Ministry of Health

HEALTH SECTOR ICT POLICY AND STRATEGY

(FINAL)

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PREFACE

Information, communication and technology (ICT) presents new opportunities for improving access to health services and ensuring efficient management of health resources.

This Health Sector ICT Policy and Strategy charts a roadmap for the exploitation, development and deployment of ICT to accelerate the service delivery process. It is guided by the Ghana ICT for Accelerated Development (ICT4AD) Policy.

I am pleased to note that the development of this policy was based on an extensive sector-wide consultation with stakeholders from the public and private sectors.

I therefore call on all players in the health sector to contribute to and support the implementation of the provisions of this policy. This will enable the sector to achieve its vision to improve overall health status and reduce inequalities in health outcomes of people living in Ghana.

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ACRONYMS

5YrPOW	Five Year Programme of Work
BMC	Budget and Management Centre
BPEMS	Budget and Public Expenditure Management System
CHAG	Christian Health Association of Ghana
CHPS	Community Based Health Planning and Services
CMA	Common Management Arrangements
DHA	District Health Administration
DHMT	District Health Management Team
D/PPME	Directorate of Policy, Planning, Monitoring, and Evaluation
D/RSIM	Directorate of Research, Statistics, and Information Management
EHR	Electronic Health Record
GHS	Ghana Health Services
GPRS	Ghana Poverty Reduction Strategy
ICT	Information and Communications Technology
IEC	Information, Education and Communication
LAN	Local Area Network
MDAs	Ministries, Departments and Agencies
MDG	Millennium Development Goals (MDG)
MHIS	Ministry of Health Information Services
MOF	Ministry of Finance
MOH	Ministry of Health
NGP	Non-Government Providers
NGO	Non-Governmental Organization
NHIS	National Health Insurance Scheme
PHMHB	Private Hospitals and Maternity Homes Board
PWLHA	People Living with HIV/AIDS
PPME	Policy, Planning Monitoring and Evaluation
QA	Quality assurance
RHA	Regional Health Administration
RSIM	Research, Statistics, and Information Management
THs	Teaching Hospitals
THIS	Teaching Hospitals Information Services
WAN	Wide Area Network
WLAN	Wireless Local Area Network

EXECUTIVE SUMMARY

Ghana's health sector has made significant improvements in the past decade. There are marked achievements in several areas including immunization rates, under-five mortality and the control or eradication of some communicable diseases. However, several problems, such as malaria, HIV/AIDS, maternal and infant mortality, the crippling shortage of health professionals, availability of affordable health care and interventions, have worsened. This has resulted in the widening of the health gap between the urban and the rural populace, between the rich and the poor. Consequently, the health sector's overall goal for this decade is the *reduction in health inequalities*.

Information and communication technology (ICT) can play a major role in the achievement of the health sector's goal. ICT is increasingly applied to the global health sector because it can significantly enhance and improve all facets of health services delivery. However, the application of ICTs in the Ghanaian health sector will be constrained by several challenges if left unaddressed. Some of these challenges are a weak telecommunications infrastructure, an inadequate capacity in ICT human resources, and planning and financial constraints.

Information, communication and technology can also make a significant contribution to the realization of the five strategic objectives of the health sector's 2002-2006 5-Year Programme of Work. Specifically, ICTs can

- **Increase access to health services** by expanding the scope of activities of health professionals and specialists in a way that will minimize the effect of their low numbers in the sector; by supporting the establishment of a rapid response system to enhance performance in both clinical and public health care; and by empowering patients so that they will seek quality care and make the right demands on the health care system.

- **Improve quality of health care delivery** by facilitating skill transfer to the periphery; by enhancing service supervision and regulation; by improving access to primary healthcare services; and by supporting the emergency, ambulatory, disaster management systems and blood banking and organ donation systems.

- **Improve efficiency of heath delivery by** improving both management and technical efficiency of the sector through reliable information dissemination systems; and by supporting the decision making process through the prompt availability of information for all decision-makers.

- **Foster partnerships in improving health** through dissemination of health information and data; by providing support to overall planning and

sector assessment processes; and by supporting communication and collaboration within the entire sector

- **Improve financing of the health sector** by providing a broadcast facility for marketing the health sector.

The Government of Ghana's information and communication technology policy document, ICT for Accelerated Development, has stated that ICTs should be utilized to promote national health. The major goal of this document is the formulation of a strategic roadmap to achieve the vision and goal of the national health ICT policy. The objectives, with associated strategies, for this roadmap are:

- **Improve the information and communication technology infrastructure in the health sector** by networking all health institutions and by providing adequate ICT tools for service delivery and management

- **Improve access to and management of health information** by deploying a health information dissemination network and an health information management systems network

- **Improve access to quality health services** by deploying telemedicine applications in the health sector and by utilizing ICTs to enhance the referral, emergency and disaster management systems

- **Improve ICT knowledge, capability and utilization among health workers** by providing training in ICT skills to all prospective and current health workers; by maintaining a critical group of ICTs specialists in the health sector; and by deploying ICTs to support and enhance job functions of health workers.

This strategic document also proposes several programs and initiatives that are essential for the attainment of the health sector's ICT objectives and strategies. In addition, technical norms, procedures, standards and legislation for the use and management of information are discussed.

Finally, successful deployment of ICT in the health sector depends largely on strong corporate commitment and political will, visionary leadership, adequate funding, support from all sections of the health sector and an active participation of the general public.

1. BACKGROUND

1.1 Introduction

Impressive advances in science, especially in health care delivery, have significantly improved the health status of the global citizen in the past century. However, the forecast of good health for Ghanaians remains bleak in this new century. Ghana continues to suffer from malaria and HIV/AIDS epidemics, an increase in infant and maternal mortality, a rise in the incidences of stroke and cardiovascular diseases, and resurgence in previously eradicated communicable diseases. This situation will continue to diminish life expectancy beyond even pre-Independence levels unless and until innovative interventions are put in place within the entire health sector.

The global health sector makes effective use of information and communication technology (ICT) to facilitate and improve almost all facets of health services delivery. So far, the Ghanaian health sector seems to have responded to the ICT revolution by allowing some acquisition and use of computers and in service delivery, management and administration. Yet, even this modest response has been less structured than desired, as exploitation of ICT has been driven by individual, private interest and innovation rather than by a recognized corporate need. This has resulted in diverse degrees of utilization of ICT in the sector and a digital divide between the Ministry of Health's headquarters, the regions and the districts. Hence, the complete benefits of ICT have so far not been realized in the health sector.

An ICT policy and strategy has been identified as a necessary first step in the process of transforming the current health system into an ICT-enabled health delivery system that will improve the health outcomes of the citizens of Ghana.

1.2 Policy Context

The development of an information and communications technology (ICT) policy and strategy for the health sector is framed by certain key issues and realities.

The Ministry of Health's Five Year Programme of Work (5YrPOW) for 2002 to 2006 highlights several strategic objectives to improve overall health status and reduce inequalities in the health outcomes of people living in Ghana. Meanwhile, the Government of Ghana's ICT policy document, known as ICT for Accelerated Development (ICT4AD), has identified health as one of the priority sectors in which the broad adoption of ICT can enable the government to achieve its developmental goals. Indeed, ICT4AD directs all Ministries,

Departments and Agencies to translate the national policy into sector specific ICT policies and strategies. The Ministry of Communications has therefore established an ICT Policy and Plan Development Committee to provide technical and financial support for the development of these sector specific ICT policies and strategies. Thirdly, several in-depth reviews and studies, including the *Information, Monitoring and Evaluation System Review*[1] and the *Ghana eHealth Solutions*[2] study, have decried the low utilization of ICT in the health sector and underscored the need for an ICT policy and strategy.

Other significant events in the health sector have also contributed to highlight the urgent need for this document. The Government of Ghana has recently reengineered the Ministry of Health to emphasize its policy formulation and regulatory roles. Technical implementation of policy, previously the Ministry's primary function, has been shifted to other agencies within the health sector. The Government of Ghana is also instituting financial reforms based on decentralization to the district level, as a necessary component of this reengineering. Recently, a major government policy abolished the "Cash and Carry" system for the payment of health care services and introduced a "National Health Insurance Scheme". Another essential component of the new scheme is the development and deployment of district level health insurance management information systems.

Finally, a draft ICT Policy for the Health Sector was developed in November 1999. This draft policy sought to use ICTs to respond to the prevailing health goals and needs. The document proved useful, and some pertinent sections have been included in this new policy.

2. HEALTH SECTOR AND ICT – THE CURRENT SITUATION

The successful implementation of an ICT policy and associated strategies can be ensured by focussing on, and systematically addressing the following challenges:

1) ICT Infrastructure and Services
   - (a) Network Infrastructure and Internet Access
   - (b) Hardware and Software
   - (c) Security and Data Protection
   - (d) Health Information Management Systems
2) ICT Human Resources Capacity
3) The Private Healthcare Sector
4) Planning and Funding

2.1 ICT Infrastructure and Services

Network Infrastructure and Internet Access

The deployment of a network infrastructure is a necessary prerequisite for any ICT strategy. The existence of a network facilitates the sharing of resources and computing peripherals like printers, fax machine, dissemination of information via websites, the use of telemedicine facilities and other advanced telecommunication products. The health care sector in Ghana is not fully connected within itself or to any nationwide network system. There is inadequate networking at the national, regional or district levels and among private health care providers. Even though most health facilities and institutions make extensive use of computing and communication equipment, networking via wireless or cable technology and harnessing of the potential of the Internet highway have not been fully achieved. Thus, data is not electronically exchanged within the health sector. The Budget and Public Expenditure Management System (BPEMS) project, which is part of the government financial management reform programme, has deployed local area networks at all Regional Health Administration and Regional Medical stores. The wide area network (WAN) is only operational in the Greater Accra region. Some health facilities have undertaken an appreciable level of networking of the revenue collection points and pharmacies.

The absence of a health sector network infrastructure is part of a bigger national problem. There is no national telecommunication backbone in Ghana. Reports on the telecommunications sector indicate that telephone mainlines are 13 per thousand, 21 cellular phone subscribers per thousand and an Internet use of 7.8 per thousand[3]. According to the National Communication Authority (NCA), there are 363,103 fixed telephone lines and 8,843 payphones, thus the incidence of

telephone services is a dismal 20 per one thousand Ghanaians. The situation is compounded further by the relatively low proliferation rate of telecommunications services in the rural areas. Although 70% of all Ghanaians live in the rural areas, estimates are that 55% of fixed phone lines are found in the urban areas. Like their counterparts in Sub-Saharan Africa, Ghanaians are increasingly turning to mobile telephony as a solution to their communication needs. The use of mobile telephony is currently 21 cellular subscribers per thousand and this rate is projected to increase significantly in the current decade. However, the cost of mobile telephony effectively excludes the poor from taking advantage of the current telecommunications trend. Moreover, in the absence of adequate telecommunications infrastructure, an over-reliance on mobile telephony among the general population might stultify people's attempts to exploit the Internet.

As expected, Internet cyber cafes are common in the major urban areas but are virtually non-existent in the rural areas. This is due to several problems, including the lack of electricity, bandwidth issues, and financial operating costs. Although the Government of Ghana is making progress in providing electricity to rural areas, there are still substantial numbers of villages in the rural areas, especially in the fifty-five poorest districts, that have no access to electricity. With regard to bandwidth issues, Ghana's major telecommunication provider, Ghana Telecom (GT), is an investor in the SAT 3 submarine cable. This can provide networking and communication services over analog or digital lines at speeds ranging from 4Mbits/sec to 155Mbits/sec. However, this capability has not been exploited. Communication using radio frequency has been deployed in some regions and districts. The coverage of the radio frequency communication is restricted because of the disparate frequencies among regions and districts.

Hardware and Software

Implementation of ICT strategy requires the use computing equipment, software application, communication devices and personnel with technical and functional skills. The standardization of specification for hardware, printing communication equipment and its consistent application, compatibility of operating systems coupled with the use of common protocols for radio communication and availability of technical support are a critical success factor for any ICT project.

Standardization and the specification of hardware and software at the Ministry of Health and its agencies have not been reviewed in line with the rapid technological changes. Procurement of computing equipment and peripherals use in service delivery and emerging service needs like the NHIS and other software demands are not well co-ordinated because of inadequate technical knowledge.

Issues like functionality, technical support and availability of spare equipment parts and ultimately integration or networking with other systems are not considered in the decision-making process.

Although a schedule for planned preventative maintenance exists, low emphasis is placed on the maintenance of ICT equipment. An institutionalised planned preventative maintenance of ICT equipment is urgently needed. This plan will not only safeguard investment in the infrastructure, but also will ensure the equipment's smooth operational functionality until the end of its useful life. The Ministry of Health has an Information technology (IT) Unit that provides support for hardware, software applications, multimedia and desktop publishing to all the administrative office within the MOH/GHS complex. But, there is currently very sparse IT support at the regional and district level. Consequently, the MOH IT unit plans to train and establish ICT focal points in each of the 10 regions.

Security and Data Protection

Security with respect to granting users access to data and information, accessing and manipulating data and information over an extensive network needs to be addressed. Maintaining the integrity of data and information requires detailed and extensive planning. Security breaches and systems failures with its attendant loss of information, loss of privacy and high cost of recovery poses a major challenge.

The use of antivirus software for protection against computer viruses, firewalls and intrusion detection systems for filtering access to information, use of passwords for authentication, formulation of disaster recovery plans, routine backup procedures, deployment of software updates, documentation on all ICT infrastructure are a few of the best practices for security and data protection. Keeping proper documentation on ICT facilities like network topology and computing equipment register has not been done. Also, safeguarding ICT equipment from pilfering and theft, access to patient's electronic records and its legal implications have not been addressed.

Cyber criminality is rising in proportion to the increasing use of the Internet. Fear of software security breaches hinders the progress of ICT especially in healthcare. No framework has been outlined for dealing with patient data confidentiality and protection in Ghana. This poses a serious threat to the implementation of any ICT policy in the health sector.

Health Information Systems Development

There are very few electronic information management systems in use within the public sector in Ghana. The following systems are deployed within the public healthcare sector:

- **Budget and Public Expenditure Management System (BPEMS):** BPEMS is a government-wide system introduced by the Ministry of Finance. The system supports nearly all-financial transactions and is also used to prepare budget submissions by regions, district and sub-districts. As stated earlier, BPEMS runs over a Wide Area Network technically supported and financed by the Ministry of Finance (MOF). Networking and telecommunications issues have hampered deployment of the system to all the ten regions.

- **Integrated Personnel and Payroll Data Base:** This system is hosted and managed by the Office of Controller and Accountant General. It is a government-wide system that maintains and prepares the payroll all government staff. Five ministries, including MOH, are directly connected to the system's database.

- **A District Health information System** has been designed and deployed for capturing routine data, a quarterly TB data and a client satisfactory survey data at the district level.

- **Non-routine data such research reports are not available online.**

Several bespoke applications are also being used for reporting purposes by parallel programs. However, the systems designed are fragmented, small and not designed to support networking or integration into other systems. Thus within the public health sector, financial, clinical and patient-based systems are not integrated.

The architecture available does not allow for distributed data access and is not intended to form an integrated health information management system. Emergency response and tracking systems based on integrated networks and database systems for disease surveillance and control and ambulance service are non-existent.

Criteria for data collection and collation between the private and public and among other stakeholders in the healthcare industry have not been standardized. Most importantly, there is no system that supports the flow of information between the public and private healthcare sectors.

2.2 ICT Human Resources Capacity

The shortage of IT professionals with the appropriate IT skill sets poses the most significant challenge to the effective implementation of an ICT policy in Ghana. There are relatively fewer ICT professionals in Ghana as compared to the western nations. The public healthcare sector's ability to attract and retain highly skilled IT professionals is limited due to its comparatively low salary levels.

Attention has not been given to the following human resources issues linked with the deployment of ICT.

1. Availability of IT professionals (hardware, network and systems administrators, database administrators and help desk support staff).
2. Recruitment procedures, placement in the organization and mechanism for retaining IT staffs.
3. Mandatory ICT training for all health sectors personnel and person undergoing training at any healthcare institution. This will accelerate and promote the full use of ICT.
4. Health training using eLearning components like telemedicine, CD-ROM-based, Network-based, Intranet-based or Internet-based.
5. Health education on preventative care.

2.3 The Private Healthcare Sector

The private health sector in Ghana is a vital and growing source of healthcare delivery and pharmaceutical services. It is estimated that the private sector provides about 42% of the healthcare services in the country. However, an effective partnership between the public and private health sectors is non-existent despite the overwhelming presence and importance of the private sector. The public sector acknowledges this, and has stated the following challenges in its 5YrPOW:

- The scope of the private sector is not clear
- Collaboration between the Ministry and private practitioners in providing service is still on a volunteer or ad hoc basis
- The engagement of NGOs, in both policy formulation and implementation is still limited and mainly involves international rather than local NGOs
- The MOH Private Sector Unit has limited capacity to develop strategies for wider private-public sector partnerships in core healthcare or in support services

- The potential to involve public sector health workers in intramural practice has not been explored in any detail

In addition, the 2002 External Review Report on the Programme of Work stated that "the continued failure to take private sector activities fully into account in planning government services and, despite substantial progress in preparation during 2002, the slow progress in realising the Minister's vision of a coherent, well-regulated, pluralistic sector".

The most significant consequence of these challenges is the relatively low rate or lack of information exchange between the public and private sectors. For instance, very little is known about the following issues within the private sector: infection rates for priority health diseases, the cost of private healthcare delivery, traditional medicine and pharmaceutical issues. These challenges will also complicate the implementation of a health sector-wide ICT policy. It is crucial that the public sector engages the private sector in the implementation of the ICT policy, taking into account the particular financial and operational issues that plague the private sector.

It should be noted that the public sector enjoys a relatively good partnership with the Christian Health Association of Ghana (CHAG). This will prove particularly helpful since CHAG is currently developing and implementing its own ICT policy and strategy.

2.4 Planning and Funding

The 5YrPOW list the following as strategies to achieve the public sector's objective of improving the use of information technology:

- Streamline the deployment and use of ICT to the implementation of the ICT policy
- Develop in-service training for staff to improve capacity for using technology
- Develop multimedia mechanisms for dissemination of information and improvement of communication in the health sector, increased use of the Internet and local area networks to improve internal and external communications for BMCs

The development of these strategies has been slow because apart from stating the strategies in the 5YrPOW, very little attention and planning have been given to their implementation. It has been observed that planning and budgeting for ICT activities is largely overlooked by the public healthcare sector. Indeed, the previous *ICT Policy and Strategy for the Health Sector in Ghana* was not

implemented in the sector. There has been a lack of corporate will in furthering an ICT agenda in the health sector. This has resulted in very poor planning and budget for ICT activities in a sector overburdened with financial and operational issues. In some instances, ICT is seen as a luxury, as opposed to a necessary tool to enhance and improve healthcare delivery in the country.

3. HEALTH SECTOR OBJECTIVES AND ICT – THE CASE FOR THE STRATEGY

The Ministry of Health, in consultation with its agencies, development partners and the private sector, developed the first 5-Year Programme of Work (1997-2001) within the framework of the government's Medium Term Health Strategy. A review of the 5YrPOW I in "The Health of the Nation" report revealed that while improvements were achieved, for instance in under-five mortality and immunization rates, a number of significant problems worsened. These problems include:

- A low availability and use of government health and health related interventions
- Growing financial barriers to access which excluded poor people from taking advantage of available health services
- The health care delivery system had not been responsive to consumer needs
- A high loss of human resources from the sector which was almost equal to the number of people being trained
- Generally low productivity in the sector
- The per capita expenditure on basic health service was below the level necessary for good service provision
- Limited integration of the private sector for service delivery

These prevailing problems informed the development of the second 5-Year Programme of Work, which is an integral component of the Ghana Poverty Reduction Strategy (GPRS). The key priority issues for healthcare in the GPRS are:

- Bridging equity gaps in access to quality health care and nutrition services
- Ensuring sustainable financing arrangements that protect the poor
- Enhancing efficiency in service delivery

The GPRS classifies women, children, the disabled, the elderly, and people living with HIV/AIDS as vulnerable and excluded groups, and also identifies Northern, Upper West, Upper East and the Central Regions as priority areas.

The second 5-Year Programme of Work also expanded the definition and scope of the health sector to "*include government health services, private, traditional and non-governmental providers, civil society, and community groups*", and insisted that "*a well-functioning health system also depends upon collaboration and partnership with other ministries, departments, and agencies (MDAs) whose policies and services have a major impact on health outcomes*".

The vision of the second 5-Year Programme of Work titled <u>Partnerships for Health: Bridging the Inequalities Gap</u> is the *improved overall health status and reduced inequalities in health outcomes of people living in Ghana*. The strategic objectives of this vision are:

- To increase access to health services
- To improve quality of health delivery
- To improve the efficiency of health services delivery
- To foster partnerships in improving health
- To improve financing of the health sector

Information, communication and technology can make a significant contribution to the realization of these strategic objectives. Firstly, education and information are essential for health promotion, improvement in quality of life, disease control, health administration and management. According to the African Development Forum, while the global stock of medical knowledge has grown, access to good health information within the African health sector and by African health care professionals has decreased substantially[4]. This is most unfortunate in a sector that is so heavily dependent on good, reliable and timely information. Secondly, information and communication technologies can be used to promote better health behaviour, to promote exchange of information among peers in the health sector, to enhance evidence-based decision-making, improve financial management, improve efficiency, and empower communities to make informed choices about their health. In the current technological environment, all aspects of healthcare can be enhanced by information and communication technology.

However, in the context of the above objectives, the deployment and use of information and communication technology presents several challenges. Primarily, the strategies require that systems should be put in place to ensure that the sector is able to respond to local health needs. It is also important that, whilst building the ICT capacity to respond to local health needs, the sector also ensures that the methods of performance assessment are included in the routine data collection, analysis and dissemination processes.

Increasing access to health services

Access to health services, especially in the rural areas, is very limited. In certain areas, particularly in the northern sector, over 70% of the population do not have access to health services. Factors such as an insufficient number and quality of service delivery points at the local level, a weak referral system and a poor transportation infrastructure contribute greatly to this low level of access. Specialist support to the regions, district and sub-district levels is lacking. Health facilities in rural areas only provide partial services because over 80% of

specialist services are concentrated in the regional capitals, and other urban centres. Indicator figures for 2004 show that the national doctor to population ratio as 1:17,615 and the national nurse to population ratio as 1:1,513[5]. These figures, already very low, are projected to decrease substantially in this decade as Ghana struggles with a crippling shortage of healthcare professionals. Access to health services is also constrained by the need to travel long distances to reach primary facilities. On average, over 40% of the population live beyond one-hour travel time to a health facility. In most of these areas outreach services are few and far between.

The strategies adopted to overcome these constraints include:
- Improving geographical access through the building of new facilities such as the Community Based Health Planning and Services (CHPS), and the introduction of specialist outreach services, increased access to emergency and primary services, and reviewing patient emergency transfer facilities.
- Improving financial access through district health insurance schemes, focusing public expenditure on a priority package of health interventions
- Improving socio-cultural access by ensuring the appropriate access to services for priority groups (e.g. women, children and the disabled)

All these strategies have large recurrent implications, and the mounting costs may affect expansion in the long run. However, information and communication technologies will help in bringing specialists skill to the district and sub district levels, and also provide policy makers with a clearer understanding of the health problems at the these levels for more precise planning and programming. In addition, ICT can improve access to primary health care through telemedicine applications community health information systems that can monitor health status, identify community health problems and promote the appropriate responses; and through the dissemination of health information by radio and video transmission, and on the Internet.

Improving quality

The low level of technical competence, a poor handling of emergencies, as well as frequent shortages of drugs and medical supplies have been identified as major barriers to quality care. The underlying causes include the low level of skill among health workers at the periphery, poor physical infrastructure, mal-distribution of staff, lack of supervision, monitoring, and regulation of staff and of service delivery. The strategies to overcome these barriers include efforts to improve staff skill through basic and in-service training, improvement of transport and communication systems, redressing the unfavourable distribution

of staff, the development and promulgation of a Citizens Health Charter, and strategies to improve the sector's responsiveness to client needs.

The above strategies will take a long time to really have the desired effect of ensuring a minimum quality of care standard across the country. In this regard, a constant and sustained support from the central and regional levels will be required as a means of bridging the quality gap. Information and communication technologies will need to be deployed to facilitate skill transfer, enhance service supervision, and enable a rapid response to emergencies and adverse health events even in very remote areas.

Improving efficiency

The Ministry of Health headquarters functions as a conglomerate of different agencies. Each of these divisions and units has its own programmes, which are independently developed and implemented. This has led to a duplication of efforts, inefficient use of resources and lack of synchrony in programmes and agencies. Coupled with this problem is the absolute lack of information on programmes of the various divisions. This state of affairs can be generalized across the entire health sector, public and private.

The lack of adequate, organized, reliable and timely information leads to the mismanagement of the health of patients, resources and time. In addition, the non-existence of an adequate system to manage and disseminate information hampers the efficiency of the sector. The sector has identified improvements in cost effectiveness, planning, management and administration as strategies to combat systemic inefficiency.

Information and communication technologies will need to be employed as a means of managing and disseminating information. For example, a health information system that integrates electronic patient records, clinical data, pharmaceutical receipts, epidemiological surveillance with financial and other health management information (e.g. accreditation, food and drugs information, traditional remedies etc) is essential for cost effectiveness, and can also have a substantial impact on quality of care. However, in the face of limited resources, there is the need to put in place minimum standards to ensure systems compatibility and cost efficiency.

Fostering partnerships in health

There is a growing private health sector (including missions) without adequate regulation, control and integration with the public sector even though 40% of

people who seek healthcare do so from them. This private/public sector non-relationship is worsened by the lack of information and collaboration across the entire health sector, which in turn has resulted in a duplication and dissipation of efforts, a lack of holistic planning and an inefficient implementation of health programmes.

The sector's strategy is to bring all sectors on board to plan and implement health programmes. Contractual agreements and procedures will form the basis for most of the programme implementation arrangements. The pooled donor funds arrangements imply that donor involvement in programme implementation will be limited. Information to support further assistance will therefore have to come from the overall performance assessment exercise.

For the majority of stakeholders, the need for information will be more frequent than the annual review programme. This will require a system of information dissemination and sharing over a wide area and involving large amounts of current information. This demand can effectively be met by taking advantage of information and communication technology.

Increasing funding to the health sector

Funding to the health sector has persistently been low over the last decades. The total expenditure on health has averaged about $14 per capita with about 50% being out-of-pocket payments. The linkage between capital development and recurrent cost implications is not clear. The sector's strategy is to ensure that absolute funding to the sector is increased through both government budgetary allocation and donor support with a concurrent shift of resources to the district level. The increasing burden of out-of-pocket payments led to the launched National Health Insurance Scheme (NHIS) in September 2004.

The role of Information and communication technology in this regard is crucial and varied. A conscious effort must also be made to ensure that closer monitoring is effected at the periphery so that the objectives of resource shift are met. The health insurance scheme will require an extensive record keeping system, which can only be managed with the support of information technology. Ultimately, the sector must be able to market itself to the outside world, in order to attract donor funding.

4. GHANA ICT FOR ACCELERATED DEVELOPMENT (ICT4AD) OBJECTIVES FOR THE HEALTH SECTOR

The vision of the Ghana ICT for Accelerated Development (ICT4AD) is to: "*improve the quality of life of the people of Ghana by significantly enriching their social, economic and cultural well-being through the rapid development and modernization of the economy and society using ICTs as the main engine for accelerated and sustainable economic and social development*".

ICT4AD's main mission is to: "*transform Ghana into an information-rich knowledge-based and technology-driven high income economy and society*".

The ICT4AD policy document states the following objectives for the health sector:

1. To improve the health status of the population while focusing efforts on reducing inequalities in health.
2. To promote the implementation of telemedicine applications within the health delivery system.
3. To integrate and deploy ICTs in health program delivery with targets for health education, training and preventive detection.
4. To support the dissemination of preventive information for the general public, and in particular for HIV/AIDS.
5. To utilize ICTs as a tool for collecting community information, linking health care professionals and enhancing health administration, remote diagnostics, and distribution of medical supplies.
6. To increase geographical, financial and socio-cultural access to health services.
7. To improve quality of health delivery, improving health-worker-performance and responsiveness to client needs.
8. To improve the efficiency of health service delivery, improving cost effectiveness and planning, management and administration.

These objectives have been subsumed into four main thematic areas for the purpose of developing strategies. These areas are infrastructure development, access to and management of health information, access to quality health services and human resources development in ICT. The following section presents strategies under the four thematic areas.

5. THE ICT STRATEGY FOR THE HEALTH SECTOR

5.1: ICT4AD Health Policy Statement

The Government of Ghana is committed to implementing a number of initiatives aimed at facilitating the widespread deployment and utilization of ICTs to support the activities and the operations of the health delivery system through out the country.

As part of this commitment, the Government shall:

- Invest in ICT-based healthcare systems to ensure that all Ghanaians have access to adequate, appropriate and timely healthcare services;

- Facilitate the deployment and implementation of ICT-based programs that efficiently and effectively utilise scarce human resources in healthcare delivery system;

- Partner with private sector and civil society in the deployment and utilisation of ICTs in the health sector;

- Develop legal, regulatory and ethical frameworks for effective use of the health information and implement measures to safeguard the privacy of patient information;

- Use ICTs in the management and treatment of malaria, HIV/AIDS, maternal reproductive health, other diseases and pandemics.

5.2 Goal

The development and implementation of an information and communication technology (ICT) programme to transform the entire health delivery system and to support the achievement of the vision of the health sector.

5.3 Objectives and Strategies

Four thematic objectives, with associated strategies, have been identified to achieve the vision and objectives of the ICT4AD health policy statement.

Objective 1:   Improve the Information and Communications Technology Infrastructure in the Health Sector

Strategy 1.1:   Facilitate and improve connectivity and access to communication services, including the Internet, in all types of healthcare and health-related institutions and organizations.

Strategy 1.2: Provide adequate ICT hardware, software and tools at all levels of the healthcare delivery system to support the collection and use of healthcare information.

Objective 2: Improve Access to and Management of Health Information

Strategy 2.1: Develop and Deploy a System of ICT-based Programs to Disseminate Health Information

Strategy 2.2: Develop and Deploy a Network of Health Information Management Systems

Objective 3: Improve Access to Quality Health Services

Strategy 3.1: Deploy Telemedicine Applications in the Health Sector

Strategy 3.2: Deploy ICTs To Enhance Referral, Emergency and Disaster Management Systems

Strategy 3.3: Deploy ICTs to Support and Enhance Blood Banking and Organ Donation Systems

Objective 4: Improve ICT Knowledge, Capability and, Utilization Among Health Workers

Strategy 4.1: Provide training in ICT skills to all prospective and current health workers

Strategy 4.2: Develop and maintain a critical group of ICT specialists in the health sector

Strategy 4.3: Develop and deploy ICTs to support and enhance the job functions of health workers

Objective 1: Improve the Information and Communications Technology (ICT) Infrastructure in the Health Sector, that is within all government health institutions, in quasi-government, mission and private sector health institutions, and at all levels (national, regional, district and sub district) of the entire health system.

Strategy 1.1: Facilitate and improve connectivity and access to communication services, including the Internet, in all types of healthcare and health-related institutions and organizations

The ultimate result of this strategy is a health sector that is connected within and without itself through a diverse set of communication platforms and devices. This inter- and intra-connectivity must enhance communication for all segments of the health sector regardless of location, particularly distance from the major urban areas. This communication network must be integrated, secure, fully interoperable with other networks, and must provide connectivity and access to the Internet for all professionals, workers and consumers in the health sector.

Strategy 1.2: Provide adequate ICT hardware, software and tools at all levels of the healthcare delivery system to support the collection and use of healthcare information.

All types of health institutions and all classes of workers shall be provided with the appropriate and adequate technological tools, both hardware and software, to support and enhance service delivery and management.

Objective 2: Improve the Access to and Management of Health Information.

The ultimate goals of this objective are the improvement in health outcomes of healthcare consumers, and the increased efficiency and effectiveness of health services.

The ICT4AD policy and objectives for the health sector clearly state that the access to and dissemination of preventive health information are key factors for combating national health threats. A number of diseases have been identified by the health sector as priority diseases targeted for control or eradication in the medium term. This is due to "their actual impact on health or because of the current large disparities in health outcomes between regions, and between urban and rural areas". These diseases collectively pose the greatest disease burden but are most easy to prevent, eradicate or cure. The priority diseases are:

- HIV/AIDS/STI
- Malaria
- Tuberculosis
- Guinea worm
- Poliomyelitis
- Reproductive, maternal, and child health
- Accidents and emergencies
- Non-communicable diseases
- Oral health and eye care
- Specialist Services, including psychiatric care

However, the information required to improve health behaviour is often inadequate or cannot be accessed by the health consumer. Not surprisingly, the urban and rural poor pay the greatest price, both in health outcomes and in actual financial costs, for this health informational vacuum. ICTs can be used to disseminate a wide array of health information from basic health care issues to environmental sanitation practices. This will empower consumers to make informed decisions about their health.

The health sector needs information of the highest quality for evidence-based transactions and decision-making. Challenges such as the lack of reliable information, not knowing when and where information is needed, and not knowing how to effectively use the information even when it is available, are all major barriers to the provision of quality health services and most importantly, results in decreased inefficiency and effectiveness (in cost and services) of the sector. Conversely, the manner with which health data and information are managed is a critical determinant in improving cost-effectiveness of health care services.

Strategy 2.1: Develop and Deploy a System of ICT-based Programs to Disseminate Health Information

A system of ICT-based Health Dissemination programs will be developed and deployed over the entire nation. It will be accessible to all types of health information consumers and users, including but not limited to patients, healthcare workers, researchers and students. Special emphasis will be placed on making both the content and the modes of delivery of health information accessible to vulnerable groups such as women, children, the disabled, the elderly, and the rural poor. The system of programs will be conceived in a manner that allows for and depends on extensive participation by the mission institutions, quasi government institutions, the private sector and non-governmental organizations. It will deliver all types of health information, including but not limited to:

- Preventive health
- Environmental sanitation
- Maternal and Reproductive Health
- Child Health
- Malaria
- HIV/AIDS
- Tuberculosis
- Nutrition
- Adolescent and Youth Health Issues
- Insurance Issues
- Traditional Medicine
- Drug Information

- Information on local health facilities
- Community-specific health issues
- Evidence-based research information

In its mandate to reach as large a population and as wide an area, all types of technologies (e.g. wireless, radio, video, voice-based, web, different storage devices) will be employed for information delivery. Examples of the types of ICT-based programs of a Health Information Dissemination System are:

- A web-based Health Information Portal for health consumers
- An evidence-based Health Research Information website
- A Youth Health Information Network that includes websites, radio and television transmissions
- Disease management information on different portable and storage devices

Strategy 2.2: Develop and Deploy a Network of Health Information Management Systems

A network of Health Information Management Systems will be developed and deployed for use across the entire health sector. The principle aim of this strategy is to support the efficient management of the entire health sector. However, the nature, scope, and size of the network will differ or change over time depending on the availability of inputs such as funding, IT expertise and infrastructure. This network of information systems will manage all the types of information needed and collected in all sections of the health sector such as:

- Health Administration (e.g. financial, accreditation)
- Clinical/Hospital
- Public Health
- Traditional Medicine
- Community or District-based
- Private Health
- Emergency
- Health Literature
- Pharmacy and Medical Supplies
- Insurance

This network of health information systems must

- Automate a large amount of the work;
- Make information and knowledge available to all levels (district, regional, national) within the health sector when it is needed;

- Support feedback, monitoring and evaluation
- Provide the information needed to address health inequalities.
- Combine information from other sectors
- Provide information to support research and education

The information systems network should not be based on any proprietary features and should be fully complaint with international norms and standards for data, coding schemes and software. It must be built in incremental steps using modular elements and thus should evolve from a network of stand-alone systems to a fully integrated eHealth information management system that makes extensive use of electronic health records (EHR).

Objective 3: Improve Access to Quality Health Services.
The goal of this objective is the use of ICT to decrease the widening health gaps between the rural and urban populations, and also between rich and poor citizens, through access to quality health services. Within the health sector, access to quality health services is impeded by several factors such as the dwindling number and the mal-distribution of health care professionals, an inadequate patient referral system and, a poor transportation infrastructure that hampers travel to and from health facilities over long distances. These factors also lead to an imbalance of supply and demand of health care services. The following strategies will improve access to quality health services by lessening the effects of the above factors on health status and outcomes.

Strategy 3.1: Deploy Telemedicine Applications in the Health Sector.

This strategy will introduce a telemedicine network throughout the country. Telemedicine has been defined as the use of information and communication technology to provide diagnostic and therapeutic medical information between patient and doctor without either of them having to travel.

The benefits of telemedicine include**:**
- Improved access to medical care for geographically or socio-economically isolated patients.
- Prevent unnecessary patient travel to secondary or tertiary health care centers.
- Augmentation of the quality, continuity and affordability of medical care.
- Assist preservation of the patient's current provider-to-patient relationship while facilitating access to specialty care.
- Effectively utilize medical resources by creating an integrated network of primary, secondary and tertiary care.

Telemedicine can address the several problems that currently plague the health sector such as the brain drain among health professionals at all levels of service

delivery; the geographical mal-distribution of health professionals and by level of service delivery, the lack of continuity in services delivery, with poor referral mechanisms between levels and between non-government providers (NGP) and government services and; the underperformance of Ghana's hospitals resulting from excess capacity at district and regional levels and overcrowding at the tertiary level, largely with patients who could be treated more efficiently elsewhere.

The telemedicine network will be used to

- Promote and improve rural patient management;
- Promote access to specialists for diagnostics in areas of chronic shortage including radiology, pathology, dermatology, ear-nose-throat speciality, emergency care/ambulance, cardiology, EKG-transmittance, physiology, endoscopy, surgery (e.g. neurosurgery and orthopaedics);
- Improve consultation (Tele-consultation) between remote health workers and specialists in the above fields;
- Support primary and home care (Tele-homecare) especially for homebound chronically ill and frail elderly persons whose mobility is limited by illness, transportation costs, or other factors.

Strategy 3.2: Deploy ICTs To Enhance Referral, Emergency and Disaster Management Systems

This strategy will improve access to quality services through the utilization of a wide variety of "low" to "high" technological and communication tools to support and enhance the referral, emergency and disaster management systems. Specifically, ICTs will be utilized to
- Transmit verified and authenticated emergency and disaster information to both the communities most likely to be affected and the appropriate authorities who manage such events;
- Enhance the management of adverse incidents and;
- Coordinate health emergency relief systems.

Strategy 3.3: Deploy ICTs to Support and Improve Blood Banking and Organ Donation Systems

Patients' access to essential and quality health services such as blood banks and organ donation is very limited and further hampered by inadequate collection, distribution, communication and transportation systems. ICT tools will be used to

- Improve the collection and donation systems by utilising a wide variety of ICT-based broadcast systems

- Improve efficient management of resources through computerization systems
- Improve equitable distribution through the use of registries

Objective 4: Improve ICT Knowledge, Capability and, Utilization Among Health Workers

The mobilisation of health workers to support the process of moving the health sector into the information age is a top priority of the Ministry of Health. Consequently, the Ministry of Health is fully committed to putting in place and facilitating the implementation of a comprehensive human resource development programme, targeting critical ICT skill areas across the health sector to support the development of the health delivery systems.

Strategy 4.1: Provide training in ICT skills to all prospective and current health workers

Future leaders and workers in the health sector must be well-versed and skilled in IT use. Whether clinical, public health, managerial or administrative, all workers in the health sector must be adequately familiar with information technology in order to perform efficiently in their jobs. However, the exposure of most health workers to ICT is low to non-existent. The situation must be radically improved if the plan to transform the health delivery system through the adoption of ICT is to succeed.

This strategy will result in the development of the health sector's human resource needs in critical ICT skill areas and will focus on:

- Pre-employment acquisition of ICT skills in training institutions
- In-Service training in ICT skills

STRATEGY 4.2: Develop and maintain a critical group of ICT specialists in the health sector

A core cadre of IT specialists must be resident at the Ministry of Health Headquarters, in each of its agencies and, at the district and regional levels. Each team must comprise all or any combination of the following positions:

- o Health System Infrastructure Architect
- o Network Leader
- o Digital Security Expert
- o Lead Systems Developers
- o Database Administrators
- o Network Administrators

- o Programmer Analysts
- o Business Analysts
- o Application Deployment Officers

These teams will be responsible for the overall development, deployment and operations of the health sector's IT infrastructure and related systems. These specialists can be employed by the sector or their services outsource to private businesses.

Strategy 4.3: Develop and deploy ICTs to support and enhance the job functions of health workers

This strategy will institute a multiplicity of ICT tools, the utilization of which will improve the overall job performance of health workers. Specifically, ICTs will be used to

- Enhance continuing medical education especially through tele-education
- Establish an interactive community for health workers
- Support rural-based providers and thus remove the obstacle of professional isolation
- Support, promote collaboration and dissemination of health research

6. PROGRAMS, INITIATIVES AND ACTIVITIES

An initial set of programs, initiatives and activities have been identified as essential for the attainment of the health sector's ICT objectives and strategies.

Strategy 1.1: Facilitate and improve connectivity and access to communication services, including the Internet, in all types of healthcare and health-related institutions and organizations

1. **Networking Program** – All existing and new healthcare institutions (national, regional, district) will be networked to provide access to the Internet and to the Health Sector's Intranet. This program presupposes that the Government of Ghana will deploy a national network infrastructure to which the health sector can utilize.

2. **Security, Privacy and Data Protection Program** - This program will formulate procedures for deployment of network management and monitoring software, firewall and anti-virus software for securing the network from internal and external threats, and the tracking of access privileges. It will also ensure the integrity and confidentiality of data, routine backup procedure and include an emergency recovery mechanism.

Strategy 1.2: Provide adequate ICT hardware, software and tools at all levels of the healthcare delivery system to support the collection and use of healthcare information.

3. **ICT Census** – A census will be taken to determine the scope of ICT activities in the health sector at primary, secondary and tertiary institutions; and also at the national, regional and district levels. It will capture information on:
    - Range of hardware and software
    - Network Connectivity
    - Types of applications
    - Levels of ICTs utilization
    - Range of database management systems in use
    - Types of ICT programs e.g. Telemedicine
    - Number and skill set of ICT human resources
    - ICT or help desk support
    - ICT funding

4. **Hardware and Software Program** - The program shall include planned preventive maintenance for existing hardware, standardized specification guidelines for the procurement of new hardware, and a phased hardware replacement program. A standard platform of network application software

development shall be specified. A system for reviewing and updating all software and hardware standards will be put in place and updated yearly.

<u>Strategy 2.1: Develop and Deploy a System of ICT-based Programs to Disseminate Health Information</u>

5. **Health Information Portal Project** - This project will result in the development of a public awareness system through the Internet. The guidelines for the design of the portal, how and what types of information are presented and update cycles will be developed by the all the partners in health sector. Some functionalities of the Portal will be:

   - Personalization and notification – allowing users to select and receive information relevant to their interests and roles.

   - Searching – the ability to search for information buried across multiple formats and sources.

   - Unified access – organizing and disseminating information assets, whether structured (databases, spreadsheets) or unstructured (e.g. documents, web pages).

   - Strict security models – ensuring various levels of security to ensure information is accessible yet protected.

   - Content submission and sharing – allowing collaborators to share valuable information in a simple, effective manner.

   - Intelligent classification – allowing the subject matter to be organized according to various standards and taxonomies (e.g. scientific, legal, public categorisation).

   - Common terminology – the portal will provide a medium to establish a common metadata repository, ensuring consistency in understanding of information.

6. **Radio, Audio and Video Health Transmission Initiative** – The goal of this initiative is the dissemination of health information to the portion of the population that are illiterate, who live in rural areas, and other people who may benefit from targeted specialized health information (such PWLHA, women, the disabled). The radio, audio and video programs will be produced by all segments of the health sector and will, most importantly, benefit from the involvement of non-governmental organizations and academic institutions. These programs can be broadcast at health, educational and social facilities.

7. **Youth Information Network** – The aim of this network is to build a nation –wide platform, with extensive representation at the district and community levels, through which information can be accessed and shared by the youth. Information on HIV/AIDS, teenage pregnancy and other youth-centred health challenges will be available. In addition, this network will link schools, community centres, NGOs and other youth-centred organizations such as virgin clubs. Information will be available through specialized websites, online forums, radio and television programs, the arts, and through mass storage and interactive technologies.

<u>Strategy 2.2: Develop and Deploy a Health Information Management Systems Network</u>

8. **Consolidated Health Information System Initiative** – A Consolidated Health Information System that consolidates existing health data that are already collected throughout the entire health sector will be developed and/or purchased and deployed across the health sector. This system will unify all the diverse public health surveillance software platforms currently in use by the parallel programs (EPI, Reproductive and Child Health, AIDS Control, Disease Surveillance, etc) in the health sector. This approach produces usable (and useful) automated support in a fairly short time frame (6-12 months). The system will include the following components:

   - A central repository or databank at the national level that will provide aggregated and disaggregated data for use by all authorized persons and non-private data for the general public
   - A set of agency-specific distributed and linked databases
   - A system of assuring quality and validation of data in the repository
   - Modules that provides for comprehensive and frequent feedback
   - Can be deployed over the Internet

   The Consolidated Health Information System must have an open architecture and be built on an open software platform to allow for modifications over time. The Ministry of Health will set the software and database management system platform in consultation with its agencies, other ministries, stakeholders and partners in the private sector.

   Each agency will have its own system and data repository within the system. However, some agencies will deploy their system(s) across the entire nation's health sector. For instance, the Hospital Management Information System, developed or purchased by Ghana Health Services, will be deployed

in all hospitals, including the Teaching Hospitals. This will ensure nation-wide compatibility. Private sector institutions, such as CHAG, other private hospitals and health-related NGOS can also use the system to collect, collate and analyse health data.

It is expected that the initial set of systems will include:

- Ghana Health Services Information System
- Teaching Hospitals Information System
- National Health Insurance Information System
- Food and Drugs Board Information System
- Pharmacy Information System
- Nurses and Midwives Council Information System
- Medical and Dental Council Information System
- Private Hospitals and Maternity Homes Information System
- Traditional and Alternate Medicine Information System
- National Emergency Information System
- CHAG Information System
- Private Sector Information Systems

Agencies and private sector users of the system will designate an authoritative source for all data entered into the system. The consolidated system must facilitate collaboration, information exchange and dialogue between the Ministry, its agencies and the private sector. The Ministry of Health will provide technical and financial assistance to agencies to adapt the system to their own mandates and contexts and will facilitate the corresponding process within the private sector. The Ministry of Health will also provide technical and financial assistance to BMCs for the deployment of the system, and will also support the training of staff in maintenance and use of the network of systems.

9. **Hospital Management Information System (MIS) Project** – The deployment of a Hospital MIS will be the first priority of the Consolidated Health Systems Initiative. The MIS will be chosen through competitive bidding and in full compliance with the country's procurement laws. The selected system will include but not limited to the following core modules:

- Admissions, Discharge & Transfers;
- Minimum Data Set of Patient Records;
- Order Entry
- Laboratory
- Pharmacy, and
- Patient Billing

The selected MIS must also meet the information requirements of the National Health Insurance Scheme.

10. **Migration to Integrated Health Information System Project** - A significant limitation of the consolidated system is the degree of integration of service information. In the consolidated system data are aggregated, usually at the facility or community level, before it enters the system. This tells us nothing about the clients, their socio-economic characteristics, or the quality and cost of services delivered, for example. This sort of analysis requires special studies such as surveys, or reconfiguration of the whole information system, including data capture forms. In theory, health sector information can also be correlated with information from other sectors such as education, agriculture, and commerce, to deal with issues such as malnutrition and to project future needs and opportunities. Such a system can also provide a foundation for countless research opportunities. An approach that integrates client information from multiple clinical encounters, and the resources used during these encounters, can capture information needed for this detailed analysis. This system requires a unique identifier per health record or data. It can be used to support regulatory functions such as licensing and accreditation, and can also form a basis for actuarial analysis leading to better estimates of the expected costs of health care. An integrated system like the one described is an evolving platform for recording and analysing information. It should not be based on any proprietary features, and should be fully complaint with international norms and standards for data, coding schemes and software. It must be built in incremental steps using modular elements. Migration to this type of system will take several years or maybe decades. The project will begin with the planning and budgeting for the proposed migration.

11. **District Information Systems Development** -

Strategy 3.1: Deploy Telemedicine Applications in the Health Sector

12. **Telemedicine Development Committee** – The work of this committee will be to review and recommend a telemedicine framework for the health sector. The initial work of this committee will be to identify basic healthcare needs, assess the ICT infrastructure, investigate any restraining and enabling factors, and explore and recommend any telemedicine technological solutions that will ultimately improve the delivery of health services especially in the rural areas.

13. **Telemedicine Pilot Project** – A telemedicine pilot project will be developed and launched, based on the recommendations and work of the Telemedicine Development Committee.

Strategy 3.2: Deploy ICTs To Enhance Referral, Emergency and Disaster Management Systems

14. **Radio-based Links Project**- This project will introduce radio links between district health system sites and other health sites in close proximity (approximately 10 kilometer range).

Strategy 4.1: Provide training in ICT skills to all prospective and current health workers

15. **Health ICT in Educational Programs Initiative** - The Health Sector will, in consultation with the Teaching Hospitals Councils, the five public universities and other public and private tertiary education and training institutions, develop and incorporate IT courses into their respective curricula. The curricula can offer a diverse number of courses on IT subjects that should include:

   - o Basic computing skills
   - o Internet and email
   - o Biomedical Informatics

16. **ICT Skills Set Project** – The Human Resources Divisions with MOH and its agencies will develop an appropriate ICT skill set for each type of job function within the public health sector.

17. **In-Service Training Program** – A training program that incorporates the following elements will be developed and deployed:

   - o Teaching the appropriate IT skills for the each job function or level
   - o Short-term training sessions
   - o Continually updating the IT skill sets

The training program can be outsourced to an IT educational institution

Strategy 4.3: Develop and deploy ICTs to support and enhance the job functions of health workers

18. **Interactive Health Network** – An interactive network will be developed for each type of health profession. It will link and provide professionals with a forum to discuss and disseminate health information. The network will include specialized websites, email, interactive chat rooms, electronic message boards, short messaging systems and information on CD-ROMs.

19. **Electronic Library Project** – An electronic library, both online and on CD-ROM, will be developed. The library will contain health journals and other research.

7. PRIORITIZATION AND TIME-LINES

The following table prioritizes and gives a time-line indication for each of the programs or initiatives outlined in the preceding section. The timely implementation of these programs and initiatives are subject to the availability of funds, the rate of infrastructure development and availability of ICT personnel

PRIORITY	ACTION	TIME-LINE
1	Establish the Health Information and Communication Technology Advisory Committee (H-ICT)	July - October 2005
1	Development of guidelines for ICT utilization and for the legislation of privacy and confidentiality issues	August – October 2006
1	Telemedicine Development Committee	July – August 2005
2	Establish ICT Task Force in each agency of MOH as needed	July - January 2006
3	ICT Census	June - August 2005
4	Implementation Plan for Health Sector ICT Policy and Strategy	June - November 2005
4	Complete hiring or outsourcing and reorganization of IT Core Technical Team at the national level	July – March 2006
4	Networking Program	July 2005 – no end date
5	Consolidated Health Information System	July 2005- June 2008
5	ICT Skills Set Project	July– October 2005
5	Radio-based Links Project	July – June 2007
5	Hospital Management Information System (MIS) Project	June 2005 – September 2006
6	Health Information Portal Project	July 2005 – July 2006
6	Telemedicine Pilot Project	September 2005
6	Health ICT in Educational Programs Initiative	September 2005
6	Security, Privacy and Data Protection Program	July – no end date
6	Hardware and Software Program	July – no end date
7	Radio, Audio and Video Health Transmission Initiative	September 2005 – March 2006
7	Youth Information Network	Sept 2005 – Sept 2007
7	Interactive Health Network	Sept 2005 – Sep 2007
8	Electronic Library Project	Nov 2005 – Nov 2007
9	Begin Planning to Migrate to Integrated Health Information System Project	September 2006

8. THE KEY IMPLEMENTATION AGENCIES

- Ministry of Health
- Agencies and Governing Councils of the Ministry of Health
- CHAG and Mission Institutions
- Private Sector Health Institutions and Businesses
- Non-Governmental Organizations
- Other Government Health Institutions
- Other Ministries, Department and Agencies of the Government of Ghana
- District Assemblies
- Health Training Institutions
- Health Research Institutions
- Public and Private Teaching Institutions
- The Public and Private Broadcasting (Radio and TV) Sector
- Telecommunications Sector
- The Armed Forces

9. NORMS, STANDARDS AND LEGISLATION FOR HEALTH SECTOR ICT

Technical norms, procedures, standards and legislation for the use and management of information must be developed and adopted. These should cover the following issues:

- Information content, such as coding and classification
- Procedures and standards on the protection and use of patient and other health related data and information
- Procedures on the procurement and standardization of equipment and software
- Standards and guidelines for ICT practice

9.1 Standards and Procedures for Information Content

Standard and procedures for information and communication management shall be developed and updated periodically through consultations within the health sector. Policies for data and information standards shall encompass:

- A unique electronic coding system for basic patient information
- A standard for the classification of diseases
- A standard for the classification of diagnosis and treatment

9.1.1 Patient Information Coding System

A unique coding system based on the provisions of **the Medical Records Policy** shall be adopted for all patients. The following minimum criteria should apply to the coding system:

- Each patient receiving medical care within the public health sector shall be assigned a unique number or identifier. The unique number will be applied to all health transactions of the patient. This will enable health providers to build a health history or an *Electronic Health Record* (EHR) on each patient. The coding will be directly applied to all information and communication systems within the public health sector.

- The unique coding system is only related to the public health sector. For the present, the public health sector will not subscribe to an integrated national unique coding system linked to non-health related issues to

avoid the potential problems with access of non-health related institutions that do not subscribe to patient-related privacy procedures.

- The private health sector shall be encouraged to adopt the same coding system.

- For each patient, a basic minimum set of patient data will be developed including at least Name, Address and other basic personal information.

- This minimum data set in combination with a standard way of registration (for example, the ICD-10) makes it possible to aggregate information for scientific and managerial purposes, and to compare figures of different regions and districts. Individual doctors or hospitals can always decide not only to use the minimum data set for collecting information, but also to register other data.

9.1.2 Standard Disease Classification System

A standard classification for diseases will be introduced to ensure effective registration and exchange of disease-related information. The following system will be deployed:

- International Classification of Diseases (ICD): ICD is a worldwide coding system for medical terms developed and updated by the World Health Organisation. The basic ICD is used for coding diagnostic terms and other families of medical terms. The most recent version, used by many countries including Ghana, is the 'ICD-10'. Other versions, which are used, are the ICD-9 and the ICD-9-CM.

9.1.3 Standard for Diagnosis and Treatment Classification

In the longer term, a standard for diagnosis and treatment classification will be introduced, which allows for the standard integration of diseases, treatment and budgeting along the following lines:

- Diagnosis-related groups (DRGs), which are a classification of hospital case types, types into groups expected to have similar hospital resource use. The groupings are based on diagnoses, procedures, age, sex, and the presence of complications or morbidity. The DRG enables the hospital or health facility to classify a hospital stay in terms of what was wrong with, and what was done for a patient. If the treatment given to patients who are suffering from a certain disease is clear, it will be possible to estimate the costs of treating a specific category of patients. The standard can be used for payments of inpatient hospital care.

- The development and inclusion of diagnostic terms for use by traditional medicine practitioners.

9.2 Procedures and standards on the protection and use of patient and other health related information

Procedures on the protection and use of patient information shall be developed for all categories of data and information and shall apply to all levels of the public and private health sectors. With the application of information, communication and technology, information flows in the health sector will become faster and more standardised. To avoid misuse and abuse of health information, the following issues should be addressed:

- Privacy and confidentiality
- Legislation and oversight
- Health information security

9.2.1 Privacy, Confidentiality and Security of Health Information

A set of national standards for the privacy, confidentiality and protection of health information must be established for the Ghanaian health sector. These standards must achieve the following:

- Guarantee that individual's health information is adequately protected while allowing the free flow of health information needed to provide and promote high quality health care, and to protect the public's health and well-being.

- Be applicable to all public health providers, private health providers, health institutions and facilities, health insurance schemes, pharmaceutical institutions, and any other public or private entities with access to health information.

- Specify the categories of health information, whether electronic, paper or oral, that will be protected for privacy purposes

- Define and limit the circumstances in which an individual's protected health information may be used or disclosed by health facilities and practitioners.

- Specify the conditions for which the individual's authorization is required before the use and disclosure of his/her protected health information.

- Give individuals the right to gain access to information held about them

9.2.2 Legislation and Oversight

The set of national standards discussed in the preceding section must be backed by legislation and legal oversight. It is recommended that a Privacy and

Confidentiality of Patient Health Information Act be passed and promulgated into law. It is also recommended that a law enforcement body be set up to provide legal oversight of the Privacy Act.

9.2.3 Health Information Security

The recommended Privacy Act should include a principle that states that an individual whose health information (whether electronic, paper or oral) is held by any health facility or institution has the right to expect that the information will be held securely, and that access to the information, and any disclosure will be permitted only for legitimate purposes. The principle must also require that steps be taken to protect electronic information against accidental loss and intentional breaches. Practices that may lead to breaches of data security in an ICT-enabled healthcare environment include:

- Inadequate controls regarding which practitioner can access information, as in for example, inadequate users ID and password control on an information system

- The storage of health data on computers or servers that do not have a high level of security safeguards like firewalls

- The emailing of confidential information

This recommended information standard or principle must require all facilities, institutions and agencies within the entire health sector to establish an appropriate information security culture, and ensure that the sector adheres to all necessary security requirements.

9.3 Procedures for the Procurement and Standardization of equipment and software

To ensure effective and efficient deployment of resources in the health sector, the standard procurement and equipment standardization procedures shall apply to information and communication systems. Procurement and standardization procedures for Information and Communication technology shall:

- Comply with the prevailing general government procurement procedures.
- Comply with the structure for hardware, software, and technical standards described in this policy framework.
- Include support and maintenance arrangements and contracts with the suppliers.

- Allow for an adequate technical evaluation by a responsible department within the Ministry of Health and its agencies: both in terms of price and quality.

9.4 Standards and Guidelines for ICT practice

Standards and guidelines for the ethical use and practice of information and communication technologies within the health sector should be developed. These guidelines should set up the best practices for ICT use, caution against fraudulent and inappropriate practices, and also specify sanctions when the standards are breached.

In addition, Codes of Ethics must be developed and posted on all Internet sites that disseminate health information to the general public. The Code of Ethics developed by the World Health Organization's eHealth Initiative Program is highly recommended. The goal of this "**eHealth Code of Ethics** *is to ensure that people worldwide can confidently and with full understanding of known risks realize the potential of the Internet in managing their own health and the health of those in their care*" .

10. INSTITUTIONAL ARRANGEMENTS

10.1 Roles of the Ministry of Health and its Agencies

To maintain institutional integrity and arrangements, the Ministry of Health is responsible for the overall ICT policy, strategies and related regulations; the coordination of information services delivery within the entire health sector and, related procurement and resource allocation. The agencies are to implement and deploy their systems in accordance with the stated policy and any related regulations. The Ministry of Health and its agencies will, through related regulations and agreements, monitor ICT policy implementation within the private sector.

10.2 Planning and Funding of Policy Implementation

It is recommended that ICT planning and budgeting should be taken up as part of the health sector's annual programme of work. In addition, a strategic planning document will be developed. In principle, earmarked funds from the health sector's budget will fund the implementation plan, and the associated annual operating ICT expenditures analysis will be conducted within the coming year.

10.3 Establishment of a Health Information and Communication Technology Advisory Committee (H-ICT)

It is recommended that the Health Sector, led by the Ministry of Health, establishes a Health ICT Committee and provide the committee with adequate funds and staff for its operations and work. The members of the committee should include directors and leaders from the public and private health sectors, ICT experts, and other stakeholders. The committee should be charged with the following functions:

- Management and oversight of the ICT infrastructure in the health sector
- Act as a clearinghouse for the implementation of the ICT policy
- Work on instituting information and communication standards and regulations
- Work on the adoption of the ICT policy and strategy within the private health sector
- Manage the needs and expectations of the health information users community

10.4 Appointment of ICT focal persons to coordinate ICT deployment

It is recommended that the Ministry of Health and each of its agencies appoint an ICT focal person to coordinate their respective activities. At the district level, the ICT focal person will most likely be part of the help desk arrangement.

10.5 Establishment of Help Desks and the Coordination and Sharing of ICT Services and Facilities

The establishment of ICT Help Desks in healthcare institutions within the health sector is highly recommended. These Help Desks will perform the traditional role of providing technical support to ICT users within the sector. In addition, the Help Desks will coordinate and share ICT services and facilities to reduce duplication of ICT services. The Ministry of Health will coordinate all Help Desks activity within the public sector. Some issues to be further addressed include:
- o Cost of in-house help desks as opposed to outsourced help desks.
- o Whether regions and district should be allowed to negotiate and set up their own help desk arrangements

ANNEX 1: DOCUMENTS AND WEBSITES CONSULTED

Ghana: Millennium Development Goals Report. Accra, Ghana. nd. (includes data through 2002).

Ministry of Health. *Common Management Arrangements (CMA II).* Accra, Ghana. January 2002.

Ministry of Health. *Private Health Sector Policy.* Accra, Ghana. June 2002.

Ministry of Health. *The Second Health Sector 5 Year Programme of Work: 2002 – 2006.* Accra, Ghana. Revised Edition 2003.

Ministry of Health. *Ghana Health Sector Programme of Work 2003.* Accra, Ghana. January 2003.

Ministry of Health. *Ghana Health Sector Programme of Work 2004.* Accra, Ghana. January 2003.

Ministry of Health. *Financial Report for National Health Insurance.* Accra, Ghana. March 2003.

Ministry of Health. *Annual Report 2002.* Accra, Ghana. April 2003.

Ministry of Health. *Annual Report 2003.* Accra, Ghana.

Ministry of Health. *Ghana Health Sector Annual Programme of Work 2004 (first draft).* Accra, Ghana. November 2003.

Ministry of Health. *Information and Communications Technology: Policy and Strategy for the Health Sector in Ghana.* Accra, Ghana. nd.

Ministry of Health / Ghana Health Service. *Medical Records Policy: Standards and Guidelines for the Development and Maintenance of Patient Records in Health Facilities (draft).* Accra, Ghana. nd.

Ministry of Health Programme of Work 2001: Review of the Five-Year Programme of Work. Accra, Ghana. June, 2002.

Ministry of Health Programme of Work 2002: Report of the External Review Team. Accra, Ghana. May, 2003.

Private-public partnerships in health. A report of the Annual Health Sector Review 2002. Accra, Ghana. May 2003.

The proposed National Health Insurance Programme. A report of the Annual Health Sector Review 2002. Accra, Ghana. May 2003.

African Development Forum: ICT in Health

World Health Organization's eHealth Initiative Code of Ethics
www.emro.who.int/his/MedicalEthics.htm

Ghana eHealth Solutions: The main pillars and a Strategy for the Way Forward, Salah Mandil. July 2004

Ministry of Health. "The Health of the Nation", Reflections on the First Five Year Health Sector Programme of Work 1997-2002, August 2001.

"The Ghana ICT for Accelerated Development (ICT4AD) Policy", a Policy Statement by the Republic of Ghana, 2003, www.ict.gov.gh

"Appraisal of the Information, Monitoring and Evaluation (IME) System for the Health Sector, A Report by for national and international consultants for the Annual health Sector Review, Accra, May 2003.

"Report Review of ICT Structure in Ghana: a Sub-contract Danish ICT Management", Ghana-India Kofi Annan Centre of Excellence in ICT, September 2004

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[1] Appraisal of the Information, Monitoring and Evaluation (IME) System for the Health Sector, May 2003
[2] Ghana eHealth Solutions, July 2004
[3] "Report Review of ICT Structure in Ghana: a Sub-contract Danish ICT Management", Ghana-India Kofi Annan Centre of Excellence in ICT, September 2004
[4] The African Development Forum 1999: Information and Communication Technology for the Health Sector
[5] Ghana Health Service, *Review of 2004 Programme of Work: Statistical Report*