

# When the 5 Rights Go Wrong

## Medication Errors From the Nursing Perspective

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This study describes nurses' perceptions about how and why medication errors occur and their personal experiences with medication errors. A survey was mailed to a random sample of registered nurses. Two hundred and two responded. Of those, 158 (78%) nurses admitted making medication errors and provided details about these errors. This study, by providing the perspective of frontline nurses, contributes to the body of knowledge on medication errors. **Key words:** *administration errors, medication errors, nurses' perspective, patient safety*

**A**LTHOUGH medication errors are the most frequently identified errors that occur in healthcare settings in the United States,<sup>1,2</sup> their extent and scope have proven difficult to quantify. Relying almost exclusively on a system of voluntary report, researchers estimate that 5% or less are reported<sup>3</sup> and that only those resulting in patient harm are consistently identified.<sup>3-5</sup> After reviewing numerous studies, the Institute of Medicine estimated that more than 1.5 million people are harmed each year by medication errors and that in hospitals "a typical patient would be subject to one administration medication error per day."<sup>1(p111)</sup> The associated costs of these errors are staggering in terms of human morbidity and mortality as well as in terms of healthcare dollars, estimated to be billions of dollars annually.<sup>1</sup>

Despite an intense organizational focus, an increased public and professional awareness,

and the development of an array of targeted interventions, the problem of medication error is proving to be as difficult to resolve as it is to quantify. Errors continue to occur at an alarming rate.<sup>5</sup> This is due, in part, to the failure to adequately address the working environment of nurses.

In clinical settings, nurses function in fast-paced, complex, unpredictable settings with high-stake patient care situations. They administer hundreds of medications daily to multiple patients with multiple disease processes and via multiple routes. Medication administration is a complex task that requires extensive knowledge and skill to perform correctly. Adding to the complexity are variables such as standardized medication administration schedules and distractions. Medication administration is an inherently risky enterprise; the conditions and environments under which medications are administered make it more so.

Because nurses administer the vast majority of medications, the participation of frontline nurses is necessary to achieve the goal of greater medication administration safety. The purpose of this study was to examine their perceptions of why and how errors occur and to solicit information about their personal experiences with medication errors, thus adding to the body of knowledge on this topic.

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## LITERATURE REVIEW

Nurses, as frontline providers, offer distinctive and useful perspectives. Their input has been solicited in a number of studies addressing various aspects of medication safety. Cohen et al<sup>3</sup> polled nurses across the country by asking the readers of a nursing journal to respond to a series of questions about medication administration errors. Of the 775 participating nurses, 79% agreed that most medication errors occur when a nurse carelessly neglects to follow the 5 rights of medication administration. Fifty-eight percent of participants believed that the commission of a medication error was indicative of nursing incompetence and error reporting a tool to measure competence. The top 5 reasons medication errors occur were identified as follows: "(1) distractions and interruptions during medication administration; (2) inadequate staffing and high nurse/patient ratios; (3) illegible written medication orders; (4) incorrect dosage calculations; and (5) similar drug names and packaging."<sup>3(p40)</sup> Although valuable, the findings from this survey demonstrate incongruencies in the ways nurses perceive errors. On the one hand, many participants perceived errors to be a result of nursing negligence and incompetence, and, on the other, factors in the nursing environment were cited as 4 of the top 5 causes of error. The most likely interpretation of these findings is that nurses believe they should be capable of administering medications without errors, regardless of the external circumstances.

A follow-up survey was done by Cohen and Shastay<sup>6</sup> 5 years later. Of the 1,296 respondents, 89% believed that medication errors occurred as a result of nurses neglecting to follow the 5 rights, and 58% believed that error reporting was an important tool to measure a nurse's competence. This survey replication did not identify the top causes of medication errors so comparison is not possible. It did find, through a series of questions related to medication administration practice, that nurses' attitudes, opinions, and behaviors

indicate a movement toward safer medication practices. The survey also highlights that negative opinions and individual blame continue to be associated with error making.

In contrast, the 2 most frequent causes of medication errors, according to the 61 nurses participating in a study by Ulanimo et al,<sup>5</sup> were nurses failing to check the name band with MAR and nurses being tired and exhausted. According to 983 nurses who responded to a survey conducted by Mayo and Duncan,<sup>4</sup> the 5 most common reasons for medication errors were as follows: (1) difficult-to-read or illegible physician handwriting, (2) distractions, (3) nurses' fatigue and exhaustion, (4) drugs with similar names, and (5) dosage miscalculations by nurses.

Commonalities in these studies are that medication errors result from a number of diverse factors both internal and external to the nurse, reflecting individual- and system-level problems. However, findings from these few studies are too limited to be conclusive, and additional research is needed to continue to examine medication errors from the nursing perspective.

## METHODS

### Design

This study had a descriptive design. A questionnaire using both quantitative and qualitative items was developed after a review of questions used by others in the field. Demographic data requested included the number of years in nursing, type of facility of current employment, race/ethnicity, and gender of respondent. Respondents were asked to rate 11 potential factors contributing to medication administration errors on a 4-point scale ranging from 1 (*very important*) to 4 (*not very important*). Respondents were also asked whether they agreed, using a 4-point scale ranging from 1 (*strongly agree*) to 4 (*strongly disagree*), with 9 statements about reporting of errors, importance of technology in reducing errors, and current medication administration procedures at their place of

employment. Finally, respondents were asked whether they had ever made a medication error. Respondents who had made medication errors answered a series of open-ended survey questions about the error (or errors). These questions requested a description of the incident, factors that contributed to making the error, and associated feelings. Respondents were able to add comments if desired. The survey could be completed in paper form or online.

### Sample

A roster of active registered nurses was obtained from the Georgia Board of Nursing. A simple random sample of 2500 nurses was selected, using the SAS statistical software, Proc Surveyselect Program. Insufficient addresses were available on 28 of the names selected, and 2472 surveys subsequently were mailed. A self-addressed, stamped envelope was included in the mailing as well as an Internet address with password protection. A reminder postcard was mailed 6 weeks after the initial mailing.

### Procedures and data analysis

Institutional review board approval was obtained before beginning the research. Because the subject matter of this study was sensitive, consent to participate was determined by return of the survey and all responses were anonymous. IP addresses were not collected for online surveys.

Analysis of quantitative data included summarizing with descriptive statistics using Microsoft Excel and SAS for Windows. The handwritten responses were transcribed using a word-processing program. The online surveys were in word-processed format. Nurses' responses often contained multiple abbreviations for medical terminology and medication names. When appropriate, these were spelled out to make responses more clear.

Analysis of the qualitative responses was performed using Benner's<sup>7</sup> interpretive model. First, the answers to each question were systematically grouped and key themes were identified within each response cate-

gory. Then, each error account was read and checked to see whether the emergent themes remained intact in the context of the account as a whole. Data were cross-checked for emerging patterns and confirmed to increase reliability.<sup>8,9</sup> After reviewing and classifying themes, representative quotes were selected as exemplars.

### RESULTS

Six surveys were returned as undeliverable. A total of 202 nurses (8.2%) responded to the questionnaire. Most of the surveys were returned by postal mail and were handwritten. Others were completed online.

#### Demographic and background information

The respondents were 176 (87%) female and 23 (11%) male, and 3 (1%) did not indicate gender. Ethnic breakdown included the following: 166 (82%) white, non-Hispanic; 20 (10%) black or African American; 4 (2%) Mexican-American, Puerto Rican, or other Hispanic; 4 (2%) Asian American; and 8 (<4%) indicated other. The respondent demographics are similar to those of the national nursing population.<sup>10</sup>

When designating place of current employment, nurses could check as many places as relevant. Many responding nurses worked in more than 1 type of environment. In terms of current status of employment, respondents included 125 (62%) currently working in a hospital environment; 27 (13%) working in public health, long-term care, home health, or education; 45 (22%) indicating other environment or not specifying current place of employment; and 16 (8%) no longer working in nursing. Of the respondents, 158 (78%) indicated that they had made a medication error and provided information about the event. Errors occurred across the spectrum in number of years of nursing experience.

#### Most important contributing factors

Using a 4-choice Likert scale, nurses rated 11 potential contributing factors to

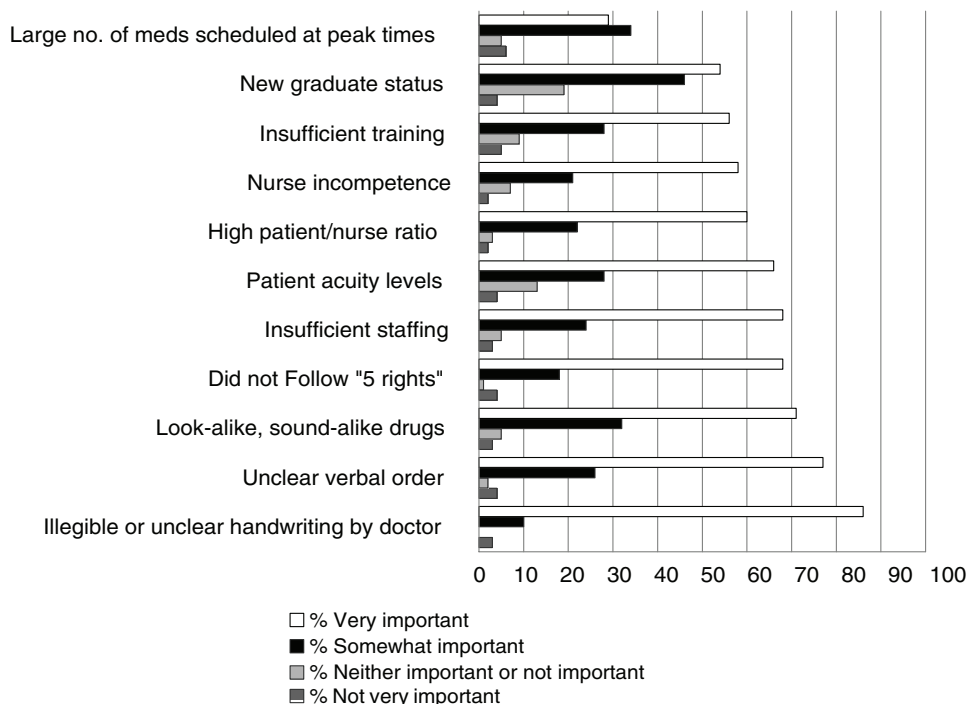


Figure 1. Contributing factors to medication errors (n = 202).

medication errors and whether each factor was “very important,” “somewhat important,” “neither important or/not important,” or “not very important.” The frequencies of the “very important” categories for each of the 11 items were as follows: illegible or unclear handwriting by the physician (86%), did not follow “5 rights” (77%), high patient-nurse ratio (71%), unclear verbal order (68%), insufficient staffing (68%), nurse incompetence (66%), look-alike or sound-alike drugs (60%), large number of medications to be administered at peak times (58%), insufficient training (56%), patient acuity levels (54%), and new graduate status (29%). Figure 1 depicts the importance rating frequencies for each factor.

Data analysis revealed that multiple variables within the nursing environment are important contributors to medication errors. This finding is consistent with other studies.<sup>2-4</sup> Nurses reported, regardless of other contributing factors, that making a medical error was related to incompetence, also consistent with the literature.<sup>3,6</sup>

### Reporting medication errors

Respondents acknowledged the importance of reporting errors: 94% either strongly agreed or agreed that medication errors should be reported even when no harm resulted to the patient. This perception that reporting should occur is inconsistent with the reality that many medication errors go unreported. Fewer (87%) believed that nurse managers should keep track of a nurse’s medication error; this somewhat reduced support for tracking errors may relate to fears of blame and punishment should tracking occur. Respondents were generally supportive of the idea that the patient or family member has a right to know, with 77% in favor of reporting the error to the patient or family.

### Technology and medication administration procedures

Although research has shown that nurses express displeasure at learning and using new technologies,<sup>5,11,12</sup> the majority in this study

**Table 1.** Nurses' perspectives (in percentage) on medication errors ( $n = 202$ )

Variable	Strongly agree	Agree	Disagree	Strongly disagree	No answer
Technology bar coding reduces medication errors	24	50	18	2	6
Medication-dispensing technology reduces medication errors	23	56	16	2	2
Tracking and reporting					
It is important to report medication errors even when no harm has resulted to patient	62	32	3	2	1
Nurse managers should keep track of a nurse's medication errors	47	40	10	2	1
Patients or family members have a right to know when a medication error has been made	31	46	19	2	1
Medication administration procedures					
The medication administration procedure at my facility... is too time consuming	11	17	54	12	6
promotes error	5	16	55	15	8
causes stress	13	27	41	12	7
creates undue pressure to deliver medications in a timely manner	11	25	43	15	6

viewed technologies as important tools in error reduction. Approximately three-quarters (74%) of nurses either strongly agreed or agreed that bar coding reduces medication errors. Similarly, 79% strongly agreed or agreed that medication-dispensing technology reduces medication errors (Table 1).

Generally, respondents did not believe that medication administration procedures at their facility were a major contributor of medication errors. Less than one-third (28%) strongly agreed or agreed that the medication administration procedure at their facility was too time-consuming. Fewer still (21%) thought that their facility's medication administration procedures promoted errors (Table 1). However, approximately twice as many strongly agreed or agreed that the medication administration procedures at their facilities cause

stress (40%) and undue pressure to deliver medications in a timely manner (36%).

### Qualitative results

Of the 202 respondents, 158 (78%) indicated that they had made 1 or more medication errors. The qualitative portion of the survey was answered only by the 158 who indicated that they had made an error, and included open-ended questions that allowed respondents to describe additional contributing factors.

The list of potential contributing factors rated by respondents in the first part of the survey was not exhaustive. Participants were asked to include specific details pertaining to their own medication error experience. Additional contributing factors identified from the open-ended responses were physical

exhaustion, interruptions and distractions, being new and having lack of experience and/or training, and pace/staffing/patient load.

### ***Physical exhaustion***

Respondents indicated that errors were made when they were physically exhausted, often resulting from multiple shifts and long hours, particularly on night shifts. Nurses reported that not taking adequate breaks or lunch contributed to exhaustion and subsequent errors. For example, a nurse wrote, “[I] increased the rate of lidocaine infusion to 230 cc/hr instead of 23 cc/hr. I was hypoglycemic, no break in 5 hours, no food, and had blurred vision.” Another respondent indicated that she “usually worked 3–11 PM shift and worked a double shift from 11 PM–7 AM. A mistake was made during the double shift time.”

### ***Interruptions and distractions***

Interruptions and distractions were viewed as important causes of medication errors. Nurses mentioned that when they were trying to do multiple tasks in a hurry, even patient needs could be distractions that led to mistakes. Examples included patients, coworkers, and physicians talking to them while they were giving medications and there were major and minor emergencies and telephone calls. As one participant explained, it is difficult to administer medications without error when one has to “rush. We are always in a hurry at the hospital, too many distractions (phone ringing, people looking for you, alarms ringing, doctors calling).”

### ***Being new and having lack of experience and/or training***

Although nurses, both those who made errors and those who did not, tended to rate graduate status as a “not very important” contributing factor (Fig 1), many of the anecdotes provided evidence that being new was a key element in the error. Nurses often recounted how the mistake was made early in their nursing career. As one respondent stated, “I was new, disorganized, overwhelmed with learn-

ing so many new things, needed to get meds out ‘on time’ and didn’t do a final check before I actually gave the patient the meds.”

### ***Pace/staffing/patient load***

Organizational factors such as patient load also made a difference. Nurses perceived that cost-cutting efforts and lack of staff resources contributed to their error event. They commented on how the cost-cutting efforts had affected their patient workloads. For example, a participant wrote, “I think institutions try to get by with too few nurses and medical support staff, and then expect way too much from them.” Another noted that “Nurses are progressively trying to do too much at one time, either too many patients or too high acuity. Nurses seem to just rise to any occasion without stepping back and saying no to situations.”

### ***Feelings about medication error***

Nurses were asked, “How did you feel when you made a medication error?” This question yielded somewhat surprising results. Many of the medication error incidents had occurred years before completion of the survey yet responses retained the emotions associated with it. Themes that emerged from these comments included concerns about patient harm; violation of trust; culpability, shame, and self-blame; loss of self-esteem and professional self-image; and an awareness that the system had failed them.

### ***Concerns about patient harm***

When asked how they felt when they made an error, nurses frequently expressed fears about the possibility of patient harm. Even when the error did not result in harm, nurses were generally aware that it might have done so. A nurse wrote, “My first and major concern was for the patient’s safety and well being. Then I experienced an overwhelming sense of despair. Fortunately, the patient was not harmed.”

### ***Violation of patient trust***

The belief that committing a medication error violated the trust that the patient placed

in the nurse echoed throughout many of the responses. For example, one participant described feeling “horrible, like I betrayed the patient’s trust even though no harm was done.”

### ***Culpability, shame, and self-blame***

Respondents judged themselves harshly for the error. Even when indicating that external factors played a role in making the error, there was minimal effort to exonerate or minimize personal responsibility. Nurses verbalized a strong sense of failure and self-blame independent of harm to the patient. As one nurse described, “I felt upset, remorseful, and stupid for making a mistake and possibly causing harm to the patient.”

### ***Loss of self-esteem and professional self-image***

Respondents described how making a medication error seriously jeopardized self-esteem and confidence in their nursing ability. Many respondents verbalized feeling “depressed . . . like a failure” and having expectations of perfection in their job performance.

### ***System failed them***

Even as nurses recounted their feelings, they described how they were not solely at fault. Other healthcare professionals and external or environmental conditions were cited as contributing to medication error events. As one participant noted, “Most of the time no one person is to blame. Errors are a result of several breakdowns along the way from ordering/pharmacy/transcribing and administering.”

To conclude the survey, respondents were invited to provide additional comments. Frustration and anger at the current working conditions and environments in which nurses work were pervasive. Many voiced feelings of disempowerment and inability to effect positive change, stating the belief that “nurses do not have enough input on organizational strategies to decrease medication errors.”

### **Limitations**

The primary limitation of this study is the response rate (8.2%). This limitation is mitigated by random selection of the sample and respondents whose demographics are representative of the national nursing population, both of which increase the credibility of the findings. While it is common for mailed questionnaires to yield limited returns,<sup>13,14</sup> this is even more likely when requesting sensitive information as this survey did. Many of the respondents described emotion-laden responses to having made a medication error. It is possible that nurses who received the questionnaire chose not to respond rather than deal with this emotional topic. There may also have been a hesitancy to share this information with the researchers, not knowing what would be done with the information. Another limitation is that the selection of contributing factors could not be exhaustive. This limitation is mitigated by the open-ended questions at the end of the survey that provided an opportunity for the respondent to include other relevant information.

### **NURSING IMPLICATIONS**

The study is valuable in that it describes personal experiences of nurses who have made medication errors and related feelings. Developing realistic solutions for prevention of medication errors requires accurate information about errors, including an understanding of the underlying reasons why medication administration errors occur.<sup>15,16</sup> This study identified a number of factors reported by nurses to contribute to medication errors, hence aiding in the understanding of medication errors in nursing.

Respondents felt a strong responsibility and personal accountability for patient safety, including medication administration. As one respondent wrote, “Nurses in their role as gatekeepers are expected to protect patients.” Even though respondents identified a number of variables that contributed to their making an error, they also perceived minimal control

over them. Additional research is needed to explore the impact, if any, of this perception on efforts to prevent medication administration errors.

Analysis of qualitative responses revealed that nurses retain strong emotional responses to medication error events. Some nurses admitted that making an error caused them to want to stop practicing nursing; it was not clear whether they actually did. Additional research is needed to explore this interaction and the psychological and emotional

toll nurses pay when making medication errors.

This study sought to identify what frontline nurses had to say about the issue of medication administration error. It has provided insights into causes of medication errors, attitudes nurses have about reporting errors, and feelings associated with the event. By providing information about why and how medication errors occur, this study contributes to ongoing efforts to reduce medication administration errors.

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