Maximizing Medication Safety

UNIVERSITY OF HAWAII
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Adverse Drug Events (ADE’s)
RISK FACTORS FOR Adverse Drug Events (ADEs)

- 6 or more concurrent chronic conditions
- 12 or more doses of drugs/day
- **9 or more medications**
- Prior adverse drug reaction
- Low body weight or low BMI
- Age 85 or older
- Estimated CrCl < 50 mL/min

*Consult Pharm 1997;12:1103-11*
## Common Drug-Drug Interactions

<table>
<thead>
<tr>
<th>Combination</th>
<th>Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACE inhibitor + potassium</td>
<td>Hyperkalemia</td>
</tr>
<tr>
<td>ACE inhibitor + K sparing diuretic</td>
<td>Hyperkalemia, hypotension</td>
</tr>
<tr>
<td>Digoxin + antiarrhythmic</td>
<td>Bradycardia, arrhythmia</td>
</tr>
<tr>
<td>Digoxin + diuretic</td>
<td>Electrolyte imbalance; arrhythmia</td>
</tr>
<tr>
<td>Antiarrhythmic + diuretic</td>
<td></td>
</tr>
<tr>
<td>Diuretic + diuretic e.g. lasix + HCTZ</td>
<td>Electrolyte imbalance; dehydration</td>
</tr>
<tr>
<td>Benzodiazepine + antidepressant</td>
<td>Sedation; confusion; falls</td>
</tr>
<tr>
<td>Benzodiazepine + antipsychotic</td>
<td></td>
</tr>
<tr>
<td>CCB/nitrate/vasodilator/diuretic</td>
<td>Hypotension</td>
</tr>
</tbody>
</table>

Common ADEs

NSAIDs: GI Bleeds, kidney damage
Antihypertensives: hypotension
Diabetes medications: hypoglycemia, lactic acidosis
Opioids: confusion, constipation, urine retention
Warfarin: bleeding with supra-therapeutic INR
Polypharmacy
What is Polypharmacy?

The use of medications that are neither indicated nor necessary.

Patient A: 80 yo male on 10 appropriate medications vs. Patient B: 80 yo male on 6 inappropriate medications
Why is Polypharmacy Bad?

- Drug Related Problems
- Drug-Drug Interactions
- Drug-Disease Interactions
- Adverse Drug Reactions

Risk increases proportionally with the number of medications
Why is Polypharmacy Bad?

- Elderly have higher susceptibility to side effects and develop toxicity to certain drugs more easily than young people

- Pharmacodynamics (effect of drugs on the body)
- Pharmacokinetics (absorption & distribution)
Why is Polypharmacy Bad?

- Adverse drug events or reactions (preventable & unavoidable drug-related events that lead to potentially negative outcomes)
  - 1-3 meds: 6% risk of adverse drug reactions
  - 7 meds: 52% risk of adverse drug reactions
  - 34% of the prescriptions are unnecessary
  - An estimated 106,000 fatal adverse drug reactions occur every year

Why is Polypharmacy Bad?

Potentially Inappropriate Medications (PIM)

◦ Higher number of medications associated with higher likelihood of having a potentially inappropriate medication

◦ PIM’s have been associated with increased risk of hospitalization or death
Potentially Inappropriate Medications
Potentially Inappropriate Medications

- Updated Beers Criteria
- Screening Tool of Older Persons’ potentially inappropriate Prescriptions (STOOPP)
- Improving Prescribing in the Elderly Tool (IPET)
- Assessing Care of Vulnerable Elders-3 Quality Indicators (ACOVE 3)
- CMS
Table 2. 2015 American Geriatrics Society Beers Criteria for Potentially Inappropriate Medication Use in Older Adults

<table>
<thead>
<tr>
<th>Organ System, Therapeutic Category, Drugs</th>
<th>Rationale</th>
<th>Recommendation</th>
<th>Quality of Evidence</th>
<th>Strength of Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st generation antihistamines</td>
<td>Highly anticholinergic; clearance reduced with advanced age, and tolerance develops when used as hypnotic; risk of confusion, dry mouth, constipation, and other anticholinergic effects or toxicity Use of diphenhydramine in situations such as acute treatment of severe allergic reaction may be appropriate</td>
<td>Avoid</td>
<td>Moderate</td>
<td>Strong</td>
</tr>
<tr>
<td>Disease or Syndrome</td>
<td>Drug(s)</td>
<td>Rationale</td>
<td>Recommendation</td>
<td>Quality of Evidence</td>
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<tr>
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<tr>
<td>Heart failure</td>
<td>NSAIDs and COX-2 inhibitors, Nondihydropyridine CCBs (diltiazem, verapamil) — avoid only for heart failure with reduced ejection fraction</td>
<td>Potential to promote fluid retention and exacerbate heart failure</td>
<td>Avoid</td>
<td>NSAIDs: moderate CCBs: moderate</td>
</tr>
</tbody>
</table>
Table 4. 2015 American Geriatrics Society Beers Criteria for Potentially Inappropriate Medications to Be Used with Caution in Older Adults

<table>
<thead>
<tr>
<th>Drugs(s)</th>
<th>Rationale</th>
<th>Recommendation</th>
<th>Quality Of Evidence</th>
<th>Strength of Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aspirin for primary prevention of cardiac events</td>
<td>Lack of evidence of benefit versus risk in adults aged ≥80</td>
<td>Use with caution in adults aged ≥80</td>
<td>Low</td>
<td>Strong</td>
</tr>
<tr>
<td>Dabigatran</td>
<td>Increased risk of gastrointestinal bleeding compared with warfarin and reported rates with other target-specific oral anticoagulants in adults aged ≥75; lack of evidence of efficacy and safety in individuals with CrCl &lt;30 mL/min</td>
<td>Use with caution in adults aged ≥75 and in patients with CrCl &lt;30 mL/min</td>
<td>Moderate</td>
<td>Strong</td>
</tr>
</tbody>
</table>
Principle 1: “Less is More”  
(Keep the Medication List Short)

- Question the need for new medications
- Prioritize treatments
- Weigh potential risks and potential benefits
- But, avoid undertreating older patients
- Pain
- Anticoagulation for stroke prevention

Stopping Medications

- Consider interactions with other medications
- Is it helping? (Benefit)
- Is it harmful? (Risk)
- Why was it started?
- Consider underlying renal and hepatic insufficiency
  - E.g. neurontin and renal insufficiency
Don’t prescribe a new drug to treat an ADE

Establish the diagnosis

- E.g. Diphenhydramine and the decongestant precipitated urinary retention in a older male with prostatic enlargement

- **Urinary retention is an ADE**

- Stop (or reduce) the offending medications

- OTC cold medicine

- Need to ask about ALL medications

- Avoid prescribing new medications (terazosin)
Principle 2: Before making a new diagnosis: “Think Drugs”

- Consider ADE as etiology of new signs/symptoms
- Remember that OTC drugs, supplements, and herbals can cause ADEs
- Consider discontinuing or dose-reducing medications rather than jumping to start a new medication
Challenges & Educational Issues
The Challenge of Patient Education

Research shows that patients remember and understand less than half of what clinicians explain to them.

Ley, Communicating with patients: improving communication satisfaction, and compliance 1988
Rost, Predictors of recall of medication regimens and recommendations for lifestyle change in elderly patients 1987.
Challenges of Prescribing for Older Adults

- Multiple chronic medical problems
- Multiple medications and multiple dosing
- Multiple prescribers/specialists
- More drugs are available each year
  - Prescription
  - Over the Counter
  - “Neutroceuticals”
More Challenges of Prescribing for Older Adults

FDA indications and off-label use are increasing

- Formularies change frequently
- Evidence of new drug-drug interactions and drug side effects are discovered
- Drugs change from prescription to OTC
- “Neutroceuticals” (herbal preparations, nutritional supplements) are booming
More Challenges of Prescribing for Older Adults

- Cost: are they on a fixed income?
- Sensory Impairments
  - Vision, Hearing
- Physical Impairments
- Arthritis limits opening bottles
- Memory Impairments
  - Forget to take medications or take too much
References

...Updated Beers Criteria... JAGS 2015
Hanlon et al. Alternative Medications... JAGS 2015
Geriatric Review Syllabus
Department of Health/Human Services: Office of Inspector General
HEDIS
Dr. Bruce Tamura