



Smart Pump Interoperability: An Overview focusing on potential benefits and risk to nursing practice

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Problem Statement: Serious Safety Events (SSEs) have a significant impact on patient outcomes, staff satisfaction, and the overall cost of healthcare. Approximately 1.5 million Americans are affected by a SSE each year. Medication errors, a SSE sub-component, can result in extended hospital stays, cause permanent injury, and result in death. In fact, over 7,000 of the reported preventable adverse drug events in 2012 resulted in patient death. Medication errors have a direct impact on nursing practice. Nurses are at the sharp end of the medication delivery process, and are often the last barrier to prevent medication errors. However, nursing alone has been cited to be the cause of over 64% of medication errors. Technology has been offered to aid in decreasing medication errors, but the application of these technologies have produced mixed results. **Methods:** A closed loop medication delivery system is one in which the entire process - from medication order, to verification, fulfillment, administration, and documentation are done electronically. The goal for this type of system is to improve efficiency and effectiveness of the medication management process. This method seeks to improve process standardization, decrease process variability, and reduce manual steps to decrease the opportunity for error. Recently many organizations have taken steps to achieve a closed loop medication delivery system. This typically includes computerized physician order entry (CPOE), electronic verification of medication orders by pharmacy, medication administration with bar-code assisted technology, and electronic documentation of medication administration within the EHR. Intravenous smart pump use and its ability to interoperate with the EMR takes the closed loop medication delivery cycle a step further by associating the IV medication order with the correct patient to program the pump and auto-document fluid volume delivered to the patient into the EMR. Limited research exists on smart pump interoperability (SPI), however there are a number of references that explain the functionality and how theoretically it can further decrease medication errors and increase nurse productivity. SPI uses a bidirectional interface, meaning that the infusion device receives and transmits information between IS and the EMR. **Results:** Children's Hospital and Clinics of Minnesota Pediatrics Hospital report "significant safety gains following smart pump-EMR integration" after a six-week pilot in their Pediatric Intensive Care Unit. These are promising, albeit preliminary, findings. With promises of decreased medication errors and increased RN efficiency, many are asking why hospitals have been slow to adopt the technology. The answer lies in the infrastructure complexity needed for the project to succeed. There may also be some reluctance to transition from a manual nursing process to one that is system-automated and tightly couples the patient to the machine delivering the medication. With SPI accountability seems diffused away from the bedside nurse. **Significance:** Nursing could potentially learn from other industries who have studied how interactively complex and tightly coupled systems can negatively impact outcomes.