

# Improving the User Experience

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Chair, AMIA Board of Directors

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June 24, 2016

AMDIS Physician-Computer Connection Symposium

Ojai, California



# **Improving the User Experience**

# User experience

- What is the experience?
- Who is the user?



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EHR distracts from personal connection

Patient has limited involvement

Entering data takes too long

# Patient's perspective

## Willingness to Recommend

% said Yes, Definitely would recommend this doctor's office to your family and friends.

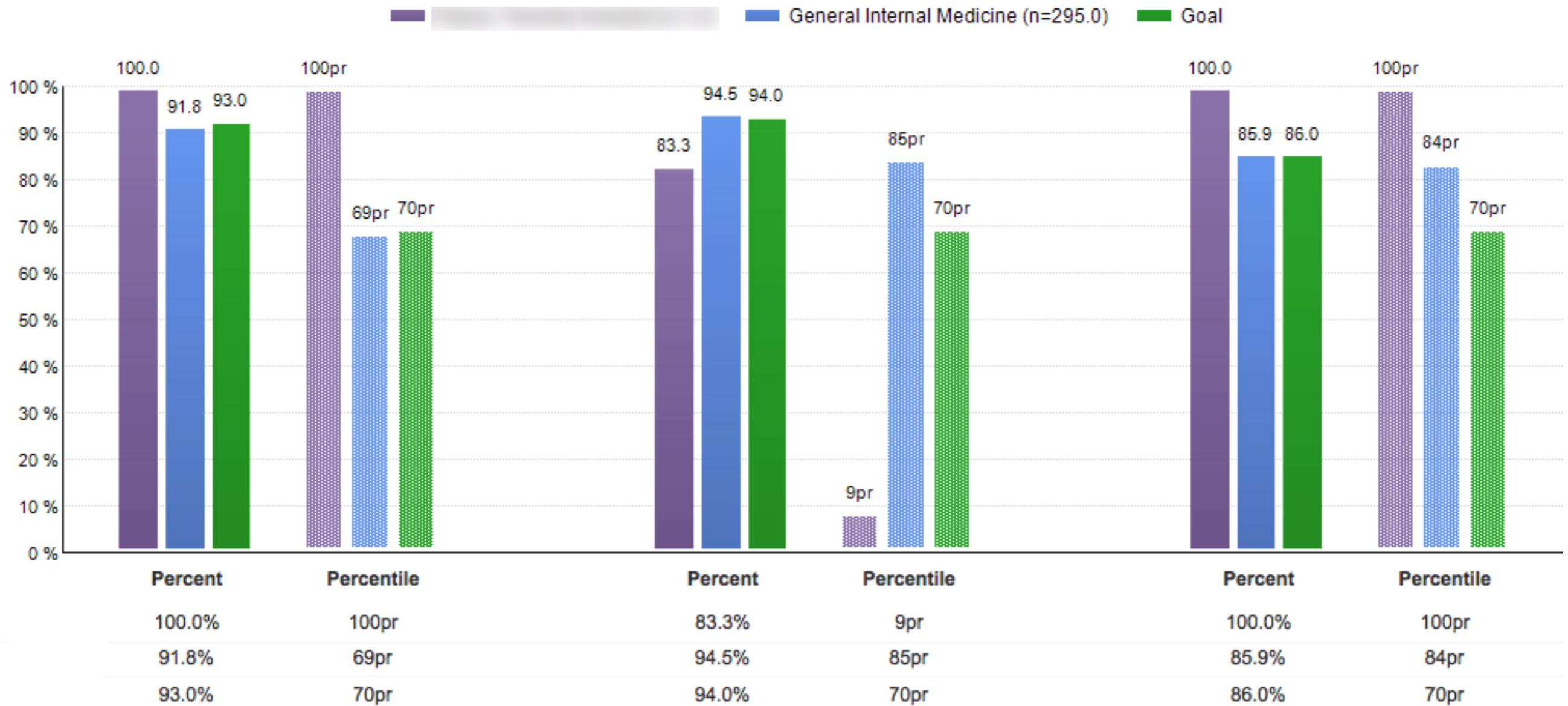
## MD Communication

% Yes, Definitely to did the doctor **explain things** in a way that was easy to understand, **listen carefully** to you, give you easy to understand instructions about taking care of health problems/concerns, seem to know the important information about your medical history, show **respect for what you had to say**, spend **enough time** with you

[View Detail](#)

## Overall MD Rating

% Rating 9 or 10 on 10pt Scale



Shouldn't health  
be simple

## What patients want from their doctors

Patients want many things from their doctors, not all of which are possible. Below, however, is a list of things that patients seem to want from their doctor and which should be possible.

- **Eye contact**—There is nothing worse than walking into a consulting room and not getting any eye contact from the doctor. It happened to me only last week; I knocked on the door, to be greeted with “Come” and to find the doctor sitting looking at his computer screen. He continued to do so while asking why I had come to see him.
- **Partnership**—Patients want to be people who doctors do things with, not people that doctors do things to. Patients want to be consulted about their condition, their treatment, and how things will progress from the consultation.
- **Communication**—Communication from doctor to patient and vice versa is the key to a successful consultation. Many patients still feel that they are entering “alien territory” when they go to see their doctor. In many cases they are scared, they don't understand what the doctor is saying, and they are not able to take everything in that they are told. Just as doctors may have

trouble understanding a patient's explanation of symptoms, so patients may have trouble understanding a doctor's explanation of the diagnosis.

- **Time**—Patients want to spend more time with their doctor: they want time to be able to explain things and have things explained to them. We all know that there is a shortage of doctors, and we know that a doctor's time is valuable. However, if one wish could be granted for patients it would be for more time with their doctor.
- **Appointments**—Patients want to get to see their doctor within a reasonable time; not weeks, but rather a few days, or, in the case of a person who is unwell, a few hours if possible.

These are just five wishes that we are told on a daily basis by patients. The relationship between a doctor and a patient is special, and one that works well in most cases. It is also a partnership, a partnership that should be valued by doctor and patient.

Mike Stone *director, Patients Association, Harrow*

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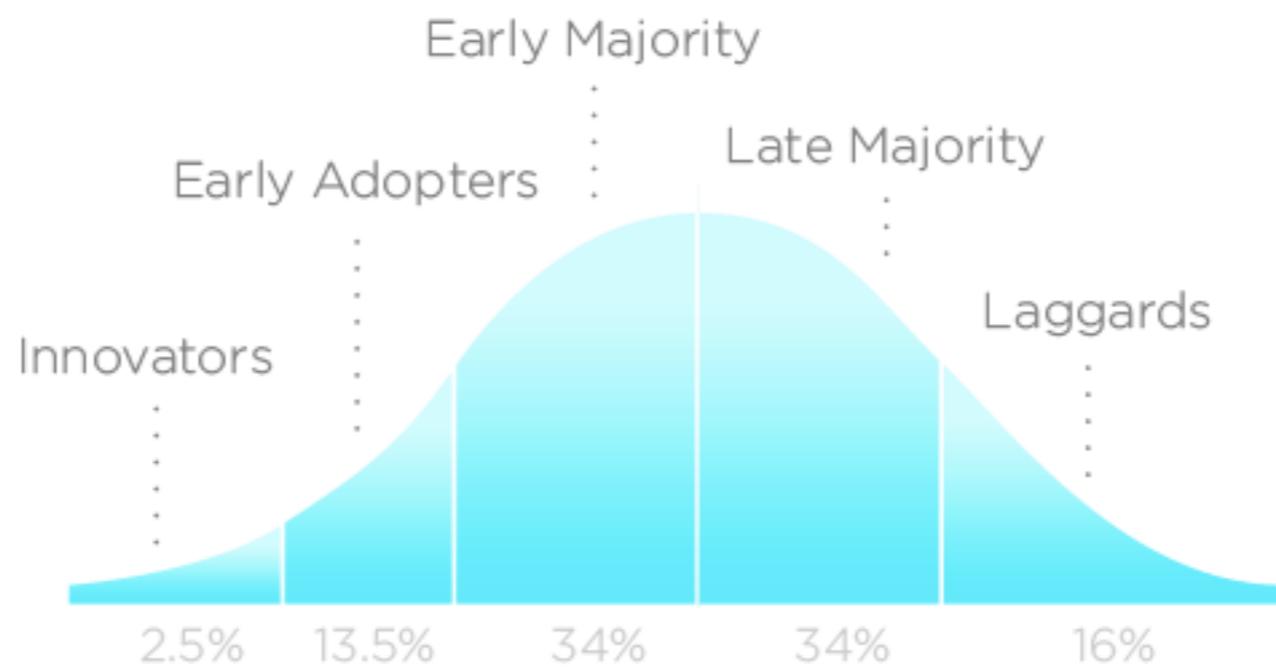
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# The physician experience



**INNOVATION ADOPTION LIFECYCLE**

## The Day the EHR Died

I was sitting at the computer, reviewing the EHR, when suddenly the software froze and I had to begin a full day in clinic.

I felt immediate frustration and anger. My job as a primary care physician is a race against time to complete as much as I can from a list of tasks: messages, results, prescriptions, paperwork, and e-mails. For each minute I am unproductive, I know I will be working 2 minutes later.

The New York Times

## With Electronic Medical Records, Doctors Read When They Should Talk

## Texting While Doctoring: A Patient Safety Hazard

Christine A. Sinsky, MD, and John W. Beasley, MD

Texting while driving is associated with a 23-fold increased risk for crashing (1) and is illegal in most states (2). Using a cell phone while driving reduces the amount of brain activity devoted to driving by 37% (3). Multitasking is dangerous—cognitive scientists have shown that engaging in a secondary task disrupts primary task performance (3).

Might physician typing into electronic health records pose similar risks? As when driving, physicians also need to be alert to environmental cues and unexpected turns. Most

Sunday Review | OPINION

## Why Health Care Tech Is Still So Bad

By ROBERT M. WACHTER MARCH 21, 2015

Email

LAST year, I saw an ad recruiting physicians to a Phoenix-area hospital. It promoted state-of-the-

# Do EHRs help us be better doctors?

- Physician job satisfaction declining
- Many reasons—EHRs are one
- “These physicians are concentrating not only on the patient but on typing the history, checking boxes, performing order entry, and other electronic tasks.”

## Texting While Doctoring: A Patient Safety Hazard

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Might physician typing into electronic health records pose similar risks? As when driving, physicians also need to be alert to environmental cues and unexpected turns. Multitasking can undermine the core activities of observation, communication, problem solving, and developing trusting relationships. Although it can be argued that texting is unrelated to the task of driving and that typing may be part of the patient care process, we believe the issue of distraction is nonetheless relevant, especially given the realities of information chaos during the encounter (4). Problems in care have been documented (5).

Although there is a relative lack of observational data, in clinics across the country we have observed patients send signals of depression, disagreement, and lack of understanding and have witnessed kind, compassionate, and well-intended physicians missing these signals while they multitask. These physicians are concentrating not only on the patient but on typing the history, checking boxes, performing order entry, and other electronic tasks (6). One physician noted, “I am always multitasking . . . I am entering orders, checking labs, downloading information while I talk to the patient. It requires chronic hypervigilance, which is exhausting and demands conscious effort to stay in the ‘present’ with the patient” (Day S. Personal communication.). External forces drive this. Vendors market their electronic health records with the pitch that costs will be offset by a reduction in transcription expenses as physicians type their notes. Computerized physician order entry displaces to the physician clerical tasks once performed by others, increasing time commitment and cognitive interruptions (7).

Stage 2 meaningful use criteria (8) require clinicians to type in orders so that physicians view clinical decision-support reminders; however, most tests ordered in the primary care setting do not require nor can they be addressed by this system. We found that less than 0.1% of the tests ordered in our practice could potentially benefit from point-of-care clinical decision support, a function not yet available for these tests. We are concerned about the hazards of applying a work burden to 100% of orders when less than 0.1% might benefit.

Time motion studies in our practice demonstrate that an additional 3 hours per week of physician time is lost to

order entry when physicians, rather than staff, perform these tasks. The time cost of this additional clerical work prevents physicians from “working to the top of their license,” is a form of waste, and effectively reduces primary care capacity. Yet, this workflow is associated with penalties in stage 2 meaningful use reporting.

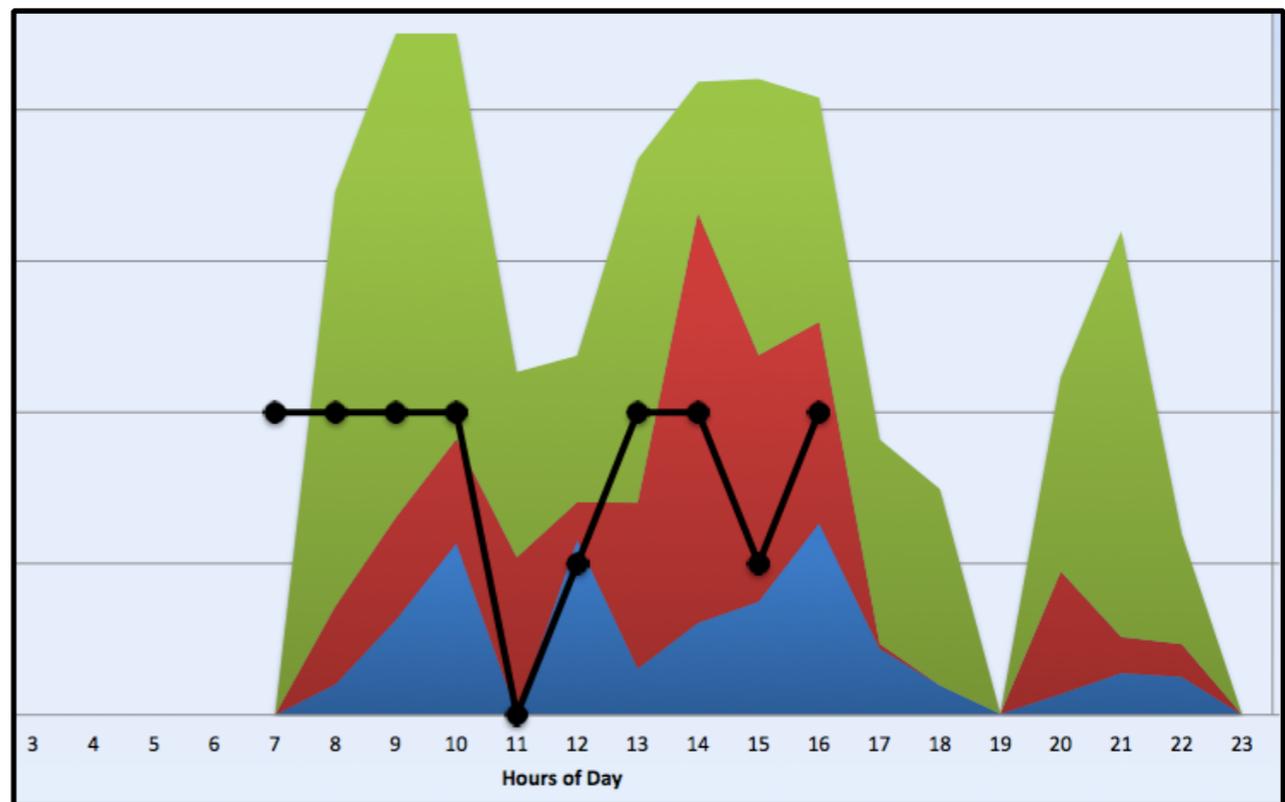
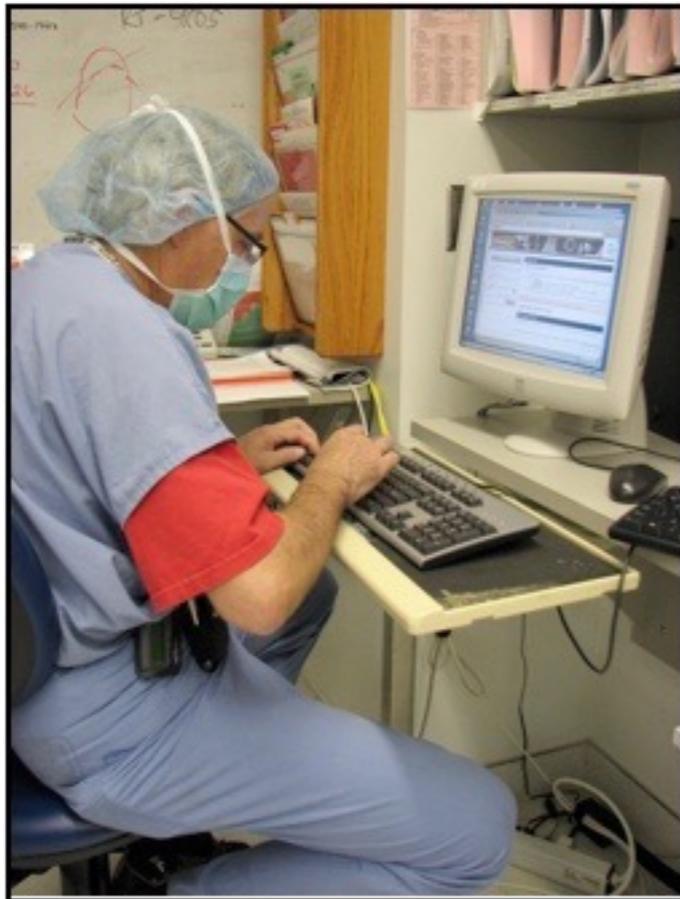
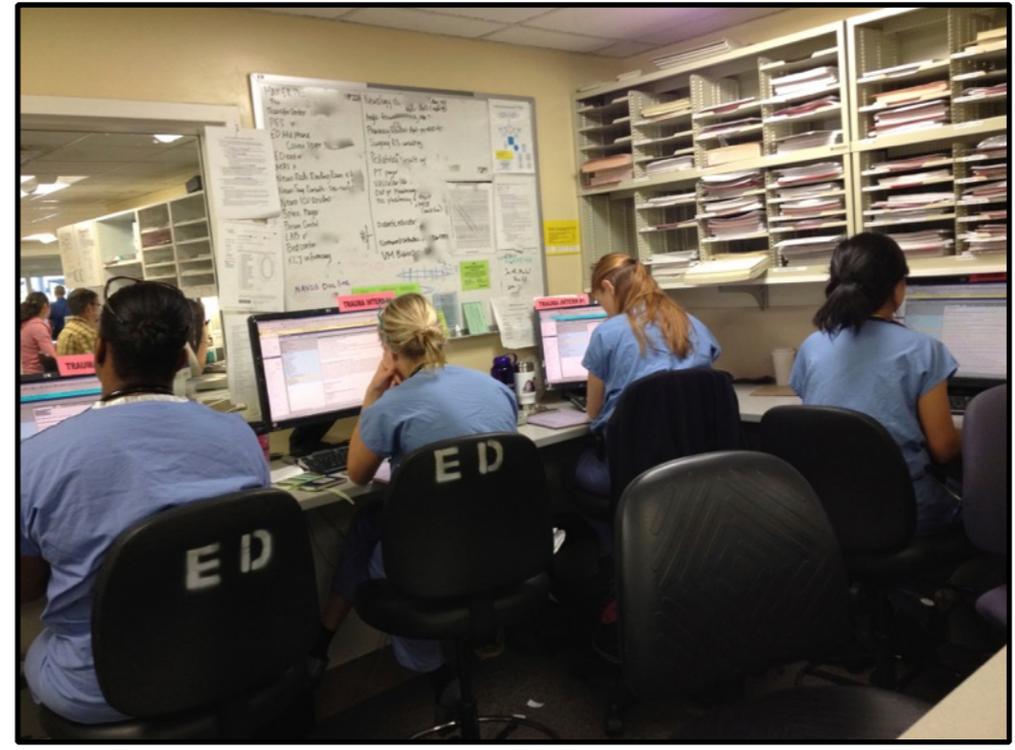
It is time to envision technologically supported, team-based models of care within a more sophisticated socio-technical framework. In these models, physicians give their patients undivided attention while other team members perform clerical and routine clinical functions, such as data acquisition, visit note documentation, and order entry.

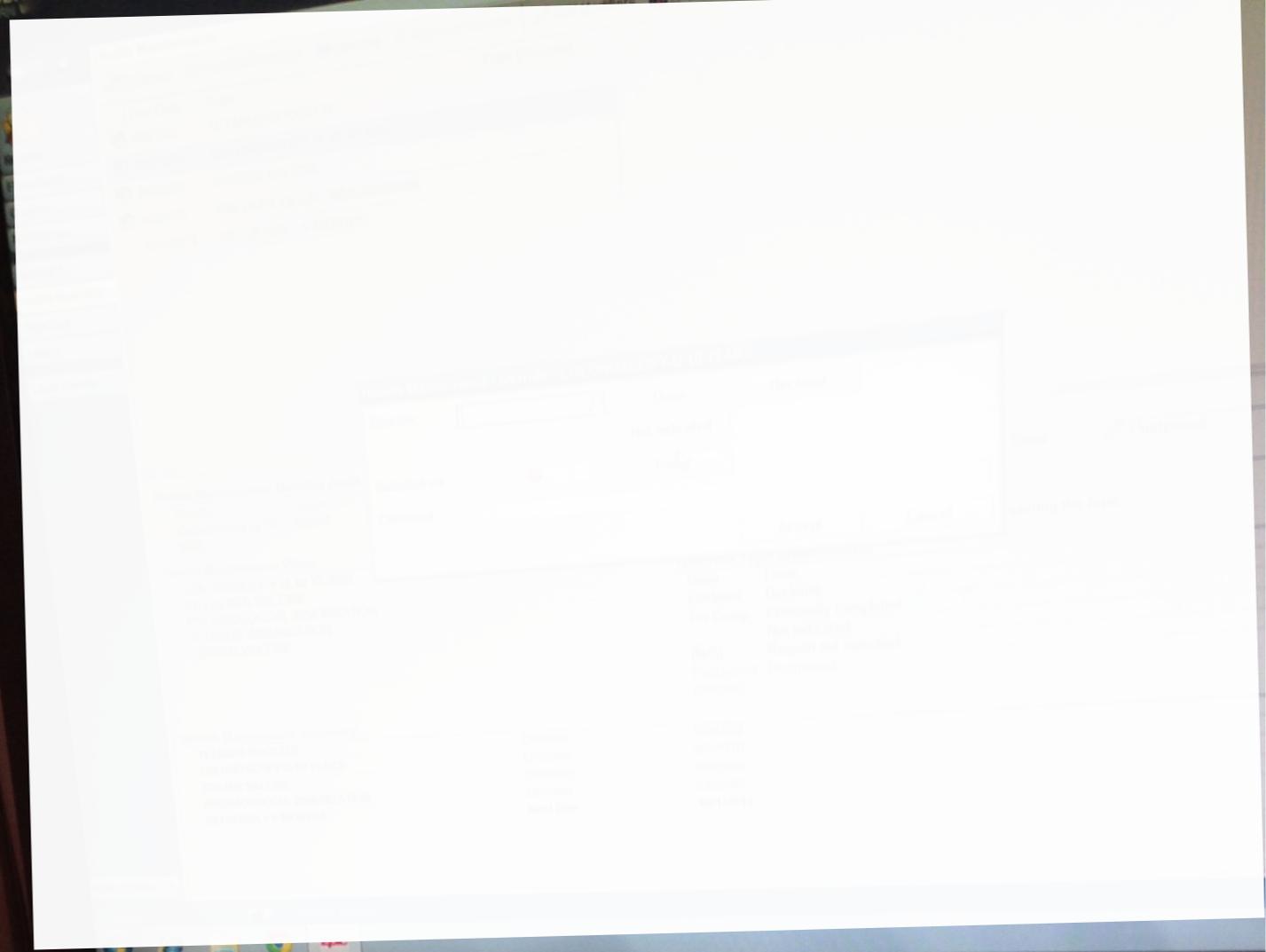
Emerging innovative models hold promise. We have observed in other practices (6, 9) and developed our own collaborative care model in which nurses, medical assistants, or health coaches manage electronic information, thus allowing the physician to provide undivided attention to the patient. Practices using these new models report greater patient access, better staff and physician satisfaction, and higher-quality metrics.

To flourish, these new models need both new policies and new technologies, such as a team login to allow seamless collaborative documentation between nurse and physician, team signatures to empower nursing staff to sign off on much of the paperwork in the practice, and meaningful use policies that allow nonclinical staff to fully support care.

New payment models will also help. The current visit-based, fee-for-service model contributes to the pressures to “text while doctoring” as clinicians record history on billing templates, progress through drop-down boxes to justify a level of service, distractedly multitask, and thus give their patients only partial attention. In contrast, we visited a practice under a global payment model in which clinician revenue does not depend on recording the encounter in a visit-based, level-of-service framework. Documentation in this practice, done largely by health coaches, focuses on the longitudinal portions of the record (problem list, patient goals, social history, and medication history), that is, those portions of the record that are most useful for care coordination and long-term management.

A tsunami is approaching the U.S. health care system: an obese, aging population, many newly insured, and a delivery system with limited primary care capacity, low numbers of students choosing primary care, and increasing burnout. But the problem is not simply one of physician supply—it is also one of physician utilization, which could be at least partially addressed by changing how work is organized, tasks are distributed, and the enterprise is regulated. At a time when so many are calling for teamwork in health care (10), policies and technologies that support



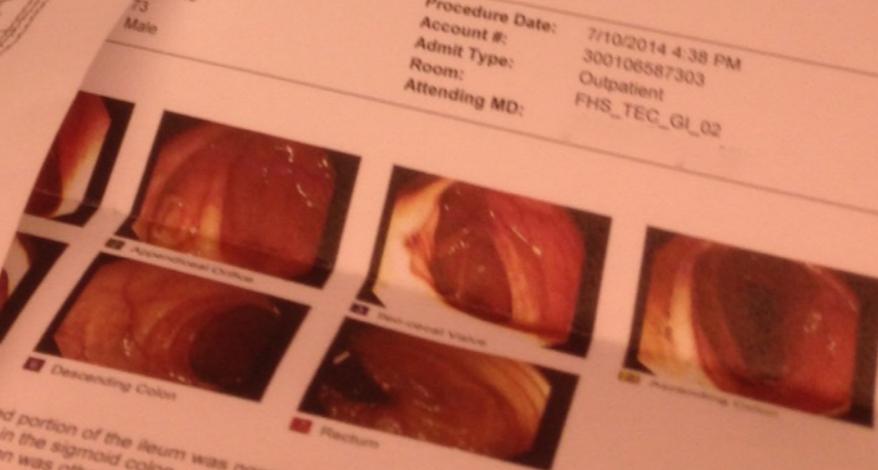


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**Texas Endoscopy Center**  
Patient Name: [Redacted]  
DOB: 08/19/40  
Age: 73  
Gender: Male  
Procedure: Colonoscopy  
Indications: Iron deficiency anemia  
Provider: Michael Kimney, MD  
Referring MD: Thomas H. Payne, MD  
Requesting Provider: [Redacted]  
Medications: Midazolam 4 mg IV, Fentanyl 100 micrograms IV  
Complications: No immediate complications

Procedure Date: 7/10/2014 4:38 PM  
Account #: 300106587303  
Admit Type: Outpatient  
Room: FHS\_TEC\_GL\_02  
Attending MD: Michael Kimney, MD

**Procedure:** The patient was administered oral pre-medications of 100mg polyethylene glycol solution and 100mg bisphosphonate. The patient is a 73-year-old male with a history of iron deficiency anemia. The colonoscopy was performed for the evaluation of iron deficiency anemia. The patient was administered oral pre-medications of 100mg polyethylene glycol solution and 100mg bisphosphonate. The patient is a 73-year-old male with a history of iron deficiency anemia. The colonoscopy was performed for the evaluation of iron deficiency anemia.



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# AMIA's position on usability

- 2013 task force of ten people: users, vendors, academics
- Usability key to safety
- Recommendations directed at policy, end-users, and research

## Enhancing patient safety and quality of care by improving the usability of electronic health record systems: recommendations from AMIA

Blackford Middleton,<sup>1</sup> Meryl Bloomrosen,<sup>2</sup> Mark A Dente,<sup>3</sup> Bill Hashmat,<sup>4</sup> Ross Koppel,<sup>5</sup> J Marc Overhage,<sup>6</sup> Thomas H Payne,<sup>7</sup> S Trent Rosenbloom,<sup>8</sup> Charlotte Weaver,<sup>9</sup> Jiajie Zhang<sup>10</sup>

<sup>1</sup>Clinical Informatics Research and Development, Partners HealthCare System, Harvard Medical School, Wellesley, Massachusetts, USA

<sup>2</sup>AMIA, Bethesda, Maryland, USA

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<sup>5</sup>Department of Sociology, University of Pennsylvania, Philadelphia, Pennsylvania, USA

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<sup>8</sup>Department of Biomedical Informatics, Vanderbilt University Medical Center, Nashville, Tennessee, USA

<sup>9</sup>School of Biomedical Informatics, Gentiva Health Services, Atlanta, Georgia, USA

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**To cite:** Middleton B, Bloomrosen M, Dente MA, et al. *J Am Med Inform Assoc*. Published Online First: [please include Day Month Year] doi:10.1136/amiajnl-2012-001458

### ABSTRACT

In response to mounting evidence that use of electronic medical record systems may cause unintended consequences, and even patient harm, the AMIA Board of Directors convened a Task Force on Usability to examine evidence from the literature and make recommendations. This task force was composed of representatives from both academic settings and vendors of electronic health record (EHR) systems. After a careful review of the literature and of vendor experiences with EHR design and implementation, the task force developed 10 recommendations in four areas: (1) human factors health information technology (IT) research, (2) health IT policy, (3) industry recommendations, and (4) recommendations for the clinician end-user of EHR software. These AMIA recommendations are intended to stimulate informed debate, provide a plan to increase understanding of the impact of usability on the effective use of health IT, and lead to safer and higher quality care with the adoption of useful and usable EHR systems.

### INTRODUCTION

US healthcare delivery is in the midst of a profound transformation which results, at least in part, from Federal public policy efforts to encourage the adoption and use of health information technology (health IT). For example, HITECH regulations<sup>1</sup> within the American Recovery and Reinvestment Act<sup>2</sup> incentivize health IT use,<sup>3,4</sup> and are changing the practice of medicine and clinical care delivery in both beneficial<sup>5,6</sup> and untoward ways.<sup>7</sup> Increased adoption of electronic health record (EHR) systems has been accompanied by heightened recognition of issues related to 'goodness of fit' in the user-friendliness of EHR systems.<sup>8</sup> Some EHR users lament that health IT seems designed more for clinical transactions than for clinical care, and may not be easy to use in some care settings.<sup>9,10</sup> In addition, many EHR systems require extensive training and lack standard user interfaces so that clinicians who work in multiple care settings using disparate technologies may struggle with the differences in interface design, with adverse impact on patient safety.<sup>11</sup> User interface design can influence provider productivity: well-designed interfaces speed work, while poorly designed interfaces steal minutes from busy schedules. The Institute of Medicine (IOM) report, *Health IT and Patient Safety: Building Safer Systems for Better Care* identified means by which health IT can lead to safer care, as well as introduce new safety

risks. A critical component of safe and effective use of health IT is usability—the effectiveness, efficiency, and satisfaction with which the intended users can achieve their tasks in the intended context of product use.<sup>12</sup> The IOM recommended that '[t]he Secretary of HHS [Health and Human Services] should specify the quality and risk management process requirements that health IT vendors must adopt, with a particular focus on human factors, safety culture, and usability' (recommendation 6, p 9<sup>3</sup>).

### PURPOSE OF THIS AMIA STATEMENT

Given the anticipated adoption of health IT, and the potential for increased health IT-related harm or potential error, the AMIA Board of Directors convened a task force of members drawn from academia, clinical practice, and industry to produce a set of AMIA recommendations on enhancing patient safety and the quality of care with improved usability of EHR systems. These AMIA recommendations are intended to stimulate informed debate, form the basis of a plan to increase understanding of the impact of usability on the effective use of health IT, and lead to safer and higher quality care with the adoption of useful and usable EHR systems.

To address this issue, the task force convened for over a year. Subcommittees reviewed the literature on usability in health IT, current related activities underway at various US Federal agencies, lessons learned regarding usability and human factors in other industries, and current federally funded research activities. The key principles and recommendations described below are based on these reviews.

### RELATIONSHIP OF USABILITY TO OPTIMAL HEALTHCARE PRACTICE

To frame this discussion, the AMIA Task Force on Usability considered the following issues related to health IT: (1) safe and effective use of EHR, (2) EHR usability, and (3) EHR usability-associated medical errors. Recent reports describe the safe and effective use of EHR as a property resulting from the careful integration of multiple factors in a broad socio-technical framework,<sup>13</sup> including coordination and consideration across requirements assessment, application design, usability and human factors engineering, implementation, training, monitoring, and feedback to application developers.<sup>14-16</sup> Following best practices for EHR implementation is essential to

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**Table 1** Fourteen usability principles for the design of electronic medical records

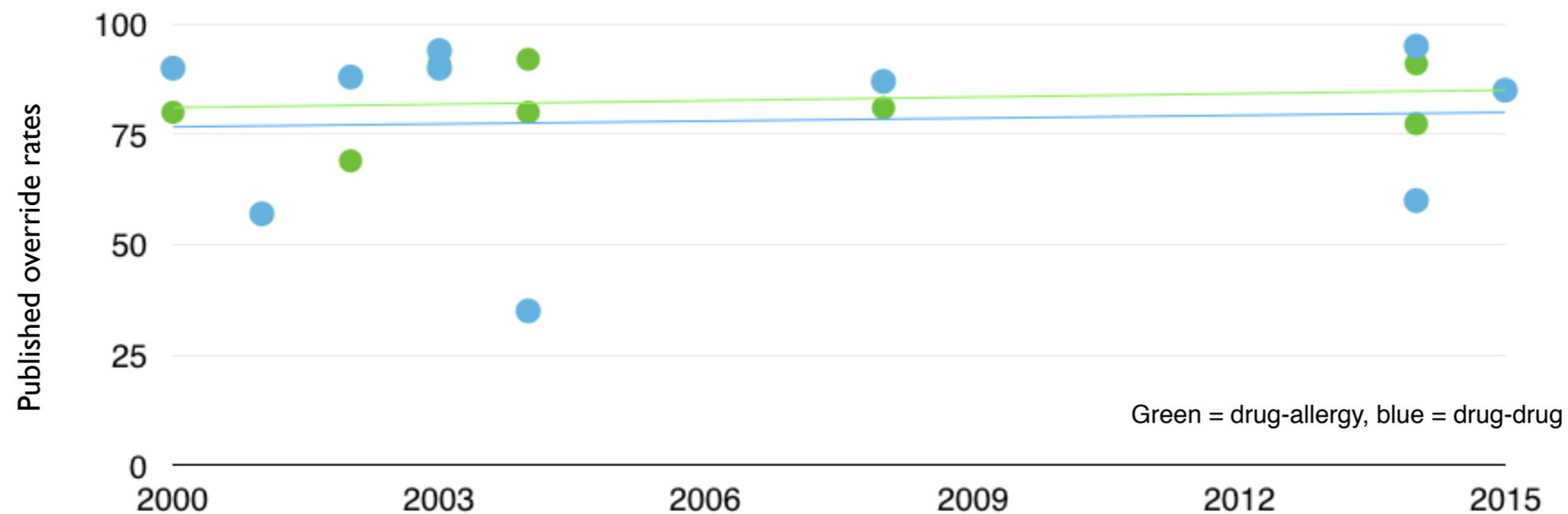
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- |   |  |
|---|--|
| 1. Consistency—Design consistency and standards utilization | 8. Message—Useful error messages         |
| 2. Visibility—System state visibility                       | 9. Error—Use error prevention            |
| 3. Match—System and world match                             | 10. Closure—Clear closure                |
| 4. Minimalism—Minimalist design                             | 11. Reversibility—Reversible actions     |
| 5. Memory—Memory load minimization                          | 12. Language—User language utilization   |
| 6. Feedback—Informative feedback                            | 13. Control—User control                 |
| 7. Flexibility—Flexible and customizable system             | 14. Documentation—Help and documentation |
- 

Adapted from Zhang and Walji.<sup>54</sup>

# The experience of decision support

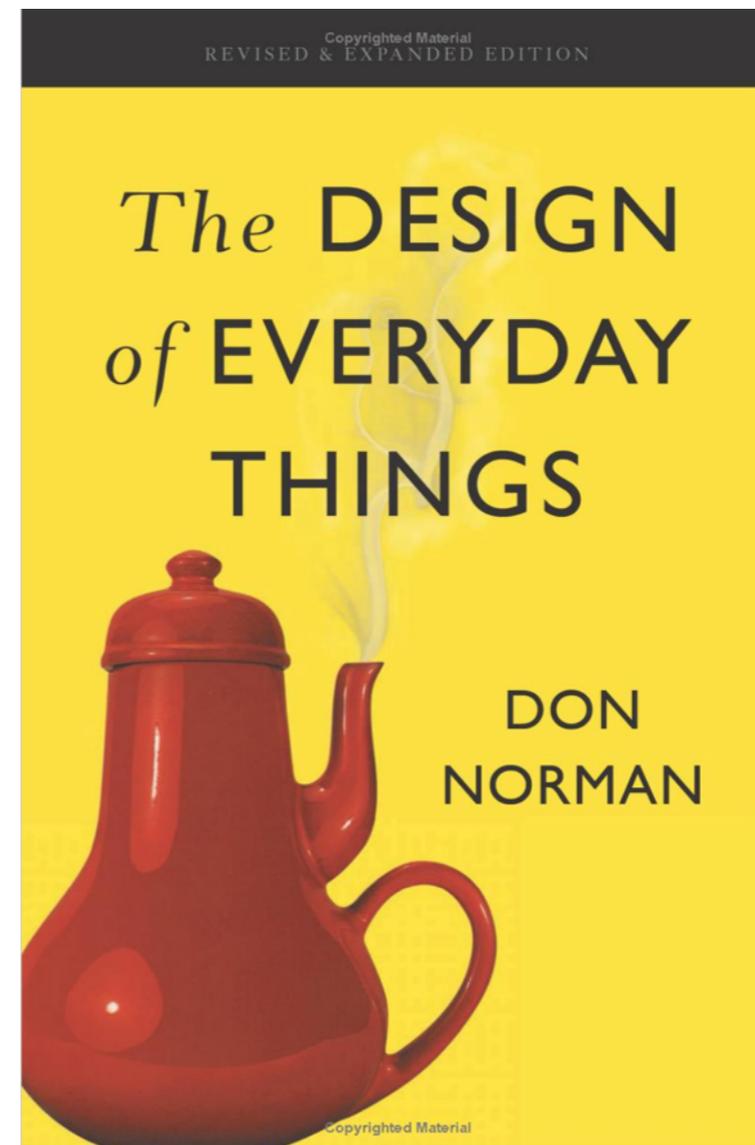
“How do we ensure the EHR helps us when we need it and stands out of the way when we don’t?”

Anonymous reviewer



# Design is difficult and important

- Current EHR designs are the product of methods we have used for decades
- Don't ask (users what they want), observe them.
- Observe design in everyday life: Doors for example.



# What does need for scribe tell us about user experience?



- Popular with many physicians
- Google “CRICO youtube EHR”

**Improving the experience**

# EHR 2020 Task Force Recommendations

Full text available at <http://jamia.org>

## Report of the AMIA EHR 2020 Task Force on the Status and Future Direction of EHRs

Thomas H. Payne,<sup>1</sup> Sarah Corley,<sup>2</sup> Theresa A. Cullen,<sup>3</sup> Tejal K. Gandhi,<sup>4</sup> Linda Harrington,<sup>5</sup> Gilad J. Kuperman,<sup>6</sup> John E. Mattison,<sup>7</sup> David P. McCallie,<sup>8</sup> Clement J. McDonald,<sup>9</sup> Paul C. Tang,<sup>10</sup> William M. Tierney,<sup>11</sup> Charlotte Weaver,<sup>12</sup> Charlene R. Weir,<sup>13</sup> Michael H. Zaroukian<sup>14</sup>



Over the last 5 years, stimulated by the changing healthcare environment and the HITECH Meaningful Use (MU) EHR Incentive program, EHR adoption has grown remarkably, and there is early evidence of benefits in safety and quality as a result.<sup>1,2</sup> However, with this broad adoption many clinicians are voicing concerns that EHR use has had unintended clinical consequences, including reduced time for patient-clinician interaction,<sup>3</sup> transferred new and burdensome data entry tasks to front-line clinicians,<sup>4,5</sup> and lengthened workdays.<sup>6,7,8</sup> Interoperability between different EHR systems has languished despite large efforts.<sup>9,10</sup> These frustrations are contributing to a decreased satisfaction with professional work life.<sup>11,12,13</sup> In professional journals,<sup>14</sup> press reports,<sup>15,16,17</sup> on wards and in clinics, we have heard of the difficulties that the transition to EHRs has created.<sup>18</sup> Clinicians ask for help getting through their days, which often extend into evenings devoted to writing

Much of the focus of the last decade, via MU and other incentives, was to encourage providers and other health professionals to implement EHRs and use them to capture and share data important to quality and cost. The work now ahead is to ensure that these systems are designed and implemented in a way that yields promised benefits to efficiency, quality and safety with fewer side effects.<sup>25</sup> While cost, usability, and other considerations are important, patient safety and quality of care need to guide how we optimize these systems.

There can be a tension between efficiency and safety. Medication reconciliation is a good example—medication errors at transitions of care are a significant safety concern and represent a rationale for adding safeguards despite the impact on time and process.<sup>26</sup> EHRs now include detailed processes to reconcile medications that some providers feel add to their workload and slow them down. Informed by careful stud-

# Task Force on Status and Future Direction of EHRs: EHR-2020 Task Force

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# EHR 2020 Task Force Recommendations

## Ten recommendations in five areas

1. Improve documentation requirements and functionality to empower patients
2. Refocus regulations so that patients and their caregivers can derive the most benefit
3. Increase transparency
4. Foster innovation
5. Support person-centered care

Full text available at <http://jamia.org>



# Foster Innovation

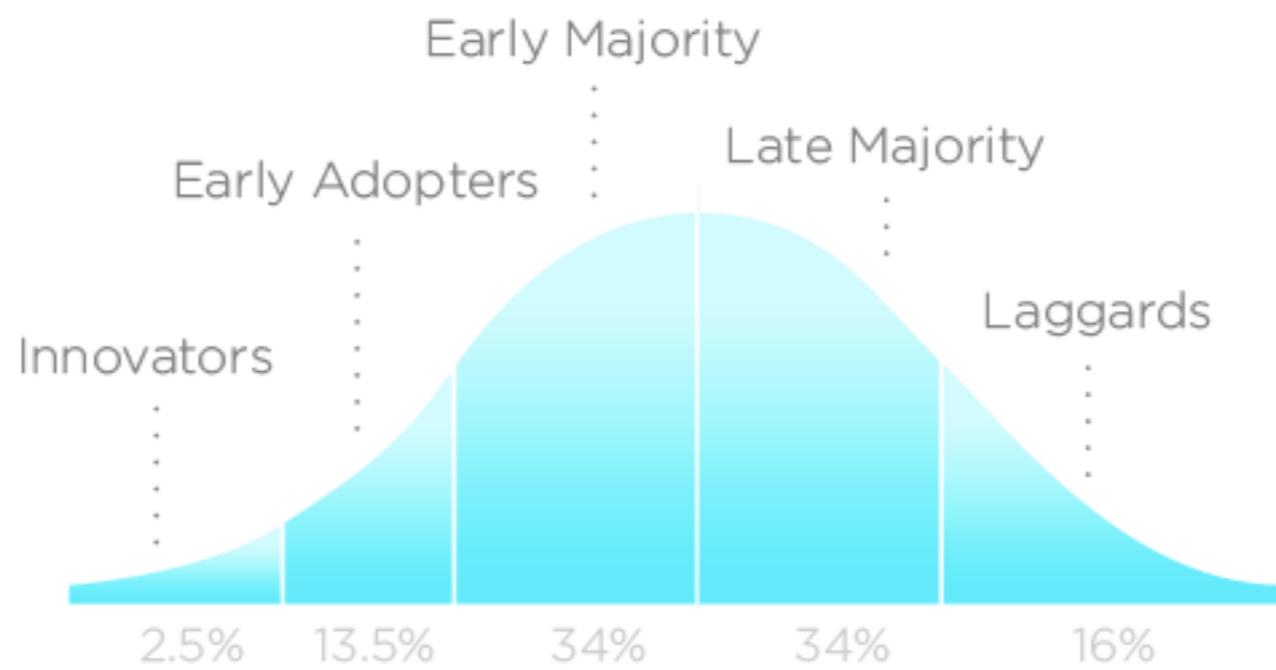
Recommendations 3, 8, 9, 10

## NEED

- Need to imagine and build next generation of EHRs
- Public standards-based application programming interfaces (APIs) and data standards
- Permit patients to gain access to their entire medical record
- Investments in research on how best to capture and integrate data, and to design new interfaces
- To know how to better use data to change individual behavior and system change

## HOW

- EHR vendors should use public standards-based APIs (JASON Task Force recommendations)
- Standards should support ecosystems of innovation to emerge inside and outside traditional health IT communities.
- Research into how to use data to change provider and system behavior



**INNOVATION ADOPTION LIFECYCLE**

## Typing Skills of Physicians in Training

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RIPUDAMAN S. MUNJAL, MBBS  
JOSEPH SCHIANODICOLA, MD  
JOEL M. YARMUSH, MD, MPA

### Abstract

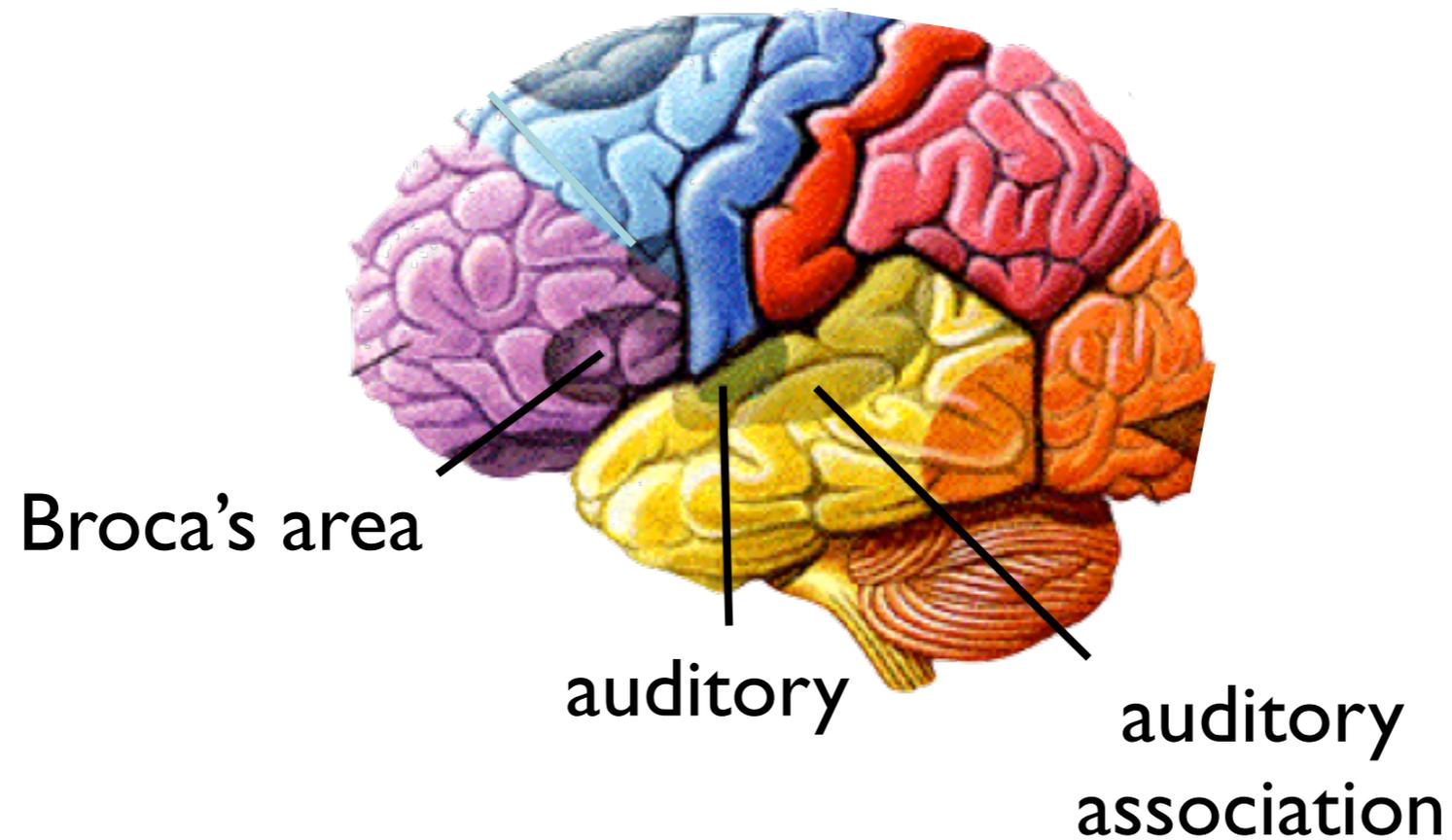
**Background** There is an increasing use of electronic health records in hospitals across the United States. The speed and accuracy of residents in documenting electronic health records has been insufficiently addressed.

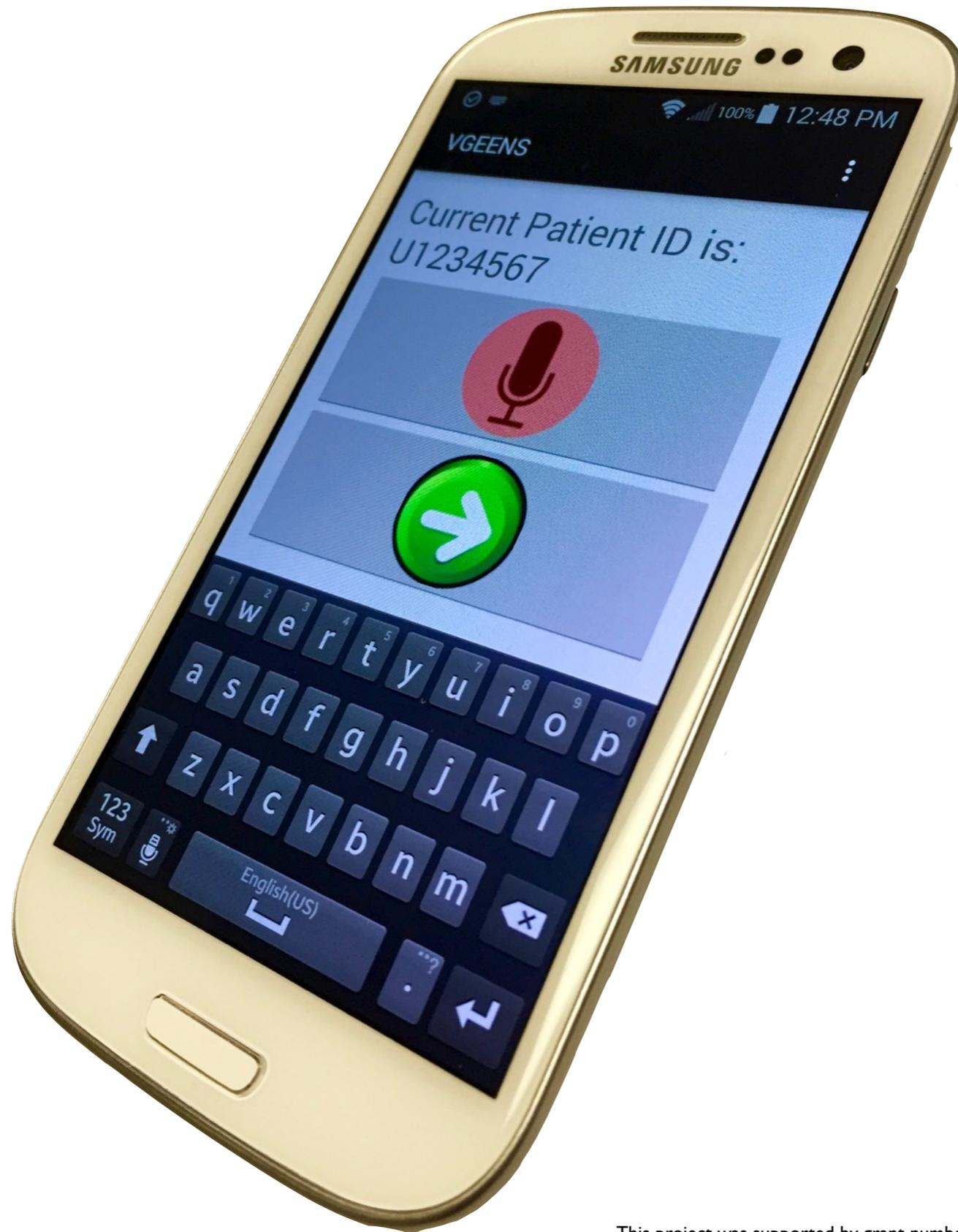
**Methods** We studied resident typing skills at New York Methodist Hospital. Participating residents typed a standard 100-word alphanumerical paragraph of a patient's medical history. Typing skills were assessed by calculating the net words per minute (WPM). Typing skills were categorized as follows: (1) fewer than 26 net WPM as very slow; (2) 26 to 35 net WPM as slow; (3) 35 to 45 net WPM as intermediate; and (4) greater than 45 net WPM as fast. Residents were further categorized into (1) American medical graduates; (2) American international medical graduates; and (3) non-American international medical graduates.

**Results** A total of 104 of 280 residents (37%) participated in the study. There was equal representation from various specialties, backgrounds, and all postgraduate levels of training. The median typing speed was 30.4 net WPM. Typing skills were very slow (34 of 104, 33%), slow (28 of 104, 27%), intermediate (29 of 104, 28%), and fast (13 of 104, 12%) among the residents. Typing skills of non-American international medical graduates (mean net WPM of 25.9) were significantly slower than those of American medical graduates (mean net WPM of 35.9) and American international medical graduates (mean net WPM of 33.5).

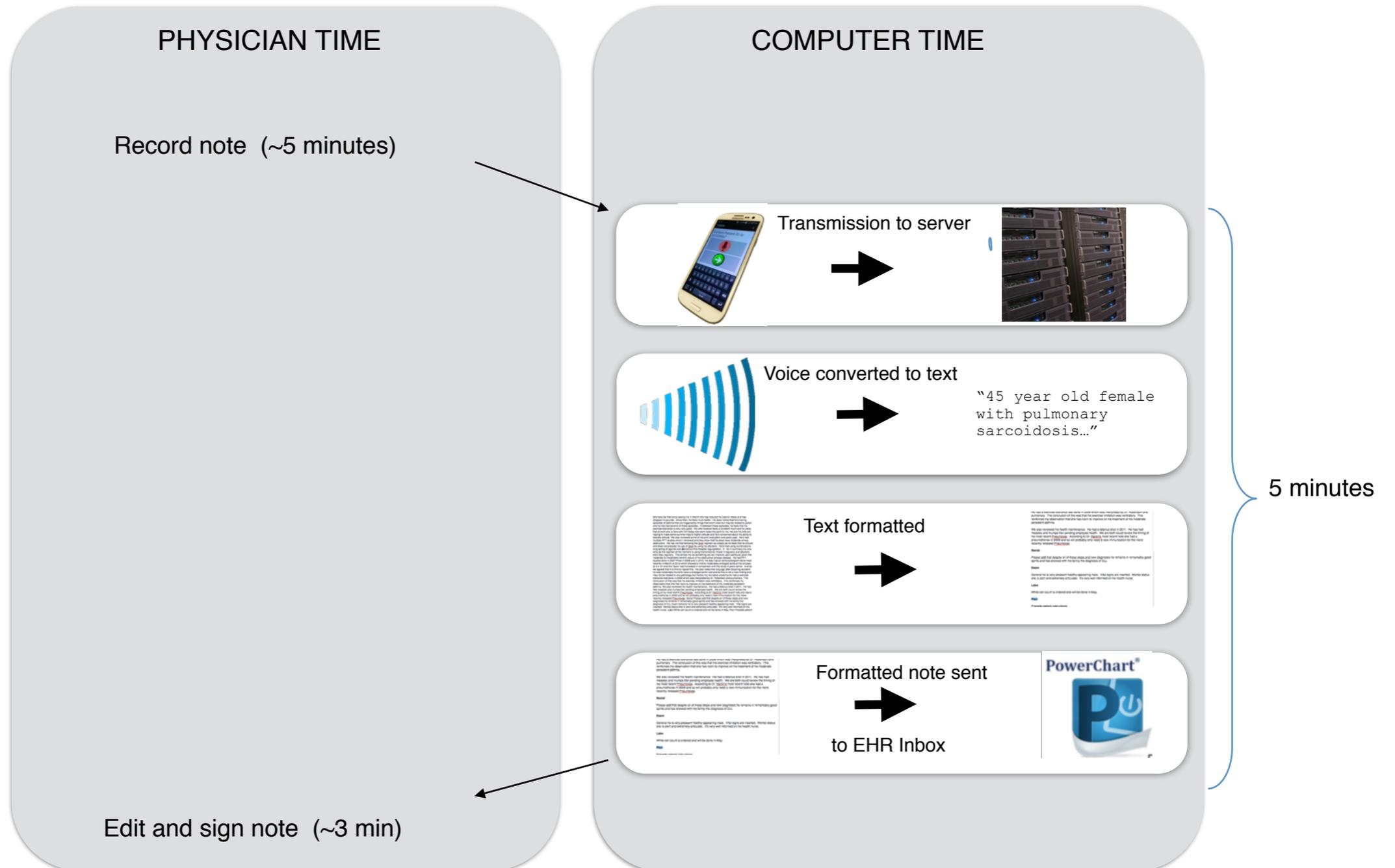
**Conclusions** Most residents (60%, 62 of 104) who participated in the study at our institute lacked typing skills. As the use of electronic health records increases, a lack of typing skills may impact residents' time for learning and patient care.

# Our brains are designed for speech





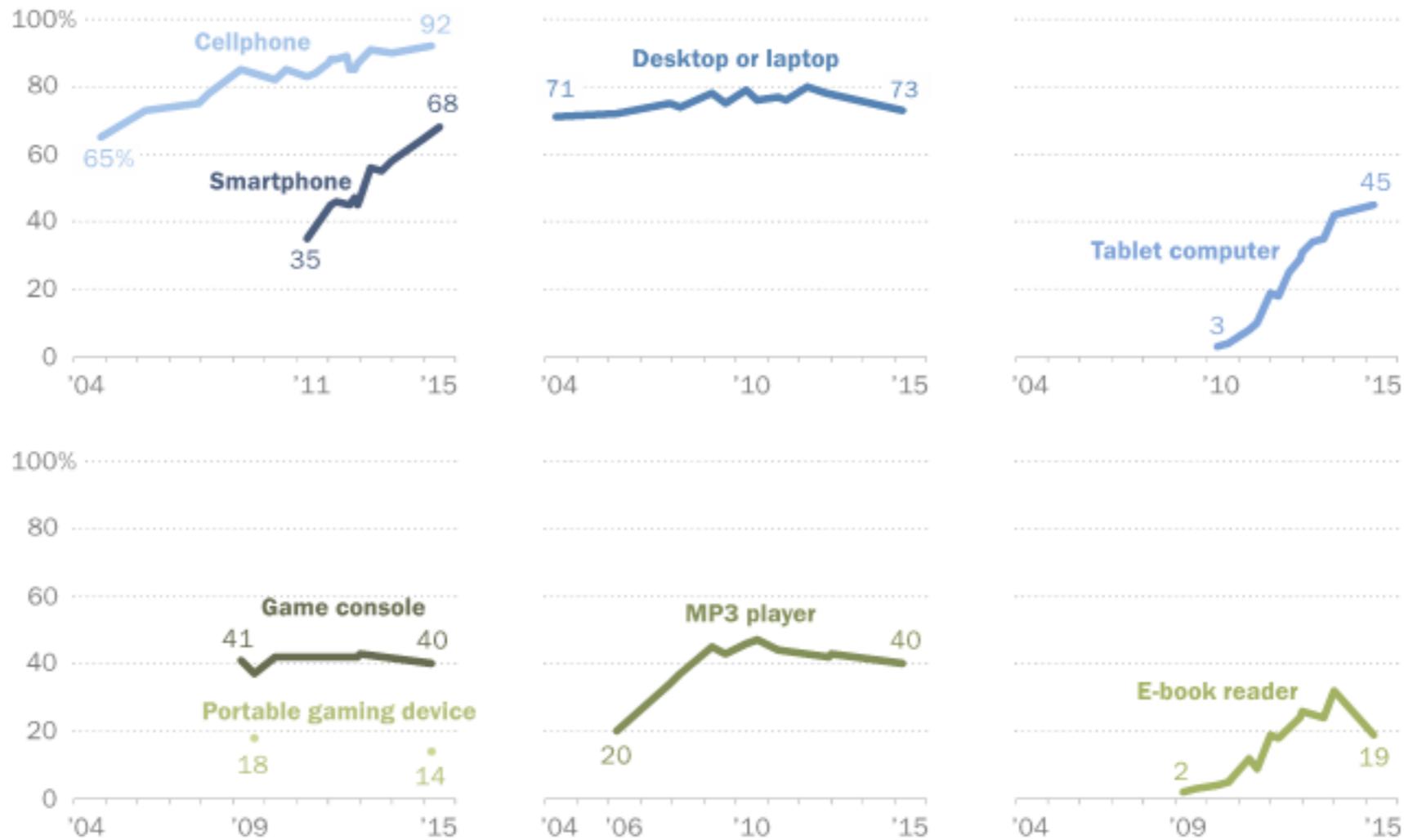
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## Smartphones, Tablets Grew in Recent Years; Other Devices Declined or Stayed Flat

% of U.S. adults who own the following devices



Source: Pew Research Center survey conducted March 17-April 12, 2015. Smartphone data based on Pew Research survey conducted June 10-July 12, 2015. Trend data are from previous Pew Research surveys.

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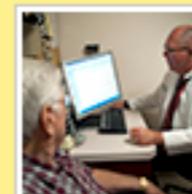
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We can and must improve the user experience.

Thank you!

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