Polypharmacy And Older Adults

Brenda Jordan, MS, ARNP, BC-PCM
Dartmouth Hitchcock - Kendal
Prescriptions & Older Adults

- Older adults get 2-3 times as many prescriptions
  - 12% of population > 32% of prescription drugs
  - Avg $955 per year on drugs
- Typical older adult takes 4-5 prescriptions and 2 OTC drugs at once
- Why?
  - More acute & chronic disease
  - More doctors visits
    - Fragmented with specialist care
  - More trips to ED
  - More side effects to medications
    - Drugs often given to counteract a side affect of another drug
Polypharmacy – “Many Drugs”

Why does it happen
In 2000, older adults made 200 million visits to healthcare providers
1/3 visits – no drug prescribed
1/3 visits – 1-2 drugs prescribed
1/3 visits – 3+ drugs prescribed
“Medications are probably the single most important healthcare technology in preventing injury, disability, and death in the geriatric population.”

“Any symptom in an elderly patient should be considered a drug side effect until proved otherwise.”
Medication-Related Problem (MRP)

- Defined by Hepler & Strand
  - “an event or circumstance involving a patient’s drug treatment that actually, or potentially, interferes with optimal outcome.”
  - Eight categories of MRP
    - Medical condition requires new or additional medication
    - Patient taking unnecessary drug given present condition
    - Wrong drug for patient’s medical condition
    - Correct drug, dose too low
    - Correct drug, dose too high
    - Adverse drug reaction
    - Drug interaction
    - Patient not taking drug correctly
In the US, estimates of as many as high as 200,000 people may die of medication-related problems or adverse drug reactions (ADR) each year. [Simonson et al. Medication Related Problems in the elderly, Drugs & Aging, 2005]

- Risk of clinically serious ADR is 4 per 100 prescriptions, 1 in 1000 will die.
- Prescription drugs 80% of ADR, OTC 20% of ADR
- Estimates of 5-17% of hospital admissions are related to ADR
- “If adverse drug effects were classified as a distinct disease, it would rank as the fifth leading cause of death in the US.” [Lasorou et al. Incidence of adverse drug reactions in hospitalized patients: a meta-analysis of prospective studies. JAMA, 1998]
- Medication-related problems/ADRs are estimated to cost the US $200 billion annually. [Cameron. Preventing medication-related problems among older Americans. Manag Care Interface, 1998]
Medication-Related Problems/ADRs in Elderly - Costly Geriatric Problems

- Falls
- Cognitive Loss /delirium
- Dehydration
- Incontinence
- Depression

End result can be
- loss of functional capacity, quality of life and often nursing home placement is result

ADRs - Preventable Problem

- Nearly one third of adverse drug events in ambulatory settings are preventable.

- Half of adverse drug events in nursing facilities are preventable.
Higher incidence of multiple chronic illness
- CAD, Valvular disease
- Hypertension, Stroke
- Diabetes, Type II
- Osteoarthritis
- Dementia
- Osteoporosis
- Depression
- Diminished hearing & vision
- Chronic Pain
Healthcare Provider Factors that Contribute to Polypharmacy

- No med review with patient on regular basis
- Presumes that patient expects meds
- Prescribes without sufficiently investigating clinical situation
- Evidence that a particular drug is the “best” drug for a problem
  - Complicated by the existence of many problems and multiple providers
- Provides unclear, complex or incomplete instructions about how to take meds
- No effort to simplify medication regimen
- Ordering automatic refills
- Lack of knowledge of geriatric clinical pharmacology
- Fear of accusations of ageism or cultural bias
Patient Factors that contribute to Polypharmacy

- Seeing multiple providers and using multiple pharmacies
- Hoarding meds & insisting on taking meds that no longer maybe appropriate
- Do not accurately report meds taken or symptoms, can result in duplicate meds
- Assume that once medication started it should be continued
- Changes in activities, smoking, food and fluid intake can affect action of meds.
Why are older people more vulnerable?

- Deterioration of physiologic systems with aging
  - Universal
  - Vary according to individual health
  - Decreased functional reserve makes “tipping over the edge” more likely.
  - Recovery is slower
  - Less Resilience
Physiologic changes of aging

- Variable according to genes, general health and environment
- Chronologic age not as important as biologic age.
- Decreased temperature regulation
- Poor judgment, diminished cognitive capacity
- Difficulty describing symptoms or adverse effects
- Increased fat to muscle ratio, decreased body water, decreased lean body mass
- Reduction in serum albumin
  - (less protein results in more free drug)
Musculoskeletal system

- Decreased muscle mass, strength and endurance
- Decreased water content of cartilage
- Decrease in bone density
Brain and nervous system

- Decreased numbers of neurons
- Decreased circulation (vessels narrow and stiffen)
- Decreased amounts of neurotransmitters
- Diminished balance and motor coordination
- Decreased ability to process and retain information
Cardiovascular System

- Diminished efficiency
- Less reserve
- Slowed response to B/P changes
- Vessels narrow and stiffen
Gastrointestinal System

- Swallowing difficulty is common
- Slowed transit
- Reduced gastric acid
- Reduced digestive enzymes
- Reduced size and flow of blood through the liver
Renal System

- Diminished ability:
  - To clear toxins
  - Concentrate urine
    - Urine more dilute, dehydration possible
  - Conserve electrolytes
    - Reduced sodium and potassium common
  - Acidify urine
Pharmacokinetic features

- Extension of half-life
- Change in volume of distribution of medication depending on whether it is lipid or water soluble
- Bound to proteins > lower albumin may permit more free drug to pass the blood-brain barrier
- Therapeutic Index – effective level to toxic level
- Metabolism in elderly
  - Phase I – less active metabolites are formed
  - Phase II – transformation to inactive metabolites remains stable
Pharmacodynamic features

- Drugs can interact pharmacodynamically to increase the adverse effects to the point of toxicity and delirium
- Must evaluate total anticholinergic or dopaminergic burden of the patient’s drug regimen
- In elders, cholinergic receptors more sensitive so exaggerate adverse effects
- With aging there is change in receptor function across organs & organ systems
- Net effect is heightened sensitivity of the brain to adverse effects
- There is also interaction between drug and disease such as Parkinson’s & dopamine and Alzheimer’s & acetycholine
Drug Reactions Look Like Growing Old

- Unsteadiness
- Dizziness
- Confusion
- Nervousness
- Fatigue
- Insomnia
- Drowsiness
- Falls
- Depression
- Incontinence

But is 5th leading cause of death in older adults
Common Iatrogenic Drug Problems

- Confusion, dry mouth, constipation, blurred vision, urinary retention and othostatic hypotension with anti-cholinergics & antiemetics
- Confusion and unsteady gait with tricyclics
- Digoxin toxicity with normal serum concentrations
- Confusion with H2 blockers
- CNS toxicity with long-acting benzodiazepines
- Confusion with narcotics and NSAIDs
Prevention of Polypharmacy

- Assess:
  - Living situation/social supports
  - Cognition
  - Funds to purchase meds
  - Functional capacity
  - Depression
Prevention of Polypharmacy

- Careful written medication instructions
- Counseling to take meds even though feeling well
- Discourage pill-sharing
- Assess other remedies patient maybe ingesting
- Encourage pill boxes, phone checks, pill counts or other med monitoring plans
- At least yearly have patient bring in all meds, Rx, OTC, vitamins, supplements, herbal preps, etc
Another Reason to Prevent Polypharmacy: Payment for Rx Drugs

- Older adults without private drug insurance, Medicare or Medicaid pay for meds out-of-pocket decreasing $$ for other needs
- New Medicare plan saves 10-25% on meds
- Monthly premium - $35
- Deductible of $250
- Pays 75% of costs $250-2250 then 100% from $2250-3600 then 95% over $3600.
Payment for drugs

- Medicaid – drug coverage for 6 million low-income Medicare beneficiaries or 15% of Medicare population
- Older adults & people with disabilities are 25% of Medicaid enrollees but spend 80% of Rx $$
- All payment plans include formularies, pre-authorization, generic substitution, fail first, dispensing limits and co-payments
Recognition of Drug-Induced Reactions

- Initial step:
  - Review the medications
  - Examine temporal relationships between new meds or increased/decreased dosage or discontinuation and onset of symptoms
  - Hyperactive state – suspect cholinergic toxicity, alcohol intoxication, stimulant intoxication, serotonin syndrome, alcohol or benzodiazepine withdrawal
  - Hypoactive state – suspect sedative or narcotic intoxication, alcohol or benzodiazepine intoxication
Potentially inappropriate medications

- Psychotropics
  - Sedative/hypnotics
  - Shorter acting are preferred
    - Ativan, Ambien, Serax
  - Long acting can be dangerous
    - Restoril, Halcion, Barbituates (avoid completely)
    - Benzodiazepines
      - Librium, Valium, Tranxene, Klonapine
      - Long half life, accumulating to toxic levels quickly if taken every day
      - Cause sedation and dizziness, profound confusion
      - Ataxia and falls
Potentially inappropriate...

- Psychotropics (con’t)
  - Antipsychotics
    - Used only as last resort, efficacy unclear
    - Side effects:
      - sedation
      - anticholinergic effects: Dry mouth, urinary retention, constipation, confusion
      - orthostatic hypotension
      - extrapyramidal symptoms: dystonia, pseudoparkinsonism, akathisia (a form of agitation)
      - tardive dyskinesia (TD): rhythmic involuntary movements of tongue, lips, jaw.
Potentially inappropriate...

- **Antipsychotics (con’t)**
  - Newer (atypical) less likely to cause side effects:
    - Clozaril, Zyprexa, Seroquel, Risperdal, Abilify
    - Used in low doses
    - Requires ongoing evaluation of effectiveness and trials of dose reduction
    - More expensive
  - Older (typical) rarely used anymore except Haldol
    - Higher incidence of extrapyramidal signs and TD
      - Thorazine, Stelazine, Prolixin, Mellaril, Haldol
Potentially inappropriate:

- **Neuroleptics**
  - Dilantin, Tegretol, Lamictal
  - Neurontin, Lyrica
    - Sedation
    - Ataxia
    - Dizziness
Potentially inappropriate...

- **Psychotropics**
  - **Antidepressants:**
    - **Tricyclics** (Elavil, Nortriptyline)
      - Highly effective but...sedating, anticholinergic, hypotension
      - Probably should be avoided even in small doses
  - **SSRI’s**
    - Very effective but interact with other medications
      - Coumadin, benzodiazepines, statins
    - Half life should be considered
    - Celexa and Lexapro may be better
Potentially inappropriate...

- Analgesics
  - Opioids
    - Morphine, Vicodin, Percocet, Codeine
      - OK in small doses, constipating, sedating, confusion
    - Demerol, Darvocet, Talwin should not be used
      - Strongly anticholinergic, confusion, hallucinations
      - Not particularly effective
  - Non-opioid
    - Tylenol, Ultram usually OK
    - NSAID’s: Indocin – CNS symptoms
      - All can cause silent bleeding – anemia – dizziness- falls
Potentially inappropriate...

- **Antiarrythmics**
  - **Digoxin**
    - Bradycardia, dizziness and weakness
  - **Amiodarone**
    - May cause irregular heart beat and dizziness
  - **Beta blockers: metoprolol, atenolol,**
    - May precipitate syncope (faint)
    - Can cause sedation
    - Bradycardia and weakness
Potentially inappropriate...

- Antihypertensives
  - Beta blockers
  - Alpha Blockers, minipres, catapress, cardura
    - Sudden drop in B/P
  - Calcium channel blockers (diltiazem, Nifidepine)
    - Short acting can cause sudden drops in B/P
Potentially inappropriate...

- Diuretics
  - HCTZ, Diazide, Lasix, Bumex
    - Lower B/P
    - Alter electrolytes and fluid balances
    - Cause frequent (often hurried) trip to the bathroom
Potentially problematic

- Even Antibiotics
  - Macrolides & Fluoroquinolones associated with delirium
Potentially inappropriate...

- Combinations of drugs that can lead to falls
  - SSRI + tricyclics
  - SSRI + St John’s wort (serotonin syndrome)
  - SSRI+Ultram (serotonin syndrome)
  - Coumadin and almost everything
  - Viagra and nitrates (sudden drops in B/P)
  - Benzodiazepines and antipsychotics
Potentially Inappropriate...

- Don’t forget alcohol
  - Interacts negatively with almost everything
  - An independent delirium & fall risk hazard
  - Not uncommon for elderly to drink
  - Reduced tolerance even small amounts
In Summary
Polypharmacy can lead to:

- Adverse drug reactions (ADR) – 10-20% of those admitted to medical services due to OTC meds
  - # of drugs is single greatest risk for ADR
- Drug-drug reactions
- Decreased medication compliance
- Poor quality of life
- Unnecessary drug expense