Medication Safety With Community-Dwelling Older Adults

Andrew Miller, MD, MPH, and Linda DeMarzo, PharmD, MLS

The number of older adults residing in US communities is increasing as our nation's population ages. Many of these individuals place special importance on continuing to live at home and require the support of caregivers and health care professionals to make this goal possible. The Centers for Medicare & Medicaid Services (CMS) recognizes that with increasing age, older adults are at particular risk for medication-related problems, and drug safety becomes an important component for reducing patient harm. A CMS 3-year contract—the 9th Scope of Work (SOW)—includes a Patient Safety Theme that focuses on quality improvement efforts to improve health care processes and systems. CMS contracts with Quality Improvement Organizations (QIOs) located in the 50 states, the US Virgin Islands, Puerto Rico, and the District of Columbia to conduct activities with providers in each of their contracted states/jurisdictions to improve quality of care.

Background

In the United States, medication-related problems and medication errors cause significant health and economic burdens. Estimates from an Institute of Medicine (IOM) report in 2001 indicated[1]:

- 1.5 million people experience a preventable medication-related injury every year
- $3.5 billion are spent annually on preventable adverse drug events that occur during hospitalizations alone

Compared with those younger than age 65, adults older than 65 are more likely to experience, or be hospitalized for, adverse medication reactions.[2] Age-related changes that affect how drugs work in the body and the presence of multiple chronic diseases put older adults at an increased risk for medication-related problems, including adverse drug reactions (ADRs), drug-on-drug interactions (DDIs), and drug-disease interactions. While not all adverse reactions are avoidable, factors known to contribute to preventable medication-related problems in older adults include polypharmacy, the prescribing of potentially inappropriate medications (PIMs), and poor medication adherence. Other factors that increase the risk for medication problems include receiving prescriptions from more than one doctor and filling prescriptions at multiple pharmacies.

Although increased focus on medication safety is leading to system-wide changes in hospitals and other health care facilities (eg, computerized physician order entry, bar coding), system supports in the outpatient/community setting to ensure safe and appropriate prescribing and medication use need to be implemented.

Risk Factors

The Institute of Medicine (IOM), in *Preventing Medication Errors: Quality Chasm Series*, calls for a patient-centered care model, which emphasizes the role of the patient in his or her own care, to improve medication safety.[1] It is important that health care providers, patients, and caregivers work together to address medication safety issues and put in place effective interventions that can be used on a consistent basis to monitor medication adherence and management. (Interventions will be addressed later in this article.) There are a number of reasons why older patients may not be taking medications as prescribed (Box 1).

Drug Safety and the 9th SOW

Drug safety is an important component of the 9th SOW Patient Safety Theme. The CMS focus on drug safety is to reduce PIMs and DDIs with older adults.

A PIM is a medication that should generally be avoided in eld-

erly patients because the potential risks may outweigh the benefits. CMS has defined the PIM measure as the percentage of Part D enrollees older than 65 with more than one PIM. The selection of drugs for the PIM measure encompasses the updated Beers list, Zhan's list, data from the National Committee for Quality Assurance NCQA, and HEDIS 2006 measures. PIMs include, but are not limited to, the selected drugs and drug classes listed in Box 2.

The CMS DDI measure describes the percentage of Part D enrollees who submit claims for drugs that potentially interact, (Box 3) but cannot measure whether any sequelae or specific outcomes resulted from any such DDIs. The selection of potentially interacting drug pairs was based on the frequency of utilization published by CMS as the top 100 drugs purchased with drug discount cards by Medicare beneficiaries in 2004; research indicating the most common potential DDIs with potentially serious adverse effects from concomitant administration; and quantifiable effects from the potentially interacting drugs (eg, increase in international normalized ratio [INR]) as opposed to qualitative effects.

It should be noted that many of the more common potential DDIs can be clinically managed through appropriate monitoring (eg, combinations of warfarin and precipitant drugs), while others should be avoided (eg, nitrates and phosphodiesterase type 5 [PDE5] inhibitors). Complete specifications for the CMS-defined measures, including numerator and denominator statements, can be found at www.qualitynet.org/qmis.

Box 1. Potential Patient Risks for Medication Nonadherence or Mismanagement[3,4]

Failure to procure medication because of financial problems

Lack of knowledge about medications, including:
- Dosing regimen
- Consequences of missing doses
- Potential for addiction
- How to administer medication (eg, inhaler technique)
- Reason medication was prescribed

Physical inability due to:
- Poor vision
- Limited manual dexterity
- Illiteracy or inability to read English
- Problems with swallowing

Poor cognitive capacity including memory problems that result in omitting medications or overmedication

Intentional nonadherence due to:
- Religious or cultural beliefs
- Side effects

Disorganization in medication administration methods including:
- Multiple storage locations
- Inability to locate medications
- Inconsistent administration of medications

Interventions

Key steps identified by IOM to prevent medication errors are collaboration of, and communication between, a patient and his or her health care providers, as well as care coordination among providers.[1]

Patient Tools

The IOM recommends that patients carefully maintain up-to-date lists of medications, including prescription medications, over-the-counter drugs, herbal products, and dietary supplements. This list, or Personal Medication Record (PMR), should include information on how patients should be taking their medications, why patients are taking the medications, and whether a medication requires monitoring, as well as other important information such as drug allergies and emergency contact information.

The PMR should be brought to every physician visit and updated whenever a medication is eliminated or added. Dose increases or decreases should be noted. A PMR is an important tool for health care professionals in performing medication reconciliation. It promotes informed health care decisions by providing physicians and other health care professionals with a readily accessible, accurate, and complete medication record. Examples of PMRs can be found on the following Web sites:

- My Medicine List™—American Society of Health-System Pharmacists Foundation (http://www.ashpfoundation.org/MainMenu-

Box 2. Selected Potentially Inappropriate Medications (PIMs)[5]

Drug/Drug Class	Reason
Skeletal muscle relaxants (carisoprodol, methocarbamol, cyclobenzaprine, metaxalone, chlorzoxazone, orphenadrine)	Potential falls and bone fractures due to the relaxant effects
Narcotics (meperidine, pentazocine, propoxyphene [including combinations])	Potential falls and bone fractures due to the sedative effects on the central nervous system (CNS)
Chlorpropamide	Potential severe hypoglycemia and/or hyponatremia in those older than 65
Thyroid hormones (desiccated thyroid)	Not the drug of choice because of available alternatives
Vasodilators (dipyridamole [short-acting only])	As a sole agent, not the drug of choice for stroke prevention
Antianxiety (meprobamate)	Potential falls and bone fractures due to sedative effects on the CNS
Analgesic (ketorolac)	Potential gastrointestinal bleeding; Black Box warning not to exceed 5 days of therapy
Antipsychotics (thioridazine, haloperidol, chlorpromazine, thiothixene)	Potential extrapyramidal side effects and undesirable CNS effects
CNS stimulants (amphetamines)	No medical necessity for these drugs in elderly patients except for narcolepsy
Calcium channel blockers (nifedipine [short-acting only])	Potential profound hypotension and/or myocardial infarction
Ticlopidine	Black Box warning for life-threatening hematologic adverse reactions
Belladonna alkaloids	Not the drug of choice for peptic ulcer or gastric secretions; other alternatives available for gastrointestinal conditions

Note: Barbiturates, long-acting benzodiazepines, and antihistamine/decongestant agents (when used to treat cold or cough) are not covered by Medicare Part D and, therefore, not included in the PIM measure, although they may meet the criteria of a PIM.

Categories/PracticeTools/MyMedicineList.aspx)
- My Personal Medication Record—AARP (http://www.aarp.org/health/staying_healthy/prevention/my_personal_medication_record.html)
- Mednotes (electronic version) (https://www.drugs.com/mednotes.html)

Provider Interactions

Health care providers, including physicians, nurses, pharmacists, physical therapists, occupational therapists, and speech language pathologists, play important roles in improving and ensuring medication safety. They are vital in educating patients about their medications and laying the groundwork for correct medication management. The following topics should become integral components of discussions with patients at each encounter, especially at a time of transitioning care from one health care setting to another (eg, hospital discharge)[1]:

- Reasons for medication administration
- Dosing regimens
- Side effects and steps to take if they occur
- Treatment options
- Drug-drug and drug-food interactions
- Patient and caregiver roles in improving adherence
- Role of medications in the patient's overall health

Health care professionals can employ "teach back" techniques to ensure that patients understand how they should use their medications properly. This can be done simply by asking patients to restate the information or instructions they have just received. If a patient is not able to do this, the provider should try communicating the directions in simpler words or perhaps use a drawing or illustration to convey the necessary information. The patient should be asked again to restate the instructions or key messages. If the patient does not understand information or instructions given in the office, he or she will not recall them any better at home. Answering medication questions while patients are

Box 3. Selected Potential Drug-on-Drug Interactions (DDIs)

Object Drug	Precipitant Drugs*
Warfarin	Nonsteroidal anti-inflammatory drugs (NSAIDs), amiodarone, cimetidine, sulfinpyrazone, thyroid hormones, anabolic steroids, quinolone, macrolide antibiotics, sulfonamide, tetracycline, metronidazole, dicloxacillin
Digoxin	Clarithromycin, erythromycin
Methotrexate	Trimethoprim
Monoamine oxidase (MAO) inhibitors	CNS stimulants, selective serotonin reuptake inhibitors (SSRIs)
Pimozide	Macrolide antibiotics
Nitrates	Sildenafil, tadalafil, vardenafil, phosphodiesterase type 5 (PDE5) inhibitors
Thiopurines	Allopurinol
Angiotensin-converting enzyme inhibitors (ACEIs), angiotensin receptor blockers (ARBs)	Potassium-sparing diuretics
Beta blockers	Verapamil, diltiazem
Clonidine	Beta blockers

*Drugs that can affect an interaction.

still in the office is instrumental in reducing medication mismanagement. Providers should be alert about cultural and language issues that may present barriers to proper medication use. Alternatively, medication information can be provided to a caregiver.

Providers also need to take steps to ensure that communications occur among themselves with the understanding that excellent patient care requires collaborative effort. For example, since older adults can be taking too many medications or inappropriate ones, it is important that providers (ie, physicians, nurses, pharmacists) conduct medication reconciliation or simplification whenever possible. This can include discontinuing PIMs or medications that can cause DDIs, prescribing sustained-release medications that will reduce the number of required daily doses, and using nondrug alternatives.[4]

Provider Action

Impact to You

The number of older adults residing in US communities is increasing, and many of these individuals place special importance on continuing to live at home. They often require the support of caregivers and health care professionals to make this goal possible.

Estimates from an Institute of Medicine (IOM) report in 2001 indicated[1]:

- 1.5 million people experience a preventable medication-related injury every year
- $3.5 billion are spent annually on preventable adverse drug events that occur during hospitalizations alone

What You Need to Know

A CMS 3-year contract–the 9th Scope of Work (SOW) for Quality Improvement Organizations–includes a Patient Safety Theme that focuses on quality improvement efforts to improve health care processes and systems.

What You Need to Do

Key steps identified by IOM to prevent medication errors are collaboration of, and communication between, a patient and his or her health care providers, as well as care coordination among providers. The QIO can provide assistance in improving the safety of medication management for seniors.

New Jersey Focus

Healthcare Quality Strategies, Inc., (HQSI), the federally designated QIO for New Jersey, is responsible for implementing CMS-sponsored quality improvement activities in

the state. As part of HQSI's efforts under the Patient Safety Theme in New Jersey, a drug safety project, called the New Jersey Drug Safety Initiative (NJDSI), focuses on reducing the use of PIMs and avoiding DDIs. The NJDSI involves:

- Conducting a patient-centered community-based project in the Brick (Ocean County), New Jersey area
- Offering educational and informational resources statewide via the HQSI Web site

To calculate the PIM and DDI rates in a selected community, HQSI is using CMS-provided Part D claims data. Additional process and outcome measures will be developed and data sources other than Medicare Part D will be used, as available. Specific PIM and DDI measures are being defined based on analysis of baseline Part D data, which includes determining the most frequently occurring PIMs and DDIs for the targeted community. HQSI will include in the measure definition the most frequent PIMs and DDIs for which there is strong clinical evidence and/or expert opinion supporting the avoidance of these medications in elderly patients and for which there are alternative therapies. M*P*M

Andrew Miller, MD, MPH, is the director of physician services, and Linda DeMarzo, PharmD, MLS, is a clinical task leader at Healthcare Quality Strategies, Inc. (HQSI). HQSI is an independent, nonprofit company committed to accelerating improvement in healthcare quality through a collaborative and interactive process with the healthcare community. This material was prepared by HQSI, the Medicare Quality Improvement Organization for New Jersey, under contract with the Centers for Medicare & Medicaid Services, an agency of the US Department of Health and Human Services. 9th SOW-NJ-6.2-09-01.

References

1. Committee on Quality Health Care in America, Institute of Medicine. *Crossing the Quality Chasm: A New Health System for the 21st Century.* Washington, DC: National Academy of Sciences; 2001. http://www.nap.edu/openbook.php?record_id=10027&page=R1. Accessed February 5, 2009.

2. Budnitz DS, Pollock DA, Weidenbach KN, Mendelsohn AB, Schroeder TJ, Annest JL. National surveillance of emergency department visits for outpatient adverse drug events. *JAMA.* 2006;296(5):1858-1866.

3. Marek KD, Antle L. Medication management of the community-dwelling older adult. In: Hughes RG, ed. *Patient Safety and Quality: An Evidence-Based Handbook for Nurses.* Rockville, MD: Agency for Healthcare Research and Quality; 2009. AHRQ Publication No. 08-0043. http://www.ahrq.gov/qual/nurseshdbk/docs/MarekK_MMCDOA.pdf. Accessed February 5, 2009.

4. Quality Insights of Pennsylvania. *Tools: Medication Manager Best Practice Intervention Package.* Harrisburg, PA: Quality Insights of Pennsylvania; 2007. Publication No. 8SOW-PA-HHQ07.418. http://www.qualitynet.org/dcs/ContentServer?cid=1200602365399&pagename=Medqic%2FMQTools%2FToolTemplate&c=MQTools. Accessed February 5, 2009.

5. Centers for Medicare & Medicaid Services (CMS). Measure ID: 10507; Part D medication-1.2: potentially inappropriate medications (PIM)–01/01/06 - 06/30/06. Quality Measures Management Information System (QMIS) Web site. https://www.qualitynet.org/qmis/measureDetailView.htm?measureId=10507&viewType=1. Accessed February 5, 2009.