Polypharmacy And Older Adults

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Percent of Community-Dwelling Medicare Beneficiaries Age 65 and Over (age-adjusted) with Prescribed Medicine Use by Sex, 1992-2003

Data source: Medicare Current Beneficiary Survey
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
Prescription Drugs

Average annual number of filled prescriptions among noninstitutionalized Medicare enrollees age 65 and over, by selected characteristics

Note: Chronic conditions include cancer (other than skin cancer), stroke, diabetes, heart disease, hypertension, arthritis, and respiratory conditions (emphysema, asthma, chronic obstructive pulmonary disease). Prescription drug coverage includes people with partial year coverage. The number of filled prescriptions counts each refill separately.

Reference population: These data refer to Medicare enrollees.

Source: Centers for Medicare & Medicaid Services, Medicare Current Beneficiary Survey.
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
Percent Distribution of Drug Mentions at Office Visits According to Therapeutic Classification Among Persons Age 65 and Over (age-adjusted), 2003-2004

Data source: National Ambulatory Medical Care Survey
“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 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.
Why A Greater Risk in Older Population

- 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.
Dietary Quality

Dietary quality ratings of people age 45 and over, as measured by the Healthy Eating Index, by age group and poverty status, 1999-2000

Note: Dietary quality was measured using the Healthy Eating Index (HEI). The HEI consists of 10 components, each representing a different aspect of a healthful diet based on the U.S. Department of Agriculture’s Food Guide Pyramid and the Dietary Guidelines for Americans. Scores for each component are given equal weight and added to calculate an overall HEI score with a maximum value of 100. An HEI score above 80 indicates a good diet, an HEI score between 51 and 80 signals a diet that needs improvement, and an HEI score below 51 indicates a poor diet.

Reference population: These data refer to the civilian noninstitutionalized population.

Source: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health and Nutrition Examination Survey.
Percentage of people age 45 and over who reported engaging in regular leisure time physical activity, by age group, 1997-2004

Note: Data are based on 2-year averages. “Regular leisure time physical activity” is defined as “engaging in light-moderate leisure time physical activity for greater than or equal to 30 minutes at a frequency greater than or equal to 5 times per week, or engaging in vigorous leisure time physical activity for greater than or equal to 20 minutes at a frequency greater than or equal to 3 times per week.” Reference population: These data refer to the civilian noninstitutionalized population. Source: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey.
Cigarette Smoking

Percentage of people age 65 and over who are current cigarette smokers, by sex, selected years 1965-2004

Reference population: These data refer to the civilian noninstitutionalized population.
Source: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey.
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
Average Expenditures on Prescribed Medicines for Community-Dwelling Medicare Beneficiaries Age 65 and Over (age-adjusted) by Functional Status, 1992-2003

Note: Two groups of Medicare beneficiaries are included as community residents. The first lived solely in household units throughout the year. The second lived part of the year in a long-term care facility and part of the year in the community.

Data source: Medicare Current Beneficiary Survey
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 soluable
- 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 & acetylcholine
Drug Reactions Look Like Growing Old

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

But is 5\textsuperscript{th} leading cause of death in older adults
Common Iatrogenic Drug Problems

- Confusion, dry mouth, constipation, blurred vision, urinary retention and orthostatic 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
Adverse Effects of Cardiac Medications

- Digitalis
- Diuretics
- Antiarrhythmics
Adverse Effects of Medications for Depression and Anxiety

- SSRI, Tricyclics, and etc
Adverse Effects of Pain Relievers

- NSAIDS
- Acetaminophen
- Narcotics
Adverse Effects of Blood Thinners

- All types (Coumadin, Heparin, ASA)
Always, Always, Always consider medications with acute confusion

- Narcotics, antidepressants, antihistamines, and etc.

- Particularly vulnerable population: Dementia
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 leads 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