The prevalence of sleep complaints and sleep disorders grows steadily with advancing age. It is estimated that as many as 57% of older adults complain of significant sleep disruption, 29% experience insomnia, and 19% complain of early-morning awakening (Bloom et al., 2009). Unlike younger patients who tend to experience difficulty falling asleep, the most common complaint from older adults is the inability to stay asleep (American Psychiatric Association [APA], 2000).

The human sleep cycle is composed of five main phases, which are repeated throughout the night. The first four stages are referred to as nonrapid eye move-

**ABSTRACT**

Insomnia and sleep complaints are common among older adults. Although once considered safer than benzodiazepine drugs, recent data on non-benzodiazepine drugs, such as zolpidem (Ambien®), have revealed similar negative effects. This issue, as well as others, has been included in the recent updated 2012 American Geriatrics Society Beers Criteria. This article describes the risks and benefits associated with sedative hypnotic agents in older adults and discusses the conundrum facing practitioners as well as patients.

Nicole J. Brandt, PharmD, CGP, BCPP, FASCP; and Jennifer M. Piechocki, BS
ment sleep, whereas the last is called rapid eye movement sleep. As a person ages, less time is spent in stages 3 and 4, which are associated with deep, restorative sleep (APA, 2000; McCall, 2005). Complicating the normal physiological aspects of aging that affect sleep are coexisting medications and medical conditions. This leads to the clinical conundrum of how to safely and effectively manage insomnia in older adults. This article provides an overview of current guidelines and treatment recommendations for older adults with a focus on the clinical challenge of safely managing this population.

**DIAGNOSIS OF INSOMNIA**

Insomnia is characterized by difficulty falling asleep or maintaining sleep for a period of at least 1 month in addition to significant impairment due to sleep deprivation. Primary insomnia occurs for an unknown reason, whereas secondary insomnia can be due to a mental disorder, substance use (including decongestants and corticosteroids), or general medical conditions. Identifying and treating the coexisting problems may be enough to resolve a patient’s insomnia without placing him or her at risk for additional medications, such as sedative hypnotics. However, it is important to note that significant sleep disorders are associated with decreased quality of life as well as negative impact on morbidity and mortality (Crowley, 2011).

**UPDATES TO THE BEERS CRITERIA WITH REGARDS TO SEDATIVE HYPNOTIC AGENTS**

The American Geriatrics Society (AGS, 2012) recently convened a panel of 11 experts to update the Beers Criteria, a clinical tool to optimize prescribing medications in older adults. This update involved a rigorous method for using a systematic review of the literature and grading of the evidence as recommended by the Institute of Medicine. The inclusion of all benzodiazepine drugs, short- and long-acting, to be avoided in all patients older than 65 for insomnia was rated with a “high” strength of recommendation and “strong” quality of evidence. Another recommendation was to avoid chronic use (> 90 days) of non-benzodiazepine hypnotic agents in older adults due to emerging safety concerns. This general guideline comes from the package labeling of these agents in an attempt to provide a class overview and restriction to use. The presence of benzodiazepine drugs, and now non-benzodiazepine hypnotic agents, on the Beers Criteria creates a new challenge to the management of insomnia in older adults.

**CURRENT RECOMMENDATIONS**

The 2008 Clinical Guideline for the Evaluation and Management of Chronic Insomnia in Adults is not specific for individuals older than 65; however, the recommendations may be applied to this population (Schutte-Rodin, Broch, Buysse, Dorsey, & Sateia, 2008). Psychological and behavioral interventions, such as stimulus control, relaxation training, and cognitive behavior therapy, are recommended first. If treatment failure occurs, a trial of benzodiazepine drugs or non-benzodiazepine hypnotic agents may be warranted. The AGS published similar recommendations including stimulus control, sleep restriction, and cognitive therapy as first-line agents (Bloom et al., 2009). In general, stimulus control refers to the limitation of activity prior to sleep. Examples include reserving the bed for sex and sleep and avoiding television in the bedroom (Morin et al., 2004). A simple way to remember behavioral interventions are the four Rs:

1. **Regularize** sleep wake patterns: Avoid daytime napping and restrict time in bed, as well as arise at a consistent time.
2. **Ritualize** cues for sleeping: Lie down when sleepy in a quiet, dark environment and if not asleep within 20 minutes, get up.
3. **Relaxation** techniques: Assume a comfortable posture, clear the mind, and use biofeedback or deep relaxation.
4. **Resist** sleep interferences: Avoid heavy meals and exercise (2 to 3 hours before bedtime) as well as tobacco, alcohol, or caffeine.

These nonpharmacological interventions can help minimize the use of pharmacological interventions and have been shown to have a lasting impact.

**OVERVIEW OF PHARMACOLOGICAL AGENTS INDICATED FOR TREATMENT OF INSOMNIA**

Although guidelines recommend initiating nonpharmacological interventions, various medications are often prescribed to address insomnia experienced by older adults. Currently, various pharmacological classes and agents are approved by the U.S. Food and Drug Administration (FDA); however, others are used “off label” for the treatment of insomnia in adults. This article highlights commonly used medications for insomnia and provides recommendations as well as evidence supporting the risk and benefits of these various treatment approaches. The Table summarizes preferred agents if treatments are clinically warranted based on the data available.

**BENZODIAZEPINE DRUGS**

Effectiveness of Benzodiazepine Drugs

To examine the effectiveness of sedative hypnotic agents in the management of insomnia, Glass, Lanktöt, Hermann, Sproule, and Busto (2005) conducted a meta-analysis involving participants older than 60. Examining eight trials comparing benzodiazepine drugs to placebo, the results indicate an improvement in total sleep time by an average of
Although this increase was considered to be statistically significant, its clinical significance is questionable. This study also found that the number needed to treat to show effect was 13 whereas the number needed to show harm was 6 (i.e., only 1 in 13 people who took benzodiazepine drugs benefited from them, whereas 1 in 6 experienced some type of adverse event) (Glass et al., 2005).

### Safety Concerns Surrounding the Use of Benzodiazepine Drugs

Due to increased sensitivity and decreased metabolism of benzodiazepine drugs, older adults are at higher risk of experiencing prolonged effects of these agents (Glass et al., 2005). In general, increased exposure to benzodiazepine drugs has been associated with numerous adverse drug events such as impaired postural stability, fractures, and cognitive impairment (Billioti de Gage et al., 2012). A published systematic review found that lorazepam (Ativan®), nitrazepam, and temazepam (Restoril®) created an increased risk of postural instability, falls, and hip fractures among users (Allain, Bentué-Ferrer, Polard, Akwa, & Patatat, 2005). Although sedative hypnotic agents promote sleep, many older adults experience nighttime awakenings due to urinary incontinence and are at higher risk of falling during the night. Benzodiazepine drugs have also been associated with a higher risk of fractures in patients older than 65 (Pike et al., 2011). One study in particular found that the relative risk of a patient experiencing a non-vertebral fracture 90 days after being prescribed zolpidem (Ambien®), alprazolam (Xanax®), lorazepam, or diazepam (Valium®), compared to his or her risk 1 to 3 years before obtaining the prescription, was 2.55 for zolpidem, 1.14 for alprazolam, 1.51 for lorazepam, and 1.97 for diazepam.

### Table: Preferred Agents for the Treatment of Insomnia Following Nonpharmacological Intervention Failure

<table>
<thead>
<tr>
<th>Drug</th>
<th>Indication</th>
<th>Recommended Treatment Dose for Older Adults</th>
<th>Administration Recommendations</th>
</tr>
</thead>
</table>
| **Benzodiazepine** | Treatment of insomnia due to anxiety or transient situational stress | 1 to 2 mg as a single dose (some patients may require more) | • Administered at bedtime as a single dose.  
• Preferred benzodiazepine (if absolutely necessary) in older adults due to its shorter half-life.  
• Always avoid benzodiazepines when possible. |
| Lorazepam (Ativan®) | | | |
| Zolpidem (Ambien®) | Short-term treatment of insomnia characterized by difficulties with sleep initiation | 5 mg | • Avoid chronic use (efficacy established for up to 35 days in healthy adults).  
• Administer immediately before bedtime and only when the patient is able to stay in bed for 7 to 8 hours.  
• Do not administer with or immediately after a meal.  
• Must be dose-adjusted for hepatic impairment. |
| Zolpidem CR (Ambien®) | Treatment of insomnia characterized by difficulties with sleep onset and/or sleep maintenance | 6.25 mg | • Avoid chronic use (efficacy established for up to 3 weeks in healthy adults).  
• Tablets are to be swallowed whole.  
• Do not administer with or immediately after a meal due to decreased onset of action.  
• Must be dose-adjusted for hepatic impairment. |

**TABLE PREFERRED AGENTS FOR THE TREATMENT OF INSOMNIA FOLLOWING NONPHARMACOLOGICAL INTERVENTION FAILURE**
<table>
<thead>
<tr>
<th>Drug</th>
<th>Indication</th>
<th>Recommended Treatment Dose for Older Adults</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Eszopiclone (Lunesta®)</td>
<td>Treatment of insomnia</td>
<td>1 mg for patients who have difficulty falling asleep&lt;br&gt;2 mg for patients who have difficulty maintaining sleep</td>
<td>• Avoid chronic use (efficacy established for up to 6 months in clinical studies).&lt;br&gt;• Administer immediately before bedtime.&lt;br&gt;• Do not administer with or immediately after a meal due to decreased onset of action.&lt;br&gt;• Tablets are to be swallowed whole.&lt;br&gt;• Avoid in older patients with severe hepatic impairment.</td>
</tr>
<tr>
<td>Zaleplon (Sonata®)</td>
<td>Short-term (up to 30 days) treatment of insomnia</td>
<td>5 mg</td>
<td>• For short-term use only (efficacy established for up to 35 days in healthy adults).&lt;br&gt;• Administer immediately before bedtime or after going to bed and then experiencing difficulty falling asleep again.&lt;br&gt;• Avoid taking with or immediately after a high-fat meal due to decreased absorption.&lt;br&gt;• Has only been found to decrease the time to sleep onset (not increase total sleep time or decrease nighttime awakenings).&lt;br&gt;• Not recommended for patients with severe hepatic impairment.</td>
</tr>
<tr>
<td>Melatonin-Receptor Agonist Agent</td>
<td>Treatment of insomnia characterized by difficulty with sleep onset (efficacy established for up to 6 months in clinical studies)</td>
<td>8 mg</td>
<td>• Avoid chronic use.&lt;br&gt;• Administer within 30 minutes of going to bed.&lt;br&gt;• Avoid taking with or immediately after a high-fat meal due to decreased absorption.&lt;br&gt;• Not recommended with severe hepatic impairment.</td>
</tr>
</tbody>
</table>


**TABLE (CONTINUED)**

**PREFERRED AGENTS FOR THE TREATMENT OF INSOMNIA FOLLOWING NONPHARMACOLOGICAL INTERVENTION FAILURE**

**NON-BENZODIAZEPINE HYPNOTIC AGENTS**

**Effectiveness of Non-Benzodiazepine Receptor Agonists (NBRAs) Hypnotic Agents**

Numerous studies have found that NBRAs, namely eszopiclone (Lunesta®), zolpidem, and zaleplon (Sonata®), to be as effective as traditional benzodiazepine hypnotics in older adults. However, there are varying degrees of improvement in sleep latency, sleep quality, and sleep time among the various agents. Dolder et al. (2007) showed that although NBRAs, such as eszopiclone, zolpidem, and zaleplon, were not included in previous versions of the Beers Criteria, data from a review of current literature prompted the AGS to recommend limiting their use in older adults (Huang et al., 2011; Kang et al., 2012). Data from a French national database examining the association between sedative hypnotic agents and the risk of injury-related traffic accidents found that all older drivers who used zolpidem had a significantly higher risk of causing a traffic accident than those not taking the medication (Orriols et al., 2011; odds ratio = 1.29, 95% confidence interval [1.09, 1.52]). Although this study did not focus entirely on older adults, the results are alarming, as the effects of sedative hypnotic agents tend to be stronger in older patients. As with benzodiazepine drugs, older adults who administered zolpidem at night experienced a higher epidemic at night compared to benzodiazepine drugs. Although NBRAs, such as eszopiclone, zolpidem, and zaleplon, were not included in previous versions of the Beers Criteria, data from a review of current literature prompted the AGS to recommend limiting their use in older adults (Huang et al., 2011; Kang et al., 2012). Data from a French national database examining the association between sedative hypnotic agents and the risk of injury-related traffic accidents found that all older drivers who used zolpidem had a significantly higher risk of causing a traffic accident than those not taking the medication (Orriols et al., 2011; odds ratio = 1.29, 95% confidence interval [1.09, 1.52]). Although this study did not focus entirely on older adults, the results are alarming, as the effects of sedative hypnotic agents tend to be stronger in older patients. As with benzodiazepine drugs, older adults who administered zolpidem at night experienced a higher epidemic at night compared to benzodiazepine drugs.
risk of impaired walking stability compared to placebo (Frey, Ortega, Wiseman, Farley, & Wright, 2011). This finding is important, as nighttime awakenings tend to be relatively common in older adults and impaired balance is a strong predictor of falls.

### ALTERNATIVE AGENTS

#### Melatonin

Melatonin is an endogenous substance that signals darkness in the body and promotes sleep (Lemoine, Garfinkel, Nir, & Zisapel, 2011). As a person ages, production declines and thus supplementation may be helpful in initiating sleep. Lemoine et al. (2011) conducted a study on the efficacy, safety, and withdrawal symptoms associated with 2 mg prolonged-release melatonin in 208 adults ages 18 to 80. After stratifying the data by age, the percentage of nights per week that patients 55 and older recorded their sleep as “good” or “very good” increased from 23% at baseline to 52% at Week 13 and 50% at Week 23. Unfortunately, 2 weeks after stopping the medication, the percentage of nights scored as “good” or “very good” decreased, thereby indicating that sustained effects require continued pharmacological treatment (Lemoine et al., 2011).

#### Ramelteon

Ramelteon (Rozerem®) is approved for the treatment of insomnia. A 6-month, double-blind, placebo-controlled trial conducted in adults between the ages of 18 and 79 evaluated ramelteon 8 mg and found that, compared with placebo, ramelteon resulted in statistically significant reductions in self-reported sleep latency following 1 week of therapy, as well as at 1 and 5 months. The study also found no statistically significant difference between ramelteon and placebo in terms of morning level of alertness and ability to concentrate (Mayer et al., 2009).

Additional support on the safety of ramelteon in older adults was found in a double-blind, randomized, crossover study involving ramelteon 8 mg, zolpidem 10 mg, and placebo. After wakening, participants were asked to perform various memory recall tests and postural stability evaluations. Results indicated that ramelteon did not impair balance, mobility, or memory and was well tolerated (Zammit et al., 2007). Although more comparative trials are needed to evaluate the efficacy of ramelteon in older adults, this medication appears to have a role in the management of insomnia in those requiring pharmacological treatment.

#### Diphenhydramine

Diphenhydramine (Benadryl®) is a first-generation antihistamine with a wide variety of uses. Although it is listed on the Beers Criteria as a medication to avoid in all adults older than 65, it is readily accessible in many over-the-counter agents and commonly used among older adults without the oversight of the health care team (Basu, Dodge, Stoehr, & Ganguli, 2003).

Concerns surrounding the use of this agent in older adults revolve around its strong anticholinergic properties. Older adults are particularly vulnerable to side effects due to decreased clearance and accumulation as well as existing comorbidities. Strong anticholinergic agents, particularly diphenhydramine, have numerous negative effects on cognition and function, which are addressed within the Beers Criteria (Agostini, Leo-Summers, & Inouye, 2001).

#### Antipsychotic Agents

Although there is no FDA-approved indication for use, antipsychotic agents are now being prescribed for the treatment of insomnia. According to the 2011 Agency for Healthcare Research and Quality Comparative Effectiveness Review of off-label uses of atypical antipsychotic agents (Maglione et al., 2011), the strength of the evidence in support of the use of atypical antipsychotic agents for the treatment of insomnia is low, and the only study conducted on the use of quetiapine (Seroquel®) for insomnia found it to be no different than placebo (Tassniyom, Paholpak, Tassniyom, & Kiewyoo, 2010).

In addition to a lack of efficacy data, the use of these agents is also discouraged due to potential side effects such as weight gain, extrapyramidal symptoms, and akathisia (Maher & Theodore, 2012). These agents should especially be avoided in patients with dementia due to their association with an increased risk of death in this population.

#### Antidepressant Agents

Although not indicated for the treatment of insomnia by the FDA, mirtazapine (Remeron®) and trazodone (Oleptro®) are often prescribed for this purpose. Unfortunately, many antidepressant agents, especially trazodone, have been associated with numerous adverse effects including orthostatic hypotension and blurred vision (Darowski, Chambers, & Chambers, 2009). These effects are particularly concerning in older adults due to their increased risk of falls and fractures. In 2010, a retrospective cohort analysis examined the risk of fall,
fracture, sprain/strain, or other injury occurring in adults older than 65 during the first month of using either a long-acting or short-acting benzodiazepine, NBRA, or sedating antidepressant agent (trazodone) compared to a reference drug (ramelteon) (Avidan, Palmer, Doan, & Baran, 2010). In this particular study, it was found that 3 months after initiation of drug therapy, patients prescribed a benzodiazepine, NBRA, or sedating antidepressant agent had significantly higher risk of an accidental event compared to those prescribed ramelteon. Although the rate of accidental events associated with trazodone (0.36%) was less than long-acting benzodiazepine (0.40%), it was almost identical to short-acting benzodiazepine (0.37%) and even higher than that associated with NBRA (0.28%) (Avidan et al., 2010).

**CLINICAL IMPLICATIONS AND LIMITATIONS TO OUR CURRENT APPROACH**

Overall, current evidence suggests that the benefits of sedative hypnotic agents for the treatment of insomnia do not outweigh the risks that they pose to older patients. Adverse effects of both benzodiazepine drugs and NBRA have been demonstrated and clinical prescribing tools, such as the Beers Criteria, have been revised to include these concerns.

Prior to administering any sedative hypnotic agent, a comprehensive assessment should be conducted to evaluate the etiology of the insomnia and advocate for the use of nonpharmacological interventions. If sedative hypnotics are prescribed, nurses need to ensure that older adults are receiving the correct dose at the correct time and are monitored closely for limited benefits as well as the emergence of adverse drug events. If a patient begins to experience adverse effects while taking a sedative hypnotic agent, the offending agent should be discontinued and cognitive behavior therapy initiated (Morin et al., 2004). Although prescribers may attempt to use other agents, such as diphenhydramine and sedating antidepressant agents to avoid sedative hypnotic drugs, current literature demonstrates that these medications may also be problematic with limited effectiveness.

**IMPLICATIONS FOR GERIATRIC NURSES**

As a result of their direct interaction with patients, it is essential that geriatric nurses provide education to both patients and caregivers. Information on good sleep hygiene should be provided whenever discussing insomnia, and the use of over-the-counter diphenhydramine should be discouraged. Patients should be told to avoid caffeine and exercise in the evening and to reserve the bedroom for sleep and sex.

As previously stated, nonpharmacological agents should always be attempted first. If these agents fail and a prescriber decides to initiate medication therapy, it is essential that nurses ensure that the dose the patient is receiving is appropriate and that adverse events, such as decreased cognition, increased falls, or psychomotor decline, do not occur. The Table provides medications that are FDA approved for insomnia in older adults with dosing and administration recommendations.

**REFERENCES**


ABOUT THE AUTHORS

Dr. Brandt is Associate Professor, Geriatric Pharmacotherapy, Pharmacy Practice, and Science, University of Maryland School of Pharmacy, and Director, Clinical and Educational Programs of Peter Lamy Center Drug Therapy and Aging, and Ms.Piechocki is Student Pharmacist, University of Maryland School of Pharmacy, Baltimore, Maryland.

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Address correspondence to Nicole J. Brandt, PharmD, CGP, BCPP, FASCP, Associate Professor, Geriatric Pharmacotherapy, Pharmacy Practice, and Science University of Maryland School of Pharmacy, and Director, Clinical and Educational Programs of Peter Lamy Center Drug Therapy and Aging, 20 North Pine Street N529, Baltimore, MD 21201; e-mail: nbbrandt@rx.umaryland.edu.

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