That's nice, but what does IT do? Evaluating the impact of bar coded medication administration by measuring changes in the process of care

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ABSTRACT

Health information technology (IT) is widely endorsed as a way to improve key health care outcomes, particularly patient safety. Applying a human factors approach, this paper models more explicitly how health IT might improve or worsen outcomes. The human factors model specifies that health IT transforms the work system, which transforms the process of care, which in turn transforms the outcome of care. This study reports on transformations of the medication administration process that resulted from the implementation of one type of IT: bar coded medication administration (BCMA). Registered nurses at two large pediatric hospitals in the US participated in a survey administered before and after one of the hospitals implemented BCMA. Nurses' perceptions of the administration process changed at the hospital that implemented BCMA, whereas perceptions of nurses at the control hospital did not. BCMA appeared to improve the safety of the processes of matching medications to the medication administration record and checking patient identification. The accuracy, usefulness, and consistency of checking patient identification improved as well. In contrast, nurses' perceptions of the usefulness, time efficiency, and ease of the documentation process decreased post-BCMA. Discussion of survey findings is supplemented by observations and interviews at the hospital that implemented BCMA.

Relevance to industry: By considering the way that IT transforms the work system and the work process a practitioner can better predict the kind of outcomes that the IT might produce. More importantly, the practitioner can achieve or prevent outcomes of interest by using design and redesign aimed at controlling work system and process transformations.

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1. Introduction

Health information technology (IT) is commonly regarded as a key patient safety solution, and there exists evidence to support that it should be: "Data now show that information technology can reduce the frequency of [medical] errors of different types and probably the frequency of associated adverse events" (Bates and Gawande, 2003, p. 2526). From a human factors engineering point of view, the quote begs the question, what is it that health IT does that improves (or, in some cases, worsens) safety outcomes? A human factors approach would suggest that changes in outcomes are a function of how IT transforms the nature of work (Holden, 2011; Holden et al., 2008b; Karsh et al., 2006b; Woods and Dekker, 2000). In Section 1.1, we elaborate on that notion, presenting a human factors model of health IT's transformational effects. Afterward, findings are reported from a study of how one particular type of health IT, bar coded medication administration (BCMA) technology (Karsh et al., 2011), transformed a critical piece of acute care nursing work: medication administration. An intent of this paper is to move beyond the simple idea that health IT has safety benefits, toward a fuller understanding of the impact of IT, or "what IT does."

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