

## REVIEW

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# Medication management in older adults

## ABSTRACT

Managing medications is a major part of providing care to older adults. Polypharmacy is common in the elderly and is fraught with risks. A careful and systematic approach is needed for managing drug therapy in these patients, recognizing the patient's specific goals.

## KEY POINTS

Statins, anticholinergics, benzodiazepines, antipsychotics, and proton pump inhibitors are widely prescribed.

In older patients, a periodic comprehensive medication review is needed to reevaluate the risks and the benefits of current medications in light of goals of care, life expectancy, and the patient's preferences.

The Beers criteria and the Screening Tool of Older Persons' Potentially Inappropriate Prescriptions provide valuable guidance for safe prescribing in older adults.

**M**EDICATIONS STARTED FOR appropriate indications in middle age may need to be monitored more closely as the patient ages. Some drugs may become unnecessary or even dangerous as the patient ages, functional status and renal function decline, and goals of care change.

*See related editorial, page 136*

Older adults tend to have multiple illnesses and therefore take more drugs, and polypharmacy increases the risk of poor outcomes. The number of medications a person uses is a risk factor for adverse drug reactions, nonadherence, financial burden, drug-drug interactions, and worse outcomes.<sup>1</sup>

The prevalence of polypharmacy increased from an estimated 8.2% to 15% from 1999 to 2011 based on the National Health and Nutrition Examination Survey.<sup>2</sup> Guideline-based therapy for specific diseases may lead to the addition of more medications to reach disease targets.<sup>3</sup> Most older adults in the United States compound the risk of prescribed medications by also taking over-the-counter medications and dietary supplements.<sup>4</sup>

In addition, medications are often used in older adults based on studies of younger persons without significant comorbidities. Applying clinical guidelines based on these studies to older adults with comorbidity and functional impairment is challenging.<sup>5</sup> Age-related pharmacokinetic and pharmacodynamic changes increase the risk of adverse drug reactions.<sup>6</sup>

In this article, we review commonly used medications that are potentially inappropriate based on clinical practice. We also review tools to evaluate appropriate drug therapy in older adults.

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**TABLE 1**

**Drugs with strong anticholinergic properties**

Class	Examples
<b>Antihistamines</b>	Diphenhydramine, hydroxyzine, meclizine
<b>Antiparkinsonian agents</b>	Benzotropine
<b>Skeletal muscle relaxants</b>	Cyclobenzaprine, methocarbamol
<b>Antidepressants</b>	Amitriptyline, imipramine, nortriptyline, paroxetine
<b>Antipsychotics</b>	Olanzapine
<b>Antiarrhythmics</b>	Disopyramide
<b>Antimuscarinics</b> (for urinary incontinence)	Oxybutynin, tolterodine, trospium
<b>Antiemetics</b>	Prochlorperazine, promethazine
<b>Antispasmodics</b>	Hyoscyamine, scopolamine

**DRUGS THAT ARE COMMONLY USED, BUT POTENTIALLY INAPPROPRIATE**

**Statins**

Statins are effective when used as *secondary* prevention in older adults,<sup>7</sup> but their efficacy when used as *primary* prevention of atherosclerotic cardiovascular disease in people age 75 and older is questionable.<sup>8</sup> Nevertheless, they are widely used for this purpose. For example, before the 2013 joint guidelines of the American College of Cardiology and the American Heart Association (ACC/AHA) were released, 22% of patients age 80 and older in the Geisinger health system were taking a statin for primary prevention.<sup>9</sup>

The 2013 ACC/AHA guidelines included a limited recommendation for statins for primary prevention of atherosclerotic cardiovascular disease in adults age 75 and older.<sup>10</sup> The guideline noted, however, that few data were available to support this recommendation.<sup>10</sup>

In a systematic review of 18 randomized clinical trials of statins for primary prevention of atherosclerotic cardiovascular disease, the mean age was 57, yet conclusions were extrapolated to an older patient population.<sup>11</sup> The estimated 10-year risk of atherosclerotic cardiovascular disease based on pooled cohort risk equations of adults age 75 and older always exceeds the 7.5% treatment threshold recommended by the guidelines.<sup>8</sup>

Myopathy is a common adverse effect of statins. In addition, statins interact with other

drugs that inhibit the cytochrome P450 3A4 isoenzyme, such as amlodipine, amiodarone, and diltiazem.<sup>8,12</sup> If statin therapy caused no functional limitation due to muscle pain or weakness, statins for primary prevention would be cost-effective, but even a small increase in adverse effects in an elderly patient can offset the cardiovascular benefit.<sup>13</sup> A recent post hoc secondary analysis found no benefit of pravastatin for primary prevention in adults age 75 and older.<sup>14</sup>

Thus, statin treatment for primary prevention in older patients should be individualized, based on life expectancy, function, and cardiovascular risk. Statin therapy does not replace modification of other risk factors.

**Anticholinergics**

Drugs with anticholinergic properties are commonly prescribed in the elderly for conditions such as muscle spasm, overactive bladder, psychiatric disorders, insomnia, extrapyramidal symptoms, vertigo, pruritus, peptic ulcer disease, seasonal allergies, and even the common cold,<sup>15</sup> and many of the drugs often prescribed have strong anticholinergic properties (Table 1). Taking multiple medications with anticholinergic properties results in a high “anticholinergic burden,” which is associated with falls, impulsive behavior, poor physical performance, loss of independence, dementia, delirium, and brain atrophy.<sup>15–18</sup>

The 2014 American College of Physicians guideline on nonsurgical management of uri-

**With statins, even a small increase in adverse effects in an elderly patient can offset cardiovascular benefit**

TABLE 2

**The 2015 Beers criteria: Selected drugs to avoid in older adults**

Drug class (example)	Recommendation	Rationale	Quality of evidence	Strength of recommendation
<b>First-generation antihistamines</b> (diphenhydramine)	Avoid	Highly anticholinergic	Moderate	Strong
<b>Antiparkinsonian agents</b> (benztropine)	Avoid	Not recommended for prevention of extrapyramidal symptoms with antipsychotics; more-effective agents available for treatment of Parkinson disease	Moderate	Strong
<b>Antispasmodics</b> (hyoscyamine)	Avoid	Highly anticholinergic	Moderate	Strong
<b>Antidepressants</b> (amitriptyline)	Avoid	Highly anticholinergic	High	Strong
<b>Antipsychotics</b> (conventional or atypical)	Avoid except for schizophrenia, bipolar disorder, or short-term use as antiemetic during chemotherapy	Increased risk of stroke and death in persons with dementia	Moderate	Strong
<b>Skeletal muscle relaxants</b> (methocarbamol)	Avoid	Most muscle relaxants are poorly tolerated by older adults	Moderate	Strong
<b>Benzodiazepine</b> (lorazepam)	Avoid	All benzodiazepines increase risk of cognitive impairment, delirium, falls, fractures, and motor vehicle crashes in older adults	Moderate	Strong
<b>Nonbenzodiazepine and benzodiazepine hypnotics</b> (zolpidem)	Avoid	Adverse events similar to those of benzodiazepines in older adults	Moderate	Strong
<b>Proton pump inhibitors</b>	Avoid using for > 8 weeks unless for high-risk patients	Risk of <i>Clostridium difficile</i> infection, bone loss, and fractures	High	Strong

Based on information in reference 58.

nary incontinence in women recommends pharmacologic treatment for urgency and stress urinary incontinence after failure of nonpharmacologic therapy,<sup>19</sup> and many drugs for these urinary symptoms have anticholinergic properties. If an anticholinergic is necessary, an agent that results in a lower anticholinergic burden should be considered in older patients.

A pharmacist-initiated medication review and intervention may be another way to adjust medications to reduce the patient's anticholinergic burden.<sup>20,21</sup> The common use of anticholinergic drugs in older adults reminds us to monitor their use closely.<sup>22</sup>

**Benzodiazepines and nonbenzodiazepines**

Benzodiazepines are among the most commonly prescribed psychotropics in developed countries and are prescribed mainly by primary care physicians rather than psychiatrists.<sup>23</sup>

In 2008, 5.2% of US adults ages 18 to 80 used a benzodiazepine, and long-term use was more prevalent in older patients (ages 65–80).<sup>23</sup>

Benzodiazepines are prescribed for anxiety,<sup>24</sup> insomnia,<sup>25</sup> and agitation. They can cause withdrawal<sup>26</sup> and have potential for abuse.<sup>27</sup> Benzodiazepines are associated with cognitive decline,<sup>28</sup> impaired driving,<sup>29</sup> falls,<sup>30</sup> and hip fractures<sup>31</sup> in older adults.

TABLE 3

**The Screening Tool of Older Persons' Potentially Inappropriate Prescriptions (STOPP): Selected warnings and recommendations**

<b>Tricyclic antidepressants</b>	Avoid use with dementia, narrow-angle glaucoma, cardiac conduction abnormality, prostatism, or history of urinary retention because of risk of worsening these conditions
<b>Benzodiazepines</b>	No indication for treatment beyond 4 weeks Risk of prolonged sedation, confusion, impaired balance, falls, traffic accidents Withdraw gradually if taken for > 2 weeks because of risk of withdrawal syndrome
<b>Proton pump inhibitors</b>	For uncomplicated peptic ulcer disease or erosive peptic esophagitis, discontinue full therapeutic dosage before 8 weeks, or reduce dosage
<b>Hypnotic "z" drugs</b> (eg, zopiclone, zolpidem, zaleplon)	May cause protracted daytime sedation, ataxia
<b>Antimuscarinic drugs</b>	For overactive bladder with concurrent dementia or chronic cognitive impairment, there is risk of increased confusion, agitation For narrow-angle glaucoma, there is risk of acute exacerbation of glaucoma For chronic prostatism, there is risk of urinary retention

Based on information in references 60 and 61.

**Nondrug therapies for reflux such as weight loss and elevation of the head of the bed may improve symptoms**

In addition, use of nonbenzodiazepine hypnotics (eg, zolpidem) is on the rise,<sup>32</sup> and these drugs are known to increase the risk of hip fracture in nursing home residents.<sup>33</sup>

The American Geriatrics Society, through the American Board of Internal Medicine's Choosing Wisely campaign, recommends avoiding benzodiazepines as a first-line treatment for insomnia, agitation, or delirium in older adults.<sup>34</sup> Yet prescribing practices with these drugs in primary care settings conflict with guidelines, partly due to lack of training in constructive strategies regarding appropriate use of benzodiazepines.<sup>35</sup> Educating patients on the risks and benefits of benzodiazepine treatment, especially long-term use, has been shown to reduce the rate of benzodiazepine-associated secondary events.<sup>36</sup>

**Antipsychotics**

Off-label use of antipsychotics is common and is increasing in the United States. In 2008, off-label use of antipsychotic drugs accounted for an estimated \$6 billion.<sup>37</sup> A common off-label use is to manage behavioral symptoms of dementia, despite a black-box warning about

an increased risk of death in patients with dementia who are treated with antipsychotics.<sup>38,39</sup> The Choosing Wisely campaign recommends against prescribing antipsychotics as a first-line treatment of behavioral and psychological symptoms of dementia.<sup>34</sup>

Antipsychotic drugs are associated with risk of acute kidney injury,<sup>40</sup> as well as increased risk of falls and fractures (eg, a 52% higher risk of a serious fall, and a 50% higher risk of a nonvertebral osteoporotic fracture).<sup>41</sup>

Patients with dementia often exhibit aggression, resistance to care, and other challenging or disruptive behaviors. In such instances, antipsychotic drugs are often prescribed, but they provide limited and inconsistent benefits, while causing oversedation and worsening of cognitive function and increasing the likelihood of falling, stroke, and death.<sup>38,39,41</sup>

Because pharmacologic treatments for dementia are only modestly effective, have notable risks, and do not treat some of the behaviors that family members and caregivers find most distressing, nonpharmacologic

measures are recommended as first-line treatment.<sup>42</sup> These include caregiver education and support, training in problem-solving, and targeted therapy directed at the underlying causes of specific behaviors (eg, implementing nighttime routines to address sleep disturbances).<sup>42</sup> Nonpharmacologic management of behavioral symptoms in dementia can significantly improve quality of life for patients and caregivers.<sup>42</sup> Use of antipsychotic drugs in patients with dementia should be limited to cases in which nonpharmacologic measures have failed and patients pose an imminent threat to themselves or others.<sup>43</sup>

### Proton pump inhibitors

Proton pump inhibitors are among the most commonly prescribed medications in the United States, and their use has increased significantly over the decade. It has been estimated that between 25% and 70% of these prescriptions have no appropriate indication.<sup>44</sup>

There is considerable excess use of acid suppressants in both inpatient and outpatient settings.<sup>45,46</sup> In one study, at discharge from an internal medicine service, almost half of patients were taking a proton pump inhibitor.<sup>47</sup>

Evidence-based guidelines recommend these drugs to treat gastroesophageal reflux disease, nonerosive reflux disease, erosive esophagitis, dyspepsia, and peptic ulcer disease. However, long-term use (ie, beyond 8 weeks) is recommended only for patients with erosive esophagitis, Barrett esophagus, a pathologic hypersecretory condition, or a demonstrated need for maintenance treatment for reflux disease.<sup>48</sup>

Although proton pump inhibitors are highly effective and have low toxicity, there are reports of an association with *Clostridium difficile* infection,<sup>49</sup> community-acquired pneumonia,<sup>50</sup> hip fracture,<sup>51</sup> vitamin B<sub>12</sub> deficiency,<sup>52</sup> atrophic gastritis,<sup>53</sup> kidney disease,<sup>54</sup> and dementia.<sup>55</sup>

Nondrug therapies such as weight loss and elevation of the head of the bed may improve esophageal pH levels and reflux symptoms.<sup>56</sup>

Deprescribing.org has practical advice for healthcare providers, patients, and caregivers on how to discontinue proton pump inhibitors, including videos, algorithms, and guidelines.

## TOOLS TO EVALUATE APPROPRIATE DRUG THERAPY

### Beers criteria

The Beers criteria (Table 2), developed in 1991 by a geriatrician as an approach to safer, more effective drug therapy in frail elderly nursing home patients,<sup>57</sup> were updated by the American Geriatrics Society in 2015 for use in any clinical setting.<sup>58</sup> (The criteria are also available as a smartphone application through the American Geriatrics Society at [www.americangeriatrics.org](http://www.americangeriatrics.org).)

The Beers criteria offer evidence-based recommendations on drugs to avoid in the elderly, along with the rationale for use, the quality of evidence behind the recommendation, and the graded strength of the recommendation. The Beers criteria should be viewed through the lens of clinical judgment to offer safer nonpharmacologic and pharmacologic treatments.

The Joint Commission recommends medication reconciliation at every transition of care.<sup>59</sup> The Beers criteria are a good starting point for a comprehensive medication review.

### STOPP/START criteria

Another tool to aid safe prescribing in older adults is the Screening Tool of Older Persons' Potentially Inappropriate Prescriptions (STOPP), used in conjunction with the Screening Tool to Alert Doctors to Right Treatment (START). The STOPP/START criteria<sup>60,61</sup> are based on an up-to-date literature review and consensus (Table 3).

## THE BOTTOM LINE

Physicians caring for older adults need to diligently weigh the benefits of drug therapy and consider the patient's care goals, current level of functioning, life expectancy, values, and preferences. Statin therapy for primary prevention, anticholinergics, benzodiazepines, antipsychotics, and proton pump inhibitors are widely used without proper indications, pointing to the need for a periodic comprehensive review of medications to reevaluate the risks vs the benefits of the patient's medications. The Beers criteria and the STOPP/START criteria can be useful tools for this purpose.

**For older patients, the Joint Commission recommends medication reconciliation at every transition of care**



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