Appendix D
e-Health Botswana

BOTSWANA'S NATIONAL ICT POLICY
2004

Maitlamo

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APPENDIX D.

E-HEALTH BOTSWANA

1.   *Introduction – Contribution to Maitlamo*

1.1   National health programmes throughout the world are facing common challenges, including the need to ensure access to health expertise through the effective management and distribution of healthcare resources, the increased involvement of patients and consumers in managing their own health, the desire to improve the continuity of care, and finally the increasing focus upon the sustainability of the system.

1.2   Botswana has outlined a vision of longer term development goals to be achieved by 2016, including a goal of "building a compassionate, just and caring nation" that addresses the need to strengthen the health care system and to ensure that Botswana is a healthy nation so that its citizens can contribute meaningfully to the country's development. This requires a coordinated programme of health promotion and disease prevention services, a well functioning primary health system and the provision of high quality health services to those who require secondary and tertiary care.

1.3   Over the past several years, there has been increasing use of Information and Communications Technologies (ICT) to support improvements in the quality of health care within both developed and developing countries. ICTs enable health care workers to perform remote consultation and diagnoses, access medical information and can help to increase the knowledge and qualifications of health professionals and thereby improve the delivery of health services.   They also provide an effective and cost-effective channel for the distribution of health and disease prevention information to the general public and can play a powerful role in improving the efficiency of health services administration, allowing health care institutions to better manage and share information, thereby improving the efficiency of the health system as a whole.   In the future, ICTs will continue to transform the structure and organization of health services, as well as the content and delivery of those services across the globe.

2.   *Health e-Readiness*

2.1   National e-Readiness Assessment

To support the development of the ICT policy, an e-Readiness assessment was completed in each sector.   The health e-Readiness assessment is

summarised below and the full document provides additional details and information.

- In Botswana, health services are provided by both the public and private sectors. In the public sector, multiple ministries are involved in health service delivery. In terms of health expenditures, Botswana spends 6% of GDP on health (NDP 9). Government spending on health is a relatively small proportion of government spending (7% vs. 15% in Canada) with private sector expenditures forming 37% of total health expenditures.
- HIV / AIDS is a key issue, with WHO reporting 37% of the population aged 15-49 reported as HIV positive. Life expectancy at birth is estimated to be reduced by 35 years due to AIDS and this gap is projected to increase to 43 years by 2015. The government is committed to making Antiretroviral Therapy available to eligible people living with HIV/AIDS through its public health facilities.
- Health human resources are in limited supply with the Ministry of Health identifying 30 physicians and 262 nurses per 100,000 population (vs. 56 / 471 for South Africa and 229 / 897 for Canada). Significant proportions (approximately 70%) of the physicians are expatriates, many of whom are in country for only 2-3 years. Other health professions, such as pharmacy, reportedly have similar issues.
- The level of computerisation varies significantly across the health system. Tertiary hospitals such as Princess Marina have computers in both administrative and clinical areas, with patient care units each having at least one computer. Other areas of the health system have no computers at all and have limited infrastructure, such as stable power supplies, to support them. There are limited data available on the deployment of ICT technologies across the health system. The Ministry of Health's Statistics Unit does not capture ICT deployment data at this time. Similarly, there are no comprehensive data outlining the percentage spending on ICT, although there are good data available at a project specific level. Health insurance firms make extensive use of ICT internally to support billing and financial management; however, there are no electronic linkages with the public or private health service organisations.
- The multi-year Integrated Patient Management System (IPMS) project will see the implementation of a clinical information system within the public health system over several phases. Outside of the IPMS, there is little electronic exchange of clinical information within the health system. For example, email is reported to be used for business / administrative purposes but is infrequently used to exchange clinical or even referral information.

- The level of awareness and training related to ICT within the health sector is identified by many respondents as weak and in need of improvement.
- Availability of information to help patients and consumers make good health decisions is limited. Currently, the bulk of Botswana specific information is made available through unidirectional media (e.g. radio) rather than interactive media. There are few web-based resources that are aimed at patients and these are available only in English. The Ministry of Health has recently begun a project to develop a web site that would provide information of the programmes and services of the Ministry, as well as some general health information.

3.   Desired Outcomes from e-health Botswana

3.1   Overall Objectives

3.1.1 e-health can be thought of as providing better healthcare by transforming health systems and business practices through the investments in and more comprehensive use of ICTs in order to increase quality, safety, timeliness and efficiency of health services to all Batswana. However, ICT deployment is simply an enabler to support the delivery of better health care to the people of Botswana. The important question is what these capabilities can do to improve health services. To provide a focus for its discussions, the Health Task Force identified several inter-related areas where ICT could be beneficial, which were then grouped into the following statements of desired outcomes:

- Patient care delivery is enhanced with increased communications throughout the health system, facilitated by the timely and secure availability of appropriate information to care providers. Increasing access to appropriate care and reduced patient waiting queues will improve rural access to care and services and reduce the rural /urban divide.

- The management of the health system is strengthened by providing health system managers and policy makers more information on a more timely basis, allowing decision making processes to be strengthened and to shorten health management cycle times. Through better management of supply chain, there is improved utilisation of resources, drugs and equipment.

- Health professionals are able to keep up to date with evolving clinical knowledge and can focus their time on meeting patient care needs. By providing continuing educational resources and reducing the paper burden associated with providing care, staff within the health system

will participate in higher value work, have higher job satisfaction, and will be able to focus their available time on more critical efforts.

- The health system is sustainable and is able to demonstrate that it is increasingly efficient and cost effective. An ethos of evaluation and continuous improvement is built upon increased capacity to collect and analyze information, measure outcomes, and disseminate the resulting information for decision making.

- Resources are available to help the citizens of Botswana make informed choices about their own health, their health care and about health policy. Information is universally accessible using a variety of media in both English and Setswana.

3.2   Specific Targets
3.2.1   The Health Task Force also identified the following national targets for e-health Botswana:

- All appropriate health facilities in which care is available for more than 10 days per month are connected by December 31, 2008;
- All Batswana have appropriate access to health information on-line by December 31, 2009;
- Services to provide health services remotely available across Botswana by December 31, 2010.

3.2.2   Developing an e-health system in Botswana that meets these goals requires concurrent and focused work across four programmes:

a. *Building a Strong Foundation for e-health*
An effective e-health system that can achieve the goals above needs solid underpinnings so that those who wish to access it can do so easily, reliably, with confidence and at reasonable cost. Implementing such an ambitious agenda requires strong leadership that can focus the energies of the health system and drive the projects to successful completion. This strategy addresses two programmes and the associated projects that will position the e-health initiative for ongoing success and ensure that the benefits of the strategy improve health and health services across Botswana.

b. *Enabling Clinicians to Deliver Quality Patient Care*
The lack of sufficient human resources (both for service delivery and within the health ICT sector) across the health system in Botswana is exacerbated by the mismatch between skills and training of health human resources and their needs related to the use of ICT. This strategy includes programmes and projects that will provide clinicians with systems that will assist them in their day-to-day work of caring for patients, as well as the

knowledge and skills to effectively use these technologies. Change management initiatives to help clinicians understand the benefits to themselves and their patients of using these tools also form part of this strategy.

c. *Improving Access to Health Services and Information*
Across the globe, an important challenge for health systems is to structure their services and resources in order to provide access to health services close to where patients live and work. In Botswana, the vast rural areas of the country make this particularly important. This strategy includes programmes and projects that will utilise ICTs to reduce the rural/urban divide and provide citizens with remote access to specialised care and to health / wellness information resources.

d. *Monitoring the Health System and the Health of the Population*
Surveillance of health, demographic and social indicators is essential to the ability to manage and improve the health system and the health of the population. Botswana has a number of health surveillance programmes including those for HIV/AIDS. This strategy includes programmes and projects that will strengthen the surveillance activities by linking them in a network and ensuring that information from the various programmes can be shared and integrated to develop a comprehensive picture of the health of the nation.

4. Recommended Programmes and Projects

4.1 The recommended e-health Botswana Programmes and Projects listed below have been carefully selected based on the needs of Botswana, priorities of Government, and best practice e-health solutions that have been successfully implemented in other jurisdictions.

4.2 Building a Strong Foundation for e-health

4.2.1 While e-health is still in its early stages in Botswana, there is good awareness of importance of increased ICT adoption within the health system and generally congruent view of issues and priorities. There have been some significant investments in e-health projects, which provide a solid foundation for the future. At the same time, the large number of current and proposed projects, and complexity associated with many of these projects, poses significant risk that the strategic agenda will not be fulfilled. Addressing this risk will require the senior leadership of the health system to set priorities that will focus energy and resources on those projects with the greatest benefits.

4.2.2 It will be important to recognize that a broad range of organisations must be fully engaged in the planning and execution of this strategy. Multiple

government ministries are involved in health services delivery and therefore will have significant influence on the success or failure of the e-health initiative. Given the involvement of the private sector in financing and delivering health services in Botswana, their active engagement and participation also will be critical.

4.2.3 *National e-Health Council*

4.2.3.1 This Council will be responsible for providing national leadership and sponsorship for e-health projects across the health system. By setting a clear direction with explicit priorities and measurable objectives, the Council will help to ensure that the highest value projects are initiated and are integrated with related work elsewhere in the system.

4.2.3.2 The Council will also explicitly address change management issues, including approaches to reducing the barriers to adoption of e-health solutions and /or providing incentives to increase their use. After establishing measurable goals and mechanisms to monitor progress, the Council will conduct regular evaluations of the entire national e-health strategy.

4.2.3.3 Involvement of the private sector is critical to ensuring the success of this strategy. A key role of the Council will to establish and support a framework for their involvement in both the planning and implementation of e-health initiatives.

4.2.3.4 The Council also will assume a standard setting role by overseeing a process to identify de facto and emerging international standards for collecting,   storing   and   transmitting   information   and   make recommendations regarding their adoption. Over time, the Council will add the responsibility of assessing new ICT technologies by establishing a process to regularly monitor the ICT environment, identify new technologies and recommend national approaches for their utilisation (including, where appropriate, the non-adoption of the new technologies). A possible future activity for the Council would be to explore with neighbouring countries the feasibility of developing a regional technology adoption strategy for the e-health sector.

4.2.3.5 Establishing the Council is an important first step in integrating the ICT projects across the health system and ultimately ensuring strong linkage between the ICT Policy vision of a "globally competitive information and knowledge society" and the national e-health strategies undertaken within the country. As such, the Council will be fully functioning by June 2005.

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4.2.4   *Enabling Legislation and Policy to Address Privacy Concerns*

4.2.4.1 In health systems across the world, there are concerns about loss of privacy that may arise from the use of ICTs – indeed, there are few information types more sensitive than personal health information. In Botswana, according to several observers, the current policy/legal framework that guides security, privacy, and confidentially of health information (in both electronic and non-electronic forms) does not provide sufficient comfort to patients and citizens that their health information is secure.

4.2.4.2 Privacy refers to the right of individuals to determine with whom, and to what extent, they share information about themselves with others. This right is addressed through three interrelated concepts: 'protection of personal information' which requires adherence to fair information practices in managing such information; 'confidentiality' which refers to the obligations on one person to preserve the secrecy of another's personal information; and 'security' which refers to the procedures and systems used to restrict access and maintain the integrity of that information.

4.2.4.3 The privacy, security, and confidentiality concerns in Botswana's health sector will be addressed through a code of conduct and health profession's standards of practice. This will involve policy development work on the part of both the Ministry of Health and the professional councils as well as work to integrate the compliance practices of both organisations. In addition, other sections of the National ICT Policy address privacy protection in a non-health context, and the policy work in the health sector will be aligned with this broader endeavour through the *High Level Consultative Council* described in the Legal and Policy Action Plan.

4.2.4.4 In addition to professional codes of conduct, confidentiality concerns must also be addressed at the institutional level. All organisations that have custodianship for health records will develop policies aimed at ensuring the security and confidentiality of the personal health information contained within these records.

4.2.4.5 Developing an effective e-health system also requires that electronic signatures are legally effective. As the need for legislation related to electronic signatures is an issue that extends beyond the health system, this project is addressed within the *Electronic Signatures Project* under the legal section of the ICT Policy.

4.2.5   *Improve Infrastructure Reach, Access and Performance*

4.2.5.1 An effective e-health programme requires a solid infrastructure foundation. Across Botswana, the level of infrastructure varies significantly, with the most significant infrastructure deficits occurring within the rural areas.

Addressing this imbalance to ensure that health facilities across the country can access ICT and take advantage of the other projects in this strategy is a key foundational programme.

4.2.5.2 Like all areas of the National ICT Policy, the health sector has identified a pervasive need to strengthen the ICT infrastructure that services the health system, especially in the rural communities. The programmes and projects outlined below will further increase the reliance of the system on a robust infrastructure – indeed the availability of such an infrastructure is likely to be a rate limiting constraint in the successful deployment of these other projects.

4.2.5.3 The Infrastructure Task Force has identified a high level action plan to increase the availability, reliability and security of the ICT infrastructure across Botswana. In order to ensure that this meets the needs of the health system – particularly in light of the proposed e-health projects – it will be important to clearly articulate the health system needs. An early project in this action plan will be to identify and analyse the infrastructure requirements for the health section, perform a gap analysis and identify where enhancements are required. This information will be used in the planning of the infrastructure projects outlined elsewhere in the ICT Policy.

4.2.5.4 Over time, as the Community Access Programme is implemented, the infrastructure initiatives within the traditional health services will be integrated with the community access and social services access infrastructures. (e.g. the schools, community clinics and hospitals linked).

4.2.5.5 However, connectivity implies more than just the ability to access a well functioning ICT environment. The value of a robust infrastructure can only be fully realised when the various information systems are able to communicate rapidly and seamlessly through the use of data standards in a way that protects patient privacy and security. Health care data, communications and security standards provide guidelines for collecting, storing and transmitting information so that the information will be able to be comparable and useful for clinical or system level decision making. While some health standards (e.g. HL7) have been de facto adopted in Botswana through various ICT projects, and there is a good recognition of the existence of international standards and of the advantages of adopting standards to guide system selection, development and deployment, there is not a process or structure to promulgate health information standards at a national health system level. Given the importance of standards in creating an interoperable e-health environment, the National e-health Council will be responsible and accountable for approving and promulgating e-health

standards and for monitoring compliance of the entire health sector with these standards.

4.2.6   *Universal Unique Patient Identifier*

4.2.6.1 Having a standard unique patient identifier at the level of the national health system is a key building block for e-health Botswana. The Ministry of Health has adopted National ID (OMANG) number as unique identifier for all citizens seeking health services in the public sector, with non-citizens patients registered by their passport number.

4.2.6.2 The Department Of Civil And National Registration registers all births and deaths and administers the national registration number (OMANG). Reporting of births and deaths, as well as OMANG registration at the age of 16, have become mandatory under legislation that came into force in 2003. The unique number given at birth becomes the OMANG number upon OMANG registration for Botswana citizens. Non-citizen children are also given a registration number, but are ineligible to receive an OMANG. Death certificates include the cause of death and the identity of the deceased, including the OMANG number.

4.2.6.3 The OMANG, along with the registration or passport number for non-citizens, is able to serve as an effective unique patient identifier for the entire health system and build on the successes in developing a standard patient identifier across the public sector health system. This can be achieved over the next several years, by ensuring that information systems across the health system have the capability of recording the OMANG or passport number, and that these identifiers become the primary key for data linkages. Given the progress within the public sector, this project will be primarily focused upon the private sector delivery systems and the insurance sectors.

4.2.7   *Health Provider Registration*

4.2.7.1 Clearly identifying the patients who receive care and the providers who deliver care is essential to enable the health system to ensure the effectiveness and efficiency of health services and to measure the health outcomes achieved. While, as noted above, there is a strong foundation on which to build the universal patient identifier, the area of provider registration is less developed.

4.2.7.2 The Botswana Health Professions Council has recently been established, following passage of the enabling legislation in 2001. Its mandate is provider registration and the development and maintenance of codes of practice for most health professions (the major exceptions being nursing and midwifery, which are regulated through a separate Council). The

registry of health professions is currently paper based and the quality of information is highly variable. According to the Council, there are medium / long term plans to computerise the registry.

4.2.7.3 This project will accelerate this timeline by ensuring that there is an electronic registry of all providers (introducing those regulated through the Health Professions Council and the Nursing and Midwifery Council). This registry will ensure that each provider is uniquely identified regardless of the location across the country where they are working and will allow the Councils to record the special qualifications and/or scope of practice limitations associated with each individual provider.

4.2.7.4 This project will position the Councils to more effectively respond to the high level of health provider turnover in Botswana (approximately 70% of the physicians are expatriates, many of whom are in country for only 2-3 years and other health professions, such as pharmacy, reportedly have similar issues). This will become increasing important as initiatives such as telemedicine mean that clinical decisions will be made at a distance and by providers which whom the person directly delivering the care may be unfamiliar.

4.3   Enabling Clinicians to Deliver Excellent Patient Care Programme
4.3.1   The delivery of health services is information intensive, with the data required to support care decisions often derived from numerous places. This need to aggregate information and to understand how the information is changing over time to reflect a patient's changing condition represents an enormous challenge that historically has been met through by the caregivers acting as information integrators.

4.3.2   Patient based health records are a fundamental cornerstone of the health system infrastructure. However, the traditional record – hand written, stored in the facility where it was created, accessible by only one individual at a time, and often duplicating information that is stored in another paper record -- leads to sub-optimal and inefficient care. An "electronic patient record" with the patient's past medical histories electronically accessible to providers on a need to know basis eliminates most of the serious gaps in the information needed for patient care. Such electronic records can pave the way to integrated and coordinated health care delivered around the patients and their needs.

4.3.3   The amount of specialised information for health professionals is growing so fast; indeed, it is estimated that practitioners will have to read 19 articles a day, 365 days a year, to keep up-to date. In order to incorporate new clinical knowledge into their practice, providers need access to timely,

accurate, accessible and user friendly information sources. Exacerbating this situation is the broad distribution of the population within Botswana which means that health care providers in rural and remote areas often have to make difficult decisions on their own and may also lack access to urban facilities for training and upgrading skills.

4.3.4 A number of specific projects are to be carried out as part of the programme to give clinicians access to the tools and current knowledge so that they are better enabled to deliver excellent patient care.

4.3.5 *Integrated Patient Management System*

4.3.5.1 Botswana has made significant progress in deploying a clinical information system that bridges the public sector hospital and community sectors and that will serve as the hospital information system for most of the country. The system is supplied by Meditech, a large North American based firm, which has extensive clinical information systems installations around the world. Implementation began in 2003 in the 2 referral hospitals, 2 other hospitals and 16 clinics with most of the key Meditech modules included in the rollout (registration, EMR, lab, drugs, but not diagnostic imaging). Given the small numbers of legacy clinical information systems, the issue of legacy system integration has not proved to be a major challenge. The first phase also included interfacing the system with several other information systems such as Medical Stores and Supplies, the OMANG database, the Births and Deaths Registration System and the Botswana Harvard Partnership laboratory equipment. Security is maintained on the system by limiting user access through the use of structured access rights.

4.3.5.2 Subsequent phases are to include the expansion of the system both in terms of functionality and geographic reach. Further extension of this system, including further linkages with systems within and outside of the public health system, will see this become a fully functional national electronic health record. This will also allow other patient care systems, such as the Interim ARV system to be replaced with the IPMS.

4.3.6 *Health Sector ICT Skills Development*

4.3.6.1 Implementing systems such as the Integrated Patient Management System (IPMS) will enhance information availability and the integration of health care across the country. At the same time, exploiting the capabilities of these technologies requires that the workforce and users have the skills, knowledge and ability to operate the technologies and perceive a value in using them.

4.3.6.2 To achieve this will require an investment in skills development and the development of effective change management programmes. Both initially,

and on an ongoing basis, the project team will need to identity skills that will be required, along with the corresponding training and/or skill acquisition strategy. ICT skills enhancement will range from basic Internet and email usage, to health system applications such as the IPMS, as well as new technologies such as telemedicine. An array of skill development approaches will be utilised to prepare health sector staff, including computer-based training, distance education through online learning and virtual classrooms, and peer-to-peer training.

4.3.6.3 The transition will also require new roles, such as information management specialists and clinical informatics specialists. While recruitment from outside of the country will be required in the short-tem, there is a growing trend internationally towards the development of these skills through distance education and short-term practicum's, allowing Botswana to develop some of their own citizens to assume these roles.

4.3.7   *Focused Change Management Initiatives for Clinicians*

4.3.7.1 As e-health solutions are developed and implemented, they inevitably affect larger and more heterogeneous groups of people and organisational areas, meaning that the major challenges to the success of the initiatives are more often behavioural than technical. Successfully introducing e-health solutions into complex health care environments requires an effective change management programme be conducted in parallel with the technical implementation. The scope of change envisioned in this Action Plan – including the transition from paper based records to an electronic clinical information system supporting care that is delivered remotely over ICTs, requires a new view of the business of health care and the roles of individuals within the health system.

4.3.7.2 This project will develop an explicit change management plan to support the transformations associated with the e-health agenda. Following a detailed assessment that compares the current roles and practices against those that will be required if the e-health projects are to fully succeed, a series of change initiatives will be outlined. The timing and pace of these initiatives will be designed to support the other projects in this Action Plan. It is likely that a range of techniques will be required, including education, directed feedback, financial incentives or penalties and administrative interventions such as reducing barriers or changes in laws regulations or institutional policies.

4.3.7.3 A small, dedicated change management team will ensure that focus is maintained on this critical area and will continually monitor and make adjustments to the change initiatives over time. Ensuring extensive involvement of clinicians in the change efforts has been shown in other e-

health programmes elsewhere to be a critical success factor. For example, the greater the range of health providers that are involved in the testing of the ICT tools, the more likely they are to be useful and user friendly for the provider audience and that people will actually use them.

4.3.8   *e-Continuing Education (e-CE)*

4.3.8.1 ICTs are ideally suited to supporting delivery of distance learning content, which for health professionals might include university-based certificate programmes, CME courses, or self-directed learning modules. The most successful programmes integrate a combination of delivery methods including on-line (e-mail and Web), CD-ROM, video (TV/VCR), audiotapes, and videoconferencing to accommodate the different capabilities and needs of the intended users.

4.3.8.2 This project will develop and maintain an e-Continuing Education (e-CE) programme for health professionals. By ensuring easy access to trusted content using a variety of ICTs to accommodate different learning styles, the knowledge base of Botswana's health providers will be enhanced and citizens can be assured that their providers have access to the latest medical information from around the globe.

4.3.8.3 Much of the content is available from other jurisdictions and so the work of this project is less about content development than in negotiating access rights; ensuring the sources of information remain current, credible and effective; and linking with other education bodies or professional groups to understand and respond to emerging informational needs.

4.3.8.4 In additional to continuing education in the clinical realm, e-CE will be useful for building capacity in programme evaluation and health system effectiveness skills that will strengthen the e-health system. These skills include such areas as assessing outcomes, cost effectiveness studies assessment of treatments and technologies in the Botswana setting.

4.3.9   *e-Library*

4.3.9.1 Given the enormous body of empirical medical information available, health professionals need to be able to assess the different types of clinical research and determine if and how the results of this research can be applied to a particular patient. By building a electronic health library with access to medical journals, care guidelines and local information, care could be enhanced, and additional clinicians could be attracted to work and stay in Botswana.

4.3.9.2 This project will establish an electronic web based health library with resources for health professionals, including access to journals, texts, and

databases; access to basic training material, especially for rural health workers; and access to information with relevant local content. Like in the area of continuing education, much of the content and resources for the e-Library are currently available but not in a way that is easy for busy practitioners across Botswana to access. This project will integrate these disparate information sources, and enable nationwide dissemination of best practices and clinical practice guidelines to all health providers, empowering them to keep abreast of the rapidly changing information in health care, including health-related research and studies. The e-Library will provide quick and easy access 24 hours a day, 7 days a week and be supported through user training in search engine and database navigation via web/computer-based training and tools and through on-line helpdesk support with centralised health informatics expertise.

4.3.9.3 While the development of evidence-based practice guidelines is not strictly an ICT-related topic, it is important for organisations and groups involved with ICT projects in the health sector to consider the need to provide this information for health professionals. Simply providing health professionals with greater access to information may do more harm than good if they feel inundated with information that they do not know if they can trust. Therefore, the e-Library will be able to bring evidence-based practice and clinical content on-line through an electronic health library.

4.4   Improving Batswana's Access to Health Services and Information
4.4.1   In the minds of many citizens, the quality of a health care system is judged primarily by its ability to provide timely access to the care people need. In those countries such as Botswana, where there are large areas with a relatively small population, this challenge is particularly acute. ICTs have been used successfully to address this challenge in many countries through the deployment of telemedicine solutions.

4.4.2   An effective e-health system should also empower members of the public to make informed choices about their own health, their health care and about health policy. In today's complex medical environment, patients worry who can help them and what kinds of treatments might be best for their condition. More people find themselves acting as information caregivers in the home and wonder where they can go for answers, support or respite. ICTs can help provide, not just over the Internet, but also over the telephone or through direct contact, a wide range of reliable information in form that usable in the patient's context.

4.4.3   Several specific projects will be undertaken to improve the access of Batswana to both health services directly and to information that will help them to make informed choices about their health.

4.4.4 *Telemedicine*

4.4.4.1 Telemedicine provides the opportunity for clinicians to provide consultation directly to other physicians or to patients in remote areas using a wide range of technologies, including telephone, e-mail, and interactive video and electronic medical instruments. These technologies enable ongoing dialogue as well as the exchange of data and clinical images such as X-rays or CT scans.

4.4.4.2 This project will deploy telemedicine access throughout Botswana. Beginning with pilot and demonstration implementations to evaluate the costs and effectiveness of different approaches, the project will grow to encompass all hospitals and clinics in the country where the bandwidth is sufficient to support it. The primary use of the telemedicine facilities is likely to be consultations between patients and health providers in the rural settings and providers in the referral hospitals. Experience in other countries suggests that telemedicine is initially used for a limited set of clinical conditions but that these grow to encompass most clinical disciplines as there is increasing comfort with this mode of care delivery and as additional medical instruments are added to the telemedicine repertoire.

4.4.4.3 Telemedicine is about more than the technology, so this project will also be concerned with the associated issues of physician acceptance; documentation requirements; licensure, liability and reimbursement of health care professionals; training, and maintenance of competence; and evaluation of its effectiveness. In essence, the goal of the project will be to build a successful telemedicine programme to the point where this modality of care is fully integrated into the health care delivery system and is no longer considered a separate initiative.

4.4.5 *Citizen / Patient Health Portal*

4.4.5.1 Currently, availability of information in Botswana to help patients and consumers make good health decisions is limited, with the bulk of Botswana specific information available through radio or printed material. In the community assessments phase of developing the National ICT Policy, fifteen communities were surveyed and informational needs identified. In the health arena, respondents identified a desire for more information in four key areas: the prevention of common diseases, family planning, HIV/AIDS & ARV, and prevention and treatment of malaria. There are few interactive media – and none in Setswana - which can be customised to deliver information for which the user has a need, rather than that which the originator determines should be disseminated. In addition, there is limited use of ICT to involve citizens and communities in health policy decisions.

4.4.5.2 In collaboration with e-Government initiatives elsewhere in the National ICT Policy and Master Plan, the Government will develop a Health Portal. This portal or website will contain regularly updated information beyond organisational programmes and include messages related to prevention, specific disease information and wellness initiatives. The content will be based upon empirical information wherever possible and will include such information as directories of health services, diagnostic aids, assessments of treatment options based on studies of outcomes and so on. The interactive site will be customised for the language and cultural needs of the population.

4.4.5.3 Maintaining this portal and ensuring that this information is current and reflects the ever-changing medical literature requires an ongoing commitment. A dedicated staff of heath information professionals will monitor the use of the portal, the changing needs of the population and the international literature to develop constantly refreshed material in both English and Setswana. There are an increasing number of high quality global information resources that can provide the core information for this maintenance effort.

4.4.5.4 As access to the Internet generally – and this portal in particular – is an issue that extends beyond the health sector, this issue is addressed in a separate section of the ICT Policy.

4.4.6 Expanded Use of Radio and Television for Health Messages
4.4.6.1 Radio is one of the most important ICTs in Botswana, with about two-thirds of households owning a radio. Radio Botswana transmitter coverage offers medium wave and FM coverage around the main towns in the country where most people are located. Health messages are a regular part of the radio broadcasts. Botswana TV also provides coverage to a large proportion of the citizens and health information is incorporated into its regular broadcasting schedule.

4.4.6.2 This project will expand on these efforts and integrate them into the other consumer e-health initiatives. While radio and television have the advantage of broad geographic reach at reasonable cost, the lack of interactivity inherent in these media means that it is difficult to understand how well the health messages are being received and whether adjustments in the information or delivery approaches are required. By monitoring the utilisation of the Citizen / Patient Health Portal (above) and the Telehealth project (below), a picture of the evolving health informational needs of the population can be developed and maintained. This will allow the health messages that are delivered through the radio and television to be updated and refined on an ongoing basis to meet the identified needs.

4.4.7   Telehealth

4.4.7.1 Telehealth services provide telephone access to RNs who use computer algorithms to triage people who are uncertain about whether to go to a health facility for care or who might have questions or concerns that can be addressed over the phone. In countries where this technology has been deployed there is clear evidence that the services alleviative demand on health facilities and reduce the number of people who would otherwise have sought treatment at busy hospital emergency wards. A pilot of this programme will be conducted in which the service will provided at no cost through toll free access 24 hours a day in both English and Setswana so that the benefits and costs associated with Telehealth in the Botswana environment can be assessed.   The pilot will evaluate whether this technology is able to reduce the amount of time that patients wait to access care, the proportion of callers that were deflected from a health facility, and the degree to which the self-help information is available elsewhere. Potential pilot test groups include new parents, patients and caregivers of patients recently diagnosed with HIV/AIDS.

4.5   Establishing a National Health Surveillance Network

4.5.1   Surveillance of health, demographic and social indicators is essential to the government's ability to manage and improve the health system and the health of the population by systematically identifying emerging issues and monitoring the effectiveness of intervention strategies. Across Botswana, there are several high quality yet independent health surveillance systems used to track public health, chronic and reportable diseases in Botswana, including those supporting the HIV/AIDS reporting and the TB reporting. However because these systems are not integrated, it is challenging to develop a comprehensive picture of the nation's health. Complicating the integration challenge is that these systems are operated by different governance entities across several government ministries, each with their own data access protocol.

4.5.2   The programmes will integrate the information in order to position the country to better monitor and evaluate the health of the population and to more rapidly develop policy recommendations, especially in those areas that bridge multiple disease entities. Instead of attempting to replace the existing systems – many of which are operating well – the project will utilise a data linkage approach to integrate the existing systems in an effective manner that addresses privacy and data quality issues.   This approach will eliminate the need to undertake unnecessary system replacement and streamline the system governance issues. The resulting "data warehouse", combined with incremental analytic capacity, will allow timely monitoring of the health of a district or the country as a whole and

enable the generation of timely, accurate public health information and knowledge which can then be distributed across the country for action.

5. *Provisional Cost Estimates*

5.1   It is difficult to accurately estimate the full cost of the e-health Botswana Programme at this time. A phased, pragmatic approach will be adopted in designing and implementing the programmes, and most of the recommended programmes and projects will require feasibility studies and business cases to support any subsequent implementation activities.

5.2   Based on experience in other jurisdictions and some very preliminary planning figures, initial estimates suggest that the e-health Botswana Programme could cost in the region of 122 Million Pula. This amount does not include the 120 Million Pula that has already been allocated toward the Integrated Patient Management System.

5.3   Projected savings resulting from e-Health Botswana are not known as yet – but should offset these costs considerably. The full cost/benefit of all e-Health Botswana initiatives will become clearer as the various business cases are completed. The largest amount of effort will be required to support people development, technical hardware and software, and reengineering – particularly during years two, three and four of this five year programme.

e-Health Botswana Provisional Cost Estimate

	Year 1	Year 2	Year 3	Year 4	Year 5	Project Cost	Programme Cost	Plan Cost
Total Cost of Action Plan								**122,250**
Building a Strong Foundation for e-Health							**41,600**	
National e-health Council						6,000		
Services	1,200	1,200	1,200	1,200	1,200			
Enabling Legislation and Policy to Address Privacy Concerns						500		
Services		500						
Improve Infrastructure Reach, Access And Performance						25,200		
Services	600	600	600	600	600			
Hardware	9,000	6,000	2,400	2,400	2,400			
Universal Unique Patient Identifier						6,300		
Services		1,800	1,800					
Hardware / Software	1,500	300	300	300	300			
Health Provider Registration						3,600		
Services		500	500	500				
Hardware / Software			1,500	300	300			
Total Programme Cost	12,300	10,900	8,300	5,300	4,800	41,600		
Enabling Clinicians to Deliver Excellent Patient Care							**29,500**	
Integrated Patient Management System						-		
Services								
Hardware / Software								
Health Sector ICT Skills Development						11,500		
Services	3,500	2,000	2,000	2,000	2,000			
Focus on Change Initiatives						10,000		
Services	2,000	2,000	2,000	2,000	2,000			
e-Continuing Education (e-CE)						4,000		
Services		1,000	1,000	1,000	1,000			
e-Library						4,000		
Services		1,000	1,000	1,000	1,000			
Total Programme Cost	5,500	6,000	6,000	6,000	6,000	29,500		
Improving Citizens' Access to Health Services and Information							**44,100**	
Telemedicine						19,900		
Services			3,500	3,500	2,500			
Hardware / Software		6,500	1,300	1,300	1,300			
Citizen / Patient Health Portal						5,300		
Services			1,500	1,500	1,500			
Hardware / Software			600	100	100			
Expanded Use of Radio and Television for Health Messages						3,200		
Services		800	800	800	800			
Telehealth						15,700		

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Services		1,500	4,500	4,500	4,500	
Hardware / Software		400	100	100	100	
Total Programme Cost	-	9,200	12,300	11,800	10,800	44,100
Monitoring the Health of the Population						**7,050**
Surveillance Network						7,050
Services			4,000	1,000	1,000	
Hardware / Software		600	150	150	150	
Total Programme Cost	-	600	4,150	1,150	1,150	7,050
Year to Year Costs	17,800	26,700	30,750	24,250	22,750	**122,250**