Examining the Relationship between Health Information Technology Adoption and Communication between Nurses and Physicians

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Purpose
Increasing use of health information technology (HIT) is likely to affect communication between nurses and physicians. There is already evidence that HIT and communication technologies can contribute to more, not fewer, communication difficulties. To characterize and better understand relationships between HIT adoption and communication between nurses and physicians, we developed three indices capturing degree of adoption, and use of computer hardware, software, and telephony, as each may impact communication differently. We also developed a fourth index that captured the frequency of non-HIT mediated physician-nurse communication, to describe the full range of communication practices in use on medical-surgical units.

Methods
We conducted a web-based survey of nurse administrators (or their designee), at all 105 members of the National Nursing Practice Network (NNPN), a national consortium of U.S. hospitals focused on implementing evidence-based nursing practices. The survey asked about overall HIT adoption, computer hardware, physician and nurse use of computers, infrastructure for electronic communication, nurse and physician use of electronic communication technologies, and non-electronic ways of communicating. We created indices by grouping questions into categories based on technology - computer and other hardware, computer software, and telephony - or non-HIT mediated physician-nurse communication. We scored responses to each question from 0 to 1, with 1 indicating more of whatever was being measured. We summed responses within each index and examined the correlations among the communication index and three technology indices.

Findings
Seventy-three hospitals provided complete data for analysis (70% response rate); all reported having electronic health records. The computer hardware index had a mean score of 7.39 (SD 1.74, range 3.5 – 11.5). The software index mean score was 5.62 (SD 1.31, range 2.5 – 9). The telephony index had a mean score of 2.75 (SD 1.08, range 0 – 5). The communication practices index mean score was 5.98 (SD 0.89, range 3 – 7). The three technology indices were summed to create an overall technology index (mean 15.77, SD 2.85, range 9.5 – 21). The communication practices index was significantly correlated with software ($r = 0.29, p = 0.01$), telephony ($r = 0.31, p = 0.01$), and overall ($r = 0.31, p = 0.01$) indices, but not the hardware index ($r = 0.09, p = 0.44$).

Conclusions
Our technology index - not dependent on a specific electronic health record system or technology type - compared level of adoption and use of technologies with communication practices. All hospitals in our study reported having an electronic health record system, but this information alone is insufficient to understand adoption. By gathering more detail about the type, amount, location, and use of technology, important nuances emerged. The significant association of communication practices with software and telephony indices suggests that these technologies may be impacting the way that physicians and nurses communicate. Given the proliferation of electronic health record systems and lack of standardization, characterizing technology, including communication practices, and answering questions such as who, how many, where, and how technology is used (as we did) is essential for developing policies or practices to promote effective communication practices through HIT.