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Connecting Mobile Users to the Hospital Information System

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The “outdoor OpenMed” project at Mainkofen Regional Hospital wins award for the most innovative concept of 2006

Many hospitals have either commenced or completed the transition to a digital patient record system. Surveys of German hospitals suggest the percentage of hospitals to have implemented electronic patient records stands at around 20%. It should be noted, however, that very few German hospitals rely exclusively on digital records. Implementing a patient file system based solely on electronic documents across the various disciplines requires a high degree of computer penetration in the hospital information system as well as a high level of interdisciplinary willingness to engage in IT supported work.

The integration of an information technology solution in the highly complex, multidisciplinary processes used in hospitals is a major challenge for an IT department, one which can only be overcome if the process secures strong support from hospital management and the system’s users.

The benefits of having a hospital-wide, cross-sectoral IT solution have been repeatedly demonstrated and documented. As external demands – the imposition of a DRG reimbursement system – and internal requirements – cost unit accounting and process cost accounting – have mounted in recent years, maintaining patient and administrative records has become an increasingly complex task. A properly implemented and well-integrated hospital IT system assists all occupational groups in meeting more stringent data recording requirements. Background in outpatient services To avoid “media breaks”, information loss and duplication, data connected to the treatment process must, where possible, be entered at the location at which it is generated. This already occurs in many processes, e.g. patient admissions. However, network connections are not usually available at the bedside when clinical or nursing services or documents are required during the ward round, hospitals with mobile networks or so-called bedside terminals being the exception. In most hospitals, information of this nature is entered in the hospital information system either at the nursing station or the doctor’s office via a PC connected to the network.

A network is usually not available when outpatient services are provided in the patient’s home. In such circumstances, it is not possible to gain offline access to the hospital information system due to security considerations related to multiple access. In these and many other circumstances, practitioners tend to resort to pen and paper to record data, which they later enter on their PC in the office. Duplication and error are intrinsic to this approach and cause dissatisfaction for the computer user, higher costs and reduced quality.

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The “Outdoor OpenMed” Project at Mainkofen Regional Hospital

This Common Problem Prompted

Mainkofen Regional Hospital to introduce modern mobile telephony standards – e.g. UMTS1 – to connect mobile users to the hospital information system. The hospital’s psychiatric institute has an outpatients’ clinic which provides home care services to patients residing within a radius of approximately 80km. The medical staff who deliver this service record administrative, socio-demographic and medical data in the patient’s home.

The hospital carried out a feasibility study to investigate the possibility of using UMTS/GPRS to establish mobile connections to the hospital information system. The goal of the “outdoor OpenMed” project was to provide doctors and nursing staff with secure, high availability, mobile access at patients’ places of residence. The study also examined the feasibility of providing mobile access to the hospital information system via UMTS as an alternative to running a wireless network and, if so, at what cost. The layout of the Mainkofen Regional Hospital site resembles that of a campus. Its 45 centres and laboratories are housed in 80 buildings spread over an area 3km in diameter. It soon emerged that the development of a new communications network throughout the site would require substantial financial and administrative resources.

Data Protection: A Prime Concern

Compliance with the provisions of data protection legislation and maintaining data integrity are absolute priorities when providing mobile access to patient data and the new system was designed with these concerns in mind. Mobile access is provided over the UMTS/GPRS network of a mobile telephony provider. An encrypted connection is established to the hospital network via a so-called VPN tunnel. Following user authentication at a terminal server, the connection to the hospital information system is established via the registration interface the user normally uses. At this point, the conventional role and rights-based access control model takes effect. The user can access all the interfaces and local network information services to which he usually has access e.g. the intranet or other knowledge databanks. Only encrypted graphic data are transferred between the hospital network and the mobile user. Once the connection via UMTS has been established, mobile access to the hospital information network is only slightly slower than access using conventional means. In addition, an efficient transmission protocol ensures that only a small amount of the UMTS connection bandwidth is used.

Project Requirements

A number of conditions must be met before the concept can be implemented. The hospital must have a terminal server infrastructure and VPN router. UMTS access cards are supplied by a range of mobile telephone companies and can be operated on every modern laptop or tablet PC. Users have a range of payment options, including a monthly user charge calculated either by volume or time, or a flat monthly rate. The UMTS mobile telephony standard can also be used on the move, for example, it is theoretically possible to get a mobile connection to the hospital network from a moving car.

Mainkofen Regional Hospital recently received an IT award for the most innovative IT concepts of 2006 from the VHiTG (Association of Information Solution Providers in Health Care) in recognition of its implementation of the feasibility study and the documentation of its results. The hospital’s concept took a new approach to combining known and proven standards and, as such, delivers added value for IT users. Application of the concept in practice has three principals: improved data quality; mobile access to patient information; and the ability to secure external access to and use of the hospital’s processes.

In a recent survey (Greater Efficiency in the Health System 2007) hospitals were questioned about the potential benefits of IT solutions. The respondents identified key areas in which the application of IT solutions could achieve significant savings for the health sector. Specifically, they noted that IT solutions could reduce costs and improve processes by removing barriers to communications and avoiding socalled “media breaks”, as well as improving the integration of software systems across sectoral boundaries. Some studies indicate that these solutions reduce costs by up to 30% (www.vde.com/dgbmt). The concept of “information any time, anywhere” using mobile, secure access to hospital information systems is about to take another step forward. In this context, access via UMTS is possible using laptops or tablet PCs as well as through PDAs (personal digital assistants), which, in addition to offering a telephone capability, can also access mobile networks. The relatively small size of the PDA display means they are most suited for accessing or creating data summaries or filling in digital forms. Nevertheless, they offer significant added value when compared to the telephone because they can provide notification services and a rapid response facility through their mobile connection.

Conclusion

The value of an item of information to the user of a hospital information system depends on the relevance and validity of the patient-related data in question. Time consumed is another key factor in this equation. The later a piece of information is supplied in the process, the smaller its overall value. The impact of the time factor is significantly diminished through secure, mobile access to data.

This is a vital advantage given the key importance of time in many medical and nursing processes. By providing users with access to their customary interfaces as well as the hospital’s internal and external information services, the system reduces the risks associated with changing user interfaces and thus increases the user’s sense of security when working with information media. In modern health systems, it is crucial to minimise “media breaks” and avoid duplication when recording and documenting information. Given that many processes used in the health sector are dependent on the quality of the stored and processed data, a clear IT strategy will make a substantial contribution towards securing

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sustainable, viable health systems into the future.

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