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

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 correctly 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.

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Questions for the project evaluation:
• Is MDS the right project in the right place?
• How successful has the project been up to date?
• What are the benefits, the risks?
• What are the strengths, the weaknesses?
• What is still to do?
• What recommendations can be made?
• Would geographic extension be useful?
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 it 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, 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 uninterrupted 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 Batticaloa on the East coast. Out of this, the best-qualified and the most attractively-priced offers were chosen. This was ideal. As well as ensuring that 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 knowledge 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.

"With MDS the quality of health care in Sri Lanka can be significantly improved. Without MDS that would be much harder."
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 technical side, the poor performance of the wireless networks 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 regularly to discuss the current status of the system. This will be a support organization that the individual institutions can rely upon.

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

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 program to store the data and to present it to the users. This required the program to be stored on every workstation 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 Internet and an E-mail connection. MDS in the future will not only store patient personal details and supply epidemiological information. It will soon start working with clinical data. This will greatly increase its usefulness to the end-users.

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

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 applications of this sort. With little modification, the software could be adapted to the country-specific situation elsewhere in the South and in developing countries, similar questions arise in health care provision as in South Asia.

If correctly implemented, MDS could improve epidemiological data collection in poorer countries and create dramatic possibilities for health intervention. The positive result for patients, if not for the whole population, 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 operating system, a web browser and a network connection. The special genius of the software is the simplicity of the screens. Complicated Hospital Information Systems 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 log-in screen that demands user name and password

Midnight patient statistics (the "Midnight Record")
- a simple and efficient management instrument

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

Space is in short supply in most hospitals

"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!'"
In one single view - the patient details and medical history

**PATIENT INFORMATION & HISTORY**

<table>
<thead>
<tr>
<th>Patient Information</th>
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<tbody>
<tr>
<td>Patient ID:</td>
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<tr>
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<tr>
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**OPD Visits**

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**Admissions**

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<th>Discharge Date</th>
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<tbody>
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<td>1</td>
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<td>HEAD INJURY</td>
<td>ALCOHOLIC LIVER DISEASE</td>
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<td>ABDOMINAL PAIN</td>
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<td></td>
<td></td>
<td>More Details</td>
</tr>
<tr>
<td>3</td>
<td>2504/07</td>
<td>BITE</td>
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<td></td>
<td></td>
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</table>

**Diagnostic details are protected**

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<th>To</th>
</tr>
</thead>
<tbody>
<tr>
<td>03/05/2007---14:35:06</td>
<td>Ward 17-Eye Male</td>
<td>Ward 4-Medical Male</td>
</tr>
<tr>
<td>04/05/2007---14:46:59</td>
<td>Ward 4-Medical Male</td>
<td>Ward 17-Eye Male</td>
</tr>
<tr>
<td>05/05/2007---10:59:14</td>
<td>Ward 17-Eye Male</td>
<td>Unknown-Undefined</td>
</tr>
</tbody>
</table>

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

**Important: diagnosis and procedures are now documented**

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

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 and Trincomalee are waiting

Kalmunai and Trincomalee are waiting

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.