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# Polypharmacy

## KEEPING THE ELDERLY SAFE

Because they take more medications than younger patients, the elderly have a higher risk of adverse reactions. Here's how to help your older patients avoid trouble.





If your elderly patient takes several medications at the same time, he's at high risk for drug-related problems.<sup>1</sup>

Elderly patients are particularly susceptible to polypharmacy issues not only because aging affects how their body handles medications, but because

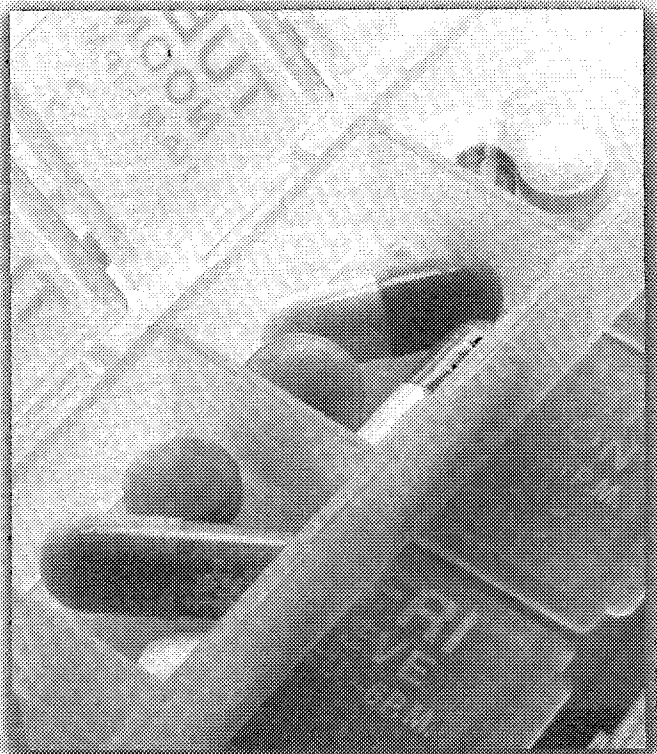
they take more medications than younger patients: In the United States, people over 65 make up approximately 13% of the population but use about 30% of all prescriptions written.<sup>2</sup> At any given time, an elderly patient takes, on average, four or five prescription drugs and two over-the-counter (OTC) medications.<sup>3</sup>

An elderly patient is also more likely to be taking a medication that has been prescribed inappropriately—one that's unnecessary, ineffective, or potentially dangerous—and to suffer an adverse drug event (ADE). In a study of more than 150,000 elderly patients, 29% had received at least one of 33 potentially inappropriate drugs.<sup>4</sup> A study of approximately 27,600 Medicare patients documented more than 1,500 ADEs in a single year.<sup>5</sup>

Most ADEs are the result of drug interactions; the more drugs a patient takes, the higher the risk of interactions.<sup>6</sup> The estimated

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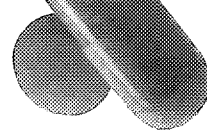
incidence of drug interactions rises from 6% in patients taking two medications a day to as high as 50% in patients taking five a day.<sup>7</sup>

As the elderly population in the United States continues to grow, so will the incidence of ADEs. You can help your elderly patients avoid the negative consequences of polypharmacy by understanding how aging affects the body's reaction to medications, which drugs are the most problematic for older patients, and how to spot a drug-related problem and intervene.

### Why elderly patients take so many meds

Several factors contribute to polypharmacy among patients over age 65. Clinicians may be prescribing more drugs for their elderly patients than they have in the past simply





because there are more drugs available for treating these patients. The discovery of a broad range of pharmaceuticals for a wide variety of conditions has helped many patients. Unfortunately, this new development has also led to both overuse and inappropriate use of prescription medications.

Many drugs that were once obtainable only with a prescription, such as Prilosec (omeprazole) and Claritin (loratidine), are now readily available over the counter, and their use is on the rise. In addition, complementary and alternative medicines, such as herbal therapies, are becoming increasingly popular among *all* patients, including the elderly.<sup>8</sup>

Compared to the general population, a patient over 65 is more likely to have several chronic disorders, each requiring at least one medication.<sup>9,10</sup> Elderly patients with more than one health condition are likely to receive care from several healthcare providers, each of whom may prescribe a different medication to treat the same symptoms.<sup>11</sup>

Additionally, patients may pur-

chase medications from more than one pharmacy, and each pharmacy checks for potential problems only on those medications that its pharmacist knows the patient is, or is supposed to be, taking.<sup>11</sup> Drug-related problems are less likely to occur when one physician or nurse practitioner oversees the patient's medication regimen.

Another factor in the equation is what's called the prescribing cascade: An elderly patient develops side effects from a medication he's taking; however, his healthcare provider interprets the symptoms not as side effects of the drug but as symptoms of a disease. The healthcare provider then prescribes yet another drug, creating the potential for even more side effects.<sup>2,11</sup>

### Aging affects drug sensitivity

An elderly patient is at risk for ADEs because the physiologic changes that occur with aging make the body more sensitive to the effects of medications.<sup>3</sup> These changes affect both pharmaco-

kinetics—what the body does to a drug—and pharmacodynamics—what a drug does to the body.<sup>3</sup>

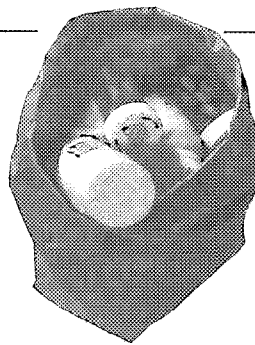
The three components of pharmacokinetics are absorption, distribution, and clearance, and each is affected by aging. Absorption, particularly after oral administration, is least affected.<sup>3</sup> In elderly patients, absorption is generally slower but complete.<sup>2</sup> (Absorption through the skin after topical administration may actually increase in the elderly as the aging skin becomes thin and frail.<sup>3</sup>) The more medications a patient takes, however, the greater the chance that one drug will interfere with the absorption of another.

Distribution of drugs throughout the body also changes with age. A medication gets distributed into either fat or water, depending on its chemical characteristics. As a patient ages, his percentage of body fat increases, so a drug that's lipid-soluble, such as diazepam (Valium), may stay in the body longer because there are more fat stores into which it can be distributed.<sup>1,3</sup> And, because older patients have proportionally less body water than younger ones, blood levels of a drug that is water-soluble may be higher than expected.<sup>3</sup> It's difficult, though, to anticipate the effect that changes in fat stores or body water will have on drug distribution because other body functions, such as protein binding, can also complicate drug distribution.

Aging significantly affects clearance because it produces changes in the liver, where drugs are metabolized, and in the kidneys, through which drugs are excreted.<sup>3</sup> As the body ages, blood flow through the liver decreases,

## Quick facts

- ▶ On average, elderly patients take four or five prescription drugs and two over-the-counter medications.
- ▶ "Brown bag" drug review—having patients bring in all their meds—may be more accurate than relying on the medical record alone.
- ▶ Elderly patients are particularly sensitive to certain antidepressants, muscle relaxants, antispasmodics, and antihistamines.





## Drugs to avoid in the elderly

Last updated in December 2003, the Beers Criteria are used to identify medications that are potentially inappropriate for elderly patients. The criteria consist of two lists. The first list, which appears below, includes medications that should generally be avoided in elderly patients because the drugs are either ineffective or pose a high risk of adverse effects and a safer

alternative is available. The second, which appears on page 49, emphasizes medications that should be avoided in patients with specific conditions. Both boxes contain only highlights from the Beers Criteria. You can find more complete information at <http://archinte.ama-assn.org/cgi/content/full/163/22/2716>.

DRUG CLASS	CONCERN
<b>Analgesics:</b> meperidine (Demerol), pentazocine (Talwin), propoxyphene (Darvon, Darvon-N, others)	CNS effects: confusion, hallucinations
<b>Anticholinergics and antihistamines:</b> chlorpheniramine (Chlor-Trimeton), diphenhydramine (Benadryl), hydroxyzine (Atarax, Vistaril), cyproheptadine (Periactin), promethazine (Phenergan), tripeleennamine (PBZ-SR, Pelamine), dexchlorpheniramine (Dexchlor, Polaramine, others)	Anticholinergic effects: confusion, blurred vision, constipation, dry mouth, lightheadedness, and difficulty with urination or loss of bladder control. Nonanticholinergic antihistamines are preferred for treating allergic reactions in elderly patients.
<b>Antidepressants:</b> amitriptyline (Amitril, Elavil, others), chlordiazepoxide-amitriptyline (Limbitrol), perphenazine-amitriptyline (Triavil), doxepin (Sinequan)	Strong anticholinergic effects. Sedation
<b>Barbiturates:</b> all except phenobarbital	Highly addictive. They cause more adverse effects in elderly patients than most sedatives or hypnotics and should not be prescribed to elderly patients except to control seizures.
<b>Benzodiazepines, long-acting:</b> chlordiazepoxide (Librium, Mitran), clidinium-chlordiazepoxide (Librax), diazepam (Valium), quazepam (Doral), halazepam (Paxipam), clorazepate (Tranxene)	Prolonged sedation, which increases risk of falls and fractures. Short- and intermediate-acting benzodiazepines are preferred if a benzodiazepine is required.
<b>GI antispasmodics:</b> dicyclomine (Antispas, Bentyl, others), hyoscyamine (Levsin, Levsinex, others), propantheline (Pro-Banthine), belladonna alkaloids (Donnatal)	Anticholinergic effects. Uncertain effectiveness in elderly patients. These drugs should be avoided, especially for long-term use.
<b>Muscle relaxants and antispasmodics:</b> carisoprodol (Rela, Soma), chlorzoxazone (Paraflex, Parafon Forte), cyclobenzaprine (Cycloflex, Flexeril), metaxalone (Skelaxin), methocarbamol (Marbaxin, Robaxin), oxybutynin (Ditropan)	Anticholinergic effects. Sedation, weakness
<b>Nonsteroidal anti-inflammatory drugs (NSAIDs), non-COX selective:</b> naproxen (Aleve, Naprosyn, others), oxaprozin (Daypro), piroxicam (Feldene)	GI bleeding, renal failure, high blood pressure, heart failure

**Source:** Fick, D. M., Cooper, J. W., et al. (2003). Updating the Beers Criteria for potentially inappropriate medication use in older adults. *Arch Intern Med*, 163(22), 2176.



which can reduce the clearance of certain drugs by 30% – 40%.<sup>3,9</sup> Also, the cytochrome P450 enzyme system—the major enzyme system by which the liver metabolizes drugs—becomes easily overwhelmed in older patients, so certain medications are metabolized more slowly and not as well.<sup>2,3</sup>

In addition, the size of the kidneys and renal blood flow both decrease with age.<sup>9</sup> Renal clearance of medications can be reduced by up to 50% as a patient reaches age 75.<sup>3</sup>

Aging also affects pharmacodynamics. Changes to drug receptors can make a patient more or less sensitive to certain medications.<sup>8</sup> Drugs that act on the CNS may have far greater impact in an elderly patient than in a younger one as a result of changes in the blood-brain barrier.<sup>3</sup>

Altered pharmacokinetics and pharmacodynamics increase an elderly patient's risk for both drug-drug and drug-disease interactions.<sup>8</sup> Drug-drug interactions typically occur when an elderly patient takes two medications that have different indications but additive pharmacologic effects. For example, an elderly patient might experience problems if he's prescribed a narcotic analgesic and an antidiarrheal agent; each is used for a different reason, but each can cause constipation.

Drug-disease interactions, in which a medication exacerbates a disease process, are also common among elderly patients, because of the prevalence of disease in this population.<sup>9</sup> Anticholinergic drugs, for example, can exacerbate glaucoma, Alzheimer's disease, and benign prostatic hyperplasia.<sup>9</sup>

## Know what to look for, how to help

One way to protect your elderly patient from the potentially harmful consequences of polypharmacy is by knowing which drugs frequently cause problems in this age group. The most common culprits are listed, by name or by class, in the two tables that accompany this article. The tables reflect the Beers Criteria, a system first developed in 1991 to identify those medications that are potentially harmful to the elderly.<sup>12</sup>

Many healthcare organizations use the Beers Criteria to evaluate the drug regimens of their elderly patients.<sup>12</sup> However, it is important to remember that the criteria don't ban the use of certain medications for all elderly patients; instead, they emphasize those that "should generally be avoided" either because they're ineffective or because they pose a high risk and a safer alternative is available.<sup>12</sup> As always, the prescriber needs to rely on clinical judgment and knowledge of the patient's condition.

Taking a thorough drug history is especially important when caring for an elderly patient. Investigate and document all medications the patient is taking, including OTC and herbal products, which a patient may not list because he does not consider them to be drugs.<sup>7</sup> Confirm that each drug's generic and brand name, drug class, and clinical indication are correct as ordered for your patient. Find out what other healthcare providers the patient is seeing and, if possible, which ones prescribed which medications.

One effective way to take a drug history is with what's called

the "brown bag" method. Rather than relying solely on the patient's medical record, ask the patient to bring all of his medications with him to the hospital or office visit. A recent study found that this method produces a more accurate list of the drugs an elderly patient takes.<sup>13</sup> Be sure to tell your patient to bring in *all* the medications he takes, including prescription and OTC drugs, topical preparations, herbal products, vitamins, and other supplements. Also ask if he is using any medications he gets from family or friends.

Find out how often and in what doses the patient has been taking all medications, and compare that with what the prescription calls for. About 40% of elderly patients fail to take their drugs as instructed.<sup>9</sup>

Know the side effect profile for each medication that your patient takes. You should also be aware of any conditions a patient has that might increase the risk of certain drug-drug interactions. For example, sildenafil (Viagra) may be appropriate for an elderly patient with erectile dysfunction, but if the patient has heart disease and is taking any form of nitrate, such as nitroglycerin (Nitrostat, Nitro-Dur, others) or isosorbide (Isordil, Sorbitrate, others), sildenafil could cause his blood pressure to drop to dangerously low levels and is, therefore, contraindicated. Know all of your patient's diagnoses, including self-diagnoses that the patient may be managing with OTC or herbal medications.

Because aging affects how drugs are cleared by the body, closely monitor the patient's lab values, particularly his liver function tests and his creatinine level, which is an indicator of how well



## Drugs and conditions that don't mix in the elderly

CONDITION	DRUGS TO AVOID	CONCERN
Anorexia/malnutrition	CNS stimulants	May suppress appetite
Bladder flow obstruction	anticholinergics, antihistamines, GI antispasmodics, muscle relaxants, antidepressants, decongestants, oxybutynin (Ditropan), flavoxate (Urispas), tolterodine (Detrol)	May decrease urinary flow
Clotting disorders	aspirin, nonsteroidal anti-inflammatory drugs (NSAIDs), dipyridamole (Persantine, Pyridamole), ticlopidine (Ticlid), clopidogrel (Plavix)	May prolong clotting time and increase potential for bleeding
Constipation (chronic)	calcium channel blockers, tricyclic antidepressants, anticholinergics	May exacerbate constipation
COPD	long-acting benzodiazepines, beta-blockers	May cause or exacerbate respiratory depression
Depression	long-term use of benzodiazepines, methyl dopa (Aldomet), reserpine (Serpalan, Serpasil), guanethidine (Ismelin)	May cause or exacerbate depression
Dysrhythmia	tricyclic antidepressants	May induce or aggravate dysrhythmia and produce QT-interval changes
Heart failure	disopyramide (Norpace), drugs with high sodium content	May promote fluid retention and exacerbate heart failure
Hypertension	pseudoephedrine (Sinutab, Sudafed, others), amphetamines	May elevate blood pressure
Insomnia	decongestants, methylphenidate (Ritalin), theophylline (Theodur), monoamine oxidase inhibitors, amphetamines	May stimulate the CNS
Obesity	olanzapine (Zyprexa)	May stimulate appetite
Parkinson's disease	conventional antipsychotics, metoclopramide (Reglan), tacrine (Cognex)	May have anticholinergic effects
Seizures/epilepsy	clozapine (Clozaril), chlorpromazine (Thorazine), thioridazine (Mellaril), thiothixene (Navene), bupropion (Wellbutrin)	May lower seizure threshold
Stress incontinence	beta-blockers, anticholinergics, tricyclic antidepressants, long-acting benzodiazepines	May worsen incontinence
Syncope/falls	Short- and intermediate-acting benzodiazepines; tricyclic antidepressants	May cause ataxia and impaired psychomotor function and exacerbate syncope and falls.

**Source:** Fick, D. M., Cooper, J. W., et al. (2003). Updating the Beers Criteria for potentially inappropriate medication use in older adults. *Arch Intern Med*, 163(22), 2176.



the kidneys are functioning. Be aware, however, that because creatinine is a byproduct of muscle metabolism and elderly patients have less lean body mass than younger ones, serum creatinine levels might overestimate creatinine clearance.<sup>7</sup> For this reason, you should use a formula such as the Cockcroft-Gault, which takes into consideration the patient's age, sex, and weight to estimate creatinine clearance.<sup>9</sup>

Be vigilant in monitoring for ADEs. Since the symptoms of ADEs vary widely and it may be difficult to distinguish the adverse effects of a drug from the symptoms of disease, it's wise to consider any new sign or symptom to be drug-related until proven otherwise.<sup>2,11</sup>

New or sudden-onset GI distress is often caused by medication. One study found that the most common ADEs among elderly patients were nausea, vomiting, diarrhea, constipation, and abdominal pain.<sup>5</sup>

Because an elderly patient is more sensitive than a younger one to drugs that affect the CNS, consider the possibility that any change in mental status is drug-related. Long-acting benzodiazepines, such as diazepam, can cause drowsiness, impaired memory, confusion, and prolonged sedation, which increase an elderly patient's risk for falls and fractures.<sup>9,12</sup>

Many drugs used in the elderly, including some antidepressants, muscle relaxants, antispasmodics, and antihistamines, have strong anticholinergic effects and, therefore, may cause confusion, blurred vision, dry mouth, lightheadedness, constipation, and difficulty with urination or loss of bladder control.<sup>2,11</sup> Elderly patients are particularly susceptible to these effects.

Keeping your patient safe also requires that you instruct him to use only one pharmacy if possible. Teach him about the potential side effects of the medications he's taking, and tell him to notify his healthcare provider if he develops any new symptoms.

If you have prescribing authority, you'll need to take additional steps to reduce your elderly patients' risk of an ADE. Heed the adage to "start low and go slow." Although requirements vary considerably from patient to patient, doses often must be reduced for elderly patients by one-third to one-half of the recommended adult dose.<sup>9</sup>

Try to simplify the patient's regimen as much as possible by, for example, prescribing a single agent rather than multiple drugs to treat a condition or choosing a drug that can be given once or twice, rather than three times a day. Always write the purpose of the drug on the order.

Review the patient's medical record and eliminate duplicate

medications—those prescribed by different healthcare providers for the same problem—and drugs with no therapeutic benefit or clinical indication.<sup>2</sup> You should substitute safer medications whenever possible. Avoid treating an adverse reaction caused by one drug with a second drug; if possible, discontinue the drug that's causing the problem or reduce the dosage.

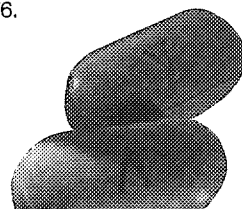
Drug therapy has improved the lives of many patients. Medications can be used to effectively treat patients regardless of their age. When drugs are used judiciously and thoughtfully, there's a much better chance of avoiding ADEs. You can help ensure that your elderly patient gets safe and effective drug therapy by carefully monitoring what your patient is taking and being alert for signs of trouble. **RN**



Have you ever asked an elderly patient to "brown bag" his medications and bring them in? Visit [www.mweb.com](http://www.mweb.com) and vote in our poll.

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## Continuing Education Test #1029



## "Polypharmacy: Keeping the elderly safe"

**OBJECTIVES** After reading the article you should be able to:

1. Discuss the implications of polypharmacy in the elderly.
2. Identify drugs that the elderly patient should avoid.
3. Develop a teaching plan for an elderly patient taking multiple medications.

Circle the one best answer for each question below. **Transfer your answers to the card that follows page 60.** Save this sheet to compare your answers with the explanations you'll receive. Or, take the test online at [www.rnweb.com](http://www.rnweb.com).

1. In the United States, what percentage of all prescriptions are written for people over age 65?
  - a. 20%.
  - b. 30%.
  - c. 40%.
  - d. 50%.
2. An elderly patient takes, on average, how many prescription drugs?
  - a. One or two.
  - b. Two or three.
  - c. Three or four.
  - d. Four or five.
3. In a study of more than 150,000 elderly patients, what percentage had received at least one of 33 inappropriate drugs?
  - a. 12%.
  - b. 19%.
  - c. 29%.
  - d. 36%.
4. The estimated incidence of drug interactions rises from 6% in patients taking two medications a day to as high as what percentage in patients taking five a day?
  - a. 20%.
  - b. 30%.
  - c. 40%.
  - d. 50%.
5. All of the following contribute to polypharmacy in the elderly EXCEPT:
  - a. Many former prescription drugs are now available over the counter.
  - b. Herbal remedies are becoming increasingly popular with the elderly.
  - c. The elderly are more likely to receive care from one healthcare provider.
  - d. The elderly tend to have more than one chronic disorder.
6. Which of the following is a concern for an elderly patient with a history of COPD who's prescribed beta-blockers? They may:
  - a. Elevate blood pressure.
  - b. Stimulate the CNS.
  - c. Worsen incontinence.
  - d. Cause or exacerbate respiratory depression.
7. Which of the following is correct concerning the Beers Criteria? It:
  - a. Bans the use of certain drugs for all elderly patients.
  - b. Identifies drugs that are effective in treating elderly patients.
  - c. Emphasizes drugs that should generally be avoided in elderly patients.
  - d. Is used to evaluate drug regimens in both children and the elderly.
8. Renal clearance of medications can be reduced by up to what percentage as a patient reaches age 75?
  - a. 30%.
  - b. 40%.
  - c. 50%.
  - d. 60%.
9. Which of the following group of drugs can exacerbate glaucoma in elderly patients?
  - a. Antibiotics.
  - b. Anticholinergics.
  - c. Antidiabetics.
  - d. Thrombolytics.
10. Which system was developed in 1991 to identify drugs that are potentially harmful to the elderly?
  - a. Beers Criteria.
  - b. Denver Screening Test.
  - c. Homans' test.
  - d. Kline's test.
11. Which of the following should the nurse monitor because it indicates how well the kidneys are functioning?
  - a. Blood urea nitrogen.
  - b. Creatinine.
  - c. Electrolytes.
  - d. Urine specific gravity.
12. When taking a drug history on an elderly patient, the nurse should do all of the following EXCEPT:
  - a. Document only prescription drugs that the elderly patient is taking.
  - b. Identify the drug's generic and brand name.
  - c. Find out what other healthcare providers the patient is seeing.
  - d. Identify the drug class and clinical indication.
13. One study found that the most common adverse drug events (ADEs) among elderly patients include:
  - a. Abdominal pain.
  - b. Glaucoma.
  - c. Headache.
  - d. Tachycardia.
14. Which of the following statements is correct concerning pharmacokinetics in the elderly?
  - a. Absorption of oral drugs is generally faster and incomplete.
  - b. Drug clearance tends to be increased by 30% - 40%.
  - c. Blood levels of a drug that's water soluble may be higher than expected.
  - d. Certain drugs are metabolized more quickly.
15. Which of the following is an anticholinergic effect that may be seen in the elderly?
  - a. Blurred vision.
  - b. Diarrhea.
  - c. Diuresis.
  - d. Profuse sweating.
16. Which of the following can reduce an elderly patient's chances of developing an ADE?
  - a. Treating an adverse reaction caused by one drug with a second drug.
  - b. Choosing a drug that can be given at least three times a day.
  - c. Prescribing a single agent rather than multiple drugs.
  - d. Starting therapy with a higher dose of the drug.
17. According to the Beers Criteria, an elderly patient with hypertension should avoid which of the following?
  - a. Acetaminophen.
  - b. Aspirin.
  - c. Penicillin.
  - d. Pseudoephedrine (Sinutab, Sudafed, others).
18. Which of the following is a concern for an elderly patient taking nonsteroidal anti-inflammatory drugs?
  - a. Heart failure.
  - b. Strong anticholinergic effects.
  - c. Prolonged sedation.
  - d. Weakness.

Credit will be granted for this unit through August 2007. It was prepared by Marilyn Herbert-Ashton, RN, BC, MS. Approved for ANCC credit and AACN Category A credit. California Board of Registered Nursing (#CEP10864).



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