The 2015 American Geriatrics Society
Beers Criteria: Implications for
Medication Use in the Elderly

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Disclosure

• I will not discuss off-label use or investigational use of medications in my presentation:

Objectives

• At the completion of this program, the participant (pharmacists and technicians) will be able to:
  • List at least three potentially inappropriate medications for use in the elderly
  • Describe how the Beers Criteria can help improve medication use
  • Describe how the Beers criteria can be used in clinical practice
"A ballet-dancing opera critic who hiked the Alps and took up rowing after diabetes cost him his legs"

- MD, Univ of Vermont
- First med student to do a geriatrics elective at Harvard's new Division on Aging
- Geriatric Fellowship, Harvard
- Faculty, UCLA/RAND
- Co-editor, Merck Manual of Geriatrics
- Editor-in-Chief, Merck Manuals

Adverse Drug Events and the Elderly

Individuals > 65 yrs more likely than younger to suffer an ADE; RR 2.4 (95% CI 1.8-3.0)

Estimated Rates of Emergency Hospitalizations for Adverse Drug Events in Older Adults, 2007-2009
ADVERSE EVENTS IN Skilled
Nursing Facilities:
NATIONAL Incidence Among
Medicare Beneficiaries

Daniel R. Levinson
Inspector General

February 2014
OEI-06-11-00370

Table 3: Adverse Events Identified Among Medicare SNF Residents by Category

<table>
<thead>
<tr>
<th>Types of Adverse Events</th>
<th>Percentage*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Events Related to Medication</td>
<td>37%</td>
</tr>
<tr>
<td>· Medication-induced delirium or other change in mental status</td>
<td>11%</td>
</tr>
<tr>
<td>· Excessive sedation due to medication</td>
<td>5%</td>
</tr>
<tr>
<td>· Fall or other trauma with injury secondary to effects of medication</td>
<td>4%</td>
</tr>
<tr>
<td>· Constipation, diarrhea, andasis related to medication</td>
<td>4%</td>
</tr>
<tr>
<td>· Other medication events</td>
<td>14%</td>
</tr>
</tbody>
</table>

Table 4: Temporary Harm Events Identified Among SNF Residents by Category

<table>
<thead>
<tr>
<th>Types of Temporary Harm Events</th>
<th>Percentage*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Events Related to Medication</td>
<td>49%</td>
</tr>
<tr>
<td>· Hypoglycemic episodes (e.g., low or significant drop in blood glucose)</td>
<td>16%</td>
</tr>
<tr>
<td>· Fall or other trauma with injury associated with medication</td>
<td>14%</td>
</tr>
<tr>
<td>· Medication-related delirium or other change in mental status</td>
<td>7%</td>
</tr>
<tr>
<td>· Throat and other naso/oral surgical site related to medication</td>
<td>4%</td>
</tr>
<tr>
<td>· Allergic reactions to medications (e.g., rash, itching)</td>
<td>2%</td>
</tr>
<tr>
<td>· Other medication events</td>
<td>2%</td>
</tr>
</tbody>
</table>

Table 6: Percentage of Preventable Adverse and Temporary Harm Events by Clinical Category

<table>
<thead>
<tr>
<th>Types of Adverse and Temporary Harm Events</th>
<th>Percentage of Preventable Adverse and Temporary Harm Events (n = 109)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Events Related to Medication</td>
<td>96%</td>
</tr>
<tr>
<td>Events Related to Resident Care</td>
<td>57%</td>
</tr>
<tr>
<td>Events Related to Infections</td>
<td>52%</td>
</tr>
</tbody>
</table>

Source: OIG analysis of SNF stays for 653 Medicare beneficiaries discharged in August 2011.
Definitions and Terminology

- **MRP** – Medication Related Problem: An event or situation involving drug therapy that negatively interferes with a patient’s health
- **Polypharmacy** (Polymedication?): 5 or more medicines?
- **PIM** – Potentially Inappropriate Medication
- **DIM** – Definitely Inappropriate Medication
- **PIP** – Potentially Inappropriate Prescription
- **PPIE** – Potentially Inappropriate Prescribing in the Elderly
- **PPO** – Potential Prescribing Omissions
- **DAE** – Drug to be avoided in the elderly
- **DRP** – Drug-Related Problem
- **ADWE** – Adverse Drug Withdrawal Events
- **Suboptimal prescribing**

Potentially Inappropriate Medications

- Emphasis on “Potentially”
  - **PIM ≠ DIM**
  - Consider the individual patient
- Experts don’t always agree on “inappropriate”
- Delphi technique v. evidence-based methods
- Actual harm vs. predicted Harm – High “signal to noise” ratio
- No harm no foul?
- PIM identification is only a starting point

Consequences of MRPs and PIMs

- Hospitalization
  - ↑ length of stay
- **ADR**
- **ADE**
- Inefficient resource use
- Financial waste
- Polypharmacy
- Medication errors
- Therapeutic failure
- Poor QOL
- Morbidity and mortality
  - ↑ Illness duration
- NF placement
- Functional decline
- Social decline
**PIMs and ADEs**

**What Tools are Available?**

- Beers List
- MAI - Medication Appropriateness Index
- IPET - Improved Prescribing in the Elderly Tool
- Zhan - AHRQ
- ACOVE - Assessing Care of Vulnerable Elderly
- MRCI - Medication Regimen Complexity Index
- NCQA-HEDIS
- STOPP/START
- IMAP - Individual Medication Assessment and Planning Tool
- Beers Criteria
- GPGPA - Good Palliative Geriatric Practice Algorithm
- SMOG - Screening Medications in the Elderly Drug User
- ARMOR - Assess, Review, Minimize, Optimize, Reassess
- TIMER - Tool to Improve Medications in the Elderly via Review
- AOU - Assessment of Underutilization

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**The Beers List**

- In 1991, Dr Mark Beers published a paper with explicit criteria to identify potentially inappropriate medication (PIM) use in nursing home residents.
- Delphi technique (also referred to as GOBSAT)
- Most recent update - 2015 American Geriatrics Society

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**Medication Appropriateness Index**

- Is there an indication for the drug?
- Is the medication effective?
- Is the dosage correct?
- Are the directions correct?
- Are the directions practical?
- Are there clinically significant drug-drug interactions?
- Is there unnecessary duplication with other drugs?
- Is the duration of therapy acceptable?
- Is this drug the least expensive alternative compared to others of equal utility?

Min = 0 = Completely appropriate
Max = 18 = Completely inappropriate
Assessing Care of Vulnerable Elderly (ACOVE): Quality Indicators for Appropriate Medication Use in Vulnerable Elders

- Drug indication—clearly defined in record
- Patient education—purpose, how to take, expected side effects, important ADEs
- Medication list—up-to-date, in record
- Response to therapy—documented within six months
- Periodic drug regimen review—at least annually
- Monitoring warfarin therapy—INR w/in 4 days and at least every 6 weeks
- Monitoring of diuretic therapy—electrolytes w/in 1 week and yearly
- Avoid use of chlorpropamide as hypoglycemic agent, due to long half-life, serious hypoglycemia
- Avoid drugs with strong anticholinergic properties when possible
- Avoid benzodiazepines—patient CVD depressants, low therapeutic index, highly addictive, multiple drug interactions, increase risk for falls/fractures
- Avoid meperidine—increased risk for delirium
- Monitor renal function and potassium in patients prescribed ACE inhibitors w/in 1 week

STOPP/START

- Screening Tool of Older Persons Potentially Inappropriate Prescriptions
- Identifies commission errors
- Comprehensive list of geriatric FIMs
- Screening Tool to Alert Doctors to the Right Treatment
- Identifies omission errors
- Recommends beneficial medications for specific conditions
- Developed in 2008 by European geriatricians using Delphi consensus technique and clinical evidence
- Inter-rater reliability: proportion of positive agreement
  - STOPP 87%
  - START 84%

Selected STOPP Items

- Thiazide diuretic with diagnosis of gout
- Calcium channel blocker with constipation
- Tricyclic antidepressants with dementia
- PPI for PUD @ full dose for >8 weeks
- Regular opiates >2 weeks with chronic constipation without laxative
- High risk drugs in fallers (psychoactive Rx, vasodilators, diphenhydramine, etc.)
Selected START Items

- Warfarin in chronic atrial fibrillation
- ACE inhibitor with chronic heart failure
- Antidepressants in severe depression >3 months
- Bisphosphonates when taking chronic corticosteroid Rx
- Ca++/Vit D in osteoporosis

STOPP/START Update


- To determine whether application of STOPP/START reduces hospital-acquired ADR, cost, length of stay
- Control group – normal procedure
- Intervention group – STOPP/START applied

- Trigger symptom or clinical phenomenon
  - Falls, electrolyte derangement, orthostatic hypotension, (pre) syncope, constipation, bleeding, dyspepsia, diarrhea

- Results
  - ADR rate 21.0% in control group
  - ADR rate 11.7% in intervention group (NNT=11)
  - LOS – no change
  - Medication cost in control group 90.62 Euros
  - Medication cost in intervention group 73.16 Euros
What has your experience been?

Take-away Points So Far

- Many different tools to identify MRPs, PIMs, etc., etc.
- Consider how they were developed
- Consider strengths v. weaknesses
- Consider what they are designed to do
- "Potential" problem vs. "actual" problem
- The tool doesn’t rule - never lose sight of the individual patient

Adverse Drug Effect?
Hill’s Criteria of Causation (1965)

- **Strength of Association:** The larger the relative effect, the more likely the causal role of the factor.
- **Dose-response:** If the risk increases with increasing dose of the risk factor, the more likely the causal role of the factor.
- **Consistency:** If similar associations are found in different studies in different populations, the more likely the causal role of the factor.
- **Temporality:** Risk factor exposure must precede the outcome.
- **Intervention:** Reduction or removal of the risk factor must reduce the risk of the outcome.
- **Biological Plausibility:** The association agrees with currently accepted understanding of pathological processes.
- **Coherence:** Associations between the risk factor and the outcome must be consistent with existing knowledge.
**Evolution of the Beers Criteria**

- Late 1980’s increasing recognition of risky medications used by elderly
- 1991
  - Dr. Beers assembled panel of 13 geriatric pharmacology experts to identify medications where risk potentially exceeded benefit.
  - Modified Delphi technique arrived at the “Beers list”
  - Intended to be used with minimal clinical data to apply to chart review or computer data bases
- 1997
  - Updated publication to include all elderly
  - Included medications to be avoided in certain conditions

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**Zhan-AHRQ**

- Looked at PIMs in community-dwelling elderly in 1996 using Medical Expenditure Panel Survey representing 33.2 million lives
- Expert panel of 7 members (geriatricians, pharmacoepidemiologist, pharmacist) classified 33 drugs from 1997 Beers drugs into three categories:
  - Always avoid (used by 2.5% of study population)
  - Rarely appropriate (used by 9.1% of study population)
  - Some indications (used by 13.3% of study population)
    - Most use considered inappropriate

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**NCQA-HEDIS (2006)**

- 2002, Secretary of HHS called for action plan to ensure appropriate use of therapeutic agents in the elderly
- NCQA convened expert consensus panel to identify rates of inappropriate prescribing in the elderly
- Panel classified the 2003 Beers drugs as follows
  - Always avoid
  - Rarely appropriate
  - Some indications
- Drugs in the “always avoid” and “rarely appropriate” composed the 2006 Health Plan Employer Data and Information set (HEDIS) measure to assess quality of care of older Americans
- Percent of persons receiving at least 1 HEDIS criteria drug
  - Male 25.2%
  - Female 23.3%
Evolution of the Beers Criteria

- 2003
  - Added new drugs and new clinical information
- 2009
  - Dr. Beers dies at age 54 of complications of diabetes
- 2012
  - Broader in scope
  - Data arranged in tables
  - Quality of evidence, Strength of recommendations
  - Drug-disease and drug-syndrome interactions

Frequency and cost of potentially inappropriate prescribing for older adults: a cross-sectional study.

Steven G. Morgan PhD, Jordan Hunt MA, Jocelyn Rioux BSc, Jeffery Proulx BSc, Deirdre Weymann MA, Cara Tannenbaum MD MSc

- Study of 2013 data
- 6 Canadian provinces
- Review of data based on 2012 Beers criteria
- 37% of those >65 years received at least 1 Beers Rx in 1 year
- 42% women, 31% men

NCQA-HEDIS (2014)

- National Committee for Quality Assurance, Health Care Effectiveness Data and Information Set (HEDIS)
- Continues to assess % of Medicare members ≥66 who receive high-risk medications
- Based on 2012 Beers Criteria
- ↓ use of high-risk medications is an opportunity to reduce costs and encourage clinicians to prescribe safer alternative medications
- Many other HEDIS measures are reported
Quality of Evidence Strength of Recommendation

<table>
<thead>
<tr>
<th>Medication</th>
<th>Recommendation</th>
<th>Quality of Evidence</th>
<th>Strength of Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barbiturates</td>
<td>Avoid in elderly</td>
<td>Strong</td>
<td>Strong</td>
</tr>
<tr>
<td>Androgens</td>
<td>Avoid unless indicated</td>
<td>Moderate</td>
<td>Weak</td>
</tr>
<tr>
<td>Tricyclic antidepressants</td>
<td>Avoid in individuals with or at high risk of delirium due to the possibility of inducing or worsening of delirium.</td>
<td>High</td>
<td>Strong</td>
</tr>
</tbody>
</table>

Evolution of the Beers Criteria

- 2015
  - American Geriatrics Society assumes responsibility for criteria
  - Update every three years
  - Important drug classes added
    - Proton pump inhibitors: omeprazole (Prilosec®), esomeprazole (Nexium®)
    - with extended use (which is often inappropriate) may ↑ increase risk of c diff infection
    - ↑ risk of bone loss and fractures
  - “Z drugs”: zolpidem (Ambien®), zaleplon (Sonata®) and eszopiclone (Lunesta®)
  - Important drug interactions
  - Selected medications - dosage adjustments in renal failure

How to Use the AGS 2015 Beers Criteria

A Guide for Patients, Clinicians, Health Systems, and Payors

A Clinician Education Tool
What is the Purpose of the Beers Criteria?

• To identify potentially inappropriate medications that should be avoided in many older adults

• To reduce adverse drug events and drug related problems, and to 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

Benefits and Challenges

• The Beers Criteria have had many positive impacts
  • Use of many medications included in the Beers Criteria has declined
  • Increased appreciation of special considerations that should be applied when prescribing for older adults

Benefits and Challenges

• However, implementation of the Beers Criteria has led to several unintended consequences
  • Many clinicians misunderstand the purpose of the criteria, mistakenly believing that the criteria judge all uses of the listed drugs to be universally inappropriate
  • Health systems have often reinforced this perception, implementing quality improvement and decision support systems that implicitly consider any use of these medications to be problematic
  • Some prior authorization programs build around the Beers Criteria have been misapplied by payors and/or misinterpreted by the prescribing clinician
Optimizing Use of the Beers Criteria: A Guide

• As part of 2015 update of the Beers Criteria, AGS created a workgroup to encourage optimal use of the criteria by patients, clinicians, health systems, and payors
  • Included input from key stakeholders
• Workgroup developed:
  • 7 key principles to guide optimal use of the criteria
  • Guidance for how clinicians and others can apply these principles in everyday practice

Why is inappropriate medication use important in older adults?

• Increases mortality, morbidity & risk of adverse drug events (Lau et al., Arch Intern Med, 2005)
• Increases healthcare costs and utilization (Fisk et al., Res in Nurs & Health, 2008; Spinewine et al., Jounc, 2007)
• Increasing use in the oldest and most vulnerable adults (Olfson et al., 2014, Davidson et al., 2015)

What is the purpose of the Beers Criteria?

• To identify drugs to avoid in older adults:
  1) Independent of diagnosis
  2) Considering diagnosis
• 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
Beers Criteria: History and Utilization

- Original 1991 – Nursing home pts
- Updates
  - 1997 All elderly; adopted by CMS in 1999 for nursing home regulation
  - 2003 Era of generalization to Med D, NCQA, HEDIS
  - 2012 Further adoption into quality measures
  - 2015 Introduction DDI, Renal Dosage Tables, How to Use and Alternatives Papers

Specific Aims 2015 AGS Beers Criteria

Specific aim: Update 2012 Beers Criteria using a comprehensive, systematic review and grading of evidence

Strategy:
- Incorporate new evidence
- Grade the new evidence
- Use an interdisciplinary panel with consensus
- Incorporate exceptions

Intent of the AGS 2015 Beers Criteria

Goals:
- Improve care by ↓ exposure to PIMS
- Educational tool
- Quality measure
- Research tool

Prescribing measure vs. Quality measure
**Method**

Framework
- Expert panel
  - 13 members + 3 ad hoc members
- IOM 2011 report on guideline development
  - Includes a period for public comment
- Extensive Literature Search

**Panel Members**

- Co-chairs
  - Donna Fick, PhD
  - Todd Semla, MS, PharmD
- Panelists (voting)
  - Judith Beizer, PharmD
  - Catherine Dubbou, MD
  - Jerome Epplin, MD, AGSF
  - Nisa Faragen, CINRN,CS-BC
  - Joseph Hamlon, PharmD, MS
  - Peter Hollmann, MD
  - Rosemary Laird, MD
  - Sunny Linnebur, PharmD
  - Stinderpal Sandhu, MD
  - Michael Steinman, MD
- Nonvoting Panelists
  - Robert Domrowski, PharmD (CMS)
  - Woody Eisenberg (PCQA)
  - Erin Giovannetti (NCQA)
- AGS Staff
  - Elvy Ickowicz, MPH
  - Mary Jordan Samuel
- Others
  - Sue Radcliff (research)
  - Susan Aiello, DVM (editing)

**Assembling the Evidence**

SEARCH TERMS: ADE, inappropriate drug use, med errors, polypharmacy x age/human/English

- Initial Search (8/1/2001-7/1-2014)
  - 25,149 citations
- Records reviewed by co-chairs
  - n=3,387
- Records Screened by Full Panel
  - (n=1,188 citations)
- Studies Used to create Evidence Tables
  - (n=335)

- Records included due to duplication or did not meet the inclusion criteria
  - n=5,531
Methodology & Process

- Use of Beers SWAT team –
- In-person meeting: review of 2012 Criteria, SWAT Team report and lit search
  - 4 groups reviewed lit, selected citations
  - Evidence tables prepared, rated quality of evidence and strength of recommendation
  - Final group consensus—multiple meetings

Designations of Quality and Strength of Evidence:
ACP Guideline Grading System, GRADE

QUALITY OF EVIDENCE GRADING—USING GRADE

- High Evidence
- Moderate Evidence
- Low Evidence

STRENGTH OF RECOMMENDATION

Strong
Benefits clearly outweigh harms, adverse events, and risks – or – harms, adverse events, and risks clearly outweigh benefits.
Weak
Benefits finely balanced with harms, adverse events, and risks.
Insufficient
Evidence inadequate to determine net harms, adverse events, and risks.
Use of Caveats

- Amiodarone is to be avoided as first-line therapy for atrial fibrillation unless the patient has heart failure or substantial left ventricular hypertrophy.

- Patients enrolled in palliative or hospice care excluded.

Disclaimer from the Panel

“The changes in the 2015 update are not as significant as those of the previous update, but two major components have been added:

1. Drugs for which dose adjustment is required based on renal impairment and
2. Drug-drug interactions.

Neither of these new additions is intended to be comprehensive, because such lists would be too extensive; instead, an interdisciplinary expert panel focused on those drugs and drug-drug interactions when there is evidence that older adults are at risk of serious harm if the dose is not adjusted or the drug interaction is overlooked.

Alternatives article

Alternative Medications for Medications in the Use of High-Risk Medications in the Elderly and Potentially Harmful Drug-Disease Interactions in the Elderly Quality Measures

Josef F. Huber, PharmD, MPH, FDA/VS, USA, Todd P. Schmitt, MD, MPharm, and Kenneth L. Schenley, MPharm

J Am Geriatr Soc 2015
Alternatives article: Methods

- Reviewed by:
  - AGS Beers Criteria Panel
  - Representatives of NCQA and PQA
  - AGS Executive Board
- Literature search 2000-2014
  - PubMed
  - Cochrane Library
  - Google Scholar
  - Other articles from personal files

Recommendations

Two tables & three appendices
- Table 1 - Alternatives to High-Risk Medications
- Table 2 - Alternatives to Potentially Harmful Drug-Disease Interactions
- Appendix I – References for Table 1
- Appendix II – References for Table 2
- Appendix III – Resources for Non-Pharmacological Alternatives for Tables 1 & 2

So What’s New in the AGS 2015 Beers Criteria?
Summary of Additions

New Tables
- Table 5 – drug-drug interactions
- Table 6 – renal dosing

- PPI’s > 8 weeks without justification
- Desmopressin for treatment of nocturia or nocturnal polyuria
- Eszopiclone and zaleplon added to list of drugs to avoid in dementia or cognitive impairment
- Opioids added to list of drugs to avoid in patients with history of falls

Table 5: Drug-Drug Interactions

<table>
<thead>
<tr>
<th>Drug/Class</th>
<th>Interacting Drug/Class</th>
<th>Rationale</th>
<th>Recommendation</th>
<th>Quality of Evidence</th>
<th>Strength of Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alpha-1 blockers, peripheral</td>
<td>Loop diuretics</td>
<td>↑ risk of urinary incontinence in older women</td>
<td>Avoid in older women, unless conditions warrant both drugs</td>
<td>Moderate</td>
<td>Strong</td>
</tr>
<tr>
<td>ACEIs</td>
<td>Amiloride or triamterene</td>
<td>↑ risk of hyperkalemia</td>
<td>Avoid routine use; reserve for patients with demonstrated hypokalemia while on an ACEI</td>
<td>Moderate</td>
<td>Strong</td>
</tr>
<tr>
<td>Anticholinergic</td>
<td>Anticholinergic</td>
<td>↑ risk of cognitive decline</td>
<td>Avoid, minimize the number of anticholinergic drugs (see Table 8)</td>
<td>Moderate</td>
<td>Strong</td>
</tr>
<tr>
<td>Antidepressant</td>
<td>*Two or more other CNS drugs</td>
<td>↑ risk of falls</td>
<td>Avoid 3 or more CNS drugs, minimize the number of CNS drugs.</td>
<td>Moderate</td>
<td>Strong</td>
</tr>
<tr>
<td>Antipsychotic</td>
<td>*Two or more other CNS drugs</td>
<td>↑ risk of falls</td>
<td>Avoid 3 or more CNS drugs, minimize the number of CNS drugs.</td>
<td>Moderate</td>
<td>Strong</td>
</tr>
<tr>
<td>Benzodiazepines</td>
<td>Benzodiazepine-receptor agonists</td>
<td>↑ risk of falls/fracture</td>
<td>Avoid 3 or more CNS drugs, minimize the number of CNS drugs.</td>
<td>High</td>
<td>Strong</td>
</tr>
<tr>
<td>Corticosteroids</td>
<td>NSAIDs</td>
<td>↑ risk of peptic ulcer disease/GI bleed</td>
<td>Avoid; if not possible, provide GI protection.</td>
<td>Moderate</td>
<td>Strong</td>
</tr>
<tr>
<td>Lithium</td>
<td>ACEIs</td>
<td>↑ toxicity</td>
<td>Avoid; monitor lithium concentrations.</td>
<td>Moderate</td>
<td>Strong</td>
</tr>
<tr>
<td>Lithium</td>
<td>Loop diuretics</td>
<td>↑ toxicity</td>
<td>Avoid; monitor lithium concentrations.</td>
<td>Moderate</td>
<td>Strong</td>
</tr>
</tbody>
</table>

Table 5: Drug-Drug Interactions (continued)
### Table 6: Renal Dosing

<table>
<thead>
<tr>
<th>Medication Class/Medication</th>
<th>Creatinine Clearance (mL/min)</th>
<th>When Action Required</th>
<th>Rationale</th>
<th>Recommendation</th>
<th>Quality of Evidence</th>
<th>Strength of Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cardiovascular/Hemostasis</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amiloride</td>
<td>&lt;30</td>
<td>↑ potassium and ↓ sodium</td>
<td>Avoid</td>
<td>Moderate</td>
<td>Strong</td>
<td></td>
</tr>
<tr>
<td>Spironolactone</td>
<td>&lt;30</td>
<td>Hyperkalemia</td>
<td>Avoid</td>
<td>Moderate</td>
<td>Strong</td>
<td></td>
</tr>
<tr>
<td>Triamterene</td>
<td>&lt;30</td>
<td>Increased risk of kidney injury; ↑ potassium and ↓ sodium</td>
<td>Avoid</td>
<td>Moderate</td>
<td>Strong</td>
<td></td>
</tr>
<tr>
<td><strong>Central Nervous System/Analgesics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Duloxetine</td>
<td>&lt;30</td>
<td>↑ GI adverse effects (nausea, diarrhea)</td>
<td>Avoid</td>
<td>Moderate</td>
<td>Strong</td>
<td></td>
</tr>
<tr>
<td>Gabapentin</td>
<td>&lt;60</td>
<td>CNS adverse effects</td>
<td>Reduce dose</td>
<td>Moderate</td>
<td>Strong</td>
<td></td>
</tr>
<tr>
<td>Levetiracetam</td>
<td>≤ 80</td>
<td>CNS adverse effects</td>
<td>Reduce dose</td>
<td>Moderate</td>
<td>Strong</td>
<td></td>
</tr>
<tr>
<td>Pregabalin</td>
<td>≤ 60</td>
<td>CNS adverse effects</td>
<td>Reduce dose</td>
<td>Moderate</td>
<td>Strong</td>
<td></td>
</tr>
<tr>
<td>Tramadol</td>
<td>&lt;30</td>
<td>CNS adverse effects</td>
<td>Immediate release and reduce dose if tolerated</td>
<td>Avoid</td>
<td>Weak</td>
<td>Weak</td>
</tr>
</tbody>
</table>

**Table 6: Non-infective Medications That Should Be Avoided or Have Their Dosage Reduced with Varying Levels of Kidney Function in Older Adults**

<table>
<thead>
<tr>
<th>Medication Class/Medication</th>
<th>Creatinine Clearance (mL/min)</th>
<th>When Action Required</th>
<th>Rationale</th>
<th>Recommendation</th>
<th>Quality of Evidence</th>
<th>Strength of Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cardiovascular/Hemostasis</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apixaban</td>
<td>&lt;25</td>
<td>↑ bleeding</td>
<td>Avoid</td>
<td>Moderate</td>
<td>Strong</td>
<td></td>
</tr>
<tr>
<td>Dabigatran</td>
<td>&lt;30</td>
<td>↑ bleeding</td>
<td>Reduce dose</td>
<td>Moderate</td>
<td>Strong</td>
<td></td>
</tr>
<tr>
<td>Edoxaban</td>
<td>30–50</td>
<td>↑ bleeding</td>
<td>Reduce dose</td>
<td>Moderate</td>
<td>Strong</td>
<td></td>
</tr>
<tr>
<td>Fondaparinux</td>
<td>&lt;30</td>
<td>↑ bleeding</td>
<td>Avoid</td>
<td>Moderate</td>
<td>Strong</td>
<td></td>
</tr>
<tr>
<td>Rivaroxaban</td>
<td>30–50</td>
<td>↑ bleeding</td>
<td>Reduce dose</td>
<td>Moderate</td>
<td>Strong</td>
<td></td>
</tr>
<tr>
<td><strong>Central Nervous System/Analgesics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Desmopressin</td>
<td>&gt;80</td>
<td>High risk of hypotension; safer alternative approach</td>
<td>Avoid for treatment of nocturia and/or nocturnal polyuria.</td>
<td>Moderate</td>
<td>Strong</td>
<td></td>
</tr>
<tr>
<td><strong>Proton-pump Inhibitors</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increased risk of C difficile infection and bone loss and fractures</td>
<td>Avoid for all weeks; switch sooner for high-risk patients (eg, chronic AGA use, erosive esophagitis, Barrett’s esophagitis, pathologic or demonstrated need for maintenance treatment.</td>
<td>High</td>
<td>Strong</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table 3 Additions

<table>
<thead>
<tr>
<th>Disease or Syndrome</th>
<th>Drug(s)</th>
<th>Rationale</th>
<th>Recommendation</th>
<th>Quality of Evidence</th>
<th>Strength of Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dementia and cognitive impairment</td>
<td>Anticholinergics (see Table 3 for full list)</td>
<td>Avoid due to enhance CVD effects.</td>
<td>Avoid</td>
<td>Moderate</td>
<td>Strong</td>
</tr>
<tr>
<td></td>
<td>Benzodiazepines  5-HT2 receptor antagonists</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Anticonvulsants,  benzodiazepines</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Antipsychotics  eszopiclone, zaleplon, zolpidem</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Antidepressants,  opioid receptors, benzodiazepines</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table 3 Additions

<table>
<thead>
<tr>
<th>Disease or Syndrome</th>
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<th>Recommendation</th>
<th>Quality of Evidence</th>
<th>Strength of Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>History of falls or fractures</td>
<td>Antihistamines,  antipsychotics,  benzodiazepines,  sedative/hypnotics</td>
<td>Ability to produce drowsiness, impaired psychomotor function, and additional falls; benzodiazepines are not safer than long-acting ones. If agent must be used, consider evaluating the use of other interventions that decrease the risk of falls and fractures, e.g., antihistamines,  opioid receptor antagonists,  benzodiazepines  5-HT2 receptor antagonists,  other medications,  and implement other strategies to prevent falls.</td>
<td>Avoid</td>
<td>High</td>
<td>Strong</td>
</tr>
</tbody>
</table>

### And what’s different?
**Nitrofurantoin (Furadantin®)**

**Change:**
- Changed recommendation to avoid in CrCl <30 mL/min (rather than 60 mL/min)
- Quality of evidence ↓ ed to low

**Reason:**
- New evidence that nitrofurantoin can be used safely and be effective in patients with CrCl 30-60 mL/min

**However:**
- Still avoid long-term use due to potential pulmonary toxicity

---

**Antiarrhythmics in Atrial Fibrillation**

(Class Ia, Ic, III)

**Change:**
- Removed from Table 2
- Amiodarone listed separately

**Reason:**
- New evidence & ACC/AHA guidelines suggest that rhythm control can have equal or even favorable outcomes compared to rate control

**However:**
- Amiodarone - avoid as 1st line unless patient also has heart failure or significant left ventricular hypertrophy
- Dronedarone – avoid in permanent atrial fibrillation or with severe or recently decompensated heart failure

---

**Digoxin**

**Change:**
- Avoid as first line in atrial fibrillation.
- Avoid as first line in heart failure.

**Reason:**
- AF – more effective alternatives; possible association with ↑ mortality
- HF – questionable effects on risks of hospitalizations; possible ↑ mortality

**However:**
- If using digoxin, still avoid doses >0.125 mg/day
Spironolactone (Aldactone®) >25mg/day

Change:
• Moved from Table 2 to renal dosing table (Table 6)
Reason:
• Concern was only related to dosing and renal function

Nonbenzodiazepine Hypnotics

Change:
• Changed "avoid chronic use (>90 days)" to avoid regardless of duration
Reason:
• Increase in the evidence of harm with minimal efficacy in treating insomnia
• Increased risk of hip fracture in nursing home residents, particularly new users

Sliding Scale Insulin

Clarification of definition of "sliding scale":
• "Use of short- or rapid-acting insulins to manage or avoid hyperglycemia in the absence of a basal or long-acting insulin. Does not apply to the titration of basal insulin or use of additional short- or rapid-acting insulin in conjunction with scheduled insulin (i.e. "corrective insulin")."
Trimethobenzamide (Tigan®)

Change:
• Removed from Table 2

Reason:
• It is the anti-emetic recommended to be used with the anti-Parkinson medication, apomorphine.

Meperidine (Demerol®)

Change:
• Added to the avoid statement: “especially in those with chronic kidney disease”

Medications to Avoid in Chronic Constipation

Change:
• Removed from Table 3

Reason:
• Not specific to the elderly.
• Considered “common knowledge”.
Medications to Avoid in Delirium & Dementia/Cognitive Impairment

Changes:
• Added antipsychotics to drugs to avoid in delirium
• Updated the language about avoiding the use of antipsychotics for behavioral problems of dementia and/or delirium.
• Only use if nonpharmacologic options have failed or are not possible AND patient is a harm to self or others.

Medications to Avoid in Incontinence / BPH

Change:
• Reorganized this section to 2 categories:
  • Urinary incontinence (all types) in women
  • Lower urinary tract symptoms, benign prostatic hyperplasia
  • Medications are the same

Other Modifications of Note

Table 4 – Medications to be Used with Caution
• Dabigatran – modified the wording to specify increased risk of GI bleeding.

Table 7 – Drugs with Strong Anticholinergic Properties
• A few additions and deletions based on various lists and review articles.
"Mr. A"

- 82 year-old man, visiting new PCP for the first time.
- He has been taking amiodarone for several years and has reported "no problems" with it during visits with his previous providers.
- Amiodarone is included in the AGS 2015 Beers Criteria
I read somewhere that older people should never take amiodarone. These doctors/nurses/pharmacists must not know what they are doing!

Why did some idiot doctor prescribe a Beers drug? We need to stop it now!

I know the Beers criteria say never to prescribe this drug, but it's really useful for some people. Those criteria are out of touch with clinical reality.

Now that it's included in the Beers Criteria, we're going to require prior authorization for all uses of amiodarone. I know clinicians complain they have to spend forever on the phone to get approval, but....

Maybe I should call the pharmacist & ask what she thinks.
If there's one thing to remember:

Use clinical judgment and common sense!!

Key Principle #1

Medications in the Beers Criteria are potentially inappropriate, not definitely inappropriate.

Key Principle #2

Read the rationale and recommendations statements for each criterion. The caveats and guidance listed there are important.
Therapeutic Category/ Drug(s) | Rationale | Recommendation | Quality of Evidence | Strength of Rec. |
---|---|---|---|---|
Amiodarone | Amiodarone has greater toxicities than other antiarrhythmics used in atrial fibrillation. It may be a reasonable first-line therapy in patients with concomitant heart failure or substantial left ventricular hypertrophy if rhythm control is preferred over rate control. | Avoid amiodarone as first-line therapy for atrial fibrillation, unless the patient has heart failure or substantial left ventricular hypertrophy. | High | Strong |

Key Principle #3

Understand why medications are included in the Beers Criteria, and adjust your approach to those medications accordingly.
Key Principle #4

Optimal application of the Beers Criteria involves identifying PIMs and where appropriate, offering safer non-pharmacologic and pharmacologic therapies.

Key Principle #5

The Beers Criteria should be a starting point for a comprehensive process of identifying and improving medication appropriateness and safety.

Key Principle #6

Access to meds in the Beers Criteria should not be excessively restricted by prior authorization and/or health plan coverage policies.
Key Principle #7

The Beers Criteria are not equally applicable to all countries

Application to Clinicians

• Think of Beers Criteria as a warning light
  • Why is the patient taking the drug; is it truly needed?
  • Safer and/or more effective alternatives?
  • Does this patient have particular characteristics that increase or mitigate risk of this medication?
    • At time of initial Rx and at follow-up
• Actively assess for symptoms, and assess whether these could be related to meds
• Don’t automatically defer to colleagues

Back to Mr. A
Mr. A

• Doctor remembers that amiodarone is on the Beers Criteria because of its multiple toxicities.
  • Warning light

• Doctor asks Mr. A about common and serious adverse effects of amiodarone. Mr. A reports low-grade but longstanding symptoms of malaise and anorexia. He has attributed these symptoms to old age.
  • Elicit potential harms

Mr. A

• Doctor emails Mr. A’s cardiologist to inform her of the patient’s symptoms and discuss options for using another medication. The cardiologist concurs that it would be reasonable to try another medication.
  • Explore alternatives
  • Discuss with colleagues

Mr. A

• Pharmacist reviews Mr. A’s other medications, including evaluating their indication, patient’s understanding, adherence, effectiveness, and potential adverse events.
• Pharmacist & doctor discuss possible alternatives.
  • Beers Criteria as a starting point for comprehensive medication review
So what’s the impact on patient outcomes?

Study of NH residents admitted to ER used 2012 Beers & STOPP to identify PIMs
• 95% were on at least 1 PIM
• 1/3 of these residents were considered to have a link between the PIM and ER visit.


Study of inpatient use of PIMs and hospital outcomes.
• Patients on ≥3 PIMs had:
  • Longer length of stay
  • More likely to have 30-day LOS
  • More costly stays
• # of PIMs did not affect odds of 30-day readmission

Hagstrom K et al. JAGS 2015;63:185-6

Study using specific 2003 Beers Criteria meds
• Sedative/hypnotics → ↑falls or fractures
• Meperidine/pentazocine → ↑delirium
• Trimethobenzamide → ↑EPS
• Higher health care costs than controls

Stockl KM et al. Am J Managed Care 2010;16:e1-e10
• Drug-related problems in pts on ≥1 PIM were 14.3% compared to 4.7% in non-PIM pts.
  

• Elevated risk of unplanned hospitalizations in pts on PIMs. Risk increased with increasing number of PIMs.
  

Conclusions

• Beers Criteria should be used with clinical judgment and common sense

• Keep in mind key principles to help you best use Beers Criteria in practice
  • Warning light

• Use AGS resources
  • and direct your patients to them too

AGS Beers Criteria Resources

• AGS 2015 Updated Beers Criteria
• How to Use Article
• Alternative Medications List
• Evidence Table Index for AGS 2015 Updated Beers Criteria
• Updated Beers Criteria Teaching Slide in GRS Teaching Slides Set
• Updated Beers Criteria Pocket Card
• Updated Beers Criteria in Geriatrics App

Public Education Resources for Patients & Caregivers

• AGS Beers Criteria Summary
• 10 Medications Older Adults Should Avoid
• Avoiding Overmedication and Harmful Drug Reactions
• What to Do and What to Ask Your Healthcare Provider if a Medication You Take is Listed in the Beers Criteria
• My Medication Diary - Printable Download
• Eldercare at Home: Using Medicines Safely - Illustrated PowerPoint Presentation
Seven Key Principles

7 Key Principles

• There are 7 key principles to guide optimal use of the Beers Criteria
• But, the most important take-home message is this:
  
  Use clinical common sense!

• The Beers criteria are intended to support, not contradict, common sense and good clinical care
Key Principle #1

Medications in the AGS 2015 Beers Criteria are potentially inappropriate, not definitely inappropriate.

• The Beers Criteria comprise meds which have unfavorable balance of benefits and harms for many older adults
  • Particularly in light of available alternatives
  • But, there are some older adults in which use of Beers Criteria meds can be appropriate
  • So, Beers Criteria meds merit special scrutiny...but they should not be considered definitely inappropriate for all older adults

Key Principle #2

Read the rationale and recommendations statements for each criterion. The caveats and guidance listed there are important.

• Medication appropriateness is not black or white
• Many medications are considered potentially inappropriate only in certain circumstances
• Understanding true meaning and purpose of each criterion is critical for proper interpretation

Key Principle #3

Understand why medications are included in the AGS 2015 Beers Criteria, and adjust your approach to those medications accordingly.

• It is not enough to know that a medication is included in the criteria. Clinicians should know why it is there
  • This info is provided in the "rationale" statement of each criterion
  • Reason why a medication is in criteria can help guide how stringent we should be in avoiding it
  • Also, allows us to individualize decision-making for individuals based on their anticipated risk
Key Principle #4

Optimal application of the AGS 2015 Beers Criteria involves … offering safer non-pharmacologic and pharmacologic therapies.

- AGS is developing a list of alternative therapies
- Often the best alternatives involve non-pharmacologic strategies, including patient counseling and lifestyle changes

Key Principle #5

The AGS 2015 Beers Criteria should be a starting point for a comprehensive process of identifying and improving medication appropriateness and safety.

- The Beers Criteria capture only a small percentage of medication-related problems in older adults
- The criteria work best when used as a starting point to review and discuss a patient’s entire medication regimen
  - This involves addressing a range of issues including (but not limited to) medication appropriateness, adherence, and adverse events

Key Principle #6

Access to medications included in the AGS 2015 Beers Criteria should not be excessively restricted by prior authorization and/or health plan coverage policies.

- Incentivizing judicious use of Beers Criteria medications through insurance design can be reasonable
- But, onerous restrictions can disrupt care and hinder access to medications for patients who need them
- Programs that restrict access should be carefully targeted and give clinicians efficient opportunities to justify use
The AGS 2015 Beers Criteria are not equally applicable to all countries.

• The criteria were created principally based on medications available in the United States
• Prior versions of Beers have been adapted for several countries
• It is reasonable to use broad-based categories of the criteria to identify potentially inappropriate medications

Don’t stop taking a medication just because it is on the Beers Criteria
• But, talk with your clinicians if there is a safer and/or more effective alternative
  • This can include doctors, nurses, pharmacists, and others
• Learn about all of the medications that you take, and let your clinician(s) know if you think you might be having a side effect, or if you are having any other problem.
  • A good source for learning about medications is Medline Plus from the National Library of Medicine, http://www.nlm.nih.gov/medlineplus/druginformation.html

Think of the Beers Criteria as a warning light
• Whenever you think about prescribing or renewing a Beers medication, the “warning light” should make you stop and think:
  • Why is the patient taking the drug, is it truly needed?
  • Are there safer and/or more effective alternatives?
  • Does my patient have particular characteristics that increase or mitigate risk of this medication?
  • But, keep in mind that there are situations in which use of Beers medications is justified and appropriate
Application of Key Principles for Clinicians

• Actively inquire about symptoms that could be adverse drug effects, and assess whether these could be related to medications

• Don’t automatically defer to colleagues
  • Just because another clinician prescribed a Beers criteria medication doesn’t mean it is safe and/or effective
  • Use the opportunity to discuss with colleagues whether that medication is right for the patient

Application of Key Principles for Clinicians

• Don’t let Beers Criteria distract you from closely attending to other elements of prescribing that are not addressed by the criteria.

• These include
  • Other high-risk medications (e.g. warfarin, hypoglycemics)
  • Medication adherence
  • Unnecessary medication use
  • Underuse of medications
  • And more (!)

Application of Key Principles for Health Systems & Payors

• Performance monitoring systems based on Beers Criteria can work well on a population level, but these systems should not judge care as inappropriate for a individual patients

• Don’t forget to measure other domains of pharmaceutical care quality like medication monitoring, medication adherence, and underuse of medications

• If used in prior authorization or similar systems:
  • Give clinicians an efficient means to justify use for specific patients
  • Where possible, suggest alternative therapies
The Beers “Criteria” – What Is It?

• Beers Criteria, not Beers List
• Most recent update - 2015 American Geriatrics Society
  Updated Beers Criteria published on-line
  (geriatricscareonline.org)
  • Evidence-based with recommendations, based on risk v
    benefit assessment
  • Strength of evidence: strong, weak, insufficient
  • Quality of evidence: high, moderate, low
  • Well-known and respected, but not necessarily well-
    understood

The Beer’s Criteria – What Is It Not?

• A list
• A tool to identify “forbidden” drugs in the elderly
• A resource that everyone agrees on
• A resource that always improves clinical outcomes

Conclusions

• The success of the AGS 2015 Beers Criteria depends on their being
  applied in a thoughtful manner

• These key principles and application strategies are intended to
  improve outcomes while minimizing unintended harms
# AGS Beers Criteria Resources

- AGS 2015 Updated Beers Criteria
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## Yes, there's an app for that!

![App Image]

$2.99

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To access all AGS 2015 Updated Beers Resources Visit

[www.geriatricscareonline.org](http://www.geriatricscareonline.org)

- [Facebook.com/AmericanGeriatricsSociety](http://Facebook.com/AmericanGeriatricsSociety)
- [Twitter.com/AmerGeriatrics](http://Twitter.com/AmerGeriatrics)
- [linkedin.com/company/american-geriatrics-society](http://linkedin.com/company/american-geriatrics-society)
Thank You!
Wsimonsonpharmd@gmail.com