# Cheers to Safety! Raising a Glass to the 2023 Beers® Criteria Update

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# Meet Your Speaker

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Dr. Jessica DiLeo has extensive experience in learning & development and leadership in both community and medication therapy management settings with over two decades experience in the pharmacy profession. Since graduating from the University of Arizona College of Pharmacy, her passions include care of older adults, medication therapy management, and ambulatory care. She is currently the Senior Manager of Learning & Development with Tabula Rasa HealthCare. Previously, she served as a Medication Therapy Management subject matter expert and Lead Clinical Trainer for MedWiseRx. She is board certified in geriatrics and ambulatory care and is a faculty advisor for the American Pharmacist Association Delivering Medication Therapy Management Certification course.

In addition, Dr. DiLeo is passionate about the advancement of pharmacy and is an active member of multiple pharmacy organizations, including the Arizona Pharmacy Association (AzPA) and the American Pharmacists Association (APhA). Dr. DiLeo has served eight years on the Board of Directors for the Arizona Pharmacy Association in a variety of positions, most recently as President. Furthermore, Dr. DiLeo is the current Medication Management Special Interest Group Coordinator for the American Pharmacists Association. She has been awarded the Distinguished Young Pharmacist of the Year Award from the Arizona Pharmacy Association and Pharmacy Leadership Award on behalf of the National Community Pharmacy Association. and serves as a co-Faculty advisor for the University of Arizona College of Pharmacy Arizona Pharmacy Association – Student Pharmacist Academy.

# Disclosure

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- I, Jessica DiLeo, declare to not have any real or apparent conflicts of interest or financial interests with any pharmaceutical manufacturers, medical device company, or in any product or service, including grants, employment, gifts, stock holdings, and honoraria related to the content of this presentation.

- I am an employee of Tabula Rasa HealthCare.

- Each of the planning committee members has listed no financial interest/arrangement or affiliation that would be considered a conflict of interest.

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# Learning Objectives

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## Objectives for pharmacist, physicians, and nurses

1. Discuss the prevalence and impact of adverse drug reactions (ADRs) in older adults
2. Review significant updates to the 2023 Beers Criteria for Potentially Inappropriate Medication Use in Older Adults
3. Summarize evidence to support updates to the 2023 Beers Criteria for Potentially Inappropriate Medication Use in Older Adults
4. Given a patient case, recognize how clinicians can apply the 2023 Beers Criteria in clinical practice

# Abbreviations

- **ADE** – Adverse drug events
- **ADR** – Adverse drug reactions
- **AGS** – American Geriatrics Society
- **AF** – Atrial fibrillation
- **APAP** – acetaminophen
- **BZD** – Benzodiazepine
- **CKD** – Chronic kidney disease
- **CNS** – Central nervous system
- **CrCl** – Creatinine clearance
- **CV** – Cardiovascular
- **CVD** – Cardiovascular disease
- **DDI** – Drug-drug interaction
- **DKA** – Diabetic ketoacidosis
- **DM** – Diabetes
- **DOAC** – Direct oral anticoagulant
- **HR** – Heart failure
- **HRT** – Hormone replacement therapy
- **GI** – gastrointestinal
- **INR** – International normalized ratio
- **NSAID** – Non-steroidal anti-inflammatory drug
- **PIM** – potentially inappropriate medication
- **PO** – By mouth
- **PPI** – Proton pump inhibitor
- **SGLT-2** – Sodium-glucose-co-transporter
- **SNRI** – Serotonin and norepinephrine reuptake inhibitor
- **SSRI** – Selective serotonin reuptake inhibitor
- **TCA** – Tricyclic antidepressant
- **TMP/SMX** – Trimethoprim/sulfamethoxazole
- **UG** – Urogenital
- **UTI** – Urinary tract infection
- **VTE** – Venous thromboembolism

# Active Learning Question #1

The 2023 AGS Beers® Criteria recommends avoiding which medication(s) when initiating therapy for VTE or non-valvular AF, assuming no contraindications or barriers to the use of an alternative agent.

A. Aspirin

B. Dabigatran

C. Rivaroxaban

D. Warfarin

# Active Learning Question #2

What additional adverse reactions were added to the rationale for avoiding scheduled use of proton-pump inhibitors for greater than eight weeks for a non-high-risk patient?

**Select all that apply.**

A. Bone loss

B. GI malignancies

C. Fractures

D. Pneumonia

# Prevalence of Adverse Drug Events

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1.3 million ER visits
Average cost per visit: $1,245
$1.62 billion annually

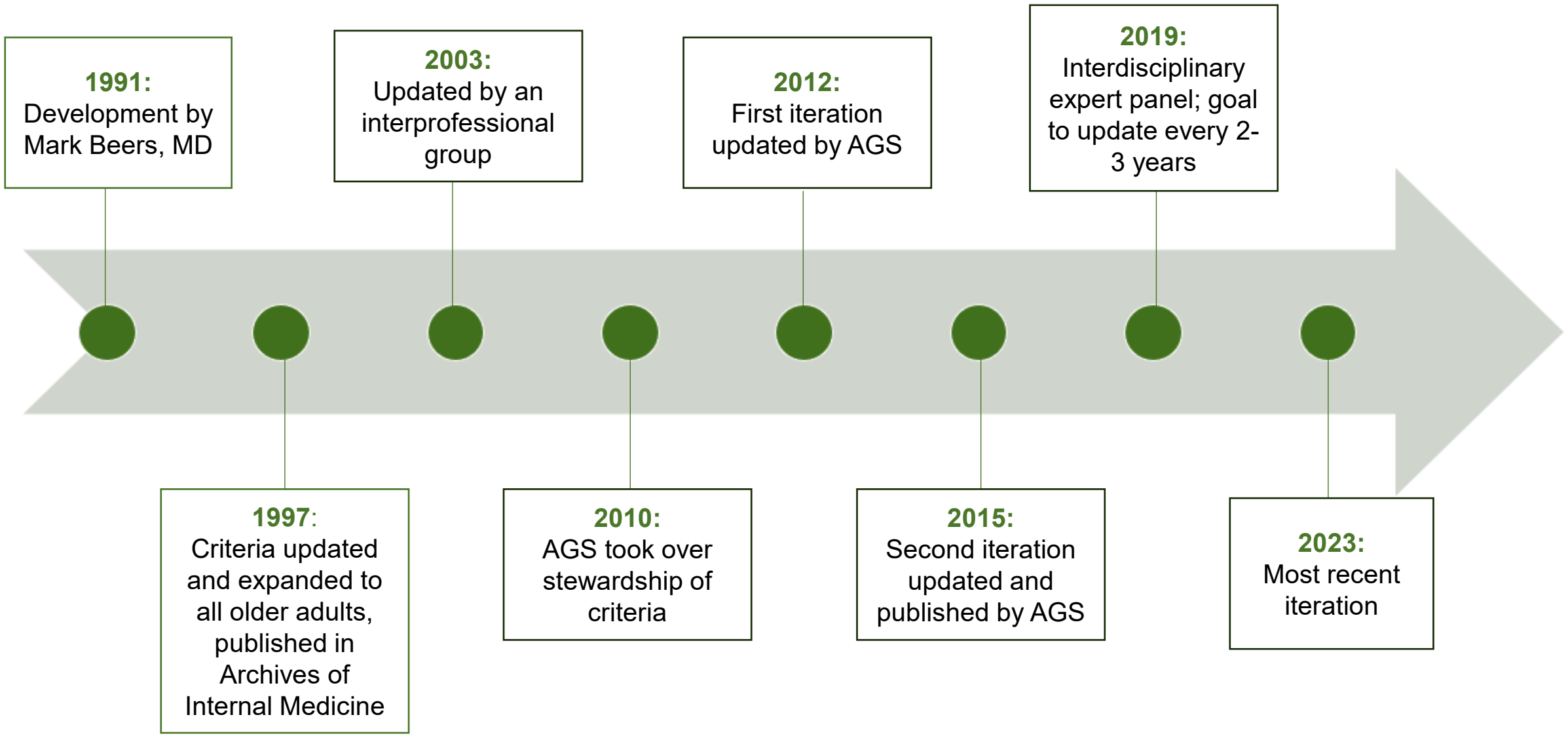
2 million hospital stays
Average cost per stay: $9,700
$19.4 billion annually

More than 3.5 million
physician office visits annually
in outpatient settings

**Older adults taking 5+ medications are 88% more likely to seek care for an ADR compared to older adults taking 1-2 medications**

Iconic bestiary. Various meds. Shutterstock.com. Stock vector ID: 1409823341

# History of the Beers® Criteria



# Intention of the 2023 AGS Beers® Criteria

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- Reduce older adults' exposure to PIMs
- Evaluate the quality of care, cost, and patterns of medication use in older adults
- Applied to adults 65 years and older in all ambulatory, acute, and institutionalized settings of care
- Not intended for hospice and end-of-life care settings

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# Structural Updates to the 2023 AGS Beers® Criteria

# Overview of Criteria Layout

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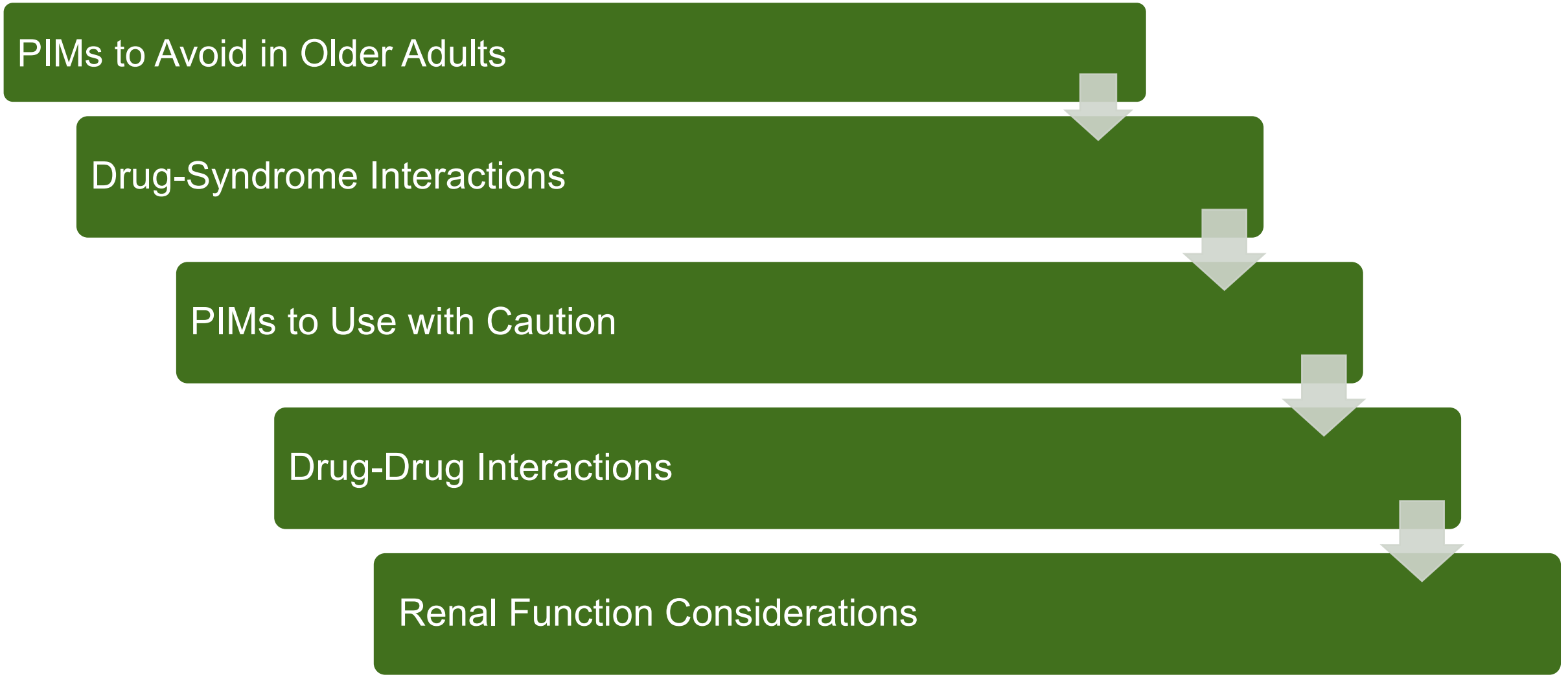

# 2023 Structural Updates

## Change to the order and wording of criteria, recommendations, and rationale

Table 2. 2019 American Geriatrics Society Beers Criteria® for Potentially Inappropriate Medication Use in Older Adults[a]

| Organ System, Therapeutic Category, Drug(s) | Rationale | Recommendation | Quality of Evidence | Strength of Recommendation |
|---|---|---|---|---|
| Anticholinergics[b] | | | | |
| First-generation antihistamines<br>Brompheniramine<br>Carbinoxamine<br>Chlorpheniramine<br>Clemastine<br>Cyproheptadine<br>Dexbrompheniramine<br>Dexchlorpheniramine<br>Dimenhydrinate<br>Diphenhydramine (oral)<br>Doxylamine<br>Hydroxyzine<br>Meclizine<br>Promethazine<br>Pyrilamine | 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<br>Use of diphenhydramine in situations such as acute treatment of severe allergic reaction may be appropriate. | Avoid | Moderate | Strong |

TABLE 2 2023 American Geriatrics Society Beers Criteria® for potentially inappropriate medication use in older adults.

| Organ system, therapeutic category, drug(s)[a] | Rationale | Recommendation | Quality of evidence[b] | Strength of recommendation[b] |
|---|---|---|---|---|
| *Antihistamines* | | | | |
| First-generation antihistamines<br>Brompheniramine<br>Chlorpheniramine<br>Cyproheptadine<br>Dimenhydrinate<br>Diphenhydramine (oral)<br>Doxylamine<br>Hydroxyzine<br>Meclizine<br>Promethazine<br>Triprolidine | Highly anticholinergic; clearance reduced with advanced age, and tolerance develops when used as hypnotic; risk of confusion, dry mouth, constipation, and other anticholinergic effects or toxicity. Cumulative exposure to anticholinergic drugs is associated with an increased risk of falls, delirium, and dementia, even in younger adults. Consider total anticholinergic burden during regular medication reviews and be cautious in "young-old" as well as "old-old" adults.<br>Use of diphenhydramine in situations such as acute treatment of severe allergic reactions may be appropriate. | Avoid | Moderate | Strong |

# 2023 Structural Updates

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## Removal of medications from criteria with low or absent use

| Low Use | Not available on the Market |
|---|---|
| Amobarbital*<br>Butobarbital<br>Carbinoxamine<br>Clemastine<br>Dexchlorpheniramine<br>Disopyramide<br>Fenoprofen<br>Flurazepam<br>Ketoprofen<br>Loxapine<br>Meclofenamate<br>Mefenamic acid<br>Methscopolamine<br>Protriptyline<br>Quazepam<br>Thioridazine<br>Trifluoperazone<br>Trimipramine | Belladonna alkaloids<br>Chlorpropamide<br>Dextrobromphiniramine<br>Guanabenz<br>Isoxsuprine<br>Mephobarbital<br>Methyldopa<br>Pentobarbital<br>Propantheline<br>Pyrilamine<br>Ranitidine<br>Reserpine (> 0.1 mg/day)<br>Rosiglitazone<br>Secobarbital<br>Tolmetin |

| Medication/Criteria | Reasons for Removal |
|---|---|
| Meperidine | Specific mention removed; merged into general opioid category |
| Corticosteroids (oral or parenteral) + NSAIDs | Incorporated into NSAIDs criteria |
| Warfarin + NSAIDs | Incorporated into NSAIDs criteria |
| Apixaban in patients with CrCl < 25 mL/min | Emerging evidence and experience support safe use at lower level |

**Available as injection only*

# 2023 Structural Updates

## Addition of language around exception notes

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TABLE 3 2023 American Geriatrics Society Beers Criteria® for potentially inappropriate medication use in older adults due to drug–disease or drug–syndrome interactions that may exacerbate the disease or syndrome.

| Disease or syndrome | Drug(s)[a] | Rationale | Recommendation | Quality of evidence[b] | Strength of recommendation[b] |
|---|---|---|---|---|---|
| ***Cardiovascular*** | | | | | |
| Heart failure | Cilostazol<br>Dextromethorphan-quinidine<br>Nondihydropyridine calcium channel blockers (CCBs)<br>Diltiazem<br>Verapamil<br>Dronedarone<br>NSAIDs and COX-2 inhibitors<br>Thiazolidinediones<br>Pioglitazone | Potential to promote fluid retention and/or exacerbate heart failure (NSAIDs and COX-2 inhibitors, non-dihydropyridine CCBs, thiazolidinediones); potential to increase mortality in older adults with heart failure (cilostazol and dronedarone); concerns about QT prolongation (dextromethorphan-quinidine).<br>*Note:* This is not a comprehensive list of medications to avoid in patients with heart failure. | Avoid:<br>Cilostazol<br>Dextromethorphan-quinidine<br>---<br>Avoid in heart failure with reduced ejection fraction:<br>Nondihydropyridine calcium channel blockers (CCBs)<br>Diltiazem<br>Verapamil<br>---<br>Use with caution in patients with heart failure who are asymptomatic; avoid in patients with symptomatic heart failure:<br>Dronedarone<br>NSAIDs and COX-2 inhibitors<br>Thiazolidinediones<br>Pioglitazone | Cilostazol, dextromethorphan-quinidine, COX-2 inhibitors: Low<br>Non-dihydropyridine CCBs, NSAIDs: Moderate<br>Dronedarone, thiazolidenediones: High | Strong |

# 2023 Structural Updates

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## Summary of companion article written to accompany 2015 & 2019 iterations

| Summary of Principles Guiding Use of Criteria |
| --- |
| • Medications are PIM, not definitely inappropriate |
| • Read the rationale and recommendations for each criterion |
| • Understand why medications are included and adjust approach accordingly |
| • Optimal application involves identifying PIMs and offering safer alternatives, when appropriate |
| • Use the criteria as a starting point for comprehensive medication reviews |
| • Access to medications included in the criteria should not be excessively restricted |
| • Not equally applicable to all countries given differences in drug availability |

Table adapted from the *American Geriatrics Society 2023 Updated AGS Beers Criteria® for potentially inappropriate medication use in older adults.*

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# Clinical Updates to the 2023 AGS Beers® Criteria

# Overview of Clinical Updates

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**CVD:**

- Aspirin
- Warfarin
- Rivaroxaban
- Apixaban
- Ticagrelor

**DM:**

- SLGT-2 inhibitors
- Sulfonylureas

**Falls, Fractures, & Delirium:**

- Anticholinergics
- Sedatives

**Estrogen**

**PPIs**

# Clinical Updates

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## PIM: Aspirin for primary prevention of CVD

### Rationale

- **Increased risk of bleeding**
- Lack of net benefit compared to net harm
- Less evidence regarding discontinuing among long-term users

### Recommendation

- **Avoid** initiating for primary prevention
- **Consider deprescribing** if taking for primary prevention

Duygu Yalcin. Stethoscope simple vector illustration. Shutterstock.com. Stock vector ID: 2119963631.

# Clinical Updates

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## History of Antithrombotic Recommendations


**Dipyridamole**

- Ticlopidine
- Aspirin

**Clopidogrel**

- Dabigatran
- Prasugrel

**Warfarin DDIs:**

- Amiodarone
- NSAID

**Renal considerations**

- Apixaban
- Dabigatran
- Edoxaban
- Enoxaparin
- Fondaparinux
- Rivaroxaban

**Warfarin DDIs:**

- Ciprofloxacin
- Macrolides*
- TMP/SMX

**Excluding azithromycin*

# Clinical Updates

## PIM: Warfarin for treatment of nonvalvular AF or VTE

### Rationale

- **Increased risk of major bleeding** compared with DOACs
- **Similar or lower effectiveness;** DOACs are preferred choice

### Recommendation

- **Avoid** starting as initial therapy unless alternatives are contraindicated or barriers to use
- May be reasonable to continue in those with well-controlled INRs and no ADRs
- **Avoid use with SSRIs**

Duygu Yalcin. Stethoscope simple vector illustration. Shutterstock.com. Stock vector ID: 2119963631.

# Clinical Updates

## PIM: Rivaroxaban for treatment of nonvalvular AF or VTE

| Rationale | Recommendation |
| --- | --- |
| • **Increased risk of major bleeding and GI bleeding** compared to other DOACs<br>• May be reasonable in special situations (e.g., once daily dosing | • **Avoid** for long-term treatment<br>• Reduce dose when CrCl < 50 mL/min |

Duygu Yalcin. Stethoscope simple vector illustration. Shutterstock.com. Stock vector ID: 2119963631.

# Clinical Updates

## PIM: Apixaban

| Rationale | Recommendation |
| --- | --- |
| • Safe use supported by emerging evidence and clinical experience | • **Safe in CrCl < 25 mL/min** |

Duygu Yalcin. Stethoscope simple vector illustration. Shutterstock.com. Stock vector ID: 2119963631.

# Clinical Updates

## PIMs to Use with Caution: Ticagrelor

### Rationale

- Increases risk of major bleeding compared with clopidogrel
- Risk may be offset by CV benefits in select patients

### Recommendation

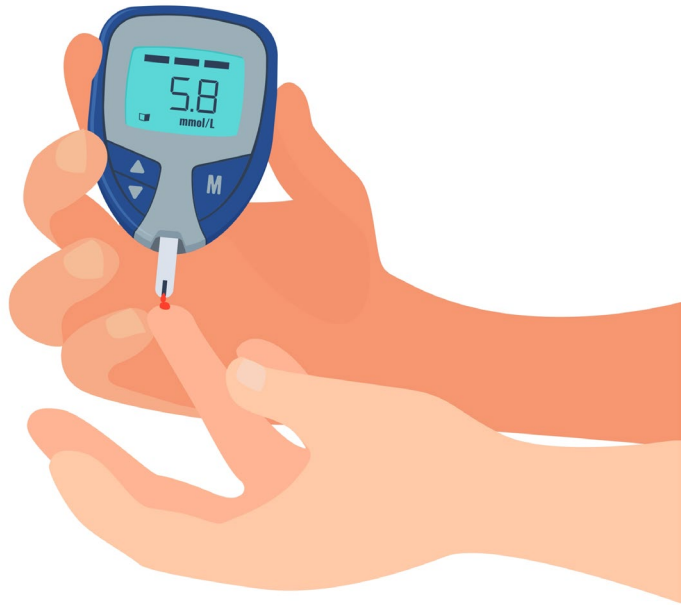
- **Use with caution, especially among adults ≥ 75 years old**

Duygu Yalcin. Stethoscope simple vector illustration. Shutterstock.com. Stock vector ID: 2119963631.

# Clinical Updates

## PIM: SGLT-2 Inhibitors

| Rationale | Recommendation |
| --- | --- |
| • Increased risk of **urogenital infection**<br>• Increased risk of **euglycemic DKA** | • **Use with caution**<br>• Monitor early during treatment for malaise, nausea, vomiting, and/or signs of UG infection |

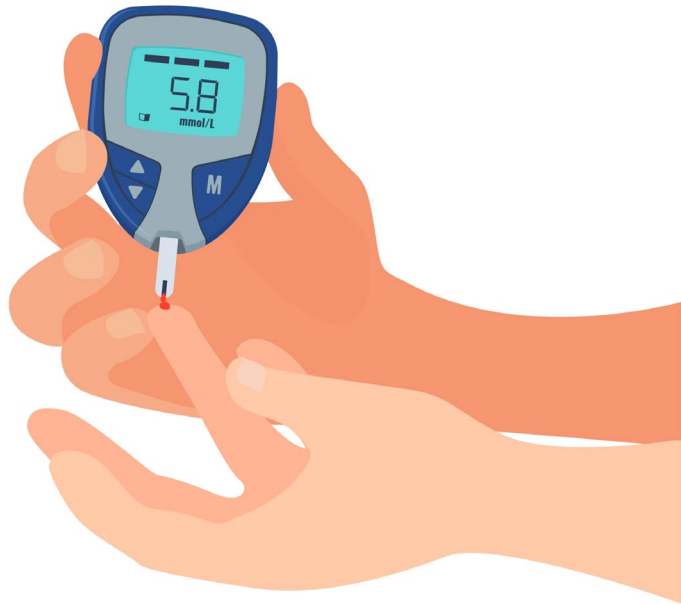



Shanvood. Person doing glucose test. Shutterstock.com. Stock vector ID: 1892161201.

# Clinical Updates

## PIM: Sulfonylureas

| Rationale | Recommendation |
| --- | --- |
| **Increased risk of:**<br>• CV events<br>• Mortality<br>• Hypoglycemia | • **Avoid** as first- or second-line monotherapy<br>• **Avoid** as first- or second-line add-on therapy<br>• If necessary, **prioritize short-acting agents preferred;** avoid glimepiride, chlorpropramide, and glyburide |




Shanvood. Person doing glucose test. Shutterstock.com. Stock vector ID: 1892161201.

# Clinical Updates

## PIM: Estrogen

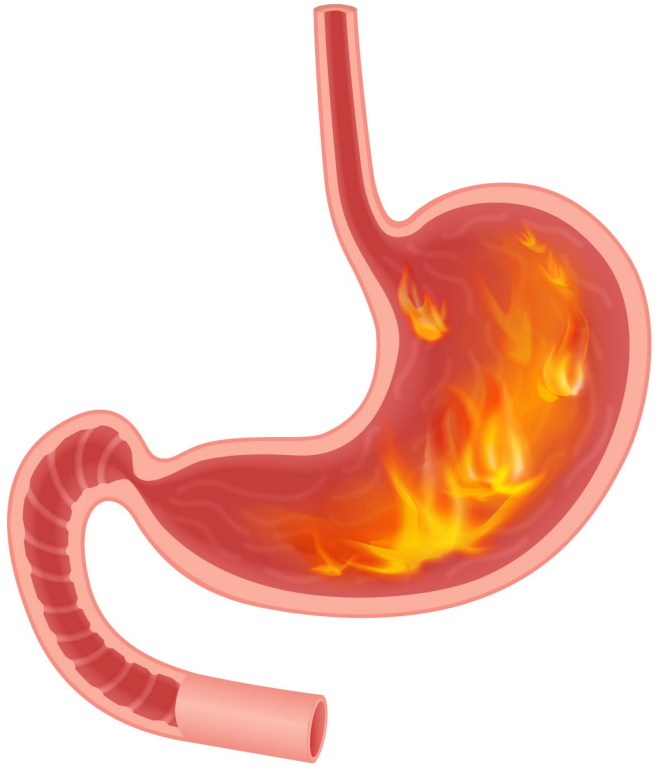

| Rationale | Recommendation |
| --- | --- |
| • For women ≥ 60 years of age, **the risks of HRT outweigh the benefits** | • **Avoid** starting systemic estrogen (e.g., oral tablets, transdermal patch) |
| • Increased risk of heart disease, stroke, blood clots, and dementia | • Consider **deprescribing** for those already using non-vaginal estrogen replacement |
| | • Topical vaginal estrogen remains suitable for symptomatic vaginal atrophy or UTI prophylaxis |

Andrii Symonenko. Estrogen level meter. Shutterstock.com. Stock vector ID: 2307471003.

# Clinical Updates

## PIM: Proton-Pump Inhibitors

| Rationale | Recommendation |
| --- | --- |
| • Risk of *C. difficile* infection, **pneumonia**, **GI malignancies**, bone loss, and fractures | • Avoid scheduled use > 8 weeks unless for high-risk patients |



Stock Vector ID: 1096504028 Realistic medical illustration of pyrosis stomach isolated. Fire disorder inside stomach.

# Clinical Updates

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## PIMs Due to Drug-Disease or Drug-Syndrome Interactions

### HF

- Addition of **dextromethorphan/ quinidine** d/t concerns of QT prolongation

### Syncope

- Clarified that tertiary TCAs referenced include amitriptyline, clomipramine, doxepin, and imipramine
- Examples provided for cholinesterase inhibitors

### Delirium

- Addition of **opioids**
- Specific mention of meperidine removed and subsumed under opioids

### Dementia or Cognitive Impairment

- Addition of **anticholinergics**
- Antidepressant level of evidenced lowered to “moderate”
- Modified language around antipsychotics

# Clinical Updates

## Falls, Fractures, and Delirium

Felink Creative Studio. Old man falling down. Shutterstock.com. Stock vector ID: 2186601797.

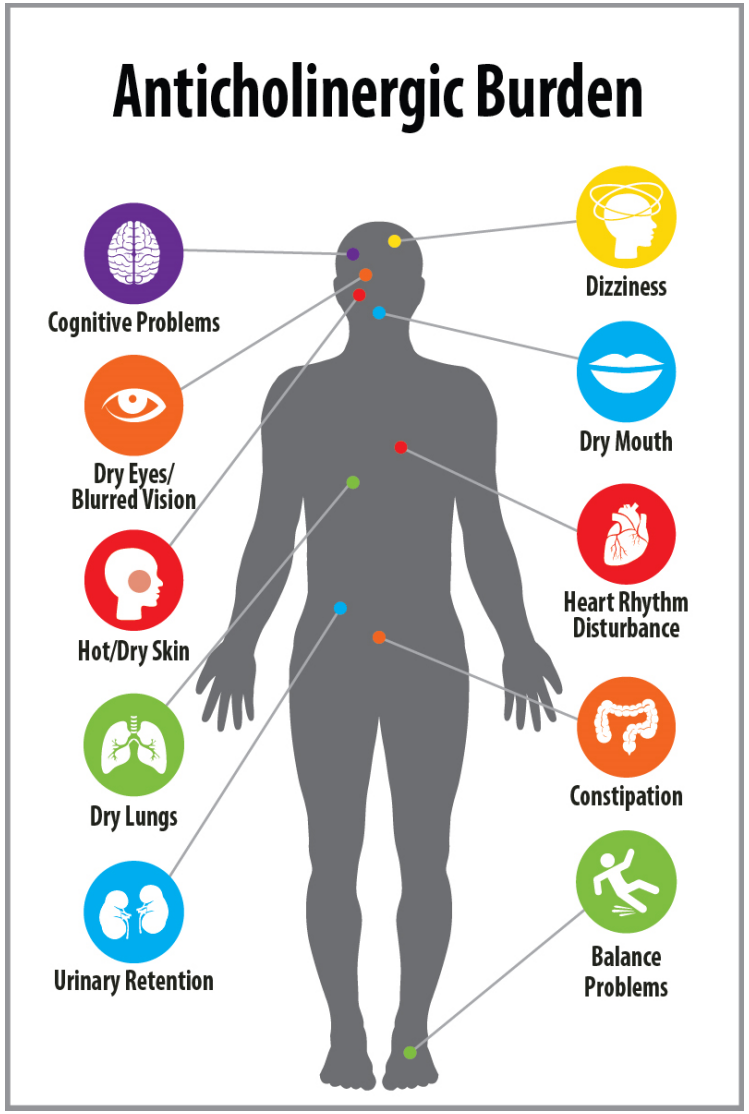
- Estimated 36 million falls annually
  - 20% of falls leads to injury, including fractures
  - Leading cause of injury with over 36,000 deaths in 2020
- 3 million emergency department visits due to falls
- Estimated $50 billion in medical costs (75% of costs paid by Medicare and Medicaid) related to falls
- Estimated $38 billion to $152 billion in medical costs related to delirium

# Clinical Updates

## Falls, Fractures, and Delirium

**Use of > 1 medication with anticholinergic properties increases the risk of:**

- Cognitive decline
- Delirium
- Falls
- Fractures



# Clinical Updates

## Falls, Fractures, and Delirium

**Use of ≥ 3 CNS-active agents:**

- Antiepileptics (including **gabapentinoids**)
- Antidepressants
- Antipsychotics
- BZDs
- Non-BZDs receptor agonist hypnotics
- **Opioids**
- **Skeletal muscle relaxants** →

Baclofen:
- Avoid use in eGFR < 60 mL/min due to increased risk of encephalopathy

woocat. Confused, anxious and stressed brain. Shutterstock.com. Stock vector ID: 2157034549.

# Clinical Updates

## Falls, Fractures, and Delirium

### Avoid if History of Falls or Fractures

| | | |
|---|---|---|
| Anticholinergics | Antidepressants:<br>• SNRI, SSRIs, TCAs<br>• Level of evidence lowered to “moderate” | Antiepileptics:<br>• Including gabapentinoids |
| Antipsychotics:<br>• Chronic use or persistent as needed use<br>• Consider deprescribing attempts | BZDs | Non-BZD receptor agonist hypnotics |
| | Opioids | Skeletal muscle relaxants |

# Active Learning Question #1

The 2023 AGS Beers® Criteria recommends avoiding which medication(s) when initiating therapy for VTE or non-valvular AF, assuming no contraindications or barriers to the use of an alternative agent.

A. Aspirin

B. Dabigatran

C. Rivaroxaban

**D. Warfarin**

# Active Learning Question #2

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What additional adverse reactions were added to the rationale for avoiding scheduled use of proton-pump inhibitors for greater than 8 weeks for a non-high-risk patient? Select all that apply.

A. Bone loss

**B. GI malignancies**

C. Fractures

**D. Pneumonia**

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# Patient Case: Meet BC

# Meet BC

77 y/o female with DM, neuropathy, stage 4 CKD, non-valvular AF with no history of a stroke or myocardial infarction, hypertension, and dyslipidemia.

- CrCl = 47 mL/min
- Serum creatinine: 1.1 mg/dL
- Weight: 69 kg
- Blood pressure: 143/87
- Heart rate: 61
- Hemoglobin $A1_C$: 7.3%

**What recommendations would you suggest?**

| Medications |
|---|
| Amlodipine 5 mg PO once daily |
| Aspirin 81 mg PO once daily |
| Atorvastatin 80 mg PO once daily |
| Bumetanide 2 mg PO twice daily |
| Gabapentin 300 mg PO three times daily |
| Lantus 100 units/mL, 32 units subcutaneously at bedtime |
| Metoprolol 50 mg PO twice daily |
| Oxycodone/APAP 5 mg/325 mg PO every 6 hours as needed |
| Pantoprazole 20 mg PO once daily |
| Rivaroxaban 20 mg PO once daily |
| Sertraline 100 mg PO once daily |
| Vitamin D 2000 units PO once daily |

mspoint. Elderly woman. Shutterstock.com. Stock vector ID: 1414637810.

# Meet BC

| Targeted Medication | Recommendation |
|---|---|
| Amlodipine + Metoprolol | • Consider deprescribing amlodipine. Could contribute to edema, which may be reason for bumetanide<br>• Add lisinopril 5 mg PO once daily |
| Aspirin 81 mg | • Consider deprescribing if taking for primary prevention |
| Bumetanide | • Consider deprescribing d/t lack of indication |
| Gabapentin + Oxycodone/APAP + sertraline | • Increased risk for falls and fractures. Monitor for ADRs<br>• Deprescribe oxycodone/APAP d/t lack of indication to reduce sedative burden |
| Pantoprazole 20 mg | • Deprescribe given no indication and patient not high-risk<br>• Consider renally adjusted famotidine if acid suppression therapy is warranted |
| Rivaroxaban 20 mg | • Avoid for long-term treatment, reduce dose when CrCl < 50 mL/min<br>• Consider switch to apixaban 5 mg PO twice daily |

mspoint. Elderly woman. Shutterstock.com. Stock vector ID: 1414637810.

# Summary of Updates to the Beers® Criteria

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**Structural Updates**

- Change to the order and wording of content
- Removal of medications with low or absent use
- Addition of language around exception notes
- Table summarizing companion articles

**Clinical Updates**

- CVD (e.g., aspirin, warfarin, rivaroxaban, apixaban, ticagrelor)
- DM (e.g., SGLT2-inhibitors, sulfonylureas)
- Falls, fractures, and delirium
- Estrogen
- PPIs

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# Thank you!


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