

# Electronic Health Records Uses and Malpractice Risks

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## LEARNING OBJECTIVES

1. Define the term Electronic Health Record (EHR).
2. Describe the ARRA-HITECH programs to support electronic health records.
3. Identify the benefits of electronic health records.
4. Describe the benefits and challenges of EHR applications in healthcare.
5. Summarize and differentiate the three groups of EHR malpractice risks.

**ABBREVIATIONS:** HER - Electronic Health Records, ARRA - American Recovery and Reinvestment Act, HITECH - Health Information Technology for Economic and Clinical Health, CDSS - Clinical Decision Support System, CPOE - Computerized Physician Order Entry, IOM - Institute of Medicine's, HIT - Health Information Technology, CRICO - Controlled Risk Insurance Company

**INDEX TERMS:** Healthcare Model, Meaningful Use, Patient Safety, Evidence Based Medicine, Health Information Technology, Malpractice Risks, Computer Related Errors

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## INTRODUCTION

Our world has been radically transformed by digital technology – smart phones, tablets, and web-enabled devices have transformed our daily lives and the way we communicate. A greater and more seamless flow of information within a digital healthcare infrastructure, created by electronic health records (EHRs), encompasses and leverages digital progress and can transform the way care is delivered and compensated. An EHR is a digital version of a patient's paper chart. EHRs are real-time, patient-centered records that make information available instantly and securely to authorized users. While an EHR does contain the medical and treatment histories of patients, an EHR system is built to go beyond standard clinical data collected in a provider's office and can be inclusive of a broader view of a patient's care.<sup>1</sup> One of the key features of an EHR is that health information can be created and managed by authorized providers in a digital format capable of being shared with other providers across more than one healthcare organization. EHRs are built to share information with other healthcare providers and organizations – such as laboratories – so they contain information from all clinicians involved in a patient's care. The EHR is composed of components such as clinical decision support systems (CDSS) that include information about relevant clinical practice guidelines and clinical reminders, and computerized physician order entry (CPOE) of medications that check orders against patient information to flag potential drug interactions, allergic reactions, and errors.<sup>2</sup>

The Health Information Technology for Economic and Clinical Health (HITECH) Act, a component of the American Recovery and Reinvestment Act (ARRA) of 2009, represents the nation's first substantial commitment of federal resources to support the widespread adoption of EHRs. The HITECH Act supports the concept of electronic health records and it proposes the meaningful use of interoperable electronic

health records throughout the United States healthcare delivery system as a critical national goal.

### Patient Safety

There's no question that EHR is a powerful tool that improves patient safety, reduces cost, and increases healthcare quality by promoting the practice of evidence-based medicine and consequently minimizing medical errors and malpractice incidents.<sup>1</sup> Nonetheless, new challenges have surfaced as a result of human error, design flaws, and technology glitches.<sup>3</sup> Malpractice risk can occur in the areas of documentation of clinical findings, test and imaging results, as well as CPOE, and CDSS.<sup>4</sup>

In a report by the Institute of Medicine's (IOM) entitled *Health IT and Patient Safety: Building Better Systems for Better Care*, the need for a new agency to oversee the safety issues and to investigate adverse events related to health information technology (HIT) was addressed.<sup>5</sup> Although safety incidents could involve a variety of HIT tools, the emphasis was on EHR utilization. The report concluded that the implementation of EHR does not automatically improve patient safety. In fact, EHR could be a contributing factor to adverse events, such as the overdosing of patients due to poor user interface design, failing to detect life threatening situations due to unclear information displays, and delays in treatment due to the loss of data. Adverse events, such as these, have led to serious injuries and death.<sup>5</sup> The Controlled Risk Insurance Company (CRICO), a leader in evidence-based risk management group of companies and operated by the Harvard medical community, recognized these emerging risks.<sup>6</sup> CRICO recently analyzed a year's worth of medical malpractice claims in its comparative database and found 147 cases in which EHRs were a contributing factor. Half of the 147 cases resulted in severe injury. Computer systems that don't talk to each other, test results that aren't routed properly, and mistakes caused by faulty data entry or copying and pasting were among the EHR-related problems found in the claims as stated by CRICO report which represented \$61 million in direct payments and legal expenses.<sup>3</sup>

### Malpractice Risks

Malpractice risks of EHR systems can be summarized in

three groups. The first type can be linked to errors during the initial implementation phase. The second group of errors can be identified while the EHR system is in place. A third group of errors are attributed to design related flaws.

### Errors during Initial Implementation

Implementing a new EHR system may initially elevate or decrease providers' malpractice risk. As with any new technology, the risk of generating a new type of error increases during the initial phases of implementation as providers move from a familiar system to a new one.<sup>2</sup>

#### 1. Computer-related errors

Computer-related errors are the most common type of errors. Medical errors and adverse events may result from individual mistakes in using EHR templates with drop-down menus. An entry error might occur if accidentally selecting the medication above or below the one desired on the menu and it could be overlooked, resulting in an erroneous information that is easily perpetuated and disseminated.<sup>7</sup>

#### 2. Clerical Error

Another error prone opportunity for an adverse event is when a user accidentally opens the wrong patient file and orders treatments or records vital signs for someone else. Because of the way EHRs are designed, it is easy to enter information in an incorrect field or for an incorrect patient without realizing it.<sup>3</sup> Effective and careful monitoring of problems after implementation is necessary to minimize the persistence of errors. An EHR that is tailored to the specific needs of the end users accompanied with effective and ongoing training would minimize the incidence of errors and adverse events.<sup>2</sup>

#### 3. Hybrid health record/EHR conversion issues

The interface between paper and electronic records and the lack of adequate electronic data exchange between the EHR and other clinical data systems, such as LIS, may create documentation gaps or other problems that affect clinical care, especially in the transitional phase.<sup>1</sup>

Having parallel electronic and paper-based systems forced clinicians to switch back and forth between the two systems, resulting in slowing workflow and increasing resistance to EHR use.<sup>1</sup> A recent study showed a higher rate of notification failure of abnormal test results in outpatient practices in which a hybrid of paper and electronic records was used.<sup>8</sup>

Additionally, paper and electronic records can be inconsistent resulting in a misinterpretation of a patient's status. A simple example is a penicillin allergy that is noted in the paper record but not yet reflected in EHR. This would definitely cause an adverse effect.<sup>3</sup>

Managing health information in this hybrid environment is challenging. It is extremely costly, and labor-intensive with extremely high risk for errors. Hence, it is strongly advisable to consider full adoption of an electronic document management system across the healthcare organization.<sup>9</sup>

#### 4. EHR as a threat of physician-patient relationship

When charting manually, many physicians developed an ability to write their clinical notes unobtrusively while still interacting with the patient. Physicians express concerns that this would not be possible when using a computer or a digital device.<sup>10</sup> Physicians fear that electronic charting might distract them from direct patient care.<sup>7</sup> Working with an EHR, filling in a computer template could divert the physician attention from patient signs and symptoms and thus lead to a greater malpractice risk.<sup>4</sup> The computer may become a barrier that weakens the physician-patient relationship by limiting interactive conversation.<sup>7</sup> Physicians also expressed concerns about patients' reactions to their use of the computer expecting patients to be offended if physicians continue typing during the encounter without giving undivided attention to them.<sup>10</sup>

In a questionnaire by Medical Economics, readers of its e-Consult newsletter were asked

to identify what they would foresee as the main threat to their relationships with patients. The number one issue cited was the prior authorizations (41%) followed by electronic health record (25.8%).<sup>11</sup>

#### 5. Changing workflow

Although implementation of EHR inclusive of CPOE and backed with CDSS is a vital component of strategies to prevent medication errors, execution of CPOE is usually slower and more problematic than anticipated and might be poorly integrated, inducing temporary loss of productivity and interfering with the users usual workflow.<sup>13</sup> When EHR alters workflow, it has the potential to negatively affect clinicians' abilities to communicate patient information. It may result in an unpleasant increase of the workload and hence lead to physicians' resistance.<sup>14</sup> Physicians resist adopting workflows that can feel more like manufacturing than traditional treatment. In addition, CPOE and CDSS are seen as yet another burden upon physicians already overcrowded schedules.<sup>15</sup> End-users of an EHR (mainly physicians) may experience strong emotional responses as they struggle to adapt to new technology and disruptions in their workflow.<sup>16</sup>

Changing workflow and physician resistance may result in an artificial hybrid system. Physicians may ignore computer-generated information and continue reliance on various traditional modes of communication, thus creating unsafe workarounds.<sup>14</sup> An online survey identified physicians as the most resistant to EHR changes compared to other health professions such as nursing personnel.<sup>15</sup>

#### An EHR System is in Place

After the initial implementation stage, it is unclear whether the use of EHR is likely to increase or decrease malpractice liability overall.<sup>2</sup> The implementation phase requires extensive planning and constant monitoring and adjustment. Lost data and workflow changes are major contributors of errors in the workplace.

#### 1. The hidden threat of cloning

An increased frequency of medical records with identical documentation across services has been noticed. This statement of concern speaks specifically to the tendency to copy information from a previous visit and paste it (cloning). Pulling data forward from past visits that aren't meaningful to the new encounter may provide inaccurate findings. Temptation to copy and paste previous patient histories instead of taking new histories produces a risk of missing new information and perpetuates previous mistakes.<sup>2</sup> Documentation that does not represent what actually transpired during a patient encounter may lead to potential improper payments as well.

Most EHR systems have options that allow copy-forward in the "problem list" or "history". It is a key time-saver for EHR users and one of the selling features of many EHR systems. While not entirely a negative feature, it should not be overused or misused.<sup>17</sup>

## 2. Too much information

EHR systems allow physicians to easily document and to generate information with a few keystrokes or even a checkmark. The use of predesigned templates allows physicians to describe a comprehensive examination in great detail. This load of information could easily be overlooked increasing the chance of missing critical data. Physicians should be able to access important findings in a very timely fashion. Highlighting important information or placing it in a separate section of the record will help to avoid skipping over important information.<sup>18</sup>

## 3. Medical alert fatigue

Medical alerts are believed to lower the rate of inappropriate medication prescriptions. Flag alerts, reminders of patient diagnosis or conditions to clinicians who access patient EHRs have demonstrated improvement in long-term treatment and enhancement of treatment goals. The success of implementing an alert system depends on how alerts impact workflow. If implemented correctly, alerts can improve patient safety.<sup>5</sup> On the other hand, an improperly designed system may be ignored or even considered a nuisance to users. The

ineffectiveness of an alert system has been attributed to high rates of overrides and alert fatigue. Alerts that don't represent clinically significant conditions can overload clinical workflow and cause clinicians to ignore information that could prevent adverse events.<sup>5</sup> In a retrospective cohort study of a large Veterans Affairs medical center and its five clinics, the override rate was found to be as high as 87%.<sup>19</sup>

Whereas an alert system can remind clinicians of important patient information, it is critical to minimize alert fatigue or high override rates, thus limiting interruptions in workflow.<sup>5</sup>

## 4. Overdependence on technology

Overdependence on technology is a growing issue in all aspects of life, including delivery of healthcare. Organizations should ensure that basic medical care will not be interrupted in the absence of technology, especially in times of system downtime or failure.<sup>5</sup> For example, a physician who is completely dependent on CDS or CPOE might not be able to remember standard dosages and formulary recommendations, or could potentially prescribe a contraindicated medication in the event of a system downtime.<sup>20</sup> Furthermore, system wide EHR failures or "crashes" that prevent access to crucial information create problems in care processes and lead to malpractice risk.

## Design Related Issues

Many aspects must be considered and end users must be consulted before acquiring and implementing an EHR system. EHR should be designed and implemented in a manner to complement the transfer of information between health professionals and patients while maintaining the reliability of patient information in an attempt to improve patient safety.<sup>21</sup> Standardization is one of the most desired outcomes of the use of EHR. When used properly, consistent performance across providers could be achieved. However, many challenges have been reported.

### 1. Design flaws

Several important factors regarding how health

IT products are designed and implemented can have meaningful effects on the utility of the product. The degree to which users can configure their IT system, training strategies, and the IT integration into clinical workflow are all contributing factors.<sup>5</sup>

The ability to test usability before implementation is the first step to successful EHR implementation.<sup>21</sup> Keys/bars too close together can cause physicians to misplace decimal points or click on the wrong dose or name of a medication.<sup>22</sup> Too many screens or clicks needed to use the EHR system can produce user error. Too many open charts at a time can cause the physicians mistakenly to enter an urgent order for the wrong patient.<sup>23</sup> An important step in promoting better reporting and reducing of medical errors is improving EHR user interface designs, which offer healthcare providers' shorter learning times, more rapid performance, and lower interface error rates.

A second step should be agreements on user interface consistency (similar formats for common medical data values such as blood pressure (systolic/diastolic), consistent placement of these common values on the screen, guidelines for choice of colors and management of alerts, etc. Such guidelines for consistency and data sharing would allow healthcare professionals who work at multiple locations resulting in improved efficiency and safely.<sup>24</sup> One of the biggest design problems with EHR is the lack of interoperability. Patients who receive care in different places will not have all the information in the different care points available to the physician when it is needed to make good decisions for the patient.<sup>21</sup>

## 2. Poorly designed CPOE

Many studies have shown that CPOE could improve patient safety by decreasing the potential of medication ordering errors and preventing adverse drug events, however, they may create new kinds of errors.<sup>2</sup> Researchers have found an association between the use of

CPOE and increased medical errors due to poorly designed system interfaces or lack of end-user training.<sup>16</sup> Poorly designed systems that default to a potentially dangerous drug dose by failing to consider clinical changes such as renal or hepatic failure can lead to harmful ordering errors if physicians fail to recalculate the dose.<sup>2</sup> Studies suggest that CPOE systems have a greater impact when designed for the specific needs of the hospital environment, workflow, and providers.

## 3. Integration of CDSS

CDSS systems are an important component of EHR. They can monitor patient conditions, prescriptions, and treatment to provide evidence-based clinical suggestions to health professionals at the point of care. Implementation of CDSS demonstrated positive outcomes on patient safety by improving performance and reducing the relative risk of medication errors. However, many reviews also emphasized that CDSS may cause unintended negative consequences. For example, a physician may lose his or her autonomy in making patient decisions because an EHR could block the ordering of certain tests or medications if that were not in accordance to CDSS.<sup>2</sup> Many feel that EHRs and particularly CDSS convert physicians who were trained to be independent thinkers into independent decision makers, causing them to feel like data entry clerks, with a computer telling them how to practice medicine.<sup>26</sup>

## CONCLUSION

The integration of EHR into medical practices is increasing, thus providing great potential to advance both the practice of good medicine and patient safety. However, there are always unanticipated consequences when new technologies are adopted, and the EHR is no exception. Real and potential liability risks are beginning to be recognized, and it is important for physicians and clinicians to become familiar with them.<sup>7</sup>

## REFERENCES

1. Miller, RH, Sim, I. Physicians' use of electronic medical records: barriers and solution. *Health Affairs*. 2004;(23)(2): 116-26.
2. Mangalmurti, SS, Murtagh, L, Mello, MM. Medical



- malpractice liability in the age of electronic health records. *N Engl J Med.* 2010;(363):2060-7.
3. Ruder, DB. Malpractice claims analysis confirms risks in EHRs. *Patient Safety & Quality Healthcare.* 2014;19:1.
4. Kern, SI. Hidden malpractice dangers in EMRs. From *Medscape Business of Medicine. Healthcare Informatics.* 2009: [www.ctimesys.com/pdfs/HiddenMalpractice.pdf](http://www.ctimesys.com/pdfs/HiddenMalpractice.pdf). Accessed April 5, 2014.
5. Health IT and Patient Safety: Building Safer Systems for Better Care. November 2011. Available at : <http://www.iom.edu/Reports/2011/Health-IT-and-Patient-Safety-Building-Safer-Systems-for-Better-Care.aspx>. Accessed April 5, 2014.
6. About CRICO - Risk Management Foundation. <https://www.rmhf.harvard.edu/About-CRICO>. Accessed April 5, 2014.
7. Electronic Health Record Malpractice Risks available at: [http://www.thedoctors.com/KnowledgeCenter/PatientSafety/articles/CON\\_ID\\_003743](http://www.thedoctors.com/KnowledgeCenter/PatientSafety/articles/CON_ID_003743). Accessed April 5, 2014.
8. Casalino, LP, Dunham, D, Chin, MH, et al. Frequency of failure to inform patients of clinically significant outpatient test results. *Arch Intern Med.* 2009;169(17):1626.
9. Managing the Transition from Paper to EHRs. Available at: [http://library.ahima.org/xpedio/groups/public/documents/ahima/bok1\\_048418.hcsp?dDocName=bok1\\_048418](http://library.ahima.org/xpedio/groups/public/documents/ahima/bok1_048418.hcsp?dDocName=bok1_048418). Accessed April 5, 2014.
10. Doylea, RJ, Wanga, N, Anthonya, D, et al. Computers in the examination room and the electronic health record: physicians' perceived impact on clinical encounters before and after full installation and implementation. *Family Practice* 2012;(29):601-8.
11. Bendix, J. Can the doctor-patient relationship survive? <http://medicaleconomics.modernmedicine.com/medical-economics/news/can-doctor-patient-relationship-survive>. Accessed April 5, 2014.
12. What are the biggest issues with EMR today? <http://www.kevinmd.com/blog/2012/11/biggest-issues-emr-today.html>. Accessed April 5, 2014.
13. Physician resistance as a barrier to implement clinical information systems. [http://clinfowiki.org/wiki/index.php/Physician\\_resistance\\_as\\_a\\_barrier\\_to\\_implement\\_clinical\\_information\\_systems](http://clinfowiki.org/wiki/index.php/Physician_resistance_as_a_barrier_to_implement_clinical_information_systems). Accessed April 5, 2014.
14. Murphy, K. Clinical Documentation and EHR, CPOE, EHR Benefits, EHR Vendor Selection, Health IT and Patient Safety, Health IT Benefits. 2012. Available at: <http://ehrintelligence.com/2012/09/17/study-shows-health-it%E2%80%99s-positive-negative-effects-on-safety/>. Accessed April 5, 2014.
15. HealthsystemCIO.com Survey Finds Independent Docs Most Resistant to Change. 2012. Available at: <http://healthsystemcio.com/>. Accessed April 5, 2014.
16. Menachemi, N, Taleah H. Benefits and drawbacks of electronic health record systems. *Risk Manag Healthc Policy.* 2011;4:47-55.
17. By Paul M. Larson, MBA, MMSc, COMT, COE, CPC, CPMA (01/01/2013.). Are There Documentation Dangers Lurking in Your EMR? Cloning claims may raise red flags.
18. Kern, SI. Hidden Malpractice Dangers in EMRs. From *Medscape Business of Medicine. Healthcare Informatics.* 2010: <http://www.medscape.com/viewarticle/589724>. Accessed April 5, 2014.
19. Lin CP, Payne TH, Nichol, WP, et al. Evaluating clinical decision support systems: Monitoring CPOE order check override rates in the Department of Veterans Affairs' Computerized Patient Order System. *JAMIA.* 2008;15:620-6.
20. Impact of EHR Alerts by Amanda Guerrero (Feb 11, 2013). Available at: [www.hitechanswers.net](http://www.hitechanswers.net) General Interest. Accessed April 5, 2014.
21. Gallegos, A. EHRs' advantages may carry malpractice risks as well. *ACP Internist.* 2014. <http://www.acpinternist.org/archives/2014/04/EHRs.htm?print=true>. Accessed April 5, 2014.
22. Hirsch, MD. EHR safety: IOM report a good start, but more can be done. 2011. <http://www.fierceemr.com/story/ehr-safety-iom-report-good-start-more-can-be-done/2011-11-17>. Accessed April 5, 2014.
23. Health IT Hazard Manager Beta-Test. Prepared by: Abt Associates and Geisinger Health System. 2012. <http://healthit.ahrq.gov/sites/default/files/docs/citation/HealthITHazardManagerFinalReport.pdf>. Accessed April 5, 2014.
24. Shneiderman, B. Tragic errors: usability and electronic health records. *ACM.* 2011;18(6):60-3.
25. Electronic Health Record Risks. [http://www.thedoctors.com/KnowledgeCenter/PatientSafety/articles/CON\\_ID\\_004844](http://www.thedoctors.com/KnowledgeCenter/PatientSafety/articles/CON_ID_004844). Accessed April 5, 2014.
26. Chesanow, N. Doctors Are talking: EHRs destroy the patient encounter. <http://www.medscape.com/viewarticle/825369>. 2014. Accessed April 5, 2014.