An Assessment of e-Health Projects and Initiatives in Africa

Assessment Report

March, 2010

Prepared for

World Health Organization

An Assessment of e-Health Projects and Initiatives in Africa

Project title	An Assessment of e-Health Projects and Initiatives in Africa
Project No	
Focus Area	e-Health telemedicine
Main activities	Design an assessment methodology to conduct a literature review and interviews on e-Health initiatives in Africa Submit report with results and recommendations as per TOR.
Project period	Two months
Project start date	
Draft report submission date	World Health Organization (WHO)
Consultant	Dr. Moretlo Molefi
Consortium members	World Health Organization
Main contact Person	Dr.Moretlo Molefi

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- The late Dr S Khotu
- Dr Sinclair Wynchank
- Millicent Kachienga
- Dr Pinkoane Thabo

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1. Executive Summary

The World Health Organization (WHO) has been spearheading the development of health in member countries. In 2005 member countries signed the WHA 58 Resolution which encourages member countries to implement e-Health as a tool of fostering healthcare service delivery for their populations. The WHO has therefore been partnering with the African Union, as well as other developmental bodies, to realize the goal of implementing e-Health in African countries .There has been a number of continental initiatives aimed at harnessing e-Health programmes in Africa. These initiatives include the Telemedicine Task Force, the Pan African e-Network and many other initiatives with developmental partners who are keen to fund e-Health programmes in Africa. The major challenges have been ensuring that these programmes will be sustainable and making sure that they can be harmonized. Most African countries do not have e-Health policies, e-Health strategies and so most require guidelines for implementation. Also almost all African countries have no e-Health budget in their fiscus. However there are over three hundred e-Health pilot projects underway or planned in Africa and most of them are neither scalable nor sustainable. The majority of projects examined for this report are funded by external donor agencies or were started as research projects. They mostly (and especially the latter) cease when the donor funding is exhausted. In contrast there are very few projects funded by the Ministries of Health from inception by African Countries.

2. Introduction

e-Health is the use of telecommunications and computer technology to transmit and provide medical information and services. The term e-Health is more precise than telemedicine because it involves all aspects of e-Health services including health promotion, prevention, education, research, population data collection and health management. It is particularly valuable in remote areas. This overall technology covers a broad range of specific applications and technologies, suited to differing environments and situations. For this reason the present assessment intentionally includes a range of projects with differing technologies, approaches and geographic spread.

e-Health and Telemedicine have been in existence since the 1920s, for example by commercial vessels at sea *(Fifth research and development framework programme 1998-2002, final report,* April 2004 edition*)*. Currently telephone lines, faxes, email and the internet are used in transmitting medical information to and from institutions of learning, health care facilities and doctors, etc, thus enhancing the process of delivering healthcare services. (*Making better access to healthcare, ITU report:* October, 2005) The WHO has been at the forefront in terms of providing support for this technology for all

healthcare workers (HCWs) and thus enabling the transformation to ensure better healthcare delivery for all in Africa and elsewhere. A wide variety of other organizations, both governmental and NGOs, have aided this transformation, as indicated in the more detailed information given below. The recognition of the ability of this technology to deliver health care is noted in many developing countries in West, Southern, North, East and even Central Africa, including some relatively unstable countries such as the Central African Republic, the Democratic Republic of Congo, Somalia and Sudan. However the lack of documentation of e-Health initiatives, coordination and evaluation of this technology remains a big concern. The WHO, having most appropriately recognized the importance of e-Health, has consequently commissioned this study. So it is hoped that this assessment will form a basis of understanding the successes and challenges of e-Health in developing countries. This study's approach was guided by WHO methodology for performing an e-Health assessment Projects/Initiatives in Africa.

3. **Rationale**

The dearth of doctors, nurses and other health care specialists on the African continent poses a real challenge to its healthcare system in general and deserves to be treated with the urgency and importance it merits. This is further compounded by lack of health infrastructure, and especially the high incidence of HIV and AIDS, tuberculosis, malaria and other diseases that kill millions and specifically women and children on the continent. The use, practical benefits and convenience of applying telecommunications and information and communication technologies (ICTs) in improving and supporting health care delivery cannot be overemphasized.

4. Strategic Assessment Objectives

The strategic objective of this assessment was to gather important information regarding the status of e-Health initiatives and projects across the African continent. This information will then be used to determine the success of the projects underway and also gather some knowledge on lessons learnt, which will assist in determining future impact and effective implementation of e-Health projects on the continent.

4.1 Objective

The key objective of this assessment was to identify and document major ongoing e-Health projects/initiatives in Africa, highlighting their strengths and weaknesses, including their standing in terms of interoperability, scalability and sustainability.

4.2 Specific Objectives

The specific aims and objectives aimed to assess and identify the following aspects of e-Health;

- Services and scope provided by the main participating institutions
- Technologies, applications or solutions used in providing e-Health services
- Main partners and donors
- Geographical coverage by region country, province, or city
- Project results, summaries and evaluation reports, if available
- Future plans of the e-Health projects
- Contact details of main coordinating person, including, telephone, email and physical or postal address
- Funding information/amounts and period of funding
- Website address of projects and URLs of reports
- Projects challenges, lessons learnt and recommendations

5. Methodology

5.1 Criteria for assessing case study projects

For each of the projects, the research attempted to satisfy appropriate selection criteria in terms of *project output.* However for some projects relevant information required was unavailable. Such information lacking could include;

- Title of Project/Initiative
- Scope and services provided, including technologies/applications/solutions being used

- Institutions and programmes concerned
- Geographical coverage (Region, Country, Province, City)
- Coordinating institution
- Partners/Donors
- Results of project, including summaries of evaluation reports, if any
- Project interoperability and/or sustainability
- Future plans
- Identification of Contact Person
- Address, Email and telephone of Contact Person
- Funding Details: Amount/Duration
- Web site address of Project/Initiative (if any)
- URLs of Reports of Projects/Initiatives

A methodology for the assessment was developed using appropriate WHO guidelines and then it was approved by WHO. Questions and themes were developed to collect information on the specific objectives as stated above. Data was collected via desk top/internet search, telephone and interviews. The data was obtained from;

- Key informants - key players in the e-Health industry
- Universities and research institutions
- Implementing agencies
- Government institutions
- E-Health data bases
- Non profit organizations

The data gathered was consolidated, examined for relevance and consequently summarized to attain the study objectives.

5.2 Strengths and limitations of the assessment

5.2.1. Strengths

This is the first pilot assessment of e-Health/telemedicine commissioned by the WHO for determining/assessing the status of e-Health initiatives in Africa. This initial assessment will serve as a baseline and consequently will be the first step in detailed examinations in the future of significant and available data on e-Health in Africa. This information will therefore aid greatly in determining the future direction of implementation of e-Health projects at various levels on the continent.

5.2.2. Limitations

- An attempt was made to examine several e-Health initiatives/projects. The search produced limited reports documenting project evaluation reports, interoperability and scalability and future plans of projects .
- Detailed reports, information on technologies applied were also limited
- The study methodology was only approved 2 months after the methodology study was submitted to the funder; this subsequently affected the assessment activities and time allocated for the completion and submission of the assessment report.
- Funding for the assessments was also limited. As a result, comprehensive data could not be obtained from some countries outside South Africa. This may have excluded relevant data likely to be obtained from other countries if circumstances were more favourable. Also there was possible over reporting of projects initiated in South Africa, as information for such projects was relatively easily available and accessible.
- Bureaucratic attitudes in many institutions hindered the collection and obtaining of relevant information required for the study.

6. Results

The following section presents results of the assessment. These Include table 1, which includes consolidated data from the internet search of various e-Health projects on the continent. Also provided are interview results from main organizations concerned with e-Health. A special mention must be made of the RAFT project, for it features prominently in table 1. It was initiated in 2000 by the University of Geneva as a French Language African Telemedicine Network. After its initiation in Mali, it

was rapidly extended to other 17 Francophone African countries and then slowly to 5 English speaking African nations. This pan-African network links 45 healthcare institutions (mainly tertiary and district hospitals) allowing a wide range of tele-education interactive courses, teleconsultations and tele-echography. The iPath platform is used for consultations which are asynchronous and mainly used for difficult cases. This network has proved sustainable for healthcare districts, with 50 000 to 200 000 inhabitants. Tele-education is now available for 16 hours monthly, with an average of 18 institutions participating per course. About ¾ of the courses are produced in Africa and there have been over 300 courses since 2003. Since 2007 the Dudal system has been used for the tele-education.

TABLE 1: PROJECT INFORMATION BY REGION AND COUNTRY

Region and country	Project title	Technologies and services provided	Main institution partners	Geographic/ Population coverage	Project reports/results and future plans	Funding contact details
NORTH AFRICA						
Algeria (1)	Gemalto Electronic Health Care project (Chifa)	Social security smart cards, which are PIN code protected - health professionals use a USB key for quick online authentication and prescription issuing, managing patient records centrally, verifying patient health care benefits, which simplify administrative procedures.	Gemalto	Algeria, 700 000 smart cards	**Results/reports** Not available **Future plans** Provide innovative content service, standardize national system to cut costs and improve efficiency, speed patient claims, automating prescriptions and reducing fraud. To enroll seven million workers and dependants.	**Funding** Micro finance **Contacts** http:ww.gemalto.com/brochures/download/micro_finannce.pdf
Algeria (2)	RAFT	Internet connection, Java enabled web browser, bw ≥30kb/s, for collaborative tele-education & teleconsultations using the iPath platform	Faculté de Médecine de l'Université de Genève & CHU de Sétif	Total Population of 35.4M*	**Results**, including Details of Courses & Participation in Teleconsultations, etc at http://raft.hcuge.ch **Future plans** continuation and expansion	**Funding** Geneva State, Switzerland, EU, WHO, Rotary **Contact** Pr A Geissbuhler, RAFT Director, antoine.geissbuhler@hcuge.ch

Egypt	Swinfen Trust Teleconsultations	Simple internet connection for Teleconsultation with 1 or more of 400 volunteer specialists using store & forward modality. This service is free.	Swinfen Charity Trust & University of Cairo, Orthodontic Dept	Total Population of Cairo 15.8M	**Results** Wide variety of medical conditions treated in 40 developing countries (mainly not African) especially uncommon/complex problems, paediatric & other	**Funding:** Donations to a Charity, expenditure 2008 £58 000 **Contact:** via website www.swinfencharitablet rust.org
Morocco	RAFT	Internet connection, Java enabled web browser, bw ≥30kb/s, for collaborative tele-education & teleconsultations using the iPath platform	Faculté de Médecine de l'Université de Genève & Faculté de Médecine, Casablanca	Total Population of 31.4M*	**Results**, including Details of Courses & Participation in Teleconsultations, etc at http://raft.hcuge.ch **Future plans** continuation and expansion	**Funding** Geneva State, Switzerland, EU, WHO, Rotary **Contact** Pr A Geissbuhler, RAFT Director, antoine.geissbuhler@h cuge.ch
Tunisia	RAFT	Internet connection, Java enabled web browser, bw ≥30kb/s, for collaborative tele-education & teleconsultations using the iPath platform	Faculté de Médecine de l'Université de Genève & Faculté de Médecine de l'Université de Sousse	Total Population of 10.4M*	**Results**, including Details of Courses & Participation in Teleconsultations, etc at http://raft.hcuge.ch **Future plans** continuation and expansion	**Funding** Geneva State, Switzerland, EU, WHO, Rotary **Contact** Pr A Geissbuhler, RAFT Director, antoine.geissbuhler@h cuge.ch
SOUTHERN AND SOUTH AFRICA						
Mozambiq	RAFT	Internet connection, Java	Faculté de Médecine	Population of	**Results**, including Details of	**Funding** Geneva

ue		enabled web browser, bw ≥30kb/s, for collaborative tele-education & teleconsultations using the iPath platform	de l'Université de Genève & Association AGIR, Gaza Province	Gaza 1.3M	Courses & Participation in Teleconsultations, etc at http://raft.hcuge.ch **Future plans** continuation and expansion	State, Switzerland, EU, WHO, Rotary **Contact** Pr A Geissbuhler, RAFT Director, antoine.geissbuhler@hcuge.ch
Namibia	RAFT	Internet connection, Java enabled web browser, bw ≥30kb/s, for collaborative tele-education & teleconsultations using the iPath platform	Faculté de Médecine de l'Université de Genève & Tsumeb Doctors, Tsumeb	Population of Tsumeb region 129 000	**Results**, including Details of Courses & Participation in Teleconsultations, etc at http://raft.hcuge.ch **Future plans** continuation and expansion	**Funding** Geneva State, Switzerland, EU, WHO, Rotary **Contact** Pr A Geissbuhler, RAFT Director, antoine.geissbuhler@hcuge.ch
South Africa (1)	HIV mobile decision support	PDAs Smart phone, mySql data base Synchronized web scheme with multi language support. For screening patients' immediate medical care	Tygerberg Hospital and Harvard School of Public Health, D-tree International,	Western Cape Province. Population 4. 5M (Census 2001)	**Results /Reports** Not available Used for triage and patient diagnosis	Not available
South Africa (2)	Limpopo Telemedicine project	Live tele-consultations using Medicenter telemedicine equipment. The teleconsultations focus on certain specialities including dermatology, dentistry,	Provincial Department of Health of Limpopo, National Departments of Health, of Science & Technology, The State Information Technology Agency	System covers 444km radius in 4 sites	**Results** The usage is very high and there is a lot of buy-in from the Doctors in the province. There are at least 10 consultations per week in the 4 sites. There are over 46 professionals trained to use the system ,	The project was initially funded by the Ministry of Science and Technology. Further roll out was funded by the South African Department of Health.

		psychiatry and emergency medicine. The connectivity is via a wireless canopy	and Medical Research Council.		including Doctors, Nurses and allied healthcare workers **Future plans** To link all 10 regional hospitals by the end of May 2010.This implementation has started.	**Contact;** Dr Pinkoane Thabo 27 15 297 6000
South Africa (3)	Mindset Health Channel	Educational health content material in the form of video, multimedia, print broadcast via satellite network , Sunday Times (newspaper), USAID, WHO	Mindset Network, Nelson Mandela Foundation, Telkom, Multi Choice Africa, Standard Bank Foundation, South Africa Departments of Health, Education, Communications	Most provinces in South Africa. Total Population of 50.7M*	**Results** Mass scale delivery of health education to both the general public and health care professionals **Future plans.** Scale the project ~~in~~ for other parts of Africa	**Contacts** South African National Department of Health and Mindset Networks. **Funding.** Not available
South Africa (4)	Post graduate qualification s in Palliative Medicine	Internet used for distance education in palliative medicine (Diploma or MPhil). These are the only such qualifications available in Africa	University of Cape Town, Cape Town & 172 students from 12 Anglophone African nations, since 2002.	Any African nation, where a student can study using English language material	**Results** Steady increase in HCWs' knowledge of Palliative Medicine **Future plans.** Continue and increase scope of project, with possible extension to Francophone nations.	**Contacts** Dr E Gwyther, University of Cape Town **Funding.** Through the university's fees, etc.
Botswana	Integrated Healthcare University of Botswana, Information Systems	Development of Internet based-health care information service. Processes text message queries form cell phone users and delivers self management information for chronic health conditions including HIV	University of Botswana National Call Centre on HIV/AIDS, Botswana – Baylor University Children's Clinical Care of Excellence Center	Botswana and its rural communities Total Population of 2.0M*	**Results/Reports** Not available **Future plans** to lower/end spread of AIDS by 2016, using affordable, simple and popular cell phone technology for the economically disadvantaged.	**Funding** US $ 1.2 million **Contacts** Microsoft Research Digital Inclusion Programme

		/AIDS				
South Africa & Cameroon (5)	Genesis Tele care	ICTs, health information system, hospital management system, low bandwidth browser-real time internet for remote pulmonary and heart diseases confidential data transmission, wireless networking, integrated medical records reports and storage, remote spirometry and fee for pulmonary services, summary and statistical, reports, web enabled devices.	Genesis Tele care (SA). Bio medical engineers specialists and supper specialists	South Africa and other African countries, Yaoundé, Douala Cameroon population 18.9M*	**Results/Reports** Not available	**Contact** Tsinga-Ecole de Police, B>P Yaoundé, Cameroun Ph: +237223841/22203842
South Africa (6) Lesotho, Malawi, Swaziland & Tanzania	Reduction of HIV/AIDS associated stigma, by Tele-education programme	Internet connections between participating institutions	South Africa: Potchefstroom town & Kayakulu rural area Malawi:Lilongwe Tanzania: Dar es Salaam & Mbeya rural area Lesotho & Swaziland, all areas	Populations Lesotho 2.1M* Swaziland 1.2M* Lilongwe 866 000 Dar es Salaam 2.6M Potchefstroom 288 000	**Results** see publication: T.W. Kohi, et al. (2006) **Future plans** to continue & stress improvement in relevant human rights in countries studied.	**Funding:** UCSF Stigma study **Contact** Project coordinator: Thecla W Kohi, tkohi@muchs.ac.tz
Zambia (1)	Zambian Electronic perinatal records	Web based electronic medical records and referral system. High speed wireless voice data network aimed at reducing	Lusaka District Health management team and Ministry of Health. University of	All perinatal clinics in Lusaka ,	**Project results/reports:** Not available **Future plan** Recognize critical conditions, monitor and evaluate interventions and health	**Funding:** Bill and Melinda Gates Foundation U$ 2.7 million

	(ZEPRS)	the spread of HIV/AIDS and management of perinatal patients and infants 6/7 weeks after delivery.	Alabama, Birmingham, AL. RTI International and Centre for Infectious Disease Research, Zambia		surveillance, provide detailed longitudinal health data. Adapt automated interface laboratory information management system, pharmaceutical supplies and transmit data over mobile network and assist in the management of malaria.	**Contacts**:Gordon Cressman, Senior Director, ICT programme, FTI International, phone: + 19195416363 E.mail:ict@rti.org Web site:www.rti.org/ict
Zambia (2)	Smart care	Electronic health record system, distributed data base systems, national M&E, user friendly touch screen, GIS data visualization both live and static from health surveys. It can be carried on flash drives for lower tech connectivity, storage and backup.	The Ministry of Health, Zambia Centres for disease control and prevention	Districts	**Project results** not available **Future plans;** Developing mart care video, certification for capacity building and system strengthening. Ambulatory services modules, systems integrations with other health records including drug stock management systems.	Ministry of Health, P.O Box 30205, Lusaka, Zambia
Zambia (3)	Support/Education for Zambian HCWs infected with HIV &/or caring for HIV/AIDS patients	Basic internet application for distance learning	Zambian & Norwegian Nursing Associations	All appropriate Zambian HCWs	**Project results** Needs assessment performed, then focus on training, forming local support groups & monitoring progress. **Future** Continuation & extension	**Funding & Contact:** Zambian & Norwegian Nursing Associations
Zimbabwe	RAFT	Internet connection, Java enabled web browser, bw	Faculté de Médecine de l'Université de	Total Population of	**Results**, including Details of Courses & Participation in	**Funding** Geneva State, Switzerland, EU,

		≥30kb/s, for collaborative tele-education & teleconsultations using the iPath platform	Genève & Zimbabwe Doctors for Human Rights, Harare	13.0M*	Teleconsultations, etc at http://raft.hcuge.ch **Future plans** continuation and expansion	WHO, Rotary **Contact** Pr A Geissbuhler, RAFT Director, antoine.geissbuhler@hcuge.ch
WEST AFRICA						
Benin	RAFT	Internet connection, Java enabled web browser, bw ≥30kb/s, for collaborative tele-education & teleconsultations using the iPath platform	Faculté de Médecine de l'Université de Genève & Université de Abomey Calavi	Total Population of 8.9M*	**Results**, including Details of Courses & Participation in Teleconsultations, etc at http://raft.hcuge.ch **Future plans** continuation and expansion	**Funding** Various: including EU, WHO, Rotary **Contact** Pr A Geissbuhler, RAFT Director, antoine.geissbuhler@hcuge.ch
Benin, Niger (1) & Rwanda (1)	WHO programme to reduce deaths from Obstetric Complications	Basic internet connections to facilitate web based tele education for skilled birth attendants	WHO, University Research Co, Bethesda, MD, USA & participating developing nations	Populations of Benin 8.9M*, Niger 15.3M* & Rwanda 9.9M*	**Results:** Training of birth attendants& establishing subsequent trends in neonatal mortality. **Future plans**: to address relevant drug inavailability/distribution, equipment supply & maintenance,	**Funding:** USAID, UNICIEF, CARE **Contact:** Proj Coordinator Prof S Harvey, SHarvey@urc-chs.com
Burkina Faso	RAFT	Internet connection, Java enabled web browser, bw ≥30kb/s, for collaborative tele-education & teleconsultations using the iPath platform	Faculté de Médecine de l'Université de Genève & CHU Yalgado Ouedraogo, CHU de Bobo-Dioulasso	Total Population of 15.8M*	**Results**, including Details of Courses & Participation in Teleconsultations, etc at http://raft.hcuge.ch **Future plans** continuation and expansion	**Funding** Geneva State, Switzerland, EU, WHO, Rotary **Contact** Pr A Geissbuhler, RAFT Director, antoine.geissbuhler@h

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Cameroon	RAFT	High level telemedicine/e-Health technology and basic internet facilities, training conduced between Yaoundé Hospital and Geneva	Central Hospital Yaoundé	Yaoundé 17.8 million	**Reports/results** Not available **Future plans** Equip national and regional hospitals in telemedicine (Internet access, ultrasound, ECG, proposed mini V-sat technology)	Not available
Gambia	Web-based consulting service in ophthalmology	Standard internet link with image transmission	Royal Victoria Teaching Hospital, Banjul & Moorfield's Eye Hospital, Univ of London, London, UK	Total Population of 1.6M*	**Reports/Results** Academic publications **Future Plans** unavailable	**Funding** University of London
Ghana	Swinfen Trust Teleconsultations	Simple internet connection for Teleconsultation with 1 or more of 400 volunteer specialists using store & forward modality. This service is free.	Swinfen Charity Trust & Kumasi Hospital, Kumasi	Population of Kumasi 152 000	**Results** Wide variety of medical conditions treated in 40 developing countries (mainly not African) especially uncommon/complex problems, paediatric & other	**Funding:** Donations to a Charity, expenditure 2008 £58 000 **Contact:** via website www.swinfencharitablet rust.org
Guinea	RAFT	Internet connection, Java enabled web browser, bw ≥30kb/s, for collaborative tele-education & teleconsultations using the iPath platform	Faculté de Médecine de l'Université de Genève & CHU Donka, Conakry	Total Population of 10.1M*	**Results**, including Details of Courses & Participation in Teleconsultations, etc at http://raft.hcuge.ch **Future plans** continuation and expansion	**Funding** Geneva State, Switzerland, EU, WHO, Rotary **Contact** Pr A Geissbuhler, RAFT Director, antoine.geissbuhler@hcuge.ch
Ivory Coast	RAFT	Internet connection, Java	Faculté de Médecine	Total	**Results**, including Details of	**Funding** Geneva

		enabled web browser, bw ≥30kb/s, for collaborative tele-education & teleconsultations using the iPath platform	de l'Université de Genève & CHU de Yopougon, Abidjan	Population of 21.4M*	Courses & Participation in Teleconsultations, etc at http://raft.hcuge.ch **Future plans** continuation and expansion	State, Switzerland, EU, WHO, Rotary **Contact** Pr A Geissbuhler, RAFT Director, antoine.geissbuhler@hcuge.ch
Liberia	Swinfen Trust Teleconsultations	Simple internet connection for Teleconsultation with 1 or more of 400 volunteer specialists using store & forward modality. This service is free.	Swinfen Charity Trust & Mercy Ships, Africa Mercy, Monrovia	Total Population 4.0M*	**Results** Wide variety of medical conditions treated in 40 developing countries (mainly not African) especially uncommon/complex problems, paediatric & other	**Funding:** Donations to a Charity, expenditure 2008 £58 000 **Contact:** via website www.swinfencharitabletrust.org
Mali (1)	Specialized distance pilot project	Wireless technology, and numeric telephony, mini – V-sat, ultrasound, ECG and solar panels	Bamako Point G Hospital and Geneva University Hospital, Tombouctou, Mpoti, Segou, Sikasso, Kayes Koulikoro Geneva University and International Institute for Communication and Development,	Bamako, population 11.9 million	**Project results** Project was found to be irrelevant due to different diagnostic resources and unsuccessful implementation training. Establishment of telegraphy network with Malienne Centre d'Imagerie connecting one district hospital **Future plans** unavailable	FSN
Mali (2)	RAFT	Internet connection, Java enabled web browser, bw ≥30kb/s, for collaborative tele-education & teleconsultations using	Faculté de Médecine de l'Université de Genève & Fondation HON du Mali	Total Population of 13.0M*	**Results**, including Details of Courses & Participation in Teleconsultations, etc at http://raft.hcuge.ch **Future plans** continuation and	**Funding** Geneva State, Switzerland, EU, WHO, Rotary **Contact** Pr A Geissbuhler, RAFT

		the iPath platform			expansion	Director, antoine.geissbuhler@hcuge.ch
Mauritania	RAFT	Internet connection, Java enabled web browser, bw ≥30kb/s, for collaborative tele-education & teleconsultations using the iPath platform	Faculté de Médecine de l'Université de Genève & Institut National des Spécialités Médicales	Total Population of 3.3M*	**Results**, including Details of Courses & Participation in Teleconsultations, etc at http://raft.hcuge.ch **Future plans** continuation and expansion	**Funding** Geneva State, Switzerland, EU, WHO, Rotary **Contact** Pr A Geissbuhler, RAFT Director, antoine.geissbuhler@hcuge.ch
Nigeria (1)	NIGERIASAT1,	Video conferencing for live time sessions Ibadan Teaching Hospital and Maiduguri Teaching Hospital,	National Hospital of Abuja and Federal Medical Centre in Bidia. Intel Corporation, Federal Ministry of Health	Abuja, covering a population of 178.7 million	**Reports/results** Not available **Future plans** Involvement of public sector and health facilities, connecting teaching hospitals in Ibadan and Owo using V-sat technology; these include video conferencing, medical imaging, however concerns are being raised over receiver satellites' success and technical assistance	Intel Corporation $ 30 000 and $ 5 000 monthly for duration Not available
Nigeria (2)		V-sat links connecting AMD stethoscopes opthalmosopes dermascopes & otoscopes and other equipment between Ibadan & Maiduguri Teaching Hospitals,	Nigeria National Space Agency &University Hospitals of Ibadan & Owo		**Reports** unavailable **Future plans** to launch 2 further satellites in 2010 and so connect 9 hospitals in all.	**Funding** NSARDA for Ministry of Health

Nigeria (3)	RAFT	Internet connection, Java enabled web browser, bw ≥30kb/s, for collaborative tele-education & teleconsultations using the iPath platform	Faculté de Médecine de l'Université de Genève & l'Hôpital National Lamordé, Niamey	Total Population of 15.3M*	**Results**, including Details of Courses & Participation in Teleconsultations, etc at http://raft.hcuge.ch **Future plans** continuation and expansion	**Funding** Geneva State, Switzerland, EU, WHO, Rotary **Contact** Pr A Geissbuhler, RAFT Director, antoine.geissbuhler@hcuge.ch
Senegal	RAFT	Internet connection, Java enabled web browser, bw ≥30kb/s, for collaborative tele-education & teleconsultations using the iPath platform	Faculté de Médecine de l'Université de Genève & Université Cheikh Anta Diop, Dakar,	Total Population of 12.5M*	**Results**, including Details of Courses & Participation in Teleconsultations, etc at http://raft.hcuge.ch **Future plans** continuation and expansion	**Funding** Geneva State, Switzerland, EU, WHO, Rotary **Contact** Pr A Geissbuhler, RAFT Director, antoine.geissbuhler@hcuge.ch
EAST AFRICA						
Eritrea	Pilot WHO Poject to Alleviate Critical HCW Shortage in Developing Nations	Primarily Internet applied to distance learning.	Universities of Asmara, Eritrea & State of NY (Stony Brook), USA	Eritrea 5.1M*	**Results** Determination of most appropriate technology for distance education in Eritrea. Learning adjusted for local needs. Selection made for Eritrean staff for a Nursing College	**Contact** Prof P Johnson, coordinator: pjohnson@jhpiego.net
Ethiopia	Swinfen Trust Teleconsultations	Simple internet connection for Teleconsultation with 1 or more of 400 volunteer specialists using store & forward modality. This	Swinfen Charity Trust; Leprosy, TB and Rehabilitation Training Centre, Addis Abba; Mekele Hospital,	Total Population of Ethiopia 82.8M*	**Results** Wide variety of medical conditions treated in 40 developing countries (mainly not African) especially uncommon/complex problems, paediatric & other	**Funding:** Donations to a Charity, expenditure 2008 £58 000 **Contact:** via website www.swinfencharitablet

		service is free.	Mekele & Adventist Mission Hospital, Gimbie			rust.org
Kenya (1)	RTI/PMO project	Electronic reporting and management system for ARV drug management to improve timelines, competencies and drug, tracking, accuracy and improved patient regiments broadband, wireless technology ,EV-DV Rev		Remote areas with limited accesses	Not available	Qualcomm,Inc, Wireless Reach Initiative ereynolds@rti.org
Kenya (2)	Community -based health manageme nt system	Not specified		Kibwezi district	Not available Not available	Kenya Airways Nichasius Ndwiga

Rwanda (1)	Twubakane Decentralization and health project "Lets build together"	ICTs, National health expenditure tracking, evaluation of service delivery, health policy analysis	RTI International and Tulane University, Intra Health, Netherlands International Cooperation Agency engenderd e-Health and Rwanda's Association of local government and pro-Femmes	Total Population of 9.9M*	**Report and results** Anti malaria campaign, treating 155 000 households, reproductive health and child care services, strengthened health facility capacity, community based insurance, ownership of health services, entry point for other governance activities i.e. anti corruption, fiscal and tax reforms **Future plans** Protect 1.3 million Rwandans against malaria, develop capacity at local government level	$ 28 million funded by US government through USAID and Rwanda's association of local government Laura Hoemeke Project Director, PO Box 4585, Kigali, Rwanda
Rwanda (2)		Internet connection, Java enabled web browser, bw ≥30kb/s, for collaborative tele-education & teleconsultations using the iPath platform	King Faisal Hospital, Kigali	Total Population of 9.9M*	**Results**, including Details of Courses & Participation in Teleconsultations, etc at http://raft.hcuge.ch **Future plans** continuation and expansion	**Funding** Geneva State, Switzerland, EU, WHO, Rotary **Contact** Pr A Geissbuhler, RAFT Director, antoine.geissbuhler@hcuge.ch
Somaliland	Swinfen Trust Teleconsultations	Simple internet connection for Teleconsultation with 1 or more of 400 volunteer specialists using store & forward modality. This service is free.	Swinfen CharityTrust & Edna Adan Hospital, Hargeisa	Population of Hargeisa 650 000	**Results** Wide variety of medical conditions treated in 40 developing countries (mainly not African) especially uncommon/complex problems, paediatric & other	**Funding:** Donations to a Charity, expenditure 2008 £58 000 **Contact:** via website www.swinfencharitabletrust.org

Uganda	RAFT	Internet connection, Java enabled web browser, bw ≥30kb/s, for collaborative tele-education & teleconsultations using the iPath platform	Faculté de Médecine de l'Université de Genève, Kampala International Univ, Dept of Medlab Sciences & Community Welfare Initiative Network, Kampala	Total Population 30.7M*	**Results**, including Details of Courses & Participation in Teleconsultations, etc at http://raft.hcuge.ch **Future plans** continuation and expansion	**Funding** Geneva State, Switzerland, EU, WHO, Rotary **Contact** Pr A Geissbuhler, RAFT Director, antoine.geissbuhler@hcuge.ch
CENTRAL AFRICA						
Burundi	RAFT	Internet connection, Java enabled web browser, bw ≥30kb/s, for collaborative tele-education & teleconsultations using the iPath platform	Faculté de Médecine de l'Université de Genève & Faculté de Médecine de Bujumbura	Total Population of 8.3M*	**Results**, including Details of Courses & Participation in Teleconsultations, etc at http://raft.hcuge.ch **Future plans** continuation and expansion	**Funding** Geneva State, Switzerland, EU, WHO, Rotary **Contact** Pr A Geissbuhler, RAFT Director, antoine.geissbuhler@hcuge.ch
Central African Republic	Swinfen Trust Teleconsultations	Simple internet connection for Teleconsultation with 1 or more of 400 volunteer specialists using store & forward modality. This service is free.	Swinfen CharityTrust & Paoua Hospital, Paoua	Population of Paoua 18 000. Also a large unknown number of refugees in surrounding region from Darfur	**Results** Wide variety of medical conditions treated in 40 developing countries (mainly not African) especially uncommon/complex problems, paediatric & other	**Funding:** Donations to a Charity, expenditure 2008 £58 000 **Contact:** via website www.swinfencharitabletrust.org

Chad (1)	RAFT	Internet connection, Java enabled web browser, bw ≥30kb/s, for collaborative tele-education & teleconsultations using the iPath platform	Faculté de Médecine de l'Université de Genève & CSSI, Tchad	Total Population of 10.3M*	**Results**, including Details of Courses & Participation in Teleconsultations, etc at http://raft.hcuge.ch **Future plans** continuation and expansion	**Funding** Geneva State, Switzerland, EU, WHO, Rotary **Contact** Pr A Geissbuhler, RAFT Director, antoine.geissbuhler@hcuge.ch
Chad (2)	Swinfen Trust Teleconsultations	Simple internet connection for Teleconsultation with 1 or more of 400 volunteer specialists using store & forward modality. This service is free.	Swinfen Charity Trust & Maroua Hospital, Maroua	Total Population of Chad 10.3M*	**Resu Results** Wide variety of medical conditions treated in 40 developing countries (mainly not African) especially uncommon/complex problems, paediatric & other	**Funding:** Donations to a Charity, expenditure 2008 £58 000 **Contact:** via website www.swinfencharitabletrust.org
Congo, Brazzaville	RAFT	Internet connection, Java enabled web browser, bw ≥30kb/s, for collaborative tele-education & teleconsultations using the iPath platform	Faculté de Médecine de l'Université de Genève & Université Numerique Francophone Mondiale, Brazzaville	Total Population of 3.7M*	**Results**, including Details of Courses & Participation in Teleconsultations, etc at http://raft.hcuge.ch **Future plans** continuation and expansion	**Funding** Geneva State, Switzerland, EU, WHO, Rotary **Contact** Pr A Geissbuhler, RAFT Director, antoine.geissbuhler@hcuge.ch
DRC	RAFT	Internet connection, Java enabled web browser, bw ≥30kb/s, for collaborative tele-education & teleconsultations using the iPath platform	Faculté de Médecine de l'Université de Genève & Cliniques Universitaires de Kinshasa	Total Population of 68.7M*	**Results**, including Details of Courses & Participation in Teleconsultations, etc at http://raft.hcuge.ch **Future plans** continuation and expansion	**Funding** Geneva State, Switzerland, EU, WHO, Rotary **Contact** Pr A Geissbuhler, RAFT Director, antoine.geissbuhler@hc

						uge.ch
Sudan	Swinfen Trust Teleconsultations	Simple internet connection for Teleconsultation with 1 or more of 400 volunteer specialists using store & forward modality. This service is free.	Swinfen Charity Trust & Leonard Cheshire Home and Hospital, Khartoum	Population of Khartoum 2.2M	**Results** Wide variety of medical conditions treated in 40 developing countries (mainly not African) especially uncommon/complex problems, paediatric & other	**Funding:** Donations to a Charity, expenditure 2008 £58 000 **Contact:** via website www.swinfencharitabletrust.org
INDIAN OCEAN ISLANDS						
Madagascar	RAFT	Internet connection, Java enabled web browser, bw ≥30kb/s, for collaborative tele-education & teleconsultations using the iPath platform	Faculté de Médecine de l'Université de Genève & Université d'Antananarivo	Total Population of 19.5M*	**Results**, including Details of Courses & Participation in Teleconsultations, etc at http://raft.hcuge.ch **Future plans** continuation and expansion	**Funding** Geneva State, Switzerland, EU, WHO, Rotary **Contact** Pr A Geissbuhler, RAFT Director, antoine.geissbuhler@hcuge.ch
Mauritius	RAFT	Internet connection, Java enabled web browser, bw ≥30kb/s, for collaborative tele-education & teleconsultations using the iPath platform	Faculté de Médecine de l'Université de Genève, Mauritius Institute of Health & Ministry of Health	Population 1.3M*	**Results**, including Details of Courses & Participation in Teleconsultations, etc at http://raft.hcuge.ch **Future plans** continuation and expansion	**Contact** Pr A Geissbuhler, RAFT Director, antoine.geissbuhler@hcuge.ch
Reunion	Paediatric cardiology teleconsultations	Videoconferencing and echocardiographic image transmission (25 frames/s) using 384 kb/s	St Pierre Hospital, Reunion & University of Toulouse, France	Total Population of 0.8M*	**Results** as academic publications **Future plans** continuation and expansion	**Funding** University of Toulouse

* Population figures for mid 2009, from Population Reference Bureau: http://www.prb.org/pdf09/09wpds_eng.pdf

6.1. Interviews

Results of Interviews from various organizations are presented below

6.2. Non governmental organizations and private health services

The interviews confirmed that a number of organizations were implementing e-Health/telelmecidine projects in partnership with government departments, universities, private and technical organizations. These included ICT companies. However these institutions did not provide the researcher with detailed information and what was available was scanty and not easily accessible. Many institutions did not confirm if there were reports or evaluation that they could provide in addition to what was publically available on the internet. Most respondents felt that it was not within their mandate to release such information. Further they referred researchers to various persons holding positions within the organization to provide information. Generally these persons proved unavailable. A majority also reported that since a number of organizations was involved in the specific e-Health projects, they could not provide all the information required for the assessment. Frequently respondents asserted that they were not fully responsible for the project and hence were not in a position to provide the information required, or that the information required could only be provided by or with the consent of a person holding a higher position.

6.3. Universities/Research Institutions

The results indicate that most of the e-Health projects studied were in partnership with various universities across the continent. It must be stated that the universities or research institutions provided more information than all other institutions 'interviewed'. The universities/research institutions, mainly in South Africa, provided more information usually because of their proximity to the location where the study was undertaken. This was unlike other countries where the research relied mainly on information gathered via telephone interviews or from the internet. Some organizations in South Africa, which have been actively involved in e-Health, including The South African Medical Research Council, CSIR, University of KwaZulu-Natal were within relatively easy reach. However, in general we were referred to the main funder, or other collaborators, or services providers, or main implementing institutions. This made the quest to obtain information difficult because of being referred from one person to the other and frequently reports could not be provided.

6.4. Government Institutions and Health Care Facilities

Despite repeated requests via telephone very limited response was received from government institutions. It appeared that individuals who were to provide information did not only know much about the projects or the technologies, but were also not willing to provide information due to bureaucracy and protocols in place. Many reasons were given for non availability of the information requested, such as*, "I am not in charge, the responsible person is not available, call tomorrow, make an email request, we need to have permission from the provincial office to release the information, etc*."

6.5. African Regional Organizations

Regional organizations such as NEPAD, through the NEPAD e-Africa commission, launched the NEPAD–school initiative in 2003. Several schools received computers, ICT training and networking power. The project aimed at ensuring that Africans graduate with ICT skills that will enable them to participate effectively in the area of ICT. One of the components relevant to this assessment was the inclusion the "health point", aimed making every learner health literate. For reasons already mentioned, regrettably the search did not yield information with regards to the "health point" component or its information content.

6.6. Interoperability

Interoperability is defined as "*the ability of systems, units, or forces to provide services to, and accept services from, other systems units, or forces and to use the services so exchanged to enable them to operate effectively"* in (www.atis.org), a website of Alliance for Telecommunications Industry Solutions. During the period of the assessment one important aspect became very clear; information regarding interoperability of the technologies employed was not readily available, nor could be obtained at all. Most respondents did not even understand the term interoperability and the concept of the machine/technology or equipment being used to solve any additional health problems was news to them. In order to garner full benefits of interoperable e-Health as affirmed in, *"Making better access to healthcare services 2005, ITU Report October 2005"*, technical operability is crucial. Also organizational, cultural and policy frameworks must also be worked through for optimal profit and use.

6.7. Scalability

The function of technology and technology transfer is a critical factor in each project and varies according to project selection, "*Sustainability and replicability".* This is a key yardstick for every project

and is associated to the development of a project and technology choice. e-Health is a comparatively young model and is undoubtedly new in the African context. Constructing opinions on sustainability at such an early phase would be impractical at this stage. With evident increase in the number of e-Health projects initiated on the continent, the likelihood and opportunities for replicability cannot be underestimated.

6.8. Sustainability

Some projects are stated to be sustainable and feasible. The possibility of sustainability is not far fetched if one is to examine the rate at which projects are funded and scaled to reach millions in North Africa and other African countries. Funding is required to generate additional sustainable revenue opportunities. Some of the projects are designed to provide a wide African reach and the models and methodologies can easily be replicated into other parts of Africa, if additional attention is first paid to examine unique needs and capabilities of each country

7. Discussion

Results of this e-Health initiative assessment point to the willingness of its participants, their enthusiasm and their wish to embrace ICTs to aid in providing remote healthcare delivery in Africa. However the lack of resources, coordination, infrastructure and financing are major stumbling blocks towards the adoption and implementation this technology. Several reports from the Western countries have documented the substantial benefits of e-Health in healthcare delivery. This assessment has revealed several projects/initiatives started throughout the continent. For example South Africa, Rwanda, Kenya, Zambia and some countries in North Africa have a number of projects/initiatives underway, but because of their lack of documentation and proper evaluation the present evaluation has been limited and overall success of these e-Health projects/initiatives is uncertain. In Africa educative aspects of e-Health have the potential to provide support for healthcare that is of great value, because opportunities for those in remote locations to have further training and study is restricted, mainly because of the large distances to centres where teaching can take place and the lack of funds to provide replacement personnel at village clinics where there are very few professional HCWs. A number of such programmes underway is listed in table 1 and their pedagogic success and cost effectiveness implies that their scope will be expanded and applied more widely.

Limited resources for project implementation have been reported; for example there were frequently no project managers dedicated to specific projects. The lack of a dedicated project manager/facilitator, based at pilot sites, made it difficult to obtain important information, including reports required for this assessment. Consequently there is some lack of clarity in roles and responsibilities because of poor communication and in-coordination of activities and report compilation.

8. Challenges

The following challenges were encountered in the production of this report.

- The lack of proper documentation of project reports, evaluation, training and implementation strategies made it difficult to tease out best ~~a~~ practice models that could be used for appropriate replication of e-Health projects across the continent.
- An attempt was made to obtain documentation of important aspects required by the funder namely; interoperability, scalability and sustainability of e-Health projects. The search was generally not successful in acquiring the required information.
- The few reports that were available in West Africa, East Africa and North Africa reported on the very same challenges as those pointed out in the above discussion. Other challenges include the dearth of ICT specialists, inadequate training during the implementation of projects and difficulties in identification of major driving forces and common problems.

9. Opportunities

Various opportunities do exist with regards, to funding, willingness by service providers, health care professionals and patients alike. It is clear that the enthusiasm of participants in African projects, which have been examined in this document, and the proven successes of certain e-Health initiatives in certain non-African developing countries will permit such success to be extended to Africa. However this may necessitate a fuller research project, not limited to Africa, which studies those successful e-Health projects in all developing nations. This too will aid greatly the evaluation of characteristics of future successful African e-Health applications. In addition it should be noted that there are lessons to be learned from failed non-African e-Health activities which will also aid the success of future African projects**.** The above opportunities may further create a space for replication of this technology across the continent.

10. Recommendations

The assessment recommends the following be done:

- A similar assessment study on a larger scale, which may require a longer time for preparation, needs to be undertaken to understand more clearly the underlying issues/factors around the success and challenges of e-Health projects in the continent and relevant projects elsewhere.
- Audit of e-Health initiatives by regions and country, with specific emphasis on the countries' geographical, socioeconomic and infrastructural status
- Technologies used by specific countries, including challenges and success of such technologies merit more detailed analysis.
- Identification of e-Health drivers in various countries, in the light of the last paragraph, concentrating on successes and lessons learned from e-Health failures in all developing countries.
- Documentation of specific or unique country factors for ~~a~~ successful e-Health implementation

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- Emphasis on project documentation and evaluation
- Documentation of specific or unique country factors for a successful e-Health implementation
- Examination of the relevant functionality, technical support and interoperability needs more attention.

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12. TOR checklist

Title: To conduct an assessment of e-Health Projects and Initiatives in Africa

1. Objectives:

The objective of the consultancy is to identify and document the major ongoing e-Health projects/initiatives in Africa, highlighting their strengths and weaknesses, including their standing in terms of interoperability, scalability, and sustainability,

2. Description of Assignment:

The consultant

- Will submit to WHO a plan of how the consultancy will be carried out within 3 days of signing the contract
- Will conduct the assessment through a review of the literature or key informant interviews as may be required (done)
- Will submit a draft written report to WHO no later than one month after signing the contract
- Will submit a final written report within 1 week of receipt of comments from WHO

Output

The expected output of the consultancy is a report not exceeding 25 to 30 pages which comprises the following sections

i. Background and objectives (done)

ii. Method of assessment (done)

iii. Results (done)

(For each project/initiative, the minimum information required is as follows:

- Title of Project/Initiative (done)
- Scope and services provided, including technologies/applications/solutions being used (done)
- Institutions and programmes concerned (done)
- Geographical coverage (Region, Country, Province, City) (done)
- Coordinating institution (done)

- Partners/Donors (done)
- Results of project, including summaries of evaluation reports, if any (done)
- Future plans (done)
- Contact Persons (done)
- Address, Email and Telephone of Contact Person (done)
- Funding Details / Amount/Period (done)
- Web site address of Project/Initiative, if any (done)
- URLs of reports of projects/initiatives

iv. Challenges and lessons learnt (done)

v. Opportunities (done)

vi. Recommendations (done)

3. Consultant:

Dr Moretlo Molefi

BSc, MB, ChB, TelemedDip, SMP

Contact details

lmolefi@mweb.co.za

moretlo.molefi@sita.co.za

27828232571

27110238849