

DRESSed for Failure

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The Case

A 60-year-old woman who uses a wheelchair presented to the emergency department (ED) with right hand cellulitis and an uncomplicated urinary tract infection. The patient had a complicated medical history that included poly-substance abuse, hepatitis C, a mitral valve replacement, and multiple strokes, which left her non-verbal and fully dependent on caretakers for tasks of daily living. In the ED, she was treated with a dose of intravenous ceftriaxone and sent home with a prescription for oral cephalexin. One week later, the patient returned to the ED critically ill with hypotension, altered mental status, and an erythematous rash on her upper extremities. She was admitted to the intensive care and treated presumptively for sepsis. Dermatology was consulted to evaluate her desquamating rash and, on full chart review, they noted a previous diagnosis of drug rash with eosinophilia and systemic symptoms (DRESS) associated with cephalexin. High-dose steroids were administered and the patient's condition rapidly improved. She ultimately returned to her baseline condition and was discharged home with her caretaker.

In conducting a root cause analysis of the error, the patient's history of cephalexin-induced DRESS was only documented as an "allergy" in the previous electronic health record (EHR). The medical center recently transitioned to a new EHR, and the institution made a deliberate decision to have clinicians review all patient allergies "from scratch" rather than simply transfer the information over from the old system. However, despite a few ambulatory visits for this patient since transition to the new EHR, the allergy list was never updated to include cephalexin. Further complicating this particular case, because the affected patient was non-verbal with many caretakers over the past few years, history taking was unreliable.

The Commentary

Unprecedented federal initiatives are now underway to promote the adoption and meaningful use of electronic health records (EHRs).⁽¹⁾ The goal of these initiatives is to improve the quality, safety, and efficiency of health care delivery. As a result, EHR adoption rates are increasing dramatically. Currently, more than 50% of physicians and 80% of hospitals have adopted EHRs, up from 17% and 8% respectively in 2008.⁽²⁻⁴⁾

Of the hospitals and providers who have not already made the move to EHRs, most will be transitioning from paper records to an electronic system over the next few years, although an important minority will be transitioning between electronic systems as many homegrown or legacy systems are not eligible for federal meaningful use incentives. Meaningful use incentives are financial payments given to eligible hospitals and providers who follow a set of standards in using EHRs. These standards were developed by the Centers for Medicare and Medicaid Services (CMS) to promote effective EHR use. However, many older systems do not have all the functionalities required to meet the standards developed by CMS, and hospitals and providers will therefore have to transition between systems or upgrade to newer system versions to achieve meaningful user status. There is little published data on the prevalence of this type of transition.

Implementation of EHRs is known to be challenging, regardless of whether a provider or organization is transitioning from paper to an EHR or between EHR systems. Challenges common to all transitions include: overcoming provider and staff resistance to using a new system, ensuring adequate technical infrastructure and support, transitioning patient data, and meeting the substantial training needs of providers.⁽⁵⁾ In addition, the transition between EHR systems presents unique difficulties, including challenges with data mapping and migration and unanticipated decreases in usability or functionalities associated with new systems.⁽⁶⁻⁹⁾

As can be seen in this case, these challenges can pose important safety threats for patients. The hospital made a reasonable decision not to transfer historical patient allergy medication to the new EHR—a decision likely intended to facilitate physician review and documentation of accurate and up-to-date information. However, the unintended consequence was a life-threatening drug allergy prescribing error in a high-risk patient when the historical data allergy information was not transferred between systems or updated by treating providers.

Limited data is available about safety threats and other unintended consequences following the transition between EHR systems. We conducted an epidemiological study of prescribing errors after the transition from a homegrown EHR to a new commercial EHR that demonstrated an increase in many types of errors soon after the transition.⁽⁶⁾ This was despite the new EHR's advanced clinical decision support, which was designed to aid providers with the prescribing process, and the organization's intensive pre-implementation efforts to migrate data between systems and train providers on the new system. This underscores the need for careful planning from an information technology, operational, and patient care standpoint to minimize patient safety threats.

Although there are no specific requirements for how to transition between EHRs, there are best practices that can be identified from the experiences of organizations in implementing EHRs.^(7,10-12) These are presented as a [Table](#) and include: (i) careful workflow mapping to understand what features are used in the older system and potential limitations in the new system; (ii) data mapping and migration when possible; (iii) extensive on-the-ground training and support for all staff, both before and after go-live; and (iv) reduction in patient scheduling for at least several weeks after go-live to allow physicians adequate time to adapt to the system during actual use. This case highlights in particular why an organization's approach to data mapping and migration is particularly relevant. On the one hand, transmission of poor quality data perpetuates poor quality data into the new EHR. On the other hand, failing to carry over critical data can severely impact patient care. It may also affect provider satisfaction with a new system, given the increased

time required to update system information.(9)

The transfer of allergy information between EHRs is among the most critical data elements, and it should be prioritized. Hypersensitivity drug reactions affect 7% of the general population, tend to remain present over the course of one's life, and the consequences from drug allergy prescribing errors are severe and potentially life-threatening.(13) In published literature from organizations transferring between EHRs, transferring drug allergy information has been identified by clinicians as essential, likely for the reasons above.(7,12) Other information identified as key by physicians includes medication data, laboratory data, imaging files, clinical documentation, discharge summaries, and transcriptions of operative reports.(7)

However, transferring information between EHRs can be technically challenging and resource intensive. For medication and allergy information specifically, data mapping and migration can be particularly difficult if a significant amount of information in the older system is captured as "free text" versus structured data. Unlike narrative or free text data, structured data is captured in discrete fields, is readable by the computer, and can be queried and reported. Reporting requirements for meaningful use are in part helping to drive the movement toward structured data capture. Traditionally, the vast majority of physicians prefer documenting narrative or free text data, with extensive use of shorthand notation, because it is fast and efficient and is organized in an intuitively familiar way.(14) This, however, greatly limits the ability of the computer to transfer or "reuse" information between systems. Furthermore, medication history information is particularly problematic to transfer accurately because it changes so frequently.(6,7)

In addition to careful strategic planning about data migration, this case emphasizes the importance of careful physician training when new systems are implemented as well as reinforcement throughout the implementation process. The patient in our case had visited the ambulatory clinics on several occasions, and her allergy information was never updated. These previous visits represent important missed opportunities to prevent this potentially life-threatening DRESS reaction from occurring. Reinforcing with physicians exactly what information is being transferred when a new EHR goes live, as well as the potential hazards associated with transitioning, may heighten awareness and promote increased vigilance during the transition period. Moreover, some systems can demarcate data that has been transitioned from an old system and include "hard stops" that prevent charts from being closed unless key data fields, such as allergies, are completed. Although there is little published literature about the effectiveness of such system features in preventing errors, it seems likely that these functionalities would decrease the risk to patients when transitioning between systems and should be strongly encouraged within the health care community.

Take-Home Points

- Implementation of new EHR systems is occurring with increasing frequency across the country as a result of federal incentives.
- While most transitions will be from paper to EHR, EHR-to-EHR transitions occur and pose unique challenges, including determining data migration (moving from the old system to the new) and mapping needs.
- Drug allergy information, given its critical nature for patients, should strongly be considered for data migration.

- Education to providers about the potential safety threats associated with transitions may heighten prescribing vigilance and help avert errors.

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References

1. Centers for Medicare and Medicaid Services. Electronic Health Records and Meaningful Use. Washington, DC: US Department of Health and Human Services, Office of the National Coordinator for Health Information Technology; July 26, 2010.
2. Doctors and hospitals' use of health IT more than doubles since 2012. US Department of Health and Human Services. May 22, 2013. [\[Available at\]](#)
3. DesRoches CM, Campbell EG, Rao SR, et al. Electronic health records in ambulatory care—a national survey of physicians. *N Engl J Med*. 2008;359:50-60. [\[go to PubMed\]](#)
4. Jha AK, DesRoches CM, Campbell EG, et al. Use of electronic health records in U.S. hospitals. *N Engl J Med*. 2009;360:1628-1638. [\[go to PubMed\]](#)
5. McGinn CA, Grenier S, Duplantie J, et al. Comparison of user groups' perspectives of barriers and facilitators to implementing electronic health records: a systematic review. *BMC Med*. 2011;9:46. [\[go to PubMed\]](#)
6. Abramson EL, Malhotra S, Fischer K, et al. Transitioning between electronic health records: effects on ambulatory prescribing safety. *J Gen Intern Med*. 2011;26:868-874. [\[go to PubMed\]](#)
7. Bornstein S. An integrated EHR at Northern California Kaiser Permanente: pitfalls, challenges, and benefits experienced in transitioning. *Appl Clin Inform*. 2012;3:318-325. [\[go to PubMed\]](#)
8. Zandieh SO, Abramson EL, Pfoh ER, Yoon-Flannery K, Edwards A, Kaushal R. Transitioning between ambulatory EHRs: a study of practitioners' perspectives. *J Am Med Inform Assoc*. 2012;19:401-406. [\[go to PubMed\]](#)
9. Abramson EL, Patel V, Malhotra S, et al. Physician experiences transitioning between an older versus newer electronic health record for electronic prescribing. *Int J Med Inform*. 2012;8:539-548. [\[go to PubMed\]](#)
10. McAlearney AS, Song PH, Robbins J, et al. Moving from good to great in ambulatory electronic health record implementation. *J Healthc Qual*. 2010;32:41-50. [\[go to PubMed\]](#)
11. Crosson JC, Etz RS, Wu S, Straus SG, Eisenman D, Bell DS. Meaningful use of electronic prescribing in 5 exemplar primary care practices. *Ann Fam Med*. 2011;9:392-397. [\[go to PubMed\]](#)

12. Gettinger A, Csatar A. Transitioning from a legacy EHR to a commercial, vendor-supplied, EHR: one academic health system's experience. *Appl Clin Inform.* 2012;3:367-376. [\[go to PubMed\]](#)
13. Gomes ER, Demoly P. Epidemiology of hypersensitivity drug reactions. *Curr Opin Allergy Clin Immunol.* 2005;5:309-316. [\[go to PubMed\]](#)
14. Elnahal SM, Joynt KE, Bristol SJ, Jha AK. Electronic health record functions differ between best and worst hospitals. *Am J Manag Care.* 2011;17:e121-e147. [\[go to PubMed\]](#)

Table

Table

Phase of Implementation	Best Practices
Pre-Implementation	<ul style="list-style-type: none"> • Identify leaders, including physician champions, to promote user buy-in • Conduct workflow analysis to determine how the new system will integrate into workflow • Perform data mapping and migration • Conduct pre-implementation training with users
Implementation	<ul style="list-style-type: none"> • Consider reducing physician schedules to allow for system acclimation • Have on-site technical support available to help clinicians in real time
Post-Implementation	<ul style="list-style-type: none"> • Have ongoing technical support available • Optimize system functionality for users • Conduct ongoing safety and use monitoring

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