Technology and Nursing
A Love/Hate Relationship

A recent article, “IT and the Future of Nursing,” in the Fall 2008 JHIM prompted me to consider the current state of affairs between technology and nursing care, particularly as it relates to patient safety, nurse efficiency and nursing satisfaction. I might propose that these two are often viewed as being in a love/hate relationship. Technology and nursing have a history of significant successes and considerable challenges when they have tried to work together in harmony.

Nurses love technology when it helps them enhance patient care and improve workflow processes. This is certainly not the case when technology is slow, imperfect, takes more time or generally does not fit into a workflow process.

Organizations can often “force” the use of systems with nurses. For example, an organization can simply eliminate a paper system in favor of one that is computerized. But and organization cannot force technology adoption into workflow or the transformation of care, particularly if these are not inherent to the technology and process being implemented. For example, if an eMAR is accessed through a PC in the patient room, but the meds are located in a unit-based cabinet at the end of the hallway, the pill-crusher is in the med room and the refrigerated meds are in the nursing station, it’s difficult for the nurse to see an eMAR as streamlining med administration workflow.

I’m going to explore some conditions that might impact this love/hate relationship.

PEOPLE, PROCESS AND TECHNOLOGY

In my Fall 2008 JHIM column, I noted that the interplay between people, processes and technology is critical to successful implementation and subsequent care transformation.

The basic principle is that technology does not stand on its own. It is used by people to perform a process. Getting these three elements aligned is essential to project success and optimized workflow.

In my Winter 2009 column, I emphasized the importance of clinical sponsor-ship and ownership. I acknowledged that IT is a means to an end, not an end unto itself. If we want to deliver real business value through IT, we need to ensure that we use IT to change the business. We can only do that with the clinical business leaders at our side as sponsors, owners and drivers of IT projects.

In this column, I will talk about the importance of integrating the use of technology into a complete quality improvement process, and letting the improvement process drive and define when and how technology is used. This is an interesting twist, as we often start with an information system and then plan how the system can be integrated into clinical workflow as it is implemented. I am asserting that in some cases we might reverse that process. We might start with a quality improvement team who identifies the need for change to a clinical process that then involves technology implementation. In this case, the team has already defined the improvement aims and established the quantitative improvement measures. Thus, we implement the technology based on an established value proposition, and can measure our success with the established criteria.

When considering nursing process redesign, three landmark works are worth mentioning as drivers of quality improvement that involve technology implementation:
1. Transforming Care at the Bedside (TCAB) initiative.
2. Technology Drill Down (TD2) research.
3. Time and Motion Study of how nurses spend their time.

I will explore each of these works, and then discuss the overall significance and ramifications for health IT

TRANSFORMING CARE AT THE BEDSIDE

TCAB is an initiative funded by the Rob-
A Synthesized Approach for Identifying

Wert Wood Johnson Foundation (RWJF) and the Institute for Healthcare Improvement (IHI), which created a framework for change on medical/surgical units built around improvements in four categories: safety and reliability, care team vitality, patient-centeredness and increased value.

In 2003, three hospitals participated in Phase 1 to determine the viability of a process for transforming care on med/surg units. Based on promising results, an expanded pilot phase was launched in 2004, with 13 participating hospitals, to develop, test and spread effective strategies and processes that transform the patient care experience on med/surg units, as well as the experience of the nurses who care for them. Running for two years, the pilot served to highlight and strengthen the link between the quality of care patients receive and the work environment in which their caregivers function.

Since June 2006, this initiative has been in its result dissemination phase. More than 50 hospitals have joined the TCAB Learning and Innovation Community in IHI’s IMPACT Network; 68 hospitals are participating in the American Organization of Nurse Executive’s TCAB Collaborative; and hundreds of hospitals are implementing TCAB’s published strategies and changes.

The TCAB initiative is not about the implementation of information technology—or any other specific intervention for that matter. It is about the unique quality improvement method used for redesigning care processes to remove waste and re-invest that time into activities that provide value for patients. Some of the most successful activities have been simple, common sense changes in the way nurses interact with patients and vice versa. However, the use of technology has been a common theme when identifying strategies for decreasing redundant documentation, improving communication, streamlining processes, and moving equipment, supplies and workstations closer to patients.

**TECHNOLOGY DRILL DOWN**

The RWJF awarded a grant to the American Academy of Nursing (AAN) in 2005 for a project called “Technology Targets: A Synthesized Approach for Identifying and Fostering Solutions to Workflow Inefficiencies on Medical/Surgical Units.” A major component of Technology Targets is a process called Technology Drill Down (TD2), which represented an opportunity to identify workflow issues and areas most ripe for technological fixes as well as process improvements. Specifically, they were looking for work environment factors that could be improved through the use of technology. Twenty-five hospitals participated in the study in 2006 and 2007, including some hospitals who also participated in the TCAB initiative. More than 1,000 individuals from 200 med/surg units participated in a two-day exercise to identify current workflow practices, envision idealized workflow patterns and recommend technology solutions to close the gap between the two.

Though the study was about technology, what made it distinctive is that the work environment was studied from the vantage of the ideal physical space to the ideal workflow process and how technology can be used to support both, as well as promote efficiency, reduce waste, and improve working conditions and the care provided. Nurses voiced dissatisfaction with many existing technologies that does not provide needed functionality or is not user-friendly.

Nurses also expressed concern about multi-media patient records, such as, for example, both paper and electronic patient records and data stored in several non-integrated systems, which complicates workflow. Nurses further reported discontent with lack of bedside, mobile or handheld technology. Nurses believe it is essential to have smart, portable, point-of-care solutions to capture and share data, as well as routine communication. They want technology to reduce demand on nursing time by eliminating waste in care resulting from inefficient workflow. The study demonstrated that the greatest impact of technology is on written communication and data, followed by improvement in safe care delivery, system integration, supply chain and oral communication.

**TIME AND MOTION STUDY**

The Time and Motion Study was designed to quantify how med/surg nurses spend their time, how the work environment affects the use of their time and to measure the distance they travel during a work shift. The goal was to identify drivers of inefficiency in nursing work processes and nursing unit design. The study was funded by the RWJF and the Gordon and Betty Moore Foundation. It was conducted in 2005 and 2006, at 36 hospital med/surg units within 17 health systems, including some who also participated in the TCAB and TD2 studies. A total of 767 nurses participated. Nurses’ time was divided into categories of activities and locations, based on PDA-documentation. Total distance traveled and energy expenditure were assessed based on RFID-tracking and physiological monitoring of nurses, respectively. Distance traveled was evaluated across different types of unit design.

Key findings of the study showed that although more than three-quarter of nurses’ time was devoted to nursing practice, only 19 percent of that was spent in direct patient care and 7 percent on patient assessment. The remainder was spent on documentation (35 percent), medication administration (17 percent) and care coordination (20 percent). No relationship was found between the architectural design of the unit and the time nurses spent with patients. Nurses traveled between one and five miles per daytime shift, and between 1.3 and 3.3 miles per night shift. In conclusion, a picture emerges of the nurse who is constantly moving from patient room to patient room, spending a minority of time on patient care and a great amount of time on documentation, coordination of care, medication administration and movement around the unit. Changes in technology, work processes and unit organization and design could allow for substantial improvements in nursing efficiency and the safe delivery of care.

**SYNTHESIS AND SIGNIFICANCE**

Nurses are highly trained professionals and a hospital’s primary caregivers. Efficient use of their time and talent is paramount to ensuring the quality of patient care. Several landmark studies have demonstrated just how tenuous the interplay is between people, process and technology when completing nursing process redesign during technology.
implementation. There are many lessons to be learned. We need to turn the tables and let the quality improvement process drive and define when and how technology is used. This just may be what we need to turn the “love/hate” relationship into a “marriage”. JHIM

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REFERENCES