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## Volume 1 / Issue 5 2005 - Investing in IT

### A Telemedicine Platform for Shared Case Files

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University Hospital Erlangen creates Internet-based telematics platform for shared case files in a range of application scenarios. The University Hospital Erlangen together with a second surgical centre and more than 90 external eye specialists have entered into an IGV contract (integrated care service - interdisciplinary) for the treatment of cataract and retinal diseases. For the purposes of quality assurance, the contract stipulates that shared case files be used to record information on outpatient treatments, surgery and test results. To meet this requirement, the hospital needed to develop practical telemedicine solutions.

At the same time, other departments of the hospital were needed to respond to emerging requirements with a telemedicine dimension. The heart surgery unit, for example, examined the possibility of introducing a teleradiological solution for referring clinics which would facilitate rapid and secure sharing of coronary angiographs. The pain clinic sought a telemedicine solution to enable it to share treatment-related documentation with an external centre for sports medicine.

The University Hospital Erlangen eventually decided to introduce a single telemedicine platform, one which would meet the maximum possible number of requirements. While the various once-off solutions available to address telemedicine needs in individual cases provide acceptable solutions in their respective, specific areas, the introduction of a single telemedicine platform helps minimise operating costs.

#### Technical Implementation

The product selected by the hospital is a centralised, web-based patient file offering the possibility of compiling diagnostic findings and medical multimedia data in an illness-specific case file.

Each file is allocated to a treatment team whose members are given access to its various documents. This approach satisfies the core requirement set out in data protection legislation that access to medical data may only be given for treatment purposes.

As part of the quality assurance element of the IGV contract, standardised forms are used to record treatment information. Once completed, these forms – PDF files – are stored as XML BLOBs on the database.

Patient-specific information is not recorded until the patient has been thoroughly briefed and his or her written consent obtained. The data may only be accessed by staff of the participating healthcare institutions directly involved in the treatment process.

Shared data on treatments in the pain centre are subsequently reproduced on the consulting service that is integrated in the application.

The teleradiology requirements (transmission, storage and display of cardiac catheterisation images in DICOM format) were implemented using a Java-based application. This application is integrated as a module in the telemedicine platform and is not visible to users as an external programme.

#### Security Requirements Guaranteed

To access the telemedicine platform users require access to a browser and the Internet. The platform is accessed behind a firewall in the so-called demilitarised zone of the University Hospital Erlangen. The data entered are separated from the application by a further firewall and stored in a separate network area. This strict separation of application and data guarantees a high level of data security.

#### The Current State of Play: Slow Acceptance

Thus far, 22 independent eye specialists have joined the project and been given access to the telematics platform. However, only eight of these specialists record treatment data online by filling out PDF forms. The other specialists involved in the IGV contract – about 80 in all – continue to fill out treatment forms in writing. These are then posted to the eye clinic and the information is subsequently entered electronically by a member of the clinic's staff. Of the 7,000 forms electronically recorded to date, only 200 were originally entered on the system in real time. The remaining

6,800 forms were first completed in writing, before being sent to the eye clinic where they were entered into the system by clinic staff. Doctors participating in the project are also given access to retinal images and physicians' letters in PDF format.

The heart surgery unit has successfully established a link with a referring cardiology unit and over the past four months, ten heart catheter examinations have been transmitted via the new system. Although the referring clinic was initially sceptical about the ability of a telemedicine application to improve co-operation, the benefits of the project have now been positively evaluated. A pilot project has commenced to assess the benefits of establishing a telemedicine link with a second referring clinic.

In the meantime, the project to develop a telemedicine application for recording data on treatments performed jointly by the pain centre and an external centre for sports therapy is running smoothly, with between eight and ten joint treatments documented each month.

#### **Reasons for Slow Progress**

The browser-based telemedicine platform, which has been operating for 13 months, currently has ten bona fide external users. Given the internal and external costs of the project, progress in implementing the project has been disappointing. The following reasons have been identified:

P In many medical practices data processing and the Internet are kept separate to allay security concerns. This means that data cannot be entered on the system while a patient is being treated. For this reason, pen and paper continues to be the principal means by which information is recorded.

P User-friendliness of the application: In many areas the quality of the system's interfaces and its navigation is sub-optimal. For this reason, users frequently delay entering data.

P Lack of financial incentives: Given that users may continue to submit test results to the eye clinic in writing for in-house entry on the system at a later date, direct real-time data entry offers no tangible benefits for independent physicians.

#### **Conclusion**

The telematics platform at the University Hospital Erlangen has been in operation since July 2006. Despite intensive efforts and substantial investment, the system continues to experience low levels of acceptance and the number of active users remains relatively small.

In addition to the reasons for the slow pace of the project's implementation cited above, the impact of socio-technical barriers should not be underestimated. These are additional factors to be overcome. In the German health system at least, communications between the various institutions providing patient care continue to be largely paper-based. The use of telematics in this sector will require changes to be made and will need the approval of all concerned.

We remain convinced that the work invested in this project will pay off and that once its teething problems have been overcome, it will have a positive impact in terms of achieving improved communications and links with external partners.

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Published on : Wed, 28 Sep 2005