Learning Report

iicd
People - ICT - Development

ICT for health: five years of learning

JANUARY 2014

CONTENT

"The project delivered numerous solutions for our problems. Before the project, the raising of awareness on health problems took the form of posters and discussion meetings. Now, showing the images allows women to understand better and they ask for more health information. We go to the CSCOM with our images, show them, and then the women ask questions and receive answers. At present, several health indicators are improving, such as the number of prenatal consultations, the number of pregnant women receiving malaria medication, the number of women using impregnated mosquito nets and the number of non-eventful births." Nestor Koné, Head doctor of the Community Health Centre of Dangassa, Mali

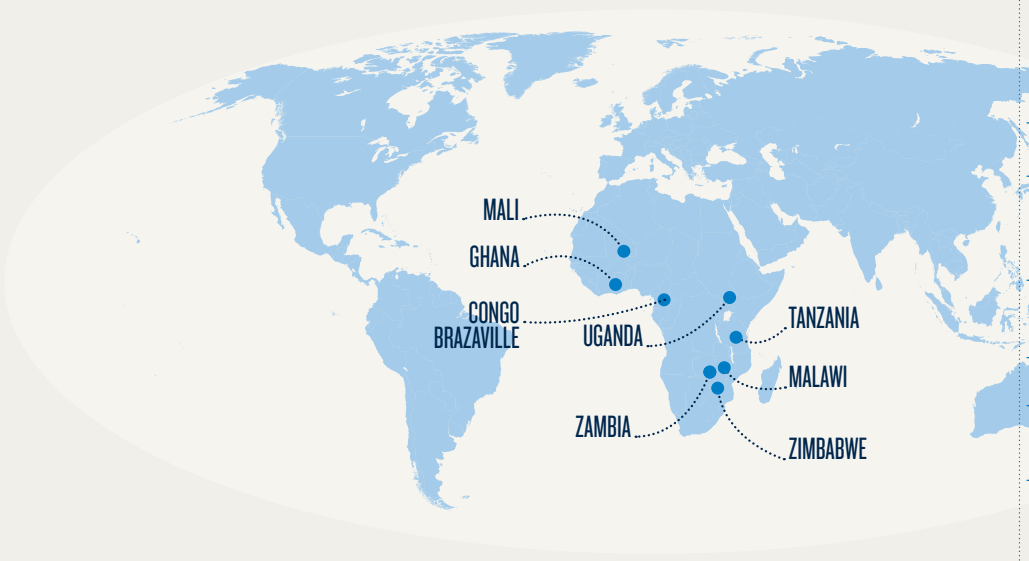
INTRODUCTION

Information and Communication Technologies (ICT) have the potential to make healthcare delivery and health systems more efficient and effective, allowing us to rethink the way healthcare services can be delivered. Adequate information management, telemedicine and e-Learning can contribute, enabling healthcare providers to deliver quality healthcare wherever and whenever needed in the most efficient way. Traditional and new means of communication and information influence the ability of impoverished communities to access services, engage with and advocate for a health sector that responds to their priorities and needs.

Healthcare issues in developing countries today

Improving health in developing countries is challenging as most health systems are weak and access to quality healthcare is limited. Health facilities often lack the instruments to register and manage data on patients, finances and stock supplies, which are vital for efficient healthcare delivery and help policymakers decide on priorities for resource allocation in the sector. Other factors undermining the quality of healthcare include a lack of health facilities, shortages in health staff, lack and quality of (continuous) medical training and access to new medical knowledge.

IICD IN SECTOR HEALTH



8 COUNTRIES
CONGO BRAZAVILLE, GHANA, MALAWI, MALI, TANZANIA, UGANDA, ZAMBIA, ZIMBABWE

INTERNATIONAL PARTNERS, DONORS AND CLIENT ORGANISATIONS
DGIS, EU, ESA, SDC, FHI, NORAD, WORLD BANK, CORDAID

300 HEALTH FACILITIES

24 PROJECTS SUSTAINED
18 PROJECTS IN IMPLEMENTATION
9 MHEALTH PROJECTS

5,000 HEALTH CARE WORKERS
1,000,000 PATIENTS

20 LOCAL PARTNERS

PATIENTS' SATISFACTION FOR HEALTH SERVICES PROVIDED: **60%** TO **85%**

INCREASE IN THE NUMBER OF PATIENTS SEEKING FORMAL HEALTHCARE AFTER RECEIVING INFORMATION VIA TELEVISION, RADIO OR TEXT MESSAGE SERVICES: RANGE FROM **11%** TO **80%**

This is particularly true in remote areas, where disease burden is highest, health facilities are scarce and often far from communities where people reside, and people do not know how to acquire reliable health information and quality services.

The role of IICD

IICD's primary goal in the health sector is to expand the effectiveness, efficiency and equity of healthcare systems. Together with local partner organisations, from hospitals to community-based organisations, IICD integrates the use of ICT tools into health services and community health programmes. The use of adequate tools and skills helps individuals and organisations to overcome a number of challenges that affect the quality and accessibility of healthcare.

The 'ICT-led social innovation process'

IICD uses a distinctive participatory and multi-stakeholder approach to strengthen health services in developing countries. Whereas many ICT for Development (ICT4D) projects focus on the transfer of new or innovative technologies, IICD does not only focus on technology, but on people. By strengthening individual and organisational capacities, IICD enables people and organisations in developing countries to use ICTs effectively and independently to achieve their own development goals. In health, IICD's approach brings together a range of stakeholders who set the priorities for improvements in their sector and design how their organisations could use ICT to empower health professionals and improve access to quality healthcare.

IICD's approach consists of six phases constituting our 'ICT-led social innovation process': needs assessment, project formulation, implementation and pilots, embedding, scaling up and systemic change. In all these phases, IICD facilitates capacity building processes, such as the 'solution design workshop', where participants evaluate technological solutions and ICT competences. Additionally, IICD offers one-to-one coaching and advice on strategic, technical and financial aspects of the projects, as well as integration of ICT within our partners' institutions and more widely. Furthermore, IICD facilitates knowledge sharing and lobbying on ICT in health. Once a sector programme has been completed, IICD continues to be available in the roles of advisor and broker for further expansion and scaling up of ICT within the sector. Consolidating and building on our own and our partners' experiences and input, IICD works with governments, donors and NGOs to develop and implement national strategies, policies and large-scale ICT4D projects and programmes.

This publication

In this publication, IICD's interventions, results and a selection of the key lessons learned on our ICT4Health programmes over the past five years are described. These are grouped into four intervention areas[1]: **(I)** improving healthcare delivery, **(II)** enhancing health professionals' capacities, **(III)** strengthening health systems and **(IV)** improving community health awareness.

Each intervention area presents a list of applied solutions, followed by results and lessons learned. The lessons learned are grouped around three themes that play a major role in IICD's work:

- solution design
- capacity development
- sustainability of the solution.

[1] *IICD's intervention areas 'improving health care delivery', 'enhancing health professionals' capacities' and 'strengthening health systems' relate directly to the World Health Organization (WHO)'s intervention areas.*

IMPROVING HEALTH ALONG IICD'S FOUR INTERVENTION AREAS

| IMPROVING HEALTHCARE DELIVERY

The ability to communicate effectively and have access to and use relevant information is vital in supporting health workers to improve healthcare delivery. This is particularly crucial in rural areas in developing countries where there is a significant shortage of qualified health professionals with most of the specialised doctors based in the capital city. Distances to more specialised hospitals are immense in most countries because of the poor transport infrastructure. Doctors in rural hospitals do what they can to make a good diagnosis. Statistics[2] show that in the case of interpreting x-rays, half of the generalist doctors performed an incorrect diagnosis, compared to only 5% of radiologists. Furthermore, the possibilities for professional development and further training are very limited for health workers in these areas. Therefore, people in developing countries suffer from poor or faulty diagnoses, and unnecessary and cost- and time-consuming referrals.

IICD supports (front-line) health workers with a variety of ICT tools. In Mali, Tanzania and Uganda, IICD has implemented simple low-tech solutions that allow voluntary health workers in remote places to use **mobile and land-line phones** to consult certified mid-wives in hospitals. In other cases, community health workers use **mobile data collection tools** to report incidences of malaria, which help those infected to be treated faster. IICD also supports the use of **portable digital microscopes** to make laboratory tests **and advice** possible in first line health centres. Other more advanced solutions, such as **satellite-enabled telemedicine platforms** or **teleconferencing equipment**, enable health professionals to conduct (real-time) consultation between health workers and medical specialists operating in different regions or countries. The types of platforms used include the telemedicine solutions **i-Path and Open Yalim**, and **Blackboard Collaborate** (formerly known as Elluminate) as teleconferencing software.

[2] *T. Romain-Rolland, "Teleradiology interest in the field of second diagnosis in Mali: Case of exchange between Point G hospital, Marseille hospital and Geneva University Hospitals," 2002.*

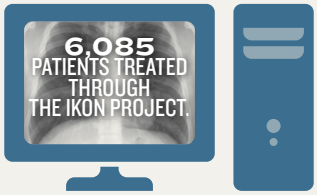
CASE

IKON Teleradiology

Only 21% of Malian communities live within 5 kilometres of daily transport. This presents a particular problem for emergency access to health services with 37% of communities located further than 15 kilometres away from the nearest health clinic. This issue was compounded by a scarcity of specialised health workers and the fact that most of the health specialists resided in the capital, Bamako. The potential of telemedicine to tackle these geographical issues led to the implementation of the IKON Project in early 2005 by a group of doctors in Mali from SOMIM (Société Malienne d'Imagerie Médicale), supported by IICD. The IKON project aimed to address the three key issues of poor penetration of health services into the rural zones, poor communication channels and a lack of trained radiologists.

IKON aimed to realise these aims by linking the regional hospitals that had functional x-ray tables with expert radiologists in Bamako through an Internet-based exchange of x-rays. During the first year of implementation, the project had several setbacks, especially on the technical and organizational level: scanners proved more expensive than they were originally budgeted for and server problems forced the IKON project to migrate to a Canada-based server. There also existed a lack of ICT based training among health professionals. Addressing these project issues required implementing ICT training initiatives and expanding district ICT services. Focus was therefore placed on improving the quality of the user-experience.

The subsequent first successful exchange of an x-ray via the Internet was performed during 2005. As a result of the IKON project, the extension of the capacity of health specialists available for consultation increased.



It can therefore be concluded that due to the project, quality of healthcare in the rural hospitals improved significantly. For instance, experts in Bamako promptly dismissed an initial diagnosis by general doctors in Mopti of potential bone cancer in one of the fingers of a patient. These experts observed a default error on the x-ray film thereby saving the patient from a premature amputation.

By focussing on improving the quality of the user-experience, IKON's successful implementation resulted in faster and better diagnosis of health patients due to increased coordination between hospitals. There was a reduction in costs in terms of avoiding referrals to Bamako hospitals as consultation could now take place at a distance. The long-distance coaching provided by an expert radiologist to local health professionals, subsequently improved the local delivery of services and allowed regional staff to carry out vital interventions.

THE RESULTS

Better quality of diagnosis and treatment

The implemented solutions have helped health workers to improve their core skills in diagnosis and treatment. Evaluations done for the IKON telemedicine project in Mali showed that on average, 98% of the patients and 100% of the specialists were satisfied with the telemedicine services. Doctors participating in the ELCT telemedicine project in Tanzania indicated they always received timely and useful replies. They also valued the personal advice, discussion and consideration of various alternatives that were absent before, when they used Google to seek advice. In Mali, at least 4,500 patients accessed better healthcare as a result of the peer advice.

Unnecessary referrals prevented, cost savings and reductions in waiting time

In many cases, unnecessary transferal of patients was prevented because the doctors at the referral hospital were able to diagnose the patient's health problems online. In the IKON project in Mali, because patients no longer needed to be referred[3], an estimated €90,000 in travel costs were not incurred. In a number of cases, the waiting time for treatments was reduced as well. For example, in the MAMMA project in Mali, the community health workers, trained to report on malaria cases, managed to increase the number of malaria patients treated within 24 hours of falling ill by 15% and reduce the healthcare response time by 65%. Community Health Workers are able to visit more families because the process has become more efficient.

More effective use of available human resources

Capacity development in ICT can result in more effective use of the available, often scarce, human resources at medical facilities. In the case of an IICD-supported telemedicine initiative in Mali for example, operational tasks in echography and cardiology were delegated to non-specialised staff in order to free up time of the few health specialists. This is working well. The non-specialised staff performed their new tasks properly and 90% of the cases were sent correctly and 83% were of good quality.

As a result of receiving instruction by *specialists from the national hospital* in proper X-ray analysis, these doctors can now diagnose and *less external support with diagnosis is needed* for the regional hospitals. Because of the regular staff turnover in regional hospitals, hospitals that were not included in the telemedicine project also benefit by having more competent doctors.

[3] *Thanks to the IKON project 10% less patients have to be referred. This percentage will most likely have grown in recent years, as telemedicine is now also used within other health disciplines.*

LESSONS LEARNED

Designing solutions that enable learning and quick responses

Platforms where the *consultation cases remain online for teaching purposes* will serve a double goal, as they also make e-Learning possible. In Mali for example, the peer-assistance functionality facilitated by the design of the platform, stimulated the project team to develop more specific e-courses on demand.

When putting ICT-solutions in place to consult peers, *delays in responses* to urgent questions are very detrimental. Therefore, building in possibilities to *send automatic updates via SMS to doctors*, once a consultation is uploaded, avoids delays in the process.

Inclusive approach: getting everyone on board

ICT tends to be picked up faster by *younger health workers*. In many cases, they are the *pioneers* at their facility. Telemedicine is also adopted much quicker in the more *remote hospitals* and in *foreign missionaries* (as they tend to promote it more). However, due to the hierarchy and established interests in the health system, pioneers often face resistance. Though they inspire and often manage to get others on board, it is not sufficient to focus on these pioneers. *Management, administration and medical staff* all need to be involved from the start, and addressed separately, in order to ensure ownership at all levels. *Recognition* for their contribution and time investment is an important factor motivating them to continue. *Making the benefits of the ICT intervention explicit* to all stakeholders is also crucial to get everyone on board.

Building a culture of sharing to scale

Cultural attitudes towards knowledge sharing are an important factor to address in ICT-enabled healthcare delivery interventions. As in many countries doctors – considered to be the experts – are not accustomed to seeking a second opinion. The way in which the "peer health worker" interacts with the health worker seeking advice is therefore essential. Especially, in the initial phase of the project, building a relationship of trust between doctors and the expert is crucial. An 'anonymous' peer diagnosis system may therefore have difficulties to convince and be adopted by local staff.

Scale is key in order to achieve affordable rates for telemedicine consultations for low-income countries, both in terms of the amount of cases to be diagnosed and in terms of the number of clients. In that perspective, it may be wise to determine regional 'zones' with sufficient demand to be covered by 'expert hubs' (which could interlink amongst themselves). The cultural/geographical distance between client and expert should not be too big though, in order to increase the chances for trust relationships to support the success of peer consultation systems.

CASE

Combating Mother and Child Malaria Mortality with Mobiles

Maternal and child health risks in Sub-Saharan Africa can be more efficiently mapped and responded to by using ICTs. The Ma Santé programme successfully introduced mobile phones and an app to collect and share data between Community Health Worker's (CHWs) and health centres in Mali. IICD and mobile operator Orange Mali launched a pilot project in 2011 to strengthen the work of 50 CHWs and 10 health specialists working for Muso Ladamunen, a local NGO fighting malaria. The CHWs were trained in making use of mobile devices and a locally developed mobile application, called MAMMA (Mamans Mobiles contre le Malaria au Mali). The MAMMA app consisted of a questionnaire listing various indicators. The data collected was sent by SMS to a database with a web interface allowing health specialists to monitor the health situation and respond when needed.

In the first six months of the pilot project the CHWs of Muso Ladamunen managed to collect data on 2,225 malaria patients in the Yirimadjo area, among them were 120 pregnant women and 926 children. The data is now frequently being updated by the CHWs allowing both Muso Ladamunen and authorized health specialists in surrounding health clinics to consult the most recent data online. This enables specialists to monitor the evolution of the disease in real time and detect and respond much faster to outbreaks of malaria.

The project will be upscaled to two other areas in Mali and replicated in Senegal, increasing the outreach of the programme from 50,000 to 200,000 people in Mali and from 20,000 to 100,000 people in Senegal.

RESULTS OF THE MAMMA* PROJECT SINCE ITS 2011-12 IMPLEMENTATION

FASTER TREATMENT RESPONSE

+65%

INCREASE OF CHILDREN RECEIVING TREATMENT WITHIN 24 HOURS

INCREASE OF NUMBER OF PATIENT VISITS MADE BY HEALTH WORKERS

INCREASE OF PREGNANT WOMEN SLEEPING UNDER A TREATED BED NET

WHERE WE ARE NOW:

2,220

PATIENTS TREATED

*MOBILES AGAINST MALARIA

2 ENHANCING HEALTH PROFESSIONALS' CAPACITIES

ICT enables health workers to access the latest medical information and knowledge without the need to travel. Thus they keep themselves informed, learn collectively with peers and continue their professional medical education online.

In many developing countries, basic medical pre-service training is very theoretical and not relevant enough to the actual job demands. At the same time, medical practices and job requirements keep evolving because of changes in disease patterns, medical technology, and policy priorities. All these factors call for continuous training and learning. However, many health workers find themselves in remote areas with very limited possibilities to acquire such training and keep up with the newest medical knowledge. Continuous Professional Development activities, mandatory for all health facilities, are held irregularly and are not tailored to the needs of rural health workers.

In order to help improve these circumstances, ICT solutions have been developed and implemented by IICD in Malawi, Mali, Uganda, Tanzania and Zambia to enhance Continuous Professional Development (CPD) opportunities for rural health workers. These include the use of multimedia **(using video, digital cameras and presentation software)** to make CPD sessions more engaging for the audience. In other projects, ICT-supported resource centres enable community health workers to access contextualised medical information, enabling them to improve their outreach work in the communities. These resources are often illustrated for better comprehension and are saved on robust and affordable **local storage solutions[4], the Internet or mobile apps.**

Distance education is enabled through appropriate **teleconferencing tools, digitisation and (online) repositories of study materials.** Where appropriate IICD supports the development of more advanced and comprehensive **e-Learning solutions** to support CPD. This type of online training is particularly useful for health workers working in remote areas who want to renew their license and have limited possibilities and resources to travel for their professional development.

THE RESULTS

ICT Capacities for Continuous Professional Development

ICT capacities of the health workers and their computer usage increased significantly in all the projects. For example, in Malawi, prior to the e-Learning project, only 54% of the nurses used a computer. As a result of part-time training taking place over three months, all nurses are now typing their work and emailing. Many have acquired new skills and are now using on- and offline CPD materials, uploading their own materials, and producing power point presentations for CPD sessions. As a result, the sessions have become more relevant and easier to comprehend because of the visualisations. In addition, the materials can be shared across facilities and used multiple times thereby saving time of the health workers to prepare their sessions.

Improved Learning Outcomes

Due to the possibility to follow courses online, health workers have shown improved results in tests done to renew their licences. They also managed to renew their licences faster than before. Since the content was developed on the basis of needs, health workers found the content was more relevant to individual, specific practices.

[4] *An often used type of NAS server used in IICD e-health programmes are Synology DiskStations, see http://www.iicd.org/articles/african-hospitals-and-schools-share-experience-with-innovative-digital-storage*

In the projects for which continuous professional development sessions were organised, thanks to the interactive and visual presentations, the sessions were revitalised and now held on a weekly basis. In Uganda, findings also reveal that the number of health workers attending the sessions increased by over 100%. This was mainly because the sessions are now livelier and more relevant due to the pictures, the examples and other visual effects. In Mali, there are at least two e-Learning sessions per week and special courses have been developed for community health centres. Since the start of the project almost 400 courses have been offered. Health workers also feel much more in charge of their own professional development, since they are able to self-direct their learning when and as it suits them.

More time for patients and improved care

Thanks to being able to follow courses at a distance, health workers saved a lot of time and money that was previously reserved for travelling to health training institutes to do exams or attend trainings. This has resulted in more time for their patients. Due to the improved medical education and relevant knowledge acquired, they could also provide better care to their patients.

LESSONS LEARNED

Managing content in remote areas

As most solutions are implemented in remote areas, solutions that work with minimum bandwidth and energy requirements are to be selected. Also *back-up solutions*, such as solar power, are needed to ensure learning can take place on a continuous basis. Systems can never only rely on *online access*, as Internet connectivity is still very unreliable in many areas. *Computers* are still scarce in most facilities and most health workers do not have their own computers. In some cases therefore, special schemes are introduced enabling health workers to pay a laptop in instalments.

When a lot of relevant content is available, *simple content management and search functionalities* need to be developed enabling health workers to easily find and store the relevant information. Often, the Continuous Professional Development coordinators play an important role to guide this process and assist users with creating and managing their own content.

Facilitating self-directed learning

Capacity building entails both *general ICT training* (in office productivity software, Internet use) and more tailored training and support on how to use *ICT particularly for Continuous Professional Development*. This means searching for the content health workers want to learn more about, doing self-assessments and getting in touch with peers to discuss issues of mutual interest. In these first phases, a system of *continuous support* is crucial.

In IICD-supported programmes, health workers are encouraged to *develop and enrich their own CPD materials* with content generated locally. They learn how to make and incorporate relevant pictures, animations or videos in their own presentations and training materials. This tailors the sessions more to the specific local settings, making the content easier to relate to. Encouraging *health workers in their own health facility* to take this on, rather than having a centralised body developing the materials for everyone, has proven to work best in encouraging wider adoption and integration of ICT in the health facility activities. The implementing partner, who oversees the CPD for a number of health facilities, often facilitates *sharing of materials between facilities* to share good practices.

Change management for sustainable e-Learning

Many e-Health initiatives fail to be sustained because they do not qualify for *certification*. From the very beginning, it is therefore crucial to develop a *change management strategy* that involves and engages stakeholders, such as the Ministry of Health and accreditation bodies. Using content from approved institutions is an additional help in ensuring compliance and quality of content. In Malawi for example, NOMH uses and digitises content from the Nurses and Midwives Council of Malawi and the Nursing Directorate of the Ministry of Health.

CASE

NOMH e-learning platform for nurses and midwives

In Malawi, the National Organisation of Nurses and Midwives (NOMH) created an online e-learning platform for all nurses and midwives. The platform allows nurses to search, access, download, and store educational materials. It is available offline as well as online. The system also provides new ways for them to assess their own skills, submit work for evaluation and receive feedback. Having undergone a rigorous process of self-assessment and action planning, the nurses and midwives are currently using the e-learning platform to improve their skills according to tailored personal development plans. They indicate they now feel much more in control of their own professional education.

In Malawi nurses need to renew their licence every year. In order to do so they must travel to the nearest location where they can attend the eight exams needed for the renewal. This is quite costly and takes a lot of their time. The NOMH e-Learning project has enabled nurses to prepare themselves for their licence renewal without having to travel to main towns and in some cases they can also submit part of the assignments online. As a result of the e-Learning system, one nurse stated that she could avoid 7 of the 8 visits, and managed to renew her license in only 3.5 months time. She scored 1.5 points more than the year before.

3 STRENGTHENING OF HEALTH SYSTEMS

The use of ICTs to manage health data can play a major role in strengthening the health system. Health Management Information Systems (HMIS) and Health Information Systems (HIS) can contribute to high quality and efficient patient care.

Health facility management suffers from shortage of staff, high turnover rates, and inadequate availability and use of health information to keep track of patient data, manage stock supplies and make financial decisions. These factors hinder healthcare facilities in providing quality care, proper financial management, retaining staff and providing appropriate data to the national systems. At national level, the system is confronted with inaccurate health data, which is vital for monitoring and effectively addressing health issues in a country. Health facilities do not meet the required standards for reporting and it takes a lot of time from staff to collect the data.

Whilst HMIS help general service delivery, decision-making and health facility management, HIS improve tracking of health trends in the area, help to plan health policies and can improve coordination and transparency in the sector.

The type of data collection in HMIS includes record keeping of patient information, accounting, HR management, asset management, stock management and knowledge management. In the HIS data is collected for disease surveillance and outbreak notification, registration of vital events and censuses (births, deaths and causes of death) and on administration and resource management (including budget, personnel, and supplies).

ICT tools can offer solutions to challenges faced by health systems in developing countries. **Health Information Systems and Health Management Information Systems** have therefore been introduced in Ghana, Malawi, Tanzania, Uganda and Zambia. The types of software being used by partners are **Care2x**[5], **DHIS2**[6], **Mediboard**[7] and **Afyapro**[8]. In Zimbabwe, IICD and Cordaid helped to develop a **management information system for results-based financing in the health sector**. This is a mechanism whereby payments to healthcare providers are dependent on achieving predetermined goals related to healthcare delivery. In Zambia, where due to high levels of AIDS infection, blood safety is a priority, IICD helped to develop and implement a blood donor database.

As a result of the increased mobile network coverage in developing countries, IICD has also been supporting partners to use a variety of **mobile data collection tools**. Such tools allow community health workers and home-based caregivers in the field to send data, allowing programme coordinators at central locations to analyse large amounts of data from their programmes in a timely and efficient manner. Mobile applications are also used to access health information, monitor the incidence of public health threats, assess patient satisfaction of health services, and monitor the accessibility and use of the National Health Insurance Scheme (NHIS) by low-income Ghanaians. For the above purposes, a variety of **mobile apps and survey tools**, such as **MAMMA** (a Malian-developed application), **Akvo-FLOW**, **Frontline SMS**, **Commcare and Open MRS** are being used.

THE RESULTS

More timely and effective data management

Health facilities are now able to collect their data much quicker than before. Reports for external stakeholders are more complete and are sent on time. For example in Uganda, the percentage of hospitals submitting complete reports to the Uganda Catholic Medical Bureau in time increased from 49% to 90%. The quality of the data also has significantly risen and data security improved.

With mobile data collection tools, data registration takes less time for community health workers, resulting in more visits and more data registered. There was more accurate and timely reporting as well. SEND Foundation, the organisation in Ghana that is using mobile data collection tools to monitor the performance of the National Health Insure Scheme, has made changes in its staffing as a result of integrating the use of mobile data collection tools. Collection of data and information has become more efficient, leading to time savings and a shift in staffing requirements. There is now less need for data entry clerks and more need for staff working on data analysis. SEND can also take up more research assignments. Instead of one research programme: they now carry out five research programmes per year. In some projects, the reliability of the data collected also improved. In the project with the Jinja Diocese in Uganda, for example, the use of pictures and GPS coordinates enabled data verification.

Reduction in patient waiting time and improved patient care

Since patient files can be retrieved much faster, patients can be attended to quicker. In HMIS initiatives in Tanzania, for example, some health facilities managed to reduce patient waiting time from 24 hrs. to 30 min. There was also a reduction in the loss of patient files from 30% to a mere 1%. The HMIS furthermore urged doctors in some of the facilities to

[5] *http://www.care2x.org*
[6] *http://www.dhis2.org*
[7] *http://mediboard.org/public/tiki-index.php?page=Home*
[8] *http://afyapro.software.informer.com*

do ward rounds daily to update their HMIS records which in turn led to a reduction of bed occupancy time. This also contributed to further reductions in waiting time for seeing a doctor and actual treatment.

Increase in revenues collected
Outcomes from an economic impact study carried out in 2009 for the HMIS project implemented by ELCT in Tanzania showed an increase of more than 30% in revenue collected. This was most likely due to control of fraud points, reduction of so-called 'corridor clinics' (patients treated without recording them and their payments) and better logistics and drugs management because of less wastage.

CASE
In Malawi in the ICT in home-based care project, different mobile data collection tools (Open MRS-jr, CommCareHQ and Frontline SMS) for collecting patient data and updating patient records were tested in the field. The aim was to select the one that best met all user requirements. This turned out to be a very valuable exercise. Already in the development phase, the developers learned that out of the three, only two options were suitable for further development. And only one application had the potential to meet all requested user needs. In the field test, users expressed a clear preference for the application that met all the requirements. This solution was further developed and successfully piloted.

LESSONS LEARNED

Testing and comparing before scaling the HMIS
Testing and comparing the pros and cons of various systems, helps to build practitioner knowledge on what works best in a particular setting. In some cases, IICD purposely chose to work *with different types* of software to maintain the stimulus of some competition, enrich the lessons learned and broaden the scope for developing good practices. In the Tanzania programme, for example, IICD supports the use of both Care2X and Afya Pro as HMIS in different hospitals.

When selecting a hospital management information system, it is important to consider the *requirements for scaling from the start*. Although projects often start small, with just a few HMIS modules implemented by a small number of health facilities. As their capacity to manage ICT grows, facilities implement more modules and functionalities. In the long run it is very likely that the HMIS will be scaled to a big hospital network or even to the national level.

Protecting patients while serving the needs of users in mobile data collection
Since mobile health (m-Health) is still relatively new, some important factors to be considered regarding the managing of data have emerged as a result of IICD's efforts in testing and piloting a number of mobile data collection tools. One such issue is *security and privacy of patient data*. This is particularly the case when data is stored in the cloud, which proves to be a difficult concept to grasp for partners with limited experience in using ICT. Ownership of the data is also an issue to address clearly with all parties involved. Accessibility of data on multiple devices is another functionality to consider, as data often has to be used at different levels for different purposes. IICD raises awareness and advises partners on which solutions best ensure patient privacy, as well as accessibility of the data for the intended uses.

Making training relevant
Training for health staff working at management level can best be done by organising special sessions based on their *(work) interests*, such as training in financial management or using the data for management decisions. Peer learning sessions for hospital managers have also proven to work well.

In a number of projects, especially the projects with mobile data collection components, IICD has learned that attention should be given to assisting organisations and their staff to be able to analyse collected data and to plan follow up actions. A *step-by-step training process* with job-related training materials tailored to the specific computer tasks of each health worker have proven to work best. Training for community health workers who are often semi-literate also requires a tailor-made approach that incorporates additional training, specific content level design and visual aids as training materials.

CASE
To support the implementation process of the HMIS in Tanzania, a change management manual was developed with the implementing partner ELCT based on best practices. The manual guides health facilities in 14 steps with the organisational change process, training, ICT support, and handing over the full-fledged system to a capable workforce who is able to maintain it. In this project, there was a special change management team that assisted the health facilities throughout this entire process.

Going beyond fulfilment of reporting requirements
Using the *HMIS for organisational development* instead of simply fulfilling reporting requirements is more effective. In this way, it can contribute to better management capacity, enable informed decision-making and strengthen lobbying activities. In Uganda, a web-based interface has been developed which enables health facilities to compare their performance with other facilities in the network.

As many stakeholders are involved, the *needs of all stakeholders* and *their roles* have to be explicitly documented and considered when designing and implementing the system. Consistent awareness raising through information exchange and training will contribute to more acceptance.

To ensure *financial sustainability*, financial plans should clearly express the capital investments and all associated costs. This also includes initial (and advanced) training requirements, ongoing technical support, as well as costs such as the depreciation and replacement of ICT equipment. When using mobile data collection tools, the initial investments in procuring smart phones, the recurrent costs of Internet data credits, and potential expenses to be incurred in licence costs have to be clearly stated from the very start.

4 IMPROVING COMMUNITY HEALTH AWARENESS

Solutions based on the use of radio, Internet, mobile phones and multimedia can improve the accessibility, quality and presentation of public health information, increase demand for health services and prevent diseases.

In remote areas where the disease burden is higher, people are often deprived of information on disease prevention, proper sanitation techniques or how and when to access healthcare services. In developing countries, most health risks are related to communicable diseases (45%), such as HIV and malaria, and risks related to maternal and infant child health. Nearly 50% of children die before the age of five. In these communities, health infrastructure is virtually non-existent. Furthermore, inadequate roads and long distances between the villages and urban areas make communication between these communities and the rest of the country extremely difficult.

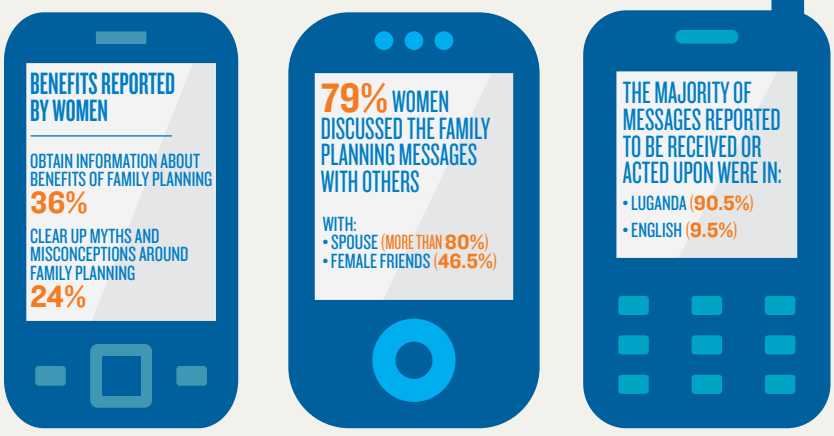
IICD's interventions and solutions in community health are therefore focused on connecting remote communities to urban parts of the country through **shortwave radio systems, the Internet and telephony**. Once these communication channels have been established, dissemination of relevant health information will be possible to community health workers in the field. They reach out to the grassroots organisations and community members through, **multimedia** enabled health education sessions that are shown using a **laptop and projector**. Additionally, tailor-made materials such as **posters, brochures or videos** are made in local languages with plenty of visual elements. **Mobile phone messages and quizzes** are increasingly being used to directly interact with community members on relevant health topics. For example to remind pregnant mothers on the importance of ante- and postnatal care. In many cases, community health workers play an important role in developing health education materials by using **digital cameras and video cameras**.

HEALTH CHILD PROJECT IN UGANDA

Can SMS increase uptake of **family planning services** in Uganda?*

WOMEN WHO RECEIVED TEXT MESSAGES TOOK UP **MORE** MODERN FORMS OF FAMILY PLANNING (IMPLANTS) **THAN** WOMEN WHO DID NOT RECEIVE TEXT MESSAGES

75% WOMEN ATTENDED FAMILY PLANNING SENSITISATION AFTER RECEIVING SMS



** Research conducted in 2012 by Health Child and School of Statistics and Applied Economics (Makerere University)*

THE RESULTS

Grass-roots organisational capacity building

The use of ICT has improved communication between the grassroots organisations in the field and the main offices. The grassroots organisations have become more autonomous, the work is better organised and more transparent. Staff members have improved skills, resulting in higher self-esteem. New skills are brought in the villages, as (young) people are now able to do video-editing for example.

A lot of travel time and costs are saved too. The quality of documents and the documentation systems have improved. This was also acknowledged by external partners. This led to more regional, national and even international recognition for the organisations and their approach. In some cases, donors decided to upscale successful interventions.

Reaching out to more people with multimedia tools

More people were reached in the communities through the use of ICT tools. Or as one of the educators of the Sahel Solidarite project in Burkina Faso said: "with the old method, 15 people were educated, but with the ICT tools, the whole village is reached". Visual support seems to have a stronger impact since awareness of recommended health and hygiene practices is reported to increase when multimedia tools are used. The use of local examples proved to be very relevant and reliable. Other key success factors were increased understanding, interaction and participation. Knowledge tests done in Burkina Faso for the Sahel Solidarite project have shown increased levels of awareness compared to people in control-groups (in villages not covered by the project). The health outreach work done by the organisations also became more systemised as multimedia products were put on CDs, thus allowing duplication of the same information to many other villages.

Increased demand for health services and preventive measures

Health indicators, such as the number of pregnant women receiving malaria medication, are improving in the communities targeted. In the MAMMA project in Mali for example, there was an increase of 21% of pregnant women who are now sleeping under a treated bed net. In the Health Child project in Uganda, out of the 500 pregnant women who were informed via SMS about the importance to deliver in a health facility, 478 gave birth in health facilities.

Hygiene practices also improved in the communities that were educated. At schools in Burkina, tracking systems for waterborne diseases were set up. Alerts could now also be given about local epidemics. While national campaigns are carried out more effectively, due to the established communication channels and trained health educators.

Scientific research[9] in Uganda has shown that the use of mobile text messages, especially in local languages, can effectively be used for awareness raising. They also encourage people to visit health facilities for specific sessions and encourage experimentation or short-term uptake of modern health practices. So far, they have not yet resulted into a long-term or sustained behavioural change.

LESSONS LEARNED

Finding out what works in remote areas

As most of the projects take place in very remote areas, often with no connection to the grid, *innovative solutions* have to be found. In some projects electricity is so scarce, such as the Sahel Solidarite project in Burkina Faso, that people are *advised on the daily use of the equipment*, for instance on the amount of time equipment can be used per day. A health education session in the evening, for example, can only take two hours.

For *mobile phone text messaging*, special skills and some training may be required to *design useful health messages*/quiz questions that fit the 160-character limit of an SMS. Although many women do have access to a mobile phone, they often have little knowledge of the *basic process of text messaging*, such as opening and reading messages. Therefore in the initial phase, women are often trained and supported in the use of mobile phone messages.

Voice messages can work to reach illiterate groups, but calls are easily missed and *messages cannot be stored* for future reference. Therefore voice messages can work well for targeting illiterate groups but can never be the only tool to reach out. Making use of personal networks is still very important too as it cannot be taken for granted that people *keep their phones charged* at all times.

Using peer learning and focus groups to improve course of action

IICD's *M&E approach* has worked as *an enabler* by bringing together project team members and the users of the projects. In the focus groups, discrepancies between information provided through the questionnaires and the realities of the projects were solved. *Peer learning and sharing* helped to *reorient certain projects*. For example, in the 3AG/Fabema project in Mali, the focus group discussions helped the project to set up stronger links with the health facilities.

How to address the needs of different target groups

Special attention for the needs of diverse user groups is necessary for *designing training materials*. In the ACDEP project in Ghana, it turned out the training materials did not adequately address *the needs of elderly people*. Most of them are very new to ICT and experience resistance to pick up new technologies.

Health related text messages are best *integrated into existing health sensitisation programmes* that already have gained a basis of trust with the target group. Many *women do not own a phone* and therefore have to be addressed via the phones of their husbands. However, this also provides a good point of entry to involve men. Though in most of the projects, female participation is high some special attention to *gender* could help encouraging women to *share more positive stories* and thus further increase female participation. Also, focal women could be appointed at the various project sites to serve as role models.

[9] *Research conducted by Health Child and School of Statistics and Applied Economics (Makerere University)*

Possible business models to scale up interventions

In many of the community health projects, demand for relevant information and additional service is very high. Other villages in the neighbourhood will also get to know about the project and start to make their own demands. Therefore, it is advised to already build in mechanisms to take care of this rising demand. This can be done by maximising connectivity, facilitating access to second-hand computers, making provisions for additional capacity building and enhancing e-skills, and sharing experiences with external stakeholders, who might be willing to help scale up the interventions.

A variety of business models have also been piloted to raise additional income. For example raising money through the RAC stations in Mali, where paid-services and multimedia products are offered and sold to the general population. In IICD's current programmes, such as Ma Santé in Mali, IICD and its partner organisations Orange and RAES, analyse various alternatives to find viable solutions to ensure the financial sustainability and scaling of the results of the initiative after funding stops. A plan to offer micro-health insurances to people targeted by the programme will require bringing together various stakeholders in order to offer access to periodical screening on malaria, health specialist consultation and a discount on medication to families with children, for a small monthly fee of 1 euro per month.

Additionally, in programmes in remote areas, the integration of ICTs has also contributed to reducing the number of physical visits to remote villages, saving money previously reserved for motorbikes and that now can be used to buy computers. In reality, assumptions often worked out differently than expected and sustainable business models in community health projects are still a challenge.

FURTHER READING

- *2013 – Accelerating development building capacities through innovation. IICD Annual Report 2012: http://annualreport.iicd.org/*
- *2013 – From need to sustainability Empowering people to use ICT for their development. http://www.iicd.org/about/publications/the-iicd-approach-from-need-to-sustainability*
- *2013 – "E-Health: Can mobile phone text messaging increase uptake of Family Planning Services in Uganda", Health Child, Walakira et al*
- *2013 – Accelerating Development - Building Capacities through Innovation IICD Annual Report 2012 http://annualreport.iicd.org/*
- *2013 – Video Shows How ICT Can Improve Healthcare in Africa http://www.iicd.org/articles/video-shows-how-ict-can-improve-healthcare-in-africa*
- *2013 – Mobile on the move. Opportunities in mobile learning from IICD's perspective: http://www.iicd.org/about/publications/mobile-on-the-move-mobile-learning-publication/*
- *2012 – From digital dreams to concrete change IICD Annual Report 2011 – facts and figures brochure. http://www.iicd.org/about/publications/annual-reports-2011-facts-and-figures-brochure*
- *2011 – ICT, a genuine tool to reduce isolation and raise health awareness Lessons learned from the 3AG/Fabema Mandé information network project: http://www.iicd.org/about/publications/ict-a-genuine-tool-to-reduce-isolation-and-raise-health-awareness-mali/*
- *2011 – Le Centre d'expertise et de recherche en télémédicine et e-Santé , du reve de la réalité. L'expérience réussie d'un centre de télémédicine et e-Santé malien: http://www.iicd.org/about/publications/le-centre-d2019expertise-et-de-recherche-en-telemedecine-et-e-sante-du-reve-a-la-realite-mali*
- *2011 – Multimedia centres for farmers and health workers Lessons learned from the Association of Church Development Projects (ACDEP): http://www.iicd.org/about/publications/multimedia-centres-for-farmers-and-health-workers-in-ghana/*
- *2010 – Connecting medical specialists in rural hospitals Lessons learned from the telemedicine project in Tanzania: http://www.iicd.org/about/publications/connecting-medical-specialists-in-rural-hospitals-tanzania*
- *2010 – Health management information systems for hospitals Lessons learned from a Tanzanian experience: http://www.iicd.org/about/publications/health-management-information-system-for-hospitals*
- *2009 – Hygiene education through multimedia tools Lessons learned – Health Burkina Faso: http://www.iicd.org/about/publications/hygiene-education-through-multimedia-tools*
- *2008 – The impact of the IICD health projects http://www.iicd.org/about/publications/impact-iicd-health-projects*
- *2008 – Realising a lasting jump in healthcare performance Challenges and achievements in the Tanzania health sector: http://www.iicd.org/files/SDC_Health_Tanzania_Final.pdf*
- *2007 – Quick diagnoses and better treatments in rural areas Teleradiology in Mali (IKON): http://www.iicd.org/about/publications/ikon-teleradiology-in-mali-project-evaluation*
- *2007 – Health management information systems as a tool for organisational development Cordaid – IICD health programme Uganda: http://www.iicd.org/about/publications/health-management-information-systems-hmis-as-a-tool-for-organisational-development*

CONCLUSIONS

In reflecting upon five years of practice, IICD has seen increased efficiency and effectiveness in healthcare delivery, increased community engagement and the emergence of modern communication and information modes that improve access to health services. All of this has been enabled through ICTs.

ICT tools allow improved healthcare delivery, enabling health workers to deliver quality healthcare in a targeted and efficient manner. Younger health workers readily adopting ICT solutions demonstrate that cultural attitudes towards knowledge sharing have to be addressed in healthcare delivery interventions. In order to achieve affordable rates and come to a financially sustainable intervention for larger target groups, scale appears to be essential.

For developing health professionals' capacities, the integration of ICTs enables rural health workers to access the latest medical information and increase their computer skills and their professional knowledge. Participatory step-by-step training processes tailored to the specific job-related computing tasks of each health worker has proved to work best.

In regards to strengthening health systems, the use of Health Management Information Systems (HMIS) to manage and analyse health data proved to contribute towards enhancing service delivery, decision-making, health facility management, planning of health policies, improved coordination and transparency. HMIS enabled health facilities to collect their data more efficiently and in some cases an increase of more than 30% in revenues was realised.

For improving community health awareness, ICT improves communication between remote grassroots organisations and their main offices. Through communication distribution channels, the demand for health services increased and diseases were prevented. More people are being reached and the number of patients receiving healthcare is increasing. In m-Health, SMS-campaigns are best integrated into existing programmes which have received the confidence of their target audiences.

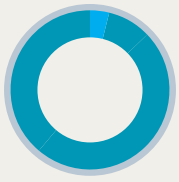
As a result of the projects' work, network activities and involvement of policy-makers in the various intervention areas, there is now an increased awareness and appreciation by the government and other stakeholders in the health sector of the role that ICT solutions can play in strengthening the health system. Small successful pilots have inspired governments and other development partners to roll solutions and approaches out on a larger scale. In a number of countries, IICD has played an important role in assisting ministries with developing e-Health policies. In Tanzania for example, telemedicine is now one of the priority areas in the national e-Health strategy.

Looking at the results and lessons learned from an overarching perspective, IICD believes that the application of its participatory 'ICT-Led social innovation process'[10], contributes to developing sustainable, scalable and successful interventions. The process brings together stakeholders who themselves point out the priorities for the interventions and jointly design how ICTs are best used to respond to user and client needs. IICD's guided process opened the door for individuals and organisations to use ICT and design the appropriate solutions independently in order to improve healthcare delivery, develop health professionals' activities, strengthen health systems and improve community health awareness.

PEOPLE IMPROVE THEIR KNOWLEDGE ON HEALTHCARE AND HEALTH-RELATED ISSUES

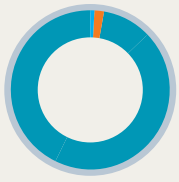
Through this project I am now better informed about health issues

Disagree	3%
Neutral	0%
Agree	97%



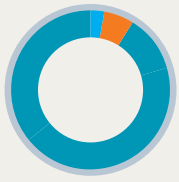
Through this project I know what I can do to protect my health

Disagree	1%
Neutral	2%
Agree	97%



This project has improved health education for the public

Disagree	3%
Neutral	6%
Agree	91%



** Results based on surveys conducted in five countries where IICD has health programmes (Burkina Faso, Ghana, Mali, Uganda and Zambia).*

[10] *The IICD Approach: From need to sustainability http://www.iicd.org/about/publications/the-iicd-approach-from-need-to-sustainability/*

IICD's vision is a world in which people are fully able to use information and technology to better their own future and that of their society.

IICD's mission is to enable 15 million low-income people in developing countries to access and use ICTs to address the challenges that they face, understanding that ICT offers opportunities for increased well-being and sustainable economic development in all sectors.

IICD leads the Connect4Change consortium in which five Dutch NGOs have joined hands to set up and support ICT for Development programmes. Our consortium partner in the health sector is Cordaid. Our other consortium partners are Akvo, Edukans and ICCO. Text to Change is a preferred partner.

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