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2025-05-12

http://hdl.handle.net/10138/600365

Tuovinen, T, Reponen, J, Viitanen, J & Lääveri, T 2025, How Have Specialist Physicians Priorities for EHR Development Evolved in Eleven Years? Results from Four Cross-Sectional Surveys in Finland. in H Ismaila, L Dusseljee-Peute, R Marcilly, P L Elkin, C E Kuziemsky, C Nohr, B A Van Dort & R Randell (eds), Context Sensitive Health Informatics : AI for Social Good - Proceedings of CSHI 2025. Studies in Health Technology and Informatics, vol. 326, IOS Press BV, pp. 39-43, 7th International Conference on Context Sensitive Health Informatics: AI for Social Good, CSHI 2025, Bradford, United Kingdom, 23/05/2025. https://doi.org/10.3233/SHTI250233

Context Sensitive Health Informatics: AI for Social Good
H. Ismaila et al. (Eds.)

doi:10.3233/SHTI250233

How Have Specialist Physicians' Priorities for EHR Development Evolved in Eleven Years? Results from Four Cross-Sectional Surveys in Finland

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Abstract. Electronic Health Record (EHR) systems continually evolve to meet the demands of user organizations, national authorities, and end users. Finland, a digital health pioneer, encountered challenges like system fragmentation and interoperability despite early EHR adoption. The rollout of national health information exchange (Kanta) services sought to address these issues but also introduced new usability concerns. In national cross-sectional usability surveys conducted among physicians in 2010, 2014, 2017, and 2021, we asked respondents to select five most pertinent development targets from a predefined list. This study analyzed specialist physicians' responses by study year and specialty group: surgical, nonoperative medical, psychiatry, general practice (GP), occupational healthcare (OH), and anesthesiology and intensive care. Compared to earlier years, unexpected EHR downtime and slowness became less urgent across all specialties in 2021. In 2010, summary views were a high priority (36–61% in other groups; 18% in OH). After EHR development, this priority decreased in 2014–17 (18–26%), but rose again, particularly among GPs and OH physicians (60–65%; 37–43% for others) in 2021, likely due to increased awareness of its potential. In 2021, the usability development of Kanta Services became a top priority across all specialties. Monitoring the evolution of physicians' priorities remains crucial for understanding the impact of EHR-system and working environment changes.

Keywords. Usability, user experience, physician, electronic health record, national survey, long-term monitoring, downtime, technical quality, development

1. Introduction

Electronic Health Record (EHR) systems are integral to modern healthcare, yet concerns regarding their usability and functionality persist among physicians [1–5]. As requirements vary across specialties [2,6–9], understanding how priorities for EHR development targets evolve among different physician specialty groups is crucial for guiding improvements to accommodate the needs of diverse healthcare EHR contexts.

Finland has been a pioneer in digital health innovation, with efforts to develop EHR systems dating back to the 1980s [10]. Initial adoption focused on localized hospital and primary care systems, but fragmentation and lack of interoperability soon emerged as challenges [10]. In response, national policies emphasized standardizing data structures and system integrations, leading to the gradual consolidation of EHR platforms and the rollout of Kanta Services (2010–2016), a nationwide health information exchange enabling centralized patient data storage, e-prescriptions, and a patient access portal [10,11]. While Kanta achieved near-universal adoption by 2017, it also introduced challenges, including increased documentation, and usability and slowness issues, which have been criticized by end users [12].

While collecting and prioritizing development requests is conducted among practically all EHR vendors and user organizations, this mostly applies to individual features [13] instead of broader development targets. The aim of this study was to investigate trends in Finnish physicians' priorities of EHR-related development targets over an 11-year period, using data from four national cross-sectional surveys conducted between 2010 and 2021. Our findings provide insights into persistent challenges and shifting priorities across specialties, informing future EHR development.

2. Methods

In 2010, 2014, 2017, and 2021, national cross-sectional web-based surveys on end-user experiences of EHRs were sent to all working-age physicians residing in Finland with 3929 total respondents in 2010, 3781 in 2014, 4018 in 2017, and 4683 in 2021 [12,14]. In a separate section, the respondents were asked to select the five most critical EHR-related development targets from a predefined list [15]. The lists of 14–17 items were not fully identical across study years but modified according to the research group's understanding of most relevant EHR-related problems. For this study, specialist respondents with over six months of system use were categorized into specialty groups (1) surgical (n=561 in 2010; 499 in 2014; 541 in 2017; 651 in 2021); (2) nonoperative medical (598;655;478;745); (3); psychiatric (310;246;276;259); (4) occupational healthcare (OH; 176;182;193;162); (5) general practice (GP; (497;412;452;446); and (6) anesthesiology and intensive care (170;168;190;183). Those with other specialties/specialty unknown/not specialized were not included in the analyses. Eight development targets (Table 1) were chosen for comparisons based on having been selected by over 30% of respondents of any specialty group in two or more study years.

3. Results

The proportions of study participants having selected each item as a top five priority are detailed in Table 1, with specialty group and study year analyses shown in Figure 1; Table 1 presents abbreviations used in Figure 1.

Between 2010 and 2017, issues like EHR downtime and slowness were a high priority but became less so by 2021 (49–57% in 2017; 30–43% in 2021). The priority of summary views was high in 2010 (36–61% in others; 18% in OH), it declined in 2014–17 (18–26%) but rose again in 2021, especially among GPs and OH physicians (60–65%; 37–43% for others). By 2021, improving the usability of Kanta Services became a top priority across all specialties.

Table 1. EHR related development targets and their abbreviations used in Figure 1 as well as proportions of respondents of this study having selected the given item as one of the five most pertinent development targets.

Item	Abbreviation in Figure 1.	Total n (%) of respondents having selected item in study year			
Study year (n of respondents per year)		2010 (2312)	2014 (2162)	2017 (2130)	2021 (2446)
Same data need to be entered in multiple places	Multiple entries	714 (31)	766 (35)	808 (38)	799 (32)
Slowness of the systems and unexpected downtime	Slowness/ downtime	994 (43)	1036 (48)	1151 (54)	855 (35)
Illogicality (paths need to be learned by heart)	Illogicality	745 (32)	722 (33)	768 (36)	1057 (43)
Difficulties in seeking information in Kanta Health Information Exchange Services	Kanta	N/A	N/A	858 (40)	1312 (53)
Lack or poor quality of summary views.	Summary views	983 (43)	681 (32)	544 (27)	1109 (45)
Structured nursing documentation makes difficult getting a whole picture of a patient	Nursing documentation	616 (27)	685 (32)	560 (26)	719 (29)
Poor usability of electronic prescription (e-prescription)	e-prescription	N/A	551 (26)	567 (27)	532 (22)
Electronic communication with patient impossible or difficult	Patient communication	N/A	454 (21)	515 (24)	639 (26)

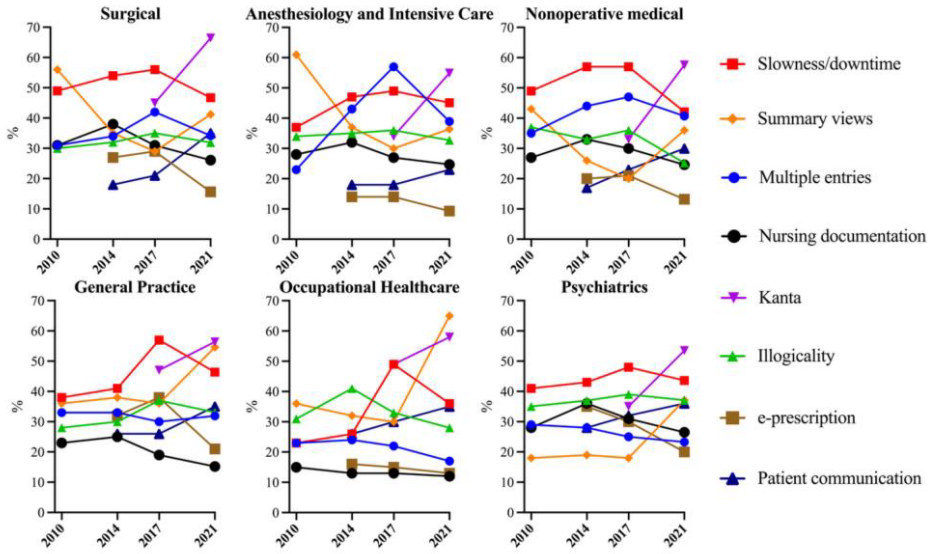

Figure 1. Proportions of specialist physicians having selected the given item as top 5 development priority analyzed by specialty group and study year.

4. Discussion

Our main finding was that priorities for EHR-related development targets evolved over an 11-year period, and that there were differences between specialties. The decline in stability concerns highlights prior successes, while rising expectations for summary views and interoperability signal new challenges. Addressing these priorities will help EHR systems continue supporting clinical work effectively.

Issues related to system stability and response times, dominant in 2010–2017, were no longer primary concerns in 2021. This reflects technical improvements such as better network speeds, hardware capacities, and integration quality; it is also likely that the EHR vendors built their systems to allow circumnavigating slowness problems when sending e-prescriptions to Kanta Services [12,16]; this development was also seen in the de-prioritization of e-prescriptions in 2021. Physicians working in anesthesiology and intensive care did not prioritize technical qualities; until 2018, their ancillary systems integrated into Kanta Services only via the main EHR. Interestingly, in OH, after having low priority in 2010–14, these issues gained top priority in 2017, most likely related to slowness of e-prescriptions [16]. These findings underline the importance of considering slowness and stability issues when designing large national or regional integrations [12].

Despite progress, some development targets re-emerged: Initially in 2010, users requested simple timeline displays for summary views; these were soon implemented. Expectations grew with experience reflecting the importance of summary views in clinical decision-making – particularly after the steep increase of available patient data due to improved integrations and cross-organizational information access through Kanta Services. This also explains the increase for GPs and OH. In the future, artificial intelligence (AI)-based solutions could assist in creating summaries of patient data [17].

Interestingly, electronic communication with patients only emerged as a priority in a few specialties (OH, GPs, psychiatry). This may be related to the slow change in healthcare practices. Moreover, in the Finnish context, in nonpsychiatric hospital specialties, nurses are mostly responsible for electronic patient communication.

Those working in surgical and nonoperative medical specialties gave relatively similar priorities through the study years; they prioritized summary views, improving documentation without multiple entries on the same data, and developing Kanta searches. However, the contents of, for example summary views or documentation templates differ; these can be developed in specialty sprints [3].

By 2021, developing Kanta functionality emerged as a top priority across all specialties, emphasizing the usability improvements in interoperability. Timeline- and text-based, as well as structured summaries are needed for cross-organizational data; the use of AI [17] here would require national legislation. Indeed, the demand for advanced features only emerges after basic needs such as stability/response times are met.

Allowing the reporting of all potential EHR-related problems could have uncovered issues in addition to predefined list. Instead, we opted to use the lists to facilitate prioritization and ensure the respondents considered various aspects; this approach would not have been feasible with free-text responses. The development targets cannot specify how the EHRs should be developed but reveal timely topics for priorization. Qualitative research could complement our findings on the clinical impact of evolving EHR functionalities and real-world implications of usability concerns. We included specialist physicians with at least six months of system use to ensure insights from experienced users; those with ongoing specialization should be analyzed separately.

To the best of our knowledge, few studies have compared the experiences of different specialties or long-term monitoring of development target priorities [7-8], though interest has resurged in recent years [6,9]. Additionally, our research has established a feedback loop for identifying and reporting physicians' EHR-related needs to the vendors thus supporting continuous improvement; results should also be scrutinized by EHR vendor. Future work should examine implementation timelines and prioritization impacts on usability development also from the perspective of vendors and IT management to understand the entity around EHR development

5. Conclusions

Our findings underscore the importance of prioritizing development targets to ensure meaningful improvements. It is not sufficient to simply list problems; instead, development targets should be identified and reported to guide vendors toward effective solutions, such as forming a feedback loop. Our findings suggest that EHR vendors should tailor summary views to specialty needs and boost interoperability, and policymakers should consider the usability impacts of their decisions. Monitoring the evolution of physicians' priorities is essential for assessing the impact of changes in EHR systems and work environments. This approach supports continuous improvement and could serve as a model for international efforts.

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