How to organize for a large-scale openEHR-based Electronic Patient Record

Gro-Hilde ULRIKSEN,a,1 Rune PEDERSENa Rolf WYNNb Gunnar ELLINGSENb

a Norwegian Centre for Integrated Care and Telemedicine
b Telemedicine and eHealth Research Group, Faculty of Health Sciences, the Arctic University of Norway

Abstract. This paper reports from a large-scale openEHR-based EPR project 2012-2016 in the North Norway Regional Health Authority. To be able to support patient pathways across the health region’s trusts, there is a need for standardized routines and practices. Therefore, the North Norway Regional Health Authority has since 2011 had an increased regional focus to prepare for this new system. This includes a) centralizing its IT portfolio to one location, b) creating regional work standards for using the EPR system, and c) establishing a Regional Department for functional ICT. There are several challenges connected to changing the focus from working as individual health trusts to work as one region. There are issues of power balance and local influence that will need a careful consideration to ensure a successful outcome.

Keywords. EPR, Standardization, Regional management, patient pathways

Introduction

Many large and complex health care organizations struggle to achieve seamless integration and standardization across professional, departmental and institutional boundaries. Existing Electronic Patient Record (EPR) systems provide an inadequate basis for such a workflow, and even quite modern EPRs in Norwegian hospitals are still considered systems of documentation rather than systems of process support [2]. Therefore, there is an increased focus in Norwegian healthcare to establish EPRs that can support patient pathways across different hospital borders, and between hospitals and primary care providers [3].

The Northern Norway Regional Health Authority (Helse Nord RHF) works in close cooperation with one of Norway’s largest EPR vendors (here denoted BigVendor) to develop a new EPR that supports patient pathways. This work is organized in one of Norway’s major ICT projects (here denoted BigProject) in the period 2012-2016. This study reports from an extensive regionalization process in the North Norway Health Region. It is part of preparing the Health Region for a new EPR system set to improve efficiency and patient safety considerably.

The new EPR is based on an international openEHR architecture, designed to ensure interoperability and design flexibility for users [1,4,5]. Systems conforming to
the openEHR architecture are considered to be “more open, adaptive and collaborative than current technologies” [6]. The openEHR architecture consists of a so-called two-level modeling approach for EPRs [4,7] that separates the technical design of the system and clinical concerns. Through this architecture, users are able to design particular patient pathways and tailor EPR content [5], by using archetypes consisting of standardized healthcare information as basis for structured information [3].

To lay the foundation for cross-organizational patient pathways – and to exploit the potential in the openEHR architecture - the North Norway Health Region in 2011 decided to increase the regional focus and collaboration within the health trusts. Important efforts in this process were a) centralizing the ICT portfolio, b) standardizing work routines for their EPR systems, and c) establishing a Regional Department for functional ICT.

In comparison with former research on openEHR, which primarily has targeted the technical potential, this paper focuses on the organizational factors surrounding the technology that is necessary to ensure sustainable large-scale use. The research questions are: Which organizational factors need to be in place to exploit the potential in an openEHR-based EPR system in large-scale settings? Which challenges are detected when regionalizing and standardizing EPR workpractice? Who will be the lead users and how will they manage the tension between regional standardization and local needs?

1. Methods

This study is part of a longitudinal interpretive study connected to the development and implementation of a new openEHR-based EPR system in Northern Norway. Methodologically, this study is positioned within a qualitative interpretive paradigm and focuses on developing an increased understanding of the phenomenon studied by seeing it from different viewpoints [8] within a context.

The data collection consisting of eight open-ended interviews were completed from October-November 2014. The interviewee were involved in the standardization processes and the development of the new system including persons from the BigProject, Regional and Local ICT management, and health trusts. In addition to the transcribed and interpreted interviews, about 15 hours of observations from workshops and meetings between September-November 2014 and project documents from the BigProject were included in the data collection.

2. Results

2.1. The BigProject

The BigProject coordinated a close cooperation between users from the Health Trust and the vendors. The goals were to develop a new EPR system for the region based on openEHR architecture including archetypes structured information, decision, and process support.
2.2. Centralizing the ICT Portfolio (2013-2015)

An important step towards a more regionalized and standardized EPR was taken in 2013, when the Health Region decided to reduce their ICT installations from nine to one. This was particularly necessary in order to support a fast evolving openEHR-based EPR based on archetypes. The daily maintenance and management of the EPR ICT portfolio would also be more efficient and cost saving by having only one installation. Other benefits from getting one regional technical installation for EPR is that hospitals share regional registries for the users, the patients, and the prescribers, and users have the same logon access across the region.

The centralized installation was located in Tromsø, close to the largest hospital in the region, the University Hospital of North Norway. In centralizing the ICT portfolio, the BigProject collaborated closely with the Health Trusts, the vendor and the regional ICT management. Making changes to the different installations was challenging since the ICT portfolio contained several technical components and integrations with other ICT systems.

First (November 2013 - December 2014) the EPR installations from the nine different locations was moved to the centralized installation, then (March 2014 – May 2015) data from the installations were converted to the shared unit, one health trust at the time. The most important challenges were: Testing all technical units and integrations both the ones moved and the new at the central unit as well as converting and connecting all necessary data from all units Also informing users and learning them to use emergency procedures when data conversion was done and EPR was shut down.

2.3. Designing Standardized Work Routines (2012 – 2016)

In addition to a centralized ICT portfolio, the actual use of the ERP systems was evaluated. The BigProject established in 2012 a sub-project focusing on standardizing work routines for using EPR in the region. More than 500 users from the four Health Trusts in the region participated in the process. The goals of standardizing were to increase quality and safety in patient treatment and establish a basis for sharing patient information across the region [9]. This is also a requirement for using systems based on openEHR technology. Since the new EPR is based on structured information, process and decision support, and aims to underline patient pathways from beginning to end across different levels of healthcare, it is important with a streamlined EPR usage. A national organization for managing archetypes is established, but there will also be a need for regional management regarding this.

In 2012, the BigProject mapped the EPR system used in the region, and in 2013, they established regional standards for using the system. They will be implemented in the hospitals in 2015-2016 and include areas like organizational structure, journal structure and access control. Standardizing work practice in the EPR is a step in preparing the Health Trusts for operating like one region instead of separate satellites capable of reaching the national goal “one citizen one journal”[10].

To design and agree on standardized work routines as a regional collaboration project was successful. An increased system knowledge and a common understanding of usage was established. This also formed a broader decision base with increased local ownership and foundation for the standardization work. Yet, reaching an agreement on
standards was challenging. The different size of the hospitals created various needs with respect to the EPR system. In addition, the power balance between the larger hospitals sometimes made it demanding to agree on solutions for EPR usage. Changing their workpractice to use standards based on other hospitals routines felt like giving up parts of their independence, especially the largest health trust struggled with this. It was not always easy to replace locally adjusted work practice with unknown regional standards and some standards connected to e.g. registration practice are still unadmitted due to severe disagreements.

2.4. Establishing a Regional Department for functional ICT (2012 – 2016)

When Northern Norway Regional Health Authority established the BigProject, and decided to increase the regional collaboration in 2012, they also started working on designing a Regional Management Organization for functional ICT. Several proposals on how to consolidate and run this organization have been suggested and discussed within the region without reaching a solution. Organizing functional ICT can be done in a different ways, depending on what to include. They also disagree whether this organization is best placed within the Health Trusts or on a regional level.

The obvious choice seemed to be placing it in the already existing regional ICT management. However, by being a regional management they are already too distant from the users to deal with daily functional issues. Their leader has also signalized that their focus will be more infrastructural (networking, databases, email, etc.). The Department that runs functional ICT management today, express concerns about separating technical and functional management since those issues are highly interconnected.

There are several perceptions on how to organize and run this management, but it seems that fragmenting it between Health Trusts and separating functional and technical issues would be difficult and challenging for today’s system, and even more impossible for the new one. Splitting this between Health Trusts creates a fragmented solution in jeopardy of losing regional perspective. This may create unnecessary conflicts in the region and a risk that local needs are prioritized. Regardless of where to locate the management organization and what to include, this needs to be solved quickly. The BigProject needs a well-organized management to continue their regional work on standardization. The EPR is an evolving system and the standards have to evolve along with them. This need will increase in the new EPR system with archetypes, decision and process support as essential contents, they need to be evaluated and updated continuously. Most clinical modelling and template creation will be conducted on this regional management level, like the development of regional standards.

3. Discussion

The standardization of the EPR system in the health region is done both to improve today’s system and to increase the regional focus preparing for the new EPR system. To lay the groundwork for an openEHR-based EPR with a regional perspective demands a lot of time and effort.

While the work of establishing regional standards for EPR usage was successful, it is not until the standards are implemented in the hospitals, and the users see the actual
consequences for their work, that the key challenges materialize. The users may not see why they have to change well-functioning workpractice for new regional standards. The benefits of making the changes must be clearly stated.

Increasingly, regionalization has influenced the power balance between the Hospitals. Today the large Health Trusts act as independent units, and feel they have a lot to lose on engaging in a regional collaboration. The smaller ones may benefit from being included more with the big trusts, but standards may not always fit local needs.

The standardization will be of no use before a Regional Department for functional ICT is established. The Health Trusts have established local managements for their EPR systems and may not see the need for a Regional Management Organization. The standards can be interpreted differently and if the health trust manages, their own EPR there will be differences in how they are understood that fragments the regional focus. There is a need for a close interconnection between the infrastructural and functional management to include all parts of the EPR system independent of where the management organization is located. This is necessary for both the new and the old EPR system. Both regional standards archetypes and support tools are necessary to update constantly to make the new system a useful work tool for the users to achieve seamless integration and standardization across institutional boundaries.

After the BigProject finish, a regionalized ICT portfolio will be in place. A key success for regionalization is having a well-functioning regional ICT organization to govern this. The new EPR depends on this to be in place to fulfill the potential of archetype based patient pathways across institutional boundaries.

References

[2.] Riksrevisjonen. Riksrevisjonen undersøkelser om IKT i sykehus og elektronisk samhandling i helsetjenesten. 2008