

Identifying Medications that Older Adults Should Avoid or Use With Caution: the 2012 American Geriatrics Society Updated Beers Criteria

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Summary of this Study

For more than 20 years, the *Beers Criteria for Potentially Inappropriate Medication Use in Older Adults* has been the leading source of information about the safety of prescribing drugs for older people. To help prevent medication side effects and other drug-related problems in older adults, the American Geriatrics Society (AGS) has updated and expanded this important resource. The expanded *AGS Updated Beers Criteria for Potentially Inappropriate Medication Use in Older Adults* identifies medications with risks that may be greater than their benefits for people 65 and older.

Why Experts Developed the Beers Criteria

As you get older, your body changes. These changes can increase the chances that you'll have side effects when you take medications. Older people usually have more health problems and take more medications than younger people. Because of this, they are also more likely to experience dangerous drug-drug interactions. Every year, one in three adults 65 or older has one or more adverse (harmful) reactions to a medication or medications. This is why it's important for researchers to identify and help reduce use of drugs that are associated with more risks than benefits in older people.

The *Beers Criteria* was last updated in 2003. The criteria need to be updated regularly because new drugs continue to be marketed and new studies continue to provide information on the safety of existing medications. In 2011, the criteria was updated by the American Geriatrics Society using a panel of healthcare and pharmacy experts. The AGS will continue to update the criteria on a regular basis.

The updated 2012 AGS Beers Criteria is published in the *Journal of the American Geriatrics Society*. It is available online at www.americangeriatrics.org.

What the Researchers Found

Using a time-tested method for developing care guidelines, and following the recommendations of the Institute of Medicine, members of the expert panel reviewed more than 2,000 high-quality research studies about medications prescribed for older adults.

Based on the review of this research, the experts identified:

- 34 medications and types of medications that are “potentially inappropriate” for older people. Healthcare providers should consider avoiding drugs on this list when

prescribing for adults 65 or older. These medications pose a higher risk of side effects, may not work as well in an older person, and may be replaced with safer or more effective medications or non-drug remedies.

- Medications used for 14 common health problems that are potentially inappropriate for older adults. Older adults often have other diseases or disorders in addition to these 14 health problems that the medications may make worse.
- 14 types of drugs that are potentially inappropriate and should be used only with caution in older adults. Drugs on this list may cause medication-related problems and may not be completely effective. However, they may be the best choice available for certain older patients. Healthcare providers need to carefully monitor how these drugs are working and keep an eye out for side effects. And older adults who take these medications, or their caregivers need to let their healthcare professionals know if these drugs don't seem to be working, or appear to be causing side effects.

How Health Professionals Are to Use this List

Healthcare providers refer to the *AGS Beers Criteria* when deciding whether and what to prescribe for older adults, but *should not make these decisions based only on the criteria*. Among other reasons, they shouldn't do this because the criteria don't apply to all situations that older patients face. The criteria, for example, don't take into account all of the unique circumstances of older people getting palliative or hospice care.

Because the criteria shouldn't dictate what healthcare providers prescribe, healthcare providers should not be penalized for prescribing a medication for an older person simply because it is on one of the criteria lists. Different older adults respond differently to the same medication, and, again, for some patients, drugs listed in the criteria will be the best choices.

The criteria are also used in research, training, determining healthcare policy, developing insurance company policies regarding medication coverage, efforts to improve the quality of prescribing for older people, and the development of quality standards for drug therapy for older adults.

What You Can Do

To lower the chance of drug-related problems:

- Keep a list of all of the medications you take—both non-prescription and prescription. This includes any supplements that you take, such as vitamins. You should also write down the doses, and bring it with you whenever you see a healthcare professional. This way, he or she will know what drugs and supplements you are taking and can check whether these might be causing side effects, or could cause side effects, if taken along with new medications.

- Ask if any of your medications are known to cause side effects. And if so, ask what they are—so you can watch for them. If you think you may be having a bad reaction to a drug, tell your healthcare professional. You should also speak with your healthcare provider if a drug you are taking appears in the *2012 AGS Beers Criteria* and you are concerned that it may be causing side effects or other problems. You should **not** simply stop taking a medication because you think it may not be working or causing side effects, or because it is included in one of the three lists mentioned above. **You should never stop taking medications without first checking with a healthcare professional.**
- Keep in mind that if a drug you take is on one of the lists in the *AGS Beers Criteria*, this does not necessarily mean that it poses greater risks than benefits *for you*. The way you respond to a medication or medications can differ from the way other people respond to it. This is why the experts who updated the criteria use the phrase “*potentially inappropriate*.” While the drugs on the lists *may* cause side effects in some older adults, they won’t necessarily cause these problems in *all* older people.

AGS Beers Criteria for Potentially Inappropriate Medication Use in Older Adults		
Drugs and Categories of Drugs	Why these drugs may be inappropriate for older adults	Recommendations
<i>Anticholinergic drugs—these drugs can cause side effects such as confusion, hallucinations, sleepiness, blurred vision, difficulty urinating, dry mouth and constipation in older adults.</i>		
Antihistamines—drugs that are typically prescribed for allergies, hives and eczema: <ul style="list-style-type: none"> • Brompheniramine • Carbinoxamine • Chlorpheniramine • Clemastine • Cyproheptadine • Dexbrompheniramine • Dexchlorpheniramine • Diphenhydramine (oral) • Doxylamine • Hydroxyzine • Promethazine • Triprolidine 	These drugs cause many side effects in older adults, including confusion, drowsiness, blurred vision, difficulty urinating, dry mouth and constipation. Safer medications are available.	Avoid Use of diphenhydramine in special situations—such as for treating severe allergic reactions—may be appropriate.

AGS Beers Criteria for Potentially Inappropriate Medication Use in Older Adults

Drugs and Categories of Drugs	Why these drugs may be inappropriate for older adults	Recommendations
Antiparkinsonian drugs prescribed for Parkinson’s disease and other health problems: <ul style="list-style-type: none"> • Benztropine (oral) • Trihexyphenidyl 	There are other medications that are usually more effective for Parkinson’s disease and related disorders than these. The drugs should not be used for other conditions, like treating side effects of other medications (for example the movement side effects of antipsychotic medications).	Avoid
Antispasmodic medications prescribed to relieve cramps or spasms: <ul style="list-style-type: none"> • Belladonna alkaloids • Clidinium-chlordiazepoxide • Dicyclomine • Hyoscyamine • Propantheline • Scopolamine 	It’s is not clear whether these drugs are effective, but they have side effects.	Avoid except if used in short-term “comfort care.”
<i>Antithrombotics—these are medications to prevent or dissolve blood clots that can form inside blood vessels. These blood clots can be life-threatening.</i>		
The short-acting form of Dipyridamole that is taken by mouth	This form may make your blood pressure drop when you stand up. This can make you dizzy and may lead to dangerous falls. More effective alternatives are available. The form of dipyridamole that is injected, however, can be used during a heart “stress test.”	Avoid
Ticlopidine	Safer, effective alternatives to this drug are available.	Avoid
<i>Anti-infective drugs—such as antibiotics and antiviral drugs</i>		
Nitrofurantoin, an antibacterial drug prescribed for urinary tract infections	This drug may cause side effects that affect the lungs. Safer medications are available.	Avoid long-term use and in patients with certain kidney problems.

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Drugs and Categories of Drugs	Why these drugs may be inappropriate for older adults	Recommendations
<i>Cardiovascular drugs—for disorders that affect the heart and blood vessels.</i>		
<p>Alpha₁ blockers—drugs for the prostate but also prescribed for high blood pressure.</p> <ul style="list-style-type: none"> • Doxazosin • Prazosin • Terazosin 	<p>These drugs can cause a drop in blood pressure and dizziness when you stand up. This can lead to falls. Alternative treatments provide better results with lower risks.</p>	<p>Avoid using for high blood pressure.</p>
<p>Medications, called Alpha agonists, which are prescribed for high blood pressure.</p> <ul style="list-style-type: none"> • Clonidine • Guanabenz • Guanfacine • Methyldopa • Reserpine at doses greater than 0.1 milligrams daily 	<p>These drugs may cause a slow heartbeat and dizziness. They are not recommended for routine treatment of high blood pressure.</p>	<p>Clonidine should not be a first-choice treatment for high blood pressure. The other drugs on the list should be avoided.</p>
<p>Antiarrhythmic drugs prescribed for atrial fibrillation (irregular heart beat). (Class Ia, Ic, III)</p> <ul style="list-style-type: none"> • Amiodarone • Dofetilide • Dronedarone • Flecainide • Ibutilide • Procainamide • Propafenone • Quinidine • Sotalol 	<p>Other treatments may provide better results, or cause fewer side effects, or both.</p> <p>Amiodarone may contribute to thyroid, lung and heart problems.</p>	<p>These drugs should not be the first choice for treating atrial fibrillation.</p>
<p>Disopyramide</p>	<p>Disopyramide may increase risks of heart failure in older adults and may cause confusion, blurred vision, difficulty urinating, dry mouth and constipation. Safer medications are available.</p>	<p>Avoid</p>
<p>Dronedarone</p>	<p>There are other drugs that provide better results in patients with atrial fibrillation (irregular heartbeat) or heart failure.</p>	<p>Avoid in some patients with atrial fibrillation or heart failure.</p>

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Drugs and Categories of Drugs	Why these drugs may be inappropriate for older adults	Recommendations
Digoxin at doses higher than 0.125 milligrams per day	In older patients with heart failure, higher doses appear to offer no additional benefit and may increase risks of dangerous side effects. Older patients with kidney problems are at particular risk of side effects.	Avoid
Nifedipine, immediate release	This drug may lower blood pressure and could cause other heart problems.	Avoid
Spironolactone at doses higher than 25 milligrams daily	In people with heart failure, higher doses may boost risks of high potassium.	Avoid higher doses in patients with heart failure or lower kidney function.
<i>Drugs affecting the brain and spinal cord</i>		
<p>Tertiary Tricyclic Antidepressants, alone or in combination:</p> <ul style="list-style-type: none"> • Amitriptyline • Clordiazepoxide-amitriptyline • Clomipramine • Doxepin at doses of more than 6 milligrams per day. • Imipramine • Perphenazine-amitriptyline • Trimipramine 	Potential side effects include: confusion, drowsiness, blurred vision, difficulty urinating, dry mouth and constipation in older adults. They can also cause a drop in blood pressure and dizziness when you stand up. Safer medications are available.	Avoid
All antipsychotic drugs	These drugs may increase risks of confusion, sleepiness, blurred vision, difficulty urinating, dry mouth, constipation, stroke, and death in people with dementia.	Avoid using these drugs to treat behavioral problems in older people with memory disorders unless non-drug options haven't worked and the patient is a threat to himself or herself or others.
Thioridazine Mesoridazine	These drugs may cause confusion, sleepiness, blurred vision, difficulty urinating, dry mouth and constipation. They may also increase risks of dangerous changes in heartbeat.	Avoid

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Drugs and Categories of Drugs	Why these drugs may be inappropriate for older adults	Recommendations
Barbiturates <ul style="list-style-type: none"> • Amobarbital • Butabarbital • Butalbital • Mephobarbital • Pentobarbital • Phenobarbital • Secobarbital 	These medications can be addictive. Over time, they get less effective in helping older adults sleep. They are more likely to cause overdoses at lower doses than alternative drugs.	Avoid
Benzodiazepines <i>Short- and intermediate-acting:</i> <ul style="list-style-type: none"> • Alprazolam • Estazolam • Lorazepam • Oxazepam • Temazepam • Triazolam <i>Long-acting:</i> <ul style="list-style-type: none"> • Chlorazepate • Chlordiazepoxide • Chlordiazepoxide-amitriptyline • Clidinium-chlordiazepoxide • Clonazepam • Diazepam • Flurazepam • Quazepam 	Older adults are especially sensitive to these medications. These drugs may increase risks of mental decline, delirium, falls, fractures, and car accidents in older adults. Despite these risks, they may be appropriate, in certain cases, for treating seizures, certain sleep disorders, anxiety disorders, withdrawal from benzodiazepine drugs and alcohol, and end-of-life care.	Avoid benzodiazepines (all types) when treating insomnia, agitation, or delirium (serious confusion that may have lasting effects).
Chloral hydrate	Not effective long-term, with high risk of overdose.	Avoid
Meprobamate	This medication makes older adults sleepy and can be addictive.	Avoid
Nonbenzodiazepine hypnotics <ul style="list-style-type: none"> • Eszopiclone • Zolpidem • Zaleplon 	These medications may not significantly improve sleep and can cause many serious side effects, including confusion, falls, and bone fractures.	Avoid ongoing use of these drugs (over 90 days).
Ergot mesylates Isoxsuprine	These medications are not very effective.	Avoid

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Drugs and Categories of Drugs	Why these drugs may be inappropriate for older adults	Recommendations
<i>Drugs and treatments for conditions affecting the glands that produce and secrete hormones, such as androgens (“male hormones”) and estrogen and progestins (“female hormones”)</i>		
Androgens <ul style="list-style-type: none"> • Methyltestosterone • Testosterone 	These drugs may worsen heart problems and cause other side effects. They shouldn’t be prescribed for men with prostate cancer.	Avoid using in men with prostate cancer. In other men, prescribe only for moderate to severe declines in natural testosterone production.
Desiccated thyroid	Desiccated thyroid may not be appropriate for patients with a history of heart problems. Safer medications are available.	Avoid
Estrogens with or without progestins	These hormones may increase risks of breast cancer and cancer of the lining of the uterus. They don’t appear to help protect women from heart disease or loss of cognitive (thinking) ability in later life. Estrogen cream inserted into the vagina does help vaginal dryness and is safe in women with breast cancer, especially if low doses are used.	Avoid pills and skin patches. Vaginal creams can be used at low doses to relieve pain during sex, and help prevent urinary tract infections, and related vaginal problems.
Growth hormone	Growth hormone has many side effects, including joint pain, swelling, enlargement of breast tissue in men, and carpal tunnel syndrome. It may also increase the chance of getting diabetes.	Avoid, except in patients who have had their pituitary gland removed for medical reasons.
Insulin, sliding scale	This way of dosing insulin is not very effective and can increase the chance of low blood sugar.	Avoid
Megestrol	This drug, prescribed to increase appetite, is not very effective, and may increase the chance of blood clots and, possibly, death.	Avoid

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Drugs and Categories of Drugs	Why these drugs may be inappropriate for older adults	Recommendations
Sulfonylureas, long-duration <ul style="list-style-type: none"> • Chlorpropamide • Glyburide 	Both medications can cause dangerous low blood sugar and other side effects in older adults. Safer medications are available.	Avoid
<i>Medications for gastrointestinal problems</i>		
Metoclopramide	This medication may cause shakiness, sleepiness, and uncontrollable abnormal body movements. Frail older adults may be even more likely to get these effects.	Avoid, except for gastroparesis, a condition that reduces the ability of the stomach to empty its contents.
Mineral oil, taken by mouth	When swallowed, mineral oil may be accidentally inhaled and, as a result, can cause pneumonia. Safer medications are available.	Avoid
Trimethobenzamide	Not very effective for treating vomiting. This medication can cause side effects such as shakiness, sleepiness, and abnormal body movements.	Avoid
<i>Pain Medications</i>		
Meperidine	This is not a very effective pain reliever and may cause seizures. Safer medications are available.	Avoid

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Drugs and Categories of Drugs	Why these drugs may be inappropriate for older adults	Recommendations
<p>Non-COX-selective Non-Steroidal Anti-inflammatory Drugs (NSAIDs), oral</p> <ul style="list-style-type: none"> • Aspirin at doses higher than 325 milligrams per day • Diclofenac • Diflunisal • Etodolac • Fenoprofen • Ibuprofen • Ketoprofen • Meclofenamate • Mefenamic acid • Meloxicam • Nabumetone • Naproxen • Oxaprozin • Piroxicam • Sulindac • Tolmetin 	<p>These medications increase the chance of stomach and intestinal bleeding in adults 75 or older, and adults 65 and older taking certain other medications (like prednisone warfarin, and clopidogrel) and medicines to prevent stroke.</p> <p>Taking a powerful stomach medication like a proton-pump inhibitor (omeprazole) or misoprostol at the same time as these drugs lowers—but doesn't eliminate—these risks.</p>	<p>Do not use these medications regularly unless there are no other effective alternatives and they are prescribed along with a proton-pump inhibitor or misoprostol.</p>
<p>Indomethacin Ketorolac</p>	<p>These drugs are NSAIDs that are even more likely to increase the chance of stomach and intestinal bleeding and ulcers or to cause other harmful effects.</p>	<p>Avoid</p>
<p>Pentazocine</p>	<p>This pain reliever can cause confusion, hallucinations and other side effects. Safer medications are available.</p>	<p>Avoid</p>
<p>Skeletal muscle relaxants</p> <ul style="list-style-type: none"> • Carisoprodol • Chlorzoxazone • Cyclobenzaprine • Metaxalone • Methocarbamol • Orphenadrine 	<p>Most muscle relaxants have questionable effectiveness and can cause side effects such as sleepiness and increased risks of bone fractures in older people.</p>	<p>Avoid</p>

AGS Beers Criteria for Potentially Inappropriate Medication Use in Older Adults

Disease or Syndrome	Drug(s)	Rationale	Recommendation
Heart failure	<ul style="list-style-type: none"> • Nonsteroidal antiinflammatory drugs (NSAIDs) and COX-2 inhibitors (see above list for examples) <p>Pioglitazone, rosiglitazone Cilostazol Dronedarone</p> <p>If the heart failure is systolic heart failure:</p> <ul style="list-style-type: none"> • Diltiazem • Verapamil 	These drugs may increase the chance of fluid retention, and contribute to heart failure.	Avoid
Syncope or fainting	<p>Acetylcholinesterase inhibitors</p> <ul style="list-style-type: none"> • Donepezil • Galantamine • Rivastigmine <p>Peripheral alpha blockers</p> <ul style="list-style-type: none"> • Doxazosin • Prazosin • Terazosin <p>Tertiary Tricyclic Antidepressants (TCAs): Amitriptyline, chlordiazepoxide-amitriptyline, clomipramine, doxepin, imipramine, perphenazine-amitriptyline, trimipramine Chlorpromazine, thioridazine, and olanzapine</p>	These drugs increase the chance of dizziness, fainting, and falling, and may cause a slowed heartbeat.	Avoid
Chronic seizures or epilepsy	<p>Bupropion Chlorpromazine Clozapine Maprotiline Olanzapine Thioridazine Thiothixene Tramadol</p>	These medications may increase the frequency of seizures in some older adults. But they may be acceptable in older patients with well-controlled seizures and for whom other drugs have not been effective.	Avoid unless seizures are well controlled and other drugs do not work.

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Disease or Syndrome	Drug(s)	Rationale	Recommendation
Delirium	All Tricyclic Antidepressants (TCAs) All Anticholinergic drugs Benzodiazepines Chlorpromazine Corticosteroids H ₂ -receptor antagonist Meperidine Sedative hypnotics Thioridazine	These medications can cause or worsen delirium in older people. Avoid these drugs in older adults with or at high risk of delirium.	Avoid
Dementia and cognitive/mental impairment	Anticholinergic drugs Benzodiazepines H ₂ -receptor antagonists Zolpidem Antipsychotics—used regularly or as needed	Avoid these drugs in adults with cognitive or “thinking” problems because these medications may make this worse. Antipsychotic drugs should not be prescribed for behavioral problems related to dementia unless non-drug or safer drug options are not working and a patient is a threat to himself or others. Antipsychotic drugs may increase the chance of stroke and death in people with dementia.	Avoid
A history of falls or fractures	Anticonvulsants Antipsychotics Benzodiazepines Nonbenzodiazepine hypnotics <ul style="list-style-type: none"> • Eszopiclone • Zaleplon • Zolpidem Tricyclic Antidepressants (TCAs) and Selective Serotonin Uptake Inhibitors (SSRIs)	These drugs can cause fainting and falls, and make it hard to coordinate movements.	Avoid unless safer medications are not available. Avoid anticonvulsant drugs in someone with a history of falls/fractures unless it is for seizures.

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Disease or Syndrome	Drug(s)	Rationale	Recommendation
Insomnia	Oral decongestants <ul style="list-style-type: none"> • Pseudoephedrine • Phenylephrine Stimulants <ul style="list-style-type: none"> • Amphetamine • Methylphenidate • Pemoline Other medications <ul style="list-style-type: none"> • Theophylline • Caffeine 	These drugs make insomnia worse.	Avoid
Parkinson's disease	All antipsychotics except quetiapine and clozapine Antiemetics <ul style="list-style-type: none"> • Metoclopramide • Prochlorperazine • Promethazine 	These drugs may worsen symptoms of Parkinson's disease and/or cause Parkinson's-like symptoms Quetiapine and clozapine appear to be less likely to worsen symptoms of Parkinson's disease than the other drugs listed here.	Avoid
Chronic constipation	Oral medications for urinary incontinence <ul style="list-style-type: none"> • Darifenacin • Fesoterodine • Oxybutynin • Solifenacin • Tolterodine • Trospium Antihistamines <ul style="list-style-type: none"> • Brompheniramine (various) • Carbinoxamine • Chlorpheniramine • Clemastine (various kinds) • Cyproheptadine • Dexbrompheniramine • Dexchlorpheniramine (various kinds) • Diphenhydramine • Doxylamine • Hydroxyzine • Promethazine • Triprolidine 	The medications can worsen constipation and safer medications are available.	Avoid unless no other alternatives are available.

AGS Beers Criteria for Potentially Inappropriate Medication Use in Older Adults

Disease or Syndrome	Drug(s)	Rationale	Recommendation
Chronic constipation (cont'd)	Heart/blood pressure medications <ul style="list-style-type: none"> • Diltiazem • Verapamil Other medications <ul style="list-style-type: none"> • Antipsychotics • Belladonna alkaloids • Clidinium-chlordiazepoxide • Dicyclomine • Hyoscyamine • Propantheline • Scopolamine • Tertiary Tricyclic Antidepressants (amitriptyline, clomipramine, doxepin, imipramine, and trimipramine) 	The medications can worsen constipation and safer medications are available.	Avoid unless no other alternatives are available.
Repeated stomach or intestinal ulcers	Aspirin at doses higher than 325 milligrams per day Non-COX-2 selective NSAIDs	These drugs may make ulcers worse and increase the chance of new ulcers.	Avoid these drugs unless other medications are not effective and the patient can take an accompanying medication that can help prevent ulcers—such as a proton-pump inhibitor or misoprostol.
Poor kidney function	Nonsteroidal anti-inflammatory drugs Triamterene (alone or in combination with other medications)	These drugs may increase risks of potentially serious kidney damage.	Avoid
Urinary incontinence (accidental loss of urine) in women	Estrogen in pill or patch form (but not estrogen cream inserted into the vagina)	Estrogen in pill or patch form can make urinary incontinence worse in women.	Avoid in women.

AGS Beers Criteria for Potentially Inappropriate Medication Use in Older Adults

Disease or Syndrome	Drug(s)	Rationale	Recommendation
Prostate enlargement or urinary problems in men	Ipratropium inhaler Tiotropium inhaler	These medications may cause aggravated prostate problems and make urination more difficult.	Avoid in men.
Stress or mixed urinary incontinence (loss of urine when sneezing/ coughing/ bending over/with exercise)	Alpha-blockers • Doxazosin • Prazosin • Terazosin	These may make bladder-control problems worse	Avoid in women.

2012 AGS Beers Criteria for Potentially Inappropriate Medications to Be Used with Caution in Older Adults

Drug(s)	Rationale	Recommendation
Aspirin to prevent heart attacks and other “cardiac events”	In adults 80-years-old and older, aspirin may do more harm than good	Use aspirin with caution in adults 80 and older.
Dabigatran	This medication, used to prevent the formation of blood clots in patients with atrial fibrillation, increases the chance of bleeding in adults 75 years and older more than another drug, warfarin, that is used for the same purpose. There isn’t enough evidence that dabigatran is effective and safe in patients with kidney problems.	Use this drug with caution in adults 75 and in older adults with kidney problems.
Prasugrel	This drug can increase the chance of bleeding in older adults, but may be appropriate for some older adults at very high risk of future heart problems.	Use with caution in adults 75 years or older.
Antipsychotics Carbamazepine Carboplatin Cisplatin All antidepressants Vincristine	These drugs may lower your blood sodium level to dangerous levels. Healthcare providers should monitor patients taking these medications.	Use with caution.
Vasodilators	These drugs may increase risks of fainting in older adults with a history of fainting.	Use with caution.

This summary is from the full report titled, *AGS Updated Beers Criteria for Potentially Inappropriate Medication Use in Older Adults*. It is in the March 2012 issue of the *Journal of the American Geriatrics Society (JAGS)*. The report is authored by the American Geriatrics Society 2012 Beers Criteria Update Expert Panel.

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