Chapter IX

Enhancing Knowledge Management in a Multi-Center Clinical Trial by a Web-Based Knowledge Medium

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The healthcare industry is essentially knowledge based. The quality and efficiency of work performed in healthcare institutions depends on their ability to both manage internally created knowledge about patients, e.g., healing practices, and available expertise as well as to enrich and integrate it with relevant external knowledge created worldwide by related institutions (pharmacy research teams, international health organizations, etc.). Efficient management of knowledge in healthcare requires, therefore, concepts and solutions for management, cooperation, and sharing of knowledge within and between institutions (Greiner & Rose, 1997).

Despite this fact, until now, knowledge management and processing techniques are mainly used in the form of isolated (e.g., expert) systems for very specific domains. The basic processes of knowledge generation and exchange across domains and locations are not supported by integrated information systems. Under the growing pressure on quality assurance and cost reduction, innovative concepts and technologies to support the management of knowledge are increasingly gaining attention from hospital workers, physicians, pharmacists, health insurance companies, and patients.

Knowledge management is a systematic approach to improve the way organizations, groups, and individuals handle their knowledge in all forms, in order to improve their effectiveness, innovation and quality. This implies effective creation, capturing, sharing, and managing of knowledge. Several approaches and guidelines for organizing knowledge management (Probst, Steffen and Kat, 1997; Davenport 1998) and technologies, such as organizational memory (Stein and Zwass, 1994; Conklin, 1996) or document-management systems, have been developed in order to guide knowledge management projects and enable
knowledge management. The basic feature of these approaches is the focus on specific aspects of knowledge management. They do not provide a holistic approach dealing with all critical aspects of knowledge management (Schmid & Stanoevska, 1998) starting from developing a vision and finishing with a concept for an appropriate technical platform.

The complexity of the knowledge management problem in healthcare requires a holistic approach, which integrates conceptual and technical aspects of knowledge management, supports modular and evolutionary development, and considers existing (legacy) internal and external knowledge sources. In this chapter we will introduce the concept of the knowledge medium as defined by Schmid (1999), which goes beyond existing solutions for knowledge management, and will demonstrate its applicability to the healthcare domain through the example of a multi-center clinical trial. The project is a joint effort by the Swiss HIV Cohort Study, the Patient-Oriented Medical Information System Initiative of Walter Fierz, MD, and the Institute for Media and Communications Management, University of St Gallen, Switzerland.

In the next section, the Swiss HIV Cohort Study and its requirements regarding data processing and knowledge management will be described. Then, the concept of the knowledge medium as a framework for the design of knowledge media in multi-center clinical trials is introduced. We relate the concept to the application context and describe the implementation of a knowledge medium in the Swiss HIV Cohort Study. Finally, the achieved results are discussed and conclusions with an outlook of further plans are given.

THE SWISS HIV COHORT STUDY

The Swiss HIV Cohort Study (SHCS) was initiated in 1987

1) to collect clinical, laboratory, and socio-economic data with the intention of analyzing the prevalence and progression of the HIV-infection in Switzerland,

2) to promote and facilitate clinical research, and

3) to improve the healthcare services provided to HIV-infected patients (Ledergerber, Von Overbeck, Egger & Luthy, 1994).

SHCS involves outpatient clinics of center hospitals (referred to as “Cohort Centers”) located in the cities of Basel, Berne, Geneva, Lausanne, Lugano, St Gallen, and Zurich as well as the Coordination and Data Center in Lausanne. In recent years, increasing numbers of private practitioners joined the study to complement the Cohort Centers. Currently, the technical infrastructure supporting the SHCS includes various legacy laboratory systems at the Cohort Centers and a relational database system at the Coordination and Data Center.

Throughout the study, data from HIV-infected patients are collected at the Cohort Centers and selected sets thereof are anonymously stored in a central database system at the Coordination and Data Center. The whole process of filling in the pre-formatted study form, sending the form to the Coordination and Data Center, and entering the data into the database system is paper-based and handled manually.

The collected data provides a central common repository of the involved Cohort Centers and provides the basis for statistical analysis and planning of clinical studies. The knowledge created from the study is distributed through publication in scientific journals, at the occasion of conferences, and through informal, bilateral contacts. Primarily because of the considerable time delay, the database system has so far not been fully exploited for the daily clinical care of the patients. With advances of antiretroviral therapy, information on past treatment and laboratory data is becoming increasingly important.
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