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Integrating the Electronic Health Card in a Computerised Hospital Information System

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The wide-ranging implementation of the electronic patient card (EPC) is still a hotly debated issue. The introduction of the EPC brings significant technical and organisational changes in its wake. To date, however, work in this area has tended to focus on system architectures and their components rather than on the processes used by service providers. It is also impossible to obtain an accurate picture of the effectiveness of an EPC system until it has been integrated within the day-to-day processes of a medical institution such as a hospital. Close co-operation between the Mannheim University of Applied Sciences and the Deaconess Charitable Hospital of Speyer produced an academic thesis which specifically addresses this problem. The study examined the issue of the EPC from the perspective of both the service provider and the processes in place in the hospital. Extensive systems analyses carried out at the hospital as part of the project identified a series of workplace types associated with the introduction of an EPC and enabled the corresponding processes to be observed. On the basis of the findings, a number of propositions were made vis-à-vis the cost and benefits of integrating the EPC in the hospital information system (HIS) and a tentative cost estimate and project plan were produced. While the thesis raised a number of problems, it also offered appropriate solutions.

Dividing the Hospital into Representative Headings

Careful study of the many different areas in the hospital indicated that its many individual parts could be grouped under a small number of generic, representative headings. While each heading includes a series of diverse medical disciplines, the organisational processes relevant to the EPC are virtually identical. In the case of the 430-bed reference hospital, it proved possible to group the 50 or so individual areas under five representative headings:

Þ Inpatient admissions: Basic admissions process and early diagnosis.

Þ Ward: Treatment and discharge (or transfer).

Þ Outpatients: Outpatients admissions, diagnosis and treatment.

Þ Functional Area: Internal service provision for inpatient and outpatient cases.

Þ External Service Centre: Co-operation partners with significant role in internal hospital processes.

This structure has key advantages for the later integration of the electronic patient card in that it allows outcomes to be presented on the basis of the core processes for each abstract workplace type referred to above and, thereafter, to be reproduced for the different members of each group. Effectiveness of EHC Applications The studies indicated that there is a good fit between mandatory uses of the electronic patient card (policyholder claims data and e-prescriptions) and the electronic process flows in a hospital. On the face of it, only the data storage medium changes.

Difficulties arise, however, in relation to voluntary EHC applications. The requirement under data-protection rules, that consent must be obtained before personal information can be used for these applications, places ownership of the data squarely in the hands of the patient. It is virtually impossible in the clinical setting to repeatedly secure consent by means of a card and patient PIN.

Furthermore, service providers will be required in future to produce two copies of data, for instance, the electronic patient file. A copy is to be held locally for security purposes and, if it the patient so wishes, centrally for the purposes of cross-sectoral communications. By removing the guarantee of completeness for cross-sectoral data, the consent requirement undermines the value of this data because it generates more documentation.

Further Applications for Electronic Health Cards

In addition to addressing problems, the analyses also identified practical functions which have not yet been defined in law. For example, they found that using electronic case histories for admissions would save time and resources. It would reduce the workload for the clinician and patient because the electronic case history only needs to be updated when changes in health status occur or special circumstances arise.

With an electronic medical report it is possible to rapidly record an encoded and digitally signed diagnosis on the service provider's information system. Using this system, a pathology department which receives a request for a digital medical report will also receive an electronic receipt that authorises it to issue the diagnosis to the requesting doctor without using the patient's EPF and PIN.

A master PIN provides a relatively simple solution to the ongoing and time-consuming problem of having patients enter a PIN, which is frequently not a feasible option. With the master PIN, the patient agrees, on admission, (perhaps by means of a clause in the admission contract) to allow the hospital to avail of the EHC functions it requires for treatment purposes for the duration of his or her stay. The patient then enters his or her PIN on the system. This master PIN allows authorised employees of the hospital to use the patient's EHC data, which is accessible at all times because it is always kept in the hanging file.

Financial and Time Costs of Integration

The following conditions must be met when integrating an electronic health card in a computerised hospital information system:

Þ Development of a public key infrastructure (PKI). Doctors and nursing and care staff must be given a health professional card (HPC).

Þ Workstations must be fitted with cardreading devices.

Þ The HIS must be linked to the health telematics platform via connectors.

Þ HIS modules (voluntary applications) must be updated and redeveloped.

The estimated cost of integration for a 400-bed hospital is¤250,000 eur o. This figure covers hardware, organisational resources, staff, interfaces and software, including updates (see Table 1). These costs will arise in tandem with the planned phased introduction of the EHC. The steps involved in integrating voluntary applications will create the greatest investment costs because they necessitate the procurement of new HIS modules and account for at least two thirds of the hardware needed for integration (see Table 2).

Most of the software development, modification and integration is done by the relevant HIS developer. However, the service provider must perform a range of organisational tasks. It is recommended that the hospital establish an internal project group to co-ordinate the project. Its principal tasks will be to oversee the internal organisational aspects of the process, manage communications with the HIS developer, ensure timely financing, procurement and installation of the required components, undertake modifications and tests and keep staff informed of developments.

Discussion and Outlook

Despite identifying many problems, the findings of the analyses showed that while the introduction of an EHC has resource and cost implications, it can also deliver improvements in information logistics and treatment processes. They also demonstrated that, in practical terms, the current specifications are still too narrow and could have detrimental effects on the dayto-day delivery of medical services.

EHC applications only deliver added value for the service provider if the provider can have full confidence that substituting them for existing, local solutions will support cross-sectoral treatment processes in all cases.

Further changes are required in the hospital sector to assure service providers that they will be facilitated rather than hindered in securing practical access to the cross-sectoral benefits of the EHC. Such a development would also foster acceptance, which is key to integration.

Cross-sectoral care would be a significant advance for German healthcare and its rapid proliferation across the system is a highly desirable outcome. For this reason, a proactive approach to advancing this goal will be necessary. This will mean giving business, policymakers and service providers a much greater role in shaping the sector.

Hardware + Organisational Resources	25,000 - €
Software	
Drugs documentation	10,000 - €
Case history documentation	10,000 - €
e-hospitalisation + e-referral	10,000 - €
Emergency data	10,000 - €
e-diagnosis	10,000 - €
Software update	
(claims data and prescriptions)	10,000 - €
Patient identification	30,000 - €
Interface adaptation	35,000 - €
Staff / Services	100,000 - €
Total	250,000 - €

Table 1: Cost calculation for a 400-bed hospital

PHASE HARDWARE	Policyholder - claims data	e-Prescription	Voluntary Prescriptions	Total
Health Professional Card	-	79 (doctors)	235 (ancillary staff)	314
Secure Module Card	-	6	7	13
Card Terminal	10 (for raising card sernifide)	-	100	110
Connector	10	-	-	7
Distribution	4 %	19 %	77 %	100 %

Table 2: Estimate of the number of required EHC components in the reference hospital

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Secure Module Card	-	6	7	
Card Terminal	10 (for raising card sernifide)	-		