Quality Prescribing for the Elderly

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Recent advances in health care and technology are enabling people to remain healthier and live longer. Globally, the population is continuing to age at an unprecedented rate. Currently, the approximately 36 million individuals age ≥65 years represent 15% of the total US population.[1] Because the frequency of acute and chronic illness increases with age, the elderly receive disproportionate amounts of medication compared to the general population, consuming nearly one-third of all prescription medications and 40% of over-the-counter medications.[1] In 2003, approximately 50% of all seniors and 70% of those with ≥3 chronic conditions were consuming ≥5 prescription medications a day.[2] The overall economic impact for the public is substantial. In 2005, 42.1 million Medicare beneficiaries accounted for $120.6 billion in total prescription drug spending, with 18% of this population responsible for 57% of the total expenditures.[2] Drug spending by and for the Medicare population is expected to increase over time, with the expenditures projected to surpass $220 billion by 2011.[2]

In addition to the economic burden, the varying effects of the aging process further complicate drug use by seniors. Physiologic changes that take place as one grows older may substantially modify the way medications interact with the body. Drug absorption typically is slowed but complete in the healthy elderly, whereas a decline in kidney or liver function may result in further changes in metabolic functioning and elimination of medications. In addition, the reduced muscle mass and total body water typically seen with aging decrease the volume of distribution of medications. As a result, medications will attain higher plasma concentrations as they distribute into muscle or total body water. Given all of these factors, it is not surprising that the elderly are at greater risk for experiencing an adverse event. One study reported that 17% of all hospital admissions by elderly patients were the result of adverse drug events.[3] Inappropriate medication prescribing has been reported as the most prominent cause of such adverse drug events.[3]

It is evident that physicians generally face a challenge when selecting the right medication or combination of medications for their older adult patients. The challenge becomes even more complex because there is a dearth of clinical information on medication safety and effectiveness in older adults. The Food and Drug Administration published guidelines in 1989 to encourage the inclusion of elderly subjects in drug-related research initiatives; however, this population is still substantially underrepresented in randomized clinical trials.[4,5]

Nevertheless, medications are unquestionably a vital and cost-effective component of the health management of seniors. They play an essential role in improving an older adult's health status and quality of life. The Medicare Modernization Act (MMA) added a prescription drug benefit, Medicare Part D, to Medicare health benefits, effective January 1, 2006. This new policy is the most significant change since Medicare's inception and is intended to provide medication access to millions of beneficiaries who previously had insufficient or no drug coverage. To control medication usage and avoid catastrophic overspending, the MMA enables prescription drug plans to employ pharmacy utilization management strategies, such as formulary establishment. Specifically, the law states that a formulary should include a minimum of 2 drugs from each therapeutic category or class, while adhering to other required standards to assure patient access to all essential medications. The MMA appointed the United States Pharmacopeia (USP) to create a list of drug categories and therapeutic

classes to serve as a tool for prescription drug plans to develop their formularies.

Drug classification is a useful mechanism for organizing a large number of medications into therapeutic categories and classes. The USP Final Model Guidelines contain 146 unique therapeutic categories and pharmacologic classes. However, this framework has been criticized because it relies mostly on class effect, an assumption that all drugs within a certain class are equal, even among the elderly.[6] For example, the antidepressant therapeutic category is further subdivided into 3 classes: monoamine oxidase type I inhibitors (MAO-Is), reuptake inhibitors (RIs), and others. The RI class is further subdivided to include selective serotonin reuptake inhibitors (SSRIs), serotonin and norepinephrine reuptake inhibitors (SNRIs), and tricyclic antidepressants (TCAs). Because the antidepressant category includes 25 medications, it is unclear which agents will be made available on the formulary and from what class. It is possible that a drug plan may remain in compliance with the guidelines and yet decide to include only TCAs on their formulary. Although TCAs have been shown to be effective in treating depression, they may cause significant adverse events in the elderly. In the aged population, normal doses of TCAs can produce higher plasma drug levels and metabolites, resulting in various degrees of anticholinergic activity. Other adverse events and complications associated with the use of TCAs include cardiac toxicity, orthostatic hypotension, central nervous system (CNS) effects, such as confusion and seizures, and increased intraocular pressure.[7] If a formulary includes an SSRI, it is likely that fluoxetine will be the medication of choice because it is available as a generic. However, fluoxetine has a long half-life and comes with a risk of producing excessive CNS stimulation, sleep disturbances, and agitation at high doses in the elderly.[6] As can be seen from this example, the reliance only on class effect to structure a formulary may impede appropriate prescribing for the elderly.

Many experts feel that with millions of Medicare beneficiaries enrolling in the new prescription drug benefit, the rate of inappropriate medication use will increase.

In an attempt to create some structure regarding appropriate prescribing for the elderly, Beers and colleagues published an explicit list of criteria in 1991 for defining and identifying medications and classes of medications that should be avoided in the elderly.[4] This list of medications was established by an expert consensus panel and has been updated twice (1997 and 2003) since its inception.[8,9] According to the Beers criteria, potentially inappropriate medications are defined as drugs that are ineffective, pose unnecessarily high risks for patients, or have safer alternatives available.[8-10]

The Beers criteria have been used extensively in epidemiologic studies to estimate the extent of potentially inappropriate medication prescribing (PIP) for the elderly in various clinical settings, including long-term care facilities, hospitals, and ambulatory care practices.[8-10] The rates of PIP discovered in these settings are alarming. For instance, a review study found ≥1 inappropriate medications being prescribed for nearly 40% of nursing home patients and 21% of community-dwelling elderly.[11] In a recent retrospective chart review of a random sample of individuals ≥65 years in 2 urban outpatient practices, 1 located in a senior citizens center and the other in a general family medicine clinic, we found that 25% of the elderly sampled in both practices had ≥1 incidents of PIP, which is consistent with earlier research in ambulatory care settings.[12] More strikingly, we did not find any differences in the prevalence of PIP in the settings investigated, 1 of which was exclusively devoted to the care of seniors.[12] Our findings suggest that the prevalence of PIP may be widespread and may not limit itself to a particular practice setting.

There is a growing concern about the quality of prescribing for the elderly, and many experts feel that with millions of Medicare beneficiaries enrolling in the new prescription drug benefit, the rate of inappropriate medication use will increase further.[6,13,14] There is no doubt that this is a serious problem, deserving more attention and immediate action. So then,

what can be done at the provider level to improve the quality of prescribing for the elderly?

1. *Use of the Internet and personal digital assistants (PDAs)*
   Providers frequently rely on various tools, such as pocket cards and drug handbooks, for quick access to prescribing information, yet this information can be dated or limited. However, with current technology, up-to-date information can be accessed 24 hours a day, 7 days a week via electronic drug databases on the Internet or a PDA. Due to the breadth of information available on drug reference software, these tools are ideal aids in making prescribing decisions. The databases are frequently updated and provide evidence-based information on dosing, indications, side effects, and drug interactions, in addition to having a host of special features, including medical calculators, treatment guidelines, pharmacokinetic information, drug prices, and drug pictures.[15] Specifically regarding the elderly, the Beers criteria can help guide the use of medications associated with the least risk. The Beers criteria can be accessed online (http://archinte.ama-assn.org/cgi/reprint/163/22/2716.pdf) for easy reference.

2. *Strengthening of relations with pharmacists*
   It is crucial for providers to strengthen their working relationships with pharmacists in their areas. As drug experts, pharmacists should be more involved in the assessment, management, and surveillance of drug regimens.

Healthy People 2010 calls for regular medication reviews in older patients.

They can advise providers on elements of appropriate drug use for the elderly, while also serving as a liaison between the patient and provider in an effort to maintain communication and prevent medication errors. Additionally, providers can also partner with pharmacists to conduct "brown bag" medication reviews, where patients are asked to bring in all of their medications in a bag. These brown bag sessions can serve as opportunities to promote better patient/provider and patient/pharmacist communication, identify and solve compliance problems, and spot duplicate, outdated and poorly stored medications.[16] This simple task also fulfills an important objective of *Healthy People 2010*, a national initiative to improve the health of Americans, which calls for regular medication reviews in older patients.[17]

3. *Advocating for computerized physician order entry (CPOE) systems*
   A CPOE system is an application in which physicians write prescription orders online and immediately receive feedback about clinically important information that may impact their prescribing decisions. This nascent system provides many benefits when compared to paper-based systems. The use of a CPOE system ensures that all orders include a dose, route, and frequency; are legible; and can be linked back to the prescribing physician. In addition, a CPOE system guarantees that the order can be checked for allergies, drug interactions, high doses, drug-laboratory problems, and whether a certain dose is suitable for a patient's liver and kidney functioning.[18]

   There is growing evidence that a CPOE system is an effective intervention for reducing medication errors in acute care facilities. Research has shown that CPOE systems decrease length of stay, repeat tests, and turn-around times for laboratory, pharmacy, and radiology requests, as well as showing a cost-savings benefit. One study conducted at a large tertiary care hospital found that the use of a CPOE system reduced serious medication errors by 55%, indicating that these systems have substantial potential to positively impact patient safety.[19]

   In conclusion, there are very compelling reasons that support making the improvement of the quality of prescribing for the elderly a priority in the US health policy agenda. Seniors often are faced with multiple chronic conditions and consume large quantities of medications, while changes in their physiologic functioning may put them at increased risk for experiencing adverse events. However, various clinical, economic, and political factors contribute to

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Take-Away Message

- 17% of all hospital admissions by elderly patients are the result of adverse drug events.
- Dr. Mark Beers and colleagues published an explicit list of criteria in 1991 for defining and identifying medications and classes of medications that should be avoided in the elderly.

ROI

Utilizing several strategies will result in reduced adverse drug events in the elderly:

- Use of the Internet and personal digital assistants (PDAs);
- Strengthening of relations with pharmacists; and
- Advocating for computerized physician order entry (CPOE) systems.

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the complexity of prescribing appropriate medications for the elderly. Without increasing implementation of the measures and tools that have been shown to be effective, the health of a vulnerable segment of our country's population remains in jeopardy. Every effort should be made to support providers as we move to create safer prescribing environments. MPM

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