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Interruptions in the Healthcare Workplace: An Alternative Approach

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Interruptions during clinical work have long been a source of concern. Accordingly, interventions have been introduced to reduce or eliminate interruptions to high-risk clinical tasks. Although interventions are often successful at protecting the individual's work from interruption, they may disrupt the work of others or be incongruent with patient-centered care. We propose that interventions may not fit the intended work system because methods used to study interruptions fail to reveal why they happen in the first place. In contrast to typical approaches used to study interruptions, we employ a complex systems perspective that moves the focus away from discrete interactions between individuals towards the intersection of work functions that make up the broader work system (Rasmussen & Lind, 1981). Analysis using a cognitive systems engineering orientation proposes that many interruptions are caused by "operational failures" (Tucker & Spear, 2006) in the system. It follows that it may be preferable to fix the source of the operational failure than to ban interruptions altogether. Given that some interruptions are necessary for clinical work to progress (Grundgeiger & Sanderson, 2009; Rivera-Rodriguez & Karsh, 2010), researchers need a better way of judging whether and when there will be a net benefit in making an intervention, and determining the form the intervention will take. Using a dual perspective observation technique we investigated the origins of interruptions in an Intensive Care Unit (ICU). To assist with conceptualization of ICU work functions and coordination of work, we adopted the integrated model of ICU communication and care coordination proposed by Miller, Weinger, Buerhaus, and Dietrich (2010). The following hierarchical "Levels of Decision Making" were used as a proxy for work functions: 1) Unit Resource Coordination, 2) Care Coordination, 3) Patient Care Planning, and 4) Patient Care Delivery (encompassing: diagnosis, prescription, administration, and monitoring). Participants were sampled from all operational levels and all work roles in the ICU work system, including medical staff, nurses in clinical and non-clinical roles, support staff, and allied health staff, in order to explore a full range of work coordination needs and motivations for interrupting. Two observers (Observer A and Observer B) recorded sessions using customized data collection booklets and audio recorders. When any interruption occurred, both observers independently recorded details of the interaction. Observer A remained with the primary participant, or "interruptee", to continue to capture information related to continuation of their work. Meanwhile, Observer B followed up with the "interrupter" to ask about the details of the work function that their interruption had served. A total of 108 interruptions were followed up by Observer B that demonstrate the considerable coordination needs of the ICU. Interruptions that arose as a result of Patient Care Delivery (administration) represented more than a quarter (31/108; 28.7%) of interruptions observed. Patient Care Delivery (administration) was most often held up by a need for medical prescription, highlighting a possible focal point for future intervention. Issues with ICU functioning at the Unit Resource Coordination level were the distal cause of interruptions across almost all levels of ICU work (31/108; 28.7%). Coordination needs that intersected multiple levels of functioning highlighted the importance of including all relevant ICU work roles in the observations. By simultaneously probing both sides of the intersection of work functions in the ICU, we uncovered the emergent sociotechnical properties of interruptions that would not necessarily have been evident by observing just one side the interaction alone. The discovery of the "interrupter" functions that would not have proceeded without the need for an interruption is an important finding in the consideration of the net benefit of an intervention, and the form that the intervention will take. It is evident that eliminating interruptions could compromise ICU work by preventing certain work functions from continuing. On the other hand, eliminating interruptions could protect ICU work by allowing the work of the "interruptee" to proceed without disruption. We emphasize that understanding an interruption from more than one perspective at the same time may lead to interventions that better fit the intended work system, or to no interventions – whichever is most appropriate.

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Grundgeiger, T., & Sanderson, P. (2009). Interruptions in healthcare: theoretical views. *International Journal of Medical Informatics*, 78(5), 293–307. doi:10.1016/j.ijmedinf.2008.10.001

Miller, A., Weinger, M. B., Buerhaus, P., & Dietrich, M. S. (2010). Care coordination in intensive care units: Communicating across information spaces. *Human Factors: The Journal of the Human Factors and Ergonomics Society*, 52(2), 147–161. doi:10.1177/0018720810369149

Rasmussen, J., & Lind, M. (1981). *Coping with Complexity*. Roskilde, Denmark.

Rivera-Rodriguez, A. J., & Karsh, B.-T. (2010). Interruptions and distractions in healthcare: review and reappraisal. *Quality & Safety in Health Care*, 19, 304–312. doi:10.1136/qshc.2009.033282

Tucker, A. L., & Spear, S. J. (2006). Operational failures and interruptions in hospital nursing. *Health Services Research*, 41, 643–662. doi:10.1111/j.1475-6773.2006.00502.x