From THE AMERICAN GERIATRICS SOCIETY

A POCKET GUIDE TO THE 2023 AGS BEERS CRITERIA®

This clinical tool, based on the 2023 AGS Updated Beers Criteria® for Potentially Inappropriate Medication Use in Older Adults (AGS Beers Criteria®), has been developed to assist healthcare providers in improving medication safety in older adults. Our purpose is to inform clinical decision-making concerning the prescribing of medications for older adults in order to improve safety and quality of care.

Originally conceived of in 1991 by the late Mark Beers, MD, a geriatrician, the Beers Criteria catalogues medications that cause side effects in the elderly due to the physiologic changes of aging. The 2023 American Geriatrics Society (AGS) Beers Criteria® (AGS Beers Criteria®) for Potentially Inappropriate Medication (PIM) Use in Older Adults is the seventh overall update and fourth since AGS became the criteria's steward in 2011. As with previous updates, the AGS and its expert panel have attempted to preserve the spirit and intent of the original Beers Criteria by providing an explicit list of PIMs that are best avoided by older adults in most circumstances or under specific situations, such as certain diseases, conditions, or care settings.

The full document, along with accompanying resources and an appendix of medications removed from the criteria tables, can be found in its entirety online at geriatricscareonline.org.

INTENDED USE

The criteria are intended to be applied to adults 65 years old and older in all ambulatory, acute, and institutionalized settings of care, except hospice and end-of-life care settings.

The intention of the AGS Beers Criteria® is to: (1) reduce older adults' exposure to Potentially Inappropriate Medications (PIMs) by improving medication selection; (2) educate clinicians and patients; and (3) serve as a tool for evaluating quality of care, cost, and patterns of drug use in older adults.

- This should be viewed as a guideline for identifying medications for which the risks of use in older adults often outweigh the benefits.
- The criteria are a blunt instrument, and we are unable to delineate all specialized use cases and possible exceptions to the criteria.
- This list is not meant to supersede clinical judgment or an individual patient's values and needs.
- Prescribing for older adults is often a complex endeavor involving the consideration of many factors, particularly the preferences and goals of the patient and family.
- These criteria are not meant to be applied in a punitive manner.
- These criteria also underscore the importance of using a team approach to prescribing and the use of non-pharmacological approaches and of having economic and organizational incentives for this type of model.
- The criteria are not applicable in all circumstances (i.e., patients receiving palliative and hospice care). If a provider is not able to find an alternative and chooses to continue to use a drug on this list in an individual patient, designation of the medication as potentially inappropriate can serve as a reminder for close monitoring and periodic review.

The primary target audience is the practicing clinician. Although the AGS Beers Criteria® may be used internationally, it is specifically designed for use in the United States and there may be additional considerations for certain drugs in specific countries.

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Geriatrics Health Professionals.
Leading change. Improving care for older adults.

TABLE 1. 2023 American Geriatrics Society Beers Criteria® for Potentially Inappropriate Medication Use in Older Adults

Organ System, Therapeutic Category, Drug(s)[a]	***Recommendation,*** Rationale, *Quality of Evidence* (*QE*[b]), *Strength of Recommendation* (*SR*[b])
Antihistamines	
First-generation antihistamines ■ Brompheniramine ■ Chlorpheniramine ■ Cyproheptadine ■ Dimenhydrinate ■ Diphenhydramine (oral) ■ Doxylamine ■ Hydroxyzine ■ Meclizine ■ Promethazine ■ Triprolidine	***Avoid*** Highly anticholinergic; clearance reduced with advanced age, and tolerance develops when used as hypnotic; risk of confusion, dry mouth, constipation, and other anticholinergic effects or toxicity. Cumulative exposure to anticholinergic drugs is associated with increased risk of falls, delirium, and dementia, even in younger adults. Consider total anticholinergic burden during regular medication reviews and be cautious in "young-old" as well as "old-old" adults. Use of diphenhydramine in situations such as acute treatment of severe allergic reaction may be appropriate. *QE = Moderate; SR = Strong*
Anti-infective	
Nitrofurantoin	***Avoid in individuals with CrCl <30 mL/min or for long-term suppression.*** Potential for pulmonary toxicity, hepatoxicity, and peripheral neuropathy, especially with long-term use; safer alternatives available. *QE = Low; SR = Strong*
Cardiovascular and antithrombotics	
Aspirin for primary prevention of cardiovascular disease	***Avoid initiating aspirin for primary prevention of cardiovascular disease. Consider deprescribing aspirin in older adults already taking it for primary prevention.*** Risk of major bleeding from aspirin increases markedly in older age. Studies suggest lack of net benefit and potential for net harm when initiated for primary prevention in older adults. There is less evidence about stopping aspirin among long-term users, although similar principles as for initiation may apply. *Note:* Aspirin is generally indicated for secondary prevention in older adults with established cardiovascular disease. *QE = High; SR = Strong*

[a]Under each drug class, drugs commonly used in the United States are listed except in cases where doing so is infeasible due to space considerations. Unless stated otherwise, all drugs within a stated drug class are considered potentially inappropriate in the context of the criterion in which they appear, even if not listed in this table.

[b]Quality of evidence and strength of recommendation ratings apply to all drugs and recommendations within each criterion unless stated otherwise.

[c]When selecting among DOACs and choosing a dose, pay special consideration to kidney function (see Table 5), indication, and body weight.

[d]Antipsychotics used in the United States include: First-generation ("typical") – chlorpromazine, fluphenazine, haloperidol, perphenazine; Second-generation ("atypical") – aripiprazole, brexpiprazole, cariprazine, clozapine, lurasidone, olanzapine, paliperidone, pimavanserin, quetiapine, risperidone, ziprasidone. This list does not include antipsychotics rarely or never used in the U.S. among older adults.

Table 1 *(continued on page 3)*

Table 1 Continued

Organ System, Therapeutic Category, Drug(s)[a]	***Recommendation,*** Rationale, *Quality of Evidence* (*QE*[b]), *Strength of Recommendation* (*SR*[b])
Warfarin for treatment of nonvalvular atrial fibrillation or venous thromboembolism (VTE)	***Avoid starting warfarin as initial therapy for treatment of nonvalvular atrial fibrillation or VTE unless alternative options (i.e., DOACs) are contraindicated or there are substantial barriers to their use. For olde adults who have been using warfarin long-term, it may be reasonable to continue this medication, particularly among those with well-controlled INRs (i.e., >70% time in therapeutic range) and no adverse effects. See also criteria on rivaroxaban (Table 1) and dabigatran (Table 3) and footnote regarding choice among DOACs.*** Compared with DOACs, warfarin has higher risks of major bleeding (particularly intracranial bleeding) and similar or lower effectiveness for treatment of nonvalvular atrial fibrillation and VTE. DOACs are thus the preferred choice for anticoagulation for most people with these conditions. *QE = High; SR = Strong*
Rivaroxaban for long-term treatment of nonvalvular atrial fibrillation or venous thromboembolism (VTE)	***Avoid for long-term treatment of atrial fibrillation or VTE in favor of safer anticoagulant alternatives. See also criteria on warfarin (Table 1) and dabigatran (Table 3) and footnote regarding choice between warfarin and DOACs and among DOACs.*** At doses used for long-term treatment of VTE or nonvalvular atrial fibrillation, rivaroxaban appears to have higher risk of major bleeding and GI bleeding in older adults than other DOACs, particularly apixaban.[c] Rivaroxaban may be reasonable in special situations, for example when once-daily dosing is necessary to facilitate medication adherence. All DOACs confer lower risk of intracranial hemorrhage than warfarin.[c] *QE = Moderate; SR = Strong*
Dipyridamole, oral short-acting (does not apply to extended-release combination with aspirin)	***Avoid*** May cause orthostatic hypotension; more effective alternatives available; IV form acceptable for use in cardiac stress testing. *QE = Moderate; SR = Strong*
Non-selective peripheral alpha-1 blockers for treatment of hypertension ■ Doxazosin ■ Prazosin ■ Terazosin	***Avoid use as an antihypertensive.*** High risk of orthostatic hypotension and associated harms, especially in older adults; not recommended as routine treatment for hypertension; alternative agents have superior risk/benefit profile. *QE = Moderate; SR = Strong*
Central alpha-agonists for treatment of hypertension ■ Clonidine ■ Guanfacine	***Avoid clonidine as first-line treatment for hypertension. Avoid other central alpha-agonists for treatment of hypertension.*** High risk of adverse CNS effects; may cause bradycardia and orthostatic hypotension; not recommended as routine treatment for hypertension. *QE = Low; SR = Strong*

Table 1 *(continued on page 4)*

Table 1 Continued

Organ System, Therapeutic Category, Drug(s)[a]	***Recommendation,*** Rationale, *Quality of Evidence* (*QE*[b]), *Strength of Recommendation* (*SR*[b])
Nifedipine, immediate release	***Avoid*** Potential for hypotension; risk of precipitating myocardial ischemia. *QE = High; SR = Strong*
Amiodarone	***Avoid as first-line therapy for atrial fibrillation unless patient has heart failure or substantial left ventricular hypertrophy.*** Effective for maintaining sinus rhythm but has greater toxicities than other antiarrhythmics used in atrial fibrillation; may be reasonable first-line therapy in patients with concomitant heart failure or substantial left ventricular hypertrophy if rhythm control is preferred over rate control. *QE = High; SR = Strong*
Dronedarone	***Avoid in individuals with permanent atrial fibrillation or severe or recently decompensated heart failure. Use caution in patients with HFrEF with less severe symptoms (NYHA class I or II).*** Worse outcomes in people who have permanent atrial fibrillation or severe or recently decompensated heart failure. In some circumstances, worse outcomes have also been reported in people with HFrEF (e.g., left ventricular ejection fraction ≤35%) who have milder symptoms (NYHA class I or II). *QE = High; SR = Strong*
Digoxin for first-line treatment of atrial fibrillation or heart failure	***Avoid this rate control agent as first-line therapy for atrial fibrillation. Avoid as first-line therapy for heart failure. See rationale for caution about withdrawal in long-term users with HFrEF. If used for atrial fibrillation or heart failure, avoid dosages >0.125 mg/day.*** Use in atrial fibrillation: should not be used as a first-line agent because there are safer and more effective alternatives for rate control. Use in heart failure: evidence for benefits and harms of digoxin is conflicting and of lower quality; most (but not all) evidence concerns use in HFrEF. There is strong evidence for other agents as first-line therapy to reduce hospitalizations and mortality in adults with HFrEF. In heart failure, higher dosages are not associated with additional benefit and may increase risk of toxicity. Use caution in discontinuing digoxin among current users with HFrEF, given limited evidence suggesting worse clinical outcomes after discontinuation. Decreased renal clearance of digoxin may lead to increased risk of toxic effects; further dose reduction may be necessary in those with Stage 4 or 5 chronic kidney disease. *QE* = Atrial fibrillation; heart failure: low. Dosage >0.125 mg/day: moderate*; SR = Strong*

Table 1 *(continued on page 5)*

Table 1 Continued

Organ System, Therapeutic Category, Drug(s)[a]	***Recommendation,*** Rationale, *Quality of Evidence (QE[b]), Strength of Recommendation (SR[b])*
Central nervous system	
Antidepressants with strong anticholinergic activity, alone or in combination ■Amitriptyline ■Amoxapine ■Clomipramine ■Desipramine ■Doxepin >6 mg/day ■Imipramine ■Nortriptyline ■Paroxetine	***Avoid*** Highly anticholinergic, sedating, and cause orthostatic hypotension; safety profile of low-dose doxepin (≤6 mg/day) is comparable to that of placebo. *QE = High; SR = Strong*
Antiparkinsonian agents with strong anticholinergic activity ■Benztropine (oral) ■Trihexyphenidyl	***Avoid*** Not recommended for prevention or treatment of extrapyramidal symptoms due to antipsychotics; more effective agents available for treatment of Parkinson disease. *QE = Moderate; SR = Strong*
Antipsychotics, first-(typical) and second-(atypical) generation ■Aripiprazole ■Haloperidol ■Olanzapine ■Quetiapine ■Risperidone ■Others[d]	***Avoid, except in FDA approved indications such as schizophrenia, bipolar disorder, Parkinson disease psychosis (see Table 2), adjunctive treatment of major depressive disorder, or for short-term use as antiemetic.*** Increased risk of stroke and greater rate of cognitive decline and mortality in persons with dementia. Additional evidence suggests association of increased risk between antipsychotic medication and mortality independent of dementia. Avoid antipsychotics for behavioral problems of dementia or delirium unless documented nonpharmacologic options (e.g., behavioral interventions) have failed and/or the patient is threatening substantial harm to self or others. If used, periodic deprescribing attempts should be considered to assess ongoing need and/or lowest effective dose. *QE = Moderate; SR = Strong*
Barbiturates ■Butalbital ■Phenobarbital ■Primidone	***Avoid*** High rate of physical dependence, tolerance to sleep benefits, greater risk of overdose at low dosages. *QE = High; SR = Strong*

Table 1 *(continued on page 6)*

Table 1 Continued

Organ System, Therapeutic Category, Drug(s)[a]	***Recommendation,*** Rationale, *Quality of Evidence (QE[b]), Strength of Recommendation (SR[b])*
Benzodiazepines ■Alprazolam ■Chlordiazepoxide (alone or in combination with amitriptyline or clidinium) ■Clobazam ■Clonazepam ■Clorazepate ■Diazepam ■Estazolam ■Lorazepam ■Midazolam ■Oxazepam ■Temazepam ■Triazolam	***Avoid*** The use of benzodiazepines exposes users to risks of abuse, misuse, and addiction. Concomitant use with opioids may result in profound sedation, respiratory depression, coma, and death. Older adults have increased sensitivity to benzodiazepines and decreased metabolism of long-acting agents; the continued use of benzodiazepines may lead to clinically significant physical dependence. In general, all benzodiazepines increase risk of cognitive impairment, delirium, falls, fractures, and motor vehicle crashes in older adults. May be appropriate for seizure disorders, rapid eye movement sleep behavior disorder, benzodiazepine withdrawal, ethanol withdrawal, severe generalized anxiety disorder, and periprocedural anesthesia. *QE = Moderate; SR = Strong*
Nonbenzodiazepine benzodiazepine receptor agonist hypnotics ("Z-drugs") ■Eszopiclone ■Zaleplon ■Zolpidem	***Avoid*** Nonbenzodiazepine benzodiazepine receptor agonist hypnotics ("Z-drugs") have adverse events similar to those of benzodiazepines in older adults (e.g., delirium, falls, fractures, increased emergency room visits/hospitalizations, motor vehicle crashes); minimal improvement in sleep latency and duration. *QE = Moderate; SR = Strong*
Meprobamate	***Avoid*** High rate of physical dependence; very sedating. *QE = Moderate; SR = Strong*
Ergoloid mesylates (dehydrogenated ergot alkaloids)	***Avoid*** Lack of efficacy. *QE = High; SR = Strong*
Endocrine	
Androgens ■Methyltestosterone ■Testosterone	***Avoid unless indicated for confirmed hypogonadism with clinical symptoms.*** Potential for cardiac problems; potential risks in men with prostate cancer. *QE = Moderate; SR = Weak*

Table 1 *(continued on page 7)*

Table 1 Continued

Organ System, Therapeutic Category, Drug(s)[a]	***Recommendation,*** Rationale, *Quality of Evidence* (*QE*[b]), *Strength of Recommendation* (*SR*[b])
Estrogens with or without progestins (includes natural and synthetic estrogen preparations)	***Do not initiate systemic estrogen (e.g., oral tablets or transdermal patch). Consider deprescribing among older women already using this medication. Vaginal cream or vaginal tablets: acceptable to use low-dose intravaginal estrogen for management of dyspareunia, recurrent lower urinary tract infections, and other vaginal symptoms.*** Evidence of carcinogenic potential (breast and endometrium); lack of cardioprotective effect and cognitive protection in older women. For women who start HRT at age 60 and older, the risks of HRT are greater than the benefits, as HRT is linked to a higher risk of heart disease, stroke, blood clots, and dementia. Evidence indicates that vaginal estrogens for the treatment of vaginal dryness are safe and effective; women with a history of breast cancer who do not respond to nonhormonal therapies are advised to discuss the risks and benefits of low-dose vaginal estrogen (e.g., dosages of estradiol <25 mcg twice weekly) with their healthcare provider. *QE = Oral and patch: high. Vaginal cream or vaginal tablets: moderate; SR = Oral and patch: strong. Topical vaginal cream or tablets: weak*
Insulin, sliding scale (insulin regimens containing only short- or rapid-acting insulin dosed according to current blood glucose levels without concurrent use of basal or long-acting insulin)	***Avoid*** Higher risk of hypoglycemia without improvement in hyperglycemia management regardless of care setting. Avoid insulin regimens that include only short- or rapid-acting insulin dosed according to current blood glucose levels without concurrent use of basal or long-acting insulin. This recommendation does not apply to regimens that contain basal insulin or long-acting insulin. *QE = Moderate; SR = Strong*
Sulfonylureas (all, including short- and longer-acting) ■ Gliclazide ■ Glimepiride ■ Glipizide ■ Glyburide (Glibenclamide)	***Avoid sulfonylureas as first- or second-line monotherapy or add-on therapy unless there are substantial barriers to use of safer and more effective agents. If a sulfonylurea is used, choose short-acting agents (e.g., glipizide) over long-acting agents (e.g., glyburide, glimepiride).*** Sulfonylureas have a higher risk of cardiovascular events, all-cause mortality, and hypoglycemia than alternative agents. Sulfonylureas may increase the risk of cardiovascular death and ischemic stroke. Among sulfonylureas, long-acting agents (e.g., glyburide, glimepiride) confer higher risk of prolonged hypoglycemia than short-acting agents (e.g., glipizide). *QE = Hypoglycemia: High. CV events and all-cause mortality: Moderate. CV death and ischemic stroke: Low; SR = Strong*
Desiccated thyroid	***Avoid*** Concerns about cardiac effects; safer alternatives available. *QE = Low; SR = Strong*

Table 1 *(continued on page 8)*

Table 1 Continued

Organ System, Therapeutic Category, Drug(s)[a]	***Recommendation,*** Rationale, *Quality of Evidence* (*QE*[b]), *Strength of Recommendation* (*SR*[b])
Megestrol	***Avoid*** Minimal effect on weight; increases risk of thrombotic events and possibly death in older adults. *QE = Moderate; SR = Strong*
Growth hormone	***Avoid, except for patients rigorously diagnosed by evidence-based criteria with growth hormone deficiency due to an established etiology.*** Impact on body composition is small and associated with edema, arthralgia, carpal tunnel syndrome, gynecomastia, and impaired fasting glucose. *QE = High; SR = Strong*
Gastrointestinal	
Proton-pump inhibitors ■ Dexlansoprazole ■ Esomeprazole ■ Lansoprazole ■ Omeprazole ■ Pantoprazole ■ Rabeprazole	***Avoid scheduled use for >8 weeks unless for high-risk patients (e.g., oral corticosteroids or chronic NSAID use), erosive esophagitis, Barrett's esophagitis, pathologic hypersecretory condition, or demonstrated need for maintenance treatment (e.g., because of failure of drug discontinuation trial or H2-receptor antagonists).*** Risk of *C. difficile* infection, pneumonia, GI malignancies, bone loss and fractures. *QE = C. difficile, bone loss, and fractures: High. Pneumonia and GI malignancies: Moderate; SR = Strong*
Metoclopramide	***Avoid, unless for gastroparesis with duration of use not to exceed 12 weeks except in rare cases.*** Can cause extrapyramidal effects, including tardive dyskinesia; risk may be greater in frail older adults and with prolonged exposure. *QE = Moderate; SR = Strong*
GI antispasmodics with strong anticholinergic activity ■ Atropine (excludes ophthalmic) ■ Clidinium-chlordiazepoxide ■ Dicyclomine ■ Hyoscyamine ■ Scopolamine	***Avoid*** Highly anticholinergic, uncertain effectiveness. *QE = Moderate; SR = Strong*
Mineral oil, given orally	***Avoid*** Potential for aspiration and adverse effects; safer alternatives available. *QE = Moderate; SR = Strong*

Table 2 *(continued on page 9)*

Table 1 Continued

Organ System, Therapeutic Category, Drug(s)[a]	***Recommendation,*** Rationale, *Quality of Evidence (QE[b]), Strength of Recommendation (SR[b])*
Genitourinary	
Desmopressin	***Avoid for treatment of nocturia or nocturnal polyuria.*** High risk of hyponatremia; safer alternative treatments for nocturia (including nonpharmacologic). *QE = Moderate; SR = Strong*
Pain medications	
Non-COX-2-selective NSAIDs, oral: ■Aspirin >325 mg/day ■Diclofenac ■Diflunisal ■Etodolac ■Flurbiprofen ■Ibuprofen ■Indomethacin ■Ketorolac ■Meloxicam ■Nabumetone ■Naproxen ■Oxaprozin ■Piroxicam ■Sulindac	***Avoid chronic use unless other alternatives are not effective and patient can take gastroprotective agent (proton-pump inhibitor or misoprostol). Avoid short-term scheduled use in combination with oral or parenteral corticosteroids, anticoagulants, or antiplatelet agents unless other alternatives are not effective and patient can take gastroprotective agent (proton-pump inhibitor or misoprostol).*** Increased risk of GI bleeding or peptic ulcer disease in high-risk groups, including those >75 years old or taking oral or parenteral corticosteroids, anticoagulants, or antiplatelet agents; use of proton-pump inhibitor or misoprostol reduces but does not eliminate risk. Upper GI ulcers, gross bleeding, or perforation caused by NSAIDs occur in ~1% of patients treated for 3–6 months and in ~2%–4% of patients treated for 1 year; these trends continue with longer duration of use. Also can increase blood pressure and induce kidney injury. Risks are dose related. *QE = Moderate; SR = Strong*
Indomethacin Ketorolac (oral and parenteral)	***Avoid*** Increased risk of GI bleeding/peptic ulcer disease and acute kidney injury in older adults. Of all the NSAIDs, indomethacin has the most adverse effects, including higher risk of adverse CNS effects. *QE = Moderate; SR = Strong*
Meperidine	***Avoid*** Oral analgesic not effective in dosages commonly used; may have higher risk of neurotoxicity, including delirium, than other opioids; safer alternatives available. *QE = Moderate; SR = Strong*
Skeletal muscle relaxants ■Carisoprodol ■Chlorzoxazone ■Cyclobenzaprine ■Metaxalone ■Methocarbamol ■Orphenadrine	***Avoid*** Muscle relaxants typically used to treat musculoskeletal complaints are poorly tolerated by older adults due to anticholinergic adverse effects, sedation, increased risk of fractures; effectiveness at dosages tolerated by older adults questionable. This criterion does not apply to skeletal muscle relaxants typically used for management of spasticity (i.e., baclofen and tizanidine) although these drugs can also cause substantial adverse effects. *QE = Moderate; SR = Strong*

Table 2 *(continued on page 10)*

TABLE 2. 2023 American Geriatrics Society Beers Criteria® for Potentially Inappropriate Medication Use in Older Adults Due to Drug–Disease or Drug–Syndrome Interactions That May Exacerbate the Disease or Syndrome

Disease or Syndrome	Drug(s)[a]	***Recommendation,*** Rationale, *Quality of Evidence (QE[b]), Strength of Recommendation (SR[b])*
Cardiovascular		
Heart failure	Cilostazol Dextromethorphan-quinidine Nondihydropyridine calcium channel blockers (CCBs) ■Diltiazem ■Verapamil Dronedarone NSAIDs and COX-2 inhibitors Thiazolidinediones ■Pioglitazone	***Avoid: Cilostazol, Dextromethorphan-quinidine. Avoid in heart failure with reduced ejection fraction: Nondihydropyridine calcium channel blockers (CCBs), Diltiazem, Verapamil. Use with caution in patients with heart failure who are asymptomatic; avoid in patients with symptomatic heart failure: Dronedarone, NSAIDs and COX-2 inhibitors, Thiazolidinediones, Pioglitazone.*** Potential to promote fluid retention and/or exacerbate heart failure (NSAIDs and COX-2 inhibitors, non-dihydropyridine CCBs, thiazolidinediones); potential to increase mortality in older adults with heart failure (cilostazol and dronedarone); concerns about QT prolongation (dextromethorphan-quinidine). Note: This is not a comprehensive list of medications to avoid in patients with heart failure. *QE = Cilostazol, dextromethorphan-quinidine, COX-2 inhibitors: Low. Non-dihydropyridine CCBs, NSAIDs: Moderate. Dronedarone, thiazolidenediones: High; SR = Strong*
Syncope	Antipsychotics (selected) ■Chlorpromazine ■Olanzapine Cholinesterase inhibitors (AChEIs) ■Donepezil ■Galantamine ■Rivastigmine Non-selective peripheral alpha-1 blockers ■Doxazosin ■Prazosin ■Terazosin Tertiary tricyclic antidepressants (TCAs) ■Amitriptyline ■Clomipramine ■Doxepin ■Imipramine	***Avoid*** Antipsychotics listed and tertiary TCAs increase the risk of orthostatic hypotension. AChEIs cause bradycardia and should be avoided in older adults whose syncope may be due to bradycardia. Non-selective peripheral alpha-1 blockers cause orthostatic blood pressure changes and should be avoided in older adults whose syncope may be due to orthostatic hypotension. *QE = High; SR = Antipsychotics, non-selective peripheral alpha-1 blockers: Weak. AChEIs, tertiary TCAs: Strong*

Table 2 *(continued on page 11)*

Table 2 Continued

Disease or Syndrome	Drug(s)[a]	***Recommendation,*** Rationale, *Quality of Evidence (QE[b]), Strength of Recommendation (SR[b])*
Central nervous system		
Delirium	Anticholinergics* Antipsychotics[c] Benzodiazepines Corticosteroids (oral and parenteral)[d] H2-receptor antagonists ■Cimetidine ■Famotidine ■Nizatidine Nonbenzodiazepine benzodiazepine receptor agonist hypnotics ("Z-drugs") ■Eszopiclone ■Zaleplon ■Zolpidem Opioids	***Avoid, except in situations listed under rationale statement.*** Avoid in older adults with or at high risk of delirium because of potential of inducing or worsening delirium. Antipsychotics: avoid for behavioral problems of dementia or delirium unless nonpharmacologic options (eg, behavioral interventions) have failed or are not possible and the older adult is threatening substantial harm to self or others. If used, periodic deprescribing attempts should be considered to assess ongoing need and/or lowest effective dose. Corticosteroids: if needed, use lowest possible dose for the shortest duration and monitor for delirium. Opioids: emerging data highlights an association between opioid administration and delirium. For older adults with pain, use a balanced approach, including use of validated pain assessment tools and multimodal strategies that include nondrug approaches to minimize opioid use. *QE = H2-receptor antagonists: Low. All others: Moderate; SR = Strong*
Dementia or cognitive impairment	Anticholinergics* Antipsychotics, chronic use or persistent as-needed use[c] Benzodiazepines Nonbenzodiazepine benzodiazepine receptor agonist hypnotics ("Z-drugs") ■Eszopiclone ■Zaleplon ■Zolpidem	***Avoid*** Avoid because of adverse CNS effects. See criteria on individual drugs for additional information. Antipsychotics: increased risk of stroke and greater rate of cognitive decline and mortality in people with dementia. Avoid antipsychotics for behavioral problems of dementia or delirium unless documented nonpharmacologic options (e.g., behavioral interventions) have failed and/or the patient is threatening substantial harm to self or others. If used, periodic deprescribing attempts should be considered to assess ongoing need and/or lowest effective dose. *QE = Moderate; SR = Strong*

*See Table 7 in full criteria on www.geriatricscareonline.org.

[a]Under each drug class, drugs commonly used in the United States are listed, except in cases where doing so is infeasible due to space considerations. Unless stated otherwise, all drugs within a stated drug class are considered potentially inappropriate in the context of the criterion in which they appear, even if not listed in this table.

[b]Quality of evidence and strength of recommendation ratings apply to all drugs and recommendations within each criterion unless stated otherwise.

[c]May be required to treat concurrent schizophrenia, bipolar disorder, and other selected mental health and neuropsychiatric conditions but should be prescribed in the lowest effective dose and shortest possible duration.

[d]Excludes inhaled and topical forms. Oral and parenteral corticosteroids may be required for conditions such as exacerbation of COPD but should be prescribed in the lowest effective dose and for the shortest possible duration.

[e]Data are limited for selective peripheral alpha-1 blockers (e.g., tamsulosin, silodosin, and others) but may apply as well.

Table 3 *(continued on page 12)*

Table 2 Continued

Disease or Syndrome	Drug(s)[a]	***Recommendation,*** Rationale, *Quality of Evidence (QE[b]), Strength of Recommendation (SR[b])*
History of falls or fractures	Anticholinergics* Antidepressants (selected classes) ■SNRIs ■SSRIs ■Tricyclic antidepressants (TCAs) Antiepileptics Antipsychotics[c] Benzodiazepines Nonbenzodiazepine benzodiazepine receptor agonist hypnotics ("Z-drugs") ■Eszopiclone ■Zaleplon ■Zolpidem) Opioids	***Avoid unless safer alternatives are not available. Antiepileptics: avoid except for seizure and mood disorders. Opioids: avoid except for pain management in the setting of severe acute pain.*** May cause ataxia, impaired psychomotor function, syncope, or additional falls. Antidepressants (selected classes): evidence for risk of falls and fractures is mixed; newer evidence suggests that SNRIs may increase falls risk. Benzodiazepines: shorter-acting ones are not safer than long-acting ones. If one of the drugs must be used, consider reducing use of other CNS-active medications that increase risk of falls and fractures (i.e., anticholinergics, selected antidepressants, antiepileptics, antipsychotics, sedative/hypnotics including benzodiazepines and nonbenzodiazepine benzodiazepine receptor agonist hypnotics, opioids) and implement other strategies to reduce fall risk. *QE = Antidepressants, opioids: Moderate. All others: High; SR = Strong*
Parkinson disease	Antiemetics ■Metoclopramide ■Prochlorperazine ■Promethazine Antipsychotics (except clozapine, pimavanserin, quetiapine)	***Avoid*** Dopamine-receptor antagonists with potential to worsen parkinsonian symptoms Exceptions: clozapine, pimavanserin, and quetiapine appear to be less likely to precipitate worsening of Parkinson disease than other antipsychotics. *QE = Moderate; SR = Strong*
Gastrointestinal		
History of gastric or duodenal ulcers	Aspirin Non-COX-2 selective NSAIDs	***Avoid unless other alternatives are not effective and patient can take gastroprotective agent (i.e., proton-pump inhibitor or misoprostol)*** May exacerbate existing ulcers or cause new/additional ulcers *QE = Moderate; SR = Strong*
Kidney/urinary tract		
Urinary incontinence (all types) in women	Non-selective peripheral alpha-1 blockers[e] ■Doxazosin ■Prazosin ■Terazosin Estrogen, oral and transdermal (excludes intravaginal estrogen)	***Avoid in women. See also recommendation on estrogen (Table 1)*** Aggravation of incontinence (alpha-1 blockers), lack of efficacy (oral estrogen) *QE = Non-selective peripheral alpha-1 blockers: Moderate. Estrogen: High; SR = Strong*

Table 4 *(continued on page 13)*

Table 2 Continued

Disease or Syndrome	Drug(s)[a]	***Recommendation,*** Rationale, *Quality of Evidence* (*QE*[b]), *Strength of Recommendation* (*SR*[b])
Lower urinary tract symptoms, benign prostatic hyperplasia	Strongly anticholinergic drugs, except antimuscarinics for urinary incontinence*	***Avoid in men*** May decrease urinary flow and cause urinary retention *QE = Moderate; SR = Strong*

TABLE 3. 2023 American Geriatrics Society Beers Criteria® for Potentially Inappropriate Medications to Be Used with Caution in Older Adults[a]

Drug(s)[b]	***Recommendation,*** Rationale, *Quality of Evidence* (*QE*[c]), *Strength of Recommendation* (*SR*[c])
Dabigatran for long-term treatment of nonvalvular atrial fibrillation or venous thromboembolism (VTE)	***Use caution in selecting dabigatran over other DOACs (e.g., apixaban) for long-term treatment of nonvalvular atrial fibrillation or VTE. See also criteria on warfarin and rivaroxaban (Table 1) and footnote d regarding choice among DOACs.*** Increased risk of GI bleeding compared with warfarin (based on head-to-head clinical trials) and of GI bleeding and major bleeding compared with apixaban (based on observational studies and meta-analyses) in older adults when used for long-term treatment of nonvalvular atrial fibrillation or VTE. *QE = Moderate; SR = Strong*
Prasugrel Ticagrelor	***Use with caution, particularly in adults 75 years old and older. If prasugrel is used, consider lower dose (5 mg) for those 75 years old and older.*** Both increase the risk of major bleeding in older adults compared with clopidogrel, especially among those 75 years old and older. However, this risk may be offset by cardiovascular benefits in select patients. *QE = Moderate; SR = Strong*
Antidepressants (selected) ■ Mirtazipine ■ SNRIs ■ SSRIs ■ TCAs Antiepileptics (selected) ■ Carbamazepine ■ Oxcarbazepine Antipsychotics Diuretics Tramadol	***Use with caution*** May exacerbate or cause SIADH or hyponatremia; monitor sodium level closely when starting or changing dosages in older adults. *QE = Moderate; SR = Strong*

[a]"Use with caution" recommendations reflect concern about the balance of benefits and harms of a medication compared with alternatives in the situation when those concerns do not rise to the level of "avoid" recommendations in other Tables because of limited evidence, a lesser degree of potential harm compared with alternative therapies, and/or extenuating clinical circumstances.

[b]Under each drug class, drugs commonly used in the United States are listed, except in cases where doing so is infeasible due to space considerations. Unless stated otherwise, all drugs within a stated drug class are considered potentially inappropriate in the context of the criterion in which they appear, even if not listed in this table.

[c]Quality of evidence and strength of recommendation ratings apply to all drugs and recommendations within each criterion unless stated otherwise.

[d]When selecting among DOACs and choosing a dosage, pay special consideration to kidney function (see Table 5), indication, and body weight.

Table 4 *(continued on page 14)*

Table 3 Continued

Drug(s)[b]	***Recommendation,*** Rationale, *Quality of Evidence* (*QE*[c]), *Strength of Recommendation* (*SR*[c])
Dextromethorphan-quinidine	***Use with caution*** Limited efficacy in patients with behavioral symptoms of dementia (does not apply to treatment of pseudobulbar affect). May increase risk of falls and concerns with clinically significant drug interactions and with use in those with heart failure (see Table 2). *QE = Moderate; SR = Strong*
Trimethoprim-sulfamethoxazole	***Use with caution in patients on ACEI, ARB, or ARNI and decreased CrCl.*** Increased risk of hyperkalemia when used concurrently with an ACEI, ARB, or ARNI in presence of decreased CrCl. *QE = Low; SR = Strong*
Sodium glucose co-transporter-2 (SGLT2) inhibitors ■ Canigliflozin ■ Dapagliflozin ■ Emplaglifozin ■ Ertuglifozin	***Use with caution. Monitor patients for urogenital infections and ketoacidosis.*** Older adults may be at increased risk of urogenital infections, particularly women in the first month of treatment. An increased risk of euglycemic diabetic ketoacidosis has also been seen in older adults. *QE = Moderate; SR =* Weak

TABLE 4. 2023 American Geriatrics Society Beers Criteria® for Potentially Clinically Important Drug–Drug Interactions That Should Be Avoided in Older Adults

Object Drug or Class	Interacting Drug or Class	***Recommendation,*** Risk Rationale, *Quality of Evidence* (*QE*[a]), *Strength of Recommendation* (*SR*[a])
RAS inhibitor (ACEIs, ARBs, ARNIs, aliskiren) or potassium-sparing diuretics (amiloride, triamterene)	Another RAS inhibitor or potassium-sparing diuretic	***Avoid routinely using 2 or more RAS inhibitors, or a RAS inhibitor and potassium sparing diuretic, concurrently in those with chronic kidney disease Stage 3a or higher.*** Increased risk of hyperkalemia. *QE = Moderate; SR = Strong*
Opioids	Benzodiazepines	***Avoid*** Increased risk of overdose and adverse events. *QE = Moderate; SR = Strong*
Opioids	Gabapentin Pregabalin	***Avoid; exceptions are when transitioning from opioid therapy to gabapentin or pregabalin, or when using gabapentinoids to reduce opioid dose, although caution should be used in all circumstances.*** Increased risk of severe sedation-related adverse events, including respiratory depression and death. *QE = Moderate; SR = Strong*

This table is not a comprehensive list of all drug-drug interactions relevant for older adults.

[a]Quality of evidence and strength of recommendation ratings apply to all drugs and recommendations within each criterion unless stated otherwise.

[b]Data are limited for selective peripheral alpha-1 blockers (e.g., tamsulosin, silodosin, and others) but may apply as well.

Table 5 *(continued on page 15)*

Table 4 Continued

Object Drug or Class	Interacting Drug or Class	***Recommendation,*** Rationale, *Quality of Evidence* (*QE*[a]), *Strength of Recommendation* (*SR*[a])
Anticholinergic	Anticholinergic	***Avoid, minimize number of anticholinergic drugs**** Use of more than one medication with anticholinergic properties increases risk of cognitive decline, delirium, and falls or fractures. *QE = Moderate; SR = Strong*
Antiepileptics (including gabapentinoids) Antidepressants (TCAs, SSRIs, and SNRIs) Antipsychotics Benzodiazepines Nonbenzodiazepine benzodiazepine receptor agonist hypnotics (i.e., "Z-drugs") Opioids Skeletal muscle relaxants	Any combination of ≥3 of these CNS-active drugs	***Avoid concurrent use of ≥3 CNS-active drugs (among types as listed at left); minimize number of CNS-active drugs.*** Increased risk of falls and of fracture with the concurrent use of ≥3 CNS-active agents (antiepileptics including gabapentinoids, antidepressants, antipsychotics, benzodiazepines, nonbenzodiazepine benzodiazepine receptor agonist hypnotics, opioids, and skeletal muscle relaxants). *QE = High; SR = Strong*
Lithium	ACEIs ARBs ARNIs	***Avoid, monitor lithium concentrations*** Increased risk of lithium toxicity. *QE = Moderate; SR = Strong*
Lithium	Loop diuretics	***Avoid, monitor lithium concentrations*** Increased risk of lithium toxicity *QE = Moderate; SR = Strong*
Non-selective peripheral alpha-1 blockers[b]	Loop diuretics	***Avoid in older women, unless conditions warrant both drugs*** Increased risk of urinary incontinence in older women *QE = Moderate; SR = Strong*
Phenytoin	Trimethoprim-sulfamethoxazole	***Avoid*** Increased risk of phenytoin toxicity *QE = Moderate; SR = Strong*
Theophylline	Cimetidine	***Avoid*** Increased risk of theophylline toxicity *QE = Moderate; SR = Strong*
Theophylline	Ciprofloxacin	***Avoid*** Increased risk of theophylline toxicity *QE = Moderate; SR = Strong*

Table 5 *(continued on page 16)*

Table 4 Continued

Object Drug or Class	Interacting Drug or Class	***Recommendation,*** Rationale, *Quality of Evidence* (*QE*[a]), *Strength of Recommendation* (*SR*[a])
Warfarin	Amiodarone Ciprofloxacin Macrolides (excluding azithromycin) Trimethoprim-sulfamethoxazole SSRIs	***Avoid when possible; if used together, monitor INR closely*** Increased risk of bleeding *QE = Moderate; SR = Strong*

TABLE 5. 2023 American Geriatrics Society Beers Criteria® for Medications That Should Be Avoided or Have Their Dosage Reduced with Varying Levels of Kidney Function in Older Adults

Drug	CrCl (mL/min) at Which Action Required	***Recommendation,*** Rationale, *Quality of Evidence* (*QE*), *Strength of Recommendation* (*SR*)
Anti-infective		
Ciprofloxacin	<30	***Doses used to treat common infections typically require reduction when CrCl <30 mL/min*** Increased risk of CNS effects (eg, seizures, confusion) and tendon rupture *QE = Moderate; SR = Strong*
Nitrofurantoin	<30	***Avoid if CrCl < 30mL/min*** Potential for pulmonary toxicity, hepatoxicity, and peripheral neuropathy, especially with long-term use. (See also Table 1.) *QE = Low; SR = Strong*
Trimethoprim-sulfamethoxazole	<30	***Reduce dosage if CrCl 15–29 mL/min. Avoid if CrCl <15 mL/min.*** Increased risk of worsening of kidney function and hyperkalemia; risk of hyperkalemia especially prominent with concurrent use of an ACE, ARB, or ARNI. *QE = Moderate; SR = Strong*
Cardiovascular and antithrombotics		
Amiloride	<30	***Avoid*** Hyperkalemia and hyponatremia *QE = Moderate; SR = Strong*
Dabigatran	<30	***Avoid when CrCl <30mL/min; dose adjustment advised when CrCl >30 mL/min in the presence of drug-drug interactions.*** Lack of evidence for efficacy and safety in individuals with a CrCl <30 mL/min. Label dose for patients with CrCl 15–30 mL/min based on pharmacokinetic data. *QE = Moderate; SR = Strong*

Table 5 Continued

Drug	CrCl (mL/min) at Which Action Required	Rationale
Dofetilide	<60	***Reduce dose if CrCl 20–59 mL/min. Avoid if CrCl <20 mL/min.*** QTc prolongation and torsades de pointes. *QE = Moderate; SR = Strong*
Edoxaban	15–50 <15 or >95	***Reduce dose if CrCl 15–50 mL/min. Avoid if CrCl <15 or >95 mL/min.*** Lack of evidence of efficacy or safety in patients with a CrCl <30 mL/min *QE = Moderate; SR = Strong*
Enoxaparin	<30	***Reduce dose*** Increased risk of bleeding *QE = Moderate; SR = Strong*
Fondaparinux	<30	***Avoid*** Increased risk of bleeding *QE = Moderate; SR = Strong*
Rivaroxaban	<50	***Avoid if CrCl <15 mL/min. Reduce dose if CrCl 15–50 mL/min following manufacturer dosing recommendations based on indication-specific dosing.*** Lack of efficacy or safety evidence in people with CrCl <15 mL/min; limited evidence for CrCl 15–30 mL/min. *QE = Moderate; SR = Strong*
Spironolactone	<30	***Avoid*** Hyperkalemia *QE = Moderate; SR = Strong*
Triamterene	<30	***Avoid*** Hyperkalemia and hyponatremia *QE = Moderate; SR = Strong*
Central nervous system and analgesics		
Baclofen	eGFR <60	***Avoid baclofen in older adults with impaired kidney function (eGFR <60 mL/min). When baclofen cannot be avoided, use the lowest effective dose and monitor for signs of CNS toxicity, including altered mental status.*** Increased risk of encephalopathy requiring hospitalization in older adults with eGFR <60 mL/min or who require chronic dialysis. *QE = Moderate; SR = Strong*
Duloxetine	<30	***Avoid*** Increased GI adverse effects (nausea, diarrhea) *QE = Moderate; SR = Weak*

This table is not a comprehensive list of all drugs that should be avoided or dose-adjusted in older adults with renal impairment.

[a]NSAIDs include: Non-selective: diclofenac, diflunisal, etodolac, flurbiprofen, ibuprofen, indomethacin, ketorolac, meloxicam, nabumetone, naproxen, oxaprozin, piroxicam, sulindac; COX-2 selective: celecoxib; Nonacetylated salicylates: diflunisal, magnesium salicylate. This list does not include NSAIDs rarely or never used in the U.S. among older adults.

Table 5 *(continued on page 18)*

Table 5 Continued

Drug	CrCl (mL/min) at Which Action Required	Rationale
Gabapentin	<60	***Reduce dose*** CNS adverse effects *QE = Moderate; SR = Strong*
Levetiracetam	≤80	***Reduce dose*** CNS adverse effects *QE = Moderate; SR = Strong*
NSAIDs (non-selective, COX-2 selective, and nonacetylated salicylates, oral and parenteral)[a]	< 30	***Avoid*** May increase risk of acute kidney injury and further decline of kidney function *QE = Moderate; SR = Strong*
Pregabalin	<60	***Reduce dose*** CNS adverse effects *QE = Moderate; SR = Strong*
Tramadol	<30	***Immediate release: Reduce dose. Extended release: avoid*** CNS adverse effects *QE = Low; SR = Weak*
Gastrointestinal		
Cimetidine	<50	***Reduce dose*** Mental status changes *QE = Moderate; SR = Strong*
Famotidine	<50	***Reduce dose*** Mental status changes *QE = Moderate; SR = Strong*
Nizatidine	<50	***Reduce dose*** Mental status changes *QE = Moderate; SR = Strong*
Hyperuricemia		
Colchicine	<30	***Reduce dose; monitor for adverse effects*** GI, neuromuscular, bone marrow toxicity *QE = Moderate; SR = Strong*
Probenecid	<30	***Avoid*** Loss of effectiveness *QE = Moderate; SR = Strong*

Abbreviations for all Tables:

ACEIs=angiotensin-converting enzyme inhibitors; AChEI=acetylcholinesterase inhibitor; ARBs=angiotensin receptor blockers; ARNIs=angiotensin receptor-neprilysin Inhibitors; CCBs=calcium channel blockers; CNS=central nervous system COPD=chronic obstructive pulmonary disease; COX=cyclooxygenase; CrCl=creatinine clearance; CV=cardiovascular; DOACs=direct oral anticoagulants; GI=gastrointestinal; HFrEF=heart failure with reduced ejection fraction; HRT=hormone replacement therapy; INR=international normalized ratio; NSAIDs=nonsteroidal anti-inflammatory drugs; NYHA=New York Heart Association; RAS=renin-angiotensin system; SIADH= syndrome of inappropriate antidiuretic hormone secretion; SGLT2=sodium glucose co-transporter-2; SNRIs=serotonin-norepinephrine reuptake inhibitors; SSRIs=selective serotonin reuptake inhibitors; TCAs=tricyclic antidepressants; VTE=venous thromboembolism