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Transforming Clinicians' Workflow-The Case for Mobile Point of Care

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The Košice Children's Teaching Hospital is widely regarded as a centre of excellence for Eastern and Central Slovakia. Children with serious and debilitating conditions such as leukaemia, cancer and malignant tumours receive first-class healthcare, delivered through extensive and detailed treatment programmes. The hospital was keen to explore whether a mobile point of care solution (MPoC) and tablet PCs, used in the Oncology department, would improve workflow and whether this would also influence levels of care.

The conclusions were straightforward: MPoC supports clinician decision making and reduces scope for error by providing accurate information on medication interactions

Unexpected Benefits: Reduction in Stay

The pilot at the hospital substantially reduced some workflow areas, enabling physicians to spend more time with patients and improve the quality of care. Significantly, this also led to a reduction in the length of time a patient stayed in hospital. Though this was not the aim of the pilot it revealed how the benefits of healthcare IT, if applied thoughtfully and with clear objectives, can cascade through an organisation.

A wireless network, five tablet PCs, two server-based applications and a tablet PC-based application replaced the traditional paper-based processes used for haematology test results, medication interaction and psychological testing. The tablet PCs were given to four paediatric oncologists and a paediatric psychologist.

The mobile point of care pilot began in April 2007 with the implementation of a Cisco wireless network, the selection of end-user devices and the commissioning of the system.

Deployment in Less Than One Week

The implementation and commissioning of the Wi-Fi network was achieved in a remarkably short time – approximately one week. This also included the installation of 15 bedside wireless internet access points, one for each of the beds in the Oncology department.

It was recognised that the Internet access points could be used by the patients when the MPoC trial was completed and regardless of the results.

Targeted at Three Areas

The overarching aim of the implementation was to determine whether the MPoC solution would improve workflows in three areas:

Haematology test results: The effect of medication to the blood is central to the treatment of patients and they are subject to constant haematology testing. The results of these tests are used by the physician to assess whether the medication has been successful or not, enabling them to modify the medication in response to the progress of the patient.

Medication interaction: The physician has to monitor the potential danger of a negative reaction between the various

medications being prescribed to the patient as part of the oncology treatment or the effect if the patient suffers from other conditions, for example, asthma.

Psychological testing: The psychologist monitors the psychology of patients undergoing oncology treatment. Each new patient undergoes a set of exams examining four areas of the psyche: intelligence, personality, emotion and psychomotor (movement of muscular activity associated with mental processes).

The pilot involved five physicians; four paediatric oncologists and one paediatric psychologist. The paediatric oncologists were each given a Fujitsu Siemens Computers' LIFEBOOK T4215* tablet PC powered by Intel® Core™ 2 processors. The paediatric psychologist was given a Fujitsu Siemens Computers' LIFEBOOK P1610* tablet PC also powered by the Intel® Core™ 2 processor. Cisco wireless network was deployed.

Three applications were made available to the tablet PCs:

A server-based application enabling the paediatricians to remotely access and examine the latest haematology test results;

A server-based application allowing the paediatricians to examine the potential interactions between medications prescribed to patients, and

A PC-based application enabling the psychologist to carry out four different types of psychology tests and calculate the results of those tests.

Time Savings and More

The MPoC pilot led to 2.5 hour saving each day for the paediatric oncologists, resulting in a nine per cent productivity increase, and a saving of one hour each week for the psychologist, resulting in a two per cent productivity increase.

However, the deeper value of the MPoC pilot was also evident in increased patient safety, greater patient and staff satisfaction, and improved quality of care. For example, keeping parents informed about the condition and treatment of their children is an important psychological factor. The clinicians not only had more time to spend with the patients but they were also able to provide more accurate information to parents. This enhanced quality of care led to a reduction in the average length of stay from seven days to 6.5 days.

Economic Factors

From an economic perspective, the MPoC pilot proved a Net Present Value of EUR 44,145 1, a breakeven within six months and a return on investment of 629 per cent. While the NPV may be relatively low, the benefits must be viewed in the context of much lower wage and cost structures in Slovakia compared to Western European countries.

In turn, by using the same measures the MPoC start up costs could be viewed as relatively high. However, the MPoC pilot established that even greater value could be gained by loading more applications onto the tablet PCs and utilising the unused wireless network capacity.

The pilot demonstrably revealed that MPoC solutions can have a positive and far-reaching role in improving clinician workflows which in turn not only modernises the delivery of healthcare but enhances the quality of care. The MPoC pilot also clearly revealed how healthcare organisations can establish benchmarks, evaluate the value of their IT investments and gain a clear understanding of how technology can help improve the delivery of care.

System

Mobile devices to support data capture and access from a patient's bedside or trolley;

Mobile infrastructure such as a secured, wireless LAN network. Many hospitals are likely to seek enterprise-class

wireless solutions, with uniform coverage/signal strength and high bandwidth. The aim would be to provide a single managed platform which hosts a full range of services (3G cellular, Wi-Fi, medical telemetry, along with a wide range of mission- and life-critical wireless applications) and is delivered to a diverse range of wireless devices, and

Mobile applications which support access to patient data to authorised personnel, throughout the hospital and beyond.

In the medium-term, one of the key trends likely to shape the MPoC industry will be intelligent, decision support for medical information delivered

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via mobile devices.

Advocacy Groups Step in

MPoC has received a powerful boost in the shape of mHealth Initiative (mHI), a Massachusetts, US-based non-profit advocacy group, supported by the Medical Records Institute (MRI), and open to vendors, groups and individuals with an interest in the field.

The mHealth Initiative is headed by MRI Vice President Claudia Tessier, formerly with the Mobile Health Care Alliance (MoHCA). Through mHI, she noted, "we will create a roadmap for the new health ecosystem based on mDevices, new software, new interoperability solutions and secure wireless transmission."

Designing Pilot Projects: Tips and Tricks

According to interviews conducted with MPoC advocates, benchmarks to assess the value of a mobile system would consist essentially of both quantitative and qualitative factors.

Quantitative factors would consist, for example, of:

Improvements in the accuracy of EMR data;

Reduced in clinical data latency (time between capturing vital sign data and entering it into the EMR);

Increase in point of care charting beyond automated vitals sign acquisition and reduction in vital signs documentation time;

Reduction in the number of data items that needed to be transcribed and a consequent reduction in transcription error

Reduction in number of clinician logins per shift, and

Time savings per shift.

Qualitative advantages would principally concern nursing satisfaction:

Enhanced patient interaction;

Lightness and portability of equipment;

Easier transit/passage in built-up or otherwise-constrained areas, and

Reduction in administrative tasks such as login and notetaking or compiling and accessing documentation.

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