Health Information from Disease Surveillance – "MDS" Sri Lanka

Findings from the project evaluation   25/09/07 to 25/10/2007

A project of the Austrian and Swiss Red Cross

Contents:

Hi-tech in a developing country?

Whoever visits a hospital in Sri Lanka would hardly get the idea that the lack of computer equipment was a gap that urgently needed to be filled. Nevertheless, the Austrian/Swiss Red Cross Consortium has now equipped eleven hospitals in Batticaloa District with the Multi-Disease Surveillance System (MDS). Originally conceived as a simple instrument for "Public Health", it has achieved much more than supplying epidemiological data to the Government and ultimately to WHO, the organization originally responsible for launching the project. Unbelievable though it may seem, in many parts of the world, patients are treated in hospital without anyone ever making a formal diagnosis. MDS obliges the staff to record a working diagnosis and therefore to focus them on the most appropriate treatment for the patient. How can you provide the correct therapy for a patient with merely a "dog bite" when you don't know where the bite was and what injury it has produced? How can you cor-

The MDS system in installed directly in the wards for the use of all staff.

rectly treat someone with a "fever" when the cause of the fever is neither looked for nor found. The PC-supported clinical information system MDS is an encouragement for both doctors and nursing staff to think more about such weak "diagnoses". Because with it, illnesses, injuries and surgical procedures are coded directly into international terminology. By making it as easy as pressing a button to send precise clinical information to the Health Ministry, it permits the development of health policies for quick and accurate reactions to health problems. For example. Authorities could react appropriately to a shortage of medications for "disturbance of heart rhythm", but could hardly do anything with the frequently written "collapse". And the heavy use of powerful antibiotics might start to be questioned when "fever" is not the only condition that is recorded during the patient's stay.

Without Information no knowledge — clinical management with MDS

The history, the current complaint and provisional diagnosis are stored in the computer and will become, quite simply, a life-long medical record. Records will no longer go missing. The quality of medical care will be raised.

As a side product some practical information will be available for hospital management. How many patients are currently in each ward? How many wards now have more patients than beds? What disease do these patients have at the moment? Which operations are being carried out in the hospital and how many? Are there enough operating theaters? Are they correctly equipped for the operations being done?

The answer to these and similar questions can be answered by the clinical information system at any moment simply at the press of a button. Hospitals without a clinical information system are often unable to say how many patients were treated up to now today, this week, this month, this year. Not to mention the disease treated in these periods. Real-time information offers the hospital management completely new possibilities to monitor trends.

Dr Pole explains to a nurse how to use the MDS system on the screen.

The desk of a ward sister who is responsible for the medical documentation.

People behind the MDS project

Dr Denham Pole, a Swiss living in Sri Lanka, doctor, medical computer specialist and project leader for the Austrian/Swiss Red Cross, was aware of the need to build up a competent team of people living in the area. The opportunities were increased by the local presence of the Eastern University, Batticaloa. Young people, recently graduated in information technology, could get an opportunity to use their knowledge (and also to practice change management) in one of the largest computer projects in the country. As "MDS trainers", they are present in the hospitals and can refresh the knowledge that the staff had been given earlier. Many of the doctors and nurses had already attended the course in basic computer use that was provided at the University.

Right until the end of the project, a local team-leader and a young computer expert will manage and coach the team of four newly graduated computer scientists and a computer programmer. When the system is extended to nearby districts, it will be possible to enlarge this team to reflect the ethnic composition of the towns to be covered. Three volunteers who up to now had not had any specialist training, have also been given the opportunity to work with this skilled team. This gave them the chance to develop considerable skills in computer training. In the hospital, the staff listen to them - the "three little girls" as they are called are now highly respected for the assistance they are giving.

In the Teaching Hospital Batticaloa, tsunami appeal funds are being used to employ a System Administrator until March 2008. After that it is planned for the hospital to take him over. He is responsible for ensuring that MDS is available round the clock each day, something that will not just "happen" unless someone keeps an eye on it.

Electricity comes from the socket – doesn't it?

Naturally is not always "naturally" in developing countries. So we have to go further than thinking of electricity being available or not available (often several times a day), but start thinking of "good electricity" and "poor electricity". Poor electricity shows itself by large fluctuations in voltage. Computers don't like that at all and even light bulbs, especially the energy saving sort, often give up the ghost after a fairly short time.

As a result of dangerous electrical installations often missing earth wires, fuses or trip switches, the frequent lightning strikes in Sri Lanka can destroy equipment as soon as it is installed. This applies not only in rural areas; one of the UN offices in Colombo recently lost valuable teleconferencing equipment due to an electrical storm.

It is therefore essential that the electrical installations in the hospitals of the MDS project should be cared for. It is essential to have an uninterruptible power supply (UPS) for each PC and for the server as well as surge protection for every CPU and monitor. That will increase the life expectancy of the equipment and the trustworthiness of the computers, an important factor in the acceptance and use of the system.

With MDS the quality of health care in Sri Lanka can be significantly improved. Without MDS that would be much harder.

No MDS project without equipment

Change management can do its best. But without the necessary technical material, it is impossible to provide optimal clinical documentation. It was therefore necessary in the MDS project to find trustworthy suppliers for the equipment. To do this it was decided to use local companies who could quickly be on site if something goes wrong. This was one of the lessons learnt from previous similar projects. A tender was prepared and given to the half-dozen or so computer shops in the tsunami-hit district of Batti-caloa on the East coast. Out of this, the best-qualified and the most attractively-priced offers were chosen. This was ideal. As well as using aid money to equip the hospitals in the region, it also supported local businesses that had also been affected by the tsunami.
The two companies that were selected were able to bring considerable know-how into the project and to build up one of the largest computer networks in the country. They were able to increase their staff and have them attend training courses, so as to have better qualified workers. The hope to have more trustworthy systems and rapid response times was fulfilled. Supply of spare parts and replacements from Colombo or in some cases from Singapore, could be carried out quickly, often on the same day. Replacements for the most important pieces of equipment were held in place - a second server in the Teaching Hospital, a complete small hospital system at the Austrian/Swiss Red Cross office. A good thing for MDS.

What is still to do?

One of the most important questions facing the project management is how to maintain the system in its current state and continue to function for a long time into the future. It was therefore necessary to determine what is still to do - how can the remaining budget best be used to ensure the sustainability of the project. These were the conclusions:

The 11 hospitals should continue to be supported by the project team for up to one year more. The project had not started at the zero-point but at a negative level below that. Almost none of the users had ever worked with a computer before. It will take time before they are all fully confident in its use. Until then they must continue to receive support and assistance. The full use of the Internet and training in the e-mail system has still to be completed in the hospitals and in the MOH (public health) offices. This will be the way that epidemiological reports and notifications of communicable diseases will be communicated. In the teaching hospital, an extension of the system to provide support for some clinical functions is already being discussed. This will increase the usefulness of the system for users. But it should not rob the system of its simplicity and user friendliness. One of the functions being considered in the Teaching Hospital is the ordering of lab tests and communication of the laboratory findings. On the tech-nical side, the poor perform-ance of the wireless net-works in some hospitals means that they may have to be replaced with network cabling. Surge protection in many of the hospitals may also have to be installed. A committee to include the project management team, supplying companies, the Teaching Hospital and the DPDHS representing the smaller hospitals and the MOHs, should meet regu-larly to discuss the current status of the system. This will be a support organiza-tion that the individual insti-tutions can rely upon.

Several small hospitals be-ing established in the newly-cleared area of the district should get MDS systems when they are ready.

All computers need surge protection and constant voltage/power devices.

MDS: past and present

The actual content of the MDS program was based on a similar project carried out by WHO in tsunami-affected areas of Sri Lanka. Initially the database was developed by that organization using the simple MS ACCESS pro-gram to store the data and to present it to the users. This required the program to be stored on every work-station before users could access the system. The more the data stored in the ACCESS database, the slower it became. From these early systems, lessons were learnt that guided the subsequent development. MDS is now based on the very functional and highly performing Caché database. There is no need to install any programs on the PCs in the wards. A standard web browser that comes with the operating system is all that is needed.

NO DATA is stored on any of the workstations. It is all kept on the hospital server. Access to the program is protected by a password; in order to see the clinical data and to keep it safe from casual passers-by, an extra password is needed. The chief programmer of MDS is currently on sabbatical leave in Russia but is able to maintain and extend the software locally via the Inter-net and an E-mail connec-tion. MDS in the future will not only store patient per-sonal details and supply epidemiological information. It will soon start working with clinical data. This will greatly increase its useful-ness to the end-users.

MDS was written to take in mind the local situation. For example it can store pa-tients who don't know their exact birth-date but only their approximate age. Many systems in use world-wide can't do that! The visual appearance of the screens explain themselves to new-comers in an intuitive way.

> "Access to the program is protected by passwords; in order to see the clinical data it requires an extra password."

Impact world-wide

The importance of the MDS project is not confined to its successful installation in the hospitals of a developing country. It can also serve as a model for world-wide ap-plications of this sort. With little modification, the soft-ware could be adapted to the country-specific situa-tion elsewhere. Everywhere in the South and in develop-ing countries, similar ques-tions arise in health care provision as in South Asia. If correctly implemented, MDS could improve epidemi-ological data collection in poorer countries and create dramatic possibilities for health intervention. The positive result for patients, if not for the whole popula-tion, is obvious to all.

The very limited demands made on the workstations of an MDS system are well within the range of the $100 laptops currently available. All that is needed is an oper-ating system, a web browser and a network connection. The special genius of the software is the simplicity of the screens. Complicated Hospital Information Sys-tems can be found all over the world. But all too often they are not used by the clinical staff or only with great reluctance. With MDS the opposite is the case! A great opportunity.

The Red Cross could raise the flag of MDS world-wide

Screen shots from the MDS program

One of the hospitals with MDS - Kallar District Hospital

The log-in screen that demands user name and password

The main menu (home screen)

"An old woman came to the patient-reception desk in the Teaching Hospital and said proudly to the nurse: 'Look in the computer; you'll find everything about me in it'!"

Midnight patient statistics (the "Midnight Record")

- a simple and efficient management instrument

Ward 3(Gyn/Obs)

Report Date:13/10/2007

Date	Previous midnight balance	Admissions	Transfers in today	Total1	Discharges	Deaths < 48 hrs	Deaths > 48 hrs	Transfers out today	Total2	Remaining
01/10/2007	12	0	0	12	0	0	0	0	0	12

Ward 4(Medical Male)

Report Date:13/10/2007

Date	Previous midnight balance	Admissions	Transfers in today	Total1	Discharges	Deaths < 48 hrs	Deaths > 48 hrs	Transfers out today	Total2	Remaining
01/10/2007	37	0	0	37	0	0	0	0	0	37

The "IMMR" – the quarterly return giving statistical information from each hospital

Space is in short supply in most hospitals

In one single view – the patient details and medical history

PATIENT INFORMATION & HISTORY

| Edit this Patient | Add OPD Entry | Admit | Print Slip |

Patient Information

Patient ID:
Full Name:
Gender: **MALE**
Date of Birth: Age :**45**Yrs **6**Months **9**Days
Civil Status: **MARRIED**
Religion: **HINDU**
NIC:
Remarks:

Telephone:
Birth PlaceVillage:
Residence Address:

OPD Visits

#	OPD_ No	Visit Date	OPD Complaint	Details

Admissions

#	BHT-No	Admission-Date	Admission Reason	Discharge Date	Discharge IMMR	Details
1		23/04/2007	HEAD INJURY	23/04/2007	ALCOHOLIC LIVER DISE	[More Detail]
2		24/04/2007	ABDOMINAL PAIN	27/04/2007		[More Detail]
3		28/04/2007	BITE	01/05/2007		[More Detail]

Modern times

Diagnostic details are protected

Date/Time	From	To
03/05/2007--14:35:06	Ward 17-Eye Male	Ward 4-Medical Male
04/05/2007--14:46:59	Ward 4-Medical Male	Ward 17-Eye Male
09/05/2007--10:59:14	Ward 17-Eye Male	Unknown-Undefined

Where was a patient hospitalized and why? MDS knows. Diagnostic details are protected from passers-by with a second, simple password
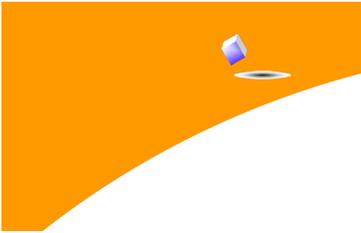

Diagnoses Password.....
This patient may have a confidential diagnosis please enter the password to view the ICD diagnosis.
Password: [   ]
[ok] [Cancel]

"The Health Ministry: 'Epidemiological data should not only be available in the capital city but also in the regions.'"

Important: diagnosis and procedures are now documented

Surgical Procedure (OPCS) Search

Enter Key Word to Search (brain, kidney, lung, heart etc....) [Search] [Cancel]

Results for "liver"

No	OPCS Code	Surgical Procedure
1	A54.3	Implantation of intrathecal drug delivery device adjacent to spinal cord
2	A54.4	Attention to intrathecal drug delivery device adjacent to spinal cord
3	A54.5	Removal of intrathecal drug delivery device adjacent to spinal cord
4	J01	Transplantation of liver
5	J01.1	Orthotopic transplantation of liver NEC
6	J01.3	Replacement of previous liver transplant
7	J01.4	Transplantation of liver cells
8	J01.5	Orthotopic transplantation of whole liver
9	J01.8	Other specified transplantation of liver
10	J01.9	Unspecified transplantation of liver

*Disease or Injury: CHEST PAIN
*Ward:
Referred From:
Contact Person:
Telephone:
Dead on Admission:

CHEST PAIN
CHICKENPOX
CHOLECYSTECTOMY
CHOLECYSTITIS
CHOLERA
CHRONIC OSTEOMYELITIS
CHRONIC OSTEOMYELITIS
CHRONIC WOUND
CIRCUMCISION
CLEFT PLATE & CLEFT LIP
COCONUT FELL ON HEAD
CONCUSSION
CONFUSION
CONJUNCTIVITIS
CONTRACEPTION
CORNEAL INJURY
CORNEAL ULCER
COUGH
COUGH & WHEEZE
CROCODILE BITE
CRUSH INJURY
CT-SCAN
CUT INJURY
DELIVERY
DENGUE/HAEM. FEVER
DENTAL PROBLEM
DEPRESSION
DERMOID CYST
DEVELOPMENTAL MONITORING AND SURVEILLANCE
DIABETES

The hospitals have few closed buildings

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„The greatest risk in this project is that its potential is overlooked, that it is not extended further, and that the possibility of its world-wide application is not considered."

Guido Burkhardt

Since 2001, Guido Burkhardt has been Project Manager in the Cantonal Hospital of Baden in Switzerland. His training in project management and his diploma in emergency medicine were obtained at the International Business School of Zurich.

His projects have concentrated on medical informatics with emphasis on complete, inter-disciplinary, digital Hospital Information Systems (HIS). Burkhardt is a member of the board of the Clinical IT Forum (Klinik-IT-Forum) of Berlin.

He is an author of the publications Krankenhaus-IT-Portal and Krankenhaus-IT-Journal of Germany. As chairman of the International HIS user group MIG, he is shortly anticipating election for a second term. He also heads the HIS discussion circle of the Open Business Club Xing, with over 1,500 members. From 2008 he will be the professor of the E-Classroom of the Klinik-IT-Akademie of Germany.

Using the MDS is "kids-play" and is even possible for people who don't speak English.
As the space in most hospitals is very limited, the large monitor shown in this picture is better replaced by a smaller LCD screens!

Kalmunai and Trincomalee are waiting

HIS projects would be logical additions in the whole country. The East Coast has set a good example!

The Sri Lankan Government wants and provides special support for further hospital information systems in those areas in the North and East that are difficult to reach. It has been strongly recommended by the authorities to extend the MDS project to the health district of Kalmunai immediately to the South of Batticaloa District. A number of small hospitals and several larger ones could be included as well as the local DPDHS and MOH offices. This project could be carried out by the existing team from Batticaloa. This will allow the project leader to spend more time in Colombo on administrative and public relations activities.

Kalmunai is part of the administrative district of Ampara. The smaller hospitals of Ampara health district offer an opportunity for 2009. Ampara General Hospital itself is currently running the old WHO ACCESS program but if requested by the Government, it could be upgraded to the current MDS software (a fairly small undertaking).

The coastal district of Trincomalee further North also offers an excellent opportunity for the implementation of MDS. It has about a dozen small hospitals and several larger ones. As well as the usual offices for DPDHS and MOHs, the district houses the office of the Provincial Director of Health Services (PDHS). One of the supplying companies is planning to set up a branch in Trincomalee and could cover that district. The other company would be able to cover the South. Project planning should start straight away as it will be necessary to establish a second team in the North. Good transport for the training teams must be ensured. The use of official Red Cross vehicles would not only provide better protection for the project workers but also allow more rapid passage through the frequent police check-points.