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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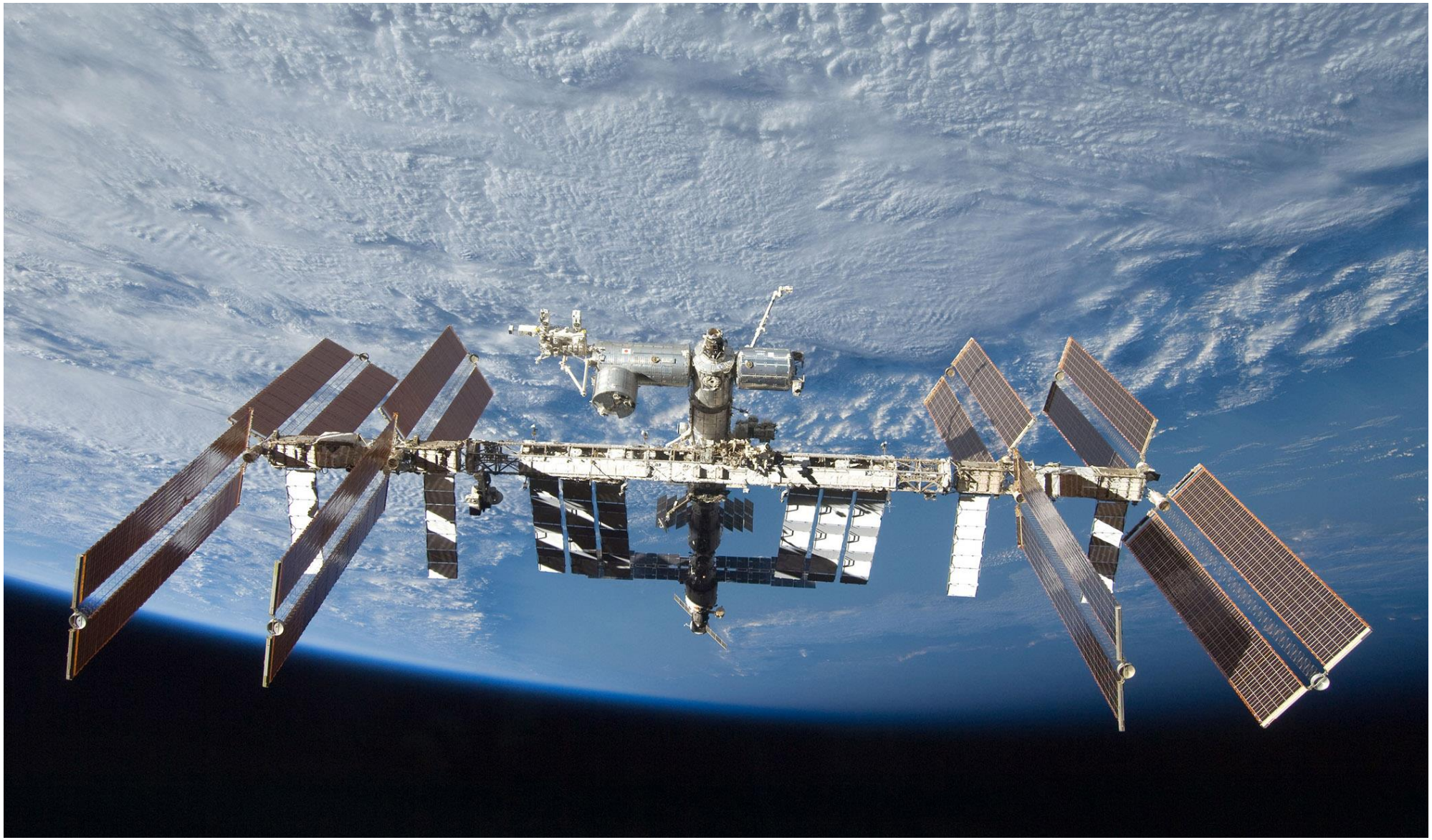
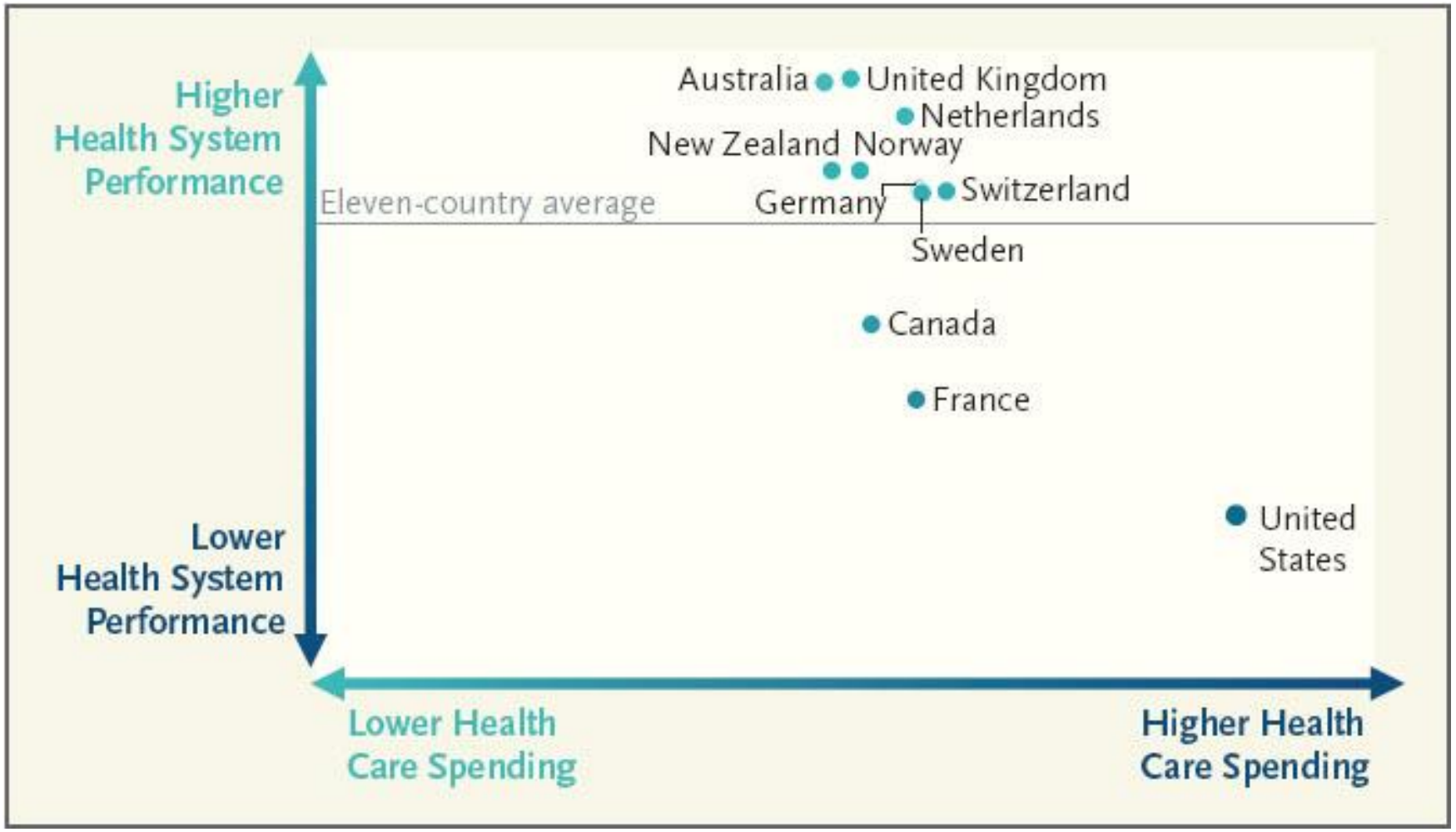
A View From 248 Miles Up



US Healthcare Quality Lags Comparable Countries



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

RAND Corporation 2005

Can Electronic Medical Record Systems Transform Health Care? Potential Health Benefits, Savings, And Costs

The adoption of interoperable EMR systems could produce efficiency and safety savings of $142–$371 billion.

by Richard Hillestad, James Bigelow, Anthony Bower, Federico Girosi, Robin Meili, Richard Scoville, and Roger Taylor

ABSTRACT: To broadly examine the potential health and financial benefits of health information technology (HIT), this paper compares health care with the use of IT in other industries. It estimates potential savings and costs of widespread adoption of electronic medical record (EMR) systems, models important health and safety benefits, and concludes that effective EMR implementation and networking could eventually save more than $81 billion annually—by improving health care efficiency and safety—and that HIT-enabled prevention and management of chronic disease could eventually double those savings while increasing health and other social benefits. However, this is unlikely to be realized without related changes to the health care system.

THE U.S. HEALTH CARE INDUSTRY is arguably the world's largest, most inefficient information enterprise. However, although health absorbs more than $1.7 trillion per year—twice the Organization for Economic Cooperation and Development (OECD) average—premature mortality in the United States is much higher than OECD averages.[1] Most medical records are still stored on paper, which means that they cannot be used to coordinate care, routinely measure quality, or reduce medical errors. Also, consumers generally lack the information they need about costs or quality to make informed decisions about their care.

It is widely believed that broad adoption of electronic medical record (EMR) systems will lead to major health care savings, reduce medical errors, and improve health.[2] But there has been little progress toward attaining these benefits. The United States trails a number of other countries in the use of EMR systems.[3] Only

Richard Hillestad (Richard_Hillestad@rand.org) and James Bigelow are senior management scientists at RAND in Santa Monica, California. Anthony Bower is a senior economist there; Federico Girosi is a policy researcher; and Robin Meili is a senior management systems analyst. Richard Scoville and Roger Taylor are senior consultants at RAND Health—Scoville, in Chapel Hill, North Carolina, and Taylor, in Laguna Beach, California.

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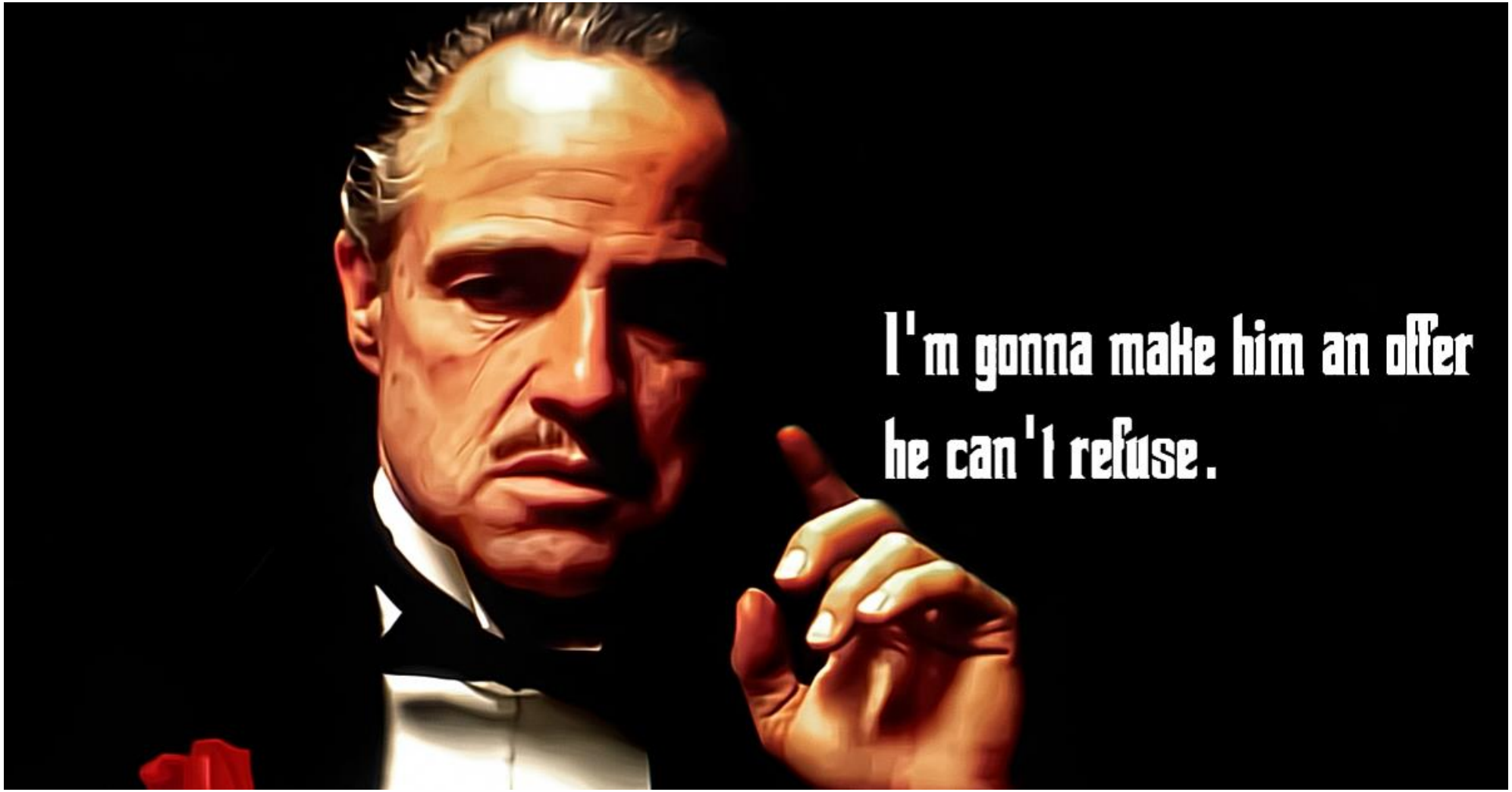
Potential benefits of adopting health IT across the US:

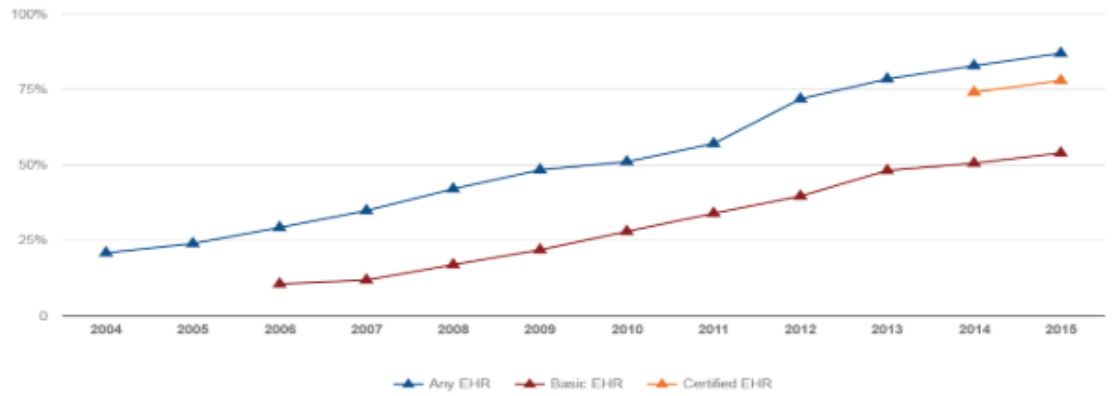
- Improved efficiency
- Improved patient care quality
- Improved patient safety
- Savings of over $81 billion annually

ARRA, HITECH, and Meaningful Use



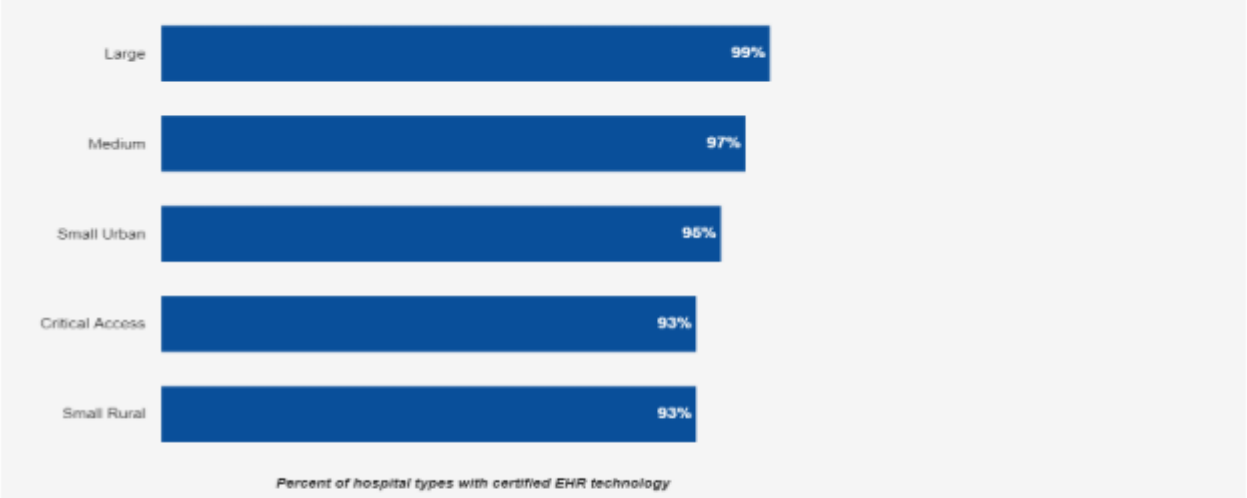
Effect of ARRA on Physician Adoption of EHRs

Office-based Physician Electronic Health Record Adoption



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.

Percent of Hospitals, By Type, that Possess Certified Health IT



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.

Stanford MEDICINE

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 — 74%
- EHRs contribute greatly to physician burnout — 71%
- Using an EHR takes valuable time away from my patients — 69%

Seven in 10 disagree that

- My EHR has strengthened my patient relationships — 69%

More time spent in EHR than with patient

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

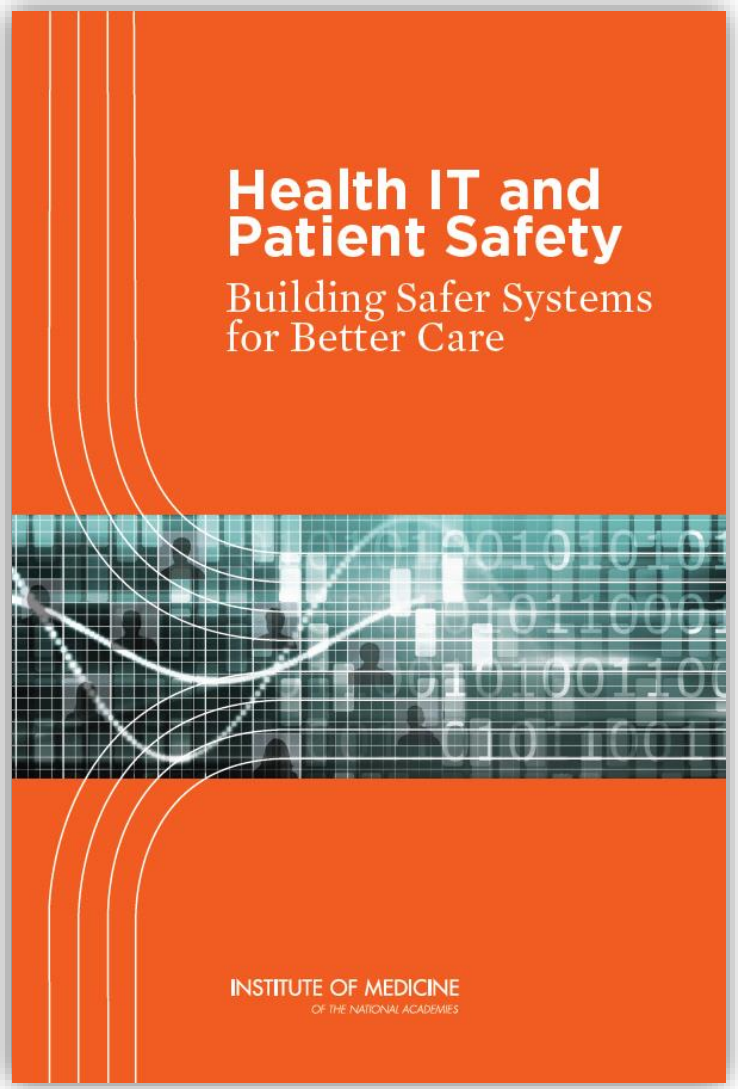
- Interacting with patient **during** visit
- Interacting with EHR **during** visit
- Interacting with EHR **outside** visit

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 priorities, end-user feedback
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

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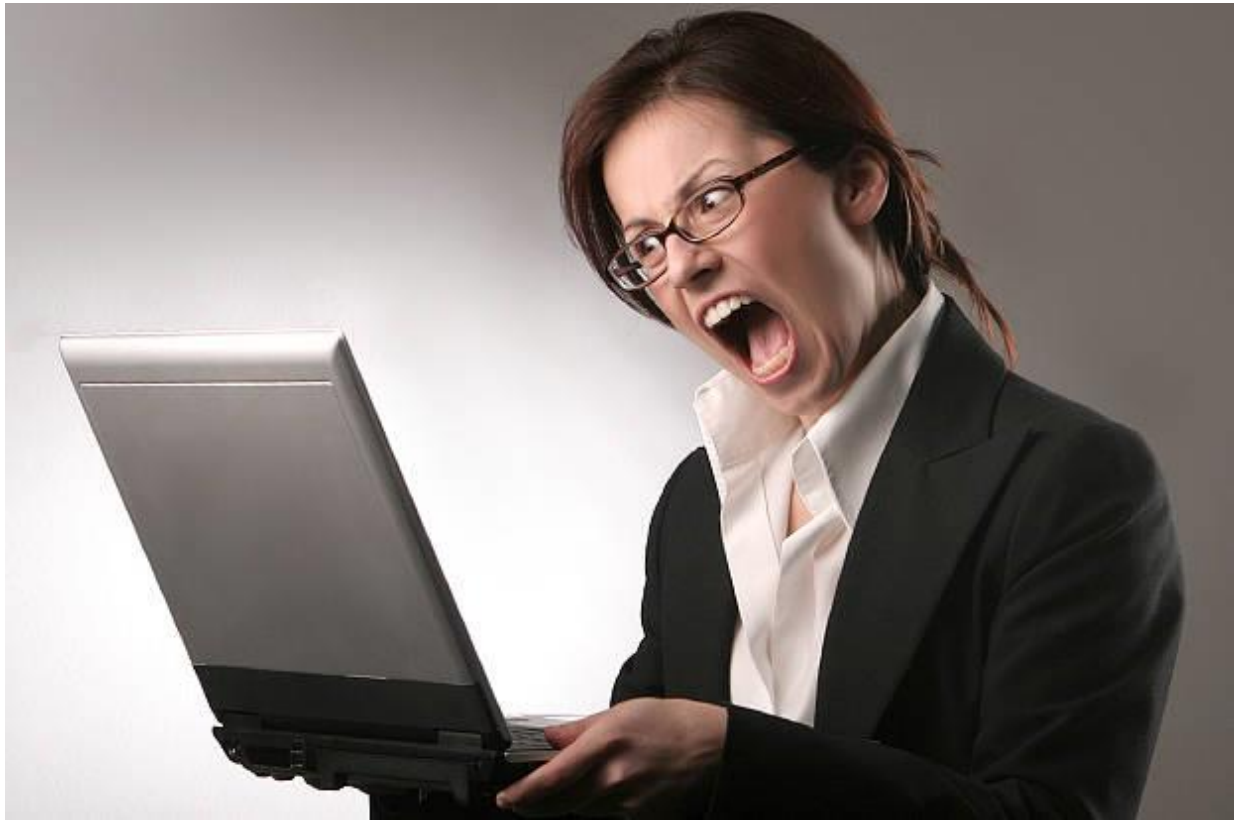
Clinical Workflow and Documentation Burdens

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

Carter J. Workflow & Process Definitions. 2018; http://www.clinicalworkflowcenter.com/resources/workflow-process-definitions.

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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Reimbursement and Administrative Regulations

Analysis

- 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:

Improve EHR user interface design to eliminate inefficiencies and reduce screen time	72%
Shift more EHR data entry to support staff	48%
Use of highly accurate voice recording technology that acts as a scribe during patient visits	38%

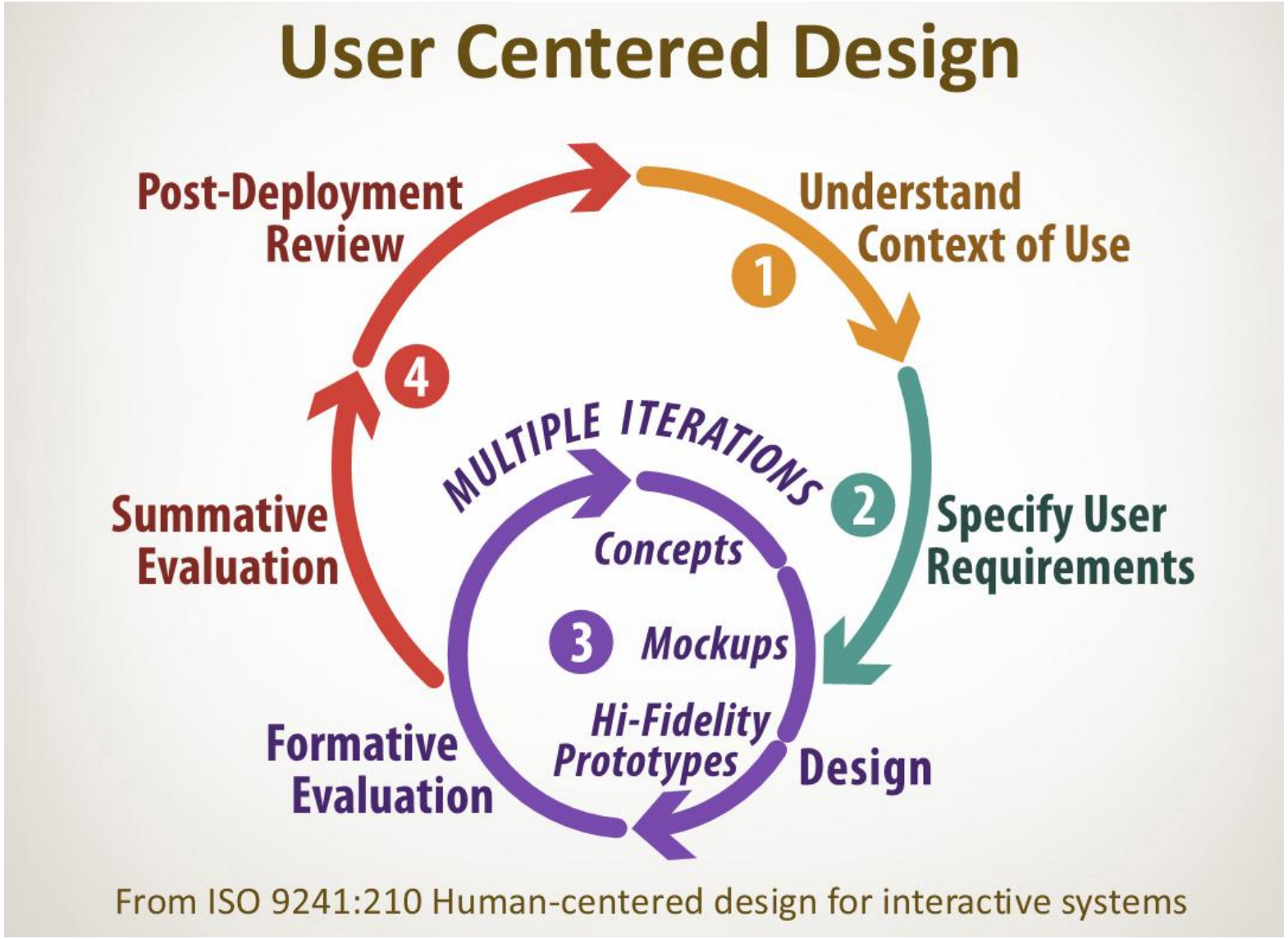
https://med.stanford.edu/content/dam/sm/ehr/documents/EHR-Poll-Presentation.pdf

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

UCD: A Consensus Approach to Making Usable Products



Paradox of User Centered Design

Every Patient is Unique

- Comorbity 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

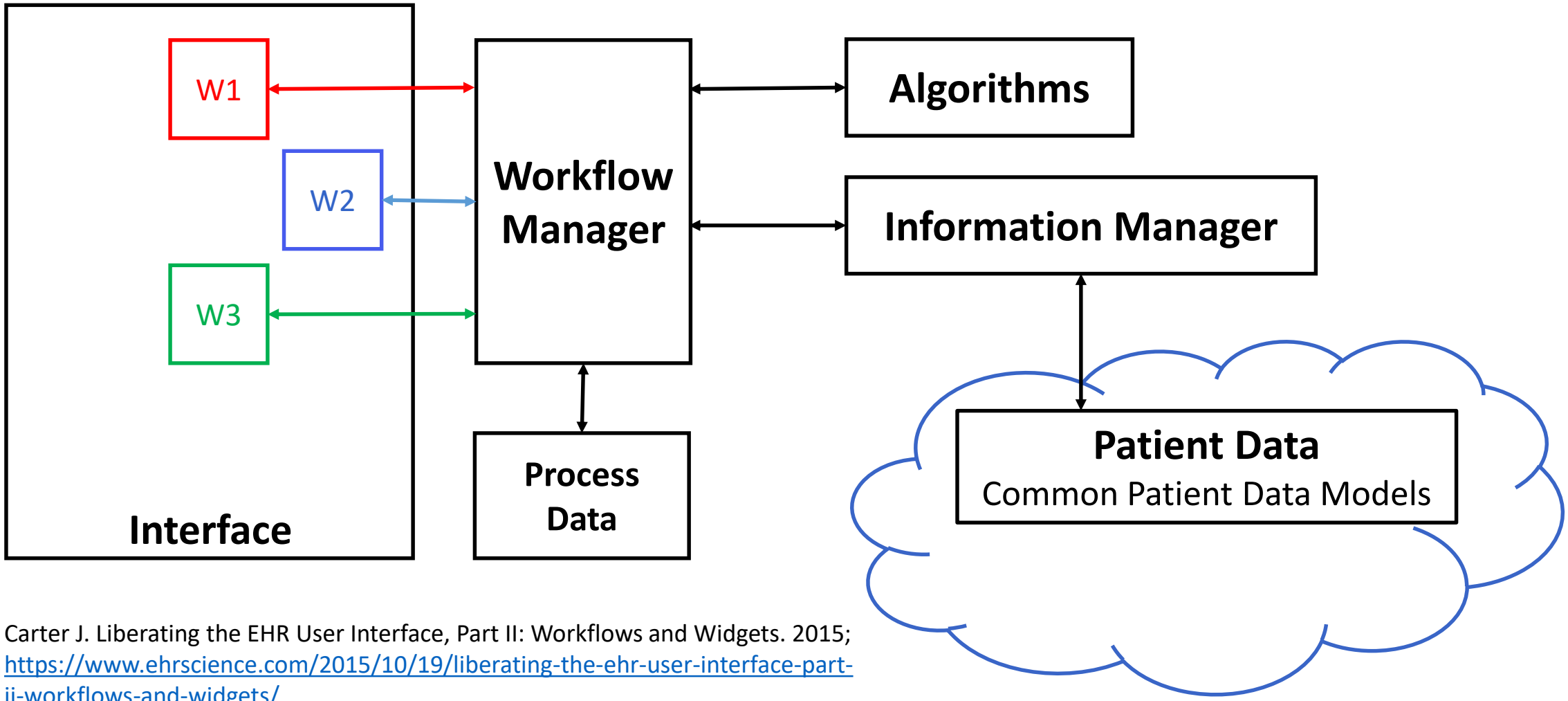
Text

Labs

Images

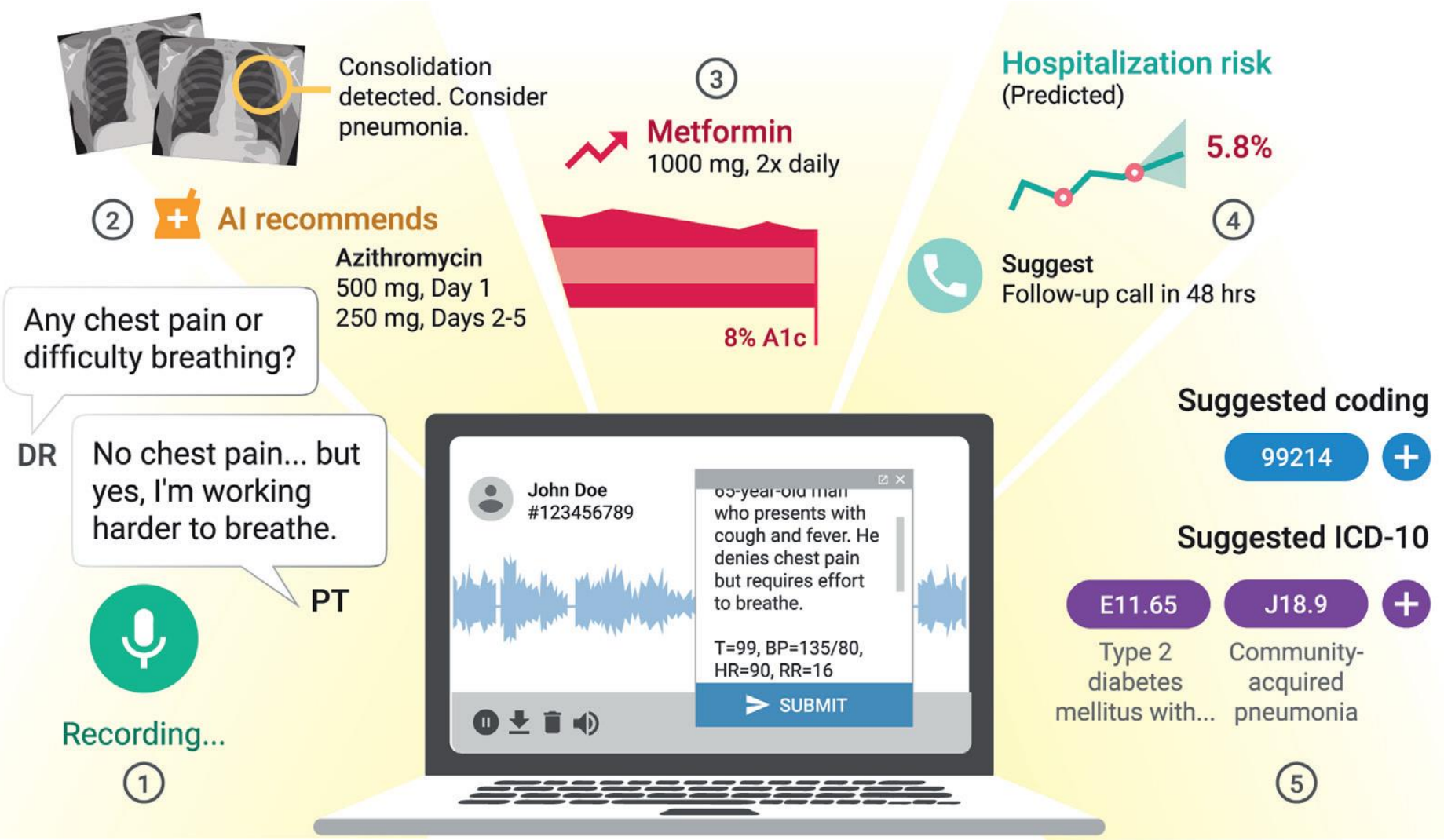
Widgets

Uncoupling the Data From the Interface



Carter J. Liberating the EHR User Interface, Part II: Workflows and Widgets. 2015; https://www.ehrscience.com/2015/10/19/liberating-the-ehr-user-interface-part-ii-workflows-and-widgets/

Artificial Intelligence and Natural Language Processing

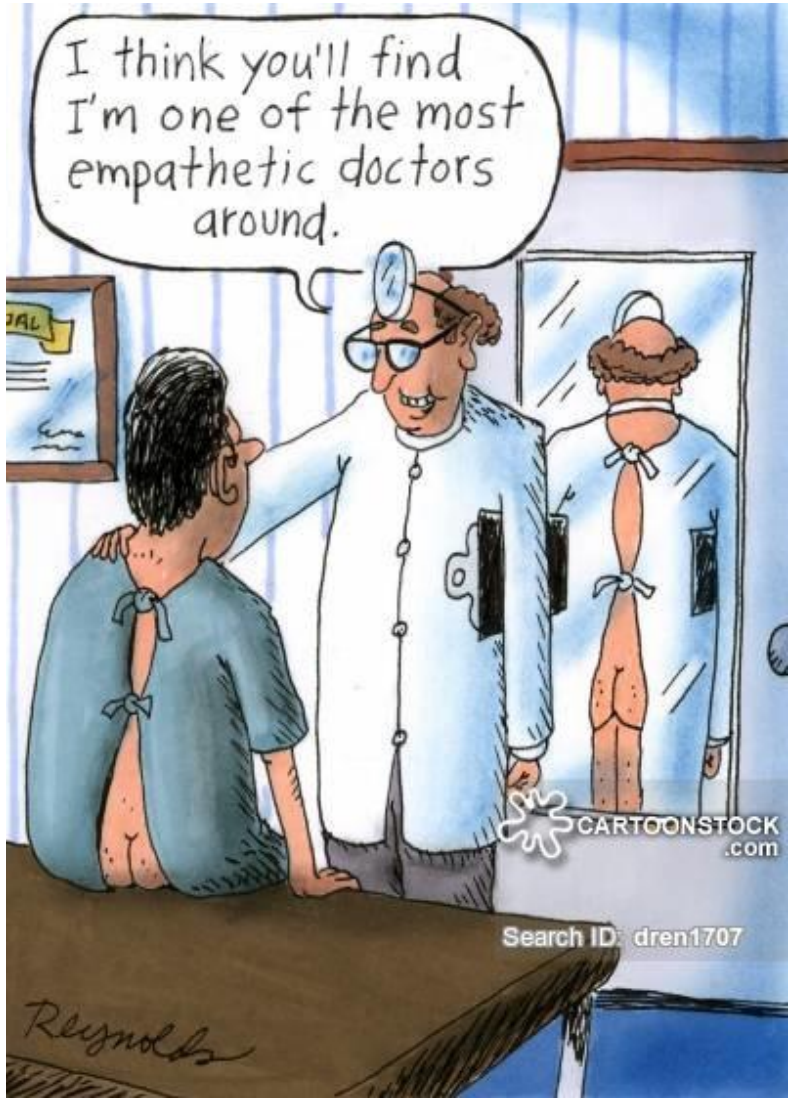


Lin SY, Shanafelt TD, Asch SM. Reimagining Clinical Documentation With Artificial Intelligence. *Mayo Clin Proc.* 2018;93(5):563-565.

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.

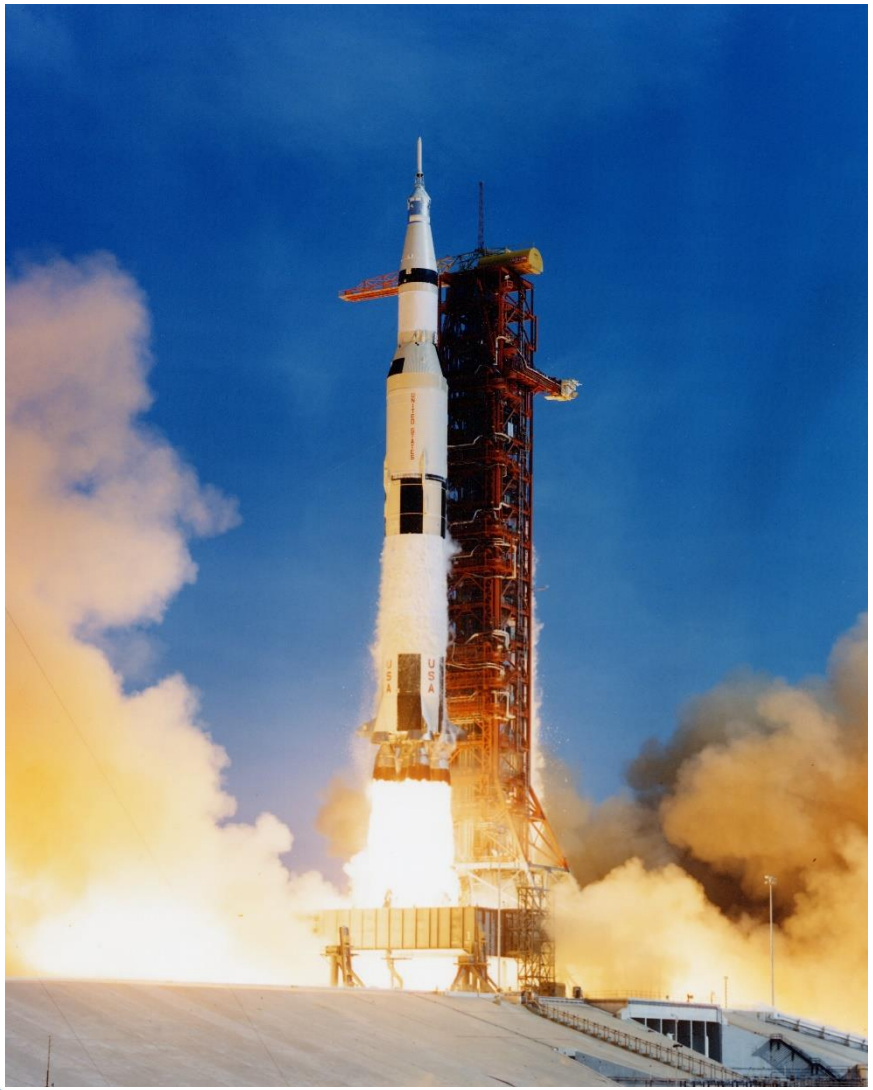
Verghese, A., Shah, N., and Harrington, R. (2018). *JAMA 319*(1): 19-20

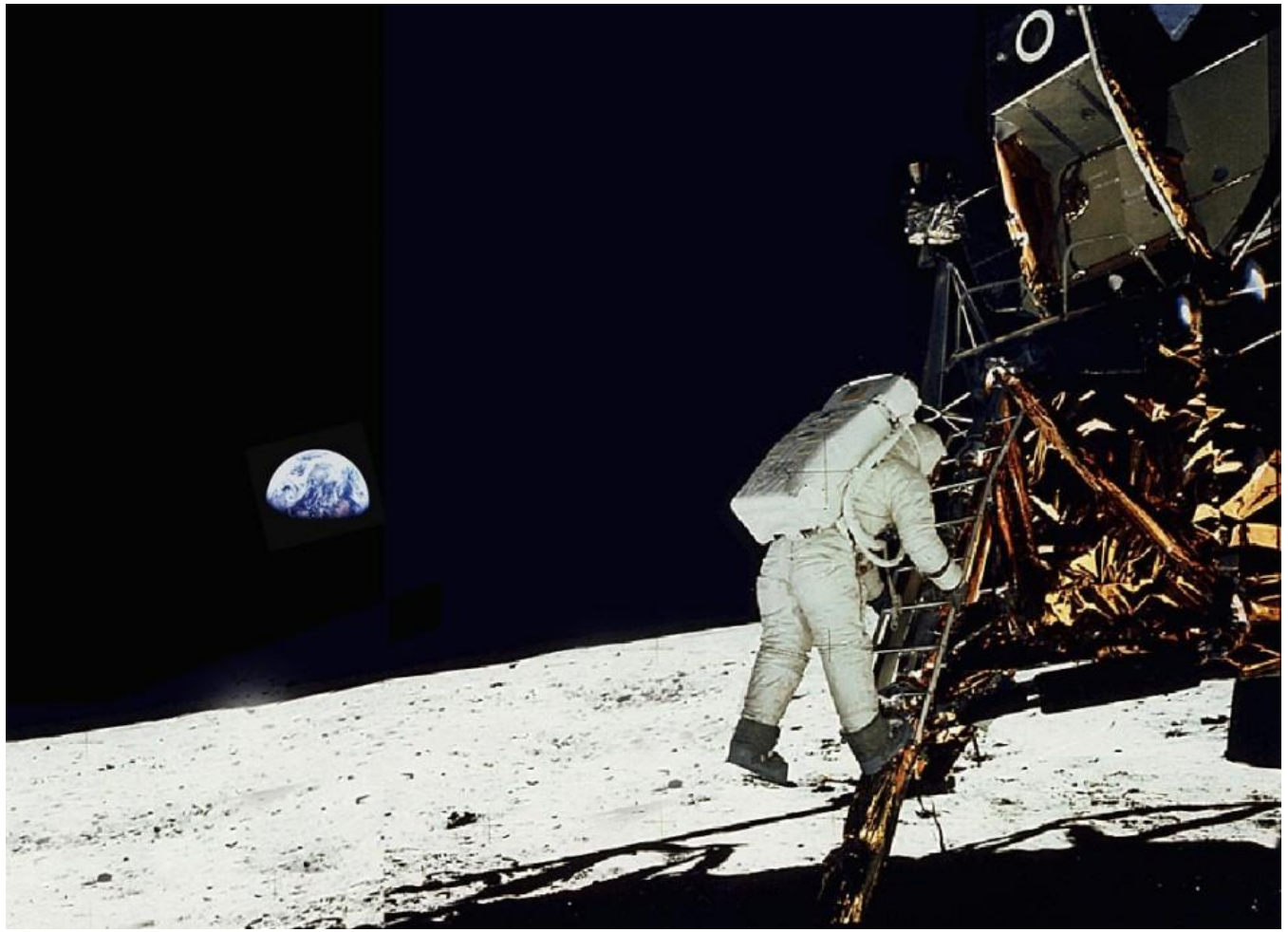
Reducing Clinician Burden Is a Shared Responsibility

- Academic researchers
- Clinical Informaticians
- Practicing Clinicians
- Software Developers
- UX Professionals
- Regulators/Policy Makers

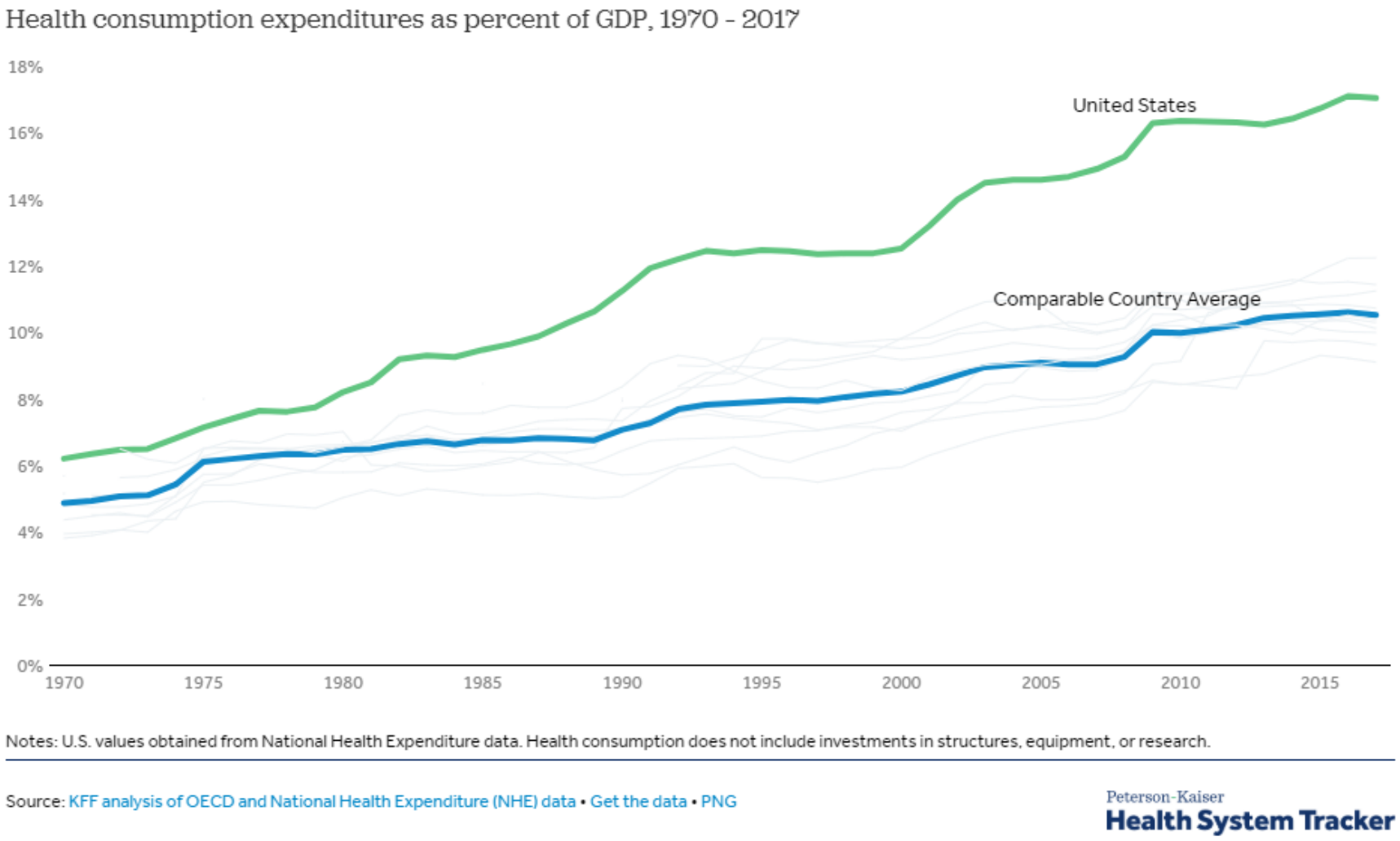
Rice University September 12, 1962

The Moon July 20, 1969





Unsustainable Rise in Healthcare Costs



https://www.healthsystemtracker.org/chart-collection/health-spending-u-s-compare-countries/#item-since-1980-the-gap-has-widened-between-u-s-health-spending-and-that-of-other-countries 2018

Comments and Questions

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