From THE AMERICAN GERIATRICS SOCIETY

A POCKET GUIDE TO THE AGS 2015 BEERS CRITERIA

This guide has been developed as a tool to assist healthcare providers in improving medication safety in older adults. The role of this guide is to *inform* clinical decision-making, research, training, quality measures and regulations concerning the prescribing of medications for older adults to improve safety and quality of care. It is based on *The AGS 2015 Updated Beers Criteria for Potentially Inappropriate Medication Use in Older Adults.*

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. In 2011, the AGS sponsored its first update of the criteria, assembling a team of experts and using an enhanced, evidence-based methodology. In 2015, the AGS again funded the development of the Updated Criteria using an evidence-based methodology and rating each Criterion (quality of evidence and strength of evidence) using the American College of Physicians' Guideline Grading System, which is based on the GRADE scheme developed by Guyatt et al.

The full document, along with accompanying resources can be viewed in their entirety online at geriatricscareonline.org.

INTENDED USE

The goal of this guide is to improve care of older adults by reducing their exposure to Potentially Inappropriate Medications (PIMS).

- This should be viewed as a guideline for identifying medications for which the risks of their use in older adults outweigh the benefits.
- These criteria are not meant to be applied in a punitive manner.
- This list is not meant to supersede clinical judgment or an individual patient's values and needs. Prescribing and managing disease conditions should be individualized and involve shared decision-making.
- 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.
- Two companion pieces were developed for the 2015 update. The first addresses the best way for patients, providers, and health systems to use (and not use) the 2015 AGS Beers Criteria. The second is a list of alternative medications included in the current use of High-Risk Medications in the Elderly and Potentially Harmful Drug-Disease Interactions in the Elderly quality measures. Both pieces can be found on geriatricscareonline.org.

The criteria are not applicable in all circumstances (i.e. patient's 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 so that adverse drug effects can be incorporated into the electronic health record and prevented or detected early.

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TABLE 1. 2015 American Geriatrics Society Beers Criteria for Potentially Inappropriate Medication Use in Older Adults

Organ System, Therapeutic Category, Drug(s)	***Recommendation,*** Rationale, *Quality of Evidence (QE), Strength of Recommendation (SR)*
Anticholinergics	
First-generation antihistamines: ■ Brompheniramine ■ Carbinoxamine ■ Chlorpheniramine ■ Clemastine ■ Cyproheptadine ■ Dexbrompheniramine ■ Dexchlorpheniramine ■ 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 Use of diphenhydramine in situations such as acute treatment of severe allergic reaction may be appropriate *QE = Moderate; SR = Strong*
Antiparkinsonian agents ■ Benztropine (oral) ■ Trihexyphenidyl	***Avoid*** Not recommended for prevention of extrapyramidal symptoms with antipsychotics; more-effective agents available for treatment of Parkinson disease *QE = Moderate; SR = Strong*
Antispasmodics: ■ Atropine (excludes ophthalmic) ■ Belladonna alkaloids ■ Clidinium-Chlordiazepoxide ■ Dicyclomine ■ Hyoscyamine ■ Propantheline ■ Scopolamine	***Avoid*** Highly anticholinergic, uncertain effectiveness *QE = Moderate; SR = Strong*
Antithrombotics	
■ Dipyridamole, oral short-acting (does not apply to the 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*
■ Ticlopidine	***Avoid*** Safer, effective alternatives available *QE = Moderate; SR = Strong*

CNS=central nervous system; NSAIDs=nonsteroidal anti-inflammatory drugs; SIADH, syndrome of inappropriate antidiuretic hormone.

Table 1 *(continued on page 3)*

Table 1 Continued

Organ System, Therapeutic Category, Drug(s)	***Recommendation,*** Rationale, *QE, SR*
Anti-infective	
■ Nitrofurantoin	***Avoid in individuals with creatinine clearance <30 mL/min or for long-term suppression of bacteria*** Potential for pulmonary toxicity, hepatoxicity, and peripheral neuropathy, especially with long-term use; safer alternatives available *QE = Low; SR = Strong*
Cardiovascular	
Peripheral alpha-1 blockers ■ Doxazosin ■ Prazosin ■ Terazosin	*Avoid use as an antihypertensive* High risk of orthostatic hypotension; not recommended as routine treatment for hypertension; alternative agents have superior risk/benefit profile *QE = Moderate; SR = Strong*
Central alpha agonists ■ Clonidine ■ Guanabenz ■ Guanfacine ■ Methyldopa ■ Reserpine (>0.1 mg/d)	***Avoid clonidine as first-line antihypertensive. Avoid others as listed*** High risk of adverse CNS effects; may cause bradycardia and orthostatic hypotension; not recommended as routine treatment for hypertension *QE = Low; SR = Strong*
Disopyramide	***Avoid*** Disopyramide is a potent negative inotrope and therefore may induce heart failure in older adults; strongly anticholinergic; other antiarrhythmic drugs preferred *QE = Low; SR = Strong*
Dronedarone	***Avoid in individuals with permanent atrial fibrillation or severe or recently decompensated heart failure*** Worse outcomes have been reported in patients taking dronedarone who have permanent atrial fibrillation or severe or recently decompensated heart failure *QE = High; SR = Strong*
Digoxin	***Avoid as first-line therapy for atrial fibrillation. Avoid as first-line therapy for heart failure. If used for atrial fibrillation or heart failure, avoid dosages >0.125 mg/d*** Use in atrial fibrillation: should not be used as a first-line agent in atrial fibrillation, because more-effective alternatives exist and it may be associated with increased mortality Use in heart failure: questionable effects on risk of hospitalization and may be associated with increased mortality in older adults with heart failure; in heart failure, higher dosages not associated with additional benefit and may increase risk of toxicity 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: moderate. Heart failure: low. Dosage >0.125 mg/d: moderate; SR = Atrial fibrillation: strong. Heart failure: strong. Dosage >0.125 mg/d: strong*

Table 1 *(continued on page 4)*

Table 1 Continued

Organ System, Therapeutic Category, Drug(s)	***Recommendation,*** Rationale, *QE, SR*
Nifedipine, immediate release	***Avoid*** Potential for hypotension; risk of precipitating myocardial ischemia *QE = High; SR = Strong*
Amiodarone	***Avoid amiodarone as first-line therapy for atrial fibrillation unless the patient has heart failure or substantial left ventricular hypertrophy*** Amiodarone is effective for maintaining sinus rhythm but has greater toxicities than other antiarrhythmics used in atrial fibrillation; it 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*
Central nervous system	
Antidepressants, alone or in combination ■ Amitriptyline ■ Amoxapine ■ Clomipramine ■ Desipramine ■ Doxepin >6 mg/d ■ Imipramine ■ Nortriptyline ■ Paroxetine ■ Protriptyline ■ Trimipramine	***Avoid*** Highly anticholinergic, sedating, and cause orthostatic hypotension; safety profile of low-dose doxepin (≤6 mg/d) comparable with that of placebo *QE = High; SR = Strong*
Antipsychotics, first- (conventional) and second- (atypical) generation	***Avoid, except for schizophrenia, bipolar disorder, or short-term use as antiemetic during chemotherapy*** Increased risk of cerebrovascular accident (stroke) and greater rate of cognitive decline and mortality in persons with dementia Avoid antipsychotics for behavioral problems of dementia and/or delirium unless nonpharmacological options (e.g., behavioral interventions) have failed or are not possible ***and*** the older adult is threatening substantial harm to self or others *QE = Moderate; SR = Strong*
Barbiturates ■ Amobarbital ■ Butabarbital ■ Butalbital ■ Mephobarbital ■ Pentobarbital ■ Phenobarbital ■ Secobarbital	***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 5)*

Table 1 Continued

Organ System, Therapeutic Category, Drug(s)	***Recommendation,*** Rationale, *QE, SR*
Benzodiazepines *Short- and intermediate-acting:* ■ Alprazolam ■ Estazolam ■ Lorazepam ■ Oxazepam ■ Temazepam ■ Triazolam *Long-acting:* ■ Clorazepate ■ Chlordiazepoxide (alone or in combination with amitriptyline or clidinium) ■ Clonazepam ■ Diazepam ■ Flurazepam ■ Quazepam	***Avoid*** Older adults have increased sensitivity to benzodiazepines and decreased metabolism of long-acting agents; 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 disorders, benzodiazepine withdrawal, ethanol withdrawal, severe generalized anxiety disorder, and periprocedural anesthesia *QE = Moderate; SR = Strong*
Meprobamate	***Avoid*** High rate of physical dependence; very sedating *QE = Moderate; SR = Strong*
Nonbenzodiazepine, benzodiazepine receptor agonist hypnotics ■ Eszopiclone ■ Zolpidem ■ Zaleplon	***Avoid*** Benzodiazepine-receptor agonists 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*
Ergoloid mesylates (dehydrogenated ergot alkaloids) Isoxsuprine	***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; contraindicated in men with prostate cancer *QE = Moderate; SR = Weak*
Desiccated thyroid	***Avoid*** Concerns about cardiac effects; safer alternatives available *QE = Low; SR = Strong*

Table 1 *(continued on page 6)*

Table 1 Continued

Organ System, Therapeutic Category, Drug(s)	***Recommendation,*** Rationale, *QE, SR*
Estrogens with or without progestins	***Avoid oral and topical patch. Vaginal cream or tablets: acceptable to use low-dose intravaginal estrogen for management of dyspareunia, 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. 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 risk and benefits of low-dose vaginal estrogen (dosages of estradiol <25 mcg twice weekly) with their health care provider *QE = Oral and patch: high. Vaginal cream or tablets: moderate.; SR = Oral and patch: strong. Topical vaginal cream or tablets: weak*
Growth hormone	***Avoid, except as hormone replacement following pituitary gland removal*** Impact on body composition is small and associated with edema, arthralgia, carpal tunnel syndrome, gynecomastia, impaired fasting glucose *QE = High; SR = Strong*
Insulin, sliding scale	***Avoid*** Higher risk of hypoglycemia without improvement in hyperglycemia management regardless of care setting; refers to sole use of short- or rapid-acting insulins to manage or avoid hyperglycemia in absence of basal or long-acting insulin; does not apply to titration of basal insulin or use of additional short- or rapid-acting insulin in conjunction with scheduled insulin (ie, correction insulin) *QE = Moderate; SR = Strong*
Megestrol	***Avoid*** Minimal effect on weight; increases risk of thrombotic events and possibly death in older adults *QE = Moderate; SR = Strong*
Sulfonylureas, long-duration ■ Chlorpropamide ■ Glyburide	***Avoid*** Chlorpropamide: prolonged half-life in older adults; can cause prolonged hypoglycemia; causes SIADH Glyburide: higher risk of severe prolonged hypoglycemia in older adults *QE = High; SR = Strong*
Gastrointestinal	
Metoclopramide	***Avoid, unless for gastroparesis*** Can cause extrapyramidal effects, including tardive dyskinesia; risk may be greater in frail older adults *QE = Moderate; SR = Strong*
Mineral oil, given orally	***Avoid*** Potential for aspiration and adverse effects; safer alternatives available *QE = Moderate; SR = Strong*

Table 1 *(continued on page 7)*

Table 1 Continued

Organ System, Therapeutic Category, Drug(s)	***Recommendation,*** Rationale, *QE, SR*
Proton-pump inhibitors	***Avoid scheduled use for >8 weeks unless for high-risk patients (e.g., oral corticosteroids or chronic NSAID use), erosive esophagitis, Barrett's esophagitis, pathological hypersecretory condition, or demonstrated need for maintenance treatment (e.g., due to failure of drug discontinuation trial or H_2 blockers)*** Risk of *C difficile* infection and bone loss and fractures *QE = High; SR = Strong*
Pain medications	
Meperidine	***Avoid, especially in those with chronic kidney disease*** Not effective oral analgesic in dosages commonly used; may have higher risk of neurotoxicity, including delirium, than other opioids; safer alternatives available *QE = Moderate; SR = Strong*
Non-cyclooxygenase-selective NSAIDs, oral: ■ Aspirin >325 mg/d ■ Diclofenac ■ Diflunisal ■ Etodolac ■ Fenoprofen ■ Ibuprofen ■ Ketoprofen ■ Meclofenamate ■ Mefenamic acid ■ Meloxicam ■ Nabumetone ■ Naproxen ■ Oxaprozin ■ Piroxicam ■ Sulindac ■ Tolmetin	***Avoid chronic use, unless other alternatives are not effective and patient can take gastroprotective agent (proton-pump inhibitor or misoprostol)*** Increased risk of gastrointestinal bleeding or peptic ulcer disease in high-risk groups, including those aged >75 or taking oral or parenteral corticosteroids, anticoagulants, or antiplatelet agents; use of proton-pump inhibitor or misoprostol reduces but does not eliminate risk. Upper gastrointestinal ulcers, gross bleeding, or perforation caused by NSAIDs occur in approximately 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 *QE = Moderate; SR = Strong*
■ Indomethacin ■ Ketorolac, includes parenteral	***Avoid*** Indomethacin is more likely than other NSAIDs to have adverse CNS effects. Of all the NSAIDs, indomethacin has the most adverse effects. Increased risk of gastrointestinal bleeding/peptic ulcer disease, and acute kidney injury in older adults *QE = Moderate; SR = Strong*
Pentazocine	***Avoid*** Opioid analgesic that causes CNS adverse effects, including confusion and hallucinations, more commonly than other opioid analgesic drugs; is also a mixed agonist and antagonist; safer alternatives available *QE = Low; SR = Strong*
Skeletal muscle relaxants ■ Carisoprodol ■ Chlorzoxazone ■ Cyclobenzaprine ■ Metaxalone ■ Methocarbamol ■ Orphenadrine	***Avoid*** Most muscle relaxants poorly tolerated by older adults because some have anticholinergic adverse effects, sedation, increased risk of fractures; effectiveness at dosages tolerated by older adults questionable *QE = Moderate; SR = Strong*
Genitourinary	
Desmopressin	***Avoid for treatment of nocturia or nocturnal polyuria*** High risk of hyponatremia; safer alternative treatments *QE = Moderate; SR = Strong*

TABLE 2. 2015 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)	***Recommendation,*** Rationale, *Quality of Evidence (QE), Strength of Recommendation (SR)*
Cardiovascular		
Heart failure	NSAIDs and COX-2 inhibitors Nondihydropyridine CCBs (diltiazem, verapamil)—avoid only for heart failure with reduced ejection fraction Thiazolidinediones (pioglitazone, rosiglitazone) Cilostazol Dronedarone (severe or recently decompensated heart failure)	***Avoid*** Potential to promote fluid retention and exacerbate heart failure *QE = NSAIDs: moderate. CCBs: moderate. Thiazolidinediones: high. Cilostazol: low. Dronedarone: high; SR = Strong*
Syncope	Acetylcholinesterase inhibitors (AChEIs) Peripheral alpha-1 blockers ■ Doxazosin ■ Prazosin ■ Terazosin Tertiary TCAs ■ Chlorpromazine ■ Thioridazine ■ Olanzapine	***Avoid*** Increases risk of orthostatic hypotension or bradycardia *QE = Peripheral alpha-1 blockers: high. TCAs, AChEIs, antipsychotics: moderate; SR = AChEIs, TCAs: strong. Peripheral alpha-1 blockers, antipsychotics: weak*
Central nervous system		
Chronic seizures or epilepsy	Bupropion Chlorpromazine Clozapine Maprotiline Olanzapine Thioridazine Thiothixene Tramadol	***Avoid*** Lowers seizure threshold; may be acceptable in individuals with well-controlled seizures in whom alternative agents have not been effective *QE = Low; SR = Strong*
Delirium	Anticholinergics* Antipsychotics Benzodiazepines Chlorpromazine Corticosteroids[a] H_2-receptor antagonists ■ Cimetidine ■ Famotidine ■ Nizatidine ■ Ranitidine Meperidine Sedative hypnotics	***Avoid*** Avoid in older adults with or at high risk of delirium because of potential of inducing or worsening delirium Avoid antipsychotics for behavioral problems of dementia and/or delirium unless nonpharmacological options (e.g., behavioral interventions) have failed or are not possible ***and*** the older adult is threatening substantial harm to self or others. Antipsychotics are associated with greater risk of cerebrovascular accident (stroke) and mortality in persons with dementia *QE = Moderate; SR = Strong*

Table 2 *(continued on page 9)*

Table 2 Continued

Disease or Syndrome	Drug(s)	***Recommendation,*** Rationale, *QE, SR*
Dementia or cognitive impairment	Anticholinergics* Benzodiazepines H_2-receptor antagonists Nonbenzodiazepine, benzodiazepine receptor agonist hypnotics ■ Eszopiclone ■ Zolpidem ■ Zaleplon Antipsychotics, chronic and as-needed use	***Avoid*** Avoid due to adverse CNS effects Avoid antipsychotics for behavioral problems of dementia and/or delirium unless nonpharmacological options (e.g., behavioral interventions) have failed or are not possible ***and*** the older adult is threatening substantial harm to self or others. Antipsychotics are associated with greater risk of cerebrovascular accident (stroke) and mortality in persons with dementia *QE = Moderate; SR = Strong*
History of falls or fractures	Anticonvulsants Antipsychotics Benzodiazepines Nonbenzodiazepine, benzodiazepine receptor agonist hypnotics ■ Eszopiclone ■ Zaleplon ■ Zolpidem TCAs SSRIs Opioids	***Avoid unless safer alternatives are not available; avoid anticonvulsants except for seizure and mood disorders. Opioids: avoid, excludes pain management due to recent fractures or joint replacement*** May cause ataxia, impaired psychomotor function, syncope, additional falls; shorter-acting benzodiazepines 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 (ie, anticonvulsants, opioid-receptor agonists, antipsychotics, antidepressants, benzodiazepine-receptor agonists, other sedatives/hypnotics) and implement other strategies to reduce fall risk *QE = High. Opioids: Moderate; SR = Strong. Opioids: Strong*
Insomnia	Oral decongestants ■ Pseudoephedrine ■ Phenylephrine Stimulants ■ Amphetamine ■ Armodafinil ■ Methylphenidate ■ Modafinil ■ Theobromines ■ Theophylline ■ Caffeine	***Avoid*** CNS stimulant effects *QE = Moderate; SR = Strong*

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

Table 2 *(continued on page 10)*

Table 2 Continued

Disease or Syndrome	Drug(s)	***Recommendation,*** Rationale, *QE, SR*
Parkinson disease	All antipsychotics (except aripiprazole, quetiapine, clozapine) Antiemetics ■ Metoclopramide ■ Prochlorperazine ■ Promethazine	***Avoid*** Dopamine-receptor antagonists with potential to worsen parkinsonian symptoms Quetiapine, aripiprazole, clozapine appear to be less likely to precipitate worsening of Parkinson disease *QE = Moderate; SR = Strong*
Gastrointestinal		
History of gastric or duodenal ulcers	Aspirin (>325 mg/d) Non-COX-2 selective NSAIDs	***Avoid unless other alternatives are not effective and patient can take gastroprotective agent (ie, proton-pump inhibitor or misoprostol)*** May exacerbate existing ulcers or cause new/additional ulcers *QE = Moderate; SR = Strong*
Kidney/Urinary tract		
Chronic kidney disease Stages IV or less (creatinine clearance <30 mL/min)	NSAIDs (non-COX and COX-selective, oral and parenteral)	***Avoid*** May increase risk of acute kidney injury and further decline of renal function *QE = Moderate; SR = Strong*
Urinary incontinence (all types) in women	Estrogen oral and transdermal (excludes intravaginal estrogen) Peripheral Alpha-1 blockers ■ Doxazosin ■ Prazosin ■ Terazosin	***Avoid in women*** Aggravation of incontinence *QE = Estrogen: High. Peripheral alpha-1 blockers: Moderate; SR = Estrogen: Strong. Peripheral alpha-1 blockers: Strong*
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*

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

CCB=calcium channel blocker; AChEI=acetylcholinesterase inhibitor; CNS=central nervous system; COX=cyclooxygenase; NSAIDs=nonsteroidal antiinflammatory drug; TCAs=tricyclic antidepressant.

Table 2 *(continued on page 11)*

TABLE 3. 2015 American Geriatrics Society Beers Criteria for Potentially Inappropriate Medications to Be Used with Caution in Older Adults

Drug(s)	***Recommendation,*** Rationale, *Quality of Evidence (QE), Strength of Recommendation (SR)*
Aspirin for primary prevention of cardiac events	**Use with caution in adults ≥80 years old** Lack of evidence of benefit versus risk in adults ≥80 years old *QE = Low; SR = Strong*
Dabigatran	**Use with caution in adults ≥75 years old and in patients with CrCl <30 mL/min** Increased risk of gastrointestinal bleeding compared with warfarin and reported rates with other target-specific oral anticoagulants in adults ≥75 years old; lack of evidence of efficacy and safety in individuals with CrCl <30 mL/min *QE = Moderate; SR = Strong*
Prasugrel	**Use with caution in adults aged ≥75** Increased risk of bleeding in older adults; benefit in highest-risk older adults (e.g., those with prior myocardial infarction or diabetes mellitus) may offset risk *QE = Moderate; SR = Weak*
Antipsychotics Diuretics Carbamazepine Carboplatin Cyclophosphamide Cisplatin Mirtazapine Oxcarbazepine SNRIs SSRIs TCAs Vincristine	**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*
Vasodilators	**Use with caution.** May exacerbate episodes of syncope in individuals with history of syncope *QE = Moderate; SR = Weak*

CrCl= creatinine clearance; SNRIs = Serotonin-nonrepinephrine reuptake inhitibors; SSRIs = Selective serotonin reuptake inhitibors; TCA=tricyclic antidepressant.

TABLE 4. 2015 American Geriatrics Society Beers Criteria for Potentially Clinically Important Non-anti-infective Drug–Drug Interactions That Should Be Avoided in Older Adults

Object Drug and Class	Interacting Drug and Class	***Recommendation,*** Risk Rationale, *Quality of Evidence (QE), Strength of Recommendation (SR)*
ACEIs	Amiloride or triamterene	***Avoid routine use; reserve for patients with demonstrated hypokalemia while taking an ACEI*** Increased risk of hyperkalemia *QE = Moderate; SR = Strong*
Anticholinergic	Anticholinergic	***Avoid, minimize number of anticholinergic drugs*** Increased risk of cognitive decline *QE = Moderate; SR = Strong*
Antidepressants (ie, TCAs and SSRIs)	≥2 other CNS-active drugs[a]	***Avoid total of ≥3 CNS-active drugs[a]; minimize number of CNS-active drugs*** Increased risk of falls *QE = Moderate; SR = Strong*
Antipsychotics	≥2 other CNS-active drugs[a]	***Avoid total of ≥3 CNS-active drugs[a]; minimize number of CNS active drugs*** Increased risk of falls *QE = Moderate; SR = Strong*
Benzodiazepines and nonbenzodiazepine, benzodiazepine receptor agonist hypnotics	≥2 other CNS-active drugs[a]	***Avoid total of ≥3 CNS-active drugs[a]; minimize number of CNS active drugs*** Increased risk of falls and fractures *QE = High; SR = Strong*
Corticosteroids, oral or parenteral	NSAIDs	***Avoid; if not possible, provide gastrointestinal protection*** Increased risk of peptic ulcer disease or gastrointestinal bleeding *QE = Moderate; SR = Strong*
Lithium	ACEIs	***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*
Opioid receptor agonist analgesics	≥2 other CNS-active drugs[a]	***Avoid total of ≥3 CNS-active drugs[a]; minimize number of CNS drugs*** Increased risk of falls *QE = High; SR = Strong*
Peripheral Alpha-1 blockers	Loop diuretics	***Avoid in older women, unless conditions warrant both drugs*** Increased risk of urinary incontinence in older women *QE = Moderate; SR = Strong*
Theophylline	Cimetidine	***Avoid*** Increased risk of theophylline toxicity *QE = Moderate; SR = Strong*
Warfarin	Amiodarone	***Avoid when possible; monitor INR closely*** Increased risk of bleeding *QE = Moderate; SR = Strong*
Warfarin	NSAIDs	***Avoid when possible; if used together, monitor for bleeding closely*** Increased risk of bleeding *QE = High; SR = Strong*

[a]Central nervous system (CNS)-active drugs: antipsychotics; benzodiazepines; nonbenzodiazepine, benzodiazepine receptor agonist hypnotics; tricyclic antidepressants (TCAs); selective serotonin reuptake inhibitors (SSRIs); and opioids.

ACEI = angiotensin-converting enzyme inhibitor; NSAID=nonsteroidal antiinflammatory drug.

TABLE 5. 2015 American Geriatrics Society Beers Criteria for Non-Anti-Infective Medications That Should Be Avoided or Have Their Dosage Reduced with Varying Levels of Kidney Function in Older Adults

Medication Class and Medication	Creatinine Clearance, mL/min, at Which Action Required	***Recommendation,*** Rationale, *Quality of Evidence* (*QE*), *Strength of Recommendation* (*SR*)
Cardiovascular or hemostasis		
Amiloride	<30	***Avoid*** Increased potassium and decreased sodium *QE = Moderate; SR = Strong*
Apixaban	<25	***Avoid*** Increased risk of bleeding *QE = Moderate; SR = Strong*
Dabigatran	<30	***Avoid*** Increased risk of bleeding *QE = Moderate; SR = Strong*
Edoxaban	30–50 <30 or >95	***CrCl 30-50: Reduce dose*** ***CrCl <30 or >95: Avoid*** Increased risk of bleeding *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	30–50 <30	***CrCl 30-50: Reduce dose*** ***CrCl <30: Avoid*** Increased risk of bleeding *QE = Moderate; SR = Strong*
Spironolactone	<30	***Avoid*** Increased potassium *QE = Moderate; SR = Strong*
Triamterene	<30	***Avoid*** Increased potassium and decreased sodium *QE = Moderate; SR = Strong*
Central nervous system and analgesics		
Duloxetine	<30	***Avoid*** Increased gastrointestinal adverse effects (nausea, diarrhea) *QE = Moderate; SR = Weak*
Gabapentin	<60	***Reduce dose*** CNS adverse effects *QE = Moderate; SR = Strong*

Table 5 *(continued on page 14)*

Table 5 Continued

Medication Class and Medication	Creatinine Clearance, mL/min, at Which Action Required	***Recommendation,*** Rationale, *QE, SR*
Levetiracetam	≤80	***Reduce dose*** CNS adverse effects *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*
Ranitidine	<50	***Reduce dose*** Mental status changes *QE = Moderate; SR = Strong*
Hyperuricemia		
Colchicine	<30	***Reduce dose; monitor for adverse effects*** Gastrointestinal, neuromuscular, bone marrow toxicity *QE = Moderate; SR = Strong*
Probenecid	<30	***Avoid*** Loss of effectiveness *QE = Moderate; SR = Strong*

CNS=central nervous system.

The primary target audience is the practicing clinician. The intentions of the criteria include 1) improving the selection of prescription drugs by clinicians and patients; 2) evaluating patterns of drug use within populations; 3) educating clinicians and patients on proper drug usage; and 4) evaluating health-outcome, quality-of-care, cost, and utilization data.

ORIGIN

STOPP/START criteria for potentially inappropriate prescribing in older people: version 2

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WHAT DOES IT CONSIST OF?

STOPP CRITERIA

- Indication of medication 3
- Cardiovascular system 13
- Antiplatelet/coagulation drugs 11
- CNS and psychotropic drugs 14
- Renal system 6
- Respiratory system 4
- Musculoskeletal system 9
- Urogenital system 2
- Endocrine system 6
- Drugs that increase risk of falls 4
- Analgesic drugs 3
- Antimuscarinic/anticholinergic burden 1

START CRITERIA

- Cardiovascular system 8
- Respiratory system 3
- Central nervous system and eyes 6
- Gastrointestinal system 2
- Musculoskeletal system 7
- Endocrine system 1
- Urogenital system 3
- Analgesics 2
- Vaccines 2

Total STOPP criteria 80
Total START criteria 34

STOPP

Section A: Indication of medication

1. Any drug prescribed without an evidence-based clinical indication.

2. Any drug prescribed beyond the recommended duration, where treatment duration is well defined.

3. Any duplicate drug class prescription e.g. two concurrent NSAIDs, SSRIs, loop diuretics, ACE inhibitors, anticoagulants (optimisation of monotherapy within a single drug class should be observed prior to considering a new agent).

Section B: Cardiovascular System

1. Digoxin for heart failure with normal systolic ventricular function (no clear evidence of benefit)

2. Verapamil or diltiazem with NYHA Class III or IV heart failure (may worsen heart failure).

3. Beta-blocker in combination with verapamil or diltiazem (risk of heart block).

4. Beta blocker with bradycardia (< 50/min), type II heart block or complete heart block (risk of complete heart block, asystole).

5. Amiodarone as first-line antiarrhythmic therapy in supraventricular tachyarrhythmias (higher risk of side-effects than beta-blockers, digoxin, verapamil or diltiazem)

6. Loop diuretic as first-line treatment for hypertension (safer, more effective alternatives available).

7. Loop diuretic for dependent ankle oedema without clinical, biochemical evidence or radiological evidence of heart failure, liver failure, nephrotic syndrome or renal failure (leg elevation and /or compression hosiery usually more appropriate).

8. Thiazide diuretic with current significant hypokalaemia (i.e. serum K+ < 3.0 mmol/l), hyponatraemia (i.e. serum Na+ < 130 mmol/l) hypercalcaemia (i.e. corrected serum calcium > 2.65 mmol/l) or with a history of gout (hypokalaemia, hyponatraemia, hypercalcaemia and gout can be precipitated by thiazide diuretic)

9. Loop diuretic for treatment of hypertension with concurrent urinary incontinence (may exacerbate incontinence).

10. Centrally-acting antihypertensives (e.g. methyldopa, clonidine, moxonidine, rilmenidine, guanfacine), unless clear intolerance of, or lack of efficacy with, other classes of antihypertensives (centrally-active antihypertensives are generally less well tolerated by older people than younger people)

11. ACE inhibitors or Angiotensin Receptor Blockers in patients with hyperkalaemia.

12. Aldosterone antagonists (e.g. spironolactone, eplerenone) with concurrent potassium-conserving drugs (e.g. ACEI's, ARB's, amiloride, triamterene) without monitoring of serum potassium (risk of dangerous hyperkalaemia i.e. > 6.0 mmol/l – serum K should be monitored regularly, i.e. at least every 6 months).

13. Phosphodiesterase type-5 inhibitors (e.g. sildenafil, tadalafil, vardenafil) in severe heart failure characterised by hypotension i.e. systolic BP < 90 mmHg, or concurrent nitrate therapy for angina (risk of cardiovascular collapse)

Section C: Antiplatelet/Anticoagulant Drugs

1. Long-term aspirin at doses greater than 160mg per day (increased risk of bleeding, no evidence for increased efficacy).

2. Aspirin with a past history of peptic ulcer disease without concomitant PPI (risk of recurrent peptic ulcer).

3. Aspirin, clopidogrel, dipyridamole, vitamin K antagonists, direct thrombin inhibitors or factor Xa inhibitors with concurrent significant bleeding risk, i.e. uncontrolled severe hypertension, bleeding diathesis, recent non-trivial spontaneous bleeding) (high risk of bleeding).

4. Aspirin plus clopidogrel as secondary stroke prevention, unless the patient has a coronary stent(s) inserted in the previous 12 months or concurrent acute coronary syndrome or has a high grade symptomatic carotid arterial stenosis (no evidence of added benefit over clopidogrel monotherapy)

5. Aspirin in combination with vitamin K antagonist, direct thrombin inhibitor or factor Xa inhibitors in patients with chronic atrial fibrillation (no added benefit from aspirin)

6. Antiplatelet agents with vitamin K antagonist, direct thrombin inhibitor or factor Xa inhibitors in patients with stable coronary, cerebrovascular or peripheral arterial disease (No added benefit from dual therapy).

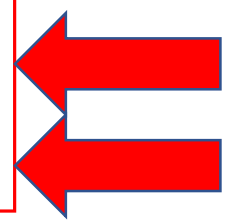
7. Ticlopidine in any circumstances (clopidogrel and prasugrel have similar efficacy, stronger evidence and fewer side-effects).

8. Vitamin K antagonist, direct thrombin inhibitor or factor Xa inhibitors for first deep venous thrombosis without continuing provoking risk factors (e.g. thrombophilia) for > 6 months, (no proven added benefit).

9. Vitamin K antagonist, direct thrombin inhibitor or factor Xa inhibitors for first pulmonary embolus without continuing provoking risk factors (e.g. thrombophilia) for > 12 months (no proven added benefit).

10. NSAID and vitamin K antagonist, direct thrombin inhibitor or factor Xa inhibitors in combination (risk of major gastrointestinal bleeding).

11. NSAID with concurrent antiplatelet agent(s) without PPI prophylaxis (increased risk of peptic ulcer disease)



STOPP

Section D: Central Nervous System and Psychotropic Drugs

1. TriCyclic Antidepressants (TCAs) with dementia, narrow angle glaucoma, cardiac conduction abnormalities, prostatism, or prior history of urinary retention (risk of worsening these conditions).

2. Initiation of TriCyclic Antidepressants (TCAs) as first-line antidepressant treatment (higher risk of adverse drug reactions with TCAs than with SSRIs or SNRIs).

3. Neuroleptics with moderate-marked antimuscarinic/anticholinergic effects (chlorpromazine, clozapine, flupenthixol, fluphenzine, pipothiazine, promazine, zuclopenthixol) with a history of prostatism or previous urinary retention (high risk of urinary retention).

4. Selective serotonin re-uptake inhibitors (SSRI's) with current or recent significant hyponatraemia i.e. serum Na+ < 130 mmol/l (risk of exacerbating or precipitating hyponatraemia).

5. Benzodiazepines for ≥ 4 weeks (no indication for longer treatment; risk of prolonged sedation, confusion, impaired balance, falls, road traffic accidents; all benzodiazepines should be withdrawn gradually if taken for more than 4 weeks as there is a risk of causing a benzodiazepine withdrawal syndrome if stopped abruptly).

6. Antipsychotics (i.e. other than quetiapine or clozapine) in those with parkinsonism or Lewy Body Disease (risk of severe extra-pyramidal symptoms)

7. Anticholinergics/antimuscarinics to treat extra-pyramidal side-effects of neuroleptic medications (risk of anticholinergic toxicity),

8. Anticholinergics/antimuscarinics in patients with delirium or dementia (risk of exacerbation of cognitive impairment).

9. Neuroleptic antipsychotic in patients with behavioural and psychological symptoms of dementia (BPSD) unless symptoms are severe and other non-pharmacological treatments have failed (increased risk of stroke).

10. Neuroleptics as hypnotics, unless sleep disorder is due to psychosis or dementia (risk of confusion, hypotension, extra-pyramidal side effects, falls).

11. Acetylcholinesterase inhibitors with a known history of persistent bradycardia (< 60 beats/min.), heart block or recurrent unexplained syncope or concurrent treatment with drugs that reduce heart rate such as beta-blockers, digoxin, diltiazem, verapamil (risk of cardiac conduction failure, syncope and injury).

12. Phenothiazines as first-line treatment, since safer and more efficacious alternatives exist (phenothiazines are sedative, have significant anti-muscarinic toxicity in older people, with the exception of prochlorperazine for nausea/vomiting/vertigo, chlorpromazine for relief of persistent hiccoughs and levomepromazine as an anti-emetic in palliative care).

13. Levodopa or dopamine agonists for benign essential tremor (no evidence of efficacy)

14. First-generation antihistamines (safer, less toxic antihistamines now widely available).

STOPP

Section E: Renal System. The following drugs are potentially inappropriate in older people with acute or chronic kidney disease with renal function below particular levels of eGFR (refer to summary of product characteristics datasheets and local formulary guidelines)

1. Digoxin at a long-term dose greater than 125µg/day if eGFR < 30 ml/min/1.73m2 (risk of digoxin toxicity if plasma levels not measured).

2. Direct thrombin inhibitors (e.g. dabigatran) if eGFR < 30 ml/min/1.73m2 (risk of bleeding)

3. Factor Xa inhibitors (e.g. rivaroxaban, apixaban) if eGFR < 15 ml/min/1.73m2 (risk of bleeding)

4. NSAID's if eGFR < 50 ml/min/1.73m2 (risk of deterioration in renal function).

5. Colchicine if eGFR < 10 ml/min/1.73m2 (risk of colchicine toxicity)

6. Metformin if eGFR < 30 ml/min/1.73m2 (risk of lactic acidosis).

Section F: Gastrointestinal System

1. Prochlorperazine or metoclopramide with Parkinsonism (risk of exacerbating Parkinsonian symptoms).

2. PPI for uncomplicated peptic ulcer disease or erosive peptic oesophagitis at full therapeutic dosage for > 8 weeks (dose reduction or earlier discontinuation indicated).

3. Drugs likely to cause constipation (e.g. antimuscarinic/anticholinergic drugs, oral iron, opioids, verapamil, aluminium antacids) in patients with chronic constipation where non-constipating alternatives are available (risk of exacerbation of constipation).

4. Oral elemental iron doses greater than 200 mg daily (e.g. ferrous fumarate> 600 mg/day, ferrous sulphate > 600 mg/day, ferrous gluconate> 1800 mg/day; no evidence of enhanced iron absorption above these doses).

STOPP

Section G: Respiratory System

1. Theophylline as monotherapy for COPD (safer, more effective alternative; risk of adverse effects due to narrow therapeutic index).

2. Systemic corticosteroids instead of inhaled corticosteroids for maintenance therapy in moderate-severe COPD (unnecessary exposure to long-term side-effects of systemic corticosteroids and effective inhaled therapies are available).

3. Anti-muscarinic bronchodilators (e.g. ipratropium, tiotropium) with a history of narrow angle glaucoma (may exacerbate glaucoma) or bladder outflow obstruction (may cause urinary retention).

4. Non-selective beta-blocker (whether oral or topical for glaucoma) with a history of asthma requiring treatment (risk of increased bronchospasm).

5. Benzodiazepines with acute or chronic respiratory failure i.e. $pO2 < 8.0$ kPa ± $pCO2 > 6.5$ kPa (risk of exacerbation of respiratory failure).

Section H: Musculoskeletal System

1. Non-steroidal anti-inflammatory drug (NSAID) other than COX-2 selective agents with history of peptic ulcer disease or gastrointestinal bleeding, unless with concurrent PPI or H2 antagonist (risk of peptic ulcer relapse).

2. NSAID with severe hypertension (risk of exacerbation of hypertension) or severe heart failure (risk of exacerbation of heart failure).

3. Long-term use of NSAID (>3 months) for symptom relief of osteoarthritis pain where paracetamol has not been tried (simple analgesics preferable and usually as effective for pain relief)

4. Long-term corticosteroids (>3 months) as monotherapy for rheumatoid arthrtitis (risk of systemic corticosteroid side-effects).

5. Corticosteroids (other than periodic intra-articular injections for mono-articular pain) for osteoarthritis (risk of systemic corticosteroid side-effects).

6. Long-term NSAID or colchicine (>3 months) for chronic treatment of gout where there is no contraindication to a xanthine-oxidase inhibitor (e.g. allopurinol, febuxostat) (xanthine-oxidase inhibitors are first choice prophylactic drugs in gout).

7. COX-2 selective NSAIDs with concurrent cardiovascular disease (increased risk of myocardial infarction and stroke)

8. NSAID with concurrent corticosteroids without PPI prophylaxis (increased risk of peptic ulcer disease)

9. Oral bisphosphonates in patients with a current or recent history of upper gastrointestinal disease i.e. dysphagia, oesophagitis, gastritis, duodenitis, or peptic ulcer disease, or upper gastrointestinal bleeding (risk of relapse/exacerbation of oesophagitis, oesophageal ulcer, oesophageal stricture)

STOPP

Section I: Urogenital System

1. Antimuscarinic drugs with dementia, or chronic cognitive impairment (risk of increased confusion, agitation) or narrow-angle glaucoma (risk of acute exacerbation of glaucoma), or chronic prostatism (risk of urinary retention).

2. Selective alpha-1 selective alpha blockers in those with symptomatic orthostatic hypotension or micturition syncope (risk of precipitating recurrent syncope)

Section J. Endocrine System

1. Sulphonylureas with a long duration of action (e.g. glibenclamide, chlorpropamide, glimepiride) with type 2 diabetes mellitus (risk of prolonged hypoglycaemia).

2. Thiazolidenediones (e.g. rosiglitazone, pioglitazone) in patients with heart failure (risk of exacerbation of heart failure)

3. Beta-blockers in diabetes mellitus with frequent hypoglycaemic episodes (risk of suppressing hypoglycaemic symptoms).

4. Oestrogens with a history of breast cancer or venous thromboembolism (increased risk of recurrence).

5. Oral oestrogens without progestogen in patients with intact uterus (risk of endometrial cancer).

6. Androgens (male sex hormones) in the absence of primary or secondary hypogonadism (risk of androgen toxicity; no proven benefit outside of the hypogonadism indication).

Section K: Drugs that predictably increase the risk of falls in older people

1. Benzodiazepines (sedative, may cause reduced sensorium, impair balance).

2. Neuroleptic drugs (may cause gait dyspraxia, Parkinsonism).

3. Vasodilator drugs (e.g. alpha-1 receptor blockers, calcium channel blockers, long-acting nitrates, ACE inhibitors, angiotensin I receptor blockers,) with persistent postural hypotension i.e. recurrent drop in systolic blood pressure ≥ 20mmHg (risk of syncope, falls).

4. Hypnotic Z-drugs e.g. zopiclone, zolpidem, zaleplon (may cause protracted daytime sedation, ataxia).

Section L: Analgesic Drugs

1. Use of oral or transdermal strong opioids (morphine, oxycodone, fentanyl, buprenorphine, diamorphine, methadone, tramadol, pethidine, pentazocine) as first line therapy for mild pain (WHO analgesic ladder not observed).

2. Use of regular (as distinct from PRN) opioids without concomitant laxative (risk of severe constipation).

3. Long-acting opioids without short-acting opioids for break-through pain (risk of persistence of severe pain)

Section N: Antimuscarinic/Anticholinergic Drug Burden

Concomitant use of two or more drugs with antimuscarinic/anticholinergic properties (e.g. bladder antispasmodics, intestinal antispasmodics, tricyclic antidepressants, first generation antihistamines) (risk of increased antimuscarinic/anticholinergic toxicity)

START

Section A: Cardiovascular System

1. Vitamin K antagonists or direct thrombin inhibitors or factor Xa inhibitors in the presence of chronic atrial fibrillation.

2. Aspirin (75 mg – 160 mg once daily) in the presence of chronic atrial fibrillation, where Vitamin K antagonists or direct thrombin inhibitors or factor Xa inhibitors are contraindicated.

3. Antiplatelet therapy (aspirin or clopidogrel or prasugrel or ticagrelor) with a documented history of coronary, cerebral or peripheral vascular disease.

4. Antihypertensive therapy where systolic blood pressure consistently > 160 mmHg and/or diastolic blood pressure consistently >90 mmHg; if systolic blood pressure > 140 mmHg and /or diastolic blood pressure > 90 mmHg, if diabetic.

5. Statin therapy with a documented history of coronary, cerebral or peripheral vascular disease, unless the patient's status is end-of-life or age is > 85 years.

6. Angiotensin Converting Enzyme (ACE) inhibitor with systolic heart failure and/or documented coronary artery disease.

7. Beta-blocker with ischaemic heart disease.

8. Appropriate beta-blocker (bisoprolol, nebivolol, metoprolol or carvedilol) with stable systolic heart failure.

Section B: Respiratory System

1. Regular inhaled β2 agonist or antimuscarinic bronchodilator (e.g. ipratropium, tiotropium) for mild to moderate asthma or COPD.

2. Regular inhaled corticosteroid for moderate-severe asthma or COPD, where FEV1 <50% of predicted value and repeated exacerbations requiring treatment with oral corticosteroids.

3. Home continuous oxygen with documented chronic hypoxaemia (i.e. pO2 < 8.0 kPa or 60 mmHg or SaO2 < 89%)

Section C: Central Nervous System& Eyes

1. L-DOPA or a dopamine agonist in idiopathic Parkinson's disease with functional impairment and resultant disability.

2. Non-TCA antidepressant drug in the presence of persistent major depressive symptoms.

3. Acetylcholinesterase inhibitor (e.g. donepezil, rivastigmine, galantamine) for mild-moderate Alzheimer's dementia or Lewy Body dementia (rivastigmine).

4. Topical prostaglandin, prostamide or beta-blocker for primary open-angle glaucoma.

5. Selective serotonin reuptake inhibitor (or SNRI or pregabalin if SSRI contraindicated) for persistent severe anxiety that interferes with independent functioning.

6. Dopamine agonist (ropinirole or pramipexole or rotigotine) for Restless Legs Syndrome, once iron deficiency and severe renal failure have been excluded.

START

Section D: Gastrointestinal System

1. Proton Pump Inhibitor with severe gastro-oesophageal reflux disease or peptic stricture requiring dilatation.

2. Fibre supplements (e.g. bran, ispaghula, methylcellulose, sterculia) for diverticulosis with a history of constipation.

Section E: Musculoskeletal System

1. Disease-modifying anti-rheumatic drug (DMARD) with active, disabling rheumatoid disease.

2. Bisphosphonates and vitamin D and calcium in patients taking long-term systemic corticosteroid therapy.

3. Vitamin D and calcium supplement in patients with known osteoporosis and/or previous fragility fracture(s) and/or (Bone Mineral Density T-scores more than -2.5 in multiple sites).

4. Bone anti-resorptive or anabolic therapy (e.g. bisphosphonate, strontium ranelate, teriparatide, denosumab) in patients with documented osteoporosis, where no pharmacological or clinical status contraindication exists (Bone Mineral Density T-scores -> 2.5 in multiple sites) and/or previous history of fragility fracture(s).

5. Vitamin D supplement in older people who are housebound or experiencing falls or with osteopenia (Bone Mineral Density T-score is > -1.0 but < -2.5 in multiple sites).

6. Xanthine-oxidase inhibitors (e.g. allopurinol, febuxostat) with a history of recurrent episodes of gout.

7. Folic acid supplement in patients taking methotexate.

Section F: Endocrine System

1. ACE inhibitor or Angiotensin Receptor Blocker (if intolerant of ACE inhibitor) in diabetes with evidence of renal disease i.e. dipstick proteinuria or microalbuminuria (>30mg/24 hours) with or without serum biochemical renal impairment.

Section G: Urogenital System

1. Alpha-1 receptor blocker with symptomatic prostatism, where prostatectomy is not considered necessary.

2. 5-alpha reductase inhibitor with symptomatic prostatism, where prostatectomy is not considered necessary.

3. Topical vaginal oestrogen or vaginal oestrogen pessary for symptomatic atrophic vaginitis.

Section H: Analgesics

1. High-potency opioids in moderate-severe pain, where paracetamol, NSAIDs or low-potency opioids are not appropriate to the pain severity or have been ineffective.

2. Laxatives in patients receiving opioids regularly.

Section I: Vaccines

1. Seasonal trivalent influenza vaccine annually

2. Pneumococcal vaccine at least once after age 65 according to national guidelines