OBJECTIVES

After reading this chapter, the student should be able to:

1. Define a medication error.
2. Identify factors that contribute to medication errors.
3. Explain the relationship of standards of care to reducing medication errors.
4. Identify specific examples of the categories of medication errors.
5. Describe the severity of different categories of medication errors.
6. Explain how rules, policies, and procedures can help prevent medication errors.
7. Describe the impact of a medication error on all aspects of an agency or institution, including clients, staff nurses, administrative personnel, departments, and hospital or corporation.
8. Describe methods of reporting and documenting medication errors and incidents.
9. Describe strategies that the nurse may implement to reduce medication errors and incidents.
10. Identify client teaching information that can be used to reduce medication errors and incidents.
11. Identify efforts recommended by the FDA to monitor medication errors and incidents and provide information to healthcare providers.
12. Explain strategies used by healthcare organizations to reduce the number of medication errors and incidents.
In their clinical practice, nurses are sensitive to the complexities of risk reduction and medication errors. They want to ensure client safety by striving to be 100% accurate when administering medications. Although nurses highly value proficiency and accuracy in giving medications, they may inadvertently commit an error that places their client at risk for injury. Doing harm to a client is every nurse's greatest fear. “To do no harm” is the ethical principle of nonmaleficence, and beneficence is the obligation to seek interventions that are beneficial for the client. These two principles guide nursing care in both theory and practice.

9.1 Defining Medication Errors

According to the National Coordinating Council for Medication Error Reporting and Prevention (NCC MERP), a medication error is “any preventable event that may cause or lead to inappropriate medication use or client harm while the medication is in the control of the healthcare professional, client, or consumer.” NCC MERP also classifies medication errors and has developed the medication error index. This index categorizes medication errors by evaluating the extent of the harm an error can cause (● Figure 9.1).

Stated simply, a medication error is any error that occurs in the medication administration process whether or not it reaches the client. These errors may be related to misinterpretations, miscalculations, misadministrations, handwriting misinterpretation, and misunderstanding of verbal or phone orders.

9.2 Factors Contributing to Medication Errors

To be successful, proper medication administration involves a partnership between the healthcare provider and the client. This relationship is dependent on the competence of the healthcare provider, as well as the client’s compliance with drug therapy. This dual responsibility provides a simple, though useful, way to conceptualize medication errors as resulting from healthcare provider error or client error. Clearly, the purpose of classifying and studying these errors is not to assess individual blame but to prevent future errors.

Factors contributing to medication errors by healthcare providers include, but are not limited to, the following:

- Omitting one of the rights of drug administration (see Chapter 4). Common errors include giving an incorrect dose, not giving an ordered dose, and giving an unordered drug.
- Failing to perform an agency system check. Both pharmacists and nurses must collaborate on checking the accuracy and appropriateness of drug orders prior to administering drugs to clients.
- Failing to account for client variables such as age, body size, and renal or hepatic function. Nurses should always review recent laboratory data and other information in the client’s chart before administering medications, especially those drugs that have a narrow margin of safety.
- Giving medications based on verbal orders or phone orders, which may be misinterpreted or go undocumented. Nurses should remind the prescribing healthcare practitioner that medication orders must be in writing before the drug can be administered.
- Giving medications based on an incomplete order or an illegible order, when the nurse is unsure of the correct drug, dosage, or administration method. Incomplete orders should be clarified with the healthcare provider before the medication is administered. The NCC MERP
Chapter 9  Medication Errors and Risk Reduction  91

NCC MERP Index for Categorizing Medication Errors Algorithm

Harm
Impairment of the physical, emotional, or psychological function or structure of the body and/or pain resulting therefrom.

Monitoring
To observe or record relevant physiological or psychological signs.

Intervention
May include change in therapy or active medical/surgical treatment.

Intervention Necessary to Sustain Life
Includes cardiovascular and respiratory support (e.g., CPR, defibrillation, intubation, etc.)

*An error of omission does reach the patient.

Figure 9.1  Index for Categorizing Medication Errors Algorithm © 2001 National Coordinating Council for Medication Error Reporting and Prevention. All rights reserved. See also Figure 9.2, page 95.

recommends that written orders avoid certain abbreviations (Table 9.1) and include the following:

• A brief notation of purpose (for example, for pain)
• Metric system measurements except for therapies that use standard units such as insulin or vitamins
• Client age and, when appropriate, weight
• Drug name, exact metric weight or concentration, and dosage form
• A leading zero preceding a decimal number less than one (for example, 0.5 mg)
Avoidance of abbreviations for drug names (for example, MOM, HCTZ) and Latin directions for use (NCC MERP, 2005).

Practicing under stressful work conditions. Studies have correlated an increased number of errors with the stress level of nurses. Studies have also indicated that the rate of medication errors may increase when individual nurses are assigned to clients who are the most acutely ill. Clients, or their home caregivers, may also contribute to medication errors by:

- Taking drugs prescribed by several practitioners without informing those healthcare providers about all prescribed medications.
- Getting their prescriptions filled at more than one pharmacy.
- Not filling or refilling their prescriptions.
- Taking medications incorrectly.
- Taking medications that may have been left over from a previous illness or prescribed for something else.

### 9.3 Nurse Practice Acts and Standards of Care

Each state has a nurse practice act that is designed to protect the public by defining the legal scope of practice. State boards of nursing or state nursing examiners ensure the enforcement of nurse practice acts. The nurse practice acts are important legislation, because they include the definition of professional nursing, part of which includes the safe delivery of medications. The professional nurse must be qualified to administer medications as defined in each nurse practice act.

All practicing nurses and student nurses should consult their state’s nurse practice act prior to implementing care for clients. Because these acts are frequently amended and differ from state to state, practicing nurses should also periodically review their current nurse practice act for changes and updates.

**Standards of care** are the skills and learning commonly possessed by members of a profession. In nursing, standards of care are defined by nurse practice acts and the rule of **reasonable and prudent action**. This rule defines the standard of care as the actions that a reasonable and prudent nurse with equivalent preparation would perform under similar circumstances. What should the nurse do if the healthcare practitioner orders a dose of morphine that the nurse considers to be unsafe? If the nurse gives the medication and the client dies, who is responsible? If the nurse does not give the medication and the client suffers with pain or an adverse effect, who is responsible? Safeguarding the life and welfare of the client is the guiding principle. In cases of uncertainty, the nurse is legally judged by whether he or she acted within the jurisdiction of the state’s nurse practice act and whether the actions were what a reasonable and prudent nurse would have done when faced with a similar dilemma.

Nurses who practice in clinical agencies need to understand and follow policies and procedures governing medication administration of the organization in which they practice. These policies and procedures establish the standards of care for that particular hospital or organization, and it is important that nurses adhere to those established policies and procedures. Common errors relate to failing to administer a medication at the prescribed time.

---

**TABLE 9.1 Abbreviations to Avoid in Medication Administration**

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Intended Meaning</th>
<th>Common Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>U</td>
<td>units</td>
<td>Mistaken as a zero or a four (4) resulting in overdose. Also mistaken for “cc” (cubic centimeters) when poorly written.</td>
</tr>
<tr>
<td>μg</td>
<td>micrograms</td>
<td>Mistaken for “mg” (milligrams) resulting in an overdose.</td>
</tr>
<tr>
<td>q.d.</td>
<td>Latin abbreviation for every day</td>
<td>The period after the “Q” has sometimes been mistaken for an “I,” and the drug has been given “QID” (four times daily) rather than daily.</td>
</tr>
<tr>
<td>q.o.d.</td>
<td>Latin abbreviation for every other day</td>
<td>Misinterpreted as “QD” (daily) or “QID” (four times daily). If the “Q” is poorly written, it looks like a period or “I.”</td>
</tr>
<tr>
<td>SC or SQ</td>
<td>subcutaneous</td>
<td>Mistaken as “SL” (sublingual) when poorly written.</td>
</tr>
<tr>
<td>t.i.w.</td>
<td>three times a week</td>
<td>Patient’s medications have been prematurely discontinued when D/C, (intended to mean “discharge”) was misinterpreted as “discontinue,” because it was followed by a list of drugs.</td>
</tr>
<tr>
<td>D/C</td>
<td>discharge; also discontinue</td>
<td>Misinterpreted as “three times a day” or “twice a week.”</td>
</tr>
<tr>
<td>hs</td>
<td>half strength</td>
<td>Misinterpreted as the Latin abbreviation “HS” (hour of sleep).</td>
</tr>
<tr>
<td>cc</td>
<td>cubic centimeters</td>
<td>Mistaken as “U” (units) when poorly written.</td>
</tr>
<tr>
<td>AU, AS, AD</td>
<td>Latin abbreviation for both ears, left ear, right ear</td>
<td>Misinterpreted as the Latin abbreviation “OU” (both eyes); “OS” (left eye); “OD” (right eye)</td>
</tr>
<tr>
<td>IU</td>
<td>international unit</td>
<td>Mistaken as IV (intravenous) or 10 (ten)</td>
</tr>
<tr>
<td>MS, MSO4, MgSO4</td>
<td>Confused for one another</td>
<td>Can mean morphine sulfate or magnesium sulfate</td>
</tr>
</tbody>
</table>

For example, an agency policy may identify that it is permissible to give a medication 30 minutes early or 30 minutes late for medications taken four times a day. The standards of care and the agency’s policy manual are designed to help the nurse reduce medication errors and maintain client safety.

### 9.4 The Impact of Medication Errors

Medication errors are the most common cause of morbidity and preventable death within hospitals. When a medication error occurs, the repercussions can be emotionally devastating for the nurse and extend beyond the particular nurse and client involved. A medication error can increase the client’s length of stay in the hospital, which increases costs and the time that a client is separated from his or her family. The nurse making the medication error may suffer self-doubt and embarrassment. If a high error rate occurs within a particular unit, the nursing unit may develop a poor reputation within the facility. If frequent medication errors or serious errors are publicized, the reputation of the facility may suffer, because it may be perceived as unsafe. Administrative personnel may also be penalized because of errors within their departments or the hospital as a whole.

There are no acceptable incidence rates for medication errors. The goal of every healthcare organization should be to improve medication administration systems to prevent harm to clients due to medication errors. All errors, whether or not they affect the client, should be investigated with the goal of identifying ways to improve the medication administration process to prevent future errors. The investigation should occur in a nonpunitive manner that will encourage staff to report errors, thereby building a culture of safety within an organization. An error can alert nurses and healthcare administrators that a new policy or procedure needs to be implemented to reduce or eliminate medication errors.

### 9.5 Reporting and Documenting Medication Errors

When a nurse commits or observes an error, effects can be lasting and widespread. Although some errors go unreported, it is always the nurse’s legal and ethical responsibility to report all occurrences. In severe cases, adverse reactions caused by medication errors may require the initiation of lifesaving interventions for the client. After such an incident, the client may require intense supervision and additional medical treatments.

The Food and Drug Administration (FDA) is concerned about medication errors at the federal level. Since 1992, the FDA has received about 20,000 reports of medication errors. Because these are voluntary reports, the actual number of errors is likely much higher. The FDA requires that nurses and other healthcare providers report medication errors for its database that is used to assist other professionals in avoiding similar mistakes. Medication errors, or situations that can lead to errors, may be reported in confidence directly to the FDA by telephone at 1-800-23-ERROR.

A second organization that has been established to provide assistance with medication errors is the National Coordinating Council for Medication Error Reporting and Prevention (NCC MERP). This organization was formed during the Pharmacopoeia Convention in 1995 to help standardize the medication error reporting system, examine interdisciplinary causes of medication errors, and promote medication safety. NCC MERP coordinates information on medication errors and provides medication error prevention education. The telephone number for NCC MERP is 1-800-822-8772.

### DOCUMENTING IN THE CLIENT’S MEDICAL RECORD

Facility policies and procedures provide guidance on reporting medication errors. Documentation of the error should occur in a factual manner: The nurse should avoid blaming or making judgments. Documentation in the medical record must include specific nursing interventions that were implemented following the error to protect client safety, such as monitoring vital signs and assessing the client for possible complications. Documentation does not simply record that a medical error occurred. Failure to document nursing actions implies either negligence or failure to acknowledge that the incident occurred. The nurse should also document all individuals who were notified of the error. The medication administration record (MAR) is another source that should contain information about what medication was given or omitted.

### WRITING AN INCIDENT REPORT

In addition to documenting in the client’s medical record, the nurse making or observing the medication error should complete a written incident report. The specific details of the incident should be recorded, in a factual and objective manner. The incident report allows the nurse an opportunity to identify factors that contributed to the medication error. The incident report, however, is not included in the client’s medical record.

Accurate documentation in the medical record and on the incident report is essential for legal reasons. These documents verify that the client’s safety was protected and serve as a tool to improve medication administration processes.
9.6 Strategies for Reducing Medication Errors

What can the nurse do in the clinical setting to avoid medication errors and promote safe administration? The nurse can begin by adhering to the four steps of the Nursing Process:

1. **Assessment**: Ask the client about allergies to food or medications, current health concerns, and use of over-the-counter (OTC) medications and herbal supplements. Ensure that the client is receiving the right dose, at the right time, and by the right route. Assess renal and liver functions, and determine if other body systems are impaired and could affect pharmacotherapy. Identify areas of needed client education with regard to medications.

2. **Planning**: Minimize factors that contribute to medication errors: Avoid using abbreviations that can be misunderstood, question unclear orders, do not accept verbal orders, and follow specific facility polices and procedures related to medication administration. Have the client restate dosing directions, including the correct dose of medication and the right time to take it. Ask the client to demonstrate an understanding of the goals of therapy.

3. **Implementation**: Be aware of potential distractions during medication administration and remove these distractions, if at all possible. When engaged in a medication-related task, focus entirely on the task. Noise, other events, and talking coworkers can distract the nurses' attention and result in a medication error. Practice the rights of medication administration: right client, right time and frequency of administration, right dose, right route of administration, right drug. Keep the following steps in mind as well:
   - Positively verify the identity of each client before administering the medication according to facility policy and procedures.
   - Use the correct procedures and techniques for all routes of administration. Use sterile materials and aseptic techniques when administering parenteral or eye medication.
   - Calculate medication doses correctly and measure liquid drugs carefully. Some medications, such as heparin, have a narrow safety margin for producing serious adverse effects. When giving these medications, ask a colleague or a pharmacist to check the calculations to make certain the dosage is correct.
   - Always double-check pediatric calculations prior to administration.
   - Open medications immediately prior to administering the medication and in the presence of the client.
   - Record the medication on the MAR immediately after administration.
   - Always confirm that the client has swallowed the medication. Never leave the medication at the bedside unless there is a specific order that medications may be left there.
   - Be alert for long-acting oral dosage forms with indicators such as LA, XL, and XR. These tablets or capsules must remain intact for the extended-release feature to remain effective. Instruct the client not to crush, chew, or break the medication in half, because doing so could cause an overdose.

4. **Evaluation**: Assess the client for expected outcomes and determine if any adverse effects have occurred.

Legal issues may worsen if there is an attempt to hide a mistake or delay corrective action, or if the nurse forgets to document interventions in the client’s chart.

Hospitals and agencies monitor medication errors through quality improvement programs. The results of quality improvement programs alert staff and administrative personnel about trends within particular units and may serve as indicators of quality client care. Through data collection, specific solutions can be created to reduce the number of medication errors.

**SPECIAL CONSIDERATIONS**

**Age-related Issues in Drug Administration**

**The Pediatric Population**
- Always double-check calculations with another nurse for pediatric drug administration.
- Medications may need to be crushed or administered in a liquid form.
- Medications can have idiosyncratic effects on pediatric clients.

**The Elderly Population**
- Remember that the frequency of adverse effects of medications is increased in elderly clients because of their slowed ability to absorb and metabolize medications.
- Assess elderly clients for ability to swallow prior to administration of oral medications.
Many nurses are now relying on personal digital assistants (PDAs) to provide current information. These devices can be updated daily or weekly by downloading information so that the information is consistently current. Nurses need to familiarize themselves with research on preventing medical errors to maintain evidence-based practice skills.

9.7 Providing Client Education for Medication Usage

An essential strategy for avoiding medication errors is to educate the client by providing written age-appropriate handouts, audiovisual teaching aids about the medication, and contact information about whom to notify in the event of an adverse reaction.

Teach clients to:
- Know the names of all medications they are taking, the uses, when they should be taken, and the doses.
- Know what side effects need to be reported immediately.
- Read the label prior to each drug administration and use the medication device that comes with liquid medications rather than household measuring spoons.
- Carry a list of all medications, including OTC drugs, as well as herbal and dietary supplements that are being taken. If possible, use one pharmacy for all prescriptions.
- Ask questions. Healthcare providers want to be partners in maintaining safe medication principles.

Definitions

Harm
Impairment of the physical, emotional, or psychological function or structure of the body and/or pain resulting therefrom

Monitoring
To observe or record relevant physiological or psychological signs

Intervention
May include change in therapy or active medical/surgical treatment

Intervention Necessary to Sustain Life
Includes cardiovascular and respiratory support (e.g., CPR, defibrillation, intubation)

Category A: Circumstances or events that have the capacity to cause error
Category B: An error occurred but the error did not reach the patient (An “error of omission” does reach the patient)
Category C: An error occurred that reached the patient but did not cause patient harm
Category D: An error occurred that reached the patient and required monitoring to confirm that it resulted in no harm to the patient and/or required intervention to preclude harm
Category E: An error occurred that may have contributed to or resulted in temporary harm to the patient and required intervention
Category F: An error occurred that may have contributed to or resulted in temporary harm to the patient and required initial or prolonged hospitalization
Category G: An error occurred that may have contributed to or resulted in permanent patient harm
Category H: An error occurred that required intervention necessary to sustain life

Figure 9.2 NCC MERP Index for Categorizing Medication Errors © 2001 National Coordinating Council for Medication Error Reporting and Prevention. All rights reserved.
How Healthcare Facilities Are Reducing Medication Errors

There is a trend for healthcare agencies to use automated, computerized, locked cabinets for medication storage on client-care units. Each nurse on the unit has a code for accessing the cabinet and removing a medication dose. These automated systems also maintain an inventory of drug supplies.

Larger healthcare agencies often have risk-management departments to examine risks and minimize the number of medication errors. Risk-management personnel investigate incidents, track data, identify problems, and provide recommendations for improvement. Nurses collaborate with the risk-management committees to seek means of reducing medication errors by modifying policies and procedures within the institution. Examples of policies and procedures include:

- Correctly storing medication (light and temperature control).
- Reading the drug label to avoid using time-expired medications.
- Avoiding the transfer of doses from one container to another.
- Avoiding overstocking of medications.

Governmental and Other Agencies That Track Medication Errors

Several agencies, both governmental and private industry, track medication errors and provide updated reporting for consumers and healthcare professionals:

- The FDA's safety information and adverse-event reporting program is MedWatch. Its toll-free number is 1-800-332-1088, and its website is www.fda.gov/medwatch/how.htm
- The Institute for Safe Medication Practices (ISMP) accepts reports from consumers and healthcare professionals related to medication safety. It publishes Safe Medicine, a consumer newsletter about medication errors. The organization's number is 1-215-947-7797, and its website is www.ismp.org/pages/consumer.html
- MEDMARX is the U.S. Pharmacopeia's anonymous medication error reporting program used by hospitals. Its toll-free number is 1-800-822-8772, and its website is www.usp.org

OTC Drugs and Medication Errors

Client use of OTC drugs and natural therapies is a common reason for adverse reactions and medication errors. For example, taking antibiotics can lower the effectiveness of oral contraceptives. OTC antihistamines can interact adversely with alcohol, sedatives, antidepressants, and antihypertensives. Encourage clients to:

- Carry a list of all medications, including OTC drugs, dietary supplements, and medicinal herbs.
- Be sure family and various healthcare providers have a copy of this list. Include vitamins, laxatives, sleeping pills, and birth control pills.
- If possible, use one pharmacy for all prescriptions, because the pharmacist is an excellent resource for providing information about drug–drug and herbal/food interactions.

OTC Drugs and Medication Errors

Client use of OTC drugs and natural therapies is a common reason for adverse reactions and medication errors. For example, taking antibiotics can lower the effectiveness of oral contraceptives. OTC antihistamines can interact adversely with alcohol, sedatives, antidepressants, and antihypertensives. Encourage clients to:

- Carry a list of all medications, including OTC drugs, dietary supplements, and medicinal herbs.
- Be sure family and various healthcare providers have a copy of this list. Include vitamins, laxatives, sleeping pills, and birth control pills.
- If possible, use one pharmacy for all prescriptions, because the pharmacist is an excellent resource for providing information about drug–drug and herbal/food interactions.
working under stressful conditions. Clients also contribute to errors by using more than one pharmacy, not informing healthcare providers of all medications they are taking, or not following instructions.

9.3 Nurse practice acts define professional nursing, including safe medication delivery. Standards of care are defined by nurse practice acts and the rule of reasonable and prudent action.

9.4 Medication errors affect client morbidity, mortality, and length of hospital stay. They also can damage the reputation of nurses, units, facility personnel, and the facility itself. There are no acceptable medication error incidence rates.

9.5 Nurses are legally and ethically responsible for reporting medication errors—whether or not they cause harm to a client—in the client’s medical record and on an incident report. The FDA and NCC MERP are two agencies that track medication errors and provide data to help institute procedures to prevent them.

9.6 Nurses can reduce medication errors by adhering to the four steps of the Nursing Process—assessment, planning, implementation, and evaluation. Keeping up to date on pharmacotherapeutics and knowing common error types are instrumental to safe medication administration.

9.7 Client teaching includes providing age-appropriate medication handouts, and encouraging clients to keep a list of all prescribed medications, OTC drugs, herbal therapies, and vitamins they are taking and to report them to all healthcare providers.

9.8 Facilities use risk-management departments and agency policies and procedures to decrease the incidence of medication errors. Automated, computerized, locked cabinets for medication storage are a means of safekeeping of medications and keeping track of inventory at the unit level.

9.9 The FDA (MedWatch), the Institute of Safe Medication Practices (ISMP), and the U.S. Pharmacopeia (MEDMARX) are three agencies that track medication errors and provide databases of error incidence, error types, and levels of harm for healthcare professionals and/or consumers.

NCLEX-RN® REVIEW QUESTIONS

1. Each nurse is responsible for becoming familiar with the nurse practice acts of the state in which he or she practices because these acts:
   1. Protect the nurse from malpractice suits.
   2. Contain national standards and responsibilities.
   3. Contain job descriptions for all nurses.

2. The nurse administers a medication to the wrong client. The appropriate nursing action is to:
   1. Monitor the client for adverse reaction before reporting the incident.
   2. Document the error if the client has an adverse reaction.
   3. Report the error to the physician, document the medication in the client record, and complete an incident report.
   4. Notify the physician and document the error in the incident report only.

3. The client with liver dysfunction experiences toxicity to a drug following administration of several doses. This adverse reaction may have been prevented if the nurse had followed which phase of the nursing process?
   1. Assessment
   2. Planning
   3. Implementation
   4. Evaluation

4. Nurses have a legal and moral responsibility to report medication errors. The steps of reporting these errors include:
   1. Punishing the nurse committing the error.
   3. Identifying potential unsafe medication facilities.
   4. Examining interdisciplinary causes of errors and assisting professionals in ways to avoid mistakes.

5. The nurse has administered a medication to the wrong client. Which of the following is a correct action the nurse must take? (Select all that apply.)
   1. Notify the physician.
   2. Document that a medication error occurred in the nurses notes.
   3. Assess vital signs.
   4. Document medication on the medication administration record (MAR).
   5. Complete a facility incident report.
CRITICAL THINKING QUESTIONS

1. A registered nurse is assigned to a team of eight clients. Six of these clients have medications scheduled for once-a-day dosing at 10 A.M. Explain how the nurse will be able to administer these drugs to the clients at the “right time.”

2. A healthcare provider writes an order for Tylenol 3 PO q3–4 for mild pain. The nurse evaluates this order and is concerned that it is incomplete. Identify the probable concern and describe what the nurse should do prior to administering this medication.

3. A new nurse does not check an antibiotic dosage ordered by a healthcare provider for a pediatric client. The nurse subsequently overdoses a 2-year-old client, and an experienced nurse notices the error during the evening shift change. Identify each person who is responsible for the error and how each is responsible.

See Appendix D for answers and rationales for all activities.