Elder Polypharmacy: Cure or Curse

Mary T. Durante, PharmD, R.Ph, PACE at ESPNS

Background

According to the FDA, every year there are over 2 MILLION serious Adverse Drug Reactions (ADR) and 100,000 deaths. ADRs are the 4th leading cause of death ahead of pulmonary disease, diabetes, AIDS, pneumonia, accidents and automobile deaths. 350,000 of these ADR occur in nursing home patients.

PACE at Elder Service Plan of the North Shore provides all-inclusive care to over 800 people who are nursing home eligible, while keeping 90% of them in a non-institutionalized setting.

Table 1. Common Adverse Drug Events and Clinical Outcomes

Drug Class	Common Adverse Reactions	Common Clinical Outcomes
NSAID/Cox 2 inhibitors	Gastric irritation, ulcers, chronic blood loss, nephrotoxicity, hypercoagulability	Hemorrhage, sodium retention, renal failure, decreased effectiveness of antihypertensive agents, thrombotic events
Anticholinergics (antihistamines, antipsychotics, muscle relaxants, antidepressants, bladder antispasmodics) motility, hypotonia	Dry mouth, decreased gut motility, orthostatic hypotension, blurry vision, decreased urinary	Instability and falls, constipation, decreased cognition, sedation, confusion, bladder retention
Tricyclic antidepressants	Anticholinergic effects, heart block	Falls, confusion, urinary retention
Antipsychotics	Sedation, tardive dyskinesia, dystonia, anticholinergic effects,hypotension	Falls, hip fractures, confusion, disability
Beta-blockers	Decreased myocardial contractility, slowed cardiac conduction, orthostatic hypotension	Bradycardia, heart failure, confusion, mild sedation, falls
Digoxin disturbances	Decreased cardiac conduction, gastrointestinal	Arrhythmias, nausea, anorexia
Narcotics	Decreased gut motility, sedation	Confusion, falls, constipation

Source: Kane RL, Ouslander JG, Abrass IB. Essentials of Clinical Geriatrics. 4th ed. New York: McGraw-Hill; 1998.

Understanding Polypharmacy

Greatest risks include concurrent administration of 5+ drug and patients with significant medical co-morbidities or impairments in vision or dexterity. Approximately 75% of Medicare recipients age 65-69 have no chronic health conditions compared to 90% over age 85.

Geriatric Syndromes

Frailty and Failure to Thrive: Older frail adults are at highest risk for numerous adverse health outcomes. Failure to thrive in the elderly is a multifactorial state of decline often caused by functional impairments and chronic comorbidities.

Delirium: An acute disorder of attention and global cognitive function, delirium is a common, serious and potentially preventable source of morbidity and mortality in the hospitalized elderly.

Falls: Falls have a multifactorial etiology. Twenty years of research have shown incidence, consequences, risk factors, and prevention techniques.

Sleep Disorders: Sleep difficulties are associated with changes in endogenous circadian clock, medical and psychiatric illness, medication intake, and specific sleep disorders.

Dizziness: A sensation of postural instability or imbalance, dizziness is commonly categorized as vertigo, disequilibrium, and presyncope, among others. Mixed dizziness, a combination of two or more of the above types, is the form most commonly reported by older adults.

Syncope: Syncope is a transient, self-limited loss of consciousness, usually leading to falling, and is associated with rapid onset and a spontaneous, complete, and prompt recovery.

Pressure Ulcers: The preferred term for any lesion caused by unrelieved pressure resulting in damage of underlying tissue is *pressure ulcers*; they are also referred to as *decubitus ulcers* and *bedsores*.

Incontinence: Incontinence is the involuntary loss of urine or feces in an amount or frequency sufficient to be a social and/or health problem.

Disorders of Temperature Regulation: Seniors may experience declining regulation of homeostatic mechanisms (i.e., hypothermia, hyperthermia).

Elder Mistreatment: This describes a variety of activities perpetrated upon an older person by others (e.g., physical abuse, neglect, financial or material abuse, psychological or verbal abuse).

Physiologic drug processing is influenced largely by age:

Absorption: Remains relatively constant despite age

Distribution: Total Body H20 ↑, Lean Body Mass ↓, Body Fat % ↑ May lead to elevated or reduced drug concentrations in the body or prolonged drug half-lives.

Metabolism: Many drugs undergo hepatic metabolism to produce more soluble forms for subsequent elimination by the body; Hepatic metabolism is affected by multiple variables including: genotype, hepatic perfusion, lifestyle, hepatic disease, drug-drug interactions & aging. Phase I hepatic metabolism affected most by aging, leading to greater toxicity of unmetabolized entity or decreased efficacy if metabolism is necessary for drug activation.

Excretion: Renal elimination of drugs is altered greatly by aging. Utilize the Cockcroft-Gault equation to estimate overall renal function and to approximate the renally-adjusted dose of drug.

Goals

This quality improvement project aimed to **reduce the number of drugs prescribed** through clinical pharmacist review and intervention to:

- Reduce hospitalizations
- Reduce unwanted adverse effects of medications
- Reduce potential for medication errors
- Elimination of prescribing cascades *(See Table I above)*
- Improve functional status and decrease falls
- Decrease risk of geriatric syndromes *(see Table II above)*
- Reduce medication expenses

Approach

Team-approach to choose participant for review based on monthly care-plan list; 2 participants from 5 rotating sites reviewed/month, one site out of 6 reviewed monthly due to large participant-census & split medical team.

- EHR-generated referral to PharmD for polypharmacy review
- Collaboration with remainder of inter-disciplinary team to discuss goals
- Clinical pharmacist-driven review of medical record to identify approach to streamline polypharmacy
- Clinician-centered review of pharmacist recommendations & alteration o medication list based on accepted changes
- Potential clinical pharmacist consult sought out for participant counseling

Methods

Participants assessed for risk factors by interdisciplinary team, including clinical pharmacist based on:

- Number of medications
- Presence of multiple co-morbidities
- Desire to reduce medication load
- Status of chronic illness

Interventions included:

- Simplifying medications, eliminating duplications or reducing dosages to geriatric-approved levels
- Substitution with safer alternatives or discontinuation *see Table III right*
- Palliative care medication consults in Long-Term Care
- Reduction of prescribing cascades
- Pharmacist-led interviews for medication counseling
- Assessment of appropriate immunization history

Table III: Abbreviated Beers List of Medications with Increased Risk of ADR in patients 65+

Medications	Reason that Use is a Problem
Pain Relievers	
propoxyphene and combination products (Darvon®, Darvocet N-100®)	Used to control pain. Propoxyphene offers little pain-relieving advantage over acetaminophen (Tylenol®), yet has the side effects of other narcotics.
Meperidine (Demerol®)	Used to treat pain. Meperidine is not an effective oral pain reliever and has many disadvantages compared to other narcotics. Avoid using in older persons.
Antidepressants	
amitriptyline (Elavil®) doxepin (Sinequan®)	Used to treat depression. These medications can cause sedation, weakness, blood pressure changes, dry mouth, problems with urination, and can lead to falls and fractures.
Sleeping Pills and Antianxiety Medications	
flurazepam (Dalmane®)	Used to treat insomnia. This medication produces prolonged sedation/sleepiness (often lasting for days and can worsen if taken daily) and can increase the risk of falls and fractures.
alprazolam (Xanax®) 2 mg lorazepam (Ativan®) 3 mg oxazepam (Serax®) 60 mg temazepam (Restoril®) 15 mg triazolam (Halcion®) 0.25mg zolpidem (Ambien®) 5 mg	Used to treat insomnia and anxiety. Older people should be prescribed small doses of these medications. Total daily doses should rarely exceed the suggested maximum doses noted to the left.
chlordiazepoxide (Librium®) diazepam (Valium®)	Used to treat insomnia and anxiety. Chlordiazepoxide and diazepam produce prolonged sedation (often lasting several days and can worsen if taken daily) and can increase the risk of falls and fractures.
Heart Medications	
digoxin (Lanoxin®) [doses above 0.125 mg]	Used to treat abnormal heart rhythms and heart failure. Because of decreased processing of digoxin by the kidney, doses in older persons should rarely exceed 0.125 mg daily, except when treating certain types of abnormal heart rhythms.
dipyridamole (Persantine®)	Used to help stop blood from clotting in people who have experienced strokes, heart attacks, and other conditions. Dipyridamole frequently causes light-headedness upon standing in older persons. Dipyridamole has been proven beneficial only in patients with artificial heart valves. Whenever possible, its use in older persons should be avoided.
methyldopa (Aldomet®) methyldopa/HCTZ (Aldoril®)	Used to treat high blood pressure. Methyldopa may cause a slowed heart beat and worsen depression. Alternate treatments for hypertension are generally preferred.
Diabetes Medications	
chlorpropamide (Diabinese®)	Used to control blood sugar in people with diabetes. Chlorpropamide can cause prolonged and serious low blood sugar.
Stomach and Intestinal Medications	
dicyclomine (Benty®) hyoscyamine (Levsin®, Levsinex®) propantheline (Pro-Banthine®) belladonna alkaloids (Donnatal®)	Used to treat stomach and intestinal cramps. These medications can cause sedation, weakness, blood pressure changes, dry mouth, problems with urination, and can lead to falls and fractures. All of these drugs are best avoided in older persons, especially for long term use.
trimethobenzamide (Tigan®)	Used to control nausea. This is one of the least effective medications used to control nausea and vomiting, yet can cause severe side effects, such as stiffness, shuffling gate, difficulty swallowing, and tremor.
Antihistamines	
chlorpheniramine (Chlor-Trimeton®) diphenhydramine (Benadryl®) hydroxyzine (Vistaril®, Atarax®) cyproheptadine (Periactin®) promethazine (Phenergan®)	Used to treat the runny nose of the common cold and allergy symptoms. Most nonprescription and many prescription antihistamines can cause sedation, weakness, blood pressure changes, dry mouth, problems with urination, and can lead to falls and fractures. Many cough and cold preparations are available without antihistamines, and these are safer substitutes in older persons.
diphenhydramine (Benadryl®)	Used to treat allergies and insomnia. Diphenhydramine can cause sedation, weakness, blood pressure changes, dry mouth, problems with urination, and can lead to falls and fractures.. When used to treat or prevent allergic reactions, it should be used in the smallest possible dose and with great caution.

Adapted from: http://www.seniorcarepharmacist.com/inappropriate/. Used with permission. For a complete list, go to http://mqa.dhs.state.tx.us/qmweb/MedSim/MedSimTable1.htm

Findings

Between months of November and December, 2013, 3 sites & 4 participant cases were reviewed; the following recommendations were made & based on the number of these findings:

- 4 Drugs Identified Without Adequate Indication
- 4 Prescriptions Without Appropriate Directions for Use
- 4 Dose Regimens Simplified
- 1 BEERS Criteria Drugs Identified
- 1 Prescribing Cascades Identified

Next Steps:

- Continue data collection
- Provide ongoing education to team about polypharmacy reduction
- Further collaborate with clinicians to discuss & define care plan goals
- Follow up on recommendations not completed in a timely fashion