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MediCoordination: A Practical Approach to Interoperability in the Swiss Health System

Henning MÜLLER [a,b,1], Michael SCHUMACHER [b], David GODEL [b], Abu Khaled OMAR [b], Francois MOOSER [b], Sandrine DING [b]
[a] *Medical Informatics Service, University & Hospitals of Geneva, Switzerland*
[b] *University of Applied Sciences Western Switzerland (HES SO), Sierre, Fribourg, Lausanne, Switzerland*

Abstract. Interoperability and data exchange between partners in the health sector is seen as one of the important domains that can improve care processes and in the long run also decrease costs of the health care system. Data exchange can assure that the data on the patient are as complete as possible avoiding potential mistreatments, and it can avoid double examinations if the data required are already available. On the other hand, health data is a sensible point for many people and strong protection needs to be implemented to protect patient data against misuse as well as tools to let the patient manage his/her own data. Many countries have eHealth initiatives in preparation or already implemented. However, health data exchange on a large scale still has a fairly long way to go as the political processes for global solutions are often complicated. In the MediCoordination project a pragmatic approach is selected trying to integrate several partners in health care on a regional scale. In parallel with the Swiss eHealth strategy that is currently being elaborated by the Swiss confederation, particularly medium-sized hospitals and external partners are targeted in MediCoordination to implement concrete added-value scenarios of information exchange between hospitals and external medical actors.

Keywords. interoperability, health data exchange, eHealth strategy

1. Introduction

The advent of fully electronic patient records has strongly altered data management and processes in hospitals [1]. The availability of all data in digital format allows for an easy communication of data and several people can access them at the same time as data can be duplicated easily. The exchange of health data in digital format also has other advantages as data loss can be prevented (for example compared to the case of images transported on film) and it can lead to the availability of essential and more complete data on patients avoiding mistreatments [2, 3]. Double examinations can be avoided if the examination results can be communicated quickly. On the other hand, people are afraid of data abuse with large centrally stored data repositories containing sensitive health data as the abuse potential is higher than with paper-based records.

To tackle the high potential of the domain of medical interoperability but also respond to potential risks of data abuse, strategies for the interoperability exist in many

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[1] Corresponding Author: Henning Müller, HES SO, TechnoArk 3, 3960 Sierre, Switzerland; Tel.: ++41 27 606 9036; E-mail: henning.mueller@hevs.ch.

countries [4, 5] and also on a European level [6]. The Swiss Confederation has also started an eHealth strategy creating a clear outline for the next ten years in managing health data at various scales, and including participants from a large number of interest groups. This effort has lead to several concrete propositions for potential standards for data exchange and particularly an identification of partners in the system. For a highly federated country such as Switzerland a distributed structure is foreseen, storing the data at the place where they were produced, and then allowing selected access.

Many standards already exist in the domain and it cannot be the goal to create new standards. Not all standards offer an optimal scenario, though, and the choice needs to be made well as the consequences are important. HL7 CDA (Health Level 7, Clinical Document Architecture) offers formats for exchanging several types of documents and CEN 13606 (European Committee for Standardization) also offers a general framework for data exchange. Standards for coding exist for many domains including ICD (International Code of Diseases) for diseases, SNOMED CT (Systemized Nomenclature in Medicine Clinical Terms, [7]) as a very large-scale terminology, LOINC (Logical Observation Identifiers Names and Codes) for laboratory and clinical results, and many others.

Political processes usually advance slowly as it is a sensitive domain and wrong steps can lead to negative feedback, particularly for politicians interested in the voter's opinions. On the other hand a clear need is currently visible to have all health data of a patient at a single place. Large companies such as Microsoft[2] and Google[3] have also realized this and allow for a creation of personal health profiles. In the US many hospitals also offer such personal health records or allow for an export of the data to one of the commercial solutions [8]. This creates a risk as well that the commercial players might misuse the data they manage. On the other hand, patients have an interest to have a complete personal health profile.

The MediCoordination[4] project described in this paper tries to complement the Swiss eHealth strategy by collaborating mainly with regional medium-sized hospitals and smaller partners in the health system, where data exchange has not been an as important subject as in large University hospitals that often already exchange health data with external actors [9]. By communicating with several actors in the health system, several scenarios for health data exchange could be identified, where an implementation brings a clear added value for all partners. This allows for testing the infrastructures in parallel to the creation of the eHealth strategy also for smaller actors in the health system to gain experience with these tools and potential problem. This project has currently limited its scope to the French-speaking part of Switzerland.

2. Methods

The MediCoordination project includes two distinct phases. During the first phase interviews were performed with several actors in the Swiss health sector (limited to the French-speaking part of Switzerland), from small to medium and large hospitals, the medical associations, insurance companies, producers of laboratory and imaging data, producers of software for general practitioners (GP) and hospitals. The selection was

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[2] http://www.healthvault.com/.

[3] http://www.google.com/health/.

[4] http://www.medicoordination.ch/.

made by creating an exhaustive list of actors, and then choosing to have all sectors included. The second phase that has started in early 2009 concerns the choice and concrete implementation of one use case. This article mainly describes the first phase and the outline of the use case chosen for implementation.

Personal interviews with 18 chosen partners were performed with the goal to have a qualitative evaluation of the needs of each partner concerning medical interoperability at the largest sense. The following questions were taken as a basis for a longer qualitative discussion during the interviews. Interviews took between 90–120 minutes per partner and were moderated by several persons from the project (two persons per interview). Questions were developed by the project partners together.

- Which electronic patient record is used and what exactly is digital?
- Which standards and terminologies are used, or even entire data models (such as HL7 RIM)?
- What is your attitude towards interoperability and data exchange? What is the potential and where are the risks?
- Which scenarios would help you concretely in exchanging data (2–3 examples) with external actors?

Depending on the responses and the situation of the partner further questions were asked to have a detailed scenario for each partner.

3. Results

3.1. Partners Selected for Survey and Their Particular Interests

Partners for the interviews were all chosen in the French speaking part of Switzerland as proximity and confidence play an important role to obtain results quickly and in sufficient detail. An exhaustive list was created and partners with existing contacts were contacted first. A balanced list of partners was the goal of the project as well. The following partners were contacted for further interviews:

- two large University hospitals, two small private hospitals;
- six medium size regional hospitals in French-speaking Switzerland;
- two independent laboratories, a radiology lab for medical imaging;
- an insurance company;
- a producer of a GP medical record and two GPs using this solution;
- a producer of a clinical information system (IS);
- the Swiss society for GPs;
- several regional health boards in the French-speaking cantons.

The atmosphere in the interviews was very good and the varied questions allowed obtaining a fairly global view of the interests of the participants in interoperability in the health domain.

3.2. Use Cases Chosen for a First Reference Implementation

In most interviews it became quickly clear that there are a few scenarios where a very simple solution can have a high impact and added value particularly in medium-sized regional hospital such as those we targeted.

Figure 1 illustrates the general processes that occur between a patient, its GP, a hospital, and laboratories, all currently paper-based. The most important added value for GPs and medium-sized hospitals was identified as: (1) quick electronic release note, (2) electronic release letter, and (3) operation protocol. At admission time, documents on the admission are sent from the hospital to the GP and when leaving the hospital the documents are sent from the hospital to the treating GP. This communication happens for basically all patients and a quick information flow can reduce manual processes. Patients can opt out of it by not supplying a GP (a form of indirect informed consent).

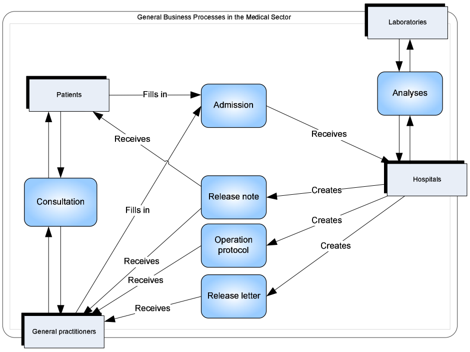

Figure 1. Communication processes between hospitals and external partners

All medical actors visited implement the documents of these groups of processes as paper versions (sent by fax or paper mail). Parts of the documents can be created automatically by the clinical IS. In all cases, information has to be added manually by GPs or secretaries usually computer-based. None of the documents is created using coding standards other than ICD for diagnosis. Interoperability is on a document level. Figure 2 illustrates the process for the creation of a release letter.

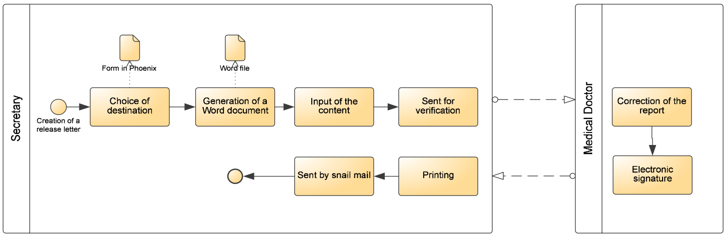

Figure 2. Creation of the release letter in one of the participating hospitals

We defined the first specifications of a release notification with an architecture using a result server, as illustrated in Figure 3. The release notification is a short text summarizing the patient stay in a hospital. The medical doctor (MD) directly writes it in free text (semi-structured) in the information system when the patient leaves the hospital and it currently is handed to the patient on paper, sent by fax or mail. The goal of the release notification is to inform treating GP about the diagnosis, possible interventions, and medications when leaving, as well as controls to perform. The flow of events in the proposed electronic system can be summarized as follows:

1. The MD in the hospital creates a new release note;
2. The destination of the document is chosen;
3. The document is generated partly with the data from the patient record;
4. The document is filled with further information;
5. The document is encrypted (encryption system has not yet been chosen);
6. The document is sent to the document server;
7. The server notifies the GP that a new document is available (or GP has to check actively);
8. The GP connects to the server and creates a secure channel;

9. The GP downloads the document into its application using a secure channel;
10. The document is decrypted;
11. The GP checks the document and confirms its validity and correctness, then logs out.

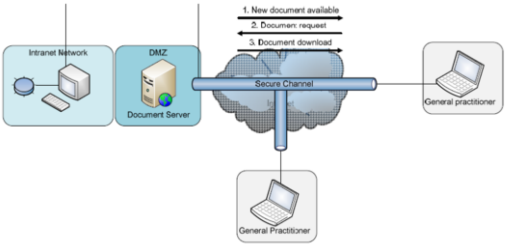

Figure 3. The scenario of a document server inside each hospital and an exchange with external partners

In this context it is particularly important that the information flow is quick and the GP is informed about the status of his/her patients as soon as they leave the hospital. A similar process can then be created for the admission of a patient, the full release letter, and other simple document types.

4. Conclusions

Interoperability for exchanging health information is a sensitive topic and the potential is as high as a fear to lose control over the data and allow for abuse. Most eHealth strategies target a global solution on a country level and are long term. This is required but it is also important to gain experience through small solutions with a high added value. Our interviews showed that the interest of participants is differing but that everyone is motivated once a gain is seen. A scenario for exchanging the release letter is currently implemented in 2 hospitals, a producer of a GP medical record, and 2 GPs. An extension of this group is planned in the second half of the project.

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References

[1] Haux, R. (2006) Health information systems – Past, present, future. *International Journal of Medical Informatics* 75(3–4):268–281.
[2] Kohn, L.T., Corrigan, J.M., Donaldson, M.S. (Eds.) (2000) To Err is Human: Building a Safer Health System. National Academy Press, Washington DC.
[3] Walker, J., Pan, E., Johnston, D., Adler-Milstein, J., Bates, D.W., Middleton, B. (2005) The value of health care information exchange and interoperability. *Health Affairs Web Exclusives*, W5-10–W5-18.
[4] Ruotsalainen, P., Iivari, A.K., Doupi, P. (2008) Finland's strategy and implementation of citizens' access to health information. *Studies in Health Technology and Informatics* 137:379–385.
[5] Confédération Suisse: Stratégie nationale en matière de cybersanté (eHealth), December 2008.
[6] Commission of the European Communities (2004) e-Health – making healthcare better for European citizens: An action plan for a European e-Health Area. *Com* 356.
[7] Spackman, K.A., Campbell, K.E., Cote, R.A. (1997) SNOMED-RT: A reference terminology for health care. *AMIA Annual Fall Symposium Proceedings 1997*, 640–644.
[8] Steinbrook, R. (2008) Personally controlled online health data – The next big thing in medical care? *New England Journal of Medicine* 358(16):1653–1655.
[9] Lovis, C. et al. (2007) Comprehensive management of the access to the electronic patient record: Towards trans-institutional networks. *International Journal of Medical Informatics* 76 (5-6):466-470.