

The EHR: Problems and Possibilities

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Disclosure of Financial Interest

- No declarations.....except I am a Cubs fan.

Goals of Presentation

- Understand the history of the EHR
- Understand the social and market forces and their influence on EHR development and implementation
- Review the major issues of dissatisfaction with the EHR
- Review current problems with usability:
 - Interface Design
 - CDS
 - Patient Engagement
- Review potential solutions
- Become aware of position statements of the ACP and ASMI
- View the future of the EHR

A question:

- The concept of the EHR was first developed in:
 - A. The 1960's
 - B. The 1970's
 - C. The 1980's
 - D. The 1990's

Lessons in the Evolution of Technology



NEW YORK **WORLD'S FAIR** 1964-1965

Evolution of Technology: Predicting the future

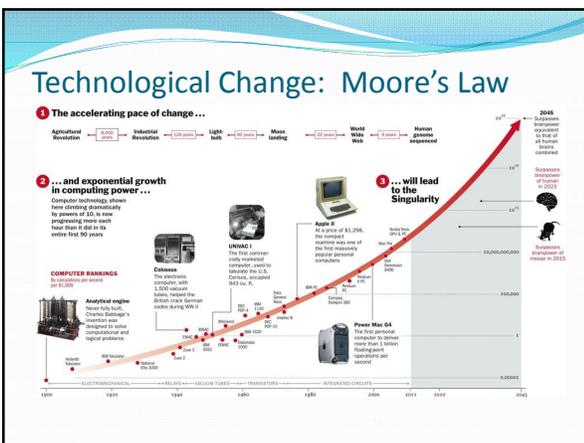


Lessons from the World's Fair

- Predicted correctly:
 - Video phones
 - Personal computer usage
 - Robotics
 - Rapid changes in technology
- Predicted incorrectly:
 - Colonization of moon and ocean

The Point

- Evolution of technology is a non-linear or “chaotic” process
- Implementation even with a correct concept is also “non-linear”.
- Market place forces have a major influence



Technological Evolution

- State of the art medical computer 1983
- Most commonly used medical computer 2015



Extinction Level Event



Extinction Level Event



History of the EHR



Alan Turing

Larry Weed

"The reasonable man adapts himself to the world. The unreasonable one persists in trying to adapt the world to himself. Therefore, all progress depends on the unreasonable man." (George Bernard Shaw)

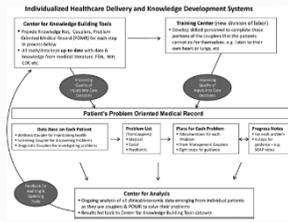
Grand Rounds Emory University: Larry Weed 1971

- https://www.youtube.com/watch?feature=player_detailpage&v=qMsPXSMTpFI

Larry Weed: Health IT Iconoclast

- In 1968 he first started writing about reorganizing medical record keeping : POMR
- The first advocate for an EMR
- His views were and continue to be controversial
- His original goals for the EMR are not widely remembered

Weed's Vision



EMR

- “The sole cause and root of almost every defect in the sciences is this: that whilst we falsely admire and extol the powers of the human mind, we do not search for its real helps.”
— Novum Organum: Aphorisms [Book One], 1620, Sir Francis Bacon
- “Medical education and medical practice ignore a truth grasped by Francis Bacon 400 years ago. A root cause of a major defect in the health care system is that, while we falsely admire and extol the intellectual powers of highly educated physicians, we do not search for the external aids their minds require.”
— Lawrence Weed, MD

Underlying Philosophy

- “It is important to understand that the discipline imposed by the POMR has not been fully embraced. Too often the POMR is sporadically employed as a convenience, not consistently enforced as a discipline. One reason is that medical education is fundamentally incompatible with the underlying philosophy of the POMR. Medical education seeks to instill medical knowledge and “clinical judgment.” In doing so, medical schools give students a misplaced faith in the completeness and accuracy of their own personal store of medical knowledge and the efficacy of their intellects. What is done to students in medical school is the antithesis of a truly scientific education.”
— Lawrence Weed, MD

Weed's Vision

- Knowledge will be in IT tools instead of heads
- Medical student's should be trained in the reliability of performance of given tasks which will part of a medical care system
- They should be selected for their hands on skills and interpersonal skills, not on memory
- Required a competence in discrete skills and procedures.

EHR from Weed's Perspective

- There were many warnings of the disaster coming in the financial system and all were ignored. The present health care system is a medical and financial disaster, and perhaps only the disaster itself will get bad enough to change the status quo. My fear is that the government will spend billions computerizing the present chaos and will remain unaware of the fundamental changes that are so badly needed.

Limitations

- Dependent on being able to extract data from an encounter to analyze.
- Natural language abstraction is a highly complicated process.
- Technology was a limitation at the time.
- It is not now.
- Natural Language Processing: Structured and Unstructured Data

The Evolution of the EHR

- First EHRs appeared in the 1960's
- 1965 EHRs were in 73 hospitals
- Mayo Clinic was one of the first adopters
- Modern EMR's first appeared in 1971-1972
- Expense limited adoption
- First users were government hospitals: VA

History of the EHR

- In 1991 a goal was set that by 2000 all physicians would be using computers in their practice
- 18% were doing so by 2001
- However, most EHRs were optimized for economic reasons

Political and Economic Forces

- American Recovery and Reinvestment Act of 2009
 - HITECH Act:
 - Health Information Technology and Clinical Health
 - 19 Billion dollars of which 17 billion was to go to physicians and hospitals
 - Established concepts of meaningful use

HITECH requirements

- Provide clinical decision support
- Support physician order entry
- Capture and query information relevant to health care quality
- Exchange electronic information with, and integrate such information from, other sources.

Recent Trends: Hospitals

- 59% of hospitals had advanced EHR systems
- 91 % have demonstrated Stage 1 meaningful use
- Majority of hospitals have capabilities for Stage 2 meaningful use objectives that are not being used.

Recent Trends: Office Based Physicians

- Significant increases since 2009 with doubling of adoption rates
- 78% of office based physicians have now have an EHR , though less in solo practices
- 48% have an EHR with advanced capabilities
- 40% can exchange information with other physicians within organization
- 11% can exchange with outside physicians

Observations

- The software industry has a checkered history with implementation of the EHR
 - Refusal to establish common standard for inter platform communication: EPIC vs. CERNER
 - Design still biased towards those that write the checks: "Bean counter bias".
 - You need to be very skeptical about vendor's claims

Observations

- Too much reliance on vendors
- Belief the technology will solve complex human and managerial issues
- Hospital leadership doesn't realize what is involved in installing clinical symptoms.....figure vendor knows best
- Problems get "hard wired in" instead of solved

Observations



- Underestimate the importance for building support and educating the physicians before implementation

The Rand Report 2013

- RESEARCH REPORT
- Factors Affecting Physician Professional Satisfaction and Their Implications for Patient Care, Health Systems, and Health Policy
- HEALTH
- Mark W. Friedberg • Peggy G. Chen • Kristin R. Van Busum • Frances M. Aunon
- Chau Pham • John P. Caloyeras • Soeren Mattke • Emma Pitchforth
- Denise D. Quigley • Robert H. Brook
- F. Jay Crosson • Michael Tutty
- Sponsored by the American Medical Association
- The RAND Corporation

Methods

- Between January and August 2013, they gathered data from 30 physician practices in six states:
- Colorado, Massachusetts, North Carolina, Texas, Washington, and Wisconsin
- Practices were selected to achieve diversity on practice size (<9 physicians, 10-49 physicians, >50 physicians),
- These included specialty (multispecialty, primary care, single subspecialty), and ownership model (physician owned or physician partnership, hospital or other corporate ownership).

Findings

- EHR's were one of the largest source of dissatisfaction among providers
- They went on to characterize the areas in which physicians were satisfied as well as dissatisfied.

Specifics

- Satisfaction with:
 - Better Access to Patient Data
 - Improvement of some aspects of quality of care
 - Better communication between patients and providers
 - Increase efficiency for reviewing results

Problem Areas

- Time consuming data entry
- User interfaces that do not match clinical workflow
- Interference with face to face care
- Insufficient Health Information Exchange
- Information overload: ("Cognitive load")
- Mismatch between Meaningful Use Criteria and Clinical Practice

Problem Areas

- EHRs threaten practice finances
- Require physicians to perform lower skilled work.



**PAY NO ATTENTION
TO THE MAN BEHIND THE
CURTAIN**

memegenerator.net

Expert Recommendations

- NISTIR 7988
- Integrating Electronic Health Records into Clinical Workflow: An Application of Human Factors Modeling Methods to Ambulatory Care
- Svetlana Z. Lowry
- Mala Ramaiah
- Information Access Division
- Information Technology Laboratory

Highlights

- Recommendations for industry and end users
- Highlights
 - Decrease redundant data
 - Allow continuity with interruption of tasks
 - Room design to support EHR use

Expert Recommendations

- Enhancing patient safety and quality of care by improving the usability of HER systems: recommendations from the AMIA
- Middleton B, et al. J Am Med Inform Assoc 2013;20:e2-e8. doi:10.1136/amiajnl-2012-001458

Highlights

- Proposes a usability research agenda
- Suggest common user interface style guide
- Suggestions for industry: Safety issues
- Suggestions for the end user:
 - Taking ownership

ACP Position Paper

- Clinical Documentation in the 21st Century: Executive Summary of Policy Position Paper from the American College of Physicians
- Kuhn, et al.
- Ann Intern Med. 2015;162:301-303. doi:10.7326/M14-2128 www.annals.org

ACP Major Points

- Clinical Documentation
 - Support care and improve outcomes
 - Define professional standards throughout organizations by appropriate redesign with consensus driven standards
 - Macros and templates used appropriately, such as ROS or PE findings
 - Facilitate thoughtful review of previously documented information

ACP Major Points

- EHR documentation training should be an ongoing process
- Primary purpose of the EHR should be facilitation of care while contributing to data collection
- Structured data should be captured only when useful
- Patient access to notes may be useful

ACP Major Points

- Need to determine the best way to disseminate standards of documentation and best practice
- EHR should support cognitive process
- Should not require a user to check a box if the action has already been taken
- Integrate patient data and maintain the identity of the source.

Usability: Three Issues

- Interface Design
- Clinical Decision Support
- Patient Engagement

The Future: Was Weed right?

- IBM's Watson Medical
- Cognitive Computing
- Partnerships: Mayo, Cleveland Clinic, MD Anderson
- The internet of "things"
- <http://www.ibm.com/smarterplanet/us/en/ibmwatson/health/>

IBM's Watson

- Reasoning based on all available medical knowledge
- It is accurate
- It is consistent
- Low marginal cost
- Available anywhere in the world
