

# Cordaid-IICD Health Programme Uganda

Health Management Information Systems as a tool for organisational development

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# Abstract

A Health Management Information System (HMIS) can be a powerful tool to make health care delivery more effective and far more efficient. This paper describes how an HMIS can also be used for organisational development and reports on the experiences of the HMIS programme of the Uganda Catholic Medical Bureau (UCMB) in Uganda. The programme forms part of a larger programme on ICTs for health in Uganda, Tanzania and Zambia and is supported jointly by the International Institute for Communication and Development (IICD) and the Catholic Organisation for Relief and Development Aid (Cordaid). The goal of the paper is to evaluate the project against a background of organisational development and to draw practical lessons from the project that may provide guidance to new HMIS projects in the development context.

## Introduction

In the health sector, Health Management Information Systems (HMIS) are more and more being applied, amongst others, to fulfil the - often very demanding - reporting requirements of higher institutional levels such as the Ministry of Health. Basically an HMIS is keeping track of the main outputs in a health institute. However, a HMIS can also be used as a tool for organisational development.

Organisational development or capacity development at organisational level using information and communication technologies (ICTs) is a relatively new phenomenon to the South. The introduction of ICTs in an organisation often starts with manual processes being supported or replaced by automated processes. An example in the health sector is the digitization of patient records. The first part of this paper describes the background of Uganda Catholic Medical Bureau (UCMB), HMIS and organisational development in general. The following sections describe a model for organisational development using an HMIS and is followed by the conclusions and lessons learned.

With regard to terminology, 'capacity development' is used to refer to the ability of individuals to perform within an organisation as a whole. As such, it is not equated with any subsidiary element such as a particular 'capability'. That term refers to a specific ability of the organisation to do something in particular, such as to manage projects.

# The Uganda Catholic Medical Bureau

Uganda Catholic Medical Bureau (UCMB) is the health office of the Roman Catholic Church (RCC) in Uganda and is the technical arm of the Health Commission dealing with health related matters. UCMB is an umbrella organisation gathering 27 hospitals, 230 Lower Level Units (LLUs) and 14 Health Training Institutions belonging to the Catholic Church. UCMB alone provides about 40% of the overall health services in the country and has an important role in civil society building and policy influencing. It fulfils these roles through:

1. Services oriented functions:
  - Offering services aimed at improving managerial, administrative, fiscal and legal capacities of health services, either directly through its own staff or through purchased expertise
  - Gathering and managing data/information with a view to proving the relevance, cost efficiency/effectiveness and the social orientation of health services
  - Gathering and disseminating relevant health information on patients, deceases and drugs
  - Facilitating the establishment of fora for common discussion, learning, collaboration, exchange of experiences and identification of common problems and priorities
2. Environment oriented functions:
  - Advocating/lobbying for the RCC health services with government, private for profit organisations, international agencies and the development partners
  - Representing the RCC health services before and liaising with government
  - Co-operating with the government in areas of health policy development, planning, quality assurance, training, etc.
3. Intra-institutional functions:
  - Facilitate the work of the Health Commission and of the Annual General Assembly
  - Present to the Episcopal Conference and to the Ordinaries points of action required by the established policies
  - Highlight areas of non-compliance of Episcopal Conference, Ordinaries and Units with established policies and standards

UCMB operates on the basis of a long-term strategic plan which main objective is to achieve a recognised place in the national health services system. Currently UCMB employs seven core staff and has a team of 4 advisors supported by external partner organisations. One of the objectives of UCMB is to strengthen the institutional capacity. Therefore the overall idea is that in the coming years the advisory team members will be substituted by local staff. In this line UCMB is trying to make sure that institutional capacity is built through the embedding of these people into its core staff team. Therefore a new Strategic and Operational Plan are now being developed through a broad consultation process and will be effective from the year 2007.

During the implementation of its current Operational Plan UCMB has established a system aiming at improving the implementation of the national Health Management Information System (HMIS). The idea for the programme emerged from a roundtable conference (IICD 2003) organised by IICD and Cordaid in November 2003. The workshop brought together participants from the health sector, and the following problem was identified: "The challenge for ICT in health is to make available content that is relevant and appropriate and well targeted to the demands that have been identified".

In order to address this problem, the "Information and Data Management for Continuing Medical Education in UCMB Health Units" programme was formulated (Andrea Mandelli, Daniele Giusti 2005). The key objective is to improve data management and the use of information in the UCMB targeted health institutions in order to improve the overall management of the health services in 27 up-country hospitals.

The most prominent problems which are to be addressed by this project were:

1. Lack of access to information and proper feed back by UCMB to hospitals and Lower Level Units (LLUs);
2. Delayed feed back on the information provided by the different health institutions;
3. Lack of technical as well as managerial human capacity in order to implement a proper HMIS;
4. The link between HMIS and Continuous Medical Education (CME) is non-existent due to an insufficiently recognised role of HMIS for CME in the health sector.

# Understanding Health Management Information Systems

An HMIS is basically a database system in which “raw data” are stored and transformed into information (T. Lippeveld, R. Sauerborn, 2000). The words, information and data, are used interchangeably in many contexts. However, they are not synonyms. Raw data are numbers, characters, images or other outputs. Such data are typically further processed by a human or input into a computer, stored and processed there, and/or transmitted output to another human or computer. Another way to describe the difference is that information has meaning or can inform, while data do not. Computers work with data and not with information. That is why one can make a computer calculate the average employee number even though it is meaningless.

An example:

‘26012’ is raw data; ‘Outdoor Patient Department total attendance in last Financial Year = 26012 patients’ is information for a hospital manager.

The HMIS in first instance is a “system” and, like each system, it has an organised set of interrelating components which can be grouped under two entities. At a first level the data collection process is to ensure the collection of data from lower levels to the central level and to transform data into information. The conceptual level relates to the analysis plus feedback mechanisms assisting in transforming information into knowledge for informed decision making. The functionality of an HMIS may differ from organisation to organisation. In general one sees that HMIS collect and generate data and information on patients, costs, performance of personnel, reporting etc..

## Organisational development in general

As we look at an organisation we can distinguish five aspects that are strongly interrelated: vision, programmes, people, structures and procedures. They are interrelated because they have a strong mutual influence on each other and require a balance. Organisational development can be seen as a permanent search for this balance (I/C Consult, 2006). There is a certain hierarchy or logical order in the five components.

The first component will principally shape all the others. Important is the coherence between these components. Key issues here are relevance of programmes/projects in relation to the vision; contribution: do short term objectives contribute to the long term objectives?; alignment: are actual effects of activities in line with the intended changes?; consistency: do structure, system and procedures really support the core business of the organisation?

We can divide four principal organisational processes, which make that an organisation is a dynamic organism, created by people. These are:

- a. Thinking and learning: This refers to a regular process of reviewing important factors, actors and trends in environment, the impact of the programme and possibilities and restrictions of the organisational competencies.
- b. Doing: This relates to what the organisation is doing to achieve its objectives. The doing is restricted to the core-business of an organisation.
- c. Being: This is the process of “organising to do the work”, the organisational structure and processes (like administration, systems etc.)
- d. Relating: This relates to how an organisation relates to other actors in its environment including other non-governmental organisations (NGOs), community based organisations (CBOs), churches, governmental institutions, universities etc.. The strength of an organisation lays both in the understanding of this environment and in the strategic choices it makes.

On top of being a strong organisation it also has to prove an added value in the landscape of actors working on the same and related problems. It has to “position” itself. The ultimate goal of organisation development is not only the improvement of a single organisation, but also to contribute to the strengthening of the sector or landscape to which it belongs. The sector is composed of a complex environment of actors, policies and regulations and improving the sector is part of the “common good” of a society. So an organisation can not be seen isolated from this context and a broader perspective has to be taken. An analysis of the landscape is needed to value the contribution of a specific organisation. The way an organisation relates to others in this landscape of actors can be valued under “relating” in the organisational scan.

When analysing the needs for organisational support, one can assess the organisation on the components of coherence and balance as well as the underlying processes as described above. I/C consult developed an organisational scan (a short and an elaborated version; the scan can be downloaded from [www.icconsult.nl/en/index.phtml](http://www.icconsult.nl/en/index.phtml)), which enables organisations to assess their own organisational qualities, strengths, potencies and risks. It will also give an answer to which aspects of the organisation are running well and which need further strengthening.

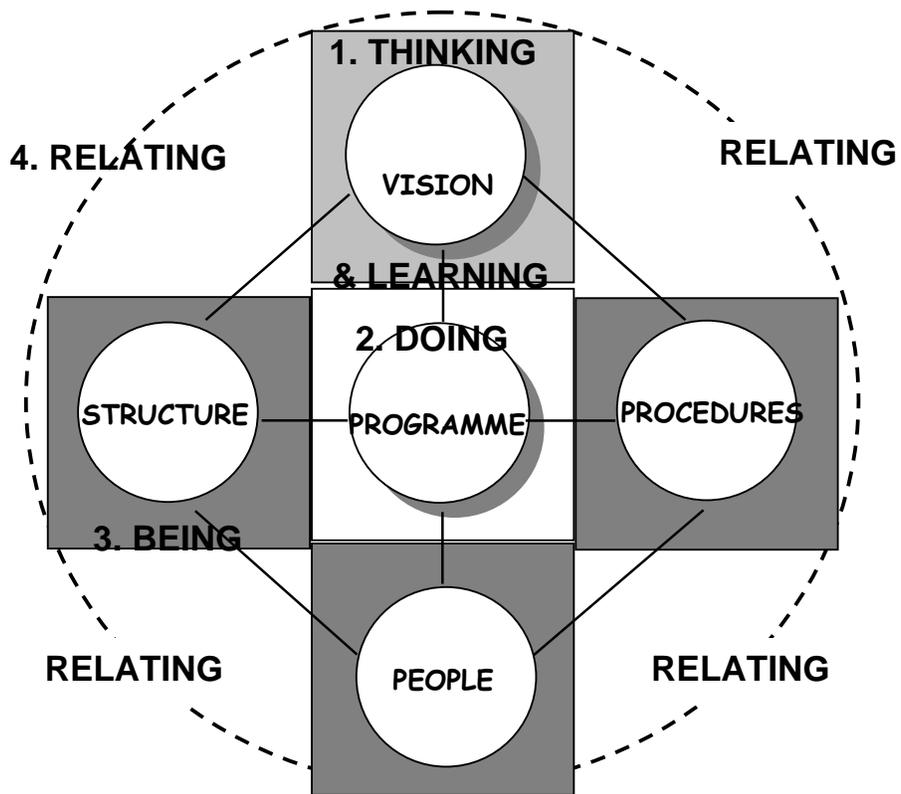


Figure 1: The organisational processes

# The UCMB project in more detail

## Set up and implementation of the project

The proposed technical solution was simple and straightforward. To improve the communication between the up-country hospitals and UCMB head quarters (HQ), data communication links needed to be set up to connect all these units with UCMB HQ. At the start of the project there was virtually no experience with the use of information and communication technology (ICT) at the levels of rural hospitals, while the offerings of the different ICT suppliers were meagre. The whole project plan from design, through procurement, implementation, training and evaluation was expected to take two years.

Due to the fact that implementing Internet connectivity up-country and training took longer than expected, the project implementation was delayed by about 6-9 months. The project coordinators did fight technology for more than a year. Another vital factor it the training of data administrators and hospital managers in the analysis and use of data. The training also took much longer than expected mainly because of high staff turn-over.

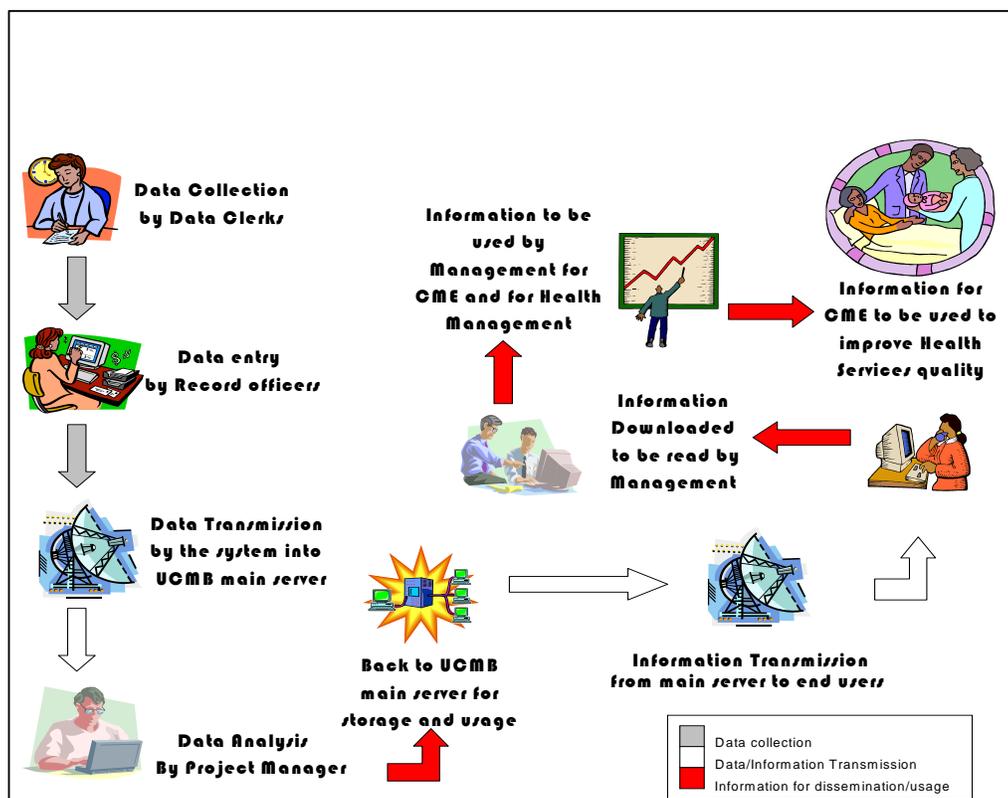


Figure 2: Processing data

In the project raw data from 27 hospitals up-country are transformed using Excel and Access templates, developed on the basis of the Ministry of Health (MoH) HMIS template, into information. In a next step this information is transformed via statistical analysis in a "usable" form for management decision-making. Some examples of information in a usable form are: drug supply, occupancy rate of beds, number and costs per treatment in the outpatient department.

The complete HMIS process, depicted in figure 2, can be broken down in the following components:

1. Data collection supported through low-level ICT tools;
2. Data transmission supported through Internet connectivity;
3. Data processing mainly at UCMB;
4. Data analysis conceptual level at UCMB;
5. Feedback from UCMB head quarters to hospital managers for use in planning and management of the health services.

These last three steps can be lumped together and represent the conceptual level in terms of use of data to generate information to be used for monitoring, planning and managing health services at large. A part of the analysis is also taking place in the up-country hospitals: within the project context huge capacity development interventions have been realised to enable hospital managers to process and analyze the data.



*Figure 3: Hospital manager Mutolere hospital in front of connectivity equipment*

## The impact of the system

“The feedback by UCMB makes it possible to develop contingency plans”– Pontius Mayuga – Administrator St. Francis Hospital Mutolere.

We can appreciate a number of direct outputs on health care services delivery resulting from the programme. On the basis of questionnaires related to satisfaction and impact, presented to 145 hospital staff including doctors, nurses and administrative staff in 2005 and 2006, we have found a number of outputs. Firstly, the users of the information system indicate high levels of satisfaction with the information and ICT facilities put in place (see figure 4).

The satisfaction is based on a series of measurable outputs resulting from the programme. Firstly, in Uganda all hospitals and LLUs are to report via a collection of forms, capturing data reporting on outputs ranging from statistical data such as “suspected tuberculosis in service area” to performance based indicators such as “Out Patient Department total attendance”. The monthly reports have to be submitted within the first week after the completion of the month. Before the start of the project hospital managers of UCMB hospitals had to fill in hard-copy forms and send them by normal mail to UCMB head office. This was a cumbersome, labour intensive process leading to inaccurate data, with backlogs of three to six months not uncommon and data getting lost in transport.

The digitization of data is now taken care of by the hospitals themselves which is in line with the objective to make UCMB a leaner organisation. After digitising the data and checking its completeness, the hospitals then forward the data via email to UCMB HQ, resulting in a timely delivery of the data needed for lobbying purposes. The percentage of hospitals submitting complete HMIS data in time increased from 49% to 90% during the project implementation.

"The quality of the data has improved tremendously while the work can be done much faster"– Ssemwogere Deogratius- System Administrator - Rubaga hospital.

This is strongly improving the lead times for the data's arrival at UCMB HQ and the quality of the data. Moreover, UCMB HQ can now work much more efficiently and effectively because it is no longer responsible for digital recording, thus allowing more time for analysis, lobbying to the Ministry of Health and feedback to hospital managers to enable informed decision-making. The feedback mechanism enables hospital managers to finalise their planning and budgeting processes. After two years of project implementation 75% of the hospitals publish analytic annual reports, while 96% of the hospitals publish quarterly reports on an agreed set of critical selected indicators.

Secondly, a strong impact is found on the health workers themselves. A majority of the participants in the programme indicated - through questionnaires - that they feel more aware of the value of information and the related ICTs. Furthermore, half of them feel empowered in their work using the new facilities. Finally, in these first years of operation, around half of the participants in the programme perceive a direct impact on the quality and access of the health care facilities delivered to their patients. Further monitoring of these indicators over the next years will show the longer-term results and impact of the programme on both the direct users and the ultimate beneficiaries, the patients.

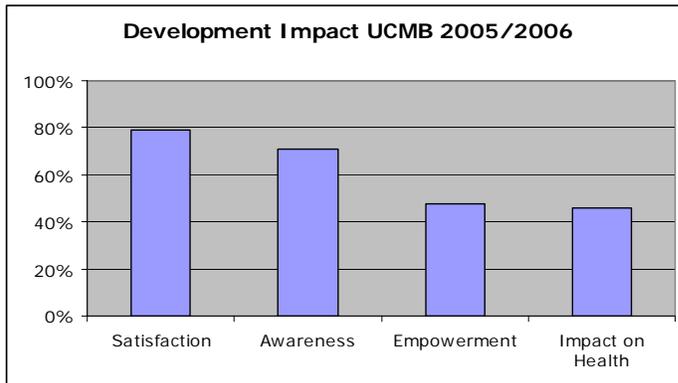


Figure 4: Development impact on users of the programme based on interviews with 145 users of the programme in 2005 and 2006

## Capacity development

Along with a short training on ICT use to familiarise end users with ICT, formal training of records assistants and officers has been offered (UCMB 2005). Tailor-made courses on HMIS and Information and Records Management were developed for that purpose by Uganda Institute of Information and Communications Technology (UICT, [www.uict.ac.ug](http://www.uict.ac.ug)). Two different modules of different duration are being offered: a first module called 'Basic training module for Records Assistants' of two weeks and a second one of three months at certificate level, allowing Records Assistants to upgrade their skills and qualify as Records Officers. Continuous Medical Education (CME) is not only strictly related to medical and clinical issues but also to health management focussing on:

- Use of low-level ICT tools
- Gathering data
- Data analysis leading to better informed decision making

The development of these modules has been taken up by Uganda Martyrs University, Nkozi, Uganda and has become part of the module for Hospital Managers and Lower Level Health Units Incharges on "Use of Information for Planning and Management", in the recently established Masters degree Health Services at the Faculty of Health Sciences.

## The relation with change management

Change management is a key success factor of any HMIS approach, as it is used as a tool for organisational development. The project emphasized the need to make small steps. For example data collection and transformation went through the following phases in a period of three years:

- From hard-copy forms which had to be filled in manually to standardised Excel sheets which could be filled in using a computer;
- From sending these Excel forms by normal mail to sending it by email (forms as attachments);

- A system which made it possible to link and analyze the HMIS output with a cost-based financial system;
- From sending Excel forms by email (as attachment) to filling in on-line forms.

## Strengthening the culture of information use

Information is not shared just for the sake of doing so. The project gave evidence that in each ICT4D project one has to take into account that the culture of use of information and information exchange has to be developed. Possible steps to create a "culture" of information use may include:

- Ensure that support staff report directly to the head of department, reflecting the increased emphasis on use of information to inform decision making;
- Ensure that standard reports are provided to the Head of Department on a monthly or quarterly basis;
- Conduct information reviews on a quarterly basis.

# HMIS as organisational development tool

As depicted in figure 2, the HMIS process can be classified in the following steps:

- Gathering data
- Turning that data into information (figuring out what is happening to whom, and where and when it is happening)
- Applying information to create knowledge (how this is happening will be answered in this section)
- Synthesizing knowledge to enable informed decision making

Looking at the developments of UCMB and its member units (hospitals, health centres, diocesan health offices) we can clearly see how this organisation has over time strengthened the various components. All the five principle organisational processes were supported through this project. In the following paragraphs a few examples are illustrated:

Over the past years two strategic plans have been defined; the second building further on the first one. Objectives have been clear and in-line with the long term vision. Monitoring and two evaluations have provided opportunities to learn and adjust where needed. It also showed that initial objectives were sound but too ambitious, requiring an adjustment in the following plan.

In 1997-8 a reorganisation process took place, in which much attention was paid to the organisation's vision and structure (aspects of being, thinking and learning). The number of staff in UCMB was drastically reduced in order to start up with a more structured organisation and defined group of people. This was supported through the project by transferring tasks like digitization of data to the 27 hospitals, while at the same time the leaner organisation at UCMB HQ was enabled to do what they were entitled to do: support hospital managers in informed decision making and lobbying at sector level (e.g. Ministry of Health).

Gradually intensive work was done to develop programmes, procedures (for instance information flow policies), and establish partnerships with other actors as governmental institutions, NGOs and donors. The relations with the Ministry of Health have greatly improved through the more intensive contact enabled by the project (relating).

Examples of how this project supports organisational development:

- "Thinking and learning" especially for hospital managers via the feedback loop. Regularly (at least monthly) important factors such as occupancy rate are being reviewed.
- Another example of "thinking and learning": Each quarter the number of "Outpatients Department (OPD) new cases" is being compared with the same number one year ago and the "Target Attendance this Financial Year". This enables hospital managers to analyze trends: for instance whether the number of new cases of Malaria is exceptional; whether the OPD is sufficiently utilised. Through these data analysis informed decisions about planning of hospital staff are possible.
- "Doing". This is enabled by the project at many levels: hospitals take care of their own data and data collection. Hospital managers are enabled to make timely decisions because the lead-times in the feedback loop have drastically been reduced.
- Another level at which "doing" is enabled is the operational costs of the system. These are gradually, in a period of two year, taken over by the hospitals. To enable them to achieve their objectives hospital managers do fully appreciate the costs of the system.
- "Being" is also facilitated at many levels. The process of "organising the work" is greatly supported through the HMIS.
- Also at the level of UCMB "being" and "doing" is greatly supported. For instance: One of the core functions of UCMB is advocacy/lobbying. Through the HMIS the information needed to lobby is available in a timely manner.
- "Relating" is greatly facilitated: Hospital managers meet in "cyber space" while UCMB staff members focus more on the relationships with the sector, among others with MoH.

As described: data comes in the form of raw data while information is created by analyzing the relationships between the data. Knowledge is developed by using the information for action. Knowledge answers the question "how". Or, as Wittgenstein defined: Knowledge is the "capacity to act".

Knowledge is dynamic, personal and distinctly different from data and information. This notion is too important to be dismissed: What's the point in having people with lots of data and information, who are unable to do anything with it? What is the point of filling computers with data (for reporting requirements) if the value is in the people?

Knowledge is a human competence for which information is needed. The introduction of an HMIS system should focus on making information available within a context. The UCMB experience shows that the context of organisational development focussing on Thinking & Learning, Being and Doing (improved management, lobbying and informed decision making) is working.

Organisational development is a continuous process to get better and stronger, and indeed appreciated in the sector as relevant actor (relating, positioning). Through improvements of the procedures and capacity of people (being), UCMB and the 27 hospitals are now able to show their achievements and use these for dialogues and lobbying.

# Conclusions and lessons learned

If informed decision making is a synonym of knowledge, it should be recognised that knowledge involves more than using information. Knowledge involves the application of information within a context. In the case described in this article the context was the context of organisational development.

Using an HMIS does not only mean keeping track of the main outputs produced in the health sector. Keeping track of the main outputs is what an HMIS is supposed to do, while the potential use of a sound HMIS is much more powerful. Its functionality is fully established when it is possible to keep track of the outputs produced and relate these with the inputs used in a chronological sequence (e.g. trends in performance of health workers). In this way an HMIS can be used and be a tool to monitor the effects of managerial decisions.

A user-friendly system is at the core of any successful public health system when it will:

- Assist hospital managers to align health system resources with the needs of service users
- Link performance measurements to accountability
- Monitor health-related activities to help assess what works and what doesn't
- Contribute to organisational development

Key factors in the implementation are change management, use of user-friendly ICT tools, organisational embedding and capacity development. ICTs can improve health management but much more important are capacity development at individual and organisational levels.

The key lessons learned on the basis of the UCMB programme in Uganda are:

1. Use the introduction of HMIS for organisational development instead of simply for fulfilling reporting requirements. This UCMB experience is an exemplary initiative, in line with the strategic plan, in which ICTs are being used to build management capacity, enable informed decision making and strengthen lobby. Improved management is a necessity in a situation in which the funds for the health sector in the South (and very strongly in Uganda) are decreasing while at the same time health care delivery funding is moving gradually to a cost-based system. Therefore more effective and efficient ways of working are the only solution to keep the health services at an acceptable level.
2. ICTs can be a very useful tool to strengthen organisations in the 4 organisational processes thinking/learning, doing, being and relating.
3. In order to be successful, an HMIS needs to be firmly embedded in the organisational processes and needs to be politically and technically supported by the main stakeholders in the health sector.
4. Change management is key since the HMIS is used as a tool for organisational development.
5. Strengthen the culture of information use during project implementation.

# Appendix A: Location of the 27 hospitals involved



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## About the authors

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## Cordaid Profile

Cordaid combines more than 80 years of experience and expertise in emergency aid and structural poverty eradication, for an existence with dignity for poor people and those who are deprived of their rights. Cordaid forms together with Kinderstem, Memisa, Mensen in Nood and Vastenactie one of the biggest international development organisations with a network of almost a thousand partner organisations in 36 countries in Africa, Asia, Central and Eastern Europe and Latin America.

The counterpart organisations work on various themes, including health care, quality of urban life, access to markets and peace and conflict. Each year around 170 million euros is spent on initiatives in the South. Of that, over 30 million euros is available for emergency aid. A small part is spent in the Netherlands on lobby, public support and awareness-raising.

## IICD Profile

The International Institute for Communication and Development (IICD) assists developing countries to realise sustainable development by harnessing the potential of information and communication technologies (ICTs). The driving force behind IICD activities is that local 'change agents' themselves identify and develop proposals for realistic ICT applications - local ownership forms the essential basis for sustainable socio-economic development.

Acting as a catalyst, IICD's three-pronged strategy is mainly delivered through a series of integrated Country Programmes. First, IICD facilitates ICT Roundtable Processes in selected developing countries, where local stakeholders identify and formulate ICT-supported policies and projects based on local needs. Second, working with training partners in each country, Capacity Development activities are organised to develop the skills and other capacities identified by the local partners. Third, IICD draws on its global network to provide information and advice to its local partners, also fostering local information exchange networks on the use of ICTs for development. The best practices and lessons learned are documented and disseminated internationally through a Knowledge Sharing programme.

In support of these activities, IICD invests in the development of concrete partnerships with public, private and non profit organisations, thus mobilising knowledge and resources needed by IICD and its local partners. Country Programmes are currently being implemented in Bolivia, Burkina Faso, Ghana, Jamaica, Mali, Tanzania, Uganda and Zambia.

