

## Beers Criteria for Potentially Inappropriate Medication Use in Older Adults Part I: 2002 Criteria Independent of Diagnoses or Conditions

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**WHY:** Recently published studies confirm that inappropriate medication use remains a serious problem for the elderly (Bonk, et al, 2006; Lau, et al, 2005). Nursing knowledge of potentially inappropriate medications will enable attentive monitoring for adverse effects, and increase awareness of disease and condition-specific medication concerns in older adults.

**BEST TOOL:** The *2002 Criteria for Potentially Inappropriate Medication Use in Older Adults* (Fick, et al, 2003) update the 1997 Beers Criteria, and identify medications noted by an expert consensus panel to have potential risks that outweigh potential benefits. The criteria provide an outcome severity rating (high vs. low) and a brief summary of the prescribing concerns. A total of 15 medications/classes were dropped or modified from the 1997 list, and 44 new medications were added.

Try This: Part I focuses on Table 1: 2002 Criteria Independent of Diagnoses and Conditions. It contains 48 individual medications or classes of medications to avoid in older adults and their potential concerns. Try This: Part II presents the criteria considering diagnosis or medical condition.

**TARGET POPULATION:** The criteria apply to the general population of adults older than 65 years of age. There may be additional medications that are inappropriate for a significantly older or frailer population.

**VALIDITY AND RELIABILITY:** The criteria were developed using a modified Delphi method to achieve consensus among 12 experts in geriatrics and/or pharmacology. The criteria have been used to screen populations for possible medication-related problems. Use of inappropriate medications has been associated with negative outcomes (Fu, et al, 2004; Lau, et al, 2005; Perri, et al, 2005). Additional studies are needed to support predictive validity and address potential confounding variables such as severity of underlying illness (Lau, et al, 2005; Zuckerman, et al, 2006).

**STRENGTHS AND LIMITATIONS:** The criteria will assist nurses to identify patients who may benefit from monitoring or medication review. The criteria do not identify all cases of potentially inappropriate prescribing or medication-associated adverse events, and do not address polypharmacy or underuse of helpful medications. The criteria are designed for population-based screening and are not intended to substitute for professional judgment regarding the individualized needs of particular older adults.

**FOLLOW-UP:** Nurses may use the criteria to increase awareness of medications that may increase risk for adverse drug reactions. Nurses, primary care providers and pharmacists may collaborate to optimize individualized medication regimes and provide appropriate clinical monitoring and education. The suggested references provide further information on medication risk and older adults.

### MORE ON THE TOPIC:

Best practice information on care of older adults: [www.ConsultGerIRN.org](http://www.ConsultGerIRN.org).

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Perri, M. III, Menon, A.M., Deshpande, A.D., Shinde, S.B., Jiang, R., & Cooper, J.W., Cook, C.L., Griffin, S.C., & Lorys, R.A. (2005). Adverse outcomes associated with inappropriate drug use in nursing homes. *Annals of Pharmacotherapy*, 39(3), 405-411.

Zuckerman, I.H., Langenberg, P., Baumgarten, M., Orwig, D., Byrns, P.J., & Simoni-Wastila, L., & Magaziner, J. (2006). Inappropriate drug use and risk of transition to nursing homes among community-dwelling older adults. *Medical care*, 44(8), 722-730.

**Table 1: 2002 Criteria for Potentially Inappropriate Medication Use in Older Adults: Independent of Diagnoses or Conditions**

| Drug   | Concern  | Severity Rating (High or Low) |
|--|--|-------------------------------|
| Propoxyphene (Darvon) and combination products (Darvon with ASA, Darvon-N, and Darvocet-N)   | Offers few analgesic advantages over acetaminophen, yet has the adverse effects of other narcotic drugs.   | Low                           |
| Indomethacin (Indocin and Indocin SR)  | Of all available nonsteroidal anti-inflammatory drugs, this drug produces the most CNS adverse effects.  | High                          |
| Pentazocine (Talwin)   | Narcotic analgesic that causes more CNS adverse effects, including confusion and hallucinations, more commonly than other narcotic drugs. Additionally, it is a mixed agonist and antagonist.  | High                          |
| Trimethobenzamide (Tigan)  | One of the least effective antiemetic drugs, yet it can cause extrapyramidal adverse effects.  | High                          |
| Muscle relaxants and antispasmodics: methocarbamol (Robaxin), carisoprodol (Soma), chlorzoxazone (Paraflex), metaxalone (Skelaxin), cyclobenzaprine (Flexeril), and oxybutynin (Ditropan). Do not consider the extended-release Ditropan XL.   | Most muscle relaxants and antispasmodic drugs are poorly tolerated by elderly patients, since these cause anticholinergic adverse effects, sedation, and weakness. Additionally, their effectiveness at doses tolerated by elderly patients is questionable. | High                          |
| Flurazepam (Dalmane)   | This benzodiazepine hypnotic has an extremely long half-life in elderly patients (often days), producing prolonged sedation and increasing the incidence of falls and fracture. Medium- or short-acting benzodiazepines are preferable.                      | High                          |
| Amitriptyline (Elavil), chlorthalidopoxide-amitriptyline (Limbitrol), and perphenazine-amitriptyline (Triavil)   | Because of its strong anticholinergic and sedation properties, amitriptyline is rarely the antidepressant of choice for elderly patients.  | High                          |
| Doxepin (Sinequan)   | Because of its strong anticholinergic and sedating properties, doxepin is rarely the antidepressant of choice for elderly patients.  | High                          |
| Meprobamate (Miltown and Equanil)  | This is a highly addictive and sedating anxiolytic. Those using meprobamate for prolonged periods may become addicted and may need to be withdrawn slowly.   | High                          |
| Doses of short-acting benzodiazepines: doses greater than lorazepam (Ativan), 3 mg; oxazepam (Serax), 60 mg; alprazolam (Xanax), 2 mg; temazepam (Restoril), 15 mg; and triazolam (Halcion), 0.25 mg   | Because of increased sensitivity to benzodiazepines in elderly patients, smaller doses may be effective as well as safer. Total daily doses should rarely exceed the suggested maximums.   | High                          |
| Long-acting benzodiazepines: chlordiazepoxide (Librium), chlorthalidopoxide-amitriptyline (Limbitrol) clobidinium-chlordiazepoxide (Librax), diazepam (Valium), quazepam (Doral), halazepam (Paxipam), and chlorazepate (Tranxene)             | These drugs have a long half-life in elderly patients (often several days), producing prolonged sedation and increasing the risk of falls and fractures. Short- and intermediate-acting benzodiazepines are preferred if a benzodiazepine is required.       | High                          |
| Disopyramide (Norpace and Norpace CR)  | Of all antiarrhythmic drugs, this is the most potent negative inotrope and therefore may induce heart failure in elderly patients. It is also strongly anticholinergic. Other antiarrhythmic drugs should be used.   | High                          |
| Digoxin (Lanoxin) (should not exceed >0.125 mg/d except when treating atrial arrhythmias)  | Decreased renal clearance may lead to increased risk of toxic effects.   | Low                           |
| Short-acting dipyridamole (Persantine). Do not consider the long-acting dipyridamole (which has better properties than the short-acting in older adults) except with patients with artificial heart valves                                     | May cause orthostatic hypotension.   | Low                           |
| Methyldopa (Aldomet) and methyldopa-hydrochlorothiazide (Aldoril)  | May cause bradycardia and exacerbate depression in elderly patients.   | High                          |
| Reserpine at doses >0.25 mg  | May induce depression, impotence, sedation, and orthostatic hypotension.   | Low                           |
| Chlorpropamide (Diabinese)   | It has a prolonged half-life in elderly patients and could cause prolonged hypoglycemia. Additionally, it is the only oral hypoglycemic agent that causes SIADH.   | High                          |
| Gastrointestinal antispasmodic drugs: dicyclomine (Bentyl), hyoscyamine (Levsin and Levsinex), propantheline (Pro-Banthine), belladonna alkaloids (Donnatal and others), and clobidinium-chlordiazepoxide (Librax)                             | GI antispasmodic drugs are highly anticholinergic and have uncertain effectiveness. These drugs should be avoided (especially for long-term use).  | High                          |
| Anticholinergics and antihistamines: chlorpheniramine (Chlor-Trimeton), diphenhydramine (Benadryl), hydroxyzine (Vistaril and Atarax), cyproheptadine (Periactin), promethazine (Phenergan), tripeleonnamine, dexchlorpheniramine (Polaramine) | All nonprescription and many prescription antihistamines may have potent anticholinergic properties. Nonanticholinergic antihistamines are preferred in elderly patients when treating allergic reactions.   | High                          |
| Diphenhydramine (Benadryl)   | May cause confusion and sedation. Should not be used as a hypnotic, and when used to treat emergency allergic reactions, it should be used in the smallest possible dose.  | High                          |
| Ergot mesyloids (Hydergine) and cyclandelate (Cyclospasmol)  | Have not been shown to be effective in the doses studied.  | Low                           |
| Ferrous sulfate >325 mg/d  | Doses >325 mg/d do not dramatically increase the amount absorbed but greatly increase the incidence of constipation.   | Low                           |
| All barbiturates (except phenobarbital) except when used to control seizures   | Are highly addictive and cause more adverse effects than most sedative or hypnotic drugs in elderly patients.  | High                          |
| Meperidine (Demerol)   | Not an effective oral analgesic in doses commonly used. May cause confusion and has many disadvantages to other narcotic drugs.  | High                          |
| Ticlopidine (Ticlid)   | Has been shown to be no better than aspirin in preventing clotting and may be considerably more toxic. Safer, more effective alternatives exist.   | High                          |
| Ketorolac (Toradol)  | Immediate and long-term use should be avoided in older persons, since a significant number have asymptomatic GI pathologic conditions.   | High                          |
| Amphetamines and anorexic agents   | These drugs have potential for causing dependence, hypertension, angina, and myocardial infarction.  | High                          |
| Long-term use of full-dosage, longer half-life, non-COX-selective NSAIDs: naproxen (Naprosyn, Avapro, and Aleve), oxaprozin (Daypro), and piroxicam (Feldene)  | Have the potential to produce GI bleeding, renal failure, high blood pressure, and heart failure.  | High                          |
| Daily fluoxetine (Prozac)  | Long half-life of drug and risk of producing excessive CNS stimulation, sleep disturbances, and increasing agitation. Safer alternatives exist.  | High                          |
| Long-term use of stimulant laxatives: bisacodyl (Dulcolax), cascara sagrada, and Neoloid except in the presence of opiate analgesic use  | May exacerbate bowel dysfunction.  | High                          |
| Amiodarone (Cordarone)   | Associated with QT interval problems and risk of provoking torsades de pointes. Lack of efficacy in older adults.  | High                          |
| Orphenadrine (Norflex)   | Causes more sedation and anticholinergic adverse effects than safer alternatives.  | High                          |
| Guanethidine (Ismelin)   | May cause orthostatic hypotension. Safer alternatives exist.   | High                          |
| Guanadrel (Hylorel)  | May cause orthostatic hypotension.   | High                          |
| Cyclandelate (Cyclospasmol)  | Lack of efficacy.  | Low                           |
| Isoxsuprine (Vasodilan)  | Lack of efficacy.  | Low                           |
| Nitrofurantoin (Macrochantin)  | Potential for renal impairment. Safer alternatives available.  | High                          |
| Doxazosin (Cardura)  | Potential for hypotension, dry mouth, and urinary problems.  | Low                           |
| Methyltestosterone (Android, Virilon, and Testrad)   | Potential for prostatic hypertrophy and cardiac problems.  | High                          |
| Thioridazine (Mellaril)  | Greater potential for CNS and extrapyramidal adverse effects.  | High                          |
| Mesoridazine (Serentil)  | CNS and extrapyramidal adverse effects.  | High                          |
| Short acting nifedipine (Procardia and Adalat)   | Potential for hypotension and constipation.  | High                          |
| Clonidine (Catapres)   | Potential for orthostatic hypotension and CNS adverse effects.   | Low                           |
| Mineral oil  | Potential for aspiration and adverse effects. Safer alternatives available.  | High                          |
| Cimetidine (Tagamet)   | CNS adverse effects including confusion.   | Low                           |
| Ethacrynic acid (Edecrin)  | Potential for hypertension and fluid imbalances. Safer alternatives available.   | Low                           |
| Desiccated thyroid   | Concerns about cardiac effects. Safer alternatives available.  | High                          |
| Amphetamines (excluding methylphenidate hydrochloride and anorexics)   | CNS stimulant adverse effects.   | High                          |
| Estrogens only (oral)  | Evidence of the carcinogenic (breast and endometrial cancer) potential of these agents and lack of cardioprotective effect in older women.   | Low                           |

Abbreviations: CNS, central nervous system; COX, cyclooxygenase; GI, gastrointestinal; NSAIDs, nonsteroidal anti-inflammatory drugs; SIADH, syndrome of inappropriate antidiuretic hormone secretion. Reprinted with permission: Fick, D.M., Cooper, J.W., Wade, W.E., Waller, J.L., Maclean, J.R., & Beers, M.H. (2003). Updating the Beers Criteria for potentially inappropriate medication use in older adults: Results of a US consensus panel of experts. Archives of Internal Medicine, 163(22), 2716-2724. Table 1, p. 2720. Evidence Level VI: Expert Opinion. Copyright © 2003, American Medical Association. All Rights reserved.



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