Safe Medication Use in Older Adults: A Review of the AGS Beers Criteria® and Alternative Treatments

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Disclosures

- Consulting Editor – AGS Geriatric Review Syllabus
- Member of the expert panel – AGS Updated Beers Criteria® (2012, 2015, 2019, 2023) and Alternative Treatments Panel

Learning Objectives

Pharmacists

- Describe the history and purpose of the AGS Beers Criteria® and its updates and the Alternatives to Beers Criteria medications.
- Identify medications to avoid and/or use with caution in older adults.
- Explain the application of the 2023 updates to clinical practice.
- Given a patient, formulate a treatment plan using alternative treatments for selected Beers Criteria medications.

Pharmacy Technicians

- Define the purpose of the AGS Beers Criteria®.
- List the types of medications on the AGS Beers Criteria®.
- Describe the role of the AGS Beers Criteria® in promoting safe medication use in older adults.
- Identify potentially appropriate alternative treatments for selected Beers Criteria Medications.

Age-Friendly Health System – 5 M's

MULTICOMPLEXITY

...describes the whole person, typically an older adult, living with multiple chronic conditions, advanced illness, and/or with complicated biopsychosocial needs

MIND	■ Mentation ■ Dementia ■ Delirium ■ Depression
MOBILITY	■ Amount of mobility; function ■ Impaired gait and balance ■ Fall injury prevention
MEDICATIONS	■ Polypharmacy, deprescribing ■ Optimal prescribing ■ Adverse medication effects and medication burden
WHAT MATTERS MOST	■ Each individual's own meaningful health outcome goals and care preferences

Tinetti M, Huang A, Molnar F. The Geriatrics 5M's: a new way of communicating what we do. J Am Geriatr Soc. 2017;65(9):2115.

CMS Age-Friendly Hospital Measure

5 Domains

1. Eliciting Patient Healthcare Goals
2. **Responsible Medication Management**
3. Frailty Screening & Intervention
4. Patient Vulnerability
5. Age-Friendly Care Leadership

CMS Guidance on the Age-Friendly Hospital Measure

Domain 2: Responsible Medication Management

- Our hospital reviews medications for the purpose of identifying potentially inappropriate medications (PIMs) for older adults as defined by standard evidence-based guidelines, criteria, or protocols.
- Review should be undertaken upon admission, before major procedures, and/or upon significant changes in clinical status.
- Once identified, PIMs should be considered for discontinuation and/or dose adjustment as indicated.

Why are medications a concern in older adults?

Pharmacokinetic & Pharmacodynamic alterations with age

Polypharmacy, including PIMs, OTCs, supplements

Adverse effects, drug interactions

Medication reconciliation is a “wreck”

Pharmacokinetic Changes with Aging

- Absorption
  - Gastrointestinal – *delayed, but no sig. ↓*
  - Intramuscular – *possible ↓*
  - Transdermal – *possible ↓*
- Distribution – *larger Vd for fat soluble meds*
  - protein binding - *↓ albumin, ↑ free fraction*
- Metabolism – *some pathways ↓*
- Elimination - *↓ renal function*

Pharmacodynamics in Older Adults

- P-dynamic changes are assumed when p-kinetic changes do not explain alterations.
- P-dynamics are not as well understood as p-kinetics.
- P-dynamics are more variable than p-kinetics.
- Changes are seen in:
  - numbers of receptors
  - sensitivity of receptors
  - counter regulatory mechanisms

Beers Criteria: History and Utilization

Original 1991 – Nursing home patients

Updates

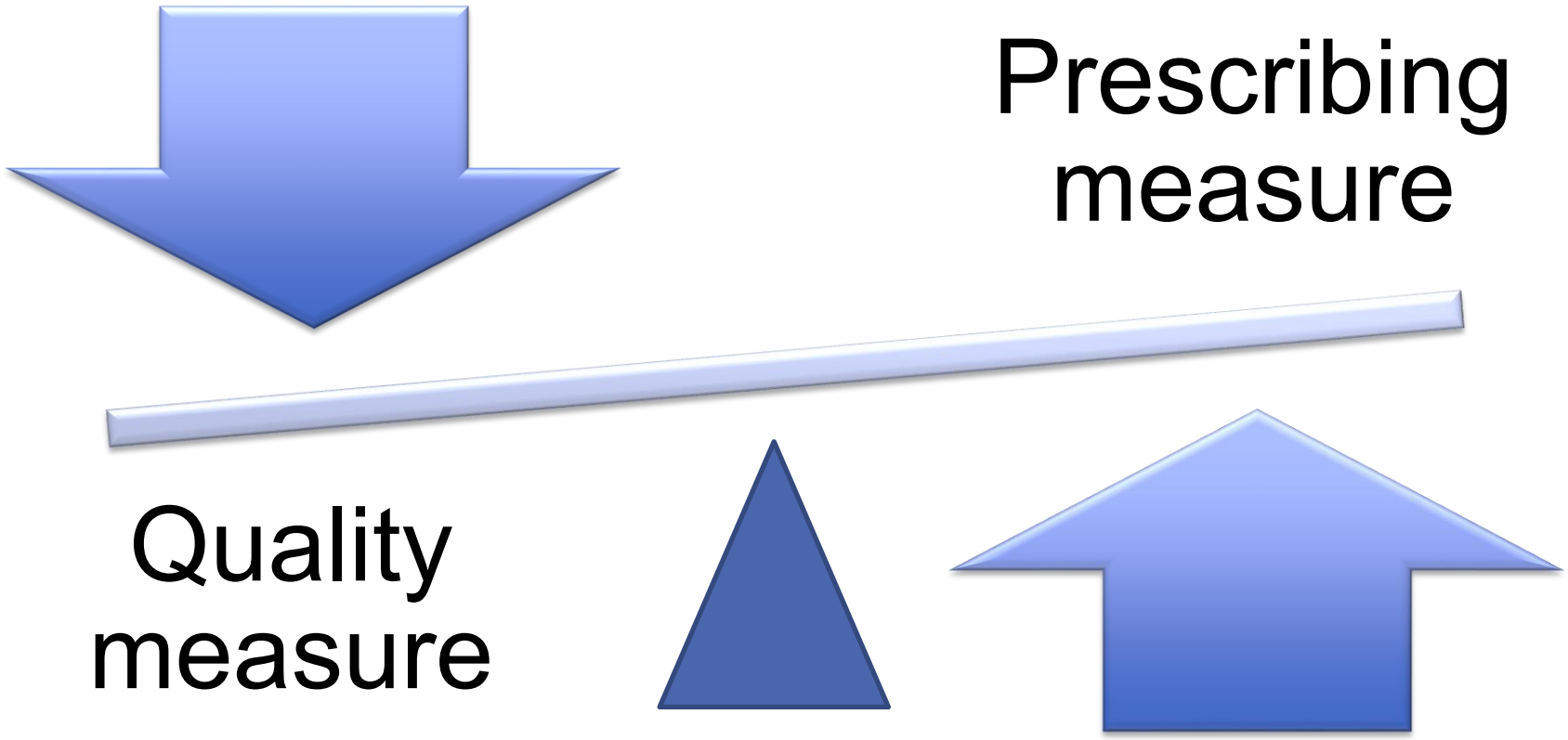
- **1997 -** All older adults; adopted by CMS in 1999 for nursing home regulations
- **2003 -** Era of generalization to Med D, NCQA, Healthcare Effectiveness Data and Information Set (HEDIS)
- **2012 -** Further adoption into quality measures (AGS started regular updates)
- **2015 -** Introduction of drug-drug interactions (DDI), renal dosage tables, how to use, and alternatives papers
- **2019 -** Further refinement of the criteria
- **2023 -** Further review and updates
- **2025 -** Alternative treatments published
- **2027 -** In progress

Mark H Beers, MD
1954-2009

What is the purpose of the Beers Criteria?

- To identify potentially inappropriate medications (PIMs) that should be avoided in older adults.
- To reduce adverse drug events and drug-related problems and improve medication selection and medication use in older adults.
- Designed for use in any clinical setting, also used as an educational, quality, and research tool.
- Not applicable for patients in palliative or hospice care.

Balancing the Purposes



Methodology

- Expert interdisciplinary panel
  - 12 voting members, 3 non-voting members
- Literature search
  - Evidence tables prepared, rated quality of evidence and strength of recommendation
- Followed IOM 2011 recommendations on guideline development
  - Includes period for public comment & invited peer review

2023 AGS Beers Criteria® – The Tables

Medications on the list have safer alternatives or inadequate evidence of efficacy in **older adults.**

- **Table 2**: Medications or medication classes that *should be avoided* in persons 65 years or older.
- **Table 3**: Medications that should be avoided in older persons known to have specific diseases or syndromes. (drug-disease interactions)
- **Table 4**: Medications that should be *used with caution.*

Tables continued

- **Table 5**: Potentially clinically important drug-drug interactions to avoid in older adults
- **Table 6**: Medications that should be avoided or have their dosage reduced with decreased renal function
- **Table 7:** Drugs with strong anticholinergic properties
- **Table 8:** Medications / criteria removed since 2019 Update
- **Table 9:** Medications / criteria added since 2019 Update
- **Table 10:** Medications / criteria modified since 2019 Update

7 Principles for Use of the AGS Beers Criteria

- Medications in the Criteria are *potentially* inappropriate, not definitely inappropriate.
- Read the rationale and recommendations for each criterion.
- Understand why medications on in the Criteria and adjust your approach to those medications accordingly.
- Optimal application of the Criteria involves identifying PIMs, and when appropriate, use safer nonpharmacologic and pharmacologic therapies.
- The Criteria are a starting point for a comprehensive process of identifying and improving medication appropriateness and safety.
- Access to medications included in the Criteria should not be excessively restricted by prior authorization and/or health plan coverage policies.
- The Criteria are not equally applicable to all countries.

Prescribers kept asking…

You keep telling us what *NOT* to use, so…

What should we use instead???

Alternative Treatments to Selected Medications in the 2023 American Geriatrics Society Beers Criteria® *J Am Geriatr Soc 2025*

Methodology

- Medication-centric
  - "Don't use diphenhydramine"
- Condition-centric
  - Insomnia, allergic rhinitis, pruritus
- Identified most commonly-used medications → conditions for which they are commonly used
- Invited generalist and specialist clinicians
  - Pharmacy, Medicine, Nursing, PT, Psychology
  - Workgroups

30 criteria, 21 conditions

Domain	Clinical Topic
Insomnia and anxiety	Insomnia, anxiety
Allergy and related	Allergic rhinitis and associated symptoms, pruritus
Cardiovascular	Atrial fibrillation (anticoagulation, VTE), atrial fibrillation (rate/rhythm control), heart failure
Pain	Pain
Neurological	Delirium, BPSD, Parkinson's, tardive dyskinesia
Endocrine	Diabetes
GI	GERD, gastroparesis, intestinal cramping and diarrhea, constipation, weight loss
GU	Nocturia & nocturnal polyuria, genitourinary sx of menopause, recurrent UTIs in women

Example from Beers Alternatives

Condition	Relevant AGS Beers Criteria Medications	Alternatives to Consider (Recommendations)	Resources
Allergic rhinitis and associated symptoms	First-generation antihistamines Recommendation: Avoid	Identify and avoid allergens, where possible. Irrigate nasal passages with purified saline solution (distilled or sterilized water only) with a neti pot or similar system. Do not use unsterilized tap water. If using an oral antihistamine, 2nd or 3rd generation agents preferred, e.g., loratadine, cetirizine, levocetirizine, fexofenadine. For nasal symptoms: • Nasal antihistamine sprays (e.g., azelastine or olopatadine, which are absorbed less than oral agents and have fewer adverse effects) • Nasal corticosteroids (e.g., fluticasone, budesonide, triamcinolone) • Nasal mast cell stabilizers (e.g., cromolyn) For ocular symptoms: eye drops (ocular antihistamines or decongestants, artificial tears).	For patients and caregivers: Information on allergic rhinitis (UpToDate) https://www.uptodate.com/contents/allergic-rhinitis-beyond-the-basics#H1 Self-care for allergic rhinitis (MedlinePlus) https://medlineplus.gov/ency/patientinstructions/000547.htm Instructions on how to administer nasal sprays (BASCI) https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7162111/figure/f4/ Safe use of nasal irrigation devices (FDA) https://www.fda.gov/consumers/consumer-updates/rinsing-your-sinuses-neti-pots-safe

Principles for the Beers Alternatives

- Stopping a PIM is not the end goal. The goal is to find interventions (non-pharmacologic and/or pharmacologic) that help people feel better and maintain health while reducing risk of medication harms.
- Don’t focus on replacing a “bad” medication with a better one. Consider non-pharmacologic strategies.
- Understanding the underlying cause(s) of a symptom or condition can help guide therapy.
- Use clinical judgement and shared decision-making. Sometimes, potentially inappropriate medications may be the best choice.
- Make use of resources (for both clinicians and patients) to aid deprescribing.

A Typical Case

An 85 yo woman is admitted to the hospital after experiencing a fall in her kitchen. She complains of left hip pain and is found to have a hip fracture. She is evaluated by orthopedics and is scheduled for surgery the next morning.
PMH: Hypertension, hyperlipidemia, osteoarthritis, depression
Other pertinent info: wt = 55 kg. Scr = 0.9 mg/dL

Medications on Admission

- Amlodipine 10 mg q day
- Atorvastatin 20 mg q hs
- Escitalopram 10 mg q day
- Zolpidem 10 mg q hs
- Ibuprofen 400 mg prn (takes 1-2 doses on most days)

Applying the Beers Criteria & Alternatives

Examples:

- Insomnia
- Pain management
- Anticoagulation
- Delirium & Behaviors in Dementia
- Medications to avoid in patients with a history of falls and/or fractures (FRIDs – fall-risk increasing drugs)

Insomnia:
AGS Beers Criteria® Recommendations

Medication	Recommendation	Rationale
Benzodiazepines, Z-drugs* (Anxiety, insomnia)	Avoid (except in situations such as REM sleep behavior disorder, withdrawal syndromes, severe GAD, anesthesia)	Benzodiazepines: Abuse, misuse, addiction, physical dependence Cognitive impairment, delirium, falls, fractures, motor vehicle crashes Z-drugs: Similar adverse effects, minimal benefits
1st-generation antihistamines (Insomnia)	Avoid (except situations such as severe allergic reactions)	Anticholinergic adverse effects: confusion, dry mouth, constipation; with cumulative exposure, falls, delirium, and dementia. Tolerance develops when used as hypnotic

*"*Z-drugs*" = *nonbenzodiazepine benzodiazepine receptor agonists*

Insomnia: Alternatives to benzodiazepines, z-drugs and 1st generation antihistamines

Assess for comorbid conditions and other factors that disturb sleep (e.g., obstructive sleep apnea [OSA])

- **First-line treatment for chronic insomnia in older adults is Cognitive Behavioral Therapy for Insomnia (CBT-I)**
  - Can be delivered by a trained provider or provided in other formats (e.g., digital CBT-I)
  - Core components include sleep restriction, stimulus control therapy, and cognitive therapy (may include additional components)

Insomnia – Alternatives to benzodiazepines, z-drugs and 1st generation antihistamines (cont.)

- If CBT-I alone is unsuccessful, use shared decision-making if considering pharmacological therapy
- Medications which may be safer and have evidence of effectiveness for in older adults (for short-term use):
  - Low-dose doxepin (up to 6 mg)
  - Dual orexin receptor antagonists (e.g., daridorexant, lemborexant, suvorexant)
  - Ramelteon
- Insufficient evidence regarding other medications commonly prescribed for insomnia in older adults (e.g., trazodone, mirtazapine, melatonin)
- Formal guidelines on insomnia medications in older adults are limited.

Pain: PIMs to Avoid in Older Adults

- Tricyclic antidepressants
- NSAIDs
  - Avoid non-COX-2 selective NSAIDs for chronic use
- Skeletal muscle relaxants
- Meperidine
- Combination of gabapentinoids with either opioids or benzodiazepines

Example from AGS Beers Criteria Table 2

Drugs	Rationale	Recommendation	Quality of Evidence	Strength of Recommendation
Skeletal muscle relaxants Carisoprodol Chlorzoxazone Cyclobenzaprine Metaxalone Methocarbamol Orphenadrine	Muscle relaxants typically used to treat MSK complaints are poorly tolerated by older adults because some have anticholinergic adverse effects, sedation, increased risk of fractures; effectiveness at dosages tolerated by older adults are questionable.*	Avoid	Moderate	Strong

*This criterion does not apply to skeletal muscle relaxants typically used for the management of spasticity (i.e. baclofen and tizanidine) although these drugs can also cause substantial adverse effects.
Baclofen was added to Table 6 – avoid in CrCl <60 mL/min)

Alternatives to Consider for Pain

- Non-pharmacological
  - Exercise, physical therapy, acupuncture, cognitive behavioral therapy (CBT), education interventions
- Pharmacological
  - Nociceptive
    - Topical NSAIDs, COX-2 inhibitors, acetaminophen, IA steroids
    - Topical agents such as capsaicin, lidocaine
  - Neuropathic
    - SNRIs, gabapentinoids alone, topical agents as above

Our patient – Post-Op Day #1
Any problems here?

The surgery was uncomplicated and orthopedics added the following medications:

- Acetaminophen 975 mg q 8 hrs prn
- Oxycodone 5 mg or 10 mg q 6 hr prn pain
- Methocarbamol 750 mg q 8 hr x 1 wk
- Gabapentin 300 mg q 8 hr
- Celecoxib 100 mg q 12 hr x 2 weeks
- Rivaroxaban 10 mg q day x 6 weeks
- Bowel regimen: senna + polyethylene glycol
- Home meds to be continued: amlodipine, atorvastatin, escitalopram, zolpidem 5 mg (dose decreased)

Aspirin, Anticoagulants 2023 Update

Drug	Recommendation
Aspirin	Avoid for primary prevention of cardiovascular disease (Moved from Table 4 to Table 2) Consider deprescribing in older patients already taking it for primary prevention.
Warfarin	Avoid as initial therapy for nonvalvular atrial fibrillation or VTE unless other alternatives are contraindicated.
Rivaroxaban	Avoid for long-term treatment of nonvalvular atrial fibrillation or VTE (Moved from Table 4 to Table 2)
Dabigatran	Use with caution (no change)

Aspirin
(moved from Table 4 to Table 2)

Recommendation:

- Avoid initiating aspirin for primary prevention of cardiovascular disease.
- Consider deprescribing in older adults already taking it for primary prevention.

Rationale:

- Risk of major bleeding from aspirin increases markedly in older age.
- Studies suggest lack of net benefit and potential for net harm when initiated for primary prevention in older adults.
- See USPSTF 2022 recommendations for adults >60.

Warfarin
(added to Table 2)

Recommendation:

- *Avoid* warfarin as initial therapy for treatment of VTE or non-valvular atrial fibrillation (NVAF) unless alternative options (eg DOACs) are contraindicated or there are substantial barriers to their use.

Rationale:

- Compared to DOACs, warfarin has higher risks of bleeding and similar or lower effectiveness for treatment of VTE and NVAF.
- For older adults who have been using warfarin chronically, it may be reasonable to continue it, particularly in those with well-controlled INRs and no adverse effects.

Rivaroxaban
(moved from Table 4 to Table 2)

Recommendation:

- *Avoid* rivaroxaban for long-term treatment of NVAF or VTE in favor of safer anticoagulant alternatives

Rationale:

- At doses used for long-term treatment of VTE or NVAF, rivaroxaban appears to have a higher risk of major bleeding and GI bleeding in older adults than other DOACs, particularly apixaban.
- Rivaroxaban may be reasonable in special situations, for example when once-daily dosing is necessary to facilitate adherence.
- All DOACs confer lower risk of intracranial hemorrhage than warfarin.

Our patient – Post-Op Day #3

The patient is ready for discharge to sub-acute rehab, but she develops atrial fibrillation, so they:

- Increase the rivaroxaban to 20 mg day (with food)
- Add metoprolol succinate 50 mg q day
- She had some confusion overnight, so she received a dose of quetiapine 25 mg x 1 dose and q 8 hr prn.

Example from AGS Beers Criteria Table 3

Disease or Syndrome	Drugs	Rationale	Recommendation	Quality of Evidence	Strength of Recommendation
Delirium	Anticholinergics **Antipsychotics** Benzodiazepines Corticosteroids H2 antagonists Opioids Nonbenzodiaze-pines (Z drugs)	Avoid in older adults with or at high risk of delirium because of potential of inducing or worsening delirium. Ex. Avoid antipsychotics for behavioral problems of dementia or delirium unless nonpharm options failed or there is risk of harm to self or others	Avoid, except in situations listed under rationale statement.	H2 antagonists – low All others - moderate	Strong

Alternatives to Consider for Delirium or Agitation

- Multicomponent nonpharmacological interventions
- No pharmacologic treatment is recommended as a routine response to delirium.
- Evaluate & address potential causes:
  - Pain, constipation, urinary retention, acute illness, medications, environmental stressors, sensory deficits
- Short-term, low dose antipsychotics or sedatives are **the last resort if patient is a harm to self or others.**

Medications with Increased Fall Risk

Disease or Syndrome	Drugs	Rationale	Recommendation	Quality of Evidence	Strength of Recommendation
History of falls or fractures	Antiepileptics Antipsychotics Benzodiazepines Nonbenzodiaze-pines (Z drugs) Antidepressants TCAs SSRIs SNRIs Opioids	May cause ataxia, impaired psycho-motor function, syncope, additional falls Benzodiazepines: Shorter-acting ones are not safer than long-acting ones Antidepressants: Evidence for risk of falls and fractures is mixed; SNRIs may confer higher falls risk Avoid use of more than 1 of these drugs	Avoid use unless safer alternatives are not available. Antiepileptics: Avoid except for seizure & mood disorders. Opioids: Avoid except for pain management in the setting of severe acute pain.	Antidepressants moderate Opioids: Moderate All others: high	Strong

Our patient – Post-Op Day #4

Transfer to Sub-Acute Rehabilitation – What should we do?

- Amlodipine 10 mg q day
- Atorvastatin 20 mg q hs
- Escitalopram 10 mg q day
- Metoprolol Succinate 50 mg q day
- Rivaroxaban 20 mg q day
- Acetaminophen 975 mg q 8 hr prn
- Oxycodone 5 or 10 mg q 6 hr prn pain
- Methocarbamol 750 mg q 8 hr x 1 wk
- Gabapentin 300 mg q 8 hr
- Celecoxib 100 mg q 12 hr x 10 days
- Zolpidem 5 mg qhs prn
- Quetiapine 25 mg qhs
- Bowel regimen: senna, polyethylene glycol, bisacodyl supp prn

BP = 114/68, HR = 70
First night in rehab, she is confused, tries to get out of bed, and is found on the floor.

Our patient – Post-Op Day #4

Transfer to Sub-Acute Rehabilitation – What should we do?

- Amlodipine 10 mg q day
- Atorvastatin 20 mg q hs
- Escitalopram 10 mg q day
- Metoprolol Succinate 50 mg q day
- Rivaroxaban 20 mg q day – Consider switching to Apixaban 2.5 mg q12h
- Acetaminophen 975 mg q 8 hr prn – Make scheduled q 8 hr
- Oxycodone 5 or 10 mg q 6 hr prn pain - ↓ to 2.5 or 5 mg q 6 hr prn
- Methocarbamol 750 mg q 8 hr x 1 wk – D/C or ↓ to 500 mg q 8 hr prn
- Gabapentin 300 mg q 8 hr – Dose too high for initial tx, D/C or ↓ dose
- Celecoxib 100 mg q 12 hr x 10 days
- Zolpidem 5 mg qhs prn – discuss risks with patient, consider melatonin
- Quetiapine 25 mg qhs – D/C, monitor behavior
- Bowel regimen: senna, polyethylene glycol, bisacodyl supp prn

Application to Health-Systems

- **Educate the whole team – including patients & families!**
- Build alerts into the CPOE system.
  - Suggest appropriate alternatives.
- Avoid PIMs in order sets.
- P & T Committee Formulary decisions.
- Role of pharmacists:
  - Medication reconciliation
  - Drug Regimen Review in nursing facilities
- Opportunities for research & Quality Improvement
  - Evaluate your institution’s data & focus on common PIMs

Application to Clinicians

- Think of AGS Beers Criteria® as a warning light
  - Why is the patient taking the drug; is it truly needed?
  - Are there safer and/or more effective alternatives?
  - Does this patient have particular characteristics that increase or mitigate risk of this medication?
  - Is this a time to consider deprescribing?
- Actively assess for symptoms and assess whether these could be related to medications – avoid a “prescribing cascade”.
- Don’t automatically defer to colleagues.

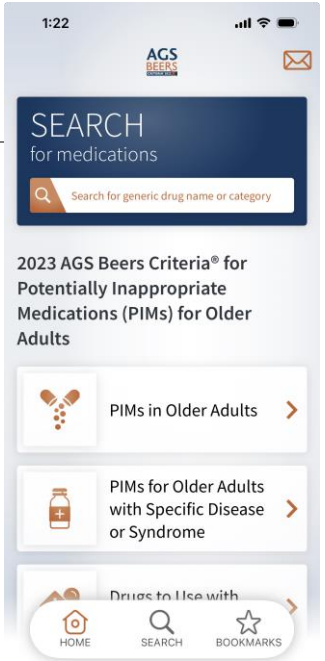
Application to Patients & Caregivers
How to Explain the AGS Beers Criteria®

Tell patients:

- Don’t stop taking a medication just because it is on the AGS Beers Criteria®.
- Talk with your clinicians to see if there is a safer and/more effective alternative.
- Learn about all of the medications that you take. Tell your clinician(s) if you think you might be having a side effect, or if you are having any other problem.

www.healthinaging.org

AGS Beers Criteria® Resources



- 2023 updated AGS Beers Criteria® for potentially inappropriate medication use in older adults. (*J Am Geriatri Soc. 2023;71:2052-81*)
- AGS Beers Criteria and Alternatives App
- Updated 2023 AGS Beers Criteria® Pocket Card
- How to Use the American Geriatrics Society 2015 Beers Criteria—A Guide for Patients, Clinicians, Health Systems, and Payors (*J Am Geriatri Soc 2015)* https://doi.org/10.1111/jgs.13701
- Alternative Treatments to Selected Medications in the 2023 AGS Beers Criteria. (*J Am Geriatr Soc. 2025;73:2657-76*)

Questions?