survey could be done of the existing legislation in Cameroon that is relevant to the field of information, and, related to this,
- ◆ A legal framework for information policy in Cameroon could be investigated and formulated.

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## APPENDICES

## Appendix 1a: Questionnaire

### A questionnaire on the application of information and communication technologies (ICTs) in the management of health information in government hospitals in Yaoundé, Cameroon

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This questionnaire is intended to collect data on the investigation into the prospects of and the necessity for developing an electronic database for the management of health information in Government Hospitals in order to supplement the current ways of disseminating or distributing information. The information on the attached questionnaire is meant to collect data on the current means of collecting, processing, storing and exchanging health information. The information on the attached questionnaire is meant to collect data on the current sources of health information, health management information, patient care information, the methods through which health information is acquired, exchanged, the general health information needs and the state of ICTs. Information on these aspects is essential to access the potential of establishing an electronic database information resource or a network. It will offer the following advantages:

- multiple and wider access to other health sources, both national and international,
- minimises scarce resources and maximises adequate decision making in health care delivery,
- gives medical personnel the opportunity to share and exchange ideas on common interest national and internationally, for example, a telemedicine will significantly reduce the need for referrals. It will make remote hospitals and health centres more accessible by giving health workers in remote areas an immediate electronic access to up-to-date health information resources. It will also ensure that medical specialists' skills are available to all parts of the country. Thus, equitable health services nation-wide.

This cannot be successfully done without your cooperation. Therefore, please

- Respond to this questionnaire as completely and honestly as possible.
- Data collected for this study will be treated in strictest confidence.
- Please tick the appropriate box that corresponds with your answer.
- Please answer all the sections to the questionnaire.
- Remember any information provided will be treated confidentially.

**Section I: Background information**

Tick in the appropriate box, and specify what is applicable to you. Please ignore the numbers in the square brackets. They are for use by the researcher.

1. Gender:            Male    [    ]    [ 0 ]  
                         Female [    ]    [ 1 ]

2. Age: In which age group do you belong? Please tick the appropriate box.

20 – 25                [    ]    [ 1 ]  
26 – 30                [    ]    [ 2 ]  
31 – 35                [    ]    [ 3 ]  
36 – 40                [    ]    [ 4 ]

3. Service/Unit or Ward: What is the name of your service or Unit or Ward?

.....

4. What is your professional status? Please tick the appropriate box.

Nurse                [    ] [ 1 ]  
Medical Doctor and field of speciality).....[    ] [ 2 ]

**Section II: Information sources**

5. What type of health information are you interested in? Please tick the appropriate box.

Service Management Information (SMI) [    ] [ 1 ]  
Patient Management/care Information    [    ] [ 2 ]  
Both type of health information            [    ] [ 3 ]  
Other (Please specify) ..... [    ]

6. From the list of health information sources below indicate how frequent do you use them for your daily work activities? (You may tick more than one).

**a) Interaction with colleagues:**

1 to 5 times a month    [    ]    [ 1 ]  
6 to 10 times a month    [    ]    [ 2 ]  
11 to 20 times a month    [    ]    [ 3 ]  
21 to 30 times a month    [    ]    [ 4 ]  
Never                        [    ]    [ 5 ]

**b) Medical Journal:**

1 to 5 times a month    [    ]    [ 1 ]  
6 to 10 times a month    [    ]    [ 2 ]  
11 to 20 times a month    [    ]    [ 3 ]  
21 to 30 times a month    [    ]    [ 4 ]  
Never                        [    ]    [ 5 ]

**c) Medical bulletins:**

1 to 5 times a month    [    ]    [ 1 ]  
6 to 10 times a month    [    ]    [ 2 ]  
11 to 20 times a month    [    ]    [ 3 ]  
21 to 30 times a month    [    ]    [ 4 ]  
Never                        [    ]    [ 5 ]

**d) Conference Proceedings:**

1 to 5 times a month    [    ]    [ 1 ]  
6 to 10 times a month    [    ]    [ 2 ]  
11 to 20 times a month    [    ]    [ 3 ]  
21 to 30 times a month    [    ]    [ 4 ]  
Never                        [    ]    [ 5 ]

**e) Unpublished departmental reports:**

1 to 5 times a month    [    ]    [ 1 ]  
6 to 10 times a month    [    ]    [ 2 ]  
11 to 20 times a month    [    ]    [ 3 ]  
21 to 30 times a month    [    ]    [ 4 ]  
Never                        [    ]    [ 5 ]

**f) Students' theses and dissertations:**

1 to 5 times a month    [    ]    [ 1 ]  
6 to 10 times a month    [    ]    [ 2 ]  
11 to 20 times a month    [    ]    [ 3 ]  
21 to 30 times a month    [    ]    [ 4 ]  
Never                        [    ]    [ 5 ]

**g) Hospital's activities report:**

1 to 5 times a month    [    ]    [ 1 ]  
6 to 10 times a month    [    ]    [ 2 ]  
11 to 20 times a month    [    ]    [ 3 ]  
21 to 30 times a month    [    ]    [ 4 ]  
Never                        [    ]    [ 5 ]



**h) Electronic discussion groups:**

1 to 5 times a month	[ ]	[ 1 ]
6 to 10 times a month	[ ]	[ 2 ]
11 to 20 times a month	[ ]	[ 3 ]
21 to 30 times a month	[ ]	[ 4 ]
Never	[ ]	[ 5 ]

**i) Internet:**

1 to 5 times a month	[ ]	[ 1 ]
6 to 10 times a month	[ ]	[ 2 ]
11 to 20 times a month	[ ]	[ 3 ]
21 to 30 times a month	[ ]	[ 4 ]
Never	[ ]	[ 5 ]

**Section III: Information management activities**

7. What is/are the method(s) used to capture and process information in the hospital?

Manually	[ ]	[ 1 ]
Electronic	[ ]	[ 2 ]
Both methods	[ ]	[ 3 ]
Other (Please specify) .....	[ ]	[ 4 ]

8. What is/are formats used to store health information in the hospital? (You may tick more than one).

Notebooks/ Ledgers	[ ]	[ 1 ]
Hard disk	[ ]	[ 2 ]
Floppy diskettes	[ ]	[ 3 ]
CD-ROM	[ ]	[ 4 ]
Others (Please specify) .....	[ ]	[ 5 ]

9. Which Department(s) or Unit(s) do you always go to whenever you need health information?

Library/Information centre	[ ]	[ 1 ]
Hospital Archives	[ ]	[ 2 ]
Statistic Department	[ ]	[ 3 ]
Administration/Personnel service	[ ]	[ 4 ]
Others (Please specify) .....	[ ]	[ 5 ]

10. From the list below indicate how often do you use these methods to exchange information with other medical staff? (You may tick more than one).

**a) Face-to-face interaction (one-to-one):**

1 to 5 times a month	[ ]	[ 1 ]
6 to 10 times a month	[ ]	[ 2 ]
11 to 20 times a month	[ ]	[ 3 ]
21 to 30 times a month	[ ]	[ 4 ]
Never	[ ]	[ 5 ]

**b) Face-to-face interaction (to two- or-more):**

1 to 5 times a month	[ ]	[ 1 ]
6 to 10 times a month	[ ]	[ 2 ]
11 to 20 times a month	[ ]	[ 3 ]
21 to 30 times a month	[ ]	[ 4 ]
Never	[ ]	[ 5 ]

**c) Workshops/seminars:**

1 to 5 times a month	[ ]	[ 1 ]
6 to 10 times a month	[ ]	[ 2 ]
11 to 20 times a month	[ ]	[ 3 ]
21 to 30 times a month	[ ]	[ 4 ]
Never	[ ]	[ 5 ]

**d) Conferences:**

1 to 5 times a month	[ ]	[ 1 ]
6 to 10 times a month	[ ]	[ 2 ]
11 to 20 times a month	[ ]	[ 3 ]
21 to 30 times a month	[ ]	[ 4 ]
Never	[ ]	[ 5 ]

**e) Interest groups:**

1 to 5 times a month	[ ]	[ 1 ]
6 to 10 times a month	[ ]	[ 2 ]
11 to 20 times a month	[ ]	[ 3 ]
21 to 30 times a month	[ ]	[ 4 ]
Never	[ ]	[ 5 ]

**f) Electronic discussion group(s)**

1 to 5 times a month	[ ]	[ 1 ]
6 to 10 times a month	[ ]	[ 2 ]
11 to 20 times a month	[ ]	[ 3 ]
21 to 30 times a month	[ ]	[ 4 ]
Never	[ ]	[ 5 ]

**g) Internet**

1 to 5 times a month	[ ]	[ 1 ]
----------------------	-----	-------

- 6 to 10 times a month [ ] [ 2 ]
- 11 to 20 times a month [ ] [ 3 ]
- 21 to 30 times a month [ ] [ 4 ]
- Never [ ] [ 5 ]

11. To what extent are you satisfied with the ways used to exchange information among medical personnel?

- Very satisfied [ ] [ 1 ]
- Satisfied [ ] [ 2 ]
- No opinion [ ] [ 3 ]
- Dissatisfied [ ] [ 4 ]
- Very Dissatisfied [ ] [ 5 ]

12. What are the problems that hinder the ways used to exchange information among medical personnel? (You may tick more than one).

Lack of relevant information (i.e. information which does not relate to the job) [ ] [ 1 ]

Information distribution activities are not done regularly [ ] [ 2 ]

Information overload (i.e., too much information provided at the same time) [ ] [ 3 ]

Poor packaging (i.e. language used in medical reports is to complicated) [ ] [ 4 ]

No finances to acquire information (to subscribe to journals) [ ] [ 5 ]

Lack or shortage of information support services [ ] [ 6 ]

Lack of cooperation and collaboration among medical personnel [ ] [ 7 ]

Other (Please specify) ..... [ ] [ 8 ]

13. Would you please suggest ways to overcome the problems indicated in Question 12?

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## Section IV: Existing ICT equipment and usage.

These equipments are those used for the management of health information only.

14. What electronic equipment do you have in your office?

- Fax machine [ ] [ 1 ]
- Photocopier [ ] [ 2 ]
- Telephone [ ] [ 3 ]
- Computer [ ] [ 4 ]
- CD-ROM [ ] [ 5 ]
- Other (Please specify).....[ ] [ 6 ]

15. Do you use a computer in your work environment?

- Yes (Go to Question 19) [ ] [ 1 ]
- No (Go to Question 16) [ ] [ 2 ]

16. If No, do you use a computer at home, Internet Café, etc?

- Yes (Go to Question 19) [ ] [ 1 ]
- No (Go to Question 17) [ ] [ 2 ]

17. If your answers to Questions 15 and 16 was No, please explain why you do not use computer in the course of your work? (You may tick more than one).

Do not know how to use a computer [ ] [ 1 ]

Do know how to use a computer but lack the time [ ] [ 2 ]

Would like to use it but not granted the access [ ] [ 3 ]

Would like to use it but do not have one [ ] [ 4 ]

Working with a computer is reserved for the seniors (directors and sub-directors) only [ ] [ 5 ]

Would like to use but do not have the skills [ ] [ 6 ]

Do not know how to use computer but would like to learn [ ] [ 7 ]

18 Please comment on how to overcome the problems indicated in Question 17 (Go to Question 25)

.....

.....

19. If your answers to Questions 15 and/or 16 was Yes, please indicate what you use the computer for? (You may tick more than one).

Typing of hospitals' correspondences [ ] [1]

Capture and analysing of patients' information [ ] [2]

Managing staff information [ ] [3]

Personal purposes [ ] [4]

Other (Please specify) ..... [ ] [5]

20. On an average, how often do you use the computer?

- Less than once a week [ ] [1]
- Once a week [ ] [2]
- Twice a week [ ] [3]
- Three times a week [ ] [4]
- Four times a week [ ] [5]
- Every working day [ ] [6]
- None of the above [ ] [7]

21. Have you received any training on the following: (You may tick more than one).

Word processing (e.g. Ms word, WordPerfect) [ ] [1]

Spreadsheets (e.g. Ms Excel, Lotus 123) [ ] [2]

Database (e.g. Ms Access, CD-ROM, Quatro Pro) [ ] [3]

Internet/WWW and e-mail service [ ] [4]

22. How would you rate the usefulness of computers for your daily activities?

- Not Useful [ ] [1]
- Useful [ ] [2]
- No opinion [ ] [3]
- Fairly useful [ ] [4]
- Very Useful [ ] [5]

Section V: Opinions on Internet services and facilities.

23. Is the computer/work-station you use connected to the

Internet/WWW?

- Yes (Go to Question 24) [ ] [1]
- No (Go to Question 25) [ ] [2]
- Don't know (Go to Question 25)[ ] [3]

24 If your computer is connected on the Internet, please state the purposes for which you use the Internet? (You may tick more than one).

Surfing the Internet/World Wide Web (e.g exploring to see what is there) [ ] [1]

Searching and accessing medical journals (e.g. MEDLINE, POPLINE, BMJ) [ ] [2]

Communicating with other colleagues via e-mail [ ] [3]

25. Which of the following Internet facilities, resources and services do you use, and how often do you use them? (Please indicate as many services and facilities).

a) **Electronic mail (E-mail):** A facility which allows you to create, send, receive, view, and print electronic mail.

- Less than once a week [ ] [1]
- Once a week [ ] [2]
- Twice a week [ ] [3]
- Three times a week [ ] [4]
- Four times a week [ ] [5]
- Never [ ] [6]

b) **World wide web (WWW, or the Web):** A facility that, allows you to access Web sites.

- Less than once a week [ ] [1]
- Once a week [ ] [2]
- Twice a week [ ] [3]
- Three times a week [ ] [4]
- Four times a week [ ] [5]
- Never [ ] [6]

c) **Intranet (Inner Web):** An internal Web site with restricted access only to staff of an organisation, community or network.

- Less than once a week [ ] [1]
- Once a week [ ] [2]
- Twice a week [ ] [3]
- Three times a week [ ] [4]

Four times a week	[ ]	[5]
Never	[ ]	[6]

**d) Portal or Subject guide (Thematic gateway):** A Web site that gives to access to selected Internet resources on specific themes or subject such as health information.

Less than once a week	[ ]	[1]
Once a week	[ ]	[2]
Twice a week	[ ]	[3]
Three times a week	[ ]	[4]
Four times a week	[ ]	[5]
Never	[ ]	[6]

**e) Mailing lists or listservs:** A specialised electric mailing systems through which people share and exchange ideas and experiences. You can also subscribe to a list and get regular e-mail correspondences on topic of common interest.

Less than once a week	[ ]	[1]
Once a week	[ ]	[2]
Twice a week	[ ]	[3]
Three times a week	[ ]	[4]
Four times a week	[ ]	[5]
Never	[ ]	[6]

**f) File Transfer Protocol (FTP):** It allows the copying of files from one machine to another irrespective of their geographical location.

Less than once a week	[ ]	[1]
Once a week	[ ]	[2]
Twice a week	[ ]	[3]
Three times a week	[ ]	[4]
Four times a week	[ ]	[5]
Never	[ ]	[6]

26. Do you experience any of the following problems that hinder you from using these Internet services and facilities? (You may tick more than one).

Unreliable and poor telephone lines and poor service provider	[ ]	[1]
Lack of skills on how to use the Internet	[ ]	[2]
Slow and congestion on Internet services	[ ]	[3]
Lack of time	[ ]	[4]

Frequent electricity failure	[ ]	[5]
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Lack of information support activities	[ ]	[6]
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Other (Please specify) .....	[ ]	[7]
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## Section VI: Opinions on skills, knowledge and training provision

27. Have you had any formal training on how to use the Internet/World Wide Web (WWW) to:

Explore the Internet/WWW (e.g Netscape, Explorer)	[ ]	[1]
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Copying/downloading files from Internet/Web pages	[ ]	[2]
---	-----	-----

Sending emails on the Web	[ ]	[3]
---------------------------	-----	-----

Use a search engine to find information	[ ]	[4]
---	-----	-----

Other (Please specify) .....	[ ]	[5]
------------------------------	-----	-----

28. To what extent would you appreciate the use of the Internet resources and services to supplement the current ways of managing health information among medical personnel?

Strongly favour	[ ]	[1]
Favour	[ ]	[2]
Oppose	[ ]	[3]
Strongly Oppose	[ ]	[4]
No Opinion	[ ]	[5]

**This series of Questions 29 (i to vii) must be answered by all respondents, whether or not you have access to and use or do not use the Internet.**

29. Below are some Internet facilities, resources and services. Please indicate which you would like to know more about or have some training on. Where possible, please be specific, e.g. knowing how to use search engine on the Internet/WWW.

Electronic Mail (E-mail)	.....	[1]
Internet/ World Wide Web (WWW)	.....	[2]

Intranet .....[ 3 ]

Portal or Subject Guide ..... [ 4 ]

Mailing lists/listserv .....[ 5 ]

Newsgroups .....[ 6 ]

File Transfer Protocol (FTP) ..... [ 7 ]

30. If you have any other comments or suggestions you would like to make concerning the state of health resources and the application of ICTs in the management of health information, please do so.

.....

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.....

**Thank you for your cooperation**



## APPENDIX 1B: QUESTIONNAIRE IN FRENCH

### Etude sur le degré d'utilisation des technologies de la communication et de l'information dans la gestion des informations sanitaires au Cameroun

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Cet questionnaire est destiné à recueillir les informations sur les enquêtes dans le but d'établir les perspectives et la nécessité de disposer d'une base de données électroniques pour la gestion des informations sanitaires au Ministère de la Santé Publique et dans les formations sanitaires publiques, dans le but d'améliorer la méthode actuelle de recueillir, traiter, sauvegarder et diffuser l'information sanitaire. Le présent questionnaire vise à rassembler des données sur les sources existantes de l'information sanitaire (les informations sur la gestion sanitaire et les informations sur la prise en charge du malade), les méthodes par lesquelles ces informations sont obtenues, partagées et diffusées, les besoins en matière de l'information sanitaire, et les technologies de l'information et de communication existantes. L'acquisition des informations sur ces aspects permettra d'établir une source de base de données électroniques sur la santé avec les avantages suivants:

- accès multiple et plus large à d'autres sources d'informations sanitaires telles Medline, Popline, JAMA, BMJ pour ne citer que celles-là.
- donner aux agents de la santé l'occasion de partager et échanger des idées sur des sujets d'intérêt commun dans le pays et avec le reste du monde.
- A titre d'exemple, la télémédecine réduira considérablement les besoins d'évacuation sanitaire. Elle rendra les hôpitaux et les centres de santé éloignés beaucoup plus accessibles en donnant aux agents de santé des régions éloignées un accès électronique immédiat pour actualiser l'information sanitaire. Elle garantira la présence des spécialistes dans toutes les parties du pays, d'où un service de santé équitable pour toute la nation entière.

Ceci ne peut se faire sans une franche collaboration de votre part. Nous vous saurons gré de bien vouloir:

- **Répondre à ce questionnaire aussi complètement et honnêtement que possible.**
- **Afin d'assurer la confidentialité de la tâche, nous vous prions de ne pas mentionner votre nom sur le questionnaire.**
- **Veillez cocher la case appropriée correspondant à votre réponse.**
- **Veillez répondre à toutes les sections du questionnaire.**

Nous vous remercions pour votre collaboration.

- **Veillez répondre le plus honnêtement possible aux différentes questions.**
- **Nous-vous rappelons que toute information fournie sera traitée confidentiellement.**

## Partie I: Information Personnelle

Veillez cocher la case appropriée correspondant à votre réponse. (Ne pas tenir compte des chiffres entre crochets).

1. **Sexe:** Masculin ☐ [ 0 ]  
Feminin ☐ [ 1 ]

2. **Age:** (Veillez cocher la case appropriée correspondant à votre réponse).

20 – 25 ☐ [ 1 ]  
26 – 30 ☐ [ 2 ]  
31 – 35 ☐ [ 3 ]  
36 – 40 ☐ [ 4 ]  
41 – 45 ☐ [ 5 ]  
46 – 50 ☐ [ 6 ]  
51 and above ☐ [ 7 ]

3. **Service** (prière de bien vouloir mentionner le nom de votre service)

.....  
.....

4. **Quelle est votre profession?**

Infirmier ☐ [ 1 ]  
Médecin (prière de bien vouloir indiquer votre  
domaine de spécialité) \_\_\_\_\_ ☐ [ 2 ]

## Partie II: Les sources des l'information

5. **Quels genres d'informations sanitaires recevez-vous habituellement?** (Veillez cocher la case appropriée).

Information sur la gestion sanitaire ☐ [ 1 ]

Prise en charge du malade/ information sur la  
prestation des soins ☐ [ 2 ]

Les deux ☐ [ 3 ]

Autre (prière de bien vouloir spécifier)  
.....

6. **Quelles sont leurs sources et la fréquence de leur utilisation dans vos activités quotidiennes?** (vous pouvez cocher plus d'une case).

a) **Discussion avec les collègues :**

Entre 1 à 5 fois par mois ☐ [ 1 ]  
Entre 6 à 10 fois par mois ☐ [ 2 ]  
Entre 11 à 20 fois par semaine ☐ [ 3 ]  
Entre 21 à 30 fois par mois ☐ [ 4 ]  
Jamais ☐ [ 5 ]

b) **Revue médicale :**

Entre 1 à 5 fois par mois ☐ [ 1 ]  
Entre 6 à 10 fois par mois ☐ [ 2 ]  
Entre 11 à 20 fois par semaine ☐ [ 3 ]  
Entre 21 à 30 fois par mois ☐ [ 4 ]  
Jamais ☐ [ 5 ]

c) **Bulletins Médicaux :**

Entre 1 à 5 fois par mois ☐ [ 1 ]  
Entre 6 à 10 fois par mois ☐ [ 2 ]  
Entre 11 à 20 fois par semaine ☐ [ 3 ]  
Entre 21 à 30 fois par mois ☐ [ 4 ]  
Jamais ☐ [ 5 ]

d) **Rapports des conférences :**

Entre 1 à 5 fois par mois ☐ [ 1 ]  
Entre 6 à 10 fois par mois ☐ [ 2 ]  
Entre 11 à 20 fois par semaine ☐ [ 3 ]  
Entre 21 à 30 fois par mois ☐ [ 4 ]  
Jamais ☐ [ 5 ]

e) **Rapport de direction non-publié :**

Entre 1 à 5 fois par mois ☐ [ 1 ]

Entre 6 à 10 fois par mois [ ] [2]  
 Entre 11 à 20 fois par semaine [ ] [3]  
 Entre 21 à 30 fois par mois [ ] [4]  
 Jamais [ ] [5]

**f) Projets d'étudiants (thèse et mémoires) :**

Entre 1 à 5 fois par mois [ ] [1]  
 Entre 6 à 10 fois par mois [ ] [2]  
 Entre 11 à 20 fois par semaine [ ] [3]  
 Entre 21 à 30 fois par mois [ ] [4]  
 Jamais [ ] [5]

**g) Rapport mensuel des activités des hôpitaux :**

Entre 1 à 5 fois par mois [ ] [1]  
 Entre 6 à 10 fois par mois [ ] [2]  
 Entre 11 à 20 fois par semaine [ ] [3]  
 Entre 21 à 30 fois par mois [ ] [4]  
 Jamais [ ] [5]

**h) Internet**

Entre 1 à 5 fois par mois [ ] [1]  
 Entre 6 à 10 fois par mois [ ] [2]  
 Entre 11 à 20 fois par semaine [ ] [3]  
 Entre 21 à 30 fois par mois [ ] [4]  
 Jamais [ ] [5]

**Partie III : Activités d'échange de l'information**

7. Quels sont les moyens utilisés pour obtenir et traiter l'information à l'hôpital?

Manuellement [ ] [1]  
 Electroniquement [ ] [2]  
 Les deux moyens [ ] [3]  
 Autres (soyez plus précis).....[ ] [4]

8. Sous quelle forme l'information est-elle sauvegardée à l'hôpital? (vous pouvez cocher plus d'une case).

Calepins/Registres [ ] [1]  
 Disk dure [ ] [2]  
 Disquettes [ ] [3]  
 CD-ROM [ ] [4]  
 Autres (prière de préciser)  
 .....[ ] [5]

9. Quels sont les services chargés de pour partager ou diffuser les informations sanitaires dans les

hôpitaux?

Bibliothèque /centre d'Information [ ] [1]  
 Archives de l'Hopital [ ] [2]  
 Service des statistiques [ ] [3]  
 Direction administrative/ personnel [ ] [4]  
 Autres (soyez plus précis)  
 ..... [ ] [5]

10. A partir de la liste ci-dessous, à quelle sont les moyens est la fréquence d'utilisation des moyens dont vous vous servés pour partager ou diffuser l'information sanitaire? (vous pouvez cocher plus d'une case).

**a) Discussion face-à-face (un à un) :**

Entre 1 à 5 fois par mois [ ] [1]  
 Entre 6 à 10 fois par mois [ ] [2]  
 Entre 11 à 20 fois par semaine [ ] [3]  
 Entre 21 à 30 fois par mois [ ] [4]  
 Jamais [ ] [5]

**b) Discussion face-à-face (avec deux ou plusieurs) :**

Entre 1 à 5 fois par mois [ ] [1]  
 Entre 6 à 10 fois par mois [ ] [2]  
 Entre 11 à 20 fois par semaine [ ] [3]  
 Entre 21 à 30 fois par mois [ ] [4]  
 Jamais [ ] [5]

**c) Ateliers/séminaires :**

Entre 1 à 5 fois par mois [ ] [1]  
 Entre 6 à 10 fois par mois [ ] [2]  
 Entre 11 à 20 fois par semaine [ ] [3]  
 Entre 21 à 30 fois par mois [ ] [4]  
 Jamais [ ] [5]

**d) Conférences :**

Entre 1 à 5 fois par mois [ ] [1]  
 Entre 6 à 10 fois par mois [ ] [2]  
 Entre 11 à 20 fois par semaine [ ] [3]  
 Entre 21 à 30 fois par mois [ ] [4]  
 Jamais [ ] [5]

**e) Groupe d'intérêt :**

Entre 1 à 5 fois par mois [ ] [1]  
 Entre 6 à 10 fois par mois [ ] [2]  
 Entre 11 à 20 fois par semaine [ ] [3]

Entre 21 à 30 fois par mois     [ ]     [ 4 ]  
Jamais     [ ]     [ 5 ]

**f) Groupe de discussion sur l'électronique :**

Entre 1 à 5 fois par mois     [ ]     [ 1 ]  
Entre 6 à 10 fois par mois     [ ]     [ 2 ]  
Entre 11 à 20 fois par semaine     [ ]     [ 3 ]  
Entre 21 à 30 fois par mois     [ ]     [ 4 ]  
Jamais     [ ]     [ 5 ]

**g) Internet :**

Entre 1 à 5 fois par mois     [ ]     [ 1 ]  
Entre 6 à 10 fois par mois     [ ]     [ 2 ]  
Entre 11 à 20 fois par semaine     [ ]     [ 3 ]  
Entre 21 à 30 fois par mois     [ ]     [ 4 ]  
Jamais     [ ]     [ 5 ]

11. Quel est votre degré de satisfaction en matière d'échange et de partage de l'information sanitaire avec les autres personnels médicale?

Très satisfait     [ ]     [ 1 ]  
Satisfait     [ ]     [ 2 ]  
Pas d'opinion     [ ]     [ 3 ]  
Mécontent     [ ]     [ 4 ]  
Très mécontent     [ ]     [ 5 ]

12. Quels sont les problèmes qui vous empêchent de partager et d'échanger les informations sanitaires avec les autres personnels médicale? (vous pouvez cocher plus d'une case)

Manque d'information pertinente ( c-à-d l'information qui n'a rien à voir avec le travail)     [ ] [ 1 ]

La diffusion de l'information n'est pas faite régulièrement     [ ] [ 2 ]

Trop d'informations (c-à-d trop d'informations fournies au même moment)     [ ] [ 3 ]

*Poor packaging* (c-à-d le langage utilisé dans les rapports médicaux est trop complexe)     [ ] [ 4 ]

Manque de moyens pour abonner a reveues médicales     [ ] [ 5 ]

Manque de services chargés de l'information

professionnelle     [ ] [ 6 ]

Manque de collaboration et mauvaise coordination entre les personels médicale     [ ] [ 7 ]

Autres (prière de bien vouloir préciser) ..... [ ] [ 8 ]

13. Quelles solutions suggèreriez-vous aux problèmes soulevés à la question 12?

.....  
.....  
.....  
.....

**Partie IV: Utilisation des appareils électroniques et TIC**

14. Quels équipements électroniques avez-vous dans votre bureau?

Fax     [ ]     [ 1 ]  
Photocopieur     [ ]     [ 2 ]  
Téléphone     [ ]     [ 3 ]  
Ordinateur     [ ]     [ 4 ]  
CD-ROM     [ ]     [ 5 ]  
Autres (bien vouloir préciser) ..... [ ] [ 6 ]

15. Utilisez-vous un ordinateur dans votre milieu professionnel ou dans votre Service?

Oui (**allez à la question 19**)     [ ]     [ 1 ]  
Non (**allez à la question 16**)     [ ]     [ 2 ]

16. Si non, utilisez-vous un ordinateur pendant que vous travaillez à la maison, au cyber café, etc.)?

Oui (**allez à la question 19**)     [ ]     [ 1 ]  
Non (**allez à la question 17**)     [ ]     [ 2 ]

17. Si votre réponse aux questions 15 et 16 est Non, expliquez pourquoi vous n'utilisez pas d'ordinateur dans le cadre de votre travail. (vous pouvez cocher plus d'une case)

Savez-vous utiliser un ordinateur?     [ ]     [ 1 ]

Savez-vous utiliser un ordinateur ou n'avez vous pas le temps de le faire ?     [ ]     [ 2 ]

Voulez-vous l'utiliser mais n'y pas accès ? [ ] [ 3 ]

Voulez-vous l'utiliser mais n'en possédez pas ? [ ] [ 4 ]

Travailler avec un ordinateur est réservé seulement aux directeurs et sous-directeurs [ ] [ 5 ]

Voulez-vous l'utiliser mais n'avez pas été formés [ ] [ 6 ]

Savez-vous utiliser un ordinateur ou voudriez-vous apprendre [ ] [ 7 ]

18. Faites vos remarques sur la façon de résoudre les problèmes posés à la question 17? (allez à la question 25)

.....  
.....  
.....  
.....

19. Indiquez ce pourquoi vous utilisez un ordinateur? (Vous pouvez cocher plus d'une case)

Saisir des correspondances [ ] [ 1 ]

Obtenir et analyser les sanitaires des malades [ ] [ 2 ]

Gérer les informations des personnels [ ] [ 3 ]

Pour la recherche privée [ ] [ 4 ]

Rechercher des sites Web [ ] [ 5 ]

Autres (précisez).....[ ] [ 6 ]

20. En moyenne, quelle est votre fréquence d'utilisation de l'ordinateur?

Moins d'une fois par semaine [ ] [ 1 ]

Une fois par semaine [ ] [ 2 ]

Deux fois par semaine [ ] [ 3 ]

Trois fois par semaine [ ] [ 4 ]

Quatre fois par semaine [ ] [ 5 ]

Tous les jours ouvrables [ ] [ 6 ]

Aucun des cas cités [ ] [ 7 ]

21. Avez-vous reçu l'une des formations suivantes relatives à l'utilisation de l'ordinateur? (vous pouvez cocher plus d'une case)

Traitement de texte (e.g. MsWord, WordPerfect) [ ] [ 1 ]

Utilisation des tableurs (e.g. Ms Excel, Lotus 123) [ ] [ 2 ]

Utilisation de base de données (e.g. Ms Access, Quatro Pro, CD-ROM) [ ] [ 3 ]

Courriers électroniques (e.g. GroupWise) et navigateur Web (e.g. Netscape, Explorer) [ ] [ 4 ]

22. Selon vous, quel est le degré d'utilité de l'ordinateur dans votre travail quotidien en matière de l'échange et de partage de l'information sanitaire ?

Pas utile [ ] [ 1 ] Utile  
[ ] [ 2 ]

Sans opinion [ ] [ 3 ]

Moyennement utile [ ] [ 4 ]

Très utile [ ] [ 5 ]

#### Partie V: Opinions sur les sources d'informations électroniques

23. Votre ordinateur/ poste de travail est-il connecté sur Internet?

Oui (allez à la question 24) [ ] [ 1 ]

Non (allez à la question 25) [ ] [ 2 ]

Ne sait pas (allez à la question 25)[ ] [ 3 ]

24. Si vous utilisez Internet, dites pour quel but vous le faites. (Vous pouvez cocher plus d'une case).

Naviguer sur le Web (c-à-d, explorer pour voir ce qui s'y trouve) [ ] [ 1 ]

Chercher et accéder aux revues médicales (telles MEDLINE, POPLINE, BMJ) [ ] [ 2 ]

Communiquer avec d'autres collègues par e-mail [ ] [ 3 ]

25. Laquelle des facilités d'Internet suivantes utilisez-vous? (vous pouvez indiquer plusieurs).

a) **Courrier électronique (E-mail):** facilité qui vous permet de créer, envoyer, recevoir, voir et imprimer le courrier



électronique.

Moins d'une fois par mois	<input type="checkbox"/>	[ 1 ]
2 – 4 fois par mois	<input type="checkbox"/>	[ 2 ]
Entre 1 à 5 fois par semaine	<input type="checkbox"/>	[ 3 ]
Plus d'une fois par jour	<input type="checkbox"/>	[ 4 ]
Jamais	<input type="checkbox"/>	[ 5 ]

b) **World wide web (WWW, ou le Web):** facilité qui vous permet d'accéder aux sites web.

Moins d'une fois par mois	<input type="checkbox"/>	[ 1 ]
2 – 4 fois par mois	<input type="checkbox"/>	[ 2 ]
Entre 1 à 5 fois par semaine	<input type="checkbox"/>	[ 3 ]
Plus d'une fois par jour	<input type="checkbox"/>	[ 4 ]
Jamais	<input type="checkbox"/>	[ 5 ]

c) **Intranet (site Web interne):** un site web interne avec accès restreint au personnel d'une organisation, une communauté ou un réseau.

Moins d'une fois par mois	<input type="checkbox"/>	[ 1 ]
2 – 4 fois par mois	<input type="checkbox"/>	[ 2 ]
Entre 1 à 5 fois par semaine	<input type="checkbox"/>	[ 3 ]
Plus d'une fois par jour	<input type="checkbox"/>	[ 4 ]
Jamais	<input type="checkbox"/>	[ 5 ]

d) **Portail sur le monde: (entrée thématique):** un site Web qui donne accès aux ressources Internet sur la base de thèmes spécifiques choisis, tels l'information sanitaire.

Moins d'une fois par mois	<input type="checkbox"/>	[ 1 ]
2 – 4 fois par mois	<input type="checkbox"/>	[ 2 ]
Entre 1 à 5 fois par semaine	<input type="checkbox"/>	[ 3 ]
Plus d'une fois par jour	<input type="checkbox"/>	[ 4 ]
Jamais	<input type="checkbox"/>	[ 5 ]

e) **Listserve :** systèmes d'envoi électronique à travers lesquels des gens peuvent partager et échanger des idées, des expériences. Vous pouvez aussi vous abonner et recevoir des correspondances régulières par email sur des sujets d'intérêt commun.

Moins d'une fois par mois	<input type="checkbox"/>	[ 1 ]
2 – 4 fois par mois	<input type="checkbox"/>	[ 2 ]
Entre 1 à 5 fois par semaine	<input type="checkbox"/>	[ 3 ]
Plus d'une fois par jour	<input type="checkbox"/>	[ 4 ]
Jamais	<input type="checkbox"/>	[ 5 ]

f) **File Transfer Protocol (FTP):** le FTP permet d'enregistrer les dossiers d'une machine à l'autre indépendamment de leur position géographique.

Moins d'une fois par mois	<input type="checkbox"/>	[ 1 ]
2 – 4 fois par mois	<input type="checkbox"/>	[ 2 ]
Entre 1 à 5 fois par semaine	<input type="checkbox"/>	[ 3 ]
Plus d'une fois par jour	<input type="checkbox"/>	[ 4 ]
Jamais	<input type="checkbox"/>	[ 5 ]

26. Rencontrez-vous certains des problèmes suivants qui vous empêchent d'utiliser les facilités et services d'Internet ? (Vous pouvez cocher plus d'une case)

Non fiabilité et mauvais service téléphonique / fournisseur d'accès ☐ [ 1 ]

Manque de formation pour utiliser l'Internet ☐ [ 2 ]

Accès lent et encombrement sur l'Internet ☐ [ 3 ]

Manque de temps ☐ [ 4 ]

Coupure fréquente d'électricité ☐ [ 5 ]

Manque des l'information de support activité pour les information ☐ [ 6 ]

Autres (précisez) ..... ☐ [ 7 ]

## Partie VI: Opinions sur les connaissances et la formation.

27. Avez-vous eu une formation sur l'utilisation de l'Internet ?

Explorer l'Internet/ Web (e.g. Netscape, Explorer) ☐ [ 1 ]

Copier / télécharger des dossiers sur des pages Web ☐ [ 2 ]

Envoyer les e-mails ☐ [ 3 ]

Les techniques de recherche des informations ☐ [ 4 ]

Autres (précisez) .....[ ] [ 5 ]

28. A quel degré pouvez être apprécier la utilisation et participation à un programme d'information électronique pour compléter les moyens actuels de diffusion et d'échange de l'information sanitaire chez les autres professionnels médicale?

Fortement pour	[ ]	[ 1 ]
Pour	[ ]	[ 2 ]
Pas d'opinion	[ ]	[ 3 ]
Contre	[ ]	[ 4 ]
Fortement contre	[ ]	[ 5 ]

Partie VII : Les séries de question 29 doivent être traitées par tous, que vous ayez accès à l'Internet ou pas, que vous utilisiez internet où pas.

29. Vous avez classés ci-dessous certaines facilités, ressources et certains services d'Internet. Indiquez celui ou celle que vous voudriez mieux connaître, celle ou celui sur lequel vous aimeriez avoir une formation. Soyez plus précis; à titre d'exemple : savoir comment utiliser le moteur de recherche sur le WWW

Courrier électronique (E-mail)  
.....[ 1 ]

World Wide Web (WWW)  
.....[ 2 ]

Intranet  
.....[ 3 ]

Portail sur le monde  
.....[ 4 ]

Listserve  
.....[ 5 ]

"Newsgroups"  
.....[ 6 ]

"File Transfer Protocol (FTP)"  
.....[ 7 ]

30. Si vous avez tout autre commentaire que vous aimeriez faire relatif à l'introduction des TICs dans la gestion de l'information sanitaire, faites-le.

.....  
.....  
.....  
.....

Merci pour votre collaboration.

## APPENDIX 2: LETTER OF INTRODUCTION FROM THE SUPERVISOR



School of Human and Social Studies

Private Bag X01, Scottsville  
Pietermaritzburg 3209, South Africa  
Tel: (033) 260 5320/5290  
Fax: (033) 260 5092  
General enquiries:  
e-mail: [acut@nu.ac.za](mailto:acut@nu.ac.za)  
[padayacheep@nu.ac.za](mailto:padayacheep@nu.ac.za)  
[www.hs.unp.ac.za/huso.htm](http://www.hs.unp.ac.za/huso.htm)

H.E. Mr. OLANGUENA AWONO Urbain  
Minister of Public Health  
Yaoundé, Cameroon

July, 29 2002

His Excellency,

### Assistance with research project

F lora Nah (Student no. 200220132) is presently completing the thesis component of her masters in Information (MIS) degree in the Information Studies Programme at the University of Natal in Pietermaritzburg.

The topic of her thesis is « **Application of information and communication technologies (ICTs) in the management of health information in government hospitals in Yaoundé, Cameroon** ». This research is timely and should be of immense benefit to our continent generally and, most especially, to Cameroon and its public health system given that crucial data for the study will be collected in Cameroon.

We would be most grateful for your assistance in enabling her to collect data required for the project. Should you have any queries, I can be contacted by telephone or at the following e-mail address : [leach@nu.ac.za](mailto:leach@nu.ac.za)

Yours sincerely,

A handwritten signature in black ink, appearing to read "Leach".

# APPENDIX 3: AUTHORISATION LETTER FROM THE MINISTER OF PUBLIC HEALTH

**MINISTRY OF PUBLIC HEALTH**  
-----

**REPUBLIC OF CAMEROON**  
**Peace – Work – Fatherland**  
-----

**SECRETARIAT GENERAL**  
-----

**DIRECTION OF HUMAN RESOURCES**  
-----

**SUB – DEPARTMENT OF PERSONNEL**  
-----

N° 130-233 /LA/MPH/SG/DHRTSDP.-

Yaounde, the 27 April

**Subject:** LETTER OF AUTHORIZATION

**The Minister of Public Health**

**To**  
Whom it may concern

This is to attest that Miss **Flora NAH**, a student at the University NATAL in South Africa currently working on a Masters Degree program in Information Technology and presently carrying out a research for dissertation entitled "An Application of the extent of the application Information and Communication Technologies (ICTS) in the management of Health Information in Cameroon" has been authorized to collect data relevant to this topic in any health establishment deemed appropriate Cameroon. /-

Pour le Ministre de la Santé Publique  
et par Délégation  
**Le Secrétaire Général**  
  
**Engoulou Henri**  
Administrateur Civil Principal



July 20, 2002

**Re: Research on the application of information and communication technologies (ICTs) by medical doctors and nurses in government hospitals in Yaoundé for the management of health information in Cameroon.**

I am female Cameroonian currently pursuing a Master of Information Studies degree at the University of Natal, Pietermaritzburg, South Africa.

The use of ICTs such as the computers, communication software and the Internet have revolutionised the way health information is managed. That is captured, processed, stored and exchanged among medical professionals. The use of computers and the Internet facilities like the Intranet, electronic discussion groups, file transfer protocol, subject guide ways (portal), Telnet (remote login) offer numerous advantages of networking opportunities. The challenge is how to effectively integrate these facilities into the existing health information exchange activities in the government hospitals in Yaoundé, Cameroon to meet the information needs of medical professionals (doctors and nurses). In order to establish an Internet and Intranet –based network, the following, among other things must be available: people with concern in interest and information seeking behaviour, the information to be exchanged, information and telecommunication technologies, that is computerise and connectivity to the Internet, sustainable source of funding and qualified human resources to develop and maintain the system.

This study is therefore, aimed at examining the state of health sources and resources at the disposal of medical professionals, the information seeking habits, the manner in which health information is captured, stored, processed and exchanged among disposal of medical professionals in the government hospitals in Yaoundé. It is anticipated that through this study, suggestions to facilitate the better health information management techniques would be formulated.

In order to collect the data required to accomplish this study, I need your cooperation to assist in completing the attached questionnaire. I am appealing to you to spare some of your valuable time to complete this questionnaire. Data collected for the study will be treated in strictest confidence.

Thank you in advance,

Yours faithfully,

Flora Nah



## APPENDIX 4B: LETTRE D'INTRODUCTION DU CHERCHEUR

**Re: Etude sur le degre d'utilisation des technologies de la communication et de l'information (TIC) dans la gestion des informations sanitaires dans les hôpitaux public à Yaoundé, Cameroun.**

Je suis une Camerounaise, actuellement inscrite dans le programme des etudes en Information, niveau Maîtrise à l'université du Natal, Pietermaritzburg, Afrique du Sud.

L'utilisation des TIC tel que les ordinateurs et les facilités offertes par l'internet a revolutionné la gestion des information sanitaires: c'est à dire dans les collecte, leur traitement, leur stockage et la façon don't elles sont échangées entre professionnels médicaux. La manipulation des ordinateurs et des avantages de l'internet comme l'intranet, les groupes de discussion sur l'electronique, "File Transfer Protocol", Portail sur le monde, offrent de nombreuses possibilités dans les réseaux. Le défi consiste à trouver un moyen d'intégrer ces facilités dans l'actuelle gestion des informations dans les hôpitaux publics à Yaoundé, Cameroun, pour subvenir aux besoins en information des professionnels médicaux (medicines et infirmiers). Dans le but d'établir un réseau d'Internet et d'intranet, les exigences suivantes doivent être mentionnées: une population interestée dans son comportement aux informations, des information pour être échangée, des technologies d'information et de communication, c'est-à-dire utilisation d'ordinateurs et connection sur Internet, source durable de financement et personnel adquat pour le developpement et la maintenance du système.

La présente recherché a pour but d'examiner l'état des ressources dont dispose le personnel medical, les informations (habituel) la façon dont les les informations sanitaires sont receuilliez, traitées, stockées et échangées entre professionnels médicaux dans les hôpitaux publics de Yaoundé.

Pour recevoir les information necessaires à cette etude, votre collaboration serait souhaitable pour remplir le questionnaire ci-après, et je demanderais de votre précieux temps pour le faire. Les information receuilliés pour l'étude seront tenues strictement confidentielles.

Vous remerciant d'avance.

Sincèrement

Flora Nah