

Polypharmacy And Older Adults



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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

Paradox of Medications – Not New

“Medications are probably the single most important healthcare technology in preventing injury, disability, and death in the geriatric population.”

Avorn, J. Medication use and the elderly: current status & opportunities, *Health Aff*, 1995.

“Any symptom in an elderly patient should be considered a drug side effect until proved otherwise.”

Gurwitz et al. *Long-term Care Quality Letter*. Brown University. 1995

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

Scope of Problem

Risk Versus Benefit

- 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

Fu et al. Inappropriate medication use and health outcomes in the elderly. *J AM Geriatr Soc*, 2004.

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.

Why are older people more vulnerable?

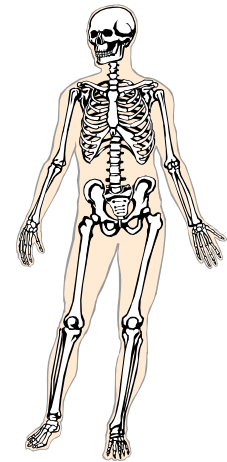
- Deterioration of physiologic systems with aging
 - Universal
 - Vary according to individual health
 - Decreased functional reserve makes “tipping over the edge” more likely.
 - Recovery is slower
 - Less Resilience

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



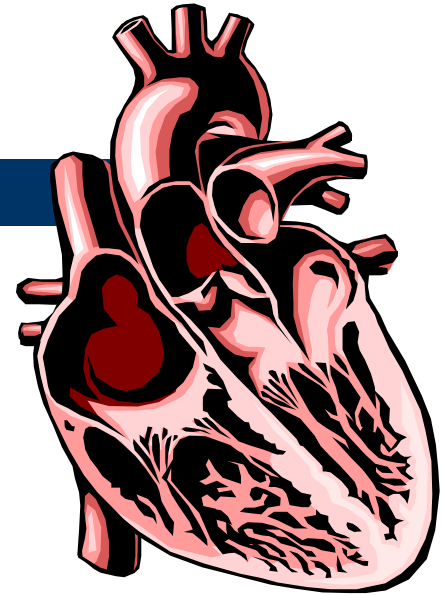
Brain and nervous system

- 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



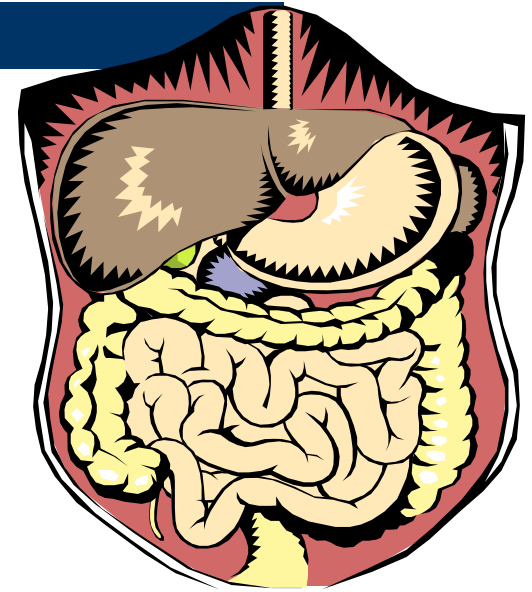
Cardiovascular System

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



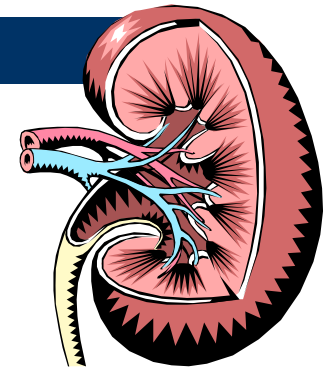
Gastrointestinal System

- 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 & acetylcholine

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 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

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...

- Antiarrhythmics
 - 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, catapres, cardura
 - Sudden drop in B/P

Calcium channel blockers (diltiazem, Nifedipine)

- 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 & Flouroquinones 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 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