Reducing Clinician Burden
New Approaches to Clinical Workflow, Clinical Documentation, and Electronic Health Record Usability
HL7 Reducing Clinician Burden Project
Clinical Workflow and Documentation Focus Team Report

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A View From 248 Miles Up
US Healthcare Quality Lags Comparable Countries

Higher Health System Performance

Lower Health System Performance

Eleven-country average

Australia, United Kingdom, Netherlands
New Zealand, Norway
Germany, Switzerland
Sweden
Canada
France
United States

Lower Health Care Spending

Higher Health Care Spending

Scheider, EC and Squires, D. From last to first—Could the US health system become the best in the world? *New Eng J Med* 2017; 377(10): 901-904
Potential benefits of adopting health IT across the US:

- Improved efficiency
- Improved patient care quality
- Improved patient safety
- Savings of over $81 billion annually
Effect of ARRA on Physician Adoption of EHRs

As of 2017, nearly 9 in 10 (86%) of office-based physicians had adopted any EHR, and nearly 4 in 5 (80%) had adopted a certified EHR. View Quick Stat.

In 2017, 96 percent of all non-federal acute care hospitals possessed certified health IT. Small rural and critical access hospitals had the lowest rates at 93 percent. Ninety-nine percent of large hospitals (more than 300 beds) had certified health IT, while 97 percent of medium-sized hospitals (more than 100 beds) had certified health IT. View Quick Stat.

https://dashboard.healthit.gov/quickstats/quickstats.php
Unfulfilled Promises

• Decreased efficiency: EHRs add 1-2 hours to the average MD workday
• Disconnect from patients: spending 50% or more of time in the EHR
• Disruption of clinician work-life balance and an epidemic of burnout
• Modest improvement in care process metrics and guideline adherence
• **No** significant change in large scale health outcomes
  • Hospital length of stay, inpatient mortality,
  • 30-day readmission rates, patient safety incidents
  • Population health metrics: Life expectancy, infant mortality, etc.
• Annual US healthcare expenditures increased from $2 trillion in 2005 to over $3.4 trillion in 2017
How Doctors Feel About EHRs
A National Physician Poll by Stanford Medicine and the Harris Organization

Time spent on EHRs effects patients relationships.

While only 3% of PCPs don’t see any value in their EHR system, time constraints take a toll and patient relationships suffer:

Seven in 10 agree that:

- Using an EHR has increased the total # of hours I work on a daily basis
- EHRs contribute greatly to physician burnout
- Using an EHR takes valuable time away from my patients

Seven in 10 disagree that:

- My EHR has strengthened my patient relationships

More time spent in EHR than with patient:

31 min spent on behalf of each patient; 19 of which spent in EHR

- Interacting with patient during visit
- Interacting with EHR during visit
- Interacting with EHR outside visit

https://med.stanford.edu/content/dam/sm/ehr/documents/EHR-Poll-Presentation.pdf
Why Do So Many Promises Remain Unfulfilled?

• Poor usability and poor support for clinical workflow are major factors—possibly the most important factors—preventing health IT from achieving its goals.

• Suboptimal human factors engineering and a challenging user experience have a strong, often direct connection to decreased clinical productivity, increased cognitive load, increased error rates, increased user fatigue, and decreased user satisfaction.
EHR Usability Affects Patient Safety

• “Designed and applied inappropriately, health IT can add an additional layer of complexity to the already complex delivery of health care, which can lead to unintended adverse consequences…”

• “The committee believes poor user-interface design, poor workflow, and complex data interfaces are threats to patient safety.”
Clinician Burden

- Clinician: A health professional whose practice is based on direct observation and treatment of patients
- Burden
  - Decreased efficiency
  - Increased stress
  - Increased physical workload
  - Increased cognitive workload
  - Unproductive time requirements
HL7 Reducing Clinician Burden (RCB) Project

• Define and assess specific clinician burdens
• Gather details from environmental scan and literature review
• Understand the history, substance and extent of the burdens
• Determine root causes of burdens
• Propose novel, innovative solutions to alleviate burdens
• Recognize success stories and share best practices
RCB Project: Topics and Categories

1.1) Clinician Burden – In General
1.2) Clinician Burnout – Sometimes the Result
2) Patient Safety (and Clinical Integrity)
3) Administrative tasks
4) Data entry requirements
5) Data entry scribes and proxies
6) Clinical documentation: quality and usability
7) Prior authorization, coverage verification, eligibility tasks
8) Provider/patient face to face interaction
9) Provider/patient communication
10) Care coordination, team-based care
11) Clinical work flow
12) Disease management, care and treatment plans
13) Clinical decision support, medical logic, artificial intelligence
14) Alerts, reminders, notifications, inbox management
15) Information overload
16) Transitions of care
17) Health information exchange, claimed “interoperability”
18) Medical/personal device integration
19) Orders for equipment and supplies
20) Support for payment, claims and reimbursement
21) Support for cost review
22) Support for measures: administrative, operations, quality, performance, productivity, cost, utilization
23) Support for public and population health
24) Legal aspects and risks
25) User training, user proficiency
26) Common function, information and process models
27) Software development and improvement
28) Product transparency
29) Product modularity
30) Lock-in, data liquidity, switching costs
31) Financial burden
32) Security
33) Professional credentialing
34.1) Identity matching
34.2) Identity and credential management
35) Data quality and integrity
36) Process integrity
37.1) Problem list
37.2) Medication list
37.3) Allergy list
37.4) Immunization list
37.5) Surgery, intervention and procedure list
38) Priorities, end-user feedback
39) Product transparency
40) Product modularity
41) Lock-in, data liquidity, switching costs
42) Financial burden
43) Security
44) Professional credentialing
45.1) Identity matching
45.2) Identity and credential management
46) Data quality and integrity
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49) Medication list
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Clinical Workflow and Documentation Burdens

How do we get from A to Z?
What Is Clinical Workflow?

• “Clinical workflow” encompasses the physical and mental activities, processes, technologies, tools, teams and environments involved in providing health care

• Clinical workflows are sequences of actions performed over time and through space which
  • Are performed by clinicians
  • Consume, transform, and/or produce information
  • Are performed to assess, maintain, or change the health of a patient.

• Producing effective EHRs requires a deep understanding of how front-line clinicians conduct their cognitive and task oriented work

Workflow Burden Topics

• Reimbursement regulations impact workflows
• Extra-visit (non-clinical) administrative requirements
• EHR systems are just electronic filing cabinets
• EHR systems dictate rather than adapt to physician workflows
• Simplistic algorithm-based system logic
• Lack of context specific information preprocessing
• Document (rather than data) exchange/Interoperability
• Ineffective clinical decision support
• Insufficient support for nursing workflows
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- EHR systems dictate rather than adapt to physician workflows
- Simplistic algorithm-based system logic
- Lack of context specific information preprocessing
• CMS 1995 and 1997 Evaluation and Management (E&M) guidelines to prevent over billing
  • Not based on a scientific examination of what should be included in a clinical note
  • Require multiple extraneous documentation elements
  • Templates and Note Bloat
• EHRs introduce an additional layer of regulatory burdens
  • Meaningful Use, MIPS, MACRA
  • Physician attested ICD-10 coding
  • Length of stay, QI
• Preauthorization, insurance coverage denials, coding justification

Result: Increased cognitive load and decreased focus on the patient
Reimbursement and Administrative Regulations

Solutions

Documentation
• It is critical that the process of defining content and quality in clinical notes be returned from payers and regulators back to practicing physicians, clinical specialty societies, and medical educators
• Regulations must allow these groups to streamline documentation down to the core essentials necessary for clinical care and communication

Administration
• Physicians must also be free to focus attention on the patient and on clinical care, not on administrative, regulatory, and financial processes of less clinical value
EHR Systems as Electronic Filing Cabinets

Analysis

- Information is not organized to fit physicians’ mental model of care
  - Information is not optimized to support clinical decision making
  - Too much clicking, scrolling, switching between paths and screens
  - Counterintuitive data presentations make it challenging to access and process important data
  - Critical information is obscured in a plethora of less important text or values.

Top three improvements PCPs want to see in the short term:

1. Improve EHR user interface design to eliminate inefficiencies and reduce screen time
   - 72%

2. Shift more EHR data entry to support staff
   - 48%

3. Use of highly accurate voice recording technology that acts as a scribe during patient visits
   - 38%

https://med.stanford.edu/content/dam/sm/ehr/documents/EHR-Poll-Presentation.pdf
EHR Systems as Electronic Filing Cabinets

Solutions

• More effective data visualization tools
• Better human-computer interaction processes
  • Voice controlled interfaces
• Context-specific information presentation
• Better personalization tools
  • Robust general purpose APIs and associated development platforms
User Centered Design

1. Understand Context of Use
2. Specify User Requirements
3. Mockups
4. Formative Evaluation

From ISO 9241:210 Human-centered design for interactive systems

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Paradox of User Centered Design

Every Patient is Unique

- Comorbidity pattern
- Ethnicity
- Genome
- Metabolome
- Response to treatment
- Socioeconomic status
- Cultural Background
- Personal values
Paradox of User Centered Design

Physicians Vary Widely

- Background and training
- Cognitive styles
- Mental models
- Workflow patterns
Paradox of User Centered Design

Conclusions

• There is no single consensus “one size fits all” interface model which will be productive and comfortable for a large proportion of clinicians, even in one specialty

• UCD applied across multiple specialties at a more granular and localized level can still be quite valuable
Simplistic System Logic/Lack of Context

Analysis

• EHRs assume healthcare delivery can be represented as algorithmic sequences of choices
• In reality, clinical care is iterative
• Physicians constantly reformulate goals, revise tasks, and reorder sequences
• The resulting workflows are inherently complex, nonlinear, and interruptive, creating an inherent “uncertainties” at branch points
• EHR designs adopted the models available at the time of design
  • Algorithmic coding methods
  • Visually complex data representations
  • Mouse/keyboard form based data entry
• EHRs dictate rather than adapt to clinician workflow
  • Hard coded workflows consisting of generic steps and tasks
  • Reduce wide spectrum of specialties and contexts to common pathways
  • Cannot parse what process is underway or what information is needed
Simplistic System Logic/Lack of Context

Solutions

• EHRs must evolve from data-centric transactional systems (essentially electronic filing cabinets) to process-centric workflow systems
• EHRs must be designed to parse the ongoing clinical process and collect, sort, and present the most relevant clinical information
• EHRs must develop new human/computer interaction paradigms such as voice control and more effective use of speech to text functionality
• Systems must also accommodate the inevitable “uncertainties” involved in clinical practice and be rapidly adjustable to fit new clinician needs “on the fly”
Widgets
Uncoupling the Data From the Interface

Text
Labs
Images
Widgets
Uncoupling the Data From the Interface

Lessons Learned

• Clinicians must be allowed to streamline documentation to include only the core essentials and keep their attention focused on their patients

• Requiring physicians to allot ever increasing amounts of time for EHR training in an attempts to modify their thought processes and workflows to predetermined systems will not improve quality of care or decrease burnout.

• Information technology solutions cannot, by themselves, improve the quality of care, especially as they are currently employed to squeeze clinicians, enforce narrowly defined productivity goals, and maximize profits

• Real progress will require EHRs to evolve from data-centric transactional systems (electronic filing cabinets) to context-aware, process-centric workflow systems
Effective Health IT Requires a Partnership

Only a combination of well-informed, empathetic physicians and sophisticated predictive tools that free them from clinical workflow burdens and help them focus on patients and reason more accurately will enable the high quality, patient-centered, cost-effective healthcare system clinicians desire and society needs.

Reducing Clinician Burden Is a Shared Responsibility

- Academic researchers
- Clinical Informaticians
- Practicing Clinicians
- Software Developers
- UX Professionals
- Regulators/Policy Makers
The Moon July 20, 1969
Unsustainable Rise in Healthcare Costs

Health consumption expenditures as percent of GDP, 1970 - 2017

Notes: U.S. values obtained from National Health Expenditure data. Health consumption does not include investments in structures, equipment, or research.

Source: KFF analysis of OECD and National Health Expenditure (NHE) data • Get the data • PNG
Comments and Questions

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