PREVENTING MEDICATION ERRORS

OBJECTIVES

Upon mastery of Chapter 9, you will be able to identify and prevent the common situations that lead to medication administration errors. To accomplish this, you will also be able to:

- Describe the consequences and costs of medication errors.
- Cite the incidence of hospital injuries and deaths attributable to medication errors.
- Explore evidence and rationale for the underreporting of medication errors.
- Name the steps involved in medication administration.
- Identify six common causes of medication errors.
- Identify the role of the nurse in preventing medication errors.
- Describe the role of technology and health care administration in medication error prevention.
- Recognize examples of prescription, transcription, and recording notation errors.
- Correct medical notation errors.
- Describe the requirements of The Joint Commission to prevent medication errors.
- Provide a sound rationale for the critical nature of medication administration and the importance of accurate and safe dosage calculations and medication administration.

MEDICATION ADMINISTRATION is one of the primary functions of the nurse and the other health care practitioners in most health care settings. Unfortunately, medication administration errors are common. Any health care practitioner is potentially at risk for making an error. Several studies addressing the problem indicate that there is no relationship between the incidence of medication errors and the characteristics of the nurses who usually make them (that is, years of practice and education).
The frequency of medication errors made by nurses and the consequences of these errors affect not only the health of the patient but also the overall cost of health care. These medication errors and the reactions that result from them cause increased length of stay, increased cost, patient disability, and death. There are additional indirect consequences as well. These include harm to the nurse involved, in regard to his or her personal and professional status, confidence, and practice (Mayo & Duncan, 2004).

Although prescription and administration mistakes are the most commonly reported, the incidence of medication errors by nurses is difficult to accurately determine. The Institute of Medicine (IOM, 2006) reported that medication errors may occur during any step of the medication process, from procuring the drug, prescribing it, dispensing it, administering it, and monitoring the effects. IOM estimates that when all steps of the medication administration process are taken into account, hospitalized patients are subjected to an average of one medication error per day.

Studies addressing nurses’ perception of medication errors support the existence of underreporting by nurses (Mayo & Duncan, 2004; Stetina, Groves, & Pafford, 2005; Wolf & Serembus, 2004). Other research indicates confusion among nurses about what constitutes a drug error. Failure to administer a medication and administering a medication late are the most underreported errors, because some nurses erroneously perceive that the patients will not be harmed in these situations (Mayo & Duncan, 2004; Stetina et al., 2005).

Statistics indicate that 10% to 18% of all hospital injuries are attributable to medication errors (Mayo & Duncan, 2004). The Institute of Medicine (2006) estimated that at least 400,000 medication errors a year resulting in $3.5 billion in annual costs, occur in U.S. hospitals and could have been prevented.

Medications that have been designated as high-alert drugs have the highest risk of causing injuries when errors are made. The Joint Commission (1999) identified insulin, opiates and narcotics, injectable potassium chloride, and intravenous anticoagulants as the high-alert medications with the greatest safety risk. A complete list of high-alert medications may be obtained on the Institute for Safe Medication Practices Website, www.ismp.org (see Figure 9-1).

The medication delivery process is complex and involves many individuals and departments. This chapter will focus on the critical role of the nurse in this process and the importance of legible medication orders, correct transcription and interpretation, safe medication administration, and accurate recording.

**PRESCRIPTION**

The steps involved in safe medication administration begin with the *prescription*, followed by *transcription* and then *administration*. Only those licensed health care providers who have authority by their state to write prescriptions are permitted to do so, such as a medical doctor (MD), an osteopathic doctor (DO), a podiatrist (DPM), a dentist (DDS), a physician’s assistant (PA), or an advanced registered nurse practitioner (ARNP).

Although nurses are not the originators of drug prescriptions, they play an important role in preventing errors in the *prescription* step. Refer back to Chapter 7 to review the seven parts of drug orders: patient’s name, date and time of the order, name of the drug, amount of the drug (including the unit of measure), route, frequency or specific administration schedule, and the prescriber’s name and licensure. It is important to always remember that the practitioner who administers a drug shares the liability for patient injury, even if the medical order was incorrect. The wise nurse always verifies the safety of the drug order by consulting a reputable drug reference, such as the American Hospital Formulary Service *AHFS Drug Information*, published annually by the American Society of Health-System Pharmacists, *Delmar’s Nurse’s Drug Handbook* published annually by Delmar Cengage Learning, and the *Physicians’ Desk Reference* published annually by Thomson Reuters. Most hospitals and health care systems have access to electronic drug guides available online, with many accessed directly from the electronic medication administration record (MAR) by clicking on the drug name, such as the Thomson Reuters Micromedex system for point-of-care decision support.
Classes/Categories of Medications

- adrenergic agonists, IV (e.g., epinephrine, phenylephrine, norepinephrine)
- adrenergic antagonists, IV (e.g., propranolol, metoprolol, labetalol)
- anesthetic agents, general, Intravenously and IV (e.g., propofol, ketamine)
- antiarrhythmics, IV (e.g., lidocaine, amiodarone)
- antithrombotic agents (anticoagulants), including warfarin, low-molecular-weight heparin, IV unfractionated heparin, factor Xa inhibitors (fondaparinux), direct thrombin inhibitors (e.g., argatroban, bivalirudin), thrombolytics (e.g., alteplase, tenecteplase), and glycoprotein IIb/IIIa inhibitors (e.g., eptifibatide)
- cardioplegic solutions
- chemotherapeutic agents, parenteral and oral
- dextrose, hypertonic, 20% or greater
- dialysis solutions, peritoneal and hemodialysis
- epidural or intrathecal medications
- hypoglycemics, oral
- inotropic medications, IV (e.g., digoxin, milrinone)
- liposomal forms of drugs (e.g., liposomal amphotericin B)
- moderate sedation agents, IV (e.g., midazolam)
- moderate sedation agents, oral, for children (e.g., chloral hydrate)
- narcotics/opiates, IV, transdermal, and oral (including liquid concentrates, immediate and sustained-release formulations)
- neuromuscular blocking agents (e.g., succinylcholine, rocuronium, vecuronium)
- radiocontrast agents, IV
- total parenteral nutrition solutions

Specific Medications

- colchicine injection
- epoprostenol (Flolan), IV
- insulin, subcutaneous and IV
- magnesium sulfate injection
- methotrexate, oral, non-rectal or use
- opium tincture
- oxytocin, IV
- nitroprusside sodium for injection
- potassium chloride for injection concentrate
- potassium phosphates injection
- promethazine, IV
- sodium chloride for injection, hypertonic (greater than 0.9% concentration)
- sterile water for injection, inhalation, and irrigation (excluding pour bottles) in containers of 100 mL or more

Background

Based on error reports submitted to the USP-ISMP Medication Errors Reporting Program, reports of harmful errors in the literature, and input from practitioners and safety experts, ISMP created and periodically updates a list of potential high-alert medications. During February-April 2007, 700 practitioners responded to an ISMP survey designed to identify which medications were most frequently considered high-alert drugs by individuals and organizations. Further, to assure relevance and completeness, the clinical staff at ISMP, members of our advisory board, and safety experts throughout the US were asked to review the potential list. This list of drugs and drug categories reflects the collective thinking of all who provided input.

**Although colchicine injection should no longer be used, it will remain on the list until shipments of unapproved colchicine injection cease in August 2008. For details, please visit: www.fda.gov/bbs/topics/NEWS/2008/NEW01791.html.
Verbal Orders

In most health care institutions, the nurse (or other authorized individual, such as a transcriptionist) can receive verbal orders either in person or by phone from licensed physicians or other practitioners who are licensed to prescribe. As the accrediting body for health care organizations and agencies, The Joint Commission (2011) annually publishes Patient Safety Goals. Goal 2 is designed to improve the effectiveness of communication among caregivers. It requires that the authorized individual receiving a verbal or telephone order first **write it down** in the patient’s chart or enter it into the computer record; second, **read it back** to the prescriber; and third, **get confirmation** from the prescriber that it is correct. For the nurse to only repeat back the order as heard or repeat it while writing it down is not sufficient to regularly prevent errors, and this is not allowed by The Joint Commission. The order must first be **written** and then it must be **read back** after it is written to ensure that the order is clear to the recipient and in turn **confirmed** by the prescriber giving the order. As with written orders, the nurse must also verify that all seven parts of the verbal order have been included and are accurate. If the nurse has any question or concern about the order, it should be clarified during the conversation. Of course, The Joint Commission advises that in emergency situations, such as a code in the ER, doing a formal read-back would not be feasible and would compromise patient safety. In such cases, a repeat-back is acceptable.

**CAUTION**

Accepting verbal orders is a major responsibility and a situation that can readily lead to medication errors. Most health care institutions have policies concerning telephone or verbal orders, and the nurse or other authorized staff member should be informed of his or her responsibility in this regard.

**TRANSCRIPTION**

One of the main causes of medication errors is incorrect **transcription** of the original prescriber’s order. Many studies addressing the causes of medication errors identify one of the main sources to be illegible physician handwriting (Stetina et al., 2005). During the transcription process, the transcriber must ensure that the drug order includes all seven parts. If any of the components are absent or illegible, the nurse must obtain or clarify that information prior to signing off and implementing the order.

Further, The Joint Commission and the Institute for Safe Medication Practices have published lists of abbreviations, acronyms, and symbols to avoid in prescriptions and patient records because they have been common sources of errors and can be easily misinterpreted. The Joint Commission first published the Official “Do Not Use” List (Figure 9-2) in 2004 and required that health care organizations publish their own lists of abbreviations not to use. It suggested that there may be other abbreviations, acronyms, and symbols added to its list in the future (Figure 9-3) and referred health care organizations to the ISMP list of dangerous abbreviations relating to medication use. The ISMP recommends that these abbreviations, symbols, and dose designations be strictly prohibited when communicating medical information (Figure 9-4).

**CAUTION**

Stay alert to the guidelines and restrictions of The Joint Commission, the ISMP, and your own health care facility regarding abbreviations and medical notation. Acceptable medical communication is subject to abrupt change. Check the Websites listed at the end of this chapter often to stay up to date.
### FIGURE 9-2  The Joint Commission’s Official “Do Not Use” List of medical abbreviations, acronyms, and symbols

<table>
<thead>
<tr>
<th>Do Not Use</th>
<th>Potential Problem</th>
<th>Use Instead</th>
</tr>
</thead>
<tbody>
<tr>
<td>U (unit)</td>
<td>Mistaken for “0” (zero), the number “4” (four) or “cc”</td>
<td>Write “unit”</td>
</tr>
<tr>
<td>IU (International Unit)</td>
<td>Mistaken for IV (intravenous) or the number 10 (ten)</td>
<td>Write “International Unit”</td>
</tr>
<tr>
<td>Q.D., QD, q.d., qd (daily)</td>
<td>Mistaken for each other</td>
<td>Write “daily”</td>
</tr>
<tr>
<td>Q.O.D., QOD, q.o.d., qod (every other day)</td>
<td>Period after the Q mistaken for “I” and the “O” mistaken for “I”</td>
<td>Write “every other day”</td>
</tr>
<tr>
<td>Trailing zero (X.0 mg)*</td>
<td>Decimal point is missed</td>
<td>Write X mg</td>
</tr>
<tr>
<td>Lack of leading zero (.X mg)</td>
<td></td>
<td>Write 0.X mg</td>
</tr>
<tr>
<td>MS</td>
<td>Can mean morphine sulfate or magnesium sulfate</td>
<td>Write “morphine sulfate”</td>
</tr>
<tr>
<td>MSO₄ and MgSO₄</td>
<td>Confused for one another</td>
<td>Write “magnesium sulfate”</td>
</tr>
</tbody>
</table>

* Applies to all orders and all medication-related documentation that is handwritten (including free-text computer entry) or on pre-printed forms.

**Exception:** A “trailing zero” may be used only where required to demonstrate the level of precision of the value being reported, such as for laboratory results, imaging studies that report size of lesions, or catheter/tube sizes. It may not be used in medication orders or other medication-related documentation.

### FIGURE 9-3  The Joint Commission’s list of additional abbreviations, acronyms, and symbols

#### Additional Abbreviations, Acronyms and Symbols

(For possible future inclusion in the Official “Do Not Use” List)

<table>
<thead>
<tr>
<th>Do Not Use</th>
<th>Potential Problem</th>
<th>Use Instead</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; (greater than)</td>
<td>Misinterpreted as the number “7” (seven) or the letter “L”</td>
<td>Write “greater than”</td>
</tr>
<tr>
<td>&lt; (less than)</td>
<td>Confused for one another</td>
<td>Write “less than”</td>
</tr>
<tr>
<td>Abbreviations for drug names</td>
<td>Misinterpreted due to similar abbreviations for multiple drugs</td>
<td>Write drug names in full</td>
</tr>
<tr>
<td>Apothecary units</td>
<td>Unfamiliar to many practitioners</td>
<td>Use metric units</td>
</tr>
<tr>
<td>Confused with metric units</td>
<td></td>
<td></td>
</tr>
<tr>
<td>@</td>
<td>Mistaken for the number “2” (two)</td>
<td>Write “at”</td>
</tr>
<tr>
<td>cc</td>
<td>Mistaken for U (units) when poorly written</td>
<td>Write “mL” or “ml” or “milliliters” (<em>“mL” is preferred</em>)</td>
</tr>
<tr>
<td>µg</td>
<td>Mistaken for mg (milligrams) resulting in one thousand-fold overdose</td>
<td>Write “mcg” or “micrograms”</td>
</tr>
</tbody>
</table>
Abbreviations | Intended Meaning | Misinterpretation | Correction |
--- | --- | --- | --- |
pg | Microgram | Mistaen as mg** | Use “mcg” |
AD, AS, AU | Right ear, left ear, each ear | Mistaen as OD, OS, OU (right eye, left eye, each eye) | Use “right ear,” “left ear,” or “each ear” |
OD, OS, OU | Right eye, left eye, each eye | Mistaen as AD, AS, AU (right ear, left ear, each ear) | Use “right eye,” “left eye,” or “each eye” |
BT | Bedtime | Mistaen as “BID” (twice daily) | Use “bedtime” |
cc | Cubic centimeters | Mistaen as “u” (units) | Use “ml” |
D/C | Discharge or discontinue | Premature discontinuation of medications if D/C (intended to mean “discharge”) has been misinterpreted as “discontinued” when followed by a list of discharge medications | Use “discharge” and “discontinued” |
IJ | Injection | Mistaen as “IV” or “intraperitoneal” | Use “injection” |
IN | Intranasal | Mistaen as “IM” or “IV” | Use “intranasal” or “NAS” |
HS | Half-strength | Mistaen as bedtime | Use “half-strength” or “bedtime” |
hs | At bedtime, hours of sleep | Mistaen as half-strength | Use “half-strength” or “bedtime” |
IU** | International unit | Mistaen as IV (intravenous) or 10 (ten) | Use “units” |
e.d. or OD | Once daily | Mistaen as “right eye” (OD-oculus dexter), leading to oral liquid medications administered in the eye | Use “daily” |
OJ | Orange juice | Mistaen as OD or OS (right or left eye); drugs meant to be diluted in orange juice may be given in the eye | Use “orange juice” |
Per os | By mouth, orally | The “as” can be mistaken as “left eye” (OS-oculus sinister) | Use “PO,” “by mouth,” or “orally” |
q.d. or OD** | Every day | Mistaen as q.d., especially if the period after the “q” or the tail of the “q” is misunderstood as an “r” | Use “daily” |
qh | Nightly at bedtime | Mistaen as “qhr” or every hour | Use “nightly” |
qu | Nightly or at bedtime | Mistaen as “q” (every hour) | Use “nightly” or “at bedtime” |
q.d. or QOD** | Every other day | Mistaen as “q.d.” (daily) or “q.i.d. (four times daily) if the “q” is poorly written | Use “every other day” |
q1d | Daily | Mistaen as q.i.d. (four times daily) | Use “daily” |
q2PM, etc. | Every evening at 6 PM | Mistaen as every 6 hours | Use “daily at 6 PM” or “6 PM daily” |
SC, SQ, sub q | Subcutaneous | SC mistaken as SL (sublingual); SQ mistaken as “5 every:” the “q” in “sub q” has been mistaken as “every” (e.g., a heparin dose ordered “sub q 2 hours before surgery” misunderstood as every 2 hours before surgery) | Use “subcut” or “subcutaneously” |
s | Sliding scale (insulin) or ½ (apothecary) | Mistaen as “.55” | Spell out “sliding scale;” use “one-half” or “½” |
SSRI | Sliding scale regular insulin | Mistaen as selective-serotonin reuptake inhibitor | Spell out “sliding scale (insulin)” |
SSI | Sliding scale insulin | Mistaen as Strong Solution of Laxative (Lugal’s) | Spell out “sliding scale (insulin)” |
jd | One daily | Mistaen as “tid” | Use “1 daily” |
TIW or tiw | 3 times a week | Mistaen as “3 times a day” or “twice in a week” | Use “3 times weekly” |
U or u** | Unit | Mistaen as the number 0 or 4, causing a 10-fold overdose or greater (e.g., 4U seen as “40” or 4u seen as “44”); mistaken as “cc” on dose given in volume instead of units (e.g., 4u seen as 4cc) | Use “unit” |
UD** | As directed (“ut dictum”) | Mistaen as unit dose (e.g., dltauzin 125 mg IV infusion “UD” misinterpreted as meaning to give the entire infusion as a unit [dolus] dose) | Use “as directed” |

### Abbreviations with a period following the abbreviation

- **mg**: The period is unnecessary and could be mistaken as the number 1 if written poorly. Use mg mL, etc. without a terminal period.
**These abbreviations are included on The Joint Commission’s “minimum list” of dangerous abbreviations, acronyms, and symbols that must be included on an organization’s “Do Not Use” list, effective January 1, 2004. Visit www.jointcommission.org for more information about this Joint Commission requirement.**

<table>
<thead>
<tr>
<th>Drug Name Abbreviations</th>
<th>Intended Meaning</th>
<th>Misinterpretation</th>
<th>Correction</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARA A</td>
<td>vidarabine</td>
<td>Mistaken as cytarabine (ARA-C)</td>
<td>Use complete drug name</td>
</tr>
<tr>
<td>AZT</td>
<td>zidovudine (Retrovir)</td>
<td>Mistaken as azathioprine or azotrexam</td>
<td>Use complete drug name</td>
</tr>
<tr>
<td>CPZ</td>
<td>Compazine (prochlorperazine)</td>
<td>Mistaken as chlorpromazine</td>
<td>Use complete drug name</td>
</tr>
<tr>
<td>DPT</td>
<td>Diamox-Pentogaine-Thorazine</td>
<td>Mistaken as diphenhydramine-pentazocine (vaccine)</td>
<td>Use complete drug name</td>
</tr>
<tr>
<td>DTO</td>
<td>Diluted tincture of opium, or dehydrated tincture of opium (Pangiac)</td>
<td>Mistaken as tincture of opium</td>
<td>Use complete drug name</td>
</tr>
<tr>
<td>HDI</td>
<td>hydrochloric acid or hydrochloride</td>
<td>Mistaken as potassium chloride</td>
<td>Use complete drug name unless expressed as a salt of a drug</td>
</tr>
<tr>
<td>HCT</td>
<td>hydrocortisone</td>
<td>Mistaken as hydrochlorothiazide</td>
<td>Use complete drug name</td>
</tr>
<tr>
<td>HCTZ</td>
<td>hydrochlorothiazide</td>
<td>Mistaken as hydrocortisone (seen as HCT250 mg)</td>
<td>Use complete drug name</td>
</tr>
<tr>
<td>MgSO4**</td>
<td>magnesium sulfate</td>
<td>Mistaken as morphine sulfate</td>
<td>Use complete drug name</td>
</tr>
<tr>
<td>MS, MSO4**</td>
<td>morphine sulfate</td>
<td>Mistaken as magnesium sulfate</td>
<td>Use complete drug name</td>
</tr>
<tr>
<td>MTX</td>
<td>methotrexate</td>
<td>Mistaken as mexitilene</td>
<td>Use complete drug name</td>
</tr>
<tr>
<td>PCA</td>
<td>procaineamide</td>
<td>Mistaken as patient controlled analgesia</td>
<td>Use complete drug name</td>
</tr>
<tr>
<td>PTU</td>
<td>propylthiouracil</td>
<td>Mistaken as mercaptopurine</td>
<td>Use complete drug name</td>
</tr>
<tr>
<td>T3</td>
<td>T3-iodine with codeine No. 3</td>
<td>Mistaken as lithium</td>
<td>Use complete drug name</td>
</tr>
<tr>
<td>TAC</td>
<td>triamcinolone</td>
<td>Mistaken as tetracaine, Adrenalin, cocaine</td>
<td>Use complete drug name</td>
</tr>
<tr>
<td>TNK</td>
<td>TNKase</td>
<td>Mistaken as “TPA”</td>
<td>Use complete drug name</td>
</tr>
<tr>
<td>ZnSO4</td>
<td>zinc sulfate</td>
<td>Mistaken as morphine sulfate</td>
<td>Use complete drug name</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stemmed Drug Names</th>
<th>Intended Meaning</th>
<th>Misinterpretation</th>
<th>Correction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitro drip</td>
<td>nitroglycerin infusion</td>
<td>Mistaken as sodium nitroprusside infusion</td>
<td>Use complete drug name</td>
</tr>
<tr>
<td>Norflex</td>
<td>norfloxacin</td>
<td>Mistaken as Norflex</td>
<td>Use complete drug name</td>
</tr>
<tr>
<td>IV Flame</td>
<td>intravenous vancomycin</td>
<td>Mistaken as Hyvan</td>
<td>Use complete drug name</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Symbols</th>
<th>Intended Meaning</th>
<th>Misinterpretation</th>
<th>Correction</th>
</tr>
</thead>
<tbody>
<tr>
<td>min</td>
<td>minute</td>
<td>Symbol for minute mistaken as “m”</td>
<td>Use “min”</td>
</tr>
<tr>
<td>3</td>
<td>for three days</td>
<td>Mistaken as “3 doses”</td>
<td>Use “for three days”</td>
</tr>
<tr>
<td>&gt; and &lt;</td>
<td>greater than and less than</td>
<td>Mistaken as opposite of intended; mistakenly use incorrect symbol; “&lt;” 10 mistaken as “4”</td>
<td>Use “&gt;” or “&lt;”</td>
</tr>
<tr>
<td>1/ (slash mark)</td>
<td>separates two doses or indicates “per”</td>
<td>Mistaken as the number 1 (e.g., “25 units/10 units” misread as “25 units and 10 units”)</td>
<td>Use “per” rather than a slash mark to separate doses</td>
</tr>
<tr>
<td>@</td>
<td>at</td>
<td>Mistaken as “2”</td>
<td>Use “at”</td>
</tr>
<tr>
<td>&amp;</td>
<td>and</td>
<td>Mistaken as “and”</td>
<td>Use “and”</td>
</tr>
<tr>
<td>+</td>
<td>plus or and</td>
<td>Mistaken as “+”</td>
<td>Use “+”</td>
</tr>
<tr>
<td>8</td>
<td>hour</td>
<td>Mistaken as a zero (e.g., “62” seen as 6 or “20” seen as 20)</td>
<td>Use “hr,” “h,” or “hour”</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Drug Name Abbreviations</th>
<th>Intended Meaning</th>
<th>Misinterpretation</th>
<th>Correction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inderal 40 mg</td>
<td>Tegretol 300 mg</td>
<td>Mistaken as Inderal 140 mg</td>
<td>Place adequate space between the drug name, dose, and unit of measure</td>
</tr>
<tr>
<td>10 mg</td>
<td>100 mL</td>
<td>The “m” is sometimes mistaken as a zero or two zeros, risking a 10- to 100-fold overdose</td>
<td>Place adequate space between the dose and unit of measure</td>
</tr>
<tr>
<td>100,000 units</td>
<td>1,000,000 units</td>
<td>100,000 has been mistaken as 10,000 or 1,000,000, 1,000,000 has been mistaken as 100,000</td>
<td>Use commas for dosing units at or above 1,000, or use words such as 100 “thousand” or 1 “million” to improve readability</td>
</tr>
</tbody>
</table>

**ISMP’s List of Error-Prone Abbreviations, Symbols, and Dose Designations (continued)**

**ISMP** indicates “per” symbol mistaken as “mL”

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Section 2 Measurement Systems, Drug Orders, and Drug Labels

Many health care institutions are utilizing a computerized physician/prescriber order entry (CPOE) system to help eliminate transcription sources of error. Physicians choose drug orders from a menu screen (Figure 9-5) and then choose the route and dosage strength offered on the following screen (Figure 9-6). These systems can also be implemented with clinical decision support systems (CDSS). The CDSS may include suggestions or default values for drug dosages, routes, and frequencies. The chance still exists that the order may be entered incorrectly, but the computer system does remove the variable of illegible handwriting and is known to foster a safety culture.

**FIGURE 9-5** A CPOE menu screen allows the user to select a drug

**FIGURE 9-6** A CPOE offers options for route and dose of the drug chosen
SAFETY MEDICATION ADMINISTRATION

The Five Rights of medication administration (right patient, right drug, right amount, right route, and right time) have been the cornerstones for safe and effective nursing practice in the area of medication administration. A sixth right, right documentation, is often added to the list. These Six Rights were introduced in Chapter 7. Thoroughly and consistently following these rights can ensure that nurses administer medications safely.

REMEMBER
Nurses should refer to reputable drug reference resources to validate the safety of the medication as ordered and transcribed. Whoever administers a medication is legally responsible for patient safety. Any medication errors that result also fall under the responsibility of the person who administered the drug, regardless of the primary source of the error.

Right Patient

The administration of a medication to a patient other than the one for whom it was ordered is clearly an error. It is also one that should be easily prevented. Yet the literature shows this to be one of the three most common causes of medication errors. The failure of the nurse to accurately identify a patient is the most common cause for the error. The Joint Commission (2011) has a Patient Safety Goal to improve the accuracy of patient identification when administering medications. The Joint Commission requires that patients be identified with at least two unique person-specific identifiers (neither of which can be the patient’s room number), such as name and date of birth or name and patient ID number. Electronic identification technology coding, such as barcoding, that includes two or more person-specific identifiers (not room number) will also comply. Basic nursing education emphasizes the importance of correctly identifying a patient prior to administering a medication, by comparing the two person-specific identifiers with the patient’s arm band, medication administration record (MAR), or chart and by asking the patient to state his or her name (as a third identifier). Both steps should be consistently implemented regardless of the nurse’s familiarity with the patient or the practice arena.

It is also wise to tell the patient at the time of administration what medication and dosage strength of the drug the nurse is administering. This extra step can often prevent errors, because patients who are familiar with their medications may spot an error or question a drug dosage. This is also an opportunity to engage the patient in medication teaching and learning. However, the nurse should never rely on this practice as the primary means to prevent errors. Instead, this is an extra precaution.

Technological advances in medication administration and documentation have included mechanisms to help prevent errors in this area. Computers installed at the patient’s bedside and/or handheld devices that enable the nurse to scan the barcodes on the patient’s identification band and on the medications serve as reinforcement to visual checks by the nurse. Few studies have been published in regard to the effectiveness of these systems in preventing errors. However, this additional mechanism to ensure correct patient identification increases efficiency, ensuring that the right patient receives the right drug. The health care industry has invested heavily in technology to help prevent costly medication errors caused by carelessness and distraction.

Right Drug

Nurses can ensure that the right drug criterion is maintained by checking the medication label against the order or MAR at three points during the administration process:

1. On first contact with the drug (removing it from the medication cart, drawer, or shelf).
2. Prior to measuring the drug (pouring, counting, or withdrawing the drug).
3. After preparing the drug, just prior to administration.
Distraction in the workplace has been identified as a key reason for error in obtaining the right drug (Pape, Guerra, Muzquiz, & Bryant, 2005). Nurses should take measures to ensure that they are not distracted during this phase of medication administration. Optimally, the physical workplace should provide for the nurse to move to an area without distractions. However, if this is not available, the nurse should be conscious of the need to focus solely on the task at hand and avoid the temptation to multi-task while dispensing medications.

In February 2004, the U.S. Food and Drug Administration (FDA) issued a regulation that requires all new pharmaceuticals to be barcoded upon launch into the market (FDA, 2006). Studies by U.S. Pharmacopeia in 2003 indicated that insulin products have the highest rates of error (Information Technology, 2005). Projections by the FDA indicate that barcoding on prescription drugs will reduce errors in the United States by 500,000 instances over the next 20 years, with estimated savings of $93 billion in additional health care costs, patient pain, and lost wages (FDA, 2004). This represents a 50% reduction in the medication errors that would otherwise occur without the use of barcoding (FDA, 2004).

Barcodes on drugs are used with a barcode-scanning system and computerized database. At a minimum, the code must contain the drug’s National Drug Code. This number uniquely identifies the drug. The process starts as a patient enters the hospital and is given a barcoded patient identification band. The hospital has barcode scanners that are linked to the hospital’s electronic medical records system. Before a health care worker administers a medication, he or she scans the patient’s barcode, which allows the computer to access the patient’s medical records. The health care worker then scans each drug prior to administration. This notifies the computer of each medication to be administered. The information is compared to the patient’s database to ensure a match. If there is a problem, the health care worker receives an error message and investigates the problem.

Nurses are responsible for being knowledgeable about the actions, indications, and contraindications of the medications they administer. The constant changes that are occurring in health care delivery and the steady influx of new medications being released into the market have challenged the individual nurse’s ability to meet this responsibility. A valid and current drug-reference system should be available in every practice setting. The nurse should not hesitate to seek information about any medication that is unfamiliar. The prescribing clinician should be contacted for clarification or confirmation for any medication order that appears inappropriate or incorrect.

Automated dispensing cabinets (ADCs) (Figure 9-7) have been utilized in many health care settings since the 1980s and are now used in the majority of hospitals. There are many safety measures in place with the use of this technology, but the possibility still exists that the patient may receive the wrong medication. It is important that the correct medication be stocked by the pharmacy in the correct location within the ADC to avoid mistakes in drug selection (ISMP, 2008a). In a survey conducted by the ISMP (2008b), nurses reported that at least half of the ADCs were not located in areas free from distractions. Nurses also reported that they always or frequently wait in line to access the ADC, and one-third of the respondents indicated that they often remove multiple patients’ medications at a time. This identified “workaround” is known to lead to drug administration errors. Recognizing that few resources exist to guide health care organizations in the safest use of this technology, the ISMP has developed and posted guidelines that include 12 interdisciplinary core processes for safe use of automated dispensing cabinets.

**CAUTION**

When medications are distributed with automated dispensing cabinets, follow the ISMP Core Processes for safe ADC use (ISMP, 2008a).

1. Provide ideal environmental conditions for the use of ADCs
2. Ensure ADC system security
3. Use pharmacy-profiled ADCs
4. Identify and include information that should appear on the ADC screen
5. Select and maintain proper ADC inventory
6. Select appropriate ADC configuration (e.g., lidded compartments are preferred to matrix drawers)
7. Define and implement safe ADC restocking processes
8. Develop procedures to ensure the accurate withdrawal of medications from the ADC
9. Establish strict criteria for ADC system overrides
10. Standardize processes for transporting medications from the ADC to the patient’s bedside
11. Eliminate the process for returning medications directly to their original ADC location
12. Provide staff education and competency validation

**FIGURE 9-7** The Pyxis MedStation® is an example of an automated dispensing cabinet (ADC) system
In addition, nurses who practice in a setting utilizing this technology should continue to implement the three checks described at the beginning of this section to avoid administering the wrong drug: during retrieval, preparation, and administration. Review the information about reading drug labels in Chapter 8 to ensure that all of the important information is confirmed.

A common preventable medication error is interchanging look-alike/sound-alike (LASA) medication pairs—prescribing and administering one for the other. The Joint Commission (2011) Patient Safety Goal 3 addresses this issue and posts online an extensive list of LASA medications that pose the greatest risk for medication errors, including drugs such as ephedrine and epinephrine, hydromorphone injection and morphine injection, hydroxyzine and hydralazine, OxyContin (controlled release) and oxycodone (immediate release). Hospitals are independently required to list at least 10 look-alike/sound-alike drug pairs commonly prescribed and administered in their institution for their caregivers to monitor. A survey conducted by the Institute for Safe Medication Practices (ISMP, 2009a) indicated that compliance with The Joint Commission National Patient Safety Goal 3 for LASA drugs has been high, with rates of at least 95% for hospitals. Yet 27% of staff nurses responding were still uncertain whether their organization maintained a list of LASA drug name pairs. To reduce the risk of errors, all clinical staff, but especially nurses administering medications, must know the hospital’s list of LASA drugs and its importance to patient safety.

The ISMP and the Food and Drug Administration (FDA) also suggest the use of “Tall Man” lettering to differentiate drugs with look-alike names (ISMP, 2010b). Using this method, the drug name is highlighted by various means such as uppercase letters, colors, bolding, and italics to call attention to the dissimilarities between look-alike drug names; the FDA-approved Tall Man list is shown in Figure 9-8. Tall Man lettering is being used in many hospitals on computerized physician/prescriber order entry (CPOE) screens, automated dispensing cabinet (ADC) screens, computer-generated medication administration records (MARs), computer-generated pharmacy labels, preprinted standard orders, and medication shelf labels.

The Joint Commission (2011) National Patient Safety Goal 8 addresses the practice of reconciling the right medications across the continuum of care, beginning with admission and following the patient through transfers within the health care facility (such as from a hospital intensive care unit to a medical floor) and back home or to a long-term care facility. A complete list of current medications the patient is taking at home (including dosage, route, and frequency) is created and documented upon admission, ideally before prescribing any new medications. The medications ordered for the patient while under care are compared to this list and discrepancies are reconciled and documented. Likewise, when the patient is transferred to another unit within the hospital or to another facility, or discharged to home, the up-to-date, reconciled medication list is communicated and documented. Strict adherence to these standards will prevent many medication errors of transcription, omission, duplication, and drug interactions.

**Right Amount**

Illegible prescriber’s handwriting, transcription error, miscalculation of the amount, or misreading of the label can result in errors involving the administration of an incorrect dose of a medication. The need for each nurse to carefully read and clarify drug orders and recheck drug labels has been previously discussed. Two nurses must check some potent high-alert drugs, such as insulin or heparin, which are common sources of errors. Transcription errors involving dosage can be avoided if nurses consult drug references to confirm the dosage of medications when they are in doubt. The Joint Commission’s Official “Do Not Use” List (Figure 9-2) will also help eliminate dosage problems for those medications ordered daily, ordered every other day, or measured in units.

While medication errors are known to be the most common type of medical error in general, the risk of harm from dosage errors is a significant risk in the pediatric population. Increased caution must be taken when administering medication to children because of the greater frequency of weight-based dosage calculations, fractional dosage, and the need for decimal points in calculations (The Joint Commission, 2008b).
### FIGURE 9-8 FDA-approved list of generic drug names with Tall Man letters

**FDA and ISMP Lists of Look-Alike Drug Names with Recommended Tall Man Letters**

<table>
<thead>
<tr>
<th>Drug Name with Tall Man Letters</th>
<th>Confused with</th>
</tr>
</thead>
<tbody>
<tr>
<td>acetaZOLAMIDE</td>
<td>acetoHEXAMIDE</td>
</tr>
<tr>
<td>acetoHEXAMIDE</td>
<td>acetaZOLAMIDE</td>
</tr>
<tr>
<td>buPROPlon</td>
<td>buPIRone</td>
</tr>
<tr>
<td>busPIRone</td>
<td>buPROPlon</td>
</tr>
<tr>
<td>chlorproMAZINE</td>
<td>chlorproPAMIDE</td>
</tr>
<tr>
<td>chlorproPAMIDE</td>
<td>chlorproMAZINE</td>
</tr>
<tr>
<td>clomiPHENE</td>
<td>clomiPRAmine</td>
</tr>
<tr>
<td>clomiPRAmine</td>
<td>clomiPHENE</td>
</tr>
<tr>
<td>cycloSERINE</td>
<td>cycloSPORINE</td>
</tr>
<tr>
<td>cycloSPORINE</td>
<td>cycloSERINE</td>
</tr>
<tr>
<td>DAUNOrubicin</td>
<td>DOXOrubicin</td>
</tr>
<tr>
<td>dimenhyDRINATE</td>
<td>dimenhyORINATE</td>
</tr>
<tr>
<td>diphenhyDRINATE</td>
<td>dimenhyORINATE</td>
</tr>
<tr>
<td>DOBUTamine</td>
<td>DOPamine</td>
</tr>
<tr>
<td>DOPamine</td>
<td>DOBUTamine</td>
</tr>
<tr>
<td>DOXXrubicin</td>
<td>DAUNOrubicin</td>
</tr>
<tr>
<td>glyBURIDE</td>
<td>glyBURIDE</td>
</tr>
<tr>
<td>glyBURIDE</td>
<td>glyBURIDE</td>
</tr>
<tr>
<td>hydrALAZINE</td>
<td>hydrOXYzine</td>
</tr>
<tr>
<td>hydrOXYzine</td>
<td>hydrALAZINE</td>
</tr>
<tr>
<td>medroxyPROGESTERone</td>
<td>methylPREDNISalone - methylTESTOSTERone</td>
</tr>
<tr>
<td>methylPREDNISalone</td>
<td>medroxyPROGESTERone - methylTESTOSTERone</td>
</tr>
<tr>
<td>methylTESTOSTERone</td>
<td>medroxyPROGESTERone - methylPREDNISalone</td>
</tr>
<tr>
<td>nICARidine</td>
<td>NIFEdipine</td>
</tr>
<tr>
<td>NIFEdipine</td>
<td>nICARidine</td>
</tr>
<tr>
<td>prednisOLONE</td>
<td>prednSONE</td>
</tr>
<tr>
<td>prednisOLE</td>
<td>prednSONE</td>
</tr>
<tr>
<td>sulfADIAZINE</td>
<td>sulfSOXAZOLE</td>
</tr>
<tr>
<td>sulfSOXAZOLE</td>
<td>sulfADIAZINE</td>
</tr>
<tr>
<td>TOLAZamide</td>
<td>TOLBUTamide</td>
</tr>
<tr>
<td>TOLBUTamide</td>
<td>TOLAZamide</td>
</tr>
<tr>
<td>vinBLAStone</td>
<td>vinCristine</td>
</tr>
<tr>
<td>vinCristine</td>
<td>vinBLAStone</td>
</tr>
</tbody>
</table>
Ensuring that the patient receives the right amount when administering parenteral fluids is equally important. Electronic infusion pumps have enabled nurses to have greater control over the rate of infusion of intravenous solutions and medications, thereby reducing medication errors. The newest innovation with infusion pumps is the Smart Pump, which is equipped with computer software that includes a library of medications and dosage guidelines (ISMP, 2009b). Other infusion pumps, such as the patient-controlled analgesia (PCA) pump and the insulin pump, have enabled patients to be active participants in their own care (FDA, 2010a). Although infusion pump technology has increased administration safety, one cannot rely fully on these devices. Because electronic infusion pumps are primarily used for patients who require a precise delivery of fluids or critical medications, errors can result in serious consequences to the patient. Recently, the Food and Drug Administration (FDA) has become greatly concerned with the number of adverse events associated with the use of infusion pumps. Some of these events are attributed to user error, while others have been associated with pump malfunction. The FDA Infusion Pump Improvement Initiative (2010b) addresses infusion pump safety problems. Along with establishing additional safety requirements for infusion pump manufacturers, the FDA is increasing user awareness with a new infusion pump Website (http://www.fda.gov/MedicalDevices/ProductsandMedicalProcedures/GeneralHospitalDevicesandSupplies/InfusionPumps/default.htm). It is the responsibility of the nurse to be trained on the proper use of infusion pumps and to be watchful for potential problems associated with emerging technologies.

Teaching effective dosage calculation methods is the main purpose of this text. The need for each nurse to estimate the correct dosage prior to calculating the exact amount is stressed throughout the book. The inclusion of this commonsense approach to calculating dosages is crucial in preventing errors in dosage calculation. Calculating, preparing, and administering the wrong dose of a drug are preventable medication errors. Full attention to accurate dosage calculations will ensure that you avoid such liabilities.

**Right Route**

Errors involving the route of medication administration can occur for several reasons. One of the most common problems has already been addressed: that of illegible prescriber’s handwriting. Another common error relates to the nurse’s knowledge of medications and their dosage forms. Nurses are usually familiar with medications commonly ordered and administered in their area of practice, but the nurse should consult a drug information source to confirm that the correct route is ordered for an unfamiliar medication, particularly in regard to injectable forms of medications.

Nurses should also be alert to the need to change or clarify administration forms or routes for the patient receiving medication through a feeding tube, such as a nasogastric or surgically inserted gastric tube. Medication errors related to this route of administration may occur due to administering multiple medications that are incompatible, preparing the medications improperly, or using improper administration techniques (ISMP, 2010d). Sometimes the patient may not be allowed any oral intake (NPO status) or may have a nasogastric tube but the medications are ordered for oral administration. Prescribers may order time-released or enteric-coated medications to be administered via a feeding tube but not realize that medications must be crushed or dissolved to be administered. The Institute for Safe Medication Practices (2010e) provides a comprehensive drug list of oral dosage forms that should not be crushed, including the rationale for the restriction. Such situations require the nurse to contact the prescriber for a change in the medication form or route or to seek clarification for the drug to be administered safely and correctly. Enteral infusion pumps are often used to administer liquid nutrients and medications by the gastrointestinal route. These pumps may be used with patients who also have intravenous infusion pumps or other pumps in place. Serious adverse events as a result of misconnections of tubing have been reported due to a mix-up with electronic infusion devices as well as tubing regulated by manual devices (The Joint Commission, 2006). To ensure that the patient receives the ordered medication by the right route, it is recommended that the tube or catheter from the patient be traced to the point of origin before connecting any new device or infusion. Additionally, a
“line reconciliation” should be conducted to recheck connections and trace all patient tubes and catheters to their sources upon a patient’s arrival at a new setting as part of the handoff process (The Joint Commission, 2006). It is the nurse’s responsibility to be alert to potential errors of all kinds that may interfere with patient safety and rights.

**Right Time**

Medication orders should include the frequency with which a drug is to be administered or the specific administration schedule. Computerized hospital drug administration systems automatically indicate these times on the medication administration record. The nurse is responsible for checking these records to be sure they are accurate. For example, a physician writes an order for an antibiotic to be given q.i.d., or 4 times a day. The computer system might transcribe these times to 9:00 AM, 1:00 PM, 5:00 PM, and 9:00 PM. The nurse should recognize that an antibiotic should be administered at regular intervals around the clock so that the 4 doses would be 6 hours apart. The right time for the order should have been q.6h or every 6 hours. The nurse should contact the physician to clarify the order.

The Joint Commission has recognized the problem of misinterpretation of time and frequency in medication orders. It has taken steps to prevent common errors in regard to the time a drug is to be administered, by prohibiting the use of some abbreviations related to dosing frequency (Figure 9-2). For example, the notation to give a drug q.d. has frequently been transcribed as q.i.d., with the period being mistaken for an i, resulting in a daily medication being administered four times a day instead of once daily.

**Right Documentation**

The last step in medication administration is correct documentation. The policy in most institutions directs nurses to administer a medication prior to documentation. Numerous studies indicate that fatigue and lack of time are factors that contribute to medication errors. Nurses who prioritize their time may find that they give medications correctly but fail to document that they have done so. This omission can result in unintentional overmedication of the patient when the follow-on nurse responds as though the drug was not given. Many of the new ADCs document drug administration at the time the drug is removed from the machine. This ensures that administration is documented, but an error occurs if the patient does not take the medication. In that situation, the nurse must follow the institution’s policy for clarifying or deleting the initial documentation. Often, this is a time-consuming process, but if omitted, it can result in undermedication of the patient.

**THE NURSE’S CRITICAL ROLE IN MEDICATION ERROR PREVENTION**

As the largest segment of the health care workforce, nurses are essential to reducing medication errors and improving patient outcomes. In the Institute of Medicine (2006) landmark report, _Preventing Medication Errors_, the most effective way to reduce errors was identified as a partnership between patients and their health care providers. Communication between nurses and patients should be open, with nurses not only talking to patients, but listening to them as well. To this end, The Joint Commission (2002) launched a Speak Up™ campaign to urge patients to take a larger role in preventing errors by becoming more active participants in their care. When administering medications, nurses should be prepared for and encourage patients’ questions. By way of brochures, buttons, and posters displayed in health care facilities, patients are instructed to use six strategies to avoid medication mistakes at the hospital or clinic (Figure 9-9).
A lot of people are responsible for your medicine—including you!

- Check all of your medicines with your doctor to make sure they are OK to take together.
- Check with your pharmacist to see if there are other medicines, foods or drinks you should not take with your new medicines. This helps to avoid a bad reaction.
- Give your doctors, pharmacists and other caregivers a list of all your medicines. This list should have your:
  - prescription medicines
  - over-the-counter medicines (for example, aspirin)
  - vitamins
  - herbs
  - diet supplements
  - natural remedies
  - recreational drugs
  - amount of alcohol you drink each day or week

Check your medicines and ask questions

- Make sure you can read the handwriting on the prescription. If you can't read it, the pharmacist may not be able to read it. Ask to have the prescription printed.
- Read the label. Make sure it has your name on it and the right medicine name.
- Understand all of the instructions for your medicines.
- If you have doubts about a medicine, ask your doctor, pharmacist or caregiver about it.
- Call your doctor or pharmacist if you forget the instructions for taking a medicine.
- Don't be afraid to ask questions about any of your medicines.

How to avoid medicine mistakes at the hospital or clinic

- Make sure your doctors, nurses and other caregivers check your wristband and ask your name before giving you medicine. Sometimes patients get a medicine that was supposed to go to another patient.
- Don't be afraid to tell a caregiver if you think you are about to get the wrong medicine.
- Know what time you should get a medicine. If you don't get it then, speak up.
- Tell your caregiver if you don't feel well after taking a medicine. Ask for help immediately if you think you are having a bad reaction.
- You may be given IV (intravenous) fluids. Read the bag to find out what is in it. Ask the caregiver how long it should take for the liquid to run out. Tell the caregiver if it's dripping too fast or too slow.
- Get a list of your medicines—including your new ones. Read the list carefully. Make sure it lists everything you are taking. If you're not well enough to do this, ask a friend or relative to help.

Patients need to be active participants in their care. You can do this by following these tips.

The goal of the Speak Up™ program is to help patients become more informed and involved in their health care.
Additionally, the number of medication errors may be reduced by making greater use of information technologies when prescribing and administering medications. Nurses cannot be expected to keep up with all the relevant information on all the medications they administer. Using point-of-care reference information provided with the electronic medical record or by automated dispensing units, the Internet, or downloaded content on personal digital assistants (PDAs) will enhance the nurse’s ability to apply critical reasoning when making judgments related to medication administration. Yet, while technological interventions such as smart infusion pumps, patient-controlled analgesia, computerized physician/provider order entry (CPOE), automated dispensing cabinets (ADCs), automated medication dispensing machines (AMDMs), electronic medical records (EMRs), and barcoding identification have contributed to improved patient care, there is considerable data on incidences of adverse events while using these tools (The Joint Commission, 2008a). As health technologies are increasingly adopted by health care organizations, nurses must be mindful of the safety risks and preventable adverse events that these new innovations may bring about. Still, some nurses will be involved in medication errors and they must be aware of the appropriate response. Whenever a medication error is identified, the nurse must follow the health organization’s procedure for reporting. This enables organizations to track errors and implement improvement processes aimed at preventing repeat errors. Organizations have also been encouraged to have specific plans in place in order to guide health providers in the appropriate manner to disclose harmful errors to patients and family members (ISMP, 2006). Many organizations have participated in the Medication Errors Reporting Program (MERP), a confidential national voluntary reporting program. The ISMP publishes Medication Safety Alerts that provide vital information about medication and device errors and adverse drug reactions (ISMP, 2010a). Nurses may also receive a monthly safety newsletter, ISMP Medication Safety Alert! Nurse Advise-ERR, specifically designed to meet the needs of frontline nurses who are actively involved with medication administration (ISMP, 2010c). Another source for error-prevention advice, provided on the Website of The Joint Commission (2008b), is the Sentinel Event Alert, which includes reduction strategies for sentinel events that occur with significant frequency.

Throughout this text there are Clinical Reasoning Skills that require critical thinking. They are designed to alert you to common medication errors and to practice how to prevent them. Combating errors requires diligent adherence to safety standards prescribed by organizations such as The Joint Commission, the Institute of Medicine, the Institute for Safe Medication Practices, and your health care agency. Stay alert by practicing the Six Rights of Safe Medication Administration, regularly reading prevention publications, and spotting and reporting medication errors.

**SUMMARY**

In conclusion, medication administration is a critical nursing skill that can lead to costly errors, morbidity, and death if not carried out correctly. It is the nurse’s responsibility to ensure that the right patient receives the right drug, in the right amount, by the right route, at the right time, and with the right documentation. The nurse who administers a medication is legally liable for medication errors whether the primary cause was an unsafe order, an incorrect transcription, a wrong drug, an inaccurate dosage calculation, an improper preparation, or an administration error.

**Review Set 21**

1. What are the six patient rights of safe medication administration?

2. Using The Joint Commission’s Official “Do Not Use” List, correct the notations in the following medication order: **NPH insulin 20.0 U SC qd**
Section 2 Measurement Systems, Drug Orders, and Drug Labels

3. Safe medication administration requires that you check the drug against the order three times:
   1) when you first make contact with the drug (such as removing it from the medication drawer),
   2) when you measure it, and 3) __________________________________________________ ___.

4. Give two examples of acceptable patient identification according to The Joint Commission, using two unique person-specific identifiers.
   ___________________________________________________________________________ _.

5. True or False? The nurse who administers a drug based on an incorrect or unsafe medication order shares legal liability for patient injury that results from that drug. __________________ ____.

6. According to the Institute of Medicine landmark report, Preventing Medication Errors, what strategy is the most effective way to reduce errors?
   a. partnership between the patient and health care providers
   b. double-checking insulin dosage
   c. checking medications three times
   d. safe use of prescribing, dispensing, and recording technologies
   e. strict adherence to “Do Not Use” lists of abbreviations, symbols, and acronyms

7. Identify one common “workaround” known to lead to drug administration errors during the use of an automated dispensing cabinet (ADC). ______________________________________________.

8. Where are the two barcodes located that are scanned during medication administration?________ __________________________________________________________________________ _.

9. Name four drugs or drug categories that have the highest risk of causing injuries when errors are made. How are these drugs designated?______________________________________________ _.
   __________________________________________________________________________ _.

10. To ensure the accuracy of the order, what nursing actions should you implement following the receipt of a verbal or telephone order from a licensed prescribing practitioner?
   __________________________________________________________________________ _.

After completing these problems, see page 603 to check your answers.

**CLINICAL REASONING SKILLS**

It is important for the nurse to check the label on each medication administered, regardless of the medication dispensing mechanism.

**ERROR**

Failing to check the medication label.

**Possible Scenario**

Suppose a physician orders 40 mg of Lasix (a diuretic) for an adult with congestive heart failure. The Lasix is supplied in 20 mg tablets. The nurse plans to administer 2 tablets and use an automated medication dispensing machine. The nurse chooses the correct medication from the computer screen. The medication drawer, which should contain the medication, opens. The nurse removes 2 tablets without reading the label, goes to the patient’s room, and administers the medication. The medication the nurse removed was Lanoxin 0.25 mg tablets (a cardiac glycoside). The pharmacy technician incorrectly stocked the medication drawer.
Potential Outcome
Although the patient has an order for Lanoxin 0.25 mg daily, he had already received his dose for the day. At this point, he has received three times the correct amount. He becomes nauseated, and when the nurse checks his pulse, it is 40 beats per minute. The nurse notifies the doctor of the change in the patient’s condition. As the one who administered the incorrect medication, the nurse clearly shares responsibility for the medication error.

Prevention
The nurse should read the label on each medication and compare it to the order or MAR three times before administering the drug. If the nurse had checked the label as the drug was removed from the medication drawer, the error could have been prevented. And the nurse had two more opportunities to prevent this error: prior to calculating the dose (the amount should have been 40 mg, not 0.25 mg) and prior to administering the medication.

CLINICAL REASONING SKILLS

The nurse should ensure that the medication ordered can be administered by the right route.

ERROR
Opening a time-released capsule and administering it through a nasogastric tube.

Possible Scenario
Suppose a patient is hospitalized to treat a stroke. The physician’s orders state to continue all of the patient’s home medications. One of the medications is theophylline 100 mg, to be administered daily as a 24-hour extended-release capsule (Theo-24) for the treatment of asthma. The patient is unable to swallow as a result of the stroke, and all of his medications must be given through his nasogastric tube. The nurse opens the capsule and dissolves the contents in water and administers it via the nasogastric tube. The patient begins complaining of palpitations, and his pulse increases to 180 beats per minute. The nurse evaluates the changes in the patient’s condition and realizes the error.

Potential Outcome
The physician would be notified of the error, and a peak level of theophylline would be ordered. If the patient had a history of cardiac problems, the sympathetic stimulation caused by the theophylline could result in anginal pain or an acute myocardial infarction. The patient would be treated symptomatically until his theophylline blood levels returned to therapeutic range.

Prevention
The nurse should have recognized that a time-released medication could not safely be administered through a nasogastric tube. The physician should have been contacted to obtain orders for a different dosage form of the medication.

PRACTICE PROBLEMS—CHAPTER 9

1. Which of the following statements is/are true?
   a) Statistics show that 5% of all hospital injuries are attributable to medication errors.
   b) According to the Institute of Medicine, most medication errors occur during the administration step of the medication process.
Section 2 Measurement Systems, Drug Orders, and Drug Labels

c) A nurse with more experience and education is less likely to make medication errors.
d) The medication delivery process involves many individuals and departments.
e) c and d

2. True or False? Studies indicate that nurses’ education and years of practice are closely correlated to the incidence of medication errors. __________

3. True or False? Ten percent (10%) to 18% of patient injuries are attributable to preventable medication errors. __________

4. True or False? Administering a drug late is a frequently underreported medication error. __________

5. True or False? Illegible prescriber’s handwriting is a major contributor to transcription errors. __________

6. Fill in the blanks of the following statement. “The right __________ must receive the right __________ in the right __________ by the right __________ at the right __________, followed by the right __________.”

7. What are the three steps of medication administration? ___________________________________________________________________________________

8. The nurse can ensure that the patient receives the right drug by checking the drug label three times. When should the nurse perform these label checks? ___________________________________________________________________________________

9. Which of the following medical notations is (are) written in the recommended format?

   0.75 mg .2 cm q.d. ____________________________

10. Describe a nursing action to prevent medication errors when receiving verbal drug orders. ___________________________________________________________________________________

11. Cite four of the direct and/or indirect costs of medication errors. ___________________________________________________________________________________

12. Describe the strategy or strategies you would implement to prevent this potential medication error.

   **Possible Scenario**
   Suppose the physician writes the following order: **Dilacor XR 240 mg p.o. q.d.**
   The order is transcribed as **Dilacor XR 240 mg p.o. q.i.d.**, and the medication is scheduled for administration at 0600, 1200, 1800, and 2400 on the medication administration record.
   The nurse reviews the order prior to obtaining the medication for administration. The nurse notices the XR following the name of the medication and recognizes that the letters usually indicate a sustained-release form of medication. The nurse consults the current **AHFS Drug Information** resource and finds that the drug is a sustained-release formula and is only to be given once daily. The nurse reviews the original orders and notes that there was a transcription error. The medication administration record is corrected, and the patient receives the correct amount of medication at the correct time.

   **Potential Outcome**
   Had the nurse administered the medication at each of the times indicated on the medication administration record, the patient would have received four times the intended dosage. The drug’s therapeutic effect is a decrease in the cardiac output and decrease in blood pressure. However, the toxic effects caused by overdosing could have resulted in congestive heart failure. The patient’s life would have been jeopardized.
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Prevention

After completing these questions, see page 603 to check your answers.

For additional practice, visit the online practice software at www.CengageBrain.com, using the Premium Website access code found in the front of your text.

REFERENCES


Section 2 Measurement Systems, Drug Orders, and Drug Labels


