

A Randomized Controlled Study to Identify Workflow Factors in Implementing Safe and Effective Bedside Barcode Technology in the Intensive Care Units

Pharmacist Investigator: Craig P. Frost, R.Ph., MBA

Co-Principal Investigator: Sujit S. Sansgiry, Ph.D.

Abstract

The penetration of bedside barcode technology into all health-system practice environments, especially the intensive care arena, is not yet complete. The objective of this research is to identify workflow factors in implementing safe and effective bedside bar coding technology in the intensive care environment.

The research team will be comprised of three pharmacists, a physician, an intensive care nurse, a nurse with informatics specialization, and a graduate research assistant with a pharmacy background. The study will compare time devoted to medication administration in an intensive care unit with and without bedside bar code technology. A prospective observational time-and-motion study with AB design will be conducted to test the research objective. The study will be conducted at St. Luke's Episcopal Hospital, which is a tertiary teaching institution with 627 staffed beds, of which, 143 beds are intensive care. Currently, bedside bar code technology is not implemented in any intensive care units at this hospital. Bedside bar code technology will be implemented in one of the intensive care units, with around 14 beds. Medication administration will be observed and recorded by a trained research assistant with and without the implementation of the bedside bar code technology. A total of 300 randomly selected medication administration, patient care, administration activities, and other miscellaneous activities related to medication administration will be recorded. In addition, nurse perception relevant to the workflow barriers will be measured after each medication administration. Covariates such as age, gender, body weight, length of stay of the patients, drug dose, route, order type, and vital signs taken for administering drugs in a particular medication administration. Data collected will be validated and analyzed using the SAS® 9.2 statistical package.

Student's t-tests and multivariate analysis of variance will be performed to detect the difference in time related to workflow variables between the two groups, where implementation of bedside bar code technology in an intensive care patient unit would be the intervention studied. Furthermore, the perception of nurses regarding the performance obstacles encountered during medication administration in both groups will be compared to validate the results. Additionally, regression analysis will be conducted to analyze the effect of various workflow variables on total medication administration time. Workflow parameters with negative impacts on efficiency will be identified and strategies to reduce or optimize these barriers would be implemented. The positive aspects of bedside bar code technology will be considered in future implementation of this technology to all intensive care units.