

Deprescribing and Polypharmacy in the Geriatric Population

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OSPENS

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Objectives

Describe	Aging population and medication use
Analyze	Geriatric pharmacokinetic/pharmacodynamic changes
Utilize	Medication assessment tools
Reduce	Polypharmacy = "deprescribing"
Improve	Geriatric prescribing at WellSpan York Hospital



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Patient case

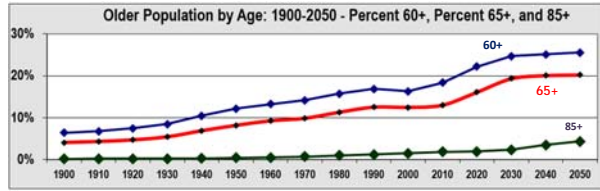
86yo F
CC: worsening weakness and ambulatory dysfunction;
weight loss due to poor caloric intake and refractory abdominal pain
PMH: dementia, osteoarthritis, diverticulitis, hypertension
Wt: 41.6 kg
CrCl 44.2 ml/min
Vitals: afeb HR 63 RR 16 BP 134/74 96% on RA
QTC interval 477 (on admission)
Nutrition: Ensure TID
Patient admitted to a general floor



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The Aging Population – United States



<http://www.silverco.org/en/statistic/>



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Geriatric Statistics

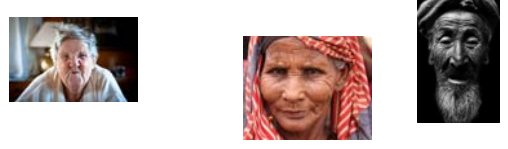
- Responsible for 40% of prescribed medications
- Polypharmacy
 - ≥ 5 Rx medications – 35.8%
 - ≥ 5 combined Rx, OTC, supplements – 67.1%
- Adverse drug events (ADE)
 - 88% of preventable hospitalizations
 - 5+ medications – 88% risk of adverse drug event (ADE)
- Potentially Inappropriate Medications (PIM)
 - 33% of medications on geriatric medication list

Mahoney, D. Dovepress. 2018
Bourgeois, FT Pharmacoeconomol 2010



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Pharmacodynamic/Pharmacokinetic Changes in Geriatric Patients

Images courtesy of Google images



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Pharmacodynamics (PD)

Site action affinity
Receptors
Effect
Concentration

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Geriatric PD Changes

Central Nervous System	• ↓ anesthesia dosage requirements
Cardiovascular System	• ↑ doses for β agonists and β blockers
Respiratory System	• ↑ concentration of β agonists

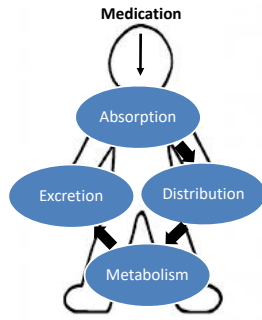
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Geriatric PD changes

Gastrointestinal System	• ↑ sensitivity to gastric irritants (NSAIDs) • ↓ levels of circulating Vitamin D
Renal System	• Decrease in GFR
Musculoskeletal System	• ↑ incidence of insulin resistance

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Pharmacokinetics (PK)



Absorption

↓	Saliva secretion	Oral disintegrating tablets (ODT)
↑	Gastric pH	Sucralfate, calcium carbonate, enteric coated medications
↓	Gastric acid secretion	Sucralfate
↓	Gastric surface area	Extended release formulations
↓	Gastrointestinal motility	Extended release formulations
↓	Active transport mechanisms	Cyanocobalamin, iron, calcium

Distribution

↓	Hepatic blood flow	Phenytoin
↑	Adipose tissue	Fentanyl
↓	Serum albumin	Phenytoin, warfarin
↑	Distribution of lipid-soluble drugs	Diazepam
↓	Distribution of water-soluble drugs	Gentamicin, digoxin

Metabolism

↓	Hepatic oxidation reactions	Diazepam
↑	Steady state levels	Digoxin, cephalexin, morphine
↑	Half lives	Vancomycin
↑	Levels of active metabolites	Morphine, meperidine
↓	First pass metabolism (increased bioavailability)	Metoprolol, nortriptyline

MSD Manual Professional Edition, (2019), Pharmacokinetics in Older Adults - Geriatrics

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Excretion

↓	Renal perfusion	Angiotensin converting enzyme inhibitors (ACEIs)
↓	Kidney size	Lithium
↓	Glomerular filtration rate	Nitrofurantoin, non steroidal anti-inflammatory agents (NSAIDs)
↓	Tubular secretion	Vancomycin
↑	Tubular reabsorption	Salicylates, phenobarbital

MSD Manual Professional Edition, (2019), Pharmacokinetics in Older Adults - Geriatrics

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Polypharmacy

Defined as a disease:

- Risk Factors
- Symptoms/consequences
- Exacerbating factors

Treatment is "deprescribing"

D'Arrigo, Terri, 2018, Pharmacy Today

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Prescribing Cascade

Patient has trouble sleeping due to pain

Patient chooses acetaminophen/diphenhydramine

Patient subsequently develops constipation and dry eyes

Patient chooses docusate/senna and lubricating eye drops



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Prescribing Cascade

Patient has increased pain

Patient chooses a non-steroidal anti-inflammatory agent

Patient subsequently develops increased swelling and heartburn

• After going to their provider, furosemide and famotidine are prescribed



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Factors predisposing to Prescribing Cascade

- Individual and team factors
- Patient-related factors
- Work-environment factors
- Task-related factors



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Beers Criteria

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Beers Criteria

Advantages	Disadvantages
Expert consensus and extensive literature review	Does not discuss drug-nutrient interactions, medication underuse
Three medication categories – older adults, drug-disease state interactions, caution in older adults	Does not discuss CAM, OTC or medication adherence
Most cited and widely used screen tool for Potentially Inappropriate Medication (PIM) used in the elderly	Lacks clear recommendations for appropriate dosing and dosing frequency

Whitman AM, Oncologist. 2016

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STOPP/START Screening Tool

STOPP: Screening Tool of Older People's potentially inappropriate Prescriptions.
Prescriptions that are potentially inappropriate in persons aged ≥ 65 years

START: Screening Tool to Alert doctors to Right (i.e. appropriate, indicated) Treatments.
Treatments that should be considered for people ≥ 65 years of age, where no contraindication exists

Herford dahrccg_nhs.uk. 2019

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STOPP Screening Tool

Screening tool of older person's prescriptions (STOPP)

Central nervous system	First generation antihistamines
Cardiovascular system	Aldosterone antagonists
Respiratory system	Systemic corticosteroids

STOPP Screening Tool

Screening tool of older person's prescriptions (STOPP)

Gastrointestinal system	Proton pump inhibitors for > 8 weeks
Hematologic system	Concomitant NSAIDs/Vitamin K antagonists
Endocrine system	Metformin if GFR < 30 ml/min

STOPP Screening Tool

Screening tool of older person's prescriptions (STOPP)

Renal system	NSAIDs with renal failure, ESRD or dialysis
Urogenital system	Antimuscarinic medications
Musculoskeletal system	Prescription NSAIDs with peptic ulcer disease

START Screening Tool

Screening tool to alert to right treatments (START)

Potential prescribing omissions	Vaccines
	Metformin
	Aspirin
	Statin therapy



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STOPP/START Criteria

Advantages	Disadvantages
Effective at identifying polypharmacy targets for intervention	Require additional validation in different clinical settings
Tools applied to primary care, nursing home and inpatient settings	Further studies required looking at long term patient outcomes
Assesses drug-drug disease interactions, duplicate therapies and therapies that increase falls risk	Does not evaluate the use of CAM, OTC or medication underuse



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Screening Tools Comparison

	MAI	Beers Criteria	STOPP/START
OTC	Y	N	N
CAM	Y	N	N
Med administration	Y	N	N/A
Cost	Y	N	N/A
Validated	Y	Y	Y
Allergies	N	N	N/A
ADRs	N	Y	Y
Medication adherence	N	N	N/A
Medication underuse	N	N	N
Subjective	Y	N	Y

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Deprescribing

Current medication list/indication

Risk vs benefit of deprescribing intervention

Medication – future benefit vs harm

Prioritize drugs for discontinuation with lowest benefit-harm

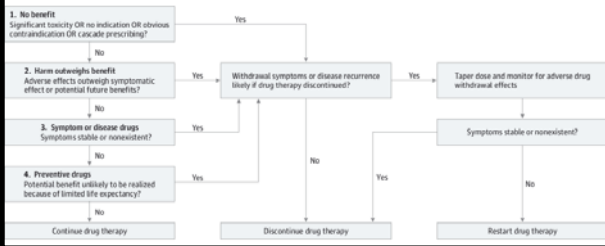
Implement change/monitor for improvement in outcomes or onset of adverse effects.



Scott, Ian. JAMA 2015.



Deprescribing Algorithm



Medication De-Prescribing in Patients, American Association of Diabetes Educators, Medication De-Prescribing in Patients with Diabetes after Implementing Lifestyle Changes, Driving Change and Innovation, 7/18/17



Back to our patient...



Home Medications

Donepezil	Lactobacillus acidophilus
Metoprolol succinate XL	Acetaminophen
Sucralfate	Cyanocobalamin
Pantoprazole	Polysaccharide iron complex
Docusate sodium	Zinc oxide
Docusate sodium/sennosides	Trazodone



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Medications during Hospitalization

Donepezil	Cyanocobalamin – further workup
Metoprolol succinate XL	Polysaccharide iron complex – further workup
Docusate sodium/sennosides	Mirtazapine
Lactobacillus acidophilus	Lorazepam IV/PO
Acetaminophen PO/PR	Sucralfate
Ondansetron IV/PO	Pantoprazole
ICU electrolytes	Docusate sodium
Zinc oxide	Prochlorperazine
	Cefpodoxime
	Trazodone



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MAI – one medication example

Pantoprazole	
Is there an indication for the drug?	N
Is the medication effective for the condition?	N
Is the dosage correct?	Y
Are the directions correct?	Y
Are the directions practical?	Y
Are there clinically significant drug-drug interactions?	Y
Are there clinically significant drug-disease interactions?	Y
Is there unnecessary duplication with other drugs?	Y
Is the duration of therapy acceptable?	N
Is this drug the least expensive alternative compared to others of equal utility?	N

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Patient Case – MAI application

	MAI Score
Pantoprazole	12
Sucralfate	12
Cyanocobalamin	7
Polysaccharide iron complex	7
Trazodone	7
Docusate Sodium	4
Docusate sodium/sennosides	4
Zinc oxide	4
Acetaminophen	2
Donepezil	0
Lactobacillus acidophilus	0
Metoprolol succinate XL	0

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Beers Criteria – Patient Case Example

- Beers list medications = 6 (trazodone, prochlorperazine, lorazepam (IV/PO), pantoprazole, mirtazapine)
- Avoid lorazepam IV/PO
 - Age-related
 - Comorbidities present
 - Drugs with similar side effect profiles
- Avoid long term proton pump inhibitor (PPI) use
- Use mirtazapine with caution



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STOPP/START – Patient Case Example

- Stop prochlorperazine
- Stop pantoprazole
- Start influenza vaccine
- Start pneumococcal vaccine
- Start shingles vaccine



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Meds during hospitalization – after Deprescribing Tools

Donepezil
Metoprolol succinate XL
Docusate sodium/sennosides
Lactobacillus acidophilus
Acetaminophen PO/PR
Ondansetron IV/PO
ICU electrolytes
Zinc oxide

Cyanocobalamin – further workup
Polysaccharide iron complex – further workup
~~Mirtazapine~~
~~Lorazepam IV/PO~~
~~Sucralfate~~
~~Pantoprazole~~
~~Docusate sodium~~
~~Prochlorperazine~~
~~Cefpodoxime~~
~~Trazodone~~



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Meds during hospitalization – after Pharmacist Intervention

Donepezil
Metoprolol succinate XL
Docusate sodium/sennosides
Lactobacillus acidophilus
Acetaminophen PO
~~Ondansetron IV/PO~~
~~ICU electrolytes~~
~~Zinc oxide~~

Cyanocobalamin – further workup
Polysaccharide iron complex – further workup
~~Mirtazapine~~
~~Lorazepam IV/PO~~
~~Sucralfate~~
~~Pantoprazole~~
~~Docusate sodium~~
~~Prochlorperazine~~
~~Cefpodoxime~~
~~Trazodone~~



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Other Pharmaceutical Care Recommendations

- Untreated indication – osteoarthritis
- Drug interactions (drug/drug, drug/food)
- Medication use without an indication



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WellSpan York Hospital Initiatives

- Falls Task Force
- Implementation of diuretic time change
- Implementation of DVT prophylaxis timing



Image courtesy of Google images



Delirium Clinical Effectiveness Team (CET)

Delirium (Symptoms)/Encephalopathy (Diagnosis)	
Does the patient have an acute change from baseline behavior??	
Delirium Risk Factors	Underlying Causes (Investigate)
Age > 65	Hypoxia
Dementia	Hypertensive emergency/occult MI
Delirium history	Stroke
Acute illness/infection	Sepsis/occult infection
Post-operative/post-procedure	Pain
History of liver/renal disease	Dehydration/malnutrition
Parkinson's disease (PD)	Electrolyte imbalances
Prior brain injury/stroke	Medication (side effects/withdrawal)
Multiple sclerosis	Illlicit drugs, alcoholism
Substance abuse	Urinary retention/Constipation
	Hyper/hypoglycemia

Approach to Management and Treatment

- Nonpharmacological interventions: Reorientation, mobilization, hearing aids/glasses, hydration/nutrition, sleep, bowel regimen, safety, establish diagnosis
- Assess for and treat pain
- Educate families re: delirium and patient safety
- Injury prevention: toileting schedule, bed/chair alarms, floor pads, frequent rounds
- Drugs to manage symptoms when other interventions have failed should only be used short term for rescue and stopped as symptoms improve. Drugs to use for rescue are Haloperidol 0.5 mg or Risperidone 0.5 mg (DO NOT USE in Parkinson's Disease and Lewy Body Dementia)
- Avoid Lorazepam for restlessness and sleep. Use for ETOH withdrawal

Document courtesy of WellSpan York Hospital
Delirium Clinical Effectiveness Team (CET)

Behavioral Emergency Response Team (BERT)

Monday through Friday
0700 – 1500

Document courtesy of Behavioral Emergency Response Team (BERT), WellSpan York Hospital

Blue Book Medication Reduction Initiative

Championed by Dr. Jonathan Whitney

Inpatient/outpatient population goal → 20% meaningful reduction of lorazepam, zolpidem and cyclobenzaprine orders



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Beers medication reduction initiative with goals of potentially decreasing falls, delirium or orthostatic hypotension

On admission, the chief complaint is most important – BUT, avoidance of potential hazards can also have positive impact

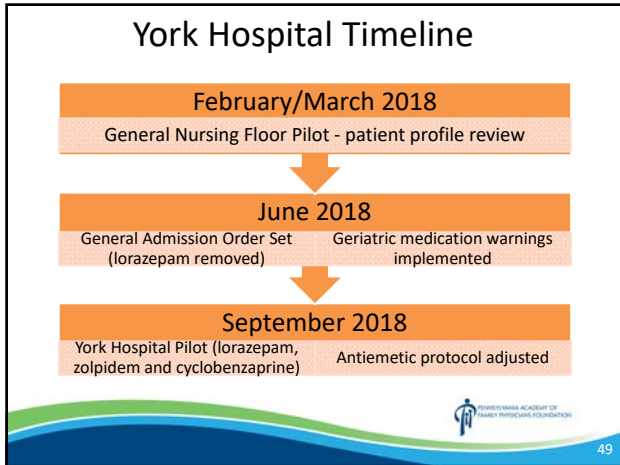


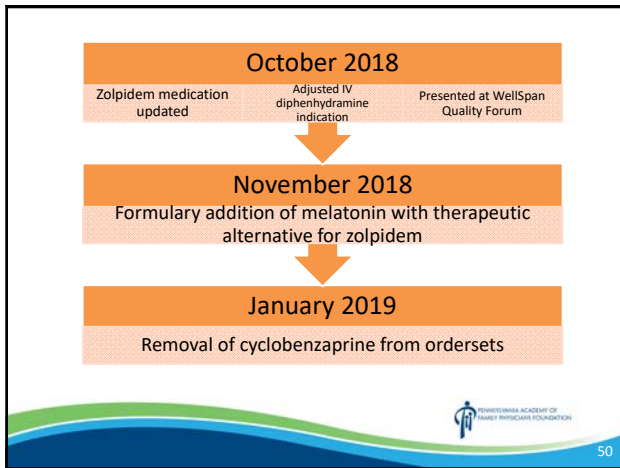
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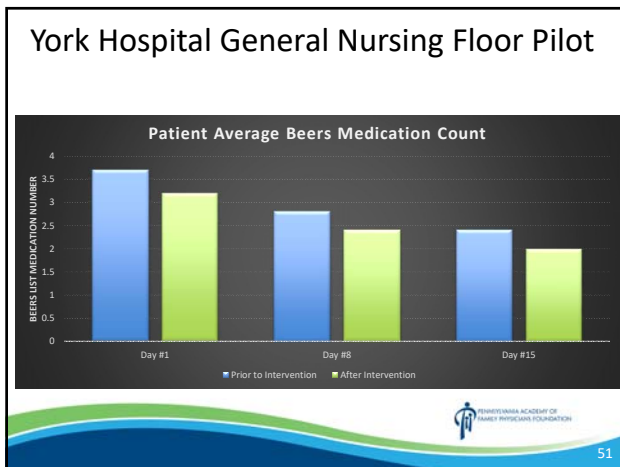
So, this could be what happens if we are not paying attention to one of the legs...



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Inpatient prescribing of lorazepam, zolpidem and cyclobenzaprine for patients ≥65 years old

	FY2018 Q3	FY2019 Q1	Change (%)
Patient Days*	42,624	41,933	
# of Orders	2,531	1,967	- 21%
# of Administrations	3,923	3,087	- 20%

* Adjusted per patient day



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Did you know?

Jeanne Louise Calment was the oldest human who lived for 122 years and 164 days.

Born in France on February 21, 1875

Died at a nursing home in Arles, Southern France, on August 4, 1997.



Bigwood JG. Jeanne Louise Calment. Find A Grave: <https://www.findagrave.com/memorial/1864/jeanne-louise-calment>. Published January 1, 2001. Accessed January 23, 2019.



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Less is more



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Potentially Harmful Drugs in the Elderly: Beers List, Pharmacist's Letter/Prescriber's Letter, December 2015

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