Differential Effects of an Electronic Health Record System Change on Physician and Nursing Workload in an Urgent/Convenient Care Clinic

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INTRODUCTION

◈ **The Electronic Health Record Financial Incentives**: Recently the Center for Medicare and Medicaid Services enacted strong financial incentives for the adoption of Electronic Health Records (EHR) with the goal of improving care quality and efficiency.

◈ **Meaningful Use and Providers' Tasks:** Currently the meaningful use objectives of EHR are focused on physician tasks (e.g. order entry, drug alerts, electronic prescriptions). With less attention to nursing tasks and decision making.

◈ **Study Aim:** We examined the effects of changing from a hybrid paper/electronic (H-EHR) to a Meaningful Use EHR (MU-EHR) on physician and nurse workload, and whether the effects reflect perceived EHR usability, as suggested by models of technology acceptance (Holden & Karsh, 2010).

METHOD

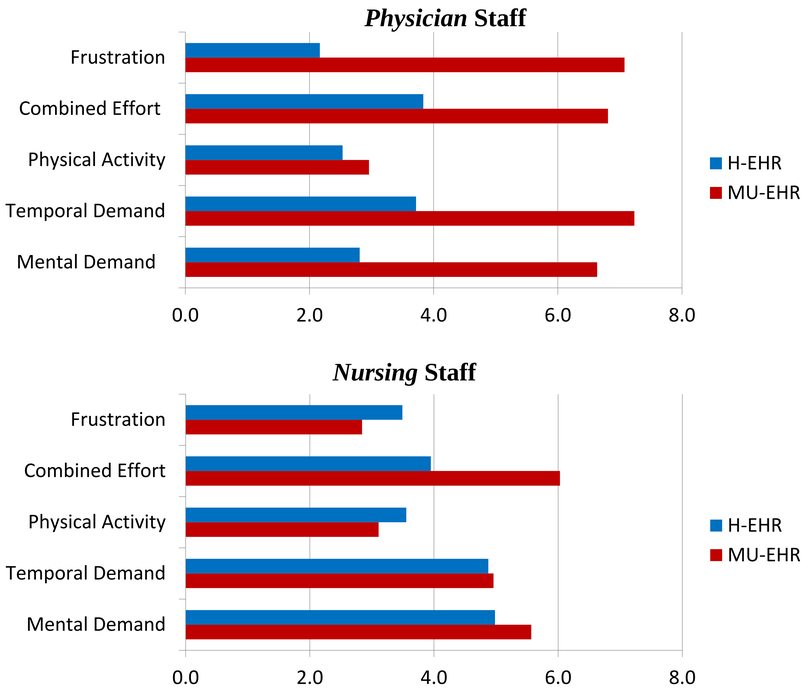
◈ **Setting & Participants:**

- Design: Pre-Intervention. (H-EHR) vs. post-intervention (MU-EHR)
- Setting: 2 non-academic UCC clinics in a suburban Midwestern medical system
- Participants: 9 physician staff (5 MDs, 1 PA, and 4 APNs) and 16 nursing staff (8 RNs and 8 MAs) participants in two ambulatory clinics

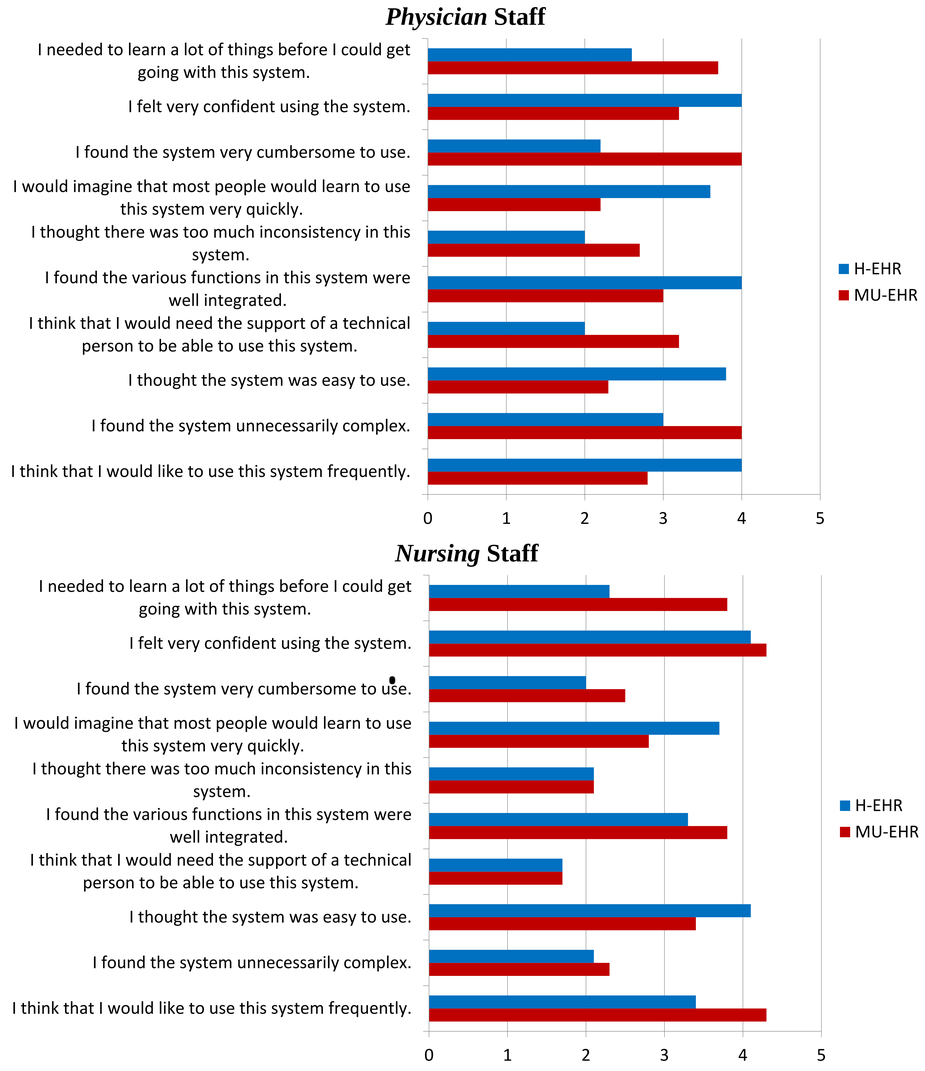
	Physician Staff		Nursing Staff	
Measures:	H-EHR	MU-EHR	H-EHR	MU-EHR
Interview (N)	6	5	9	10
Survey (N)				
System Usability Scale	5	6	7	12
NASA-TLX (Workload)	6	6	12	12
Observation (Hours)				
Shadowing	8	9.5	16	20
Time-Motion (work)	6	3	4	4

RESULTS

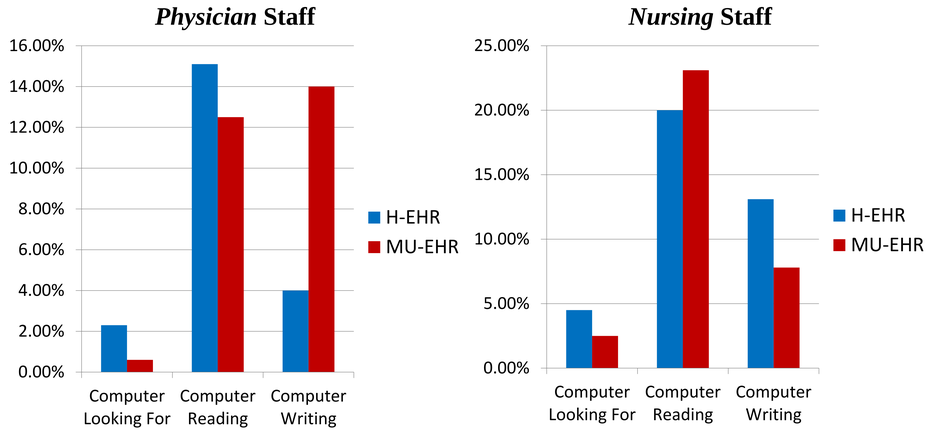
1. NASA-TLX Ratings (0 = Very Low, 10 = Very High)



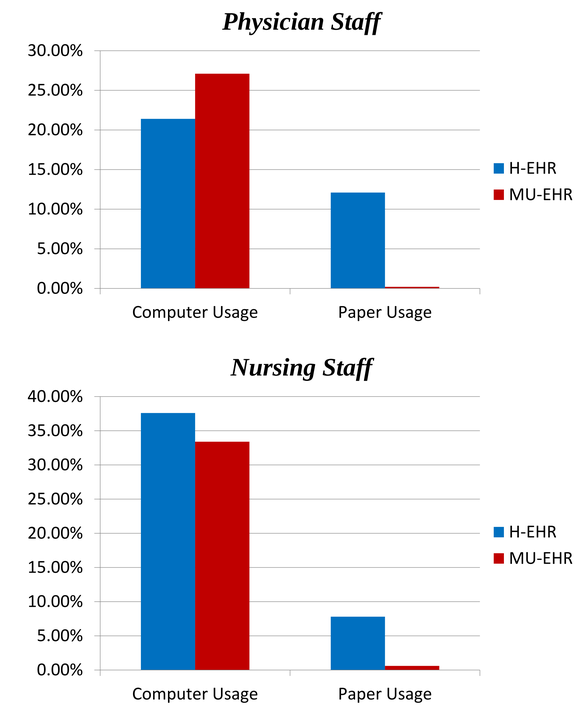
2. EHR System Usability Scale (1 = Strongly Disagree, 5 = Strongly Agree)



3. Time-Motion Observation: Percent of Time Using Computer



4. Time-motion Observation: Percent of Time Using Paper vs. Computer



FINDINGS

◈ **Physicians perceived workload increased when shifting from H-EHRs to MU-EHRs while nursing staff reported less change.**

◈ **Workload differences appeared to reflect usability:** SUS ratings largely mirrored the staff differences in workload, with physicians viewing the MU-EHR as less usable .

◈ **Workload differences also reflected change in work**: Physicians used the computer to accomplish more tasks to comply with meaningful use requirements. For example, they entered patient summary information directly into the computer rather than verbally dictating notes via phones. These tasks are likely more complex and require more interaction with the MU-EHRs compared to nurse tasks. Nurses entered patient data (e.g. vitals, chief complaints) into computer in either system, although data entry more occurred during rather than after patient visits with MU-EHR.

◈MU-EHR adoption had dramatic effects on how both physician and nursing staff performed their work, with reduction in using paper to collect, store and exchange patient information.

TAKEAWAY

◈ The effects of EHR system change on physician and nursing workload differ, with physicians required to perform more computer-based tasks with MU-EHR system. MU-EHR usability problems will likely be magnified for them.

◈ Increased mental workload for physicians, who already have high cognitive demands, may have negative implications for the quality and safety of healthcare delivery.

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