Objectives

- Understand and identify polypharmacy in your patients
- Realize how to prevent polypharmacy
- Understand how to treat polypharmacy
- Use these strategies in practice to manage polypharmacy
Introduction

• People live longer
• More medications available
• More diagnoses
• Bigger percent of the population is getting older
• Less time spent with providers
• The internet is the truth
• Everyone wants a “magic bullet” to fix their problems
• Habits are hard to break
Polypharmacy

• What is it?
  • It’s complicated and misunderstood
  • Old school:
    • A single patient taking a specific number of medications (i.e. >4)
  • New school:
    • A single patient taking multiple unnecessary medications
      • Identify Over and Under treated diseases
      • May do more harm than good
Identify polypharmacy$^{2,3}$

• 2015 Updated Beers’ Criteria
  • Lists PIMs (Potentially Inappropriate Medications)
  • Newest additions
    • Adjustments based on kidney function
    • Drug-Drug Interactions

• Others:
  • Comprehensive Geriatric Assessment (CGA)
  • Hyperpharmacotherapy Assessment Tool (HAT)
  • Medication Appropriateness Index (MAI)
  • Screening Tool to Alert doctors to Right Treatment (START)
  • Screening Tool of Older Persons’ Prescriptions (STOPP)
Beers Criteria Overview²

• Apply to all populations 65 years and older
  • Does not apply to hospice/palliative care
• Apply to all settings: ambulatory, acute, institutional
• Use criteria in educational and quality measure
• PIMs (Potentially Inappropriate Medications)
  • Avoid in certain conditions/diseases
  • Reduce doses
  • Use with caution
  • Carefully monitored
  • Associated with poor health outcomes – falls, confusion, mortality
Medications to AVOID²

- Nitrofurantoin in CrCl < 60ml/min and long term
- Amiodarone as 1st line unless HF/substantial LVH
- Digoxin as 1st line and more than 0.125mg/d
- Benzodiazepine agonists (zolpidem, etc.)
- Insulin siding scale
- Proton Pump Inhibitors beyond 8 weeks without justification
- Desmopressin for nocturia
- Opioids in fall/fracture risk
- Antipsychotics for 1st line dementia
- 3 or more CNS acting medications
- Alpha-blockers and loop diuretics in women
## Polypharmacy Statistics

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Adults 65 years old and older</td>
<td>29.2 million</td>
<td>38.7 million</td>
</tr>
<tr>
<td>Median # of medications</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>On 5 or more medications</td>
<td>3.7 million</td>
<td>15.1 million</td>
</tr>
<tr>
<td>Adults 80 years old and older</td>
<td>5.8 million</td>
<td>9.8 million</td>
</tr>
<tr>
<td>On a statin</td>
<td>0.09%</td>
<td>45.7%</td>
</tr>
<tr>
<td>On an antihypertensive</td>
<td>50.4%</td>
<td>79%</td>
</tr>
<tr>
<td>On an antihyperglycemic</td>
<td>6.4%</td>
<td>16.9%</td>
</tr>
</tbody>
</table>

NHANES excludes patient in nursing homes or other care facilities.
Polypharmacy Statistics

• US National Nursing Home Survey 2004
  • Pt on more than 9 medications
    • 3x higher in patients with over 10 co-morbidities compared to less than 3 co-morbidities
  • Associated diseases
    • CAD/Stroke
    • HF
    • DM
    • COPD
  • Associated medication classes
    • Cardiovascular
    • Metabolic
    • CNS
Polypharmacy Statistics

• Expensive
  • Costs health plans more than $50 billion per year in 2002

• Patients 65 years old and older in the US
  • Largest consumer of prescription and non-prescription medications
  • Medication use more than doubled since 1990
  • Consume one-third of prescriptions per year

US Center for Medicare and Medicaid Services
Risk factors

- Co-Morbidities
  - 8% increase medications per co-morbidity in women over 64 y/o
- Multiple providers
- Following Clinical Practice Guidelines (CPGs)
- Multiple pharmacies
- Drug Interactions
- Self treating (excessive over-the-counter medications)
- Use of herbals/supplements that are unproven/dangerous
- Hospitalization
- Reduced communication
  - No medication list
Risk factors

• Patient conditions
  • Low economic status
  • Formal/Informal support
  • Mental decline
  • Visual impairment
  • Dysphagia
  • Muscle mass or venous access
  • Patient’s needs and preferences
Effects

- Adverse Reactions
  - 8.6% increase risk for each medication
  - Falls
- Non-Compliance
- Increase cost
  - To patients
  - To society
Prevent polypharmacy\textsuperscript{1,6}

- Quantifying the problem is difficult
- Know your patient and use most current information
- Follow Evidence Based Medicine understanding the limitations
- Understand Pharmacokinetics and Pharmacodynamics
- Recognize Contributing Patient Factors
- Avoid the prescribing cascade
- Prescribe only medications you know thoroughly
Communication

- Allow enough time to answer questions
- Avoid distractions
- Sit face to face, maintain eye contact, Listen
- Speak slowly, clearly and loudly
- Use simple language, do not judge
- Obtain interpreters as necessary
- Give written instructions
Write answers to questions:

1.
2.
3.
4.
5.
6. OTC product:
Communication

• It’s time to eat grandpa
Communication

• I love you
Medication Errors

• Brand vs. Generic
• Look and Sound alike
• Different salts and formulations
  • Metoprolol tartrate vs. succinate
  • XL, LA, XR, ODT, SL, SR, CD, etc.
Medication Errors

• Look Alike AND Sound Alike
  • sulfasalazine and sulfadiazine
  • clonidine and klonopin
  • celebrex and celexa
  • risperidone and ropinirole
<table>
<thead>
<tr>
<th>Generic name</th>
<th>Ropinirole</th>
<th>Risperidone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brand name</td>
<td>Requip, Requip XL</td>
<td>Risperdal, Risperdal M-Tab</td>
</tr>
<tr>
<td>Strengths</td>
<td>Oral tablet: 0.25 mg, 0.5 mg, 1 mg, 2 mg, 3 mg, 4 mg, 5 mg Extended-release tablet (XL): 2 mg, 4 mg, 6 mg, 8 mg, 12 mg</td>
<td>Oral tablet: 0.25 mg, 0.5 mg, 1 mg, 2 mg, 3 mg, 4 mg Orally disintegrating tablets (M-tab): 0.5 mg, 1 mg, 2 mg, 3 mg, 4 mg</td>
</tr>
<tr>
<td>Dosage form</td>
<td>Tablet</td>
<td>Tablet</td>
</tr>
<tr>
<td>Dosing intervals</td>
<td>Once daily, Twice daily, or Three times daily</td>
<td>Once daily or Twice daily</td>
</tr>
</tbody>
</table>

Sample Container Labels

![Sample Container Labels for Ropinirole and Risperidone](http://www.fda.gov/Drugs/DrugSafety/ucm258805.htm)
Medication Errors

Dose
• Split/multiple tabs, measure (tsp, tbsp, mL, etc.)

Frequency
• What time is daily? Bedtime? PRN is NOT a frequency!

Routes/Techniques/Calculations
• Injections, Inhalers, Suppositories, etc.

Duration

Side effects
• Allergies vs. Intolerances
Medication Errors

Compliance
• Don’t feel they help, Affordable, Side effects, Forgetful
• Patients need Buy-In

Storage
• Cool and dry
• Separate from other family members
• Protect from others (kids and animals)

Don’t save expired or transfer to others

Transfer of care - hospitalizations
Medication Errors

Self prescribe OTCs and Herbals

• Not regulated by FDA
• Purchase on internet
• Don’t realize ALL that’s in it

Get quality products - USP verified products

http://www.nabp.net/programs/accreditation/vipps/find-a-vipps-online-pharmacy
Office visit

Who is the source of truth?

• Have patient bring in all medications each visit
  • Can check for expiration, integrity, provider, directions, ingredients, techniques

• Get pharmacy refill history for compliance

• Give patient written information

• Have patient/family/pharmacy make medication list
  • Include product, form, dose, frequency, indications, special instructions, prescriber, indications
  • May also include diagnoses, allergies, tests, pharmacies, etc.

Anyone can copy them down incorrectly or omit info
Follow Evidence Based Medicine understanding the limitations

• What was the population?
  • Inclusion/exclusions

• What was the quality of trial?
  • Randomized, double blind, controlled, sample size, bias

• Does the treatment need to be modified?
  • Weight, renal, hepatic

• Can it be easily monitored and administered?
  • Cost, compliance
Understand Pharmacokinetics and Pharmacodynamics

- Pharmacokinetic changes
  - Absorption (motility, gastric secretions, liver blood flow, etc.)
  - Distribution (albumin, fat stores)
  - Metabolism (liver blood flow and enzymes)
  - Elimination (kidney function)

- Pharmacodynamic changes
  - Receptor sensitivity
### Common P450 Drug Interactions

<table>
<thead>
<tr>
<th>Enzyme</th>
<th>Inhibitors</th>
<th>Inducers</th>
</tr>
</thead>
<tbody>
<tr>
<td>CYP1A2</td>
<td>Ciprofloxacin, Fluvoxamine</td>
<td>Phenytoin, Rifampin</td>
</tr>
<tr>
<td>CYP2C9</td>
<td>Fluconazole</td>
<td>Carbamazepine, Rifampin</td>
</tr>
<tr>
<td>CYP2D6</td>
<td>Buproprion, Fluoxetine, Paroxetine</td>
<td></td>
</tr>
<tr>
<td>CYP3A</td>
<td>Azole antifungals, Cimetidine, Ciprofloxacin, Grapefruit juice, Macrolides, Protease inhibitors</td>
<td>Carbamazepine, Modafinil, Phenobarbital, Phenytoin, Rifabutin, Rifampicin, St. John’s wort</td>
</tr>
</tbody>
</table>
Pharmacodynamic changes\textsuperscript{6}

\begin{itemize}
  \item \textbf{Serotonin Syndrome}
    \begin{itemize}
      \item Hyperthermia, Hyperreflexia, Hypertension
      \item Tramadol, SSRIs, SNRIs, buspirone, meperidine, etc.
    \end{itemize}
  \item \textbf{Anticholinergic syndrome}
    \begin{itemize}
      \item Antihistamines, anticholinergics, TCAs, etc.
        \begin{itemize}
          \item Hot as a rock
          \item Red as a beet
          \item Dry as a bone
          \item Blind as a bat
          \item Mad as a hatter
        \end{itemize}
    \end{itemize}
\end{itemize}
Adding it all together

- CrCl
- Medication X
- Weight
- Activity
- Albumin
- Gastric pH
- Motility
- Medication Z
- Blood pressure
- LFTs
- Body fat
In which box will adding all vectors end?
Contributing Patient Factors

- Medications
- Healthcare providers
- Pharmacies used
- Comorbidities
  - Diabetes, Depression, Osteoporosis, Parkinson, Hearth failure, etc.
- Deficiencies
  - Hearing, Vision, Dexterity, Swallowing
  - Illiteracy/numeracy
  - Cognitive, Communication, Understanding
  - Economic
Avoid the prescribing cascade\(^1\)

- Side effects lead to more medication
  - Opioids $\rightarrow$ Constipation $\rightarrow$ Laxatives $\rightarrow$ Electrolytes $\rightarrow$
  - Beta-blockers $\rightarrow$ Erectile dysfunction $\rightarrow$ PDE-5 inhibitors
  - ACE inhibitors $\rightarrow$ Cough $\rightarrow$ Antitussives
  - Calcium Channel blockers $\rightarrow$ Edema $\rightarrow$ Diuretics
Prescribe only medications you know thoroughly\textsuperscript{6}

- Use
- Directions
  - Dose and dosage forms
  - Dosage adjustments
- Side effects
- Monitoring
- Interactions – medications, diet, and alcohol
Treat polypharmacy\textsuperscript{5}

- Hyperpharmacotherapy Assessment Tool (HAT)
  - Goal I: Monitor number of medications
  - Goal II: Decrease inappropriate medication use
  - Goal III: Decrease inappropriate pharmacology
  - Goal IV: Optimize dosing regimen
  - Goal V: Organize sources of medications
  - Goal VI: Educate patient
Treat polypharmacy$^{3,7}$

- Comprehensive Geriatric Assessment (CGA)
  - Multidimensional, interdisciplinary approach to clinical, nutritional, functional, cognitive and social parameters

- Deprescribing
  - Systematically identifying and discontinuing medications which pose more harm than risk
    - Considering patient goals, function, prognosis, values and preferences
    - Not negative or denying medication
    - Positive, patient centered, reaching consensus
    - Requires stepwise approach and follow-up monitoring
Deprescribing Steps

1. Find out ALL medications patient is taking and why
   • Including herbal, OTC, infrequent, non-oral

2. Evaluate OVERALL risk of medication HARM
   • Number of medications, high risk, cognitive status, co-morbidities, substance abuse, number of providers, etc.

3. Assess EACH medication for NEED
   • Diagnosis, effectiveness, prescribing cascade, adverse effects, benefit vs. lifespan, pill burden

4. Prioritize medications for DISCONTINUATION
   • Greatest harm/no benefit
   • Easy/no withdrawal effects
   • Patient willing to try

5. Implement and monitor discontinuation regimen
   • Create a plan, communicate to ALL involved, fully document
<table>
<thead>
<tr>
<th>ICD-10-CM Code</th>
<th>Condition</th>
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<tbody>
<tr>
<td>T88.7</td>
<td>Unspecified adverse effect of drug or medicament</td>
</tr>
<tr>
<td>Z91.12</td>
<td>Patient's intentional underdosing of medication regimen</td>
</tr>
<tr>
<td>Z91.13</td>
<td>Patient's unintentional underdosing of medication regimen</td>
</tr>
<tr>
<td>Z91.14</td>
<td>Patient's other noncompliance with medication regimen</td>
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<tr>
<td>Z91.120</td>
<td>Patient's intentional underdosing of medication regimen</td>
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<tr>
<td></td>
<td>due to financial hardship</td>
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<tr>
<td>Z91.128</td>
<td>Patient's intentional underdosing of medication regimen</td>
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<td>for other reason</td>
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<td>Z91.130</td>
<td>Patient's unintentional underdosing of medication regimen</td>
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<tr>
<td></td>
<td>due to age-related debility</td>
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<tr>
<td>Z91.138</td>
<td>Patient's unintentional underdosing of medication regimen</td>
</tr>
<tr>
<td></td>
<td>for other reason</td>
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</tbody>
</table>

http://www.icd10data.com/ICD10CM/Codes
Polypharmacy/hyperpharmacotherapy

Summary

• Be aware of it
• Understand there are many causes
• Evaluate the situation
• Try to prevent it in the future
• Communicate well with your patients
  • Listen to them, get all the facts
  • Print out information
• Address it when you see it
Questions

1. Polypharmacy is easy to identify and treat.
   True
   False

2. Beers criteria have been around for over 20 years and identify medications that have high risks to the elderly.
   True
   False

3. All of the following are risks for polypharmacy except:
   A. Hospitalization
   B. Using multiple pharmacies
   C. Noncompliance
   D. Drug interactions

4. Providers can help manage polypharmacy by:
   A. Deprescribing inappropriate medications
   B. Monitoring the number of medications
   C. Organizing sources of medications
   D. Educate patient
   E. All of the above
References


