

Abstract: This is a proposal to study the effectiveness of a medication barcode-scanning system at the point of medication administration in reducing harm to a highly vulnerable, priority population of neonates in the neonatal intensive care unit (NICU), in a care environment that does not include computer physician order entry (CPOE). The principle aim of our patient safety proposal is to study the effectiveness of the system in decreasing the combined incidence of preventable and potential adverse drug events. Secondary aims are to measure the reduction by the system in all medication errors and to determine if safety gains achieved are maintained. Our hypothesis is that in this environment, barcode-scanning will reduce preventable and potential adverse drug events by at least 45% and can be maintained. The cohort study design opportunistically takes advantage of the imminent introduction of bedside barcode scanning by the University of Iowa Hospitals and Clinics into a care environment that does not include CPOE, but already has wireless connectivity, barcoded medications, intravenous fluids, blood products and patients. Outcomes of interest will be identified by daily reviews of medical records using a specific trigger tool of clinical events that has been developed for the NICU population to aid in the detection of harm caused by medication errors. We will control for potentially confounding learning effect and patient and environmental characteristics. Over a 18-month period, we will conduct the study in three phases within two parallel patient units, during which time 67,000 "doses" will be administered to the patients in the 36 beds. The study has sufficient power to detect a 45% reduction in actual patient harm by the intervention in the absence of confounding. Although the Food and Drug Administration will require medications to bear barcodes and the Joint Commission on Accreditation of Healthcare Organizations is likely to require systems such as the one we will study, there has been no controlled study of the effectiveness of a barcode system on *reduction of harm* to patients. This study will address that need.