



MedStar Health

It's how we **treat people.**

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Oh the Pain!

The Impact of EHR Usability on Clinical Documentation

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What is Usability?

- Usability
 - The degree to which something is able or fit to be used
 - *Is it easy to use? Do I make mistakes?*
- Usefulness
 - The quality or fact of being useful
 - *Are you actually going to use it?*
 - *How will it work under real world conditions?*



What is the impact of EHR Usability?

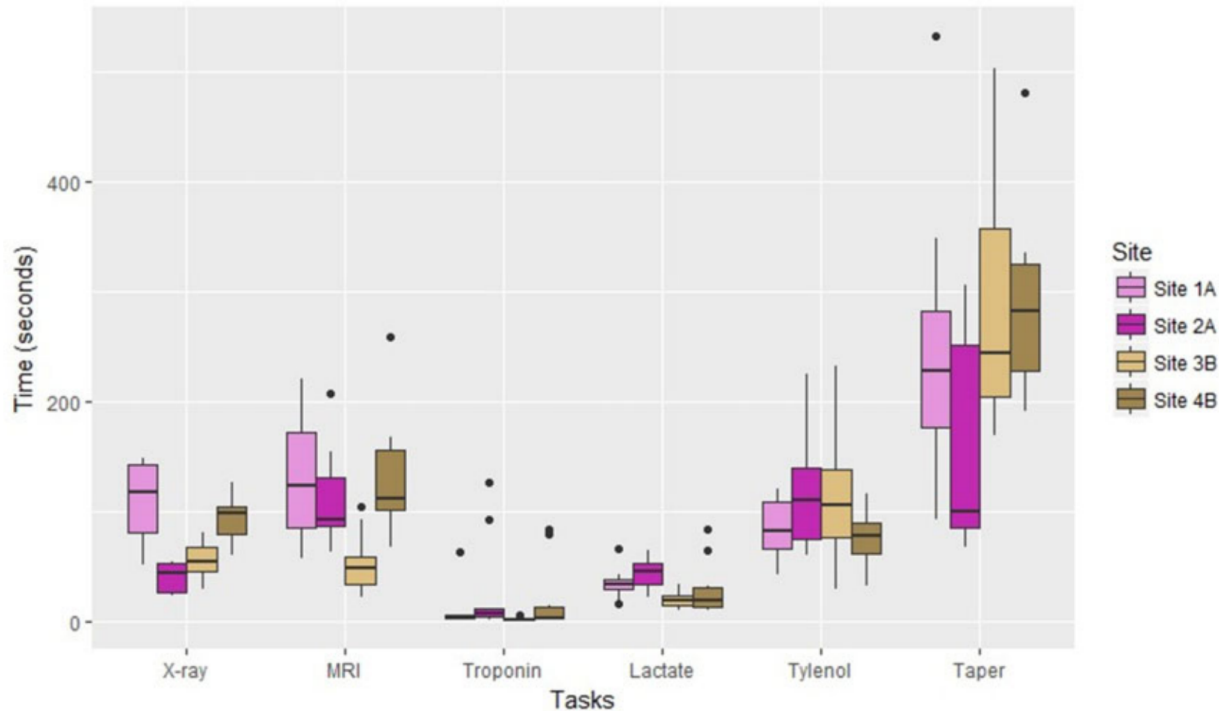


Table 2. Summary of duration, clicks, and accuracy

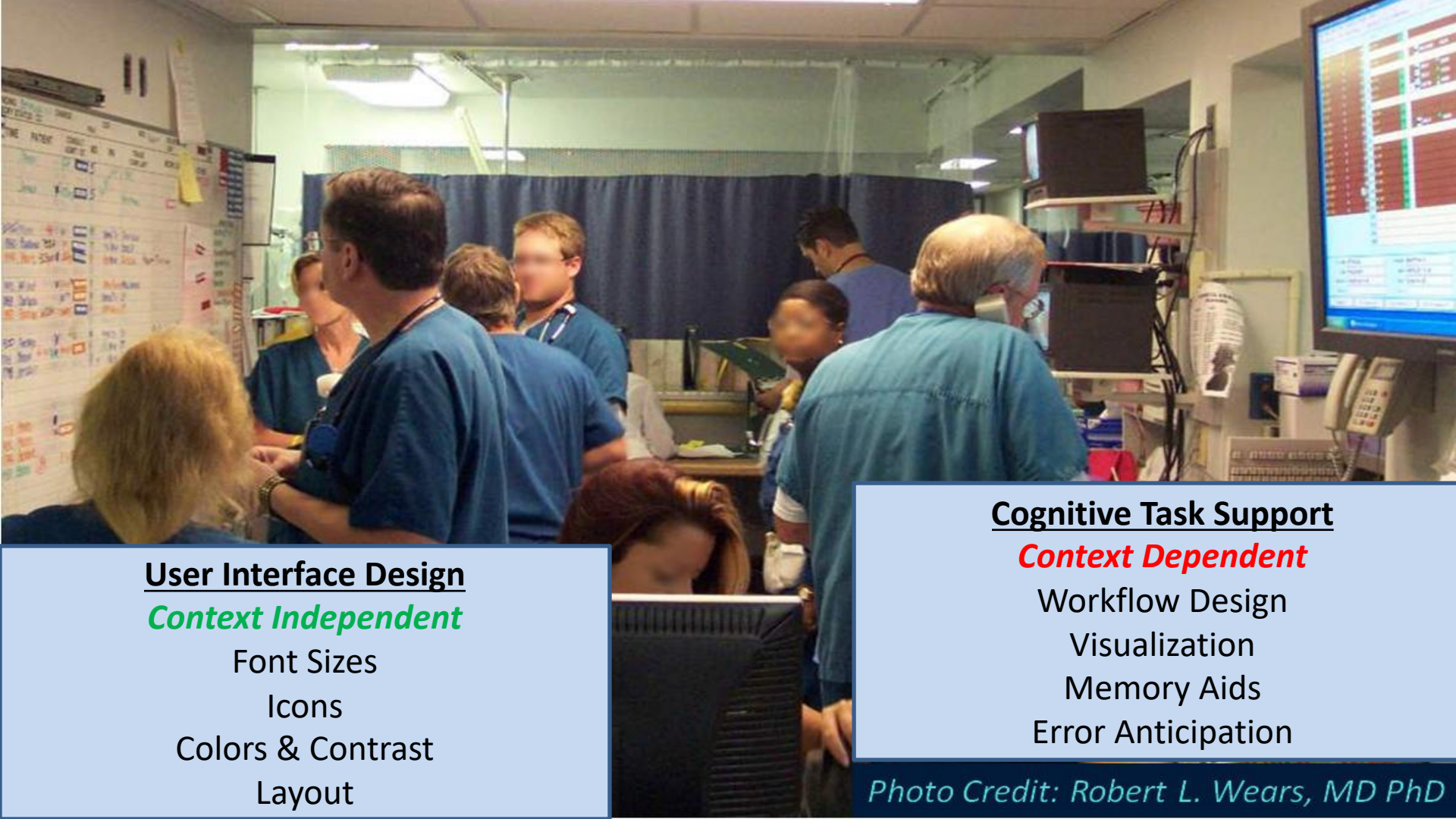
EHR functions	Usability and safety metrics	Site 1A Mean (SD)	Site 2A Mean (SD)	Site 3B Mean (SD)	Site 4B Mean (SD)
X-ray (left elbow, wrist, forearm)	Task duration (sec)	64.1 (22.4)	24.3 (8.5)	33.3 (9.9)	55.5 (13.3)
	Clicks	31.1 (12.6)	7.7 (3.8)	8.1 (4.9)	15.5 (6.6)
	Error rate	25%	16.7%	35.7%	20%
	Types of errors:				
	- <i>Wrong-site x-ray ordered</i> - <i>Omission of one part of the order (eg, forearm)</i>				
MRI (cervical, thoracic, lumbar)	Task duration (sec)	78.9 (33.4)	66 (25.6)	32.2 (16.1)	79.5 (34.3)
	Clicks	28.9 (13.7)	22.4 (10.5)	14.2 (18.2)	33.3 (15.7)
	Error rate	0	8.3%	7.1%	10%
	Types of errors:				
	- <i>Omission of one part of the order (eg cervical)</i>				
Troponin	Task duration (sec)	5.3 (10.3)	14.2 (24.5)	1.5 (.9)	12.1 (19.7)
	Clicks	2.7 (2.9)	4.3 (9.4)	.9 (.9)	8.2 (16.3)
	Error rate	0	0	0	0
	Types of errors: <i>None</i>				
Lactate (timed order)	Task duration (sec)	20.4 (8)	26.9 (7.9)	12.1 (4.9)	17.5 (15.1)
	Clicks	9.9 (3)	11.1 (3.4)	6 (2.5)	6.6 (5.5)
	Error rate	0	0	14.3%	0
	Types of errors:				
	- <i>Ordered for wrong time</i> - <i>Ordered unnecessary tests</i>				
Tylenol (500 mg PO, 4-6 hours)	Task duration (sec)	51.4 (15.3)	70.4 (32)	69.3 (38.2)	45.6 (15.9)
	Clicks	14 (4.1)	23.5 (15.8)	61.6 (94)	25.8 (11.2)
	Error rate	8.3%	0	7.1%	30%
	Types of errors:				
	- <i>Wrong dose, frequency, route, and rate</i>				
Prednisone taper (60 mg, reduce by 10 mg every 2 days for 12 days)	Task duration (sec)	148.6 (76.1)	152.7 (163.4)	175.1 (73)	178.7 (62.6)
	Clicks	32.2 (16.6)	20 (32.8)	42.3 (17.6)	28.2 (5.7)
	Error rate	16.7%	41.7%	50%	40%
	Types of errors:				
	- <i>Wrong dose</i>				



How Documentation Gets into the EHR

- **Typing**
- **Dictation/Natural Language Processing**
- Scanning
- Images/Videos
- *Health Information Exchanges*
- *Third Party Applications/Mobile Tools*
- *Medical Devices*





User Interface Design

Context Independent

Font Sizes

Icons

Colors & Contrast

Layout

Cognitive Task Support

Context Dependent

Workflow Design

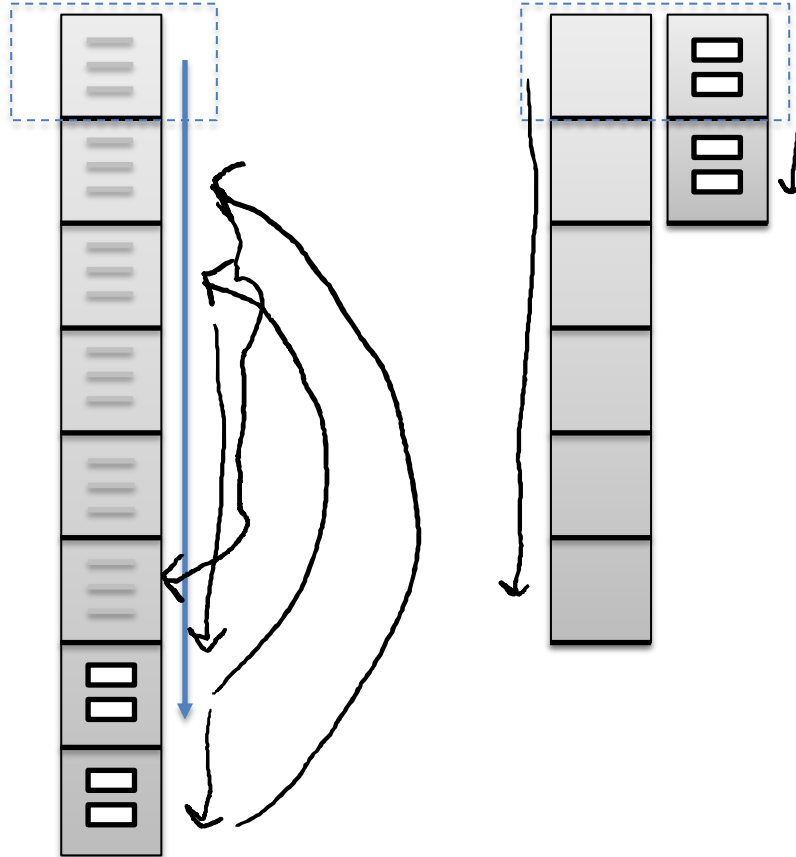
Visualization

Memory Aids

Error Anticipation

Photo Credit: Robert L. Wears, MD PhD

Example: Interface Adjustments



Example: Macros

Constitutional: No fevers, no chills, no night sweats, no weight loss

Eye: No change of vision, no eye pain, no visual problems, no diplopia, no blurry vision

ENT: No ear pain, no nasal congestion, no sore throat

Respiratory: No shortness of breath, no cough

Cardiovascular: No chest pain/pressure, no palpitations, no syncope

Gastrointestinal: No nausea, no vomiting, no diarrhea, no constipation, no melena, no anorexia

Genitourinary: : No hematuria, no nocturia, no dysuria, no incontinence, no change in urinary frequency, no urinary retention, no discharge

Musculoskeletal: No back pain, no neck pain, no joint pain, no muscle pain, no swelling, no change in range of motion

Integumentary: No rash, no pruritus, no abrasions

Neurologic: No headache, no paresthesia, no limb weakness, Alert & oriented X 3

Psychiatric: No anxiety, no depression, no suicidal ideation

Constitutional: **Positive fevers**, no chills, no night sweats, no weight loss

Eye: No change of vision, no eye pain, no visual problems, no diplopia, no blurry vision

ENT: No ear pain, no nasal congestion, **Positive sore throat**

Respiratory: **Positive shortness of breath**, **Positive cough**

Cardiovascular: **Positive chest pain/pressure**, no palpitations, no syncope

Gastrointestinal: **Positive nausea**, **Positive vomiting**, **Positive diarrhea**, no constipation, no melena, no anorexia

Genitourinary: : No hematuria, no nocturia, no dysuria, no incontinence, no change in urinary frequency, no urinary retention, no discharge

Musculoskeletal: No back pain, no neck pain, no joint pain, no muscle pain, no swelling, no change in range of motion

Integumentary: No rash, no pruritus, no abrasions

Neurologic: No headache, no paresthesia, no limb weakness, Alert & oriented X 3

Psychiatric: No anxiety, no depression, no suicidal ideation

Current Documentation Usability Challenges

- Duplicate documentation/copy-paste
- “Silofication” of Notes (e.g. MD/RN)
- Note Bloat/Kitchen Sink Approach
- Readability of the Output



The Future is Now: Data Integration Usability

- Health Information Exchange Usability Issues
 - Manual vs. Automatic Integration
 - Deduplication Techniques
 - Validity/Provenance
- Patient Reported Outcomes/Measures
- Consumer Electronics
 - Mobile Applications
 - Watches
 - Smart Scales



Thank you

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