Learning Brief

Health | Tanzania

September 2010

Telemedicine users getting familiar with a digital camera

Connecting medical specialists in rural hospitals

Lessons learned from the telemedicine project in Tanzania

This brief describes the lessons learned from the IICD and Cordaid supported Tanzania Evangelical Lutheran Church Tanzania (ELCT) telemedicine project. It is intended for actors in the health area as well as for institutions implementing a similar project that would like to learn from this experience.

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This brief takes much of its learning from the Monitoring and Evaluation (M&E) activities that have been performed by the project, with help of IICD and the local M&E partner during the project period. The M&E system, which was developed by IICD, consists of quantitative and qualitative assessments. Each year, questionnaires are filled in anonymously by the end users of the project (all users of the project or a representative sample). The answers are then analysed to discover more about end-user profiles, levels of use and satisfaction, and the impact of the project. This process is complemented by periodical Focus Group discussions which are attended by project staff and end users in order to reflect on the data that has been collected through the questionnaires and discuss successes and challenges relating to the project, and possible solutions.

Context

In Tanzania, most people live in rural areas where access to health care is poor. Yet the epicentre of healthcare expertise and resources remains in the cities. Isolation from the rest of the medical world, lack of up-to-date reference material and lack of consultation possibilities results in low quality diagnosis in rural areas. People who can afford it come to cities for their health care; in huge numbers and at enormous cost. Others do not have access

to specialist care at all. One of the options to get specialist care in rural areas is by means of telemedicine.

In telemedicine applications, medical information is transferred through interactive audiovisual media for the purpose of consulting, and sometimes for remote medical procedures or examinations. Telemedicine may be as simple as two health professionals discussing a case over the telephone, or as complex as using satellite technology and videoconferencing equipment to conduct a real-time consultation between medical specialists in two different countries.

Particularly in remote areas telemedicine is beneficial for patients, because it increases their access to specialist health care. Treatment in their nearby hospital saves travel costs and time.

Telemedicine can only be applied when telecommunication structures are in place, and is besides the use of (mobile) telephones making use of a broader array of communication tools that require internet connectivity. Although the implementation of the national fibre backbone started in Tanzania in 2009, it will still take many years for remote areas to be connected to broadband internet. Satellite or mobile internet connection remain the only options for the nearby future.

At the Roundtable workshop on ICT for Health, held in Mwanza in February 2005, telemedicine was one of the themes identified as being of interest to improving health care in Tanzania. The Roundtable was organised by the Ministry of Health and Social Welfare (MOHSW), Christian Social Services Committee (CSSC), and the Tanzania Commission on Science and Technology (COSTECH) with the support of IICD and Cordaid, a Dutch development organisation.

As a result of this Roundtable the Evangelical Lutheran Church Tanzania (ELCT), supported by IICD and Cordaid, set up a project to develop and test a telemedicine-based medical service support system for diagnosis and treatment that could be a model for other health facilities in Tanzania.

The Evangelical Lutheran Church Tanzania (ELCT) owns and manages 23 hospitals, 5 paramedical institutions, over 160 dispensaries and health centres and various projects and programmes, which constitutes about 15% of the national health services in Tanzania. The telemedicine project is closely linked to another IICD project with ELCT on Hospital Management Information Systems (HMIS).

The project is run by the ELCT Information Technology (IT) Unit and employs a project manager and an assistant project manager. The team is supported and coached by IICD's country programme manager, officer capacity development and officer knowledge sharing.
After two years of project formulation and preparation, the first implementation phase of the project started in January 2008 and continued for two years. The total amount of funds for this first phase was € 100,000.

Tanzania Profile

Tanzania	
Surface Area (sq. km):	9.473.000 km²
Population total:	42,5 million
Life expectancy:	56 years
Adult literacy:	72,3 %
School enrolment, primary):	110,2 %
Human development index:	151 (out of 182 countries)

Source: World Development Indicators, 2009

Access to communication technologies
per 1,000 people

Telephone lines:	2,9
Mobile subscribers:	306,2
Internet users:	12,2
Personal computers:	9,1

Source: United Nations E-Government Survey 2010

Data on the project

Number of users:	360
Number of beneficiaries:	18,000
Target groups:	Medical doctors, patients

Objectives of the project

The project was conceived to tap the potential of telemedicine in Tanzania and to develop the relevant technology and practices. The project aims to (1) reduce the strain caused by a shortage of qualified personnel, (2) contribute to training and continuous professional development, (3) improve the quality of health services in rural areas, (4) contribute to the establishment of a referral system and (5) be cost-effective. These high demands require innovative solutions.

The specific objectives of the telemedicine project are:

- To have an online consultation network operating between 43 health facilities, of which 40 are remote hospitals, with about 100 consultations taking place weekly. The effect of the telemedicine use on the quality of consultations of participating health workers will be measured and recommendations developed to improve this quality.
- To provide a platform for exchange and alignment of one to one telemedicine initiatives in Tanzania and to seek their close involvement in the realisation of the above-mentioned aims.
- To develop a set of recommendations to facilitate the integration and further development of telemedicine in the Tanzanian health sector.

Dr. Jusabani, radiologist, assists doctors all over Tanzania by interpreting x-rays received through the open source online medical consultation tool iPath

Initially, the project also aimed to integrate telemedicine with an e-learning component. Later it was decided to develop a separate e-learning project.

Direct users of the telemedicine project are doctors in remote hospitals, who through online consultation of specialists can increase their knowledge, sharpen diagnostic quality and provide better health care. Beneficiaries are patients, who have access to improved specialist care in their own health centre, and whose travel expenses and waiting time are reduced.

In most hospitals, internet connection and computers were already in place as a result of an earlier project (Mission for Essential Medical Supplies and Services - MEMS). The telemedicine project provided a digital camera to participating hospitals, to enable doctors to include pictures when they submit a medical case online.

The project team chose to work with iPath, an Open Source online medical consultation tool, developed by the University of Basel. The reason for choosing iPath is that it already has an international online community of doctors, who upload medical cases and receive a consultation by return. Also, two Tanzanian hospitals were already using iPath on a one to one base, each of them consulting one hospital abroad. These are now integrated in the Tanzanian telecentre network created.

In iPath, a group was created to share medical cases coming from Tanzania. Return consultations can come from Tanzanian doctors, but also from foreign doctors who are part of the Tanzania group, usually within 24 hours. iPath uses a store-and-forward method (as opposed to real-time consultation), which is working well in a low-bandwidth setting and users only need basic internet browsing and typing skills. Medical cases can easily be uploaded through the platform or through email. To ensure the privacy of the patients, names are never mentioned. iPath automatically informs the consultants by email when a new case is uploaded and the doctors when the consultation is made. The consultation cases remain online for teaching purposes. Consultants can include reference links for further study of the case.

Content of the telemedicine training for doctors

1. Introduction to telemedicine and its importance/ potential for the health sector
2. Demonstration of the online telemedicine platform iPath
3. Training on how to use manual forms
4. Registration of new users (medical staff) in iPath
5. Upload of sample test case. Different fields have to be filled in:

- Important history
- important clinical findings
- Important investigations
- Question to consultant

6. Practice with digital camera:

- how to use the camera
- how to take good pictures
- how to upload pictures

7. Hands-on test run by the new users

‘I was able to treat patients at my centre without them having to travel to far centres.’

Results

Training of doctors

In two years, more than 250 health workers in 40 hospitals have been trained to use the system. Before each training, the project team would contact the Doctor in Charge of the hospital and ask him or her to select health workers to be trained, specifically those with email addresses (and thus with basic computer skills). All doctors, assistant medical officers and clinical officers who were available and interested were trained. Doctors can either directly submit a medical case online, or fill in a manual form that can be submitted online by someone else. Doctors without IT skills were only demonstrated how to use manual forms and they were shown some real cases from other hospitals. The project team in each hospital tried to identify a focus person with good computer skills who would be responsible for telemedicine activities.

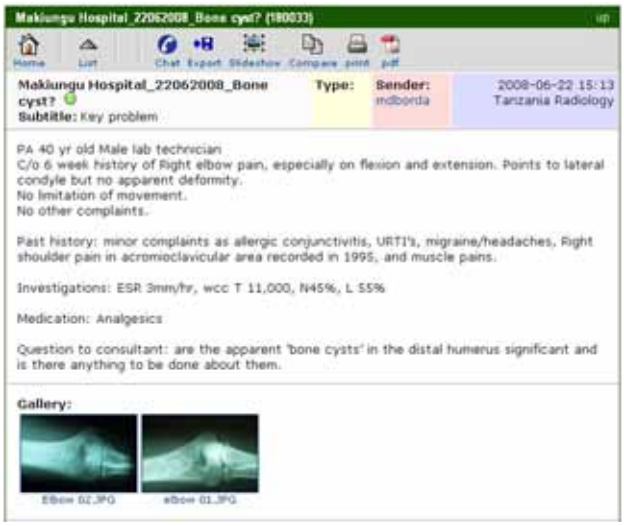
Change management was addressed during demonstration and individual training. Aside from learning to use iPath, doctors were also trained in using digital cameras so they can include pictures when submitting a case to the iPath community.

Thirty three external consultants from different countries are part of the Tanzania consultants’ base. They were found through existing informal networks. The project team was already in contact with a Swiss network of medical consultants. The team also asked Tanzanian doctors if they knew foreign doctors that had worked in Tanzania and would be interested in joining iPath.

Medical consultations and reviews

The number of uploaded cases is considerably less than the targeted number of 100 cases per week. In two years time, 364 medical cases were uploaded from 40 hospitals, and around 250 doctors registered in the Tanzanian portal. All cases received one or more return consultations. Most cases were in the field of cytology (69 cases), radiology (67), surgery (58), dermatology (42), internal medicine (40) and paediatrics (33). Many cases were complex or rarely seen. Out of 40 hospitals, five sent more than twenty cases. Fifteen hospitals are sending cases every now and then and are expected to continue using the tool without receiving additional support. Twenty hospitals are not using telemedicine. About 15% of all registered users regularly reviewed cases for education purposes.

All consultants receive email alerts when a new case is uploaded and when a consultant replies. Most cases are answered within 24 hours. If a case is not answered within 48 hours, the project team resends the case directly to the consultants.



A screenshot of iPath, an Open Source online medical consultation tool

Knowledge sharing and sensitisation

In collaboration with the IICD supported ICT for Health network AfyaMtandao, the project organised three sensitisation sessions about telemedicine, to create more interest for telemedicine among decision makers like doctors in charge and hospital administrators. This was done during project implementation.

Also with AfyaMtandao and during project implementation, three telemedicine platform meetings were organised to align and exchange with other telemedicine initiatives in the country and abroad. Among the participants were representatives from Aga Khan University Karachi, Aga Khan Hospital Dar es Salaam, AMREF, Christian Social Services Commission, I-TECH, Ministry Of Health and Social Welfare, Mkapa Foundation, Ocean Road Cancer Institute, Tanzanian Training Centre for International Health – Ifakara, Tanzania Christian Medical Association. During the last meeting, the National Health Insurance Fund and private health insurance companies were invited to explore raising their interest in funding telemedicine.

At the annual meeting of the Tanzania Christian Medical Association, about 100 doctors from all over Tanzania were informed about the telemedicine project. AfyaMtandao produced a ten minute video about the project that has been shown at various sensitisation and advocacy events, and the project developed a telemedicine manual for users.

Integration of telemedicine in the Tanzanian health sector

Through initiatives taken by the project and collaboration with other health providers and stakeholders, telemedicine is one of the priority areas in the national eHealth strategy that is being developed at the moment of writing.

‘Before using telemedicine, I was using Google. I searched on the diagnosis. But I never received a personal advice. Telemedicine is like Google, but with discussion, and with several alternatives. I always got useful replies and in time.’ *Doctor Materu*

Impact

So far, there are strong signs of positive impact of the telemedicine project on health care quality. It is safe to say that the consultations received have helped doctors to better treat their patients; saving time, costs, and most importantly lives. In the monitoring and evaluation survey filled in anonymously by 24 telemedicine users, a respondent testifies: ‘Working in a district hospital you sometimes encounter cases you can’t manage on your own. Hence being able to contact specialist helps a lot in management.’

Doctor Materu from Ngoyoni Hospital explained during a telemedicine platform meeting: ‘Before using telemedicine, I was using Google. I searched on the diagnosis. But I never received a personal advice. Telemedicine is like Google, but with discussion, and with several alternatives. I always got useful replies and in time.’

Many respondents mention that by using the telemedicine service, patients did not need to be referred. One doctor testifies: ‘I was able to treat patients at my centre without them having to travel to far centres.’ A related advantage is that if referral of patients is still needed, it can be done with more certainty of treatment, because the consultant at the referral hospital has already seen the case online. Before, patients were referred without being sure that the referral hospital could help them, risking high travel costs for nothing. Doctor Materu: ‘Telemedicine helps me to know that the hospital where the patients will be referred to is according to their disease.’

Respondents also mention the learning impact of telemedicine: ‘We have been able to receive accurate diagnoses for most of the difficult cases and therefore made better decisions on further management of our clients. We have been able to learn new things especially about changes in health care.’

59% of the respondents estimated that patients’ stay in the hospital has been reduced. However, 39% indicated that there is no influence. It has to be noted that these figures are estimates; no baseline measurement was done to compare the length of stay before and after the introduction of telemedicine.

Concerning cost reduction by telemedicine, users had varied answers: 31% rated it small while another 31% rated it high. 38% were not sure of cost reduction. Again, these figures are estimates as no baseline measurement was done.

The majority of the respondents express high satisfaction with the quality of the expert answers: 90% assert that the experts’ answers were clear and understandable.

As most telemedicine users are doctors and most doctors in Tanzania are men, only very few women were trained. No specific measures were taken to address the gender imbalance.

Challenges

It has become clear that though clearly making a difference, there are still many challenges to be tackled. From the 40 hospitals trained, only five are actively using the tool. Many of the challenges have to do with telemedicine being novel in Tanzanian hospitals: computer and typing skills are not yet widespread, internet-connected computers are not yet available on every doctor’s desk, the practice of telemedicine is not yet mainstreamed in the busy work flow, hospital management is not sufficiently aware of the benefits, and the government is still working on proper policies. By trial and error, the project contributes to finding good practices while lobbying for their institutionalisation. In the longer run, the number of consultations needs to increase significantly to justify the overhead.

Low level of computer and typing skills among doctors

One important challenge is a simple lack of computer knowledge. ‘Computers in hospitals are mostly used as typewriters ... older doctors [especially] need to get familiar with them’, said one participant in a telemedicine platform meeting. A related problem is the low level of typing skills among doctors. One participating doctor, who was not using the tool yet, explained why she hesitated in taking up the new technology: ‘For me this would be an extra work load. I need a person to help me with this.’ For many doctors, typing medical cases takes more time than writing by hand, or just browsing the internet to find medical information for a specific case. This could be overcome by providing manual forms and requesting hospital secretaries to type the cases.

Connectivity and computers

The project only works with hospitals that already have computers and internet connectivity in place. This does not mean that equipment and connectivity are without challenges. Survey respondents testify: ‘The network for telemedicine is excellent. The big limit on my use of it with teaching it to others is time online. I often start

‘Regular visits or supervision to the rural areas to assist their knowledge on ICT is important, because workers leave the rural health facilities often and new ones come who have no knowledge on ICT and Telemedicine’.

transmitting a case with images then after 45 minutes it jams, I have to return to my other work and may not get back until after another week. So help with internet speed is the biggest factor for me otherwise it is a wonderful service.’ Access to computers can be cumbersome: ‘Only having one computer in hospital [causes] delay in sending questions,’ a doctor writes.

Socio-cultural barriers
During a telemedicine platform meeting, participants highlighted that a prevailing attitude towards knowledge sharing can be a barrier: doctors are not used to seeking a second opinion. They are supposed to be knowledgeable themselves; asking for advice can be seen as a failure. As the country has the lowest Gross National Product (GNP) in the region, providing limited opportunities, knowledge is considered a bankable asset resulting in a tendency to hoard information, countering networking and knowledge sharing. In a workshop with project users, several participants mentioned that they felt discouraged by the way some of the consultants communicate. For example, consultants can react offensively if a doctor forgets to include some important details about the medical case, which could prevent them from uploading another case.

Response time
As iPath is web based and the Tanzanian group works with volunteer consultants, there is no guarantee that requests are answered in time. Consultants need to access the internet at least on a daily basis to check if there are consultation requests, which is not always possible. The project manager had to intervene several times when a request remained unanswered for two days, by personally resending cases to the consultants.

Low interest from national consultants
The national consultants seem to be weakly motivated and consequently less involved compared to international consultants. All consultants work on a voluntary basis with little or no recognition. The international consultants are very active, providing valuable feedback to the hospitals and contributing much to the smooth running of the project. A formal recognition and some reward for telemedicine consultants may be due. As one user comments in the survey: ‘For the long term sustainability there should be some motivation for those who are participating.’

Lessons learned

Organise onsite training
Originally, the idea was to train one doctor in each hospital, who would then train others; the knowledge acquired from the training sessions would naturally trickle down to other colleagues in the hospital. This training of trainers (ToT) methodology was quickly abandoned, as it proved difficult for trained doctors to organise training in their respective hospitals, due to their tight schedule. The project team solved this by organising onsite training in each hospital, so a bigger group could be exposed and doctors did not need to leave their hospital.

However, in the survey users recommend even more training and support: ‘Regular visits or supervision to the rural areas to assist their knowledge on ICT is important, because workers leave the rural health facilities often and new ones come who have no knowledge on ICT/ Telemedicine’. Another user: ‘I suggest the telemedicine coordinator to provide more workshops to the user because some areas are too behind.’

Institutionalise telemedicine through hospital management
Although a few sensitisation workshops for hospital management were done with the ICT4Health network AfyaMtandao, this was not an integral part of the original project concept. The project team mainly focused on the training of doctors. Hospital management was informed,

The camera connected to the left microscope is used to digitise tissue samples and send them to specialists.

iPath shown at a telemedicine workshop

‘Working in a district hospital, you sometimes encounter cases you can’t manage on your own. That’s why being able to contact a specialist helps a lot in management.’

but – with hindsight - not sufficiently involved. In a workshop with users, they specifically mentioned this to be a restraint. In the extension phase of the project, telemedicine champions will discuss with hospital leaders to make telemedicine a routine in daily work and to appoint a telemedicine focal person.

Demonstrate health and financial impact
Saving lives and saving costs are strong arguments in favour of telemedicine. Cases were reported where telemedicine shortened patients’ stay in the hospital or saved referral costs. Although it was part of the objectives of the current project, benefits were not structurally measured and documented. In the extension phase, studies on health benefits and financial impact for both hospital and patient are included, providing the figures to convince decision makers.

Use smarter tools
Participants of the telemedicine platform came up with suggestions to improve the ease of use of the iPath tool. Doctors should get an SMS-alert when a new case has been uploaded, so they can provide consultations faster. Also, it would be helpful if iPath users could see who else is online. The project team plans to test iPath using smart phones with camera. It will reduce the number of steps to be taken to upload a case as well as the response time, as doctors do not need to look for a computer with internet access. The speed of mobile internet is good enough if pictures are sent compressed.

Integrate telemedicine in hospital management information systems (HMIS)
Apart from the telemedicine project, the ELCT IT Unit also implements a hospital management information system (HMIS) project, based on the Open Source software Care2X. The plan is to integrate iPath with the patient recording system Care2X, to increase interoperability and to simplify the work flow. With one click, a doctor should be able to ask for a second opinion for a patient whose data is already registered in the HMIS.

Next steps and future plans

As the results from the first phase are considered promising, the project is now in an extension phase of which the components are strongly based on lessons learned from the first phase. The focus is on consolidating the work done in the target hospitals and increasing the number of active users. Champions from the first phase will advocate and work with management and doctors in less active hospitals. The project will advocate for telemedicine among government and other potential future users like the vertical health programs, health insurance companies and professional associations. The project will also have a pilot component to implement telemedicine in 10 to 15 smaller health facilities, which will be consulted by their mother hospitals.
As telemedicine is one of the priority areas in the national eHealth strategy that is being developed at the moment of writing, government support for telemedicine can be expected in the near future.

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Links
Video about the project:
http://www.iicd.org/video/telemedicine-project-in-tanzania/

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