TeamTreat – a communication platform for concerted cancer treatment

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Abstract. TeamTreat is an internet platform providing a case record for cancer patients across and inside the primary and secondary health care sector. Due to the slow progress of cross-institutional integration in healthcare IT, we created an alternative low-level approach to this problem and put special emphasis on an easy access for healthcare professionals regardless of the specific IT infrastructure they use. Physicians use the platform to share and collect information to achieve a collaborative treatment of cancer. Furthermore, the data in the case record is searchable for clinical researchers to find suitable patients for inclusion in clinical trials. Reading access for patients is also possible.

Keywords. Neoplasms/therapy, electronic health record, patient selection, clinical trials as topic/methods, patient care team, electronic patient record

Introduction

Cancer treatment of a patient involves many steps of action, different institutions and care settings. Although there is a grown infrastructure in hospitals and as well in most private practices, communication between these institutions is still relying on fax and mail carrier [1]. Electronic documents, in particular x-rays, are mainly exchanged via CD sent by letter mail.

Despite the integration efforts of IHE [2], the German EFA initiative [3] and several private companies to cross this gap, there is no fast breakthrough visible for a direct digital data interchange between German’s healthcare providers. There are two main reasons for this: At first it seems that companies offering isolated healthcare information systems lack the commercial interest in integrating with other systems [4]. Secondly, strong privacy issues are always obstacles when collecting data, especially sensitive medical data [5]. In our estimation, a full integration of systems in the near future is unachievable. We had to address this problem by a low-level approach where new partners can join easily without limitations of their infrastructure.

Another challenge in cancer treatment is to include patients in clinical trials since the handling of complex cases often involves research. We want to bring together researchers and physicians from different institutions who are involved in the treatment.

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The collected data should be searchable for research purposes. On this basis suggestions for patient recruitment in clinical trials should be generated automatically.

1. Methods

At first we identified the challenges in communication between collaboration partners in oncological treatment. For this purpose we interviewed physicians involved in clinical-oncological care and research.

As a next step we tried to find an existing appropriate software solution that was ready to use and affordable. Our search focused on electronic patient records in Germany. On basis of the definitions of different patient records [6] we searched for web pages and literature using Google, PubMed and Medpilot.de with topics “electronic patient record”, “electronic health record”, “elektronische Fallakte” and “elektronische Patientenakte”.

2. Results

2.1. Low-level approach

After evaluating the situation, our conclusion was to design a system that imposes as few technical barriers as possible for the health care provider. Our approach to the solution is a password-secured web platform called TeamTreat that can be accessed using a standard browser. It runs on the open source Java EE application server GlassFish and is secured via access control. Transport layer security is guaranteed by using HTTPS-connections. So the basic requirements for participants are a computer with internet connection and a current browser.

Additionally to the conventional file upload, a special “fax upload” is part of TeamTreat. Since most of the users have a fax machine, we offer them to send paper documents as fax messages to temporarily generated numbers, which are used for matching the incoming information to the record. There the documents will be stored in the case record after a manual selection from an inbox and can then be retrieved online. This serves as integration into paper-based systems.

Apart from textual documents, DICOM images are the next most important file type that needs to be shared. In TeamTreat a dedicated applet for DICOM upload [7] provides a convenient way to select and upload files from DICOM-CDs.

In the case record all information for the cancer treatment is collected, which is not only consisting of documents. It contains basic personal information, medication, allergies, diagnoses and the case’s history, structured in entries and presented in a form that allows a quick overview over the medical case. The documents may be attached to these record entries. For reasons of interoperability the file formats are limited to PDF and DICOM.

Uploading and downloading files is an immediate and direct improvement to the current practice of sending a physician’s letter or a DICOM-CD via letter mail. TeamTreat is designed as a place where comprehensive information for the treatment can be gained quickly. Therefore it can act as basis for an effective concerted treatment of a patient by different specialized institutions in a region.
2.2. Finding eligible patients for inclusion in clinical trials

Data describing age, sex and diagnoses is automatically searchable in TeamTreat. It can be searched by registered principal investigators of clinical trials. The system can then generate suggestions for inclusion of patients in clinical trials to both physicians and researchers. The latter also have the option to take a look inside anonymised records and can browse them manually. But they cannot see the patient’s demographics and also no attached documents, since it is not possible to anonymise them automatically with sufficient results: For anonymising a document all identifying information has to be selected and removed from it.

That way an institution that is strong in a particular field of research can find suitable patients for a research-based treatment in hospitals and practices of a whole region and cooperate with them.

2.3. Reading access for the patient

With TeamTreat a patient can access his case record online. This way he can use the platform to get information about his health status and treatment. But the patient can only see an entry in the record if the responsible physician chooses to disclose it explicitly.

2.4. Privacy and access restrictions

The protection of data must be considered both on a technological level, where we rely on standard and state-of-the-art internet technology, and on careful disclosure of data to authorized persons.

All information is stored in one central database and file system on the server. The personal data in the case record will only be stored there as long as it is needed for the specific case. If the record of a patient is not used any longer, the system will automatically close the record and ask all participating physicians if they want to export the data before its deletion. Additionally to this passive closing of the record, it is always possible for the patient to actively induce the erasure of his data.

Only physicians involved in treatment of a patient have access to his case record. An already authorized physician can give the rights for a case record to his colleague and thereby transfer the contained information as if done by sending a report. All access rights granted on the case record are visible to a user that is authorized to view its content.

If the need for accessing the data online has disappeared, e.g. when the cancer is treated successfully and the patient visits only one physician for after-care, the case record can be exported in a structured and human readable form and stored locally. In case of a recurrence of the tumour, which may be years later, the record can be restored by uploading. This way we can minimize the time when the patient’s data is available online and also prevent loss of information.
3. Discussion

3.1. Integration

Unlike e.g. the IHE Germany with its “IHE Cookbook” and the therein described models (eEPA, EFA, PEPA) [8,9], it is not our intention to connect health care information systems directly. The integration process is difficult because of many reasons: First of all, different standards have evolved that are not interoperable. For example BDT and LDT2 specifically target the ambulant sector, whereas hospitals mostly use HL7-Messaging for electronic communication [10]. Besides structural compatibility the exchange of medical data between different systems requires semantic compatibility [11,12]. In contrast to that our primary goal is not a full integration in the systems, but rather a quick introduction in many institutions and practices by letting users participate without having to adjust their systems [12].

3.2. Approaches to the usage of electronic medical records for patient recruitment

Using electronic medical records for research and recruitment of patients for clinical trials has been implemented in several projects [13–15]. These projects focus on identifying patients for recruitment by searching the local hospital information systems. TeamTreat is not competing with these systems. We do not search or connect these already existing pools of patients, but want to explore new possibilities for identifying patients that are treated across several institutions.

3.3. Patient empowerment

Like electronic health record solutions, we provide a reading access to patients because this is a common wish of most patients [10,15]. Patient-centric electronic health records [16] let the patient automatically see all information. By making the choice to share record entries with the patient optional, we let the responsible physician still be in control. This is necessary when physicians want to exchange information between each other which the patient should only get in a personal consultation: A patient shall not get bad news at first from his record or get falsely alarmed by reading speculations over possible diagnoses there.

The EFA approach [3] puts the complete control over the access of the record in the hand of the patient. Because of the usability in daily clinical workflow and the acceptance by the physicians, we allow that the access rights are transferred directly from one physician to another.

4. Outlook

After finishing the implementation process we want to see how TeamTreat performs in routine use and how convenient it is for users. By analysing usage data we plan to

2 Developed by “Qualitätsring Medizinische Software” (http://www.qms-standards.de) in collaboration with the National Association of Statutory Health Insurance Physicians (NASHIP) in Germany (German: “Kassenärztliche Bundesvereinigung”)
evaluate the system. With this knowledge and working IT-solution we want to further explore the possibilities of collaboration in cancer treatment.

References

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