Individualizing Medication Therapy for Elderly Patients: Weighing the Evidence Versus Best Practice

Randy McDonough, Pharm.D., MS, CGP, BCPS, FAPhA Co-Owner, Director of Clinical Services
Towncrest Pharmacy
Sunny Linnebur, Pharm.D., BCPS, FCCP, FASCP, CGP
Associate Professor
University of Colorado Skaggs School of Pharmacy and Pharmaceutical Sciences

Disclosures
• Dr. McDonough is co-owner of Towncrest, Solon Towncrest, & Towncrest Compounding Pharmacies. He is also co-owner of Innovative Pharmacy Solutions. Dr. McDonough is a speaker for McKesson Health Mart Town Hall Meetings.
• Dr. Linnebur is a member of the Board of Directors for the American Geriatrics Society and a member of the Expert Panel for the AGS 2015 Updated Beers Criteria. Dr. Linnebur is also an employee of CVS Pharmacy.

The American Pharmacists Association is accredited by the Accreditation Council for Pharmacy Education as a provider of continuing pharmacy education.

Learning Objectives
• Describe the physiologic changes associated with aging and their impact on pharmacokinetics and pharmacodynamics leading to medication-related problems.
• Explain how to individualize a patient’s treatment goals and medication regimen to account for changes associated with aging.
• Evaluate the usefulness and limitations of Beers Criteria when applied to the geriatric population.
• Evaluate the medication regimen of a senior patient and develop strategies to identify and resolve medication-related problems.

Self-Assessment Case
• CP is an 85 y.o. man presenting to his ambulatory clinical pharmacist for an MTM visit.
• PMH: heart failure, aortic valve replacement, stroke, COPD, GERD, RLS, and Alzheimer’s dementia
• Current medications: metoprolol succinate 25 mg daily, lisinopril 5 mg daily, atorvastatin 10 mg daily, donepezil 10 mg daily, furosemide 20 mg daily, potassium chloride 10 mLq BID, clopidogrel 75 mg daily, ASA 81 mg daily, omeprazole 20 mg daily, memantine 10 mg BID, Advair HFA 230/21—2 inhalations BID, zolpidem 10 mg daily, Spiriva—1 inhalation daily, and carbidopa/levodopa 25/100—1 tablet daily. He also has a order for ProAir HFA—2 puffs Q 6 hours PRN. He has been on this medication regimen for the past year.
• His current vitals include: weight = 120 lbs, height = 5'8, BP = 130/80 mmHg and HR = 76 BPM. His most current labs include Na = 135, K = 3.9, Glu = 89, Scr = 1.2.
1. Each of the following statements is true for CP except:
   A. CPs medication regimen puts him at an increased risk of an ADE
   B. His estimated CrCl (using Cockcroft Gault equation) = 60.3 mL/min
   C. His medication regimen does not contain a potentially inappropriate medication
   D. His medication regimen is not considered polypharmacy

2. Each of the following is a potential pharmacodynamic concern for CP except:
   A. CP may not respond as well to a beta blocker
   B. CP is more sensitive to the effects of zolpidem
   C. CP becomes dizzy moving from a sitting to a standing position
   D. CP has decreased lean body mass

3. Based upon the 2015 AGS Beers Criteria, which of the following drugs is potentially inappropriate in CP and includes an appropriate corresponding resolution?
   A. Omeprazole—switch to ranitidine
   B. Aspirin—discontinue and continue clopidogrel
   C. Donepezil—discontinue and continue memantine
   D. Zolpidem—switch to non-pharmacologic treatment

4. Which of the following is a limitation of the 2015 AGS Beers Criteria as related to CP?
   A. Aspirin has a DDI with clopidogrel but it is not included on the Criteria
   B. Because CP has dementia, the Criteria do not apply to him
   C. Because CP has dementia, he is not eligible non-pharmacologic alternative treatments
   D. We do not know how long he has taken omeprazole, so the Criteria do not apply to him

Medication Use in Older Adults

• Adults ≥ 65 years of age represent 14% of the US population, but take 30% of prescription medication and 50% of OTC medications.
• Approximately 1/3 of person > 60 years were on 5 or more medications in 2007-2008.
  - Polypharmacy is usually defined as taking 5 or more medications per day.
  - Risk of ADEs increases in a nonlinear fashion with 5 or more medications

Journals of Gerontology: Medical Sciences. 2015, 60;8:989-995
Medication Use in Older Adults

- Health concerns associated with polypharmacy
  - Decreased physical and social functioning
  - Increased risk of falls, delirium, and other geriatric syndromes.
  - Hospital admissions
  - Death

*MJA 201 (7) October 214

Medication Use in Older Adults

- Financial concerns associated with polypharmacy
  - CMS estimates the polypharmacy costs the nation’s health plans more than $50 billion annually
  - In the community population, medication-related problems cost $177.4 billion annually

*Clinical Interventions in Aging 2008;3 (2) 383-389
*J Am Pharm Assoc 2001; 41:192-199

Medication Use in Older Adults

- Hospitalizations
  - 1 in 6 hospital admissions of older adults is because of an adverse drug event
  - For persons > 75 years, 1 in 3 hospital admissions

*Am Fam Physician 2013 Mar 1;87:337-338

Adverse Drug Events in Older Adults

- Five categories of adverse drug events
  - Adverse drug reaction (ADR)
  - Medication error
  - Therapeutic failure
  - Adverse drug withdrawal event
  - Overdose
    - ADR is most common, the others are caused by non-adherence, omission, or cessation of treatment

*Ann Intern Med 2004;140:795-801
What is an Adverse Drug Event

- World Health Organization (WHO) definition
  - Adverse drug events are unintended and undesired effects of a medication at the normal dose.
  - Therapeutic failures, overdoses, and medication abuse are excluded.

Pharm Sci 2002;23:46-54
WHO: Medicines: safety of medicines-adverse drug reactions

Classification of Adverse Drug Reactions (ADRs)

- Two main types
  - Type A = ADRs associated with the pharmacologic action of a drug and are dose related
    - Common, predictable, and low mortality
  - Type B = ADRs unrelated to the pharmacological action of a drug
    - Often immunologically mediated, uncommon, and more serious


Classification of Adverse Drug Reactions (ADRs)

- Other ADR Types
  - Type C = ADRs associated with long term therapy and are related to cumulative dose (e.g. long term prednisone and HPA suppression).
  - Type D = ADRs that occur sometime after the use of the drug and are usually dose related and uncommon (e.g. TD with antipsychotics).
  - Type E = ADRs that occur soon after withdrawal of the drug (e.g. MI after beta blocker withdrawal).
  - Type F = ADRs are caused by drug-drug interactions, dose related, and common.


Risk Factors for ADRs in Older Adults

- Pharmacokinetic changes associated with aging
- Pharmacodynamic changes associate with aging
- Polypharmacy
- Co-morbidities
- Potentially inappropriate medications (PIMs) in older adult
- Medication adherence and medication errors
- Drug-drug interactions


Pharmacokinetic Changes in the Elderly

- Absorption
  - Aging impacts the rate rather than the extent
    - Delayed gastric emptying
    - Decreased colonic motility
    - Increased gastrointestinal pH
    - Altered rates of gastric blood flow
    - Presence of other drugs

Pharmacokinetic Changes in the Older Adult

- Distribution
  - Increased body fat
  - Decreased lean mass
  - Decreased body water
  - Vd increased for fat soluble drugs (BZD) and decreased for water soluble drugs (Digoxin)
  - Decreased albumin: agents that are highly bound to albumin (acidic drugs) will have a larger percentage of unbound active drug
    - E.g. warfarin and phenytoin
Pharmacokinetic Changes in the Older Adult

• **Metabolism**
  - Decreased hepatic function
  - Decreased in number of hepatocytes
  - Decreased liver blood flow
  - Oxidation/reduction/hydrolysis (Phase I) are decreased, but conjugation (Phase II) remain relatively constant
    - Diazepam and chlordiazepoxide undergo Phase I whereas Lorazepam and oxazepam undergo Phase II

• Diazepam and chlordiazepoxide undergo Phase I whereas Lorazepam and oxazepam undergo Phase II

Pharmacokinetic Changes in the Older Adult

• Decrease in hepatic mass and blood flow by about 1%/yr after age 40
  - ↓ first pass metabolism of drugs with high extraction ratio (flow dependent)
    - Nitrates, propranolol, phenobarbital, lidocaine, rifedipine, verapamil

Pharmacokinetic Changes in the Older Adult

• **Excretion**
  - Decline in kidney function
  - Decrease in GFR
  - Drugs primarily renal eliminated
    - Digoxin, lithium, amantadine
    - Nitrofurantoin
    - H2RAs, metoclopramide
    - Nadolol and Atenolol
    - Allopurinol, gabapentin
    - PCNs (except Nafcillin) and Cephs (except ceftriaxone)
    - LMWH, dabigatran, rivaroxaban, apixaban

• Digoxin, lithium, amantadine
  - Nitrofurantoin
  - H2RAs, metoclopramide
  - Nadolol and Atenolol
  - Allopurinol, gabapentin
  - PCNs (except Nafcillin) and Cephs (except ceftriaxone)
  - LMWH, dabigatran, rivaroxaban, apixaban

Pharmacokinetic Changes in the Older Adult

• Renal function declines fairly consistently with age
  - Decrease in absolute # of functioning nephrons (↓ GFR, renal plasma flow, and tubular secretion)
    - SCr is frequently in normal range
    - Decrease in lean muscle mass and physical activity
    - Drugs typically dosed lower if CrCl <50-60 ml/min
    - Cockcroft Gault equation utilized in most drug product labeling
      \[
      \text{CrCl} = \frac{(140-\text{age}) \times \text{wt Kg}}{\text{SCr} \times 72} \times 0.85 \text{ (females)} \\
      \]

• Renal function declines fairly consistently with age
  - Decrease in absolute # of functioning nephrons (↓ GFR, renal plasma flow, and tubular secretion)
    - SCr is frequently in normal range
    - Decrease in lean muscle mass and physical activity
    - Drugs typically dosed lower if CrCl <50-60 ml/min
    - Cockcroft Gault equation utilized in most drug product labeling
      \[
      \text{CrCl} = \frac{(140-\text{age}) \times \text{wt Kg}}{\text{SCr} \times 72} \times 0.85 \text{ (females)} \\
      \]

Pharmacokinetic Changes in the Older Adult

• Other therapeutic considerations in patients with renal impairment
  - Nitrofurantoin
    - CI if CrCl < 40 ml/min
    - Less effective urinary concentrations achieved
    - Increased toxicity (peripheral neuropathy and pulm fibrosis)
  - Diuretics
    - Thiazides less effective when CrCl < 30 ml/min
    - Alternatives: loop diuretics, metolazone
    - Beware of hyperkalemia with postassium sparing diuretics

• Other therapeutic considerations in patients with renal impairment
  - Nitrofurantoin
    - CI if CrCl < 40 ml/min
    - Less effective urinary concentrations achieved
    - Increased toxicity (peripheral neuropathy and pulm fibrosis)
  - Diuretics
    - Thiazides less effective when CrCl < 30 ml/min
    - Alternatives: loop diuretics, metolazone
    - Beware of hyperkalemia with postassium sparing diuretics

© 2016 by the American Pharmacists Association. All rights reserved.
Pharmacodynamic Changes in the Older Adult

- Receptor changes
  - A decrease in the number of some receptors
  - Alpha and beta
- Altered reserve capacity
  - Allows the body to compensate for changes, stress, or insults to the body or organ system
- Homeostatic changes
  - Down-regulation of baroreceptors in the elderly compromises their response to HOTN
    - Leading to dizziness, unsteady gait, loss of balance, or a fall
  - Increased sensitivity to the effect of medications
  - E.g. Warfarin, CNS medications

Quality Measures of Drug Prescribing in the Elderly

- Avoidance of inappropriate medications
- Appropriate use of indicated medications
- Appropriate monitoring
  - Therapeutic effects
  - Side effects
  - Labs
- Avoidance of drug-drug interactions
- Involvement of the of the patient and integration of patient values
  
  Lancet 2007, 370:173

Strategies to Improve Medication Use in Older Adults

- Avoid the prescribing cascade
- Assess opportunities to stop medications
- Match patient medical conditions with medications and goals of care

Medical Clinics of North America, 2015;99(2):295-310

Medication Reviews

- Use of systematic processes to review each medication
  - Does the medication correspond to an indication?
  - What are the therapeutic end-points?
  - Do the benefits outweigh the risks?
  - Is it used to treat side effects of another drug?
  - Could it interact with underlying diseases or other medications?
  - Is the medication being appropriately monitored?
  - Is the patient experiencing any ADR

Strategies to Improve Medication Use in Older Adults

- Be aware that older adults may present atypically when experiencing and ADE
- Whenever possible, use medications with a wide therapeutic index vs NTI
- Review medication lists regularly
- Set an end date and use objective criteria to determine the success or failure of an empiric trial and act accordingly
- “Start low and go slow” in dosing new meds
- Establish appropriate monitoring parameters including labs

Am Fam Physician 2013;87(5):331-336

Am Fam Physician 2013;87(5):331-336
Strategies to Improve Medication Use in Older Adults

- Antipsychotic use for longer than 1 month
- NSAIDs use for longer than 3 months
- PPIs used at a maximum therapeutic dosage for longer than 8 weeks
- Aspirin use for primary prevention in patients > 80 y.o.
- Loop diuretic as 1st line monotherapy for HTN

Am Fam Physician 2013;87(5):331-336

Strategies to Improve Medication Use in Older Adults

- BZDs in patients who had at least one fall in the past 3 months
- Duplicate drug class prescriptions
- LA BZDs for longer than 1 month
- Haloperidol (long term use)

Am Fam Physician 2013;87(5):331-336

Strategies to Improve Medication Use in Older Adults

- Use of published criteria
  - PIMs = Potentially Inappropriate Medications in Older Adults
    - Beers Criteria
    - STOPP (Screening Tool of Older People’s Prescriptions) Criteria
  - PPOs = Potentially Prescribing Omissions
    - START (Screening Tool to Alert to Right Treatment) Criteria

Age and Ageing 2015;44:213-218

Maxine

Medication List

- Lisinopril 40 mg daily
- Levothyroxine 150 mcg daily
- Venlafaxine 75 mg daily
- Gemfibrozil 600 mg one tablet BID
- Simvastatin 40 mg daily
- Diazepam 10 mg at bedtime
- Gabapentin 900 mg TID
- Amlodipine 10mg daily
- HCTZ 12.5mg daily
- Hydrocodone/apap 5/325 mg 1 tab BID prn pain
- Ibuprofen 400 mg TID
- APAP 500 mg one tablet 1-2x/wk
- Tylenol PM one tablet 1-2x/wk
- Docusate one capsule BID
- Diphenhydramine PRN allergy symptoms

Resource: The AGS Beer’s Criteria

- Consensus criteria for safe medication use in older adults
- Based on expert consensus developed through modified Delphi technique
- Originally published in 1991
- Current versions supported by AGS and include evidence rating, evidence tables, and additional resources
- Additional guidance document available + alternatives paper
- Adopted by NCQA and CMS into quality initiatives
AGS 2015 Updated Beers Criteria

Usefulness
- Evidence-based
- Updated regularly
- Includes evidence rating and evidence tables
- Designed to support good clinical judgment

Limitations
- Evidence-based
  - If no evidence, not included
- If evidence supports in patients of all ages, drug was not included
- Does not apply to all patients
- Does not replace common sense and clinical judgment
- The criteria are not equally applicable in all countries


AGS 2015 Updated Beers Criteria: Key Principles to Guide Optimal Use

1. Medications in the AGS 2015 Beers Criteria are potentially inappropriate, not definitely inappropriate
2. The caveats and guidance listed in the rationale and recommendation statements are important.
3. Understand why medications are included in the Criteria and adjust your approach to those medications accordingly.
4. Optimal application involves identifying PIMs, and where appropriate, offering safer nonpharmacological and pharmacological therapies.
5. The Criteria should be a starting point for a comprehensive process of identifying and improving medication appropriateness.
6. Access to medications included in the Criteria should not be excessively restricted by prior authorization and/or health plan coverage policies.


AGS Beers Criteria: Tables

- Table 2: PIMs that should be avoided, if possible, in all older adults
- Table 3: PIMs that should be avoided, if possible, in certain older adults
  - Those with a drug-disease/syndrome interaction
- Table 4: PIMs to be used with caution in older adults
- Table 5: Non-Infective DDIs that should be avoided
- Table 6: Non-Infective meds that should be avoided or have dose reductions in patients with varying degrees of kidney function


Format of AGS Beers Criteria 2015

<table>
<thead>
<tr>
<th>Therapeutic Category</th>
<th>Rationale</th>
<th>Recommendation</th>
<th>Quality of Evidence</th>
<th>Strength of Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>PPIs</td>
<td>Risk of Clostridium difficile infection and bone loss and fractures</td>
<td>Avoid scheduled use for &gt;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 H2 blockers)</td>
<td>High</td>
<td>Strong</td>
</tr>
</tbody>
</table>


Excerpts from AGS Beers Criteria 2015

Table 2 AVOID

<table>
<thead>
<tr>
<th>Drug</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digoxin</td>
<td>Use as first line therapy</td>
</tr>
<tr>
<td>Nifedipine IR</td>
<td>Avoid if used for AAFP or HF: avoid dosages &gt;0.125 mg/day</td>
</tr>
<tr>
<td>PPIs</td>
<td>Avoid scheduled use for &gt;8 weeks unless high risk patient, erosive esophagitis, Barrett’s esophagitis, pathological hypersecretory condition, or failure of diuretics or H2RA</td>
</tr>
<tr>
<td>NSAID</td>
<td>Avoid chronic use, unless other alternatives are not effective and patient can also take PPI/misoprostol</td>
</tr>
<tr>
<td>Skeletal muscle relaxants</td>
<td>Avoid</td>
</tr>
</tbody>
</table>


Excerpts from AGS Beers Criteria 2015

Table 2 AVOID

<table>
<thead>
<tr>
<th>Drug</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antipsychotics (all)</td>
<td>Avoid, except for schizophrenia, bipolar disorder, or short-term use as an antiemetic during chemotherapy</td>
</tr>
<tr>
<td>Benzodiazepines (all)</td>
<td>Avoid</td>
</tr>
<tr>
<td>Estrogens with or without progestins</td>
<td>Avoid oral and topical patches, Vaginal cream or tablets, acceptable to use low-dose intravaginal estrogen for management of dyspareunia, lower UTIs, and other vaginal symptoms</td>
</tr>
<tr>
<td>Nitrofurantoin</td>
<td>Avoid in individuals with creatinine clearance &lt; 30 mL/min or for long-term suppression of bacteria</td>
</tr>
</tbody>
</table>

Table 2: AVOID

<table>
<thead>
<tr>
<th>Drug/Agent</th>
<th>Avoid Use Due to Adverse Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nonbenzodiazepine hypnotics (Z-drugs)</td>
<td>Avoid due to adverse effects similar to benzodiazepines</td>
</tr>
<tr>
<td>Insulin, sliding scale (all settings)</td>
<td>Avoid due to higher risk of hypoglycemia without improvement in hyperglycemia management</td>
</tr>
<tr>
<td>Megestrol</td>
<td>Avoid due to minimal effect on weight and increased risk of thrombosis and possibly death</td>
</tr>
<tr>
<td>Glyburide</td>
<td>Avoid due to severe prolonged hypoglycemia</td>
</tr>
</tbody>
</table>

Excerpts from AGS Beers Criteria 2015

Table 3: AVOID in certain patients

<table>
<thead>
<tr>
<th>Drug/Agent</th>
<th>Avoid in Patients due to</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSAIDs, COX-2 inhibitors, Non-DHP CCBs, TZDs, clofazimine, dronedarone</td>
<td>Avoid in patients with HF</td>
</tr>
<tr>
<td>AChE-Ils, peripheral alpha-1 blockers, tertiary TCAs, chlorpromazine, thioridazine, olanzapine</td>
<td>Avoid in patients with a history of syncope</td>
</tr>
<tr>
<td>Anticholinergics, benzodiazepines, H2 blockers, Z-drugs, antipsychotics</td>
<td>Avoid in patients with dementia or cognitive impairment</td>
</tr>
<tr>
<td>Oral and transdermal estrogen, peripheral alpha-1 blockers</td>
<td>Avoid in women with urinary incontinence</td>
</tr>
</tbody>
</table>

Excerpts from AGS Beers Criteria 2015

Table 4: CAUTION

<table>
<thead>
<tr>
<th>Drug/Agent</th>
<th>Use caution due to</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASA for primary prevention of cardiac events</td>
<td>Use caution in adults ≥80 yrs</td>
</tr>
<tr>
<td>Dabigatran</td>
<td>Use caution in adults ≥75 yrs if CrCl &lt;30 mL/min</td>
</tr>
<tr>
<td>Prasugrel</td>
<td>Use caution in adults ≥75 yrs</td>
</tr>
<tr>
<td>Antipsychotics, diuretics, carbamazepine, carboplatin, cyclophosphamide, cisplatin, mitoxantrone, oxcarbazepine, SSRIs, SNRIs, TCAs, vincristine</td>
<td>Use caution in older adults due to risk of SIADH</td>
</tr>
</tbody>
</table>

Excerpts from AGS Beers Criteria 2015

Table 5: DDIs to Avoid

<table>
<thead>
<tr>
<th>Object Drug</th>
<th>Interacting Drug</th>
<th>Rationale</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benzos and Nonbenzo, Benzo receptor agonist hypnotics</td>
<td>≥2 other CNS active drugs*</td>
<td>Increased risk of falls and fractures</td>
<td>Avoid total of ≥3 CNS-active drugs*; minimize number of CNS active drugs</td>
</tr>
<tr>
<td>Anticholinergic</td>
<td>Anticholinergic</td>
<td>Increased risk of cognitive decline</td>
<td>Avoid, minimize number of anticholinergic drugs (Table 7)</td>
</tr>
</tbody>
</table>

Excerpts from AGS Beers Criteria 2015

Table 5: Renal Dosing

<table>
<thead>
<tr>
<th>Med Class</th>
<th>CRI Where Action Required</th>
<th>Rationale</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gabapentin</td>
<td>&lt;60 mL/min</td>
<td>CNS adverse effects</td>
<td>Reduce dose</td>
</tr>
<tr>
<td>Spironolactone</td>
<td>&lt;30 mL/min</td>
<td>Increased potassium</td>
<td>Avoid</td>
</tr>
<tr>
<td>Ranitidine</td>
<td>&lt;50 mL/min</td>
<td>Mental status changes</td>
<td>Reduce dose</td>
</tr>
<tr>
<td>Dabigatran</td>
<td>&lt;30 mL/min</td>
<td>Increased risk of bleeding</td>
<td>Avoid</td>
</tr>
</tbody>
</table>

Excerpts from AGS Beers Criteria 2015

Table 6: Patient Case

Medication List
- Amlodipine 10 mg daily
- HCTZ 12.5 mg daily
- Lisinopril 40 mg daily
- Levothyroxine 150 mcg daily
- Venlafaxine 75 mg daily
- Gemfibrozil 600 mg one tablet BID
- Simvastatin 40 mg daily
- Diazepam 10 mg at bedtime
- Gabapentin 900 mg TID
- Ibuprofen 400 mg TID
- Hydrocodone/apap 5/325 mg 1 tab BID pm pain
- APAP 500 mg one tablet 1-2x/wk
- Tylenol PM one tablet 1-2x/wk
- Docusate one capsule BID
- Diphenhydramine PRN allergy symptoms

Excerpts from AGS Beers Criteria 2015

Table 7: Strategies to Identify and Resolve Medication-Related Problems

Medication List
- Amlodipine 10 mg daily
- HCTZ 12.5 mg daily
- Lisinopril 40 mg daily
- Levothyroxine 150 mcg daily
- Venlafaxine 75 mg daily
- Gemfibrozil 600 mg one tablet BID
- Simvastatin 40 mg daily
- Diazepam 10 mg at bedtime
- Gabapentin 900 mg TID
- Ibuprofen 400 mg TID
- Hydrocodone/apap 5/325 mg 1 tab BID pm pain
- APAP 500 mg one tablet 1-2x/wk
- Tylenol PM one tablet 1-2x/wk
- Docusate one capsule BID
- Diphenhydramine PRN allergy symptoms

Excerpts from AGS Beers Criteria 2015

Table 8: Patient Case

Medication List
- Amlodipine 10 mg daily
- HCTZ 12.5 mg daily
- Lisinopril 40 mg daily
- Levothyroxine 150 mcg daily
- Venlafaxine 75 mg daily
- Gemfibrozil 600 mg one tablet BID
- Simvastatin 40 mg daily
- Diazepam 10 mg at bedtime
- Gabapentin 900 mg TID
- Ibuprofen 400 mg TID
- Hydrocodone/apap 5/325 mg 1 tab BID pm pain
- APAP 500 mg one tablet 1-2x/wk
- Tylenol PM one tablet 1-2x/wk
- Docusate one capsule BID
- Diphenhydramine PRN allergy symptoms
Questions to Ask Patient/Caregiver

- Assess patient for adverse effects
  - Muscle pain
  - Cognitive problems
  - Drowsiness/fatigue
  - Constipation
  - GI bleeding
  - Dizziness
  - Others?
- Can she afford her medications?
- Did someone recommend the OTCs?
- Is she adherent to everything?

Mild Cognitive Impairment: Using the Beers Criteria

The patient states that she is having some memory changes and is “forgetting things.” Which of the following medications could be contributing?
A. Diazepam
B. Gabapentin
C. Tylenol PM
D. Diphenhydramine for allergies
E. All of the above

Back Pain: Using the Beers Criteria

You discuss her back pain and she is not well controlled (pain 6/10, all day long). Which of the following changes would be the best for this patient?
A. Increase ibuprofen to 600 mg TID
B. Increase gabapentin to 1200mg TID
C. Increase hydrocodone/apap to QID
D. Change acetaminophen to scheduled QID

• What other drug changes would be helpful here?

Insomnia, Fatigue, Falls: Using the Beers’s Criteria

She tells you that she has some daytime fatigue and has fallen recently. Which of the following changes would be appropriate for her?
A. Stop diphenhydramine/apap (Tylenol PM)
B. Attempt to taper diazepam
C. Reduce gabapentin dose
D. All of the above

Insomnia, Fatigue, Falls: Using the Beers’s Criteria

3 months later, the patient presents at the pharmacy with a prescription for zolpidem. The technician enters it and it rejects, requiring a PA. How would you handle the issue?
A. Advise the patient that her insurance doesn’t pay for it and she can pay cash if she wants
B. Work with the MD to get the Prior Auth approved
C. Recommend the provider change the zolpidem to nonpharmacologic treatment
D. Recommend the provider change the zolpidem to OTC melatonin
Reducing ADEs: Dyslipidemia

You review the patient’s lipid panel, and her LDL is 98, her TGs are 110, and her HDL is 50. Which of the following plans may be appropriate to discuss with the patient and her provider?

A. Continue simvastatin and gemfibrozil
B. Continue simvastatin and D/C gemfibrozil
C. Continue gemfibrozil and D/C simvastatin
D. Other

Reducing ADEs: Constipation

You discuss constipation with the patient and she states it is still bothering her. Which of the following drugs may be contributing?

A. Amlodipine
B. HCTZ
C. Ibuprofen
D. Diphenhydramine
E. All of the above

Which drugs could you stop or change?

Resources

- American Geriatrics Society
  - Foundation for Health in Aging
  - Aging in the Know
  - http://www.healthinaging.org/

Key Points

- Adverse drug events are common in the elderly and are often preventable
- Pharmacokinetic and pharmacodynamics changes in older adults complicate the use of medications in the elderly
- A thoughtful, systematic process to review medications in the elderly is important
- The 2015 AGS Beers Criteria is a helpful resource for pharmacists making recommendations for medication management in the elderly

Self-Assessment Case

- CP is an 85 y.o. man with a PMH significant for heart failure, aortic valve replacement, stroke, COPD, GERD, RLS, and Alzheimer’s dementia
- Current medications: metoprolol succinate 25 mg daily, lisinopril 5 mg daily, atorvastatin 10 mg daily, donepezil 10 mg daily, furosemide 20 mg daily, potassium chloride 10 mEq BID, clodidogrel 75 mg daily, ASA 81 mg daily, omeprazole 20 mg daily, memantine 10 mg BID, Advair HFA 230/21—2 inhalations BID, zolpidem 10 mg daily, Spiriva—1 inhalation daily, and carbidopa/levodopa 25/100—1 tablet daily. He also has a order for ProAir HFA—2 puffs Q 6 hours PRN. He has been on this medication regimen for the past year.
- His current vitals include: weight = 120 lbs, height = 5'8, BP = 130/80 mmHg and HR = 76 BPM. His most current labs include Na = 135, K = 3.9, Glu = 89, SCR = 1.2.

1. Each of the following statements is true for CP except:
   A. CPs medication regimen puts him at an increased risk of an ADE
   B. His estimated CrCl (using Cockcroft Gault equation) = 60.3 mL/min
   C. His medication regimen does not contain a potentially inappropriate medication
   D. His medication regimen is not considered polypharmacy
2. Each of the following is a potential pharmacodynamic concern for CP except:
   A. CP may not respond as well to a beta blocker
   B. CP is more sensitive to the effects of zolpidem
   C. CP becomes dizzy moving from a sitting to a standing position
   D. CP has decreased lean body mass

3. Based upon the 2015 AGS Beers Criteria, which of the following drugs is potentially inappropriate in CP and includes an appropriate corresponding resolution?
   A. Omeprazole—switch to ranitidine
   B. Aspirin—discontinue and continue clopidogrel
   C. Donepezil—discontinue and continue memantine
   D. Zolpidem—switch to non-pharmacologic treatment

4. Which of the following is a limitation of the 2015 AGS Beers Criteria as related to CP?
   A. Aspirin has a DDI with clopidogrel but it is not included on the Criteria
   B. Because CP has dementia, the Criteria do not apply to him
   C. Because CP has dementia, he is not eligible for non-pharmacologic alternative treatments
   D. We do not know how long he has taken omeprazole, so the Criteria do not apply to him