



Understanding patients' experiences during transitions from one electronic health record to another: A scoping review

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ABSTRACT

Objectives: Identify existing research on impacts of transitions between electronic health record (EHR) systems on patients' healthcare experiences.

Methods: Scoping review. We searched MedLine, OVID, Embase, CINAHL, and PsycInfo databases for articles on patient experiences with EHR-to-EHR transitions.

Results: Three studies met inclusion criteria. All three used validated surveys to compare patient satisfaction with care pre- and post-transition. The surveys did not include specific questions about the EHR transition; one study focused on patient perceptions of provider computer use. Satisfaction levels initially decreased following EHR implementation, then returned to baseline between six and 15 months later in two of three studies. Factors associated with changes in observed satisfaction are unknown.

Conclusions: Patient experience has been given limited attention in studies of EHR-to-EHR transitions. Future research should look beyond satisfaction, and examine how an EHR-to-EHR transition can impact the quality of patients' care, including safety, effectiveness, timeliness, efficiency, and equity.

Innovation: To our knowledge, this is the first literature review on EHR transitions that specifically focused on patient experiences. In preparation for a transition from one EHR to another, healthcare system leaders should consider the multiple ways patients' experiences with care may be impacted and develop strategies to minimize disruptions in care.

1. Background

Electronic health record (EHR) systems have largely replaced paper record keeping across US healthcare settings, spurred by the Health Information Technology for Economic and Clinical Health (HITECH) Act of 2009 [1]. By definition, EHRs are “real-time, patient-centered records that make information available instantly and securely to authorized

users.” [2] As of 2019, nearly 90% of office-based physicians in the US were using an EHR system [3]. EHRs often include clinical decision support tools to facilitate evidence-based decision making and enable information sharing across providers to support continuity of care. Benefits of EHRs include improved patient participation in care, better clinical outcomes, and cost savings [4]. Providers report that EHRs enhance care by facilitating appropriate testing, supporting patient

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communication, and providing alerts for potential medication errors and critical lab values [5]. Previous work has shown that patients report high levels of satisfaction following a shift from paper-based medical records to EHRs [6,7].

Transitions from older to newer EHR systems with advanced capabilities are increasingly common as healthcare systems aim to take advantage of new capabilities purported to improve care; however, many healthcare systems grapple with issues related to productivity, quality of care, and patient safety immediately following these transitions [8]. There is evidence post-transition of increases in safety incidents, missed or delayed follow-up on test results, scheduling delays, and reduced productivity. Many of these outcomes return to baseline values after six to nine months [9].

Patients, however, are often overlooked as an EHR end-user group. In addition to experiencing indirect effects of EHR transitions through their impact on clinical encounters (e.g., safety incidents, missed follow-ups for adverse test results), patients may be directly impacted through changes to features like patient portals, appointment scheduling, and prescription refill requests. In addition to these technical challenges, providers who are experiencing issues with a new EHR may appear distracted or frustrated during patient encounters, which could negatively impact the patient-provider relationship. It is critical to understand how patients experience EHR-to-EHR transitions to identify what patient-focused supports would improve implementation processes. Patient experience includes the “sum of all interactions” between a person and the healthcare system [10,11]. Patient experience relates to expectations for interactions with the system and how they are (or are not) met. This scoping review identifies existing research about the impacts of EHR-to-EHR transitions on patient experiences.

2. Methods

We conducted a scoping review following methods established by Arksey and O'Malley [12-14]. Our research question was: How do patients experience transitions from one EHR to another? We used PRISMA-Sc reporting guidelines to organize the reporting of our methods and results.

We consulted with a librarian to identify the most appropriate databases to use and refine our search terms. We searched MedLine, OVID, Embase, CINAHL, and PsycInfo databases using search terms to capture EHR, transition, and patient experience for articles published through October 2022 [8]. See Table 1 for MedLine search terms; terms for all

Table 1
Medline search terms and results.

Step	Search Terms	Number of Records
1	exp Medical Records Systems, Computerized/ or exp. Medical Order Entry Systems/	47,247
2	exp Electronic Health Records/ ("medical order entry system*" or "computerized medical record* system*" or "electronic health record*" or EHR* or	26,656
3	"electronic medical record*" or EMR* or "computerized provider order entry*" or "computerized physician order entry*" or CPOE*).ti,ab,kf,kw.	76,327
4	exp Patient Portals/	683
5	"patient portal*".ti,ab,kf,kw.	1533
6	1 or 2 or 3 or 4 or 5	102,885
7	(migrat* or transition*).ti,ab,kf,kw.	855,806
8	Patient Satisfaction/ (patient* adj3 (experience* or opinion* or satisfaction* or communication)).ti,ab,kf,kw.	88,455
9	exp Physician-Patient Relations/ ((“doctor-patient*” or “physician-patient*” or “provider-patient*” or “doctor/patient*” or “physician/patient*” or “provider/patient*”) adj3 (relation* or communication*)).ti,ab,kf,kw.	230,651
10	exp Physician-Patient Relations/	75,811
11	((“doctor-patient*” or “physician-patient*” or “provider-patient*” or “doctor/patient*” or “physician/patient*” or “provider/patient*”) adj3 (relation* or communication*)).ti,ab,kf,kw.	12,010
12	8 or 9 or 10 or 11	353,717
13	6 and 7 and 12	157

databases are included in Supplemental Table 1. We also searched the reference lists of included articles. Inclusion criteria were studies that were (1) peer-reviewed journal articles, (2) published in English, (3) addressed patient experience during the transition from one EHR to another, and (4) where the pre-transition system met criteria for an EHR using the HealthIT.gov definition [2]. Conference abstracts, opinion pieces, and commentaries were excluded. There were no restrictions on study design or date of publication.

All databases were searched at the same time and duplicate results removed prior to title and abstract screening. We tracked the results of each stage of the screening process in an Excel spreadsheet. Two reviewers independently screened each title and abstract for inclusion. After the initial screening, each full-text article that appeared to meet inclusion criteria was independently reviewed by two team members. Disagreements about inclusion or exclusion were resolved through team discussion.

We extracted the following data from included articles: authors, title, publication year, country, practice setting, study dates, study objective, sample description, study design, methods, and key findings. We also identified whether articles reported specific communications with patients about the EHR transition. Data were extracted by one reviewer and confirmed by a second using a template. We categorized findings based on which aspects of the patient experience were addressed. All authors contributed to the synopsis of findings.

3. Results

Out of 547 unique records, three articles met our inclusion criteria (Fig. 1). The included studies were conducted in two healthcare systems in the midwestern US [15,16] and a single community hospital in Pennsylvania, US [17]. All three studies used quantitative surveys and the primary outcome for each was patient satisfaction. All three reported an initial reduction in patient satisfaction with aspects of care beginning around the time of the new EHR implementation, followed by recovery to pre-implementation satisfaction levels after six to 15 months. In all three cases, the new EHR was an Epic product. None of the studies reported patient-focused communication strategies about the EHR transition. All concluded that the impact of EHR transitions on patient satisfaction were temporary. Because of the small number of studies, we provide a brief synopsis of each below rather than a synthesis; we summarize key findings in Table 2.

North et al. reported on patient satisfaction following the EHR transition across six Mayo Clinic sites in the Midwest using Press Ganey surveys of patient experience [15]. The domains included on the Press Ganey survey were: access, care provider, moving through your visit, nurse/assistant, overall practice assessment, and personal issues; patients rated items in each domain on a 5-point Likert-type scale. They reported an initial drop in patient satisfaction with access to care, which returned to baseline levels between nine- and 15-months post-implementation. The decrease in satisfaction with providers following the transition was small. Demographic details of the sample were not reported.

Tian et al. used the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) to evaluate changes in patient satisfaction during and after the EHR transition across 10 hospitals in a healthcare system in the Midwestern US [16]. Participants were mostly white, more than half were female, and had a mean age of 59.6 years. Results showed an initial decline in satisfaction scores on four areas: communication with nurses, responsiveness of hospital staff, care transition, and whether they would recommend the hospital. Similar to North et al., scores returned to baseline after six months. Analyses were adjusted for temporal trends and seasonality, but not for participant demographics.

Monturo et al. focused on patient satisfaction related to communication with their provider and provider's point-of-care computer use before, six weeks after, and six months following an EHR transition at a

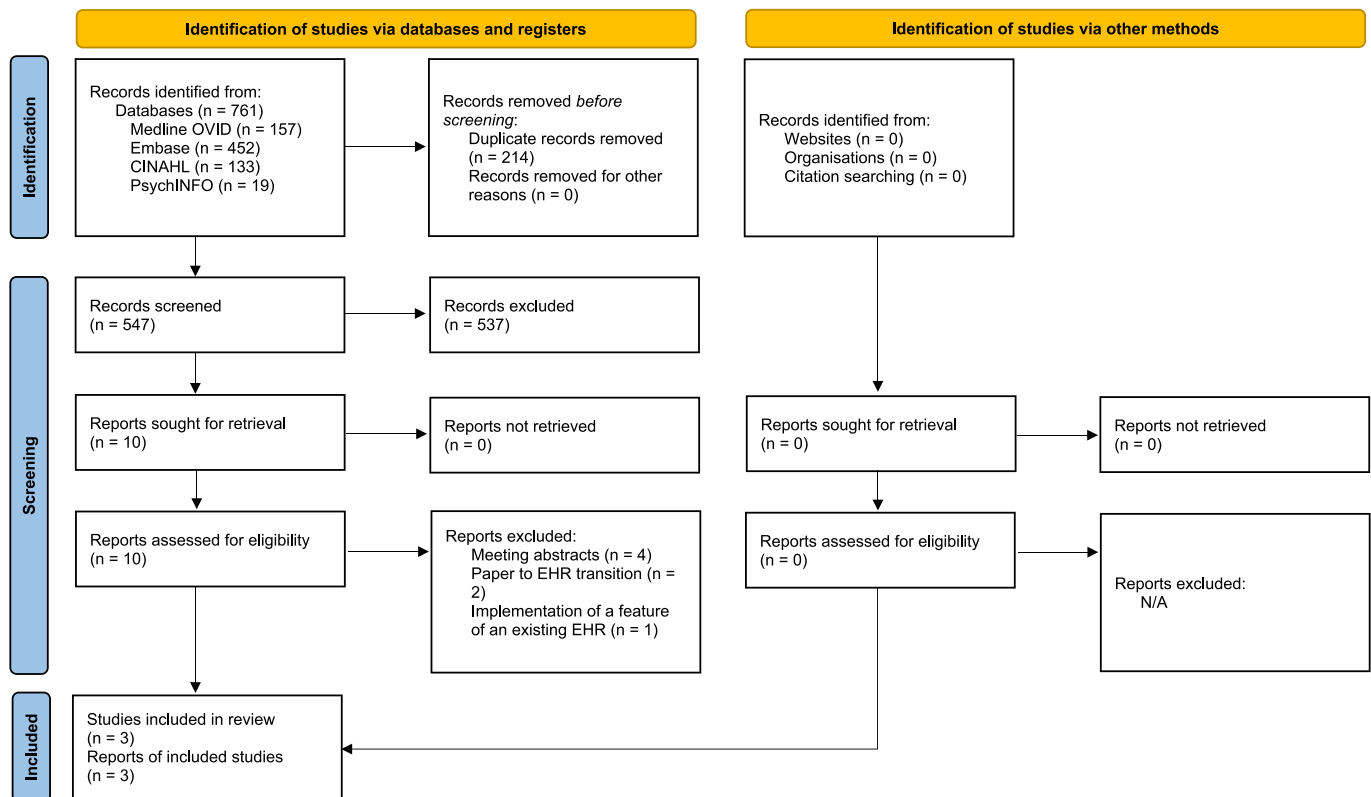


Fig. 1. PRISMA flow diagram.

Table 2
Summary of included studies.

Article	Setting	Number of Facilities	Sample Size	Old EHR	New EHR	Survey Tool	Key Findings
Monturo et al. (2021)	US community hospital	N = 1	n = 165	SOARIAN	Epic	Custom Survey	- Patients perceived more use of the computer by nurses than by other providers (physician, nurse practitioner, physician's assistant). Patients did not perceive a change in nurses' comfort using the computer. - Patients reported a positive impact on their relationship with their nurse following the EHR transition. - Patient satisfaction with access (ease of getting clinic on phone, ease of scheduling appointments, etc.) declined across all sites compared to baseline.
North et al. (2020)	US Mayo Clinic sites	N = 6	At least 500 responses per question per half month at each site	Cerner	Epic	Press Ganey survey	- Satisfaction with providers declined at four of six sites. - Patient satisfaction with access returned to baseline levels 9–15 months post-transition at all sites. - In the first quarter following EHR transition, statistically significant declines from baseline were observed on four items: communication with nurses, responsiveness of hospital staff, care transitions, and whether they would recommend the hospital to others.
Tian et al. (2021)	US Midwest healthcare system	N = 10	n = 34,306	Multiple vendors	Epic	Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS)	Patient experience returned to baseline levels two quarters after transition.

single community hospital in Pennsylvania [17]. Participants were evenly divided between males and females, ranged in age from 18 to 94 years (mean 63 years at baseline), and were mostly white and non-Hispanic; a different random sample was recruited at each time point. Results showed that, although patients perceived nurses were using the computer more after the implementation, perceived competence with computer use among nurses remained consistent across time points.

Patients perceived that other providers' (physicians, nurse practitioners, or physician assistants) were less able to simultaneously use the computer and maintain conversation with the patient at both six weeks and six months after implementation. Analyses were not adjusted for demographic characteristics.

Included studies identified limitations of their work, which comprised confounding factors that may have also impacted patient

access and experience of care [15], having patients from only a single health system [15], having nonrepresentative samples of the overall patient population served [15], and differences in computer use among different types of healthcare providers [17]. The included studies did not report on other external factors that may have contributed to changes in patient satisfaction between time points (e.g., policy changes, facility construction).

4. Discussion and conclusion

4.1. Discussion

This scoping review identified three peer-reviewed studies about patient experiences during EHR-to-EHR transitions. All three studies were US-based and used longitudinal surveys to measure patient satisfaction [15–17]. The return to baseline satisfaction levels after initial declines in two of the three studies appears positive and aligns with patterns observed on health (e.g., blood pressure control) and productivity (e.g., emergency department wait times) outcomes in other studies [8,9]. Only one of the three included studies used a tailored survey to assess changes expected after an EHR-to-EHR transition (computer use by providers) [17]. However, the use of three different survey instruments makes it challenging to synthesize results across studies. Existing studies offer a limited view of patients' experiences with their focus on satisfaction. By not asking directly about the EHR transition, a multitude of other clinically important and relevant data about patient experience are unknown.

Previous studies of patient experiences with paper-to-EHR transitions did not report a similar initial decrease in satisfaction; in fact, patients frequently reported that the change from paper to electronic records had a positive impact on their relationship with their provider [6]. Healthcare systems commonly initiate EHR-to-EHR transitions under the auspices of improving quality; yet patient-centeredness, an important domain of healthcare quality, has frequently been neglected in studies of such transitions [18]. Patient-centered healthcare is “respectful of and responsive to individual patient preferences, needs, and values and ensures that patient values guide clinical decisions.” [18] Without considering patients' experiences of EHR transitions more broadly, quality of care may be seriously harmed.

Failure to communicate about the EHR transition can leave patients unaware of changes that affect their interactions with the healthcare system, such as changes to the medication refill request processes through a patient portal, scheduling appointments, or the flow and length of their clinical encounters. Future research anchored in a patient-centered perspective could address many areas including how EHR transitions influence patient adherence to care plans, use of patient portals, and EHR-based communications with providers (e.g., secure messaging).

Research in this field would benefit from the development of a survey instrument that goes beyond satisfaction to focus on patients' experiences related to EHR-to-EHR transitions. A mixed methods approach could provide additional insight into unknown aspects of patient experiences with EHR transitions such as why their satisfaction with their care experience changed [19]. Using a mixed methods approach would combine the “complementary strengths and nonoverlapping weaknesses” of quantitative and qualitative methodologies [20]. For example, a mixed-methods study design could combine qualitative interviews to more broadly explore patients' experiences with a quantitative survey to assess larger trends. Alternatively, interviews could be used to gather additional detail about negative patient experiences related to an EHR-to-EHR transition (e.g., EHR use during clinical encounter, use of patient portal) that were identified on a survey. Future work in this area should consider these methodological approaches for a more comprehensive view of patient experiences of EHR-to-EHR transitions.

Limitations. All of the articles included in our review are from the

United States and published since 2020. Because of the small number of studies and use of different measurement tools for each, it is not possible to draw conclusions about how EHR-to-EHR transitions are associated with patient satisfaction, or patient experience more generally. A limitation of this narrow field of work is that patient experiences during an EHR-to-EHR transition might vary by demographics such as gender, age of SES- further exacerbating disparities.

4.2. Innovation

To our knowledge, this is the first literature review specifically examining patient experiences during EHR-to-EHR transitions. We found a dearth of research in this area. Healthcare systems embarking on an EHR-to-EHR transition should include evaluation of patients' experiences as part of their implementation planning using a variety of tailored methodologies. Organizations should consider how patients may be impacted both directly through EHR-based features such as patient portals and indirectly through clinical encounters.

4.3. Conclusion

Patient experiences of EHR transitions have been given limited consideration in the extant body of research on EHR-to-EHR transitions. More work is needed to understand what causes initial decreases in patient satisfaction, as well as dimensions of patient experience other than satisfaction. Patient-centeredness is a key domain of healthcare quality [18]; thus patient experiences should serve as an anchor to understanding EHR-to-EHR transitions.

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Declaration of competing interest

The authors have no competing interests to declare.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.pecinn.2024.100258>.

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