

Ambivalently Awaiting: Norwegian General Practitioners' Expectations towards a Cross-institutional Electronic Health Record

Line Melby¹, Hege K Andreassen², Torbjørn Torsvik³, Gunnar Ellingsen^{3,4}, Gro-Hilde Severinsen³, Line Silsand³, Anne G Ekeland^{2,3}, Omid Saadatfard³ & Rune Pedersen^{2,3}

¹SINTEF Digital, Trondheim, Norway line.melby@sintef.no

²UiT - The Arctic University of Norway

³NSE - The Norwegian Center for e-health research

⁴NORD University.

Abstract

A cross-institutional Electronic Health Record (EHR) where all healthcare workers can access a patient's record, is seen as an important means to improved access to information, better patient care, and increased efficiency. In Norway, the first EHR of this type (US based Epic EHR) is to be implemented in the Central Norway Regional Health Authority. General practitioners (GPs) are central actors in health service delivery, and consequently it is important that also they use the new system. However, we lack knowledge on GP's expectations and needs for cross-institutional EHRs. Drawing on interviews with 17 GPs, we discuss these topics and conclude that the GPs interviewed are ambivalent towards an EHR of this scale.

Keywords

General practitioners, Electronic Health Records (EHRs), Cross-institutional EHRs.

1 INTRODUCTION

Electronic Health Records (EHRs) are often presented as the cornerstone of a modernised health service, expected to make health care delivery better, safer, cheaper, and more integrated [1, 2]. The healthcare sector is information intensive and tasks and activities are distributed across professional, institutional and administrative boundaries. Collaboration and coordination of work and information are supported and shaped by the functionalities in digital systems, like the EHR [3]. Due to the nature of healthcare, there is a strong need for improved digital collaboration support.

Today, an increasing number of vendors are offering cross-institutional and interdisciplinary solutions, but they have not yet been tested in Norway. However, currently the Central Norway Regional Health Authority is about to implement the US based Epic EHR that will allow all health institutions in specialist and primary care, as well as general practitioners (GPs) to share data across administrative, geographical and institutional boundaries.

However, research literature reminds us that “failed” EHR programs are common, and that even “successful” initiatives are plagued by delays, escalation of costs, and technical glitches, including system crashes [4] and unintended organizational consequences [5]. A review in the field concluded that “EHR use will always require human input to recontextualize knowledge” and, further, that the efficiency gains are to be expected in secondary work (audit, research, billing) and not in clinical work, where “smaller EHR systems may sometimes be more efficient and effective than larger ones” [1].

Given the insight on such challenges, both from practice and research, it is of particular interest to explore the GPs attitudes and expectations towards such systems. Thus, the aim of the paper is to describe and discuss GPs expectations and reflections towards new cross-institutional EHRs.

2 METHODS AND MATERIAL

The paper is based on a qualitative, explorative study where the purpose was to gain knowledge on Norwegian GPs experiences with inter-organisational collaboration as well as their expectations on how a cross-institutional EHR may support such collaboration. The study is commissioned from the Health platform program in central Norway [6]. The Health Platform is responsible for the procurement and implementation of Epic in the entire Central Norway health region. The implementation is planned to start in 2021.

The study was approved by the data protection officer at the University Hospital of North Norway and the Norwegian Centre for Research Data (NSD) and conducted according to research ethical principles.

2.1 Data collection

Data was collected between January and April 2019. We conducted semi structured interviews with 17 GPs, which is a suitable method to capture people's reflections and expectations [7]. The interviews were conducted by LM, HKA, GS and LS. About half of the interviews were conducted face to face, while the rest were conducted on telephone or skype. All interviews were audio recorded and transcribed ad verbatim.

We used an interview guide, which covered the following main topics: examples of collaboration situations that currently work well, situations that do not work well, and reflections around how digital solutions could improve poorly working collaborations. We also asked more specific questions on attitudes towards information sharing, communication needs and privacy concerns related to information sharing. Background information, like working experience, current EHR-system, and satisfaction with IT-support was also included.

The interviewees comprised 11 men and 6 female GPs. They were recruited in different ways. Some of them were

suggested as potential interviewees from our contact persons in Central Norway Regional Health Authority, and a selection of these agreed to be interviewed after being contacted by the research team. Others were recruited through an open e-mail invitation from their respective district medical officers. A few others were contacted and recruited based on our knowledge on them as engaged in the study's topic. The interviewees consequently came from different health regions in Norway. Even though it is only the Central Norway Regional Health Authority that currently have decided to implement a cross-institutional EHR, Norwegian health policies and strategies recommend such an EHR on national basis. We therefore wanted to include GPs from all over Norway. Nine of the interviewees works in Central Norway Regional Health Authority, which has decided to implement Epic. All GPs had some working experience from specialist health care. The vast majority were self-employed.

2.2 Analysis

The interviews were analysed using an interpretative and eclectic approach, described by Kvale [7] as 'bricolage', in which the aim was to generate meaning and see connections across the material. the analysis was conducted stepwise. The first three authors read through all the interview transcripts and outlined several overall themes, covering collaboration challenges and digital support. These were discussed among the author group. The final themes presented in this paper were further developed by the first author, and they focus more strictly on expectations and reflection on a cross-institutional EHR.

3 RESULTS

Through the analysis we outlined six themes that represent the GPs expectations towards a common EPR-system. The themes cover both positive and negative expectations and reflections and highlight needs and concerns for such a system.

3.1 Shared information

Health care acts (e.g. [8]) state that healthcare workers should have access to information that is relevant for the treatment and follow up of the patient. A cross-institutional EHR has the potential to reduce the lack of information healthcare workers regularly experience today. Several of the interviewees see improved access to information through sharing the same EPR as the biggest benefit:

That vision is all physicians' wet dream. To be able to access a part of the hospital record, or the x-ray record... Not because we are curious, but because it eases the way forward. (GP1)

Interviewees further explained that it would be an advantage to have up-to-date basic patient data (address, next of kin etc.) through a common EHR. One common medication list across organisations was also on the top wanted list. The possibility for the GP to read running notes while the patient was admitted to hospital was also considered to be useful, even though not for all patients. A common system would also provide GPs with more detailed information about tests made at the hospital, which they currently only see the results from in the discharge letter. It could also give you access to tests and examinations that are not documented in the discharge

letter, like x-rays and some lab results, and thereby reduce the need for making tests twice.

3.2 The fear of information overload

At the same time as improved access to information is welcomed, many of the interviewees are sceptic and afraid that they will 'drown' in information. They described being over flooded by information in today's practice and they express a need for being shielded from even more information:

The horror scenario is that it becomes too much information. How will you find what you are looking for? You drown in information that others have documented. Another interviewee said something similar. He was afraid that the essential information would vanish in the enormous amount of information potentially accessible and was concerned that the search functionality would not be good enough. (GP10)

A third interviewee problematised potential ethical challenges related to increased access to information. He argued that if all information is possibly accessible, then it becomes almost an active choice *not* to use it. Consequently, there can be formed an expectation that GPs must access and read the hospital information and act upon it.

3.3 A need for summarised information

A main result from the interviews is that GPs want relevant information. And relevant information (produced in the hospital) is put shortly summarised information – like discharge letters - that describe why the patient was admitted, status at discharge and how s/he should be followed up, and by whom. GPs explained that they were interested in hospital physicians' assessment of what had happened, and not so often the running documentation:

I really don't need access to the hospital's record. I need a good discharge letter. And we do have that today. (GP3)

The expressed need for summarised information, rather than access to *all* information is reasoned from the need for quality assurance. One interviewee said that if you access information in the patient's hospital record and there are notes that are not finalised, you do not know if the preliminary conclusion (if any) is for certain, and consequently, it would be difficult to trust the information. Another interviewee elaborates on this. He argued that today's practice has a built-in quality assurance. Information from the GP to the hospital and vice versa is not sent until the sender has thought through what s/he wants to accomplish with the information.

3.4 Digital dialogue

Several of the interviewees argued for the need for digital dialogue with their collaborating partners, e.g. in the hospitals. Some of them had experiences with communicating via electronic messages (PLO-messages) with physicians in the hospital and considered this as huge progress, compared to earlier. The possibility for digital dialogue was something that all GPs felt positive about, and some of them argued for it, based on a disbelief that you could make one common EPR that fits all user groups:

I don't really believe that there is one solution for all. I rather believe that good communication between systems is more important than designing one system that fits all. (GP8)

Another interviewee added that even though you may have access to a patient's hospital record, you will sometimes need to ask questions to the specialists on how to interpret the information. E.g. do you think this should be further investigated, or should we just leave it? Should we try adding a specific medication?

One of the GPs said he would like to work closer directly with the hospital physicians and this could be achieved through improved communication, like a digital dialogue functionality.

3.5 The different meanings of the EHR

Another theme that GPs addressed related to sharing EHR-information across GPs and hospitals, was what can be labelled 'working style reflected in documentation.' GPs argued that they use the record in a different way than hospital staff (physicians). For GPs the EHR is a personal working tool, as well as documentation of what has happened to the patient. Many of the interviewees had worked in hospitals and had experienced a different way of recording in the EPR. There was therefore a concern that hospital physicians would not understand their style of documentation, and one interviewee felt that 'culture would be a challenge.' Other GPs explained that they would not change anything in their documentation practice, and consequently it would rather be the hospital physicians' problem if they did not understand the information.

Another theme addressed was if GPs would need to change their documentation style considering the 'cultural difference', and in case of others making quality judgments of their work. The interviewees felt different about this. One GP said that he would need to work differently from today

...because I will have to adapt my notes... in case someone will read what I have written. That will be resource demanding for me. I will need to protect myself all the time. And the risk is that we start doing tests etc. just to make sure you have done everything possible. (GP4)

3.6 Privacy

The last theme we address is privacy and challenges related to this, a theme which was important to many of the interviewees. It was a concern that (sensitive) information meant only for the GP now would be shared with collaborating partners using the same common EPR-system. One GP gave an example:

How much information should the hospital have? And who will read it? We do not want to share information about the patient's chlamydia infections if the patient is referred for an MRI. So, we need to protect the information. (GP3)

Systems for securing information and making sure that only the essential information is shared was therefore crucial for the interviewees. Another GP in a small municipality had concerns if home care staff would be able to read his notes. If so, then he considered the record to be useless, because you would not be able to write anything, due to privacy concerns, as he argued. One interviewee also saw a potential situation where GPs would invent parallel documentation systems for supporting their own work, containing information that would not need to be shared. And one GPs suggested a routine where they could approve in advance what kind of information would be shared.

4 DISCUSSION

While a cross-institutional EHR may provide access to information for all health-related stakeholders, considerations on how to make the most out of the possibilities such a system represent remain uncertain.

The GPs in our study expressed limited interest for a cross-institutional EHR. More precisely, they were ambivalent towards it. They saw advantages, but also several disadvantages. The ambivalent attitude may be interpreted as a form of resistance towards the new EHR. Resistance towards health information systems are not uncommon and may range from apathy and passive resistance to active resistance and aggression. The resistance may be directed towards the system itself, the system's significance or the system's advocates [9]. Often, people are not completely supportive or completely resistive of a technology but may hold contrary positions [10]. It is too early to say how GPs attitudes towards the new EHR will evolve, but in line with Greenhalgh et al. [11] we argue that resistance should be interpreted as a highly complex phenomenon with socio-material and normative components. To fully understand resistance, one must therefore explore both the technology's material properties, the balance between bureaucratic means and professional ends, as well as implications for roles, relationship and collaborations.

The GPs reserved attitude in our study may also be interpreted as a relative satisfaction with the EHRs they already are using in their GP practices combined with a lack of imagination of a new system. However, the reserved attitude may also be interpreted as a potential loss of control of their personal working tool - the GP's existing EHR or a worry related to the organizational consequences of a cross-institutional EHR (i.e. they must do more work than today). We analyse these issues in three sections in the rest of the discussion.

4.1 The role of technology

Even though some GPs mentioned a fear of having to work through new computer interfaces developed mainly for the specialists, and not the GPs, the technology itself was to a lesser degree emphasised in the interviews. This is hardly surprising. Former studies on the implementation of IT underscore the difficulties of relating to something you neither have seen, tested or experimented with, nor actually used. In a study on the implementation of groupware in a large American organization, Orlikowski [12] pointed out how the users tried to understand the technology in terms of their existing technological frames - i.e. technology they already knew and used. Similarly, Silsand and Ellingsen [13] illustrated the challenges for developers of capturing user requirement from the users by asking them to formulate short user stories (2-3 lines) as a basis for a new system. Along the same lines, Ulriksen and Ellingsen [14] demonstrated that users have to experiment with system functionality in real life to see opportunities, as well as identify potential organizational problems. These issues are particularly relevant for a cross-institutional EHR such as Epic that commands a potentially huge impact on the different stakeholders, including the GPs. The Health platform organization in Central Norway is aware of this and to accommodate user needs it invited all the potential vendors in the acquisition process of a cross-institutional EHR. The vendors were invited to present technical

solutions to relevant users in the form of patient demonstrations and user scenarios that they have created. Based on this, requirement specifications and the public tender has been modified and refined accordingly.

4.2 The potential loss of a working tool

The GPs in our study emphasised that their existing EHR is their working tool in daily clinical work. Research has shown that GPs spend almost half their workday on the EHR [15], and it is therefore to be expected that they have concerns for how a new system may affect their job. GPs in our study used the record in ways suitable for their practice, for instance by their style of writing. Accordingly, they were not interested in changing the documentation style to adapt to other stakeholders' needs, for instance that of hospital physicians. However, others argued that due to privacy concerns, they might have to adapt their notes in order to make them suitable for a wider audience.

In this regard, Grünloh et al. [16] argue that one "interpretation of the physicians' view of the record as their work tool is that they see themselves as its owners" (p. 9). While the argument of ownership may stretch the point, it unmistakably underscores the importance of the GPs' current GP EHRs in their practices. Furthermore, the concern of a loss of their working tool is not totally unfounded. Ellingsen et al. [17] discussed how the experienced usefulness of the nursing classification system NIC and NANDA among nurses, increasingly was considered for management purposes, such as resource management. Nevertheless, it is evident that a new cross-institutional EHR needs to be able to support different domains and stakeholders, and not only one user group such as the GPs. Thus, Greenhalgh et al's [4] argument that efficiency gains are to be expected in secondary work (audit, research, billing) and not in clinical work, may sound familiar. On the other hand, we cannot say yet whether the GPs worry of a loss of their working tool will materialize or not. However, a status quo on this situation is hardly an option, as the EHR increasingly becomes a tool for multiple tasks, e.g. for communication between providers and for patient's updating on their own health situation. In turn, this may nonetheless enforce a different documentation style among GPs.

4.3 Work reconfigurations

A cross-institutional EHR provides the opportunity for extensive sharing of data among GPs, hospital physicians and municipalities. The GPs are ambivalent towards this. They entertain the idea that it might be both positive (access to all necessary information) and negative (information overflow). Without concluding too much on these issues at this stage, it is clear that a cross-institutional EHR (such as Epic) has a considerable potential for streamlining and transforming regional healthcare [18]. Andreassen et al. [19] use the concepts of reconnections and reconfigurations to characterize the potential effect of this.

The GP interviews reveal a concern that the reactions to reconnecting GPs and specialist health care through a common EHR potentially can imply more work for the GPs. A cross-institutional EPR will mean a reconfiguration of work where new and old tasks will be distributed in new ways between the involved parties. E.g., today the important task of selecting and summarizing the relevant

information about each patient is ascribed to the specialist, who does this in the discharge letter. The concern is that the reconnection of specialists and GPs through a cross-institutional EHR will alter this well-established routine, and the task of identifying and summarizing information from a comprehensive and potentially over-complex record be left to the GPs.

Another element in the reconfigurations of work practices, and an effect of a cross-institutional EHR in itself, is the large-scale sharing of patient data. Earlier studies have shown that privacy concerns are barriers for EHR adoption [20, 21]. Several of the GPs in our study were also concerned for the patients' and their relatives' privacy and considered changing their ways of documenting, which in turn could be a barrier for implementing the new EHR system. Other suggested to make private notes outside of the EHR, which would undermine whole idea of a joint EHR. Sound solutions for ensuring privacy is therefore necessary for getting GPs as users of a cross-institutional EHR.

While some concerns over reconfigured work among the GPs may be justified, they are also recognized as powerful and autonomous user group. Very few organizational changes will be put into effect without agreements from the GPs. To illustrate this in practical terms: in the Health platform program in Central Norway, the GPs are not required to participate in the Epic implementation, they have rather an option to buy-in to the program. And to make sure of GPs partaking, the system must be good enough and respond to the GPs' requirements.

5 SUMMARY

In this paper, we have described GPs' expectations towards a cross-institutional EHR. Interviews with GPs revealed both positive expectations and concerns for such a system, and in the paper, we have highlighted six themes: GPs reflections on sharing information across institutions, a fear of information overload, their need for summarised information, as well as digital dialogue. Furthermore, we have pointed to the possible different meanings of the EHR for GPs and hospital physicians and that a cross-institutional system challenges patient privacy.

Implementing an EHR system like Epic is a huge task that for certain will affect many actors, including the GPs. Since it is not mandatory for GPs to install Epic, the perceived benefits and drawbacks with the system become important for GPs potential buy-in. We have addressed some of the possible consequences. It is difficult for GPs to envisage how a cross-institutional EHR will look like, and consequently how it will affect their work. Research on implementations have shown that unintended consequences are like to occur [5, 22], a fact that furthermore increases the difficulties when it comes to predicting effects of a new system. Nevertheless, the interviewees were concerned that they will lose a valuable tool and that new work configurations will give them more work, even though they also see some advantages. GPs are therefore 'sitting on the fence', waiting for evidence that a cross-institutional EHR is better than their current systems.

6 REFERENCES

- [1] Greenhalgh, T., et al., Tensions and paradoxes in electronic patient record research: A systematic

- literature review using the meta-narrative method. *The Milbank Quarterly*, 2009. **87**(4): p. 729-788.
- [2] Helse- og omsorgsdepartementet, Meld. St. 9 (En innbygger – én journal. Digitale tjenester i helse- og omsorgssektoren). 2012, Helse- og omsorgsdepartementet, Oslo.
- [3] Berg, M., Implementing information systems in health care organizations: myths and challenges. *International Journal of Medical Informatics*, 2001. **64**(2-3): p. 143-156.
- [4] Greenhalgh, T., et al., How do you modernize a health service? A realist evaluation of whole-scale transformation in London. *The Milbank Quarterly*, 2009. **87**(2): p. 391-416.
- [5] Colicchio, T.K., J.J. Cimino, and G. Del Fiol, Unintended Consequences of Nationwide Electronic Health Record Adoption: Challenges and Opportunities in the Post-Meaningful Use Era. *J Med Internet Res*, 2019. **21**(6): p. e13313.
- [6] Helse Midt-Norge. *Helseplattformen*. 2019; Available from: <https://helse-midt.no/vart-oppdrag/prosjekter/ehelse/helseplattformen>.
- [7] Kvale, S., *Doing Interviews*. 2007, London: SAGE.
- [8] Helse- og omsorgsdepartementet, *Lov om spesialisthelsetjenesten m.m. (spesialisthelsetjenesteloven)*. 1999, Helse- og omsorgsdepartementet: Oslo.
- [9] Lapointe, L. and S. Rivard, A Multilevel Model of Resistance to Information Technology Implementation. *MIS Quarterly*, 2005. **29**(3): p. 461-491.
- [10] Melby, L. and P. Toussaint, "We walk straight past the screens": The Power of the Non-Users of a Hospital Information System, in *The New Production of Users. Changing Innovation Collective and Involvement Strategies*, S. Hyysalo, T.E. Jensen, and N. Oudshoorn, Editors. 2016, Routledge: New York.
- [11] Greenhalgh, T., D. Swinglehurst, and R. Stones, Rethinking resistance to 'big IT': a sociological study of why and when healthcare staff do not use nationally mandated information and communication technologies. 2014.
- [12] Orlikowski, W.J., Learning from notes: Organizational issues in groupware implementation. 1993.
- [13] Silsand, L. and G. Ellingsen, *Generification by translation: designing generic systems in context of the local*. *Journal of the Association for Information systems*, 2014. **15**(4): p. 3.
- [14] Ulriksen, G.-H., R. Pedersen, and G. Ellingsen, *Infrastructuring in healthcare through the openEHR architecture*. *Computer Supported Cooperative Work (CSCW)*, 2017. **26**(1-2): p. 33-69.
- [15] Arndt, B.G., et al., Tethered to the EHR: primary care physician workload assessment using EHR event log data and time-motion observations. *The Annals of Family Medicine*, 2017. **15**(5): p. 419-426.
- [16] Grünloh, C., Å. Cajander, and G. Myreteg, "The Record is Our Work Tool!"—physicians' framing of a patient portal in Sweden. *Journal of medical Internet research*, 2016. **18**(6): p. e167.
- [17] Ellingsen, G., E. Monteiro, and G. Munkvold, *Standardization of work: co-constructed practice*. *The Information Society*, 2007. **23**(5): p. 309-326.
- [18] Hertzum, M. and G. Ellingsen, The Implementation of an Electronic Health Record: Comparing Preparations for Epic in Norway with Experiences from the UK and Denmark. *International Journal of Medical Informatics*, 2019.
- [19] Andreassen, H.K., et al., Digitized patient-provider interaction: How does it matter? A qualitative meta-synthesis. *Social Science & Medicine*, 2018. **215**: p. 36-44.
- [20] Kruse, C.S., et al., Adoption Factors of the Electronic Health Record: A Systematic Review. *JMIR Med Inform*, 2016. **4**(2): p. e19.
- [21] Kruse, C.S., et al., Barriers to Electronic Health Record Adoption: a Systematic Literature Review. *Journal of Medical Systems*, 2016. **40**(12): p. 252.
- [22] Melby, L. and R. Helleso, Introducing electronic messaging in Norwegian healthcare: Unintended consequences for interprofessional collaboration. *International Journal of Medical Informatics*, 2014. **83**(5): p. 343-353.