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EHRs: The Good, the Bad, and the Ugly

Graham Billingham, MD, FACEP, FAAEM, Chief Medical Officer, MedPro Group

Overview

- Identify patient safety and malpractice risks associated with electronic health record (EHR) implementation, use, and maintenance
- Discuss strategies and best practices to ensure safe patient care and an effective, efficient, and defensible medical record
- Explain how an EHR system can be used to improve patient safety and outcomes and mitigate risk
- Understand the current litigation environment of EHRs and forensic audits
- Understand emerging risks for the future

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EHR evolution

- Handwriting
- Dictation
- Template: T-System
- Boutique: Ibex, Picis
- Enterprise: EPIC, Cerner
- Aftermarket products
- mHealth – apps
- FHIR - next generation

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EHR goals

- Improve quality and convenience of patient care
- Increase patients' participation in their care
- Improve accuracy of diagnoses and health outcomes
- Improve care coordination
- Increase practice efficiencies and cost savings

Certified EHRs support patient safety efforts

- Improved aggregation, analysis, and communication
- Evidence-based diagnostic decision support.
- Therapeutic decision support
- Prevention of adverse events.
- Clinical alerts and reminders.
- Data reports to support performance improvement activities
- Use of EHRs for clinical quality improvement research.

Recent literature - EHR checklist

- Improve Communication during PACU Handoffs and Increase Nurse Satisfaction
- Use of a standardized checklist in the electronic health record (EHR) increased both the accuracy and amount of information exchanged during handoffs from anesthesia to post-anesthesia care units (PACUs)
- The checklist also decreased the time it took to conduct a verbal handoff and increased nurse satisfaction
- The use of a standardized anesthesia to PACU EMR-based handoff checklist significantly increased the percent of accurate information transferred without considerably affecting the duration of the PACU handoff process

Source: ECRI 7/3/19; Journal of PeriAnesthesia Nursing Volume 34, Issue 3, June 2019, Pages 622-632

Recent literature - reduction in adverse events

- Data from the 2012 and 2013 Medicare Patient Safety Monitoring System.
- The sample included patients age 18 and older that were hospitalized for one of 3 conditions: acute cardiovascular disease, pneumonia, or conditions requiring surgery.
- Outcome measures were in-hospital adverse events, including hospital-acquired infections, adverse drug events (based on selected medications), general events, and post-procedural events.
- Among the 45,235 patients who were at risk for 347,281 adverse events in the study sample, the occurrence rate of adverse events was 2.3%, and 13.0% of patients were exposed to a fully electronic EHR.
- Patients exposed to fully electronic health records, however, had 17-30 percent lower odds of any adverse event
- Cardiovascular, pneumonia, and surgery patients exposed to a fully electronic EHR were less likely to experience in-hospital adverse events.

Source: https://www.ncbi.nlm.nih.gov/pubmed/26854418; J Patient Saf. 2016 Feb 6. Electronic Health Record Adoption and Rates of In-hospital Adverse Events. Furukawa MF1, Eldridge N, Wang Y, Metersky M.

AHRQ Study: Fully Electronic Health Record Associated With Lower Odds of In-Hospital Adverse Events

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Recent literature – mixed results

- 1246 hospitals over 7 years
- EHR implementation, EHR vendor, and Meaningful Use status
- Looked at CHF, pneumonia, AMI
- Process care measures improved 45%
- No difference in mortality rate
- No difference in readmission rate

Source: https://www.ncbi.nlm.nih.gov/pubmed/31233144

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AHRQ

- Federal incentive programs beginning in 2009.
- To date, these initiatives have provided over $37 billion in incentive payments to clinicians and hospitals to adopt health information technology, including EHRs.
- Use of EHRs in office-based practice has grown from about 24 percent to 86 percent in 2017.
- The growth of EHRs in hospitals is even more dramatic; in 2017, 96 percent of non-Federal acute care hospitals used an EHR.

Source: retrieved from

https://www.bostonglobe.com/news/nation/2014/07/19;

https://www.ahrq.gov/news/blog/ahrqviews/promise-of-electronic-health-records.html


Hazards tied to medical records rush

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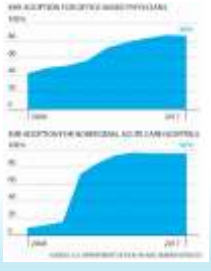
Death By 1,000 Clicks – Fortune 3/18/19



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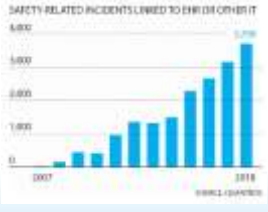
Death By 1,000 Clicks – Fortune 3/18/19



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EHRs: Is the glass half full or half empty?

- Streamline care transitions
- Decrease cost
- Reduce handoffs
- Drug-drug interactions
- Evidence-based guidelines
- Narrow practice variation
- Measure outcomes
- Clinical decision support
- Disease management
- "Hub-and-spoke" problem
- User interface
- Disenfranchised physicians
- Workflow disruption
- Patient safety errors
- Time away from patients
- Vicarious liability
- De-installations/AR lag
- Few winners as of yet

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Top EHR implementation challenges

- Excessive physician and staff time to implement
- Disruption to practice
- Concern with the time it will take to implement and be eligible for meaningful use
- Concern with staff skills and ability to implement
- Unexpected costs for associated hardware
- Unexpected costs to implement the basic system
- Concern of system quality
- Concern with vendor quality and support
- Unexpected costs to customize the system to a practice's needs and requirements
- Unexpected costs to maintain the system and keep it function

Source: Terry, K. (2015, May). EHRs broken promise. Medical Economics
Retrieved from http://medicaleconomics.modernmedicine.com/medical-economics/news/ehrs-broken-promise?page=full

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The Promise of Electronic Health Records: Are We There Yet?

- EHRs are used by 93 percent of practices.
- EHRs not designed to support quality improvement or research.
- Practices typically need ongoing support to navigate the learning curve, adjust their workflows, and improve efficiency.
- Few practices are using EHRs to report clinical quality measures. This represents a substantial missed opportunity to drive practice improvement.
- One-third of practices have never discussed their data as a team.
- Only 63 percent shared patient health data electronically with other providers or organizations.
- Practices often are unclear where to turn for technical assistance

Source: Bob McNellis M.P.H., P.A. 2/12/19, AHRQ The Promise of Electronic Health Records: Are We There Yet?

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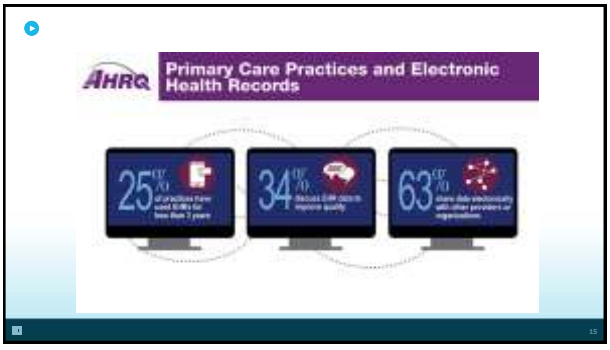

EHR Risks

- System interface issues — hardware, software applications, data flow (e.g., between order entry and pharmacy)
- Clinician communication pitfalls, including problems sending and receiving referral/consult information, as well as possible uncertainty as to whether the information was received
- Overuse or inappropriate use of the "copy and paste" function
- Alert fatigue, which may cause clinicians to ignore or workaround critical alerts
- Process lapses, such as failure to review information for content and accuracy prior to finalizing documentation
- System failure and backup processes

Role of the EHR in patient safety events

3,099 reports related to EHR

10% classified as "unsafe" condition

15 reports in "temporary" harm

- Entering wrong medication data
- Administering the wrong medication
- Ignoring a documented allergy
- Failure to enter lab tests
- Failure to document an allergy

CA Nurses Sound Alarm Over Epic EMR System

- A multimillion-dollar "go-live" implementation of the EpicCare EMR from Epic Systems Corp. came under intense scrutiny Tuesday when two nurses approached the governing body of a California hospital with patient safety concerns.

  Those concerns stem from an incident at a Contra Costa County hospital clinic at the West County Detention Facility in Richmond, CA, where one nurse says the Epic system's recommended dosage of a heart medication "could have killed the patient."

  "We're unable to document our medication administration correctly," said an emotional Lee Ann Fagan, speaking to the Contra Costa County Board of Supervisors in Martinez, CA.

  Scott Mace, for HealthLeaders Media , August 16, 2012

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Kaiser Health News June 2019

- Patient harm
- Signs of fraud "updcoding"
- Gaps in interoperability
- Doctor burnout
- Web of secrets

Source: https://www.c-span.org/video/?460228-6/washington-journal-fred-schulte-discusses-electronic-medical-record-regulations

Source: https://khn.org/news/death-by-a-thousand-clicks/

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Burnout & EHR

- Burnout among health care professionals is ubiquitous
- 102 Google Scholar articles
- 50-70% attribute cause to EHR
- Increased patient safety incidents
- Increased medical errors
- Reduced patient satisfaction
- Poorer quality and safety ratings
- Increased malpractice risk

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MedStar Health National Center for Human Factors in Healthcare

- Errors Happen Regularly
- Everyone Has Responsibilities
- 10 year anniversary HITECH Act
- 21st Century Cures Act; Sec. 3009A. Electronic Health Record Reporting Program
- Letter to congress
- https://ehrseewhatwemean.org/letter-to-congress/
- https://ehrseewhatwemean.org/

- **Abstract**
- Four healthcare systems (2 Epic and 2 Cerner).
- Six clinical scenarios.
- Imaging, laboratory, and medication tasks
- There was wide variability in task completion time, clicks, and error rates.
- For certain tasks, there were an average of a nine-fold difference in time and eight-fold difference in clicks
- Error rates varied by task (X-ray 16.7% to 25%, MRI: 0 to 10%, Lactate: 0% to 14.3%, Tylenol: 0 to 30%; Taper: 16.7% to 50%).

Source: Journal of the American Medical Informatics Association, Volume 25, Issue 9, September 2018, Pages 1197–1201,

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"You have to admire Dr. Conway's childlike beliefs. Santa Claus, the Easter Bunny and one standard format for sharing electronic health data."

Recent Court Cases

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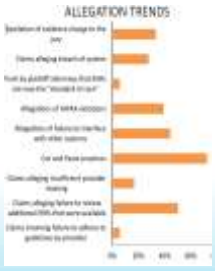
PIAA — EHR litigation data

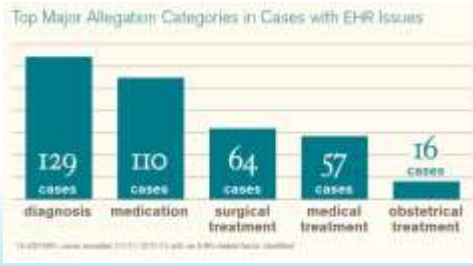
- 53% of participants have already seen EHR-related claims
- The top trends:
  - Cut-and-paste practices
  - Failure to review additional electronic records
  - Failure to interface with other systems
  - Allegations of HIPAA violations
  - Templates used by EHRs
  - Too generic
  - Not intuitive to use
  - Overreliance on the system



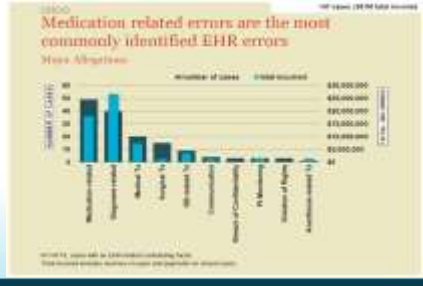
EHR errors as a risk factor — by location

Malpractice risks

- **Malpractice risks**



- **EHR errors as a risk factor — by case type**



- **Malpractice risk**

EHR-related Factors Contributing to Patient Harm

TOP FACTORS	% CASES*
user error	17%
incorrect information in record	16%
pre-populating or copy/paste errors	14%
conversion issues (hybrid paper & electronic records)	13%
system/software design issues	12%

*a case may have more than one error identified

EHR Claims Analysis

- Incorrect information in the EHR was a factor in 20% of cases
- Faulty data entry - a patient's height is 60 inches but is recorded as 60 centimeters, which distorts her body mass
- Unexpected conversions - the data is entered correctly, but the computer auto-converts it without the user noticing. For example, 2.5 changes to 25, which becomes a medication error when a clinician acts on the higher number.
- Wrong file or field - user accidentally opens up the wrong patient file and orders medication or records vital signs for someone else.
- Repetitive errors - mistakes in a patient record persist for years without being caught.

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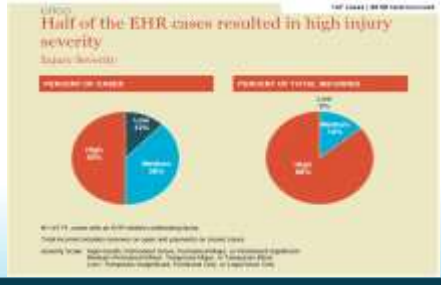
EHR errors — by clinical severity outcome



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Defining the legal EHR

- A legal EHR is an official record of patient care, with specified content and required by regulation.
- Develop a policy statement that defines what your practice considers to be a legal patient record.
- When is the record considered complete for accreditation/compliance purposes?
- How long can it remain incomplete? Complete before release?
- What "version" (considering amendments, etc.) is supplied and what visual clues to other versions? Who has access to what versions?
- What time span will be applied to each version?
- Retention periods? Scanned documents?
- Know what the printed copy of the legal EHR record looks like.

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Other problem areas

- Time synchronization
- Audit trails/metadata
- Medical guidelines and best practices are not updated
- Alert fatigue/overload
- Too many "normal" indicators
- Abnormal areas are incorrectly documented
- Usable information is harder to find
- Document events before they actually occur
- Data entered for the wrong patient

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Electronic discovery

- In 2006, e-discovery amendments were made to the Federal Rules of Civil Procedure.
  - Require production of electronically stored data and metadata if requested.
    - ✓ Metadata is the "hidden data"
    - ✓ Such as: author of the entry, timestamp, changes to the record, etc.).
    - ✓ Metadata may not be easily accessible.
  - May include requests for email.
- Risk strategy discussion:
  - Maintenance, retention, and destruction of records

- *Remember that every keystroke is in memory by time and author, even if erased or overwritten.*

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EHR audit trails

- *Hall v. Flannery*
  - Allowed audit trail over defense objections of peer review protection and privileged content
  - Using metadata to establish physician habits and routine
  - Access to original displays
  - Two different printed versions
  - Allegation that the record had been altered
  - Software patches and upgrades
  - Costly forensic battles
  - Designed to be used in the electronic environment

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Meta Data — Examples

- The printed record shows the current information, but not the information that was available to the provider at the time the care was rendered.
- Physician documents patient care 4 hours after actual treatment, but the system records the entry as occurring at the time of treatment
- The time sequence indicated that a child was born before the C-section was performed.
- Plaintiff's attorney "How much time did you spend looking at the results?"
- 2 years ago the patient had his foot amputated, but the ROS and the PE indicate that the extremities are normal.

Case #1 x-ray discrepancy

- 26 y/o smoker with fever, flu-like symptoms, pulse ox normal, WBC 14
- CXR was read normal per ED
- No preliminary reading in EHR
- Radiologist dx'd LLL pneumonia 45 min later
- Prior to patient discharge
- Admitted next day for respiratory failure and ultimately died

- Radiologist
  - Failure to properly communicate
  - Failure to follow critical result protocol
- Hospital
  - Negligent hiring, training, and supervision of physicians and nurses
  - Failure to enforce protocols for communicating radiology results
  - Negligence in providing medical care (allowing patient to be discharged on the initial ED presentation)
- ED attending and resident
  - Failure to diagnose and treat pneumonia
  - Failure to report chest X-ray findings on the radiology information system in order for the radiologist to determine whether a discrepancy report should be filed.

Case #2 different screens

- 37 y/o with HTN, headache, vomiting, blurred vision in right eye resolved by next day
- Nurse notes "dysconjugate gaze with right eye."
- ED doc normal exam; dx migraine
- Returns confused with aneurysm rupture, now G tube
- EHR refreshes every 3–4 minutes; ED doc never saw notation
- Nurses comments went to flow sheet not into notes section
- ED docs don't routinely review the flow sheet
- Docs and nurses see and use different screens

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Case #3 paper to electronic conversion

- A patient's orthodontist referred her to an oral surgeon for elective extraction of several teeth. The surgeon met with the patient to discuss the procedure and obtain consent.
- The night before the extraction, the surgeon reviewed the patient's electronic record, and the procedure commenced the next day without complications. However, following the procedure, the surgeon noticed a separate paper chart for the patient.
- In the chart was a letter from the orthodontist with a new, updated treatment plan that was never entered into the EHR. The new plan recommended removal of different teeth than the original plan specified.

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Case #4 copy and paste

- A patient who had a history of smoking, high cholesterol, and borderline hypertension presented to his primary care office complaining of intermittent numbness in his left hand and mild neck pain.
- The patient expressed concern that his symptoms were cardiac related because his brother had recently had a heart attack. The patient's electrocardiogram was normal, and the provider diagnosed the patient with nerve compression.
- Several months later, the patient presented to urgent care for gout and an ongoing cough. Although the urgent care provider had access to the patient's electronic record, it did not reflect his recent symptoms or family history of heart attack because it was a duplicate of an older record. The patient was given medication for gout and cough and sent on his way.
- Nine days later, the patient was found dead. The death certificate indicated atherosclerotic disease and heart attack as the cause of death.

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Tips to improve EHR workflow processes

- Identify a workflow process that needs to be adjusted.
- Chart the steps in the process, and determine where the pain points exist and possible solutions.
- Determine whether to phase in workflow adjustments or implement them simultaneously
- Continue to refine efficiency and workflows based on the accumulating experience with the EHR system.
- Consult outside experts, but with caution. Your EHR vendor, for example, knows their system better than how your practice works. When it comes to workflow, no one knows your processes better than your staff.

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Performance improvement: audits and high-risk metrics

- Consider quarterly report of amended records and daily/weekly report of open records
- Billing/coding audits
- Practice management
  - Patient population profiling
  - Frequently used drugs/supplies
  - Reconciliation of test results
  - Status of incomplete charts
  - Amendments (number and kind)
  - Release of PHI and HIPAA compliance

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Implementation/maintenance strategies

- Lost data
  - Transition
  - Hybrid systems
  - System failures
  - System processes – e.g., test/consult results
- Process/workflow changes – new error pathways
- Stringent documentation guidelines – no workarounds
- Be careful with 'ghost charts'
- Documentation
  - Overreliance on templates and "check boxes" – the disappearing narrative
  - Array of patient data not conducive to critical thinking

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Documentation risks and strategies

- Assessment and comparison of findings from previous visits (problem list)
- Known or suspected allergies (alerts)
- Medication list/ reconciliation (alerts)
- Documentation should reflect critical thinking and treatment plan

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Documentation risks and strategies: red flags

- Abnormal vital signs
- Changes in patient's condition
- Response to treatment
- Additions/deletions
- Late entries
- Omissions/incomplete records
- Inconsistent/contradictory entries
- Subjective remarks/finger-pointing
- Medical decision making
- Changes in treatment plans
- Patient response to a course of treatment
- Conversations with the patient
- Follow-up care provided
- Patient compliance, including missed/cancelled appointments
- After hours contact
- Consults

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Common Documentation Errors

- Omission in history
- Assessing risk factors
- Inadequate exam
- Appropriate testing (medical necessity)
- Response to therapy
- Serial exams
- High risk cases – intoxication, AMS, hostile, AMA
- Contemporaneous documentation
- Pertinent positives and negatives
- Prior episodes
- Exclude high risk diagnoses
- Change in status
- Differential diagnoses
- Discussions with consultants
- Specific discharge instructions
- Discrepancies between providers must be addressed

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Disposition

- Discharged to whom
- Specific discharge instructions
- Medications-dosage, frequency, duration
- Pre-printed
- Language specific
- Specific time frame and MD referral
- Last chance to get it right

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EHR risk strategies

- Identify functions within the EHR that create high risk for your practice, such as:
  - Test tracking
  - Drug interaction and allergy alerts
  - Cancelled appointments and "no shows"
  - Medication prescribing process
  - Consider developing a performance improvement plan to help mitigate these risks.
- Conduct regular audits
- Test system security
- Print five charts of high risk diagnoses each quarter and review
- Be wary of auto-populate, shortcuts, cloning, drop- downs
- Review scribe charting process
- Review vendor contract and "hold harmless" clause
- Be careful with customization

Source: http://www.healthit.gov/safer/safer-guides

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CRICO EHR Risk Tips

- Check the patient ID
- Document conversations, even online communications, into the patient record
- Review and update allergies prior to entering any medication orders
- For children, if not built into the EHR, use weight based dosing recommendations, age appropriate dosing calculators, dose range checking, and pedi-specific drug-to-drug interaction
- If your institution's EHR process does not facilitate both cancellation and acknowledgment of receipt of orders for labs, radiology, and pharmacy, then make sure to close this loop
- Be aware of, and use when appropriate, clinician decision support (CDS) tools in the EHR.
- Minimize the use of free text for order entry.
- Be aware of the measurement system the EHR uses (U.S. Customary Units vs. Metric System).
- Make sure that the data you enter hasn't been automatically converted to incorrect data.
- Make sure you enter information into the correct field.

Source: https://www.rmf.harvard.edu/Clinician-Resources/Newsletter-and-Publication/2014/Insight-Tips-When-Using-EHRs

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Next generation

FHIR® — Fast Healthcare Interoperability Resources

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Conclusions

- No one is going back to paper
- User interface and workflow integration remain challenging
- EHR takes time away from bedside
- Work arounds are dangerous
- Do not turn off alerts
- Marked increase in use of scribes
- Many near misses and patient safety events
- EHR-related cases are now in the courts
- Plaintiffs going after metadata and audit trails
- Doctors need to define their legal record
- Need to practice for disaster recovery
- Still searching for the Holy Grail

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