

How safe is safe enough?

Corinne Hohl, MD

Over three-quarters of emergency department (ED) visits in the United States result in the administration or prescription of medications.¹ If these data are generalizable to Canada, we prescribe or administer over 12 million medications in EDs across the country each year.² Previous work has highlighted reasons why we are at high risk for making errors during this process.³ We prescribe and administer medications to acutely ill patients with limited diagnostic and historical information available. We use medications for a wide range of conditions and must remain familiar with many complex and evolving treatment options. We prescribe and administer medications to multiple patients in close proximity nearly simultaneously while being interrupted, distracted, and delayed. Given these unfavourable circumstances, it would not be surprising if studies quantifying medication errors in EDs reported alarming findings.

In this issue of *CJEM*, Stasiak and colleagues present the results of the first Canadian study to describe errors in prescriptions written by physicians in one tertiary care ED.⁴ Two pharmacists reviewed 3,136 prescriptions containing 11,313 medication orders. They identified an error in 0.9% (99 of 11,313) of all medication orders reviewed, a remarkably small proportion. Not only was the proportion of identified errors low, but also many of them were clinically insignificant (e.g., rosuvastatin dose of 25 mg instead of 20 mg) and would not have led to patient harm. Many other errors would have been clarified and corrected by nurses on inpatient wards or by outpatient pharmacists before the drug was administered. Examples include incomplete prescriptions (e.g., lack of a signature) or prescriptions for nonformulary drugs, all of which were counted as errors in this study. Given the low

likelihood that any of the identified errors would have resulted in more than temporary harm, can we use Stasiak and colleagues' data to reassure ourselves that current medication prescribing and administration processes (which include nursing reviews of medication orders) are safe enough? In other words, have we created adequately resilient medication administration processes to avoid most bad outcomes?

As tempting as this conclusion may be, Stasiak and colleagues' study is not without limitations. The study's retrospective design is problematic as pharmacists reviewed only those prescriptions for which carbon copies were retained. Were prescriptions that were cancelled, corrected or rewritten, or those for which administration errors occurred as likely to be retained as those without errors? Without sound data on the denominator of prescriptions written during the study period, this is difficult to ascertain. The identification of errors represented the opinion of one on-duty pharmacist and was not based on explicit definitions or the consensus of a multidisciplinary team, including pharmacists and physicians, the current standard used in similar studies.⁵⁻⁸ The authors did not follow up those errors that the pharmacists were unable to catch before the patient left the ED. Follow-up of these cases would have presented us with an opportunity to understand how and when the errors were resolved and whether any patients suffered harm. This might have shed light on the clinical significance of these events and on processes inherent within the institution that provided a safety net to capture and correct them.⁹ Stasiak and colleagues' study was conducted in one ED during weekdays, limiting its generalizability.

From Department of Emergency Medicine, Faculty of Medicine, University of British Columbia, Vancouver, BC.

Correspondence to: Dr. Corinne Hohl, Emergency Department, Vancouver General Hospital, 910 West 12th Avenue, Vancouver, BC V5Z 1M9; chohl@mail.ubc.ca.

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In a recent large, prospective, multicentre study, Rothschild and colleagues observed on-site pharmacists reviewing 17,320 medication orders.⁵ An independent committee adjudicated all identified errors and removed those that had little or no potential to cause harm. Using this more rigorous design, the authors reported that pharmacists found errors in 2.9% of all medications ordered. Yet 85 to 96% were classified as intercepted potential adverse drug events. Previous work has shown that only a small proportion of potential adverse drug events will result in actual adverse drug events that cause symptoms, require a change in medical management, or result in harm.¹⁰ In another prospective study, Patanwala and colleagues reported that errors occurred in 178 of 953 (18.7%) ED medication orders.⁸ Yet a team consisting of a pharmacist and a physician judged that only one of the identified errors (0.1% of all medication orders) had the potential to contribute to or result in temporary harm to the patient and required an intervention.

Given these data, should ED pharmacists spend their valuable clinical hours reviewing orders? A growing body of evidence describes over 50 individual tasks for ED pharmacists, creating competing time demands.^{11,12} These include pharmacotherapeutic consultations for complex patients (the most common); medication reconciliation; screening for symptomatic adverse drug events to outpatient medications; roles in prescribing, monitoring, administering, and dispensing medications in the ED; providing primary care services after a diagnosis has been made; teaching; and administrative duties. Most of the published studies are noncomparator studies, making it difficult to draw any meaningful conclusions about the relative merits of each of these tasks. In the absence of evidence, clinical experience suggests that there is likely little value in having pharmacists focus on identifying and correcting errors that are readily intercepted by nurses or dispensary pharmacists or have already occurred, unless future recurrent harm can be prevented through this process. This is in contrast to the intensive care unit setting, where clear benefit has been shown for pharmacists in reviewing orders for errors during the medication ordering process.¹³

In other domains of pharmacy practice, evidence suggests that we may be able to maximize the health benefit achieved by pharmacists by directing their interventions to high-risk patients.^{6,14} For example, one large Canadian prospective study published in 2008

indicated that as many as 12% of adult ED visits may be caused by symptomatic adverse drug events to outpatient medications.¹⁵ Yet studies have shown that emergency physicians may not attribute adverse drug event-related ED presentations to medication use in 40 to 50% of such visits when compared to clinical pharmacists.^{16–18} In such cases, emergency physicians may be less likely to correct the medication-related problem at hand without the assistance of a pharmacist. Further study has found that these patients spend more days in acute care hospitals and incur almost double the cost of health care compared to comparable patients presenting for non-medication-related reasons.¹⁹ No randomized controlled trials have been conducted to date to determine whether pharmacist involvement in the evaluation and treatment of these patients improves health outcomes. However, intuitively, it seems more likely that we will obtain greater health value by focusing on interventions to improve the identification and treatment of patients suffering from health outcomes, such as adverse drug events that have clearly been associated with morbidity, health resource use, and cost, compared to interventions (above and beyond the current processes) to improve the identification of errors that are rarely associated with clinically significant events.

In Canada, the majority of EDs have dedicated clinical pharmacists who might consider spending some clinical hours conducting medication reviews in high-risk patients.^{6,20} However, in smaller rural centres and for those working nights, evenings, weekends, and holidays, clinical pharmacists are often not available. We might consider placing more emphasis on carefully assessing the relationship between a patient's medications and the reason for presentation to ensure that we do not miss clinically relevant adverse drug events.

In an era marked by resource constraint, pragmatic randomized controlled trials and high-quality prospective comparator studies are urgently needed to determine how to best use our scarce pharmacist resources. The outcomes of such studies must be patient oriented and focus on measures such as morbidity, mortality, health care use, and cost.¹¹ The results of such research can then help guide resource allocation to high-yield tasks within busy EDs and those struggling with insufficient pharmacists. This is likely to maximize the contributions that clinical pharmacists can make on a daily basis for ED patients by allowing pharmacists to focus their considerable

training and skill on those situations in which they make the most difference.

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