Transinstitutional Health Information System Architectures – a Literature Review

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Abstract

Two approaches are widely discussed in the discipline of medical informatics as concepts to cope with the negative consequences out of the ongoing demographic change: health enabling technologies and transinstitutional health information system architectures. To realize their full potential, we feel that both technologies should be integrated to sensor-enhanced transinstitutional health information systems. Fundament of such integration is knowledge of the variables characterizing these innovative technologies. While assessing health enabling technologies elsewhere, in our work we present an overview of important dimensions of transinstitutional health information system architectures. Based on a systematic literature review of publications listed in PubMed, we identified relevant (1) user-groups, (2) operation and coordination concepts, (3) the functionality of current transinstitutional architectures in health care and analyzed (4) the basic information flow supported by them.

Keywords:

Information systems, Hospital information systems, Integrated delivery of health care, Transinstitutional, Architecture, Review

Introduction

The often cited demographic change leads to challenging problems for the health care systems of most western civilizations. In the scientific discipline of Medical Informatics currently several approaches are discussed, that try to cope with its consequences for the efficiency and quality of health care. In this context especially *sensor-enhanced transinstitutional health information system architectures* seem to be promising. These complex architectures integrate health-enabling and ambient assistive technologies with health information systems belonging to several detached health care organizations. But as a basis for this integration first of all a knowledge of the variables characterizing both approaches is mandatory. In our work we aim to systematically elucidate the characteristics of transinstitutional health information system architectures.

Materials and Methods

To answer our questions we conducted a systematic literature review. On the 7th of July 2009 we searched PubMed for publications concerning transinstitutional health information system architectures, filtered the results following our inclusion criteria and analyzed the full text of the included publications. For further details concerning the methodology of our review please do not hesitate to contact the authors.

Results

In our review we first of all pooled user-groups, that were typically referred to in the analyzed publications: persons and organizations responsible for direct patient care *(health care providers),* persons and organizations that give assistance to health care processes via indirect medical services (*medical service providers*), organizations that generate new medical products (*health industry)* and *public authorities*.

As transinstitutional health information systems normally are based on rather complex architectures, we identified who was in charge for the operation and coordination of these systems and grouped them as follows: *IT industry*, *public authorities, networks of organizations* and *project groups*, which originally were initiated to develop the system.

One of the most important aspects characterizing information systems is the functionality they support. Keeping that in mind in our literature review we also identified functions supported by the presented architectures. It arose, that mainly three functional classes were supported, namely *data collection*, *workflow support* and *decision support.*

The last aspect we elucidated in our study was the information flow in transinstitutional information system architectures. It showed that in several cases data provided in existing applications were automatically imported into the new integrating system. But the integrating system vice versa usually was not able to export data to existing applications and provided access only to human users. So the information flow typically was automated only in one direction.

Conclusion

We think that the information assessed in our work can serve as a valuable starting point on the way to a better understanding of sensor-enhanced transinstitutional architectures. In addition to this work we currently assess important dimensions characterizing health-enabling technologies. Then based on both reviews we develop a first proposal for a taxonomy of sensor-enhanced transinstitutional health information system architectures.