



KEY POINT SUMMARY

OBJECTIVES

In this study, researchers examined how different types of emergency department physician workstations (open-plan, enclosed, and semi-open) affect collaboration and communication during end-of-shift handoffs.

Emergency physicians' workstation design: An observational study of interruptions and perception of collaboration during shift-end handoffs

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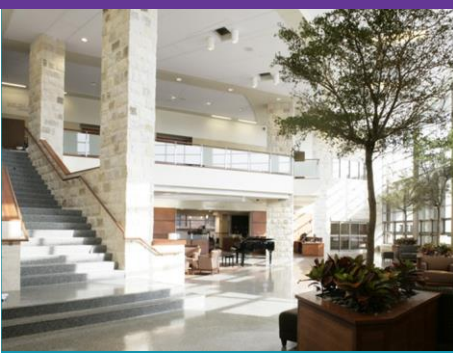
Key Concepts/Context

Findings from previous studies show that emergency department (ED) workstations do not adequately support teamwork during end-of-shift handoffs, specifically in terms of communication and collaboration. The typical open-plan design in EDs may be good for collaboration in general, but can lead to frequent interruptions during physician handoffs, which puts patient safety at risk. The results of this research point to the advantages of enclosed workstations for better collaboration during handoffs.

Methods

Researchers used a sociotechnical systems model to evaluate three different types of physician workstation designs: (a) open-plan workstation, (b) enclosed workstation, and (c) semi-open workstation. The sociotechnical systems framework suggests that we have to look at the system as a whole to solve problems, and the system is made up of people, tools, organizational factors, task characteristics, and the physical environment. The study took place in a single ED that happened to have all three workstation types housed in separate pods. All three of these pods were dedicated to high and intermediate-high acuity patients.

The researchers used a software tool to conduct "cluster random sampling technique," which allowed them to randomly select 20 handoffs from the physician schedule (during 3 p.m., 5 p.m., and 11 p.m. shift changes) to observe over the course of two months in each pod (60 total handoffs). Fifty-six attending physicians involved in those handoffs agreed to participate.



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Handoffs were broken down into three phases for observation: 40 minutes prior to handoff, or “handoff preparation,” the actual handoff, or “dialogue and exchange,” and 40 minutes after the handoff, or “post-handoff.” Researchers wanted to measure both actual and perceived interruptions and understand how staff felt about the extent of the collaboration among different team members. They recorded any interruptions they observed (anything that took the physician’s attention away from the task at hand). Immediately after the observation period, the incoming and outgoing physicians were given a survey regarding their perceptions of interruptions and the extent of collaboration they felt during the handoff. Using statistical software, the researchers compared the perception ratings and observation data.

Findings

Researchers observed a total of 1,476 interruptions during the 60 total handoffs across the three pods; which averaged as one interruption every four minutes. This translates to one-third of the total handoff time dealing with interruptions.

During the exchange and dialogue phase, handoffs took an average of 1.40 minutes, with the longest handoffs taking place in the enclosed workstation. However, physicians experienced the least amount of interruptions here.

Across all three handoff phases there were a significantly higher average number of interruptions per hour in the open pod (18.08 interruptions) compared to the semi-open pod (13.62), and the enclosed pod (11.41). Regarding the average number of interruptions:

- Significantly higher in the open pod compared to the semi-open and enclosed pods during the first preparation phase
- Significantly higher in the open pod compared to the semi-open pod during the exchange and dialogue phase
- Roughly the same in all three pods during the post-handoff phase

During all three phases of the handoff process physicians spent most of the time in face-to-face communication (41%) and computer work (34%). And most of the interruptions in all three pods were face-to-face conversations with other staff or patients’ family members. The majority of the interruptions were for clinical purposes.

Across all three phases, very few physicians in the enclosed workstation felt like they were being interrupted, which aligns with the actual number of interruptions in that space. Interestingly, while there were fewer interruptions in the semi-open workstation compared to the open workstation, the percentage of physicians who perceived frequent interruptions in the semi-open workstation was like that of the open workstation. In terms of perceived extent of collaboration, more physicians in



the enclosed pod felt they had a high level of collaboration with other staff during the handoff compared to the other two pods.

Limitations

This study would need to be replicated at more than a single site to expand the generalizability of the findings. It would also be important to include handoffs during the morning shift change.

The authors note that they may have missed some interruptions due to the naturally chaotic nature of an emergency department.

The authors also mention that the nature of the work in the open workstation may have impacted the results, as these physicians were treating high-acuity patients, including trauma patients. Interruptions are inevitable in trauma care, but interruptions impact the likelihood of adverse events and should be minimized as much as possible.

Design Implications (Style: Header L1)

The level of physician workstation enclosure has a clear impact on the number of interruptions during handoffs. Enclosed workstations appear to reduce the frequency of interruptions during handoffs, and may improve collaboration among staff as well.

Given that perceived interruptions can be higher than actual interruptions in semi-open workstations, designers should consider other factors in the design that may impact the perception of interruptions (e.g., proximity to circulation and other staff areas).

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