

Preventing medication errors by empowering patients

With most patients now managing their own drug regimens, efforts to reduce errors must focus on the patient.

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PREVENTABLE medication errors cost the U.S. healthcare system more than \$21 billion annually, according to the National Priorities Partnership and National Quality Forum. This number has risen significantly since the Institute of Medicine published *To Err Is Human: Building a Safer Health System* in 1999. That report suggested medication errors cause more deaths in 1 year than motor vehicles, breast cancer, and AIDS. The National Priorities Partnership and National Quality Forum report estimated that 98,000 people die each year from hospital-related medication errors and other medical errors, at a cost of \$17 to \$29 billion. Follow-up studies found more and more people are being treated outside the hospital and the number of preventable errors is rising, despite the many measures taken to prevent them. Why do such errors still occur? What can be done to address their causes and prevent more errors?

To Err Is Human led to initiatives to help prevent medication errors. Since then, researchers have found that many of the problems leading to these errors are systemic and cultural. Consequently, they recommend a multipronged approach to

error prevention. In 1999, the Agency for Healthcare Research and Quality began to focus heavily on preventing medication errors. Many more studies have been done and possible solutions have been implemented, but recent reports show that an increasing number of errors are endangering patients and costing the healthcare system billions of dollars.

The nursing profession has been at the forefront of preventing medication errors. For nurses, these errors can occur if they fail to ensure the “five rights” of drug administration—*right* patient, *right* drug, *right* dosage, *right* route, and *right* time.

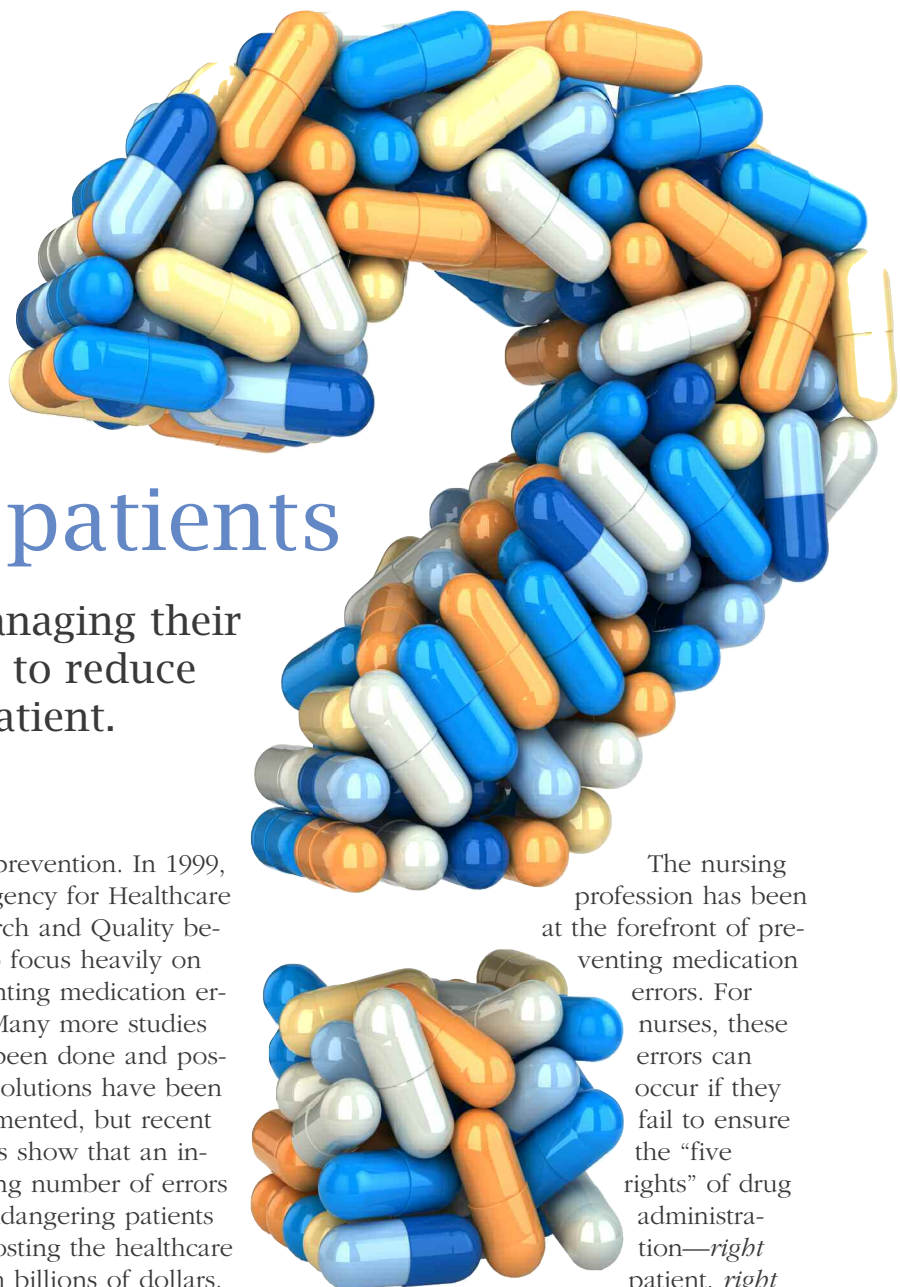


LEARNING OBJECTIVES

1. Identify factors that contribute to medication errors.
2. Discuss strategies for preventing medication errors.
3. State the role of patient education and empowerment in preventing medication errors.

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A simple checklist is no longer enough

Times have changed, and we need more than just a simple checklist like the “five rights” to keep patients safe. The “five rights” were established when multiple drugs or potentially dangerous drugs were given mostly to hospital patients. Back then, the checks-and-balances system usually worked effectively: The prescriber, pharmacist, and nurse each checked the drug before it was given to the patient. If the prescriber made an error, the pharmacist was likely to catch it. If the error got by the pharmacist or

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if the pharmacist made an error, the bedside nurse was likely to discover it before the patient received the drug.

But over the last few decades, hospital stays have shortened drastically and limits have been put on drug spending. Surgeries that used to require a week's stay with nursing care and medication teaching now fall under the 23-hour rule of hospitalization, which allows only 23 hours of hospitalization for various types of surgery. After just the briefest hospital stay, patients must go home and manage their own medications—and many of their regimens involve multiple drugs.

Now that most patients manage their regimens as outpatients, the patient has become a crucial member of the healthcare team. The “five rights” and other traditional checks and balances are no longer adequate because they don't include the patient.

An overwhelming challenge

Patients left to manage their own regimens face what for some might seem an overwhelming challenge. Many turn to the Internet for help—but not all websites are reliable or up-to-date. Based on what they read online, some people may change their drug regimen on their own or decide not to take prescribed medications. Or they may replace them with complementary and alternative medicines (CAMs), which aren't regulated by the Food and Drug Administration (FDA) and aren't necessarily safe or effective. What's more, many CAMs interact dangerously with prescription drugs. When asked by healthcare providers what drugs and supplements they're taking, many patients don't reveal they're using these products.

In addition, the number of available over-the-counter (OTC) drugs grows every year. These products are safe when used as directed—but how many people follow the directions? Also, many OTC drugs

interact with prescription medications and, as with CAMs, patients may not tell healthcare providers they're using them.

People are traveling more than ever, too, increasing their chance of contracting diseases abroad, where they may experience medication errors because drug names aren't consistent from one country to the next. For instance, in the United States, *Ambien* is the brand name of zolpidem, a sleeping aid; in the United Kingdom, *Ambyn* is the brand name of amiodarone, a potent antiarrhythmic. People who travel abroad need to know the generic names—not just the brand names—of all drugs they're taking.

Steps in the right direction

So what can government agencies, private organizations, and other stakeholders do to decrease medication errors? Working with the pharmaceutical industry and healthcare organizations, the FDA has implemented systemic changes to help prevent medication errors.

Look-alike and sound-alike drug names

Drugs names that look or sound alike have led to many errors. Today, the FDA screens medication brand names carefully and, in some cases, mandates a change in a name to prevent similarities that can confuse clinicians and patients. One example is omega-3-acid ethyl esters. This lipid-regulating drug originally was sold under the brand name *Omacor*. But prescribing and dis-

persing errors occurred because *Omacor* is similar to *Amicar* (aminocaproic acid), used to treat certain bleeding disorders. In 2007, the brand name *Omacor* was changed to *Lovaza* to help avoid confusion.

What's more, on pharmacy shelves, drugs typically are arranged alphabetically. Errors have occurred when healthcare workers mistakenly picked up the wrong bottle. To help prevent these errors, labels and colors have been changed on some drug packaging, and TALLman letters are used to help differentiate look-alike drug names. Examples of TALLman lettering include:

- DOPamine vs. DOBUtamine
- DOXORubicin vs. DAUNORubicin
- sulfADIAZINE vs. sulfiSOXA-ZOLE.

Barcode scanning and OTC drug labeling

Electronic drug ordering has helped prevent many errors, but errors still occur when drugs on the list are similar and the wrong drug is chosen. To prevent mix-ups, many hospitals now use barcode scanners to match the patient with the correct drug.

OTC drug labeling also has been changed so consumers can more easily see the drug's active ingredients, dosing instructions, and precautions.

Error-prone abbreviations and other preventive measures

In 2002, The Joint Commission (TJC) established a National Patient Safety Goal requiring accredited healthcare organizations to develop and implement a list of abbreviations not to use. In 2004, it created its own “Do not use” list of abbreviations. The Institute for Safe Medication Practices (ISMP) also has a list of error-prone abbreviations, symbols, and dose designations. (See <https://www.ismp.org/tools/errorproneabbreviations.pdf>.)

Other strategies to reduce med-



The human side of medication errors

Human error plays a large role in medication errors. Human beings order drugs, interpret orders, and administer drugs. Sometimes we make mistakes, especially when we're rushed, busy, or under other stress. Nursing and pharmacist shortages make matters worse.

Inattentional blindness—failure to see something that's not expected—accounts for some human errors. We tend to see what we expect to see. For example, a nurse might pull a heparin vial from the medication cart, thinking it's labeled 10 units/mL. If the cart is inadvertently stocked with vials labeled 10,000 units/mL, she might not notice because she's accustomed to the standard label.

Although inattentional blindness is involuntary, being aware of the problem helps. Factors that contribute to inattentional blindness include capacity, conspicuity, expectation, and mental workload.

- *Capacity* to pay attention can be altered by such factors as stress and fatigue.
- *Conspicuity* refers to how likely we are to notice something; for instance, drug labels with a strong contrast between the dose and background help avoid errors. Conspicuity also refers to how we pay attention to something that's relevant to us; if we overhear our name when preparing medication, we could be easily distracted.
- *Expectations* may cause us to miss changes in a patient's medication regimen. A contributing problem is our tendency to believe things that support our expectations and dismiss things that don't.
- *Mental workload* refers to the fact that we're more vulnerable to inattentional blindness when our attention is diverted—a frequent occurrence in a busy nurse's day.

To reduce the effects of inattentional blindness, follow these guidelines:

- Watch for look-alike drug labels. Notify the pharmacy and drug manufacturers of potential problems.
- Reduce the noise level where you prepare and administer medications to decrease distractions.
- Use a system to decrease or avoid interruptions during medication preparation. In some hospitals, nurses wear a sash signaling they're not to be interrupted.
- Know that mistakes tend to occur when new or unusual combinations of circumstances occur in a familiar setting. So take special care when dealing with routine drug orders.
- Hone your critical thinking skills, which can help you avoid confirmation bias.
- Don't over-rely on technology, such as automatic warnings, but don't ignore technology, either.

ication errors include using independent double-checks of drugs before administration, encouraging prescribers to print instead of write prescriptions, improving staffing, and—perhaps most important—educating healthcare providers at all levels to work toward preventing errors. (See *The human side of medication errors*.)

Updating the five rights

To make the “five rights” more relevant to today's healthcare environment, we need to think of these rights in a new way.

The *right patient* no longer means simply that the patient's name matches the name on the prescription. Nurses also have to ensure that:

- the patient isn't taking other prescriptions, CAMs, OTC drugs, herbal products, vitamins, minerals, or foods that could interact with the prescribed drug
- the specific drug and dosage make sense for this patient
- the patient's pregnancy status has been assessed
- the patient doesn't have allergies that could cause a problem with the prescribed drug.

The *right drug* no longer means only what the provider prescribed. Also consider whether:

- this drug is appropriate for this patient
- the drug could interact with other drugs the patient is taking
- it requires dietary restrictions
- it's a high-risk drug that requires extra monitoring
- the generic and brand names match those on the prescription.

The *right dose* (which these days may be determined by a computer) needs to match the patient's specific situation. Ask yourself:

- Does the patient have a condition that might require dosage modification?
- Does the patient need to take only two or three units of the medication?



Key patient teaching points

When educating patients about prescribed drugs, make sure the discharge plan include these key points.

- Keep a current list of all drugs you take, including prescriptions, over-the-counter (OTC) drugs, complementary and alternative medication (CAMs), herbal supplements, vitamins and minerals, and street drugs. Next to the drug's name, record the dosage and times you take it. If you stop taking a drug, remove it from the list. If a drug has been prescribed for you but you're not taking it, delete it from the list.
- Take your drug list to all healthcare visits and share it with your providers, including dentists and emergency clinicians. Carry it with you when traveling.
- Know why you're taking each medication. That way, you can stay alert for potential problems caused by the drug and evaluate how well it's working.
- If you're planning a trip and are taking a medication that can't be stopped suddenly, make sure to get refills to take with you.
- When traveling, keep drug containers with you instead of packing them in your luggage, which could get lost.
- Follow directions for taking each drug. To remind you what drugs to take and when, mark your calendar, use a weekly pillbox, or use whatever reminder method works.
- Store drugs in a safe, dry place away from children and pets. Don't store them in the bathroom, where heat and humidity can make them unstable and less effective.
- Keep drugs in their original containers so you know what's in each one.
- Dispose of drugs at government drug recycling areas, or check with your pharmacist for safe disposal points.
- If you're a female of childbearing age or are breastfeeding, call your healthcare provider before using any medication to check whether it's safe for the fetus or infant.
- Never be afraid to ask questions. If you're not clear about what drugs you're taking, how or when to take them, or what side effects to watch for, speak up with your healthcare providers and ask questions.
- Remember—you are an important member of your healthcare team. You have crucial information to share with all healthcare providers—information that affects

your health and your drug regimen. Tell all providers about your health history, allergies (especially drug allergies), all medications you're taking (including OTC drugs, CAMs, and herbal remedies), and current health problems.

Teaching parents

Cover these important points when teaching parents or caregivers about medications prescribed for their child.

- Keep a written list of all medications (prescriptions, CAMs, and OTC and herbal preparations) you give your child, their dosages, and when you give them.
- Use proper measuring techniques for liquid medications. Instead of spoons or other tableware, use the measuring device that came with the medication or another appropriate device.
- Never give adult medications to children. Read labels to make sure the drug is in a pediatric form that's safe for children.
- Contact the child's healthcare provider if you have concerns about medications or to report a change in the child or a new problem that could affect, or be affected by, the drug regimen. Medication problems can arise quickly in a child, so don't wait until more serious problems occur before making that phone call. Remember—you are your child's best advocate.

Teaching older patients

The growing population of older patients can present a special challenge for medication administration. Memory problems, comorbidities, increased sensitivity to drug effects, and fixed incomes can contribute to potential medication errors. Elders may need a strong advocate to keep them safe. Cover these key teaching points with older patients and their caregivers.

- Keep a written list of all prescriptions, OTC drugs, CAMs, herbal preparations, and vitamins and minerals you're taking; their dosages; and when you take them. Take the list to all medical appointments and keep it posted in your home where emergency providers can find it.
- Prepare a weekly medication box with daily reminders to make sure you follow your drug regimen.
- Remember—you are an important member of your healthcare team. Speak up with your healthcare providers and ask questions.

- Does the ordered dosage make sense for this patient?
- Is there a “naked” decimal point that changes the meaning of the prescription?

The *right route* also needs to be assessed with the specific patient in mind. Ask yourself:

- For an oral drug, can the patient swallow the dose (without cutting or crushing a medication that shouldn't be cut or crushed)?
- For an inhaler drug, can the patient operate the inhaler properly?
- For an injected drug, can the patient prepare and self-administer the injection?

The *right time* has always been an elusive goal in nursing. Things can and do happen that prevent exact timing of medication administration. Yet in some cases, timing is crucial for determining the critical concentration and safety of a drug. Ensuring the correct time for drug administration requires knowledge of the prescribed drug and the patient who will receive it.

In a hospital or other healthcare facility, mastering these updated “five rights” to ensure patient safety is possible. But when the patient goes home and must manage the drug regimen without nursing guidance, serious obstacles may arise.

Educating and empowering patients

Although we continue to change or improve systems and implement policies to reduce medication errors, these may fail unless we put the patient at the center of the effort. The latest summary of reported medication errors (“Preventing Medication Errors: A \$21 Billion Opportunity,” from the National Priorities Partnership and National Quality Forum) showed that the largest contributor to medication errors is the prescriber's lack of knowledge about other drugs and preparations the patient's taking, which can lead to serious interac-

tions or overdose. Only the patient has this key information required to prevent medication errors. Only the patient knows which prescribed drugs, OTC preparations, and CAMs he or she is taking and how and when these are taken.

All the more reason for us to educate patients about the medications and other products they're using, and empower them to speak up about their medications to healthcare providers, including whether they're actually taking them and how often. Encourage patients to speak up so they can protect themselves from errors. Inform them that they are key healthcare team members. Instruct them to keep a list of all drugs they're actually taking and urge them to feel empowered to show it to every healthcare provider they see.

With today's short hospital stays and increased emphasis on outpatient care, providing comprehensive medication education to patients can be a daunting task. For a concise list of key topics to include when teaching patients about their medications, see *Key patient teaching points*.

When patients manage their drug regimens at home, the potential for medication errors is enormous. To help them avoid errors, be sure to review actual and potential problems with patients and educate them on ways to stay safe. The best way to reduce medication errors is to teach patients about their medications and encourage them to speak up and become key members of their healthcare team. ★

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Please mark the correct answer online.

1. Which statement related to factors contributing to medication errors is correct?

- Many patients seek information on the Internet, which might have incorrect information.
- The number of over-the-counter medications has decreased, creating fewer options.
- Medication regimens have become more streamlined, but education has not kept up.
- Patients are travelling less, which restricts the numbers of medications they have access to.

2. Complementary and alternative medications (CAMs):

- rarely are used by patients in addition to prescription medications.
- are not regulated by the Food and Drug Administration (FDA).
- do not interact with prescription medications.
- can be substituted safely for many medications.

3. Which statement about how medication errors are being reduced is *not* correct?

- TALLman lettering can help differentiate look-alike drug names.
- Electronic drug ordering has been shown to eliminate medication errors.
- Clinicians should refer to a "do-not-use" list of abbreviations.
- The FDA screens medication names for potential confusion.

4. When thinking of the *right drug*, the nurse should consider:

- whether the patient can operate an inhaler.
- how many doses the patient needs.
- the patient's pregnancy status.
- whether the drug is high risk.

5. When thinking of the *right patient*, the nurse should consider:

- whether the patient can operate an inhaler.
- how many doses the patient needs.
- the patient's pregnancy status.
- whether the drug is high risk.

6. According to a report from the National Priorities Partnership and National Quality Forum, what is the largest contributor to medication errors?

- Patient's inability to substitute over-the-counter medications
- Patient's inability to take medications by the correct route
- Prescriber's lack of knowledge about other drugs and preparations the patient's taking
- Prescriber's lack of knowledge about indications and adverse effects of medications

7. Failure to see something that's not expected accounts for some medication errors. This problem is called:

- inattentive blindness.
- attentional blindness.
- lack of capacity.
- enhanced capacity.

8. Which term refers to how likely we are to notice something?

- Capacity
- Conspicuity
- Expectation
- Mental workload

9. Which statement about how to reduce inattentive blindness is *not* correct?

- Hone your critical thinking skills.
- Watch for look-alike drug labels.
- Use a system to decrease or avoid interruptions during medication preparation.
- Rely solely on technology, such as automatic warnings, to avoid errors.

10. Which patient-teaching point related to medications is *not* correct?

- When travelling, pack drug containers in checked luggage.
- Keep your drugs in their original containers.
- Take your drug list to all healthcare visits and share it.
- Know why you're taking each medication.

11. Advise patients to store their drugs in:

- a lower cabinet.
- the bathroom.
- a dry place.
- a moist environment.