

A Prospective Observational Study of Medication Errors in a Tertiary Care Facility

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Abstract

Emergency medicine clinicians are required to make critical decisions under high levels of uncertainty with minimal information and under significant time pressure. The high volume and high complexity of emergency practice creates an environment that is prone to errors and quality concerns.¹ The most common medical errors in institutions are due to adverse drug events (ADEs).² In hospitalized patients, extrapolated event rates are estimated to be 6.5 ADEs and 5.5 potential ADEs per 100 admissions.³ Currently, data regarding medication errors in the emergency department (ED) are obtained from databases that are dependent on voluntary reporting. Between 1998 and 2003, the United States Pharmacopeia (USP) gathered approximately 11000 medication errors in US EDs in their database (MEDMARX®)⁴. However, this may be a gross underestimation of the actual number of errors, since the error rate calculated from passive reporting systems may be erroneously low compared to more active methods such as direct observational techniques. Error rates in both adult and pediatric intensive care units measured using a direct observational approach are much higher than those estimated using other data collection procedures.^{5,6}

The purpose of this investigation is to use a direct observational approach to determine the rate of medication errors and associated ADEs in the ED. The project will involve a series of 28 observation periods in the ED during a 12 month time frame (May 1st 2008 to April 31st 2009). Each observation period will be 12 hours in duration to coincide with nursing shifts. All nursing activities related to the medication use process will be observed and recorded during each 12 hour shift. This will include prescribing, transcribing, dispensing, administering and monitoring. The data collected will be transferred into Microsoft Excel for descriptive analysis. The medication error rate will be determined and errors will be categorized according to the classification scheme developed by the National Coordinating Council for Medication Error Reporting and Prevention⁷. Statistical evaluations (e.g., inter-rater reliability of medication error categorization using the kappa statistic measure), will be performed using Stata 7.0 (Stata Corporation, College Station, Texas). The categorization of medication errors using the direct observation approach in this investigation will be compared to that obtained using a national voluntary reporting system (USP MEDMARX®) to investigate possible differences in reporting related to error detection technique. The results of this study will provide information regarding the actual rate of medication errors and associated ADEs in the ED and help ascertain patient safety issues in order to implement system changes that might preclude future errors.

¹ Burstin H. "Crossing the Quality Chasm" in emergency medicine. *Acad Emerg Med* 2002; 9(11):1074-1077.

² Leape LL, Brennan TA, Laird N et al. The nature of adverse events in hospitalized patients. Results of the Harvard Medical Practice Study II. *N Engl J Med* 1991; 324(6):377-384.

³ Bates DW, Cullen DJ, Laird N, et al. Incidence of adverse drug events and potential adverse drug events. Implications for prevention. ADE Prevention Study Group. *JAMA* 1995; 274(1):29-34.

⁴ United States Pharmacopeia, Medication Errors in Emergency Department Settings – 5 Year Review.

⁵ Buckley MS, Erstad BL, Kopp BJ, Theodorou AA, Priestley G. Direct observation approach for detecting medication errors and adverse drug events in a pediatric intensive care unit. *Pediatr Crit Care Med* 2007; 8(2):145-152.

⁶ Kopp BJ, Erstad BL, Allen ME, Theodorou AA, Priestley G. Medication errors and adverse drug events in an intensive care unit: direct observation approach for detection. *Crit Care Med* 2006; 34(2):415-425.

⁷ National Coordinating Council for Medication Error Reporting and Prevention.