

National Integration Components Challenge the Epic Implementation in Central Norway

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Abstract. Electronic health record (EHR) suites cover a broad range of cross-sectoral use scenarios. Thereby, they streamline information flows but also require that healthcare professionals with diverse responsibilities must adapt to one and the same system. In the region of Central Norway, the EHR suite from Epic is being implemented at hospitals as well as in municipal healthcare. However, the 64 municipalities in the region are increasingly exploring the option of bypassing Epic by supplementing their existing systems with national integration components. These components provide integration and data exchange across systems for selected healthcare information. We discuss whether they are a viable alternative to Epic. The three components are the summary care record, the shared medication list, and the national welfare technology hub.

Keywords. electronic health record, EHR suite, Epic, national components

1. Introduction

The overall goal of large-scale electronic health record (EHR) suites is to cover a broad range of use scenarios for healthcare workers in hospitals, nursing homes, home-care services, and general practitioner (GP) clinics. The EHR suite can then be used as the principal system in entire healthcare regions to ensure an efficient information flow among the various practices. However, large EHR suites have been increasingly criticized for their “one-size-fits-all” features, and thus the significant consequences for the various organizations involved, all of which must adapt to the same system [1]. Its implementation usually involves replacing most of the existing ICT portfolio, requires meticulous planning, and consumes considerable financial and human resources. This is of particular concern for municipalities, which are responsible for providing first-line healthcare services to citizens in the local community, such as managing nursing homes and home-care services. At the lowest politically-elected level, municipalities have fewer resources for their health services than the state-owned tertiary institutions. This includes limited resources for engaging in large-scale EHR suite implementations. As a result, they must carefully consider their strategy for ICT investments. On this basis, we ask the research question: *What viable alternatives to EHR suites do municipalities have for ensuring an efficient information flow among the different healthcare domains?* Empirically, we focus on the Health Platform program in Central Norway,

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where the goal is to implement the U.S. Epic EHR suite in 2022 [1,2]. While many municipalities in Central Norway have decided to participate, others are exploring the option of continuing to use their old systems by supplementing them with national integration components, which serve some of the same purposes as the Epic EHR suite. Theoretically, this paper is positioned in the information infrastructure literature [3]. We draw particularly on its installed base concept, which emphasizes that new functionality evolves on top of existing functionality rather than replaces it [4].

2. Method

Our study has an interpretive research approach, which considers a phenomenon from different viewpoints [5,6]. We compare the aim of the Health Platform program with the opinions of three municipality consortia that are considering alternatives to the Health Platform program. During spring of 2021, we conducted three one-hour interviews with four informants from three different municipality consortia in Central Norway. The informants have many years of professional experience with EHRs and with advising the top municipal leadership. We also include six interviews conducted with Health Platform managers in 2018 and nine interviews with GPs in Central Norway in 2019. The interviews were conducted in an open-ended manner, but in a broad sense, the focus in the interviews was on potentials and challenges with Epic.

3. Results

3.1. The Health Platform program in Central Norway

The Health Platform is a regional program jointly owned by the Central Norway Regional Health Authority and the Trondheim municipality. It is also a pilot for the national goal of “one citizen – one record”. In 2019, the program signed a NOK 2.7 billion (EUR 270 million) contract with Epic Systems Corporation to acquire and implement the Epic EHR suite in Central Norway, including all hospitals, GP clinics, nursing homes, and home-care services. The number of healthcare workers in the region totals around 44,000. As a suite system, Epic is largely self-contained. Most of the functionalities needed by health personnel are supposed to be provided by Epic, either as ready-for-use functionality or through configuration. The Central Norway Regional Health Authority and the Trondheim municipality will start implementing Epic in the three regional hospitals and in the Trondheim municipality in 2022. Thereafter, the implementation process will continue in other municipalities that choose to join the program. While the hospitals in the region must replace their current EHR, the municipalities are in no immediate hurry. Although their current systems in nursing homes and home-care services lack the most recent functionality, there is no urgent need to replace them. Similarly, GPs have quite modern systems in place, with which they are satisfied. However, since the goal of the program is to create a comprehensive health service, the Health Platform strongly encourages all municipalities to participate to secure complete and up-to-date information about the condition, treatment and medication status of the patients. While almost half of the 64 municipalities in Central Norway have indicated that they will implement Epic, the rest have become increasingly reluctant. As go-live approaches, politicians in the municipalities are realizing that

implementing Epic will drain the municipalities' human and financial resources. Therefore, some municipalities are considering the so-called "zero-alternative," which implies continuing to use their current EHR systems and upgrading these systems with national integration components, which are in the pipeline.

3.2. *The summary care record*

The summary care record (in development since 2012) is a digital solution for sharing patients' health information across the health sector. By using it, healthcare professionals have access to the same information regardless of whether they work in a hospital, a GP clinic, or an emergency room. The summary care record is integrated with the EHRs in the sector and provides real-time access to patients' critical information, pharmacy-dispensed medication, discharge letters, and laboratory results (including COVID-19). In addition, the possibility of sharing various clinical documents from Norwegian hospitals is currently being tested at different locations in Norway. Citizens may register information in the record, such as their primary contact person, disease history (structured selections), and special needs. Healthcare personnel must actively choose what information from their local EHRs they will share in the summary care record. Our informants underscore the fact that while GPs have been slow to make information in their local EHR available to the summary care record – and thus have hindered its potential – many GPs have increasingly begun to share their information. The current COVID-19 pandemic has given the care record a boost due to how easily available laboratory results from COVID tests are to various health personnel. Thus, one of our informants was quite optimistic about its potential and made a favorable comparison with the Epic EHR: "When GPs start exchanging information through the summary care record where residents, specialist health services, and the emergency services all have access, I'm not sure that GPs need so much more [i.e., the Epic EHR]." Another informant from the municipality consortium said that they had recently implemented the summary care record in the consortium and were eagerly looking forward to utilizing its potential: "Obviously, you get a lot of information that is useful. Additionally, when you start sharing patient record documents in the summary care record you can have discharge letters, nursing documentation, physiotherapy notes, and whatever you like. You can also have laboratory results and X-ray results." Based on these prospects, our informants have started to reflect on what more they need, or if they really need anything more: "After we have selected everything that we want, we are left with the question of what we haven't got that is unique to Epic."

3.3. *The shared medication list and the central prescribing module*

The process of developing a shared medication list has been underway for a while, but from December 2021 it has been piloted in Norway's second-largest city, Bergen. Compared to the summary care record, which contains an overview of the pharmacy-dispensed medication, the shared medication list gives an overview of a patient's complete list of medications. This includes prescription medicines, non-prescription medicines, and medicines that have been administered in an emergency room, hospital, nursing home, or purchased abroad. In order to be able to introduce the shared medication list throughout the country, a national component called the Central Prescribing Module is also being developed and will be available from 2022. The Central Prescribing Module is a medication and requisition module that (through integration with the EHRs)

facilitates the sharing of medication information among various EHRs. Healthcare professionals who use the module will have a unified prescription user interface, regardless of which EHR they use. Eventually, the shared medication list will become part of the summary care record. All our informants expressed great faith in the shared medication list and questioned whether there were any benefits unique to Epic. One of them said, “When we did a survey in all the 64 opt-in municipalities, where we wanted to find out what benefits the municipalities were looking for with Epic, the shared medication list was number one. This was originally presented as something unique to Epic, so it was a fairly common misconception that Epic was the only way forward.” Another informant said: “When we get the shared medication list integrated into the summary care record, then we will have a pretty good picture of the patient’s health situation.” A third informant said: “A shared medication list is not unique to Epic; it is a national functionality that all EHRs must comply with, including Epic. Epic must relate both to it and the central prescribing module.” A positive factor is that the integration of EHRs with the national components can now be done more seamlessly than before, when the national components had to be integrated with all local installations. Now EHRs can be integrated with the central prescribing module located in the cloud, thereby ensuring that all municipalities are connected to the module at the same time.

3.4. The national welfare technology hub

For the most part, Epic is a hospital-oriented system, and therefore some functionality for municipalities must be developed. One key component is the integration with the national welfare technology hub, which enables integration between the municipal EHRs and their welfare technologies. This integration will ensure an efficient information flow among welfare technologies, EHRs, and response-center solutions. Unfortunately, Epic will not be able to deliver this integration in the first round of the project and, according to our informants, “perhaps not in the second round either.” For municipalities, this is a serious concern. Many of them have been heavily engaged in the national welfare program that started in 2013, have invested a lot of resources and money in it, and “have come a long way in establishing working welfare solutions.” These technologies include bed sensors, door sensors, digital monitoring, medication dispensers, and GPS tracking. A typical use case is when an alarm goes off at a patient’s home, which then demands an action at the response center. Here, nurses or other care personnel monitor the situation for many patients through a response-center solution. Through integration with the municipal EHR, the health personnel have access to contact information, level of service provided, planned next visit, next of kin, etc. Our informants pointed out that this is crucial decision-support for the care staff in deciding how to respond. Losing the integration with the national welfare technology hub will mean that the municipalities suffer a serious setback in their welfare technology investments. Therefore, the cluster of municipalities requested that the Health Platform embed this integration in the plans for the implementation of Epic. However, this was not possible: “We started sending letters last summer to try to make them understand that this integration was important for the municipalities, but the planning for the implementation had already gone so far that if one integration was to go in, another had to come out and there was no room to take anything out.” As a result, the municipalities are increasingly worried about not being listened to. As one of our informants put it: “It is clear that if there is something the hospital needs, then it is more likely to be perceived as more important than what the municipalities need.”

4. Concluding discussion

Healthcare is delivered through a cross-sectoral collaboration that relies on a partially integrated technological infrastructure to solve problems central to citizens' wellbeing. There is a recognized need for more streamlined information flows and reduced data fragmentation. Large-scale EHR suites and national integration components are different approaches to meet this need. The former purports to replace large parts of the existing ICT portfolio with a single integrated system, and the latter to evolve the portfolio by integrating its systems better. While evolution is an incremental strategy that changes the technological infrastructure through a series of low-risk steps, replacement is a high-risk strategy because it severely upsets the equilibrium provided by the existing portfolio of systems. The information infrastructure literature emphasizes that this equilibrium consists of a wide-ranging network of interdependent relations that tend to remain unnoticed until they are disrupted [3,4]. That is, the replacement strategy is somewhat risky because its consequences are difficult to foresee. The three municipality consortia in our study are experiencing this difficulty. They lean toward a strategy based on integration components because it appears less drastic, less risky, and less costly. Their reservations about Epic highlight the challenges faced by the Health Platform program, which is responsible for the implementation of Epic and dependent on the participation of the municipalities to take full advantage of its functionality. It is increasingly evident that the national integration components will provide some of the same benefits as those initially ascribed exclusively to Epic. In the municipalities, this has prompted reflection about what the advantage of Epic really is. Such reflection does not just point to the possibility of some municipalities opting out of the Epic implementation, it undermines the rationale of implementing it in the first place, and thus the realization of the goal of the Health Program, that is, one EHR in Central Norway.

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