Medication Error Identification and Medication Reconciliation

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Faculty Disclosure
I have no relevant financial disclosures relative to the content of this presentation.

Learning Objectives
At the conclusion of this application-based activity, participants should be able to:
1. Define the term "Beers criteria."
2. Identify risk factors for inappropriate medication use in older adults.
3. List medications considered to be potentially inappropriate for use in older patients and identify safer alternatives.
4. Discuss evidence showing that inappropriate medication use results in poor health outcomes in older adults.
5. Describe strategies that pharmacists can use to improve the quality of medication use in older adults.
6. Apply principles to a geriatric patient case.

Risk Factors for Inappropriate Medication Use
- Number of prescription and nonprescription drugs
  - Polypharmacy, 5+ medications, 9+ medications
- Number of comorbidities
- Prescribers without training in geriatrics
- Higher level of patient care
  - Nursing home > acute hospital > primary care
- Age = ?

Poor Health Outcomes Related to Inappropriate Medication Use
- Medication non-adherence
- Adverse drug reactions
- Falls
- Reduced quality of life
- Hospitalization
- Increased costs
- Health care service utilization
- Mortality

On one hand...
"Medications are probably the single most important health care technology in preventing illness, disability, and death in the geriatric population."

On the other hand...
"Any symptom in an elderly patient should be considered a drug side effect until proven otherwise."


Medication-Related Problems

- **Untreated condition**: Patient has a medical condition that requires drug therapy but is not receiving any drug for that condition.
- **Drug use without indication**: Patient is taking a medication for no medically valid condition or reason.
- **Improper drug selection**: Patient’s medical condition is being treated with the wrong drug or a drug that is not the most appropriate for the patient’s special needs.
- **Subtherapeutic dose**: Patient has a medical problem that is being treated with too little of the correct medication.
- **Overdosage**: Patient has a medical problem that is being treated with too much of the correct medication.
- **Adverse drug event (ADE)**: Patient has a medical condition that is the result of a drug interacting negatively with another drug, food, or laboratory test.
- **Failure to resolve medication**: Patient has a medical condition that is the result of not receiving a medication due to accessing, psychological, sociological, or governmental reasons.

ADEs in Nursing Homes

- 815 ADEs detected among 1,247 residents in a 9-month period (9.8 per 100 resident-months)
- 42% of ADEs considered preventable

- Medications most frequently associated with preventable ADEs
  - Warfarin
  - Atypical antipsychotics
  - Loop diuretics
  - Intermediate-acting benzodiazepines
  - Opioids
  - Angiotensin-converting enzyme inhibitors

Active Learning

At which point in the medication use process do most errors occur?

- a) Ordering
- b) Dispensing
- c) Administering
- d) Monitoring
Detecting Medication-Related Problems

CLEAR Symptoms of a Medication-Related Problem

- Cognitive changes
- Loss of bladder or bowel control
- Eating or appetite changes
- Activity or energy changes
- Recurrent falls

Assessing Medication Appropriateness

- Implicit Methods
  - Medication Appropriateness Index (MAI)
  - Drug Regimen Review Checklist

- Explicit Methods
  - Screening Tool of Older People’s potentially inappropriate Prescriptions (STOPP) & Screening Tool to Alert doctors to Right Treatments (START)
  - Beers Criteria

Medication Appropriateness Index – Question

1. Is there an indication for the drug?  3
2. Is the medication effective for the condition?  3
3. Is the dosage correct?  2
4. Are the directions correct?  2
5. Are the directions practical?  2
6. Are there clinically significant drug-drug interactions?  2
7. Are there clinically significant drug-disease/condition interactions?  1
8. Is there unnecessary duplication with other drug(s)?  1
9. Is the duration of therapy acceptable?  1
10. Is this drug the least expensive alternative compared with others of equal utility?  1

Maximal score of inappropriateness 18

STOOP & START

- 80 STOPP criteria to identify PIMs
- 34 START criteria to identify medication underuse, including prescribing omissions and management of undertreated conditions


Evolution of the Beers Criteria

Overview of the 2015 Update

- 40+ PIMs or medication classes across 5 categories
  - Medications to avoid in older adults
  - Medications to avoid in older adults with specific diseases/syndromes
  - Medications to be used with caution in older adults
  - Clinically important drug-drug interactions
  - Medications for which dose adjustment is required based on renal impairment
- List of drugs with strong anticholinergic properties
- Lists of safer alternatives and complete references also available

Noteworthy Change #1: Nitrofurantoin

<table>
<thead>
<tr>
<th>Change</th>
<th>Rationale</th>
<th>Caveat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Changed</td>
<td>Changed recommended CrCl cutoff for use from &lt;60mL/min to &lt;30mL/min</td>
<td>Still avoid long-term use for suppression of bacteria</td>
</tr>
<tr>
<td>recommended</td>
<td>New retrospective data suggests relative safety and effectiveness at lower</td>
<td>Pulmonary toxicity, hepatotoxicity, peripheral neuropathy</td>
</tr>
<tr>
<td>CrCl</td>
<td>threshold of renal impairment</td>
<td></td>
</tr>
</tbody>
</table>

Rationale

- New retrospective data suggests relative safety and effectiveness at lower threshold of renal impairment

Caveat

- Still avoid long-term use for suppression of bacteria
- Pulmonary toxicity, hepatotoxicity, peripheral neuropathy

Noteworthy Change #2: Nonbenzodiazepine Hypnotics

<table>
<thead>
<tr>
<th>Change</th>
<th>Rationale</th>
<th>Caveat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Changed</td>
<td>Changed recommendation to avoid chronic use (&gt;90 days) to avoid use</td>
<td>None due to mounting evidence of harm since 2012</td>
</tr>
<tr>
<td>recommendation</td>
<td>regardless of duration</td>
<td></td>
</tr>
<tr>
<td>chronic use</td>
<td>Added to list of drugs to avoid in individuals with dementia or cognitive</td>
<td></td>
</tr>
<tr>
<td>(&gt;90 days)</td>
<td>impairment</td>
<td></td>
</tr>
<tr>
<td>chronic use</td>
<td>Increased risk of hip fracture in nursing home residents, especially new</td>
<td></td>
</tr>
<tr>
<td>(&gt;90 days)</td>
<td>users</td>
<td></td>
</tr>
</tbody>
</table>

Rationale

- New retrospective data suggests relative safety and effectiveness at lower threshold of renal impairment

Caveat

- None due to mounting evidence of harm since 2012

Noteworthy Change #3: Proton Pump Inhibitors

<table>
<thead>
<tr>
<th>Change</th>
<th>Rationale</th>
<th>Caveats</th>
</tr>
</thead>
<tbody>
<tr>
<td>Added</td>
<td>Added recommendation to avoid use for &gt;8 weeks</td>
<td>Appropriate for patients with high-risk, compelling indications, or</td>
</tr>
<tr>
<td>recommendation</td>
<td>Increased risk of Clostridium difficile infection, bone loss, and fractures</td>
<td>demonstrated need for maintenance therapy</td>
</tr>
<tr>
<td>chronic use</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(&gt;8 weeks)</td>
<td></td>
<td></td>
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</table>

Rationale

- New retrospective data suggests relative safety and effectiveness at lower threshold of renal impairment

Caveats

- Appropriate for patients with high-risk, compelling indications, or demonstrated need for maintenance therapy

Noteworthy Change #4: Opioids

<table>
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</thead>
<tbody>
<tr>
<td>Added</td>
<td>Added as a medication to avoid in patients with a history of falls and</td>
<td>May cause ataxia, impaired psychomotor function, syncope, additional</td>
</tr>
<tr>
<td>recommendation</td>
<td>fractures</td>
<td>falls</td>
</tr>
<tr>
<td>chronic use</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(&gt;8 weeks)</td>
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<td></td>
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Rationale

- New retrospective data suggests relative safety and effectiveness at lower threshold of renal impairment

Caveats

- Excludes pain management due to recent fracture or joint replacement
- If used, reduction of other CNS-active medications is recommended

Rationale

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Caveats

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- If used, reduction of other CNS-active medications is recommended
Noteworthy Change #5: Antipsychotics

<table>
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<tr>
<td>Added as a medication to avoid first-line in patients with delirium</td>
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<table>
<thead>
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</thead>
<tbody>
<tr>
<td>Potential to induce or worsen delirium</td>
</tr>
<tr>
<td>Associated with cerebrovascular accident and mortality in individuals with dementia</td>
</tr>
</tbody>
</table>

<table>
<thead>
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</thead>
<tbody>
<tr>
<td>Avoid for behavioral problems unless nonpharmacologic options have failed and patient is a harm to self or others</td>
</tr>
<tr>
<td>Avoid except for schizophrenia, bipolar disorder, or short-term use as an antiemetic during chemotherapy</td>
</tr>
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Practical Applications

- Education
- Research
- Quality
- Clinical practice
  - Cause for pause
    - Is this medication needed?
    - Is there a safer and/or more effective alternative?
    - Does the patient have a disease/syndrome that increases risk of a medication-related problem?
    - Could new symptoms be related to medication?

Strategies for Pharmacists

- Utilize available tools
- Employ technology
  - Clinical decision support system
  - http://medstopper.com/
  - http://deprescribing.org
- Involve patients and caregivers in decision-making
- Prioritize drug deprescribing
- Consider multidisciplinary approaches whenever possible

Deprescribing Protocol

1. Identify all drugs the patient is taking and reasons for each
2. Assess each drug in regard to current/future benefit potential, compare with harm potential
3. Consider risk of drug-induced harm to determine required intensity of deprescribing
4. Prioritize drugs for discontinuation (shared decision-making)
5. Implement tapering or withdrawal process, monitor for improvement in outcomes or onset of adverse effects
6. Document process and outcomes and share with all relevant healthcare professionals

Cautionary Cases

- Adverse Drug Withdrawal Event (ADWE) defined as “a clinical set of symptoms or signs that are related to the removal of a drug”
- Commonly implicated classes
  - Central nervous system medications (benzodiazepines)
  - Cardiovascular medications (diuretics, beta blockers)
  - Gastrointestinal medications (proton pump inhibitors)

Active Learning

What challenges to deprescribing do you most commonly encounter in practice?
Additional Resources

• Reviews of studies designed to improve unnecessary or inappropriate medication use in older adults