Polypharmacy in the Elderly

Angie Eaton, PharmD
Associate Professor, Pharmacy Practice
Texas Southern University
College of Pharmacy and Health Sciences
<table>
<thead>
<tr>
<th>Table of Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>● Overview of Polypharmacy</td>
</tr>
<tr>
<td>● Polypharmacy and Non-adherence</td>
</tr>
<tr>
<td>● Identifying Polypharmacy</td>
</tr>
<tr>
<td>● Clinical Pearls</td>
</tr>
</tbody>
</table>
What is Polypharmacy?

- Refers to taking multiple medications concurrently (2-6)
  - Different medical literature definitions
    - Use of four or more medications or up to seven or more medications
    - Condition in which patients receive too many medications, too long, or exceedingly high doses
    - Use of potentially inappropriate medications (PIMs)
    - May or may not include non-prescription medication
Prevalence

- Between 55-59% of people age 65 or older take 5-9 medications
- 18% take ten or more (excessive polypharmacy)
- Projections show that one in five Americans will be over the age of 65 in 2030
- By 2050, the number of people 65 years and older is expected to nearly double from 38.7 million in 2008 to an estimated 88.5 million
E.T. is a 64-year-old male who was recently discharged from the hospital after complaints of chest pains. E.T. was diagnosed with atrial fibrillation and congestive heart failure (CHF). After three days E.T. was discharged from the hospital. E.T. lives alone with no family nearby. He states he does have friends but “they call me the healthy one.”

E.T. is now taking 12 medications by mouth (PO): aspirin 81 mg once daily, metoprolol 50 mg twice daily, warfarin 5 mg once daily, amlodipine 10 mg daily, lisinopril 5 mg daily, simvastatin 40 mg once at bedtime, hydrochlorothiazide 25 mg once daily, citalopram 20 mg once daily, alendronate 70 mg weekly, calcium 500 mg twice daily, vitamin D 400IU twice daily, and multivitamin once daily.
Why address Polypharmacy?

- Increases harm in elderly patients
- Due to comorbidities associated with aging, the geriatric population is the most susceptible group of people to polypharmacy and adverse outcomes
- 37.5% of emergency room visits are due to ADRs in adults 65 and older resulted in hospitalization
Who’s at risk?

- Older adults
- Transitions of care
  - 20% of patients experience adverse health-related events after being discharged from hospital to home
  - Medication discrepancies
  - Lack of communication between providers
Gender and Polypharmacy

- Women consume more medication than men
- Women live longer than men
  - Among those that are >80 women are twice as numerous than men
- Women attend primary care visits more often
- Older more educated women are more like to engage in polypharmacy
- Self-rated health is generally poorer than that of men
Gender and Polypharmacy

- Women >65 years or older were more likely to have received PIMs in all three categories (Beers Criteria)
  - 6% women vs 4% receive 1 of 11 drugs that “should be avoided”
- Higher rates of use
  - Analgesic
  - Psychotropic
  - Anticholinergic
Gender and Polypharmacy

- Women and use of psychotropic drugs
  - 55% greater chance of receiving a psychotropic drug than men
    - Anxiolytic
    - Antidepressant

- Ambulatory Care
  - Women received more inappropriate pain relievers

- Reporting?
Causes of Polypharmacy

- Polyscribing
  - “over”specialization of medicine
  - Prescribers unaware of medication use
- More disease states
- More medications on the market
- Receiving medications from multiple sources (OTC)
Causes of Polypharmacy

- Disease states that eventually use to lead to death have more pharmacotherapy alternatives that are preventative and slow progression
  - Diabetes
  - CHF
  - COPD
  - Depression
  - Hypertension
  - Insomnia
  - Osteoarthritis
Signs of Polypharmacy

- Taking multiple medications in the elderly often mimic side effects that produce the image of growing old:
  - Unsteadiness
  - Dizziness
  - Confusion
  - Fatigue
  - Insomnia
  - Incontinence
  - Falls
ADRs – Take A Moment to Think
Adverse Drug Reaction (ADR)

- Any unexpected, unintended, undesired, or excessive response to a drug that:
  - Requires drug discontinuation
  - Requires drug therapy change
  - Requires dose modification
  - Necessitates hospital admission
  - Prolongs stay in a health care facility
  - Necessitates supportive treatment
  - Significantly complicates diagnosis
  - Negatively affects prognosis
  - Results in temporary or permanent harm, disability or death
Medication Safety Issues

- **Physiologic Changes:**
  - Alter the effect of medications in the body
    - Absorption
    - Metabolism
    - Distribution
    - Excretion
  - Can result in the medications having a prolonged effect in elderly patients
Pharmacokinetic Changes in the Elderly (ADME)

- Absorption:
  - Age-related gastrointestinal tract and skin changes seem to be of minor clinical significance for medication usage.
  - Most drugs require passive diffusion and no change in bioavailability and drugs that require active transport may have decreased bioavailability.
  - Decreased first-pass effect on hepatic metabolism will increase the bioavailability.
Pharmacokinetic Changes in the Elderly (ADME)

Distribution:
- Important age-related changes:
  - Decrease in lean body mass and total body weight
  - Increased percentage body fat
- Increase in volume of distribution for lipophilic drugs, such as sedatives that penetrate CNS
  - Protein binding changes are of modest significance for most drugs, especially at steady-state
Pharmacokinetic Changes in the Elderly (ADME)

- **Metabolism**
  - Though liver function tests are unchanged with age, there is some overall decline in metabolic capacity
  - Decreased liver mass and hepatic blood flow
    - Can affect drugs such as:
      - Lidocaine
      - Propranolol
      - Morphine
Pharmacokinetic Changes in the Elderly (ADME)

- **Excretion**
  - Age-related decreased renal blood flow and GFR is well-established
  - Decreased lean body mass leads to decreased creatinine production
    - Serum Creatinine may not be a good predictor of renal function
    - Marked renal impairment
Decreased Adherence to Drug Regimen

Factors that affect adherence in Elderly:
- Decreased cognitive function
- Confusion due to numerous drugs
- Misunderstanding
- Little or no drug education or lack of counseling

These factors contribute too:
- Worsening of disease
- Increased health care costs
- Hospitalization
- Even death
Decreased Adherence to Drug Regimen

- Study conducted in Italy, 2014
  - Looked at 100 patients (65 years of age or older) discharged from an internal medicine ward throughout 2012
  - Was followed for 3 months after discharged
  - Non-adherence was reported 55.1% at first follow-up and 69.6% at 3 months
  - Only 28.1% at first follow-up and 25.3% at second understood reason for their medication
Poor Quality of Life

- Effects on Mortality and Morbidity
  - Increases risk of falls/fractures
    - Ultimately leads to increased mortality
    - Avoids drugs with (refer to Beers criteria):
      - Sedative properties
      - Have active metabolites
      - Long acting agents
  - May worsen Dementia and decrease cognitive functions
  - Urinary incontinence
Unnecessary Drug Expenses

- Cost for providing healthcare to elderly is 3 to 5 times more than for someone younger than 65 y/o
- Major burden on Health care costs
  - Increases total Medicare cost by 19.86%
  - Increases drug cost by 9.15%
- Major Burden on Patient
  - Increased drug expense → higher cost of living
  - Increased medication waste
Common Drug Use Among the Elderly

- Analgesics
- Diuretics
- Cardiovascular Drugs
- Sedative-hypnotics
- Antipsychotics
- Antibiotics
- Over the Counter:
  - Herbals and Vitamin Supplements
Prescribing Patterns

- Inappropriate Prescribing
  - Prescribing medications outside the bounds of accepted medical standards, OR
  - Prescribing drugs whose use should be avoided because their risk outweighs their potential benefit
  - 92% were taking at least one medication with one or more inappropriate ratings
## Inappropriate Medications and Elderly Friendly

<table>
<thead>
<tr>
<th>Potentially Inappropriate</th>
<th>Elderly Friendly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methyldopa, Diuretics</td>
<td>Beta Blockers</td>
</tr>
<tr>
<td>Indomethacin</td>
<td>Celecoxib</td>
</tr>
<tr>
<td>Long-Acting Benzodiazepines (Alprazolam, Diazepam)</td>
<td>Immediate-Acting (Lorazepam)</td>
</tr>
<tr>
<td>Amitriptyline, Doxepin</td>
<td>SSRIs</td>
</tr>
<tr>
<td>Diphenhydramine</td>
<td>Loratadine, Fexofenadine, Cetirizine</td>
</tr>
<tr>
<td>Chlorpropamide</td>
<td>Sulfonylureas, Metformin</td>
</tr>
<tr>
<td>Barbituates</td>
<td>Methocarbamol</td>
</tr>
</tbody>
</table>
Vitamins and Herbals

- Generally **not** reported to health care team
- Some serious drug interactions possible:
  - Taking ginkgo biloba and other agents (NSAIDs, antiplatelets, anticoagulants) that can increase bleeding risk
  - Enzyme induction by St. John’s wort
  - Natural products may be hepatotoxic
    - Kava, comfrey, valerian
Safe prescribing for older adults

- Review medications
  - Every visit
  - Encourage to bring medication list to the appointment
  - Bring the meds
- Generic vs brand
- Inadvertent duplication
Safe prescribing for older adults

- Evaluate medication – taking success
- Consider financial constraints
- Poor understanding
- Consider every new symptom or complaint an ADR and investigate
- Review old problems
Safe prescribing for older adults

- Prescribing anti-infectives
  - Obtain a culture
  - Ignore “start low” rule
  - Avoid quinolones
    - Dose adjusted for patients with a decreased GFR
- Inform the patient about potential reactions
- Discuss the benefits of the medication and the consequences of non compliance
Guidelines for Medication Use in Older Adults

- Three tools provide limited guidance in prescribing in the elderly
  - Screening Tool of Older Persons’ potentially inappropriate Prescriptions (STOPTP)
  - Screening Tool to Alert doctors to the Right Treatment (START)
Guidelines for Medication Use in Older Adults: Beers Criteria

- Originally developed in 1991 by a team of geriatric specialists based on a consensus
- Divided into 3 categories
  - those to avoid in older adults
  - those to avoid in older adults with certain diseases and syndromes that the drugs listed can exacerbate
  - medications to be used with caution
Guidelines for Medication Use in Older Adults: STOPP

- **STOPP (2008)**
  - List of potentially inappropriate medications (PIMs) and is organized by physiological systems
    - drug-drug interactions,
    - drug-disease interactions
    - medication that will increase a patient’s risk of falls
    - duplicate drug class prescriptions
- **STOPP vs. Beers Criteria**
  - STOPP determined more PIMs
  - STOPP identified 2x as many medications that have a relationship to hospital admissions
Guidelines for Medication Use in Older Adults: START

- START was developed in 2007
- List organized by physiological system
- Intended to identify potentially beneficial medication omissions
  - In a study conducted in a teaching hospital, 58% of patients were found to have omissions of medications
Principles of Drug Prescribing

- Make diagnosis before drug therapy is initiated
- Non-pharmacologic therapy is always initiated first whenever appropriate
- Carefully weigh the risks versus benefits
- Inquire about the use of over-the-counter and alternative medications
Special Considerations

- Orthostatic hypotension
- Shared same side effects
  - ex. sedation, bleeding
- Diabetic treatment
  - optimal HbA1C
- Antipsychotic medications
- Laxatives
How to “treat” Polypharmacy

- Discontinuing unnecessary medications is one of the most important aspects of decreasing polypharmacy
  - Drugs without indications should be stopped
- Avoid treating adverse reactions/side effects of drugs with more drugs
  - Example
    - Dizziness from anti-hypertensive treated with meclizine
    - Edema from a calcium-channel blocker treated with furosemide
Strategies for Elderly Compliance

- Make drug regimens and drugs as simple as possible
- Instruct relatives or caregivers on the drug regimen
- Use aids - pill boxes and/or drug calendars
- Keep updated medication record
- Review knowledge and communication is key with elderly patients
Identifying Polypharmacy

• Clinic vs. Personal In-home Health Record
  48% of the clinic medication lists had at least one omission

• HCPs conducting in home visits have the best opportunity to notice signs of polypharmacy

• Complete information from both the prescriber and the patient can be used to assess polypharmacy
Identifying Polypharmacy

- Several tools developed
  - Comprehensive Geriatric Assessment (CGA)
  - Medication Appropriateness Index (MAI)
  - Assessing Care of Vulnerable Elders (ACOVE)
CGA

- Holistic Approach
  - Uses multiple disciplines to evaluate:
    - Clinical
    - Functional
    - Cognitive
    - Nutritional
    - Social Parameters

- Nurses, OT, PT, social workers, general practitioners, geriatricians and pharmacists
MAI

- 10 component assessment tool
- Evaluates the appropriateness of medications in elderly patients
  - Efficacy
  - Drug dosage
  - Interactions
  - Cost
  - Duplications
ACOVE

- Vulnerable elderly
  - Most likely to die or become severely disabled in the next two years
- Comprehensively evaluate the medical care given to elderly patients
  - Increased risk of decline
- Covers all four domains of care:
  - Screening and prevention
  - Diagnosis
  - Treatment
  - Follow-up continuity
## Personal Health Record

### Sample medication template

- **Patient name**
- **Allergies**
- **Healthcare provider**

<table>
<thead>
<tr>
<th>Medication (brand and generic names)</th>
<th>Dosage and frequency</th>
<th>Reason for use</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Personal Health Record

- It will reduce polypharmacy and ADRs
- It will help healthcare professionals to help transition of care from independent living, hospitals, nursing homes, and assisted living facilities
- In case of an emergency, it is readily available
- Provides the patient with more understanding of their health and what they are taking
- Provider should update list with any changes
Personal Health Record

- Personal Health Record Includes:
  - Patient identifying information
  - Caregiver contact
  - Doctor contact
  - Past medical history
  - Allergies
  - List of all medications, dose, and reason why they are taking the medication
Role of the Health Care Provider

- Recommend to the patient at least yearly, or more often if indicated, to bring in all medications that they might have
  - Prescription
  - Over-the-counter
  - Vitamin supplements
  - Herbal preparations
- Resource of Information and Counseling
- “Brown Bags”
“Brown Bag”

- Document and determine indication
- Prioritize
  - Maintenance medications vs. PRN basis
  - Cure vs. relieve symptoms
- Discuss with patient or caregiver
- Plan to reduce medications or frequency of medications
Clinical Pearls

- Review medication lists regularly
- Use single daily dose regimens (combination regimens)
- Limit the use of PRN medications
- Discontinue a drug if it is ineffective or produce intolerable adverse effects
- Provide legible instructions for the patients

Patient Education
  - Use one pharmacist/pharmacy
  - Avoid multiple physicians
  - Do not use medications from others (no pill sharing)
  - Report symptoms and all products used
Conclusion

• Polypharmacy is a complex and worrying phenomenon
• Polypharmacy is common in the elderly
• Polypharmacy in women >65 results in higher PIMs and ADRs
• More research is needed in the elderly to ensure safe medication therapy independent of age and gender
References

- Anthierens S, Tansens A, Petrovic M. Qualitative insights into general practitioners views on polypharmacy. BMC Fam Pract 2010;11:65. [PMC free article] [PubMed]
- Farrell B, Shamji S, Monahan A, & French Merkley V. Reducing polypharmacy in the elderly; Cases to help you “rock the boat”. Canadian Pharmacists Journal / Revue Des Pharmaciens Du Canada 2013; 146(5), 243-244