

Polypharmacy in the Geriatric Population

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Objectives

- Define polypharmacy
- Describe risk factors for geriatric patients
- Identify common “offending” medications
- List available screening tools for polypharmacy
- Describe ways to limit adverse drug events in the elderly population

Definitions

- Geriatric Population
 - “Greatest generation”
 - Baby Boomers?
- Polypharmacy
 - Prescribing multiple medications
 - Five or more
- Inappropriate prescribing (IP)
 - Potentially inappropriate medications (PIM)
 - Potential prescribing omissions (PPO)

Definitions

Adverse Drug Events (ADE)

- Unintended and undesired effects
- Five categories
 - Adverse drug reaction
 - Medication error
 - Allergic reactions
 - Withdrawal
 - Overdose



Anyone's Grandma

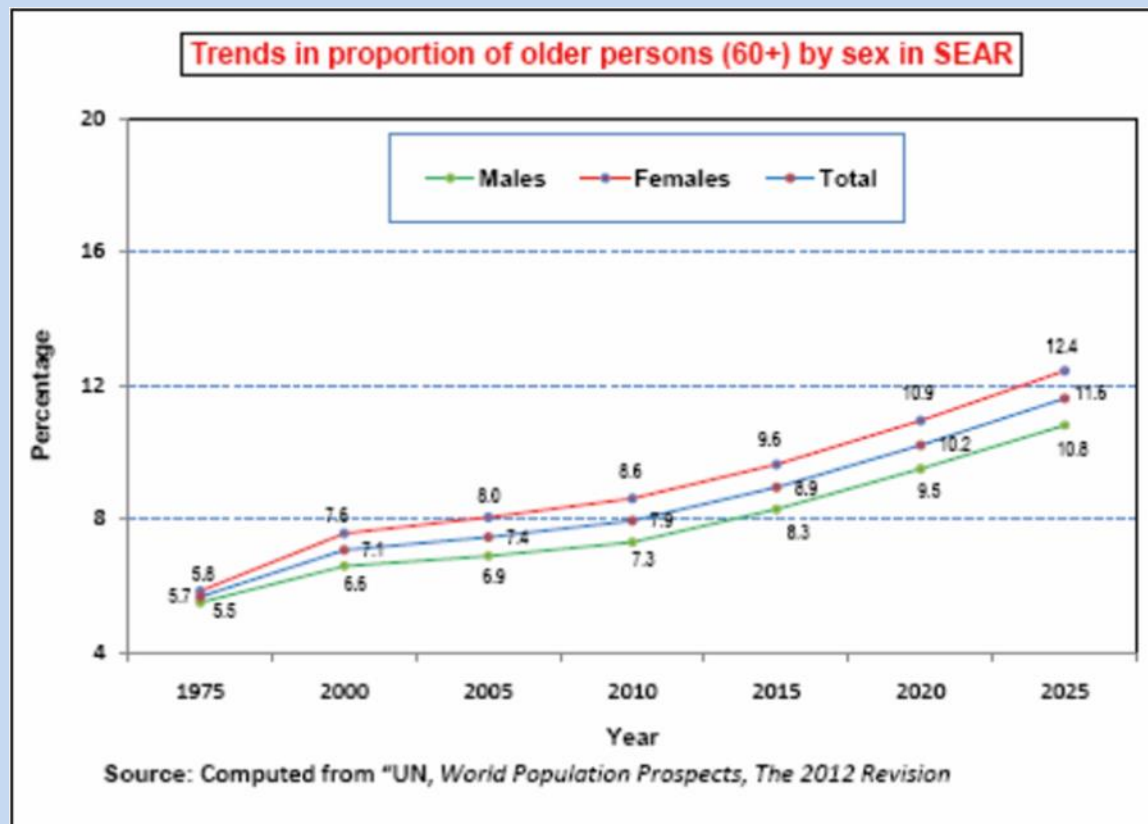


Anyone's Grandma

Your Medication List as of 2/19/18 10:43 AM	
Always use your most recent med list.	
aspirin 81 MG EC tablet	
cholecalciferol (vitamin D3) 5,000 unit tablet Commonly known as: VITAMIN D3	Take one tablet (5,000 Units total) by mouth one (1) time a day
dicyclomine 10 MG capsule Commonly known as: BENTYL	Take one capsule (10 mg total) by mouth 4 (four) times a day as needed (abdominal cramping and/or diarrhea)
EASY TOUCH TWIST LANCETS 33 gauge Misc Generic drug: lancets	For testing up to twice each day.
hydroCHLORothiazide 25 MG tablet Commonly known as: HYDRODIURIL	Take one tablet once each day.
levothyroxine 25 MCG tablet Commonly known as: SYNTHROID, LEVOTHROID	Take one tablet (25 mcg total) by mouth one (1) time a day
meloxicam 7.5 MG tablet Commonly known as: MOBIC	Take one tablet (7.5 mg total) by mouth one (1) time a day
mometasone 50 mcg/actuation nasal spray Commonly known as: NASONEX	two sprays by Each Nare route one (1) time a day
MYRBETRIQ 25 mg 24 hr tablet Generic drug: mirabegron	Take one tablet (25 mg total) by mouth one (1) time a day
nitroglycerin 0.4 MG sublingual tablet Commonly known as: NITROSTAT	Place 1 tablet (0.4 mg total) under the tongue every 5 (five) minutes as needed for chest pain
pioglitazone 15 MG tablet Commonly known as: ACTOS	Take one tablet (15 mg total) by mouth one (1) time a day
PRODIGY NO CODING Strp Generic drug: blood glucose test strip	For testing up to twice each day. (Dx: E11.9)
sertraline 25 MG tablet Commonly known as: ZOLOFT	Take one tablet (25 mg total) by mouth one (1) time a day
telmisartan 80 MG tablet Commonly known as: MICARDIS	Take one tablet (80 mg total) by mouth one (1) time a day
traZODone 50 MG tablet Commonly known as: DESYREL	Take one tablet (50 mg total) by mouth nightly

Geriatric Population

Now most live into 60s and beyond



Pharmacokinetics

- Decreased function
 - Renal
 - Hepatic
- First-pass clearance
- Protein binding
- Absorption

Polypharmacy in the Elderly

- 37% patients 75-85 years old
- Hospitals
 - Five to eight meds – 41%
 - One or more unnecessary – 59%
- > 50% nursing home residents

Polypharmacy in the Elderly

Negative outcomes

- Greater cost
- Increased ADE
 - Drug interactions
 - Non-compliance
- Reduced functional capacity
 - Activities of daily living (ADLs)
 - Nutrition
- Multiple geriatric syndromes
 - Cognitive impairment
 - Falls
 - Urinary incontinence

Polypharmacy in the Elderly

- “Do the wrong thing for the right reason.”
 - Guideline contributions
 - Evidence-based medicine
- Two disease states – all it takes
 - Diabetes
 - Heart failure
 - COPD

Adverse Drug Events

Each Year Cause

- 3.5 million physician office visits
- 1 million ER visits
- 125,000 hospital admissions
 - 1 in 3 hospital adverse events
 - Affect 2 million hospital stays
 - Prolong hospital stay 2-5 days

ADE in the Elderly

- Pharmacokinetics and polypharmacy unavoidable
- Steps to minimize
 - Accurate records
 - Balance polypharmacy
 - Individualize doses
 - Simple regimens
 - Safe management by patients
 - Therapeutic drug monitoring
 - Inter-disciplinary

Decreasing Polypharmacy

- Education
 - Providers
 - Patients
- Clinical pharmacy
 - Medication therapy management
 - Multidisciplinary teams
 - Medical homes
- Tools

Polypharmacy Screening Tools

- Beers list
- STOPP criteria
- START criteria
- Inappropriate prescribing in the elderly tool (IPET)
 - Published in Canada
 - 14 criteria

Beers Criteria

- Potentially Inappropriate Medications
- Most commonly used list
 - Organ system
 - Therapeutic category
 - Drugs
- Drug-disease
- Use with caution
- Interactions
- Renal impairment

Beers Medications

- Alpha-1 blockers
- Amiodarone
- Anticholinergics
- Antidepressants
 - Amitriptyline
 - Doxepin
- Antipsychotics
- Antispasmodics
- Barbiturates
- Benzodiazepines
- Benztropine
- Clonidine
- Digoxin
- Dipyridamole
- Estrogen
- Megestrol
- Meperidine
- Metoclopramide
- Muscle relaxants
- Nitrofurantoin
- NSAIDs
- Proton-pump inhibitors
- Sedative hypnotics
- Sulfonylureas
- Testosterone

STOPP Criteria

- Screening Tool of Older persons' Potentially inappropriate Prescriptions
- 65 clinical criteria
- ADEs significantly associated

STOPP: Screening Tool of Older People's potentially inappropriate Prescriptions

The following drug prescriptions are potentially inappropriate in persons aged ≥ 65 years of age.

Cardiovascular System

1. Digoxin at a long-term dose $> 125\mu\text{g}/\text{day}$ with impaired renal function*
2. Loop diuretic for dependent ankle oedema only i.e. no clinical signs of heart failure
3. Loop diuretic as first-line monotherapy for hypertension
4. Thiazide diuretic with a history of gout.
5. Non-cardioselective beta-blocker with Chronic Obstructive Pulmonary Disease (COPD).
6. Beta-blocker in combination with verapamil
7. Use of diltiazem or verapamil with NYHA Class III or IV heart failure
8. Calcium channel blockers with chronic constipation
9. Use of aspirin and warfarin in combination without histamine H2 receptor antagonist (except cimetidine because of interaction with warfarin) or PPI
10. Dipyridamole as monotherapy for cardiovascular secondary prevention
11. Aspirin with a past history of peptic ulcer disease without histamine H2 receptor antagonist or proton pump inhibitor
12. Aspirin at dose $> 150\text{mg}$ day
13. Aspirin with no history of coronary, cerebral or peripheral vascular symptoms or occlusive event
14. Aspirin to treat dizziness not clearly attributable to cerebrovascular disease
15. Warfarin for first, uncomplicated deep venous thrombosis for > 6 months
16. Warfarin for first uncomplicated pulmonary embolus for > 12 months
17. Aspirin, clopidogrel, dipyridamole or warfarin with concurrent bleeding disorder
* *eGFR* $< 50\text{ml}/\text{min}$.

Central Nervous System and Psychotropic Drugs

1. Tricyclic antidepressants (TCA's) with dementia
2. TCA's with glaucoma
3. TCA's with cardiac conductive abnormalities
4. TCA's with constipation
5. TCA's with an opiate or calcium channel blocker
6. TCA's with prostatism or prior history of urinary retention
7. Long-term (i.e. > 1 month), long-acting benzodiazepines e.g. chlordiazepoxide, fluzepam, nitrazepam, chlorazepate and benzodiazepines with long-acting metabolites e.g. diazepam
8. Long-term (i.e. > 1 month) neuroleptics as long-term hypnotics
9. Long-term neuroleptics in those with parkinsonism
10. Phenothiazines in patients with epilepsy
11. Anticholinergics to treat extra-pyramidal side-effects of neuroleptic medications
12. Selective serotonin re-uptake inhibitors (SSRI's) with a history of clinically significant hyponatraemia
13. Prolonged use (> 1 week) of first generation antihistamines i.e. diphenhydramine, cyclizine, chlorpheniramine, promethazine

Gastrointestinal System

1. Diphenoxylate, loperamide or codeine phosphate for treatment of diarrhoea of unknown cause
2. Diphenoxylate, loperamide or codeine phosphate for treatment of severe infective gastroenteritis i.e. bloody diarrhoea, high fever or severe systemic toxicity
3. Prochlorperazine (Stemetil) or metoclopramide with Parkinsonism
4. PPI for peptic ulcer disease at full therapeutic dosage for > 8 weeks
5. Anticholinergic antispasmodic drugs with chronic constipation

Respiratory System

1. Theophylline as monotherapy for COPD
2. Systemic corticosteroids instead of inhaled corticosteroids for maintenance therapy in moderate-severe COPD
3. Nebulised ipratropium with glaucoma

Musculoskeletal System

1. Non-steroidal anti-inflammatory drug (NSAID) with history of peptic ulcer disease or GI bleeding, unless with concurrent H2 receptor antagonist, PPI or misoprostol
2. NSAID with moderate-severe hypertension
3. NSAID with heart failure
4. Long-term use of NSAID (>3 months) for symptom relief of mild osteoarthritis
5. Warfarin and NSAID together
6. NSAID with chronic renal failure*
7. Long-term corticosteroids (>3 months) as monotherapy for rheumatoid arthritis or osteoarthritis.
8. Long-term NSAID or colchicine for chronic treatment of gout where no contraindication to allopurinol

Urogenital System

1. Bladder antimuscarinic drugs with dementia
2. Antimuscarinic drugs with chronic glaucoma
3. Antimuscarinic drugs with chronic constipation
4. Antimuscarinic drugs with chronic prostatism
5. Alpha-blockers in males with frequent incontinence
6. Alpha-blockers with long-term urinary catheter

Endocrine System

1. Glibenclamide or chlorpropamide with type 2 DM
2. Beta-blockers in those with DM and frequent hypoglycaemic episodes
3. Oestrogens with a history of breast cancer or venous thromboembolism
4. Oestrogens without progestogen in patients with intact uterus

Drugs that adversely affect those prone to falls

1. Benzodiazepines
2. Neuroleptic drugs
3. First generation antihistamines
4. Vasodilator drugs with persistent postural hypotension
5. Long-term opiates

Analgesic Drugs

1. Use of long-term powerful opiates e.g. morphine or fentanyl as first line therapy for mild-moderate pain
2. Regular opiates for >2 weeks in those with chronic constipation without concurrent laxative
3. Long-term opiates in those with dementia unless indicated for palliative care or management of moderate/severe chronic pain syndrome

Duplicate Drug Classes

1. Any duplicate drug class prescription e.g. concurrent opiates, NSAID's, SSRI's, loop diuretics, ACE inhibitors

START Criteria

- Screening Tool to Alert doctors to Right Treatments
- 22 clinical criteria
- Used with STOPP criteria
- Correct treatments

START: Screening Tool to Alert doctors to Right i.e. appropriate, indicated Treatment.

These medications should be considered for people ≥ 65 years of age with the following conditions, where no contraindication to prescription exists.

Cardiovascular System

1. Warfarin in the presence of chronic atrial fibrillation
2. Aspirin in the presence of chronic atrial fibrillation, where warfarin is contraindicated, but not aspirin
3. Aspirin or clopidogrel with a history of atherosclerotic coronary, cerebral or peripheral vascular disease in patients with sinus rhythm
4. Antihypertensive therapy where systolic BP consistently >160 mmHg
5. Statin therapy with a history of coronary, cerebral or peripheral vascular disease, where functional status remains independent for activities of daily living and life expectancy is > 5 years
6. Angiotensin Converting Enzyme (ACE) inhibitor with chronic heart failure
7. ACE inhibitor following acute myocardial infarction
8. Beta-blocker with chronic stable angina

Respiratory System

1. Regular inhaled beta 2 agonist or anticholinergic for mild to moderate asthma or COPD
2. Regular inhaled corticosteroid for moderate-severe asthma or COPD, where predicted FEV1 $<50\%$
3. Home continuous oxygen with documented chronic type 1 respiratory failure or type 2 respiratory failure

Central Nervous System

1. L-DOPA in idiopathic Parkinson's disease with functional impairment and disability
2. Antidepressant with moderate-severe depressive symptoms

Gastrointestinal System

1. Proton Pump Inhibitor with severe GORD or peptic stricture requiring dilatation
2. Fibre supplement for chronic, symptomatic diverticular disease with constipation

Musculoskeletal System

1. Disease-modifying anti-rheumatic drug (DMARD) with active rheumatoid disease lasting > 12 weeks
2. Bisphosphonates in patients taking maintenance corticosteroid therapy
3. Calcium/Vitamin D supplement in patients with osteoporosis (fragility fracture, dorsal kyphosis)

Endocrine System

1. Metformin with type 2 diabetes +/- metabolic syndrome (in the absence of renal impairment*)
2. ACE inhibitor or ARB in diabetes with nephropathy i.e. proteinuria or microalbuminuria +/- renal impairment*
3. Antiplatelet therapy in diabetes mellitus with co-existing cardiovascular risk factors
4. Statin therapy in diabetes mellitus if co-existing major cardiovascular risk factors present

* eGFR <50 ml/min.


LESS IS MORE

Potentially Inappropriate Medications Defined by STOPP Criteria and the Risk of Adverse Drug Events in Older Hospitalized Patients

Hilary Hamilton, MB, MRCPI; Paul Gallagher, PhD, MRCPI; Cristin Ryan, PhD, MPSI; Stephen Byrne, PhD, MPSI; Denis O'Mahony, MD, FRCPI


- Prospectively over 4 months
- 600 patients
 - 329 ADEs in 158 patients (26.3%)
 - 66.6% contributed to admission
- STOPP criteria associated with avoidable ADE ($p < 0.001$)
- Beers criteria not associated with reduction ($p = 0.11$)

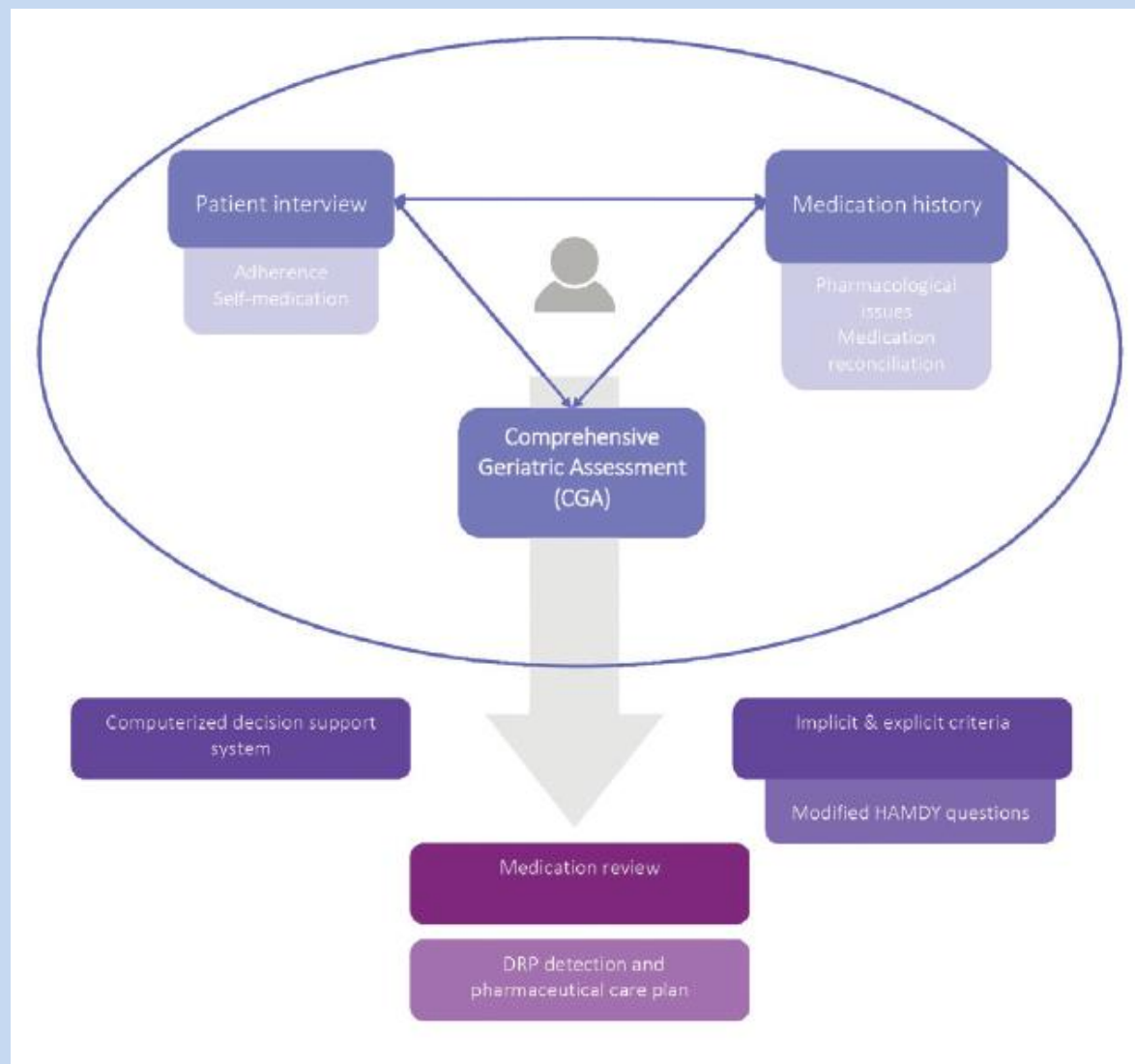
Medicine optimization strategy in an acute geriatric unit: The pharmacist in the geriatric team

Marta Gutiérrez-Valencia,^{1,2}  Mikel Izquierdo,^{1,3} Idoia Beobide-Telleria,⁴ Alexander Ferro-Uriguen,⁴ Javier Alonso-Renedo,^{2,5} Álvaro Casas-Herrero^{2,3,5} and Nicolás Martínez-Velilla^{2,3,5}


- Prospective study
- Oct 2016 - April 2017
- 234 patients \geq 75 years
- Pharmacist intervention
- Primary outcomes
 - Polypharmacy (\geq 5 drugs)
 - Hyperpolypharmacy (\geq 10 drugs)
 - Number of medications
 - Medication-related problems
 - STOPP/START criteria
 - Discharge

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Checklist for a medication review. Modified Hamdy questions

1. Is the indication for which the medication was originally prescribed still present (+ *STOPP criteria*) is it being effective?
2. Are there duplications in drug therapy? Are simplifications possible?
3. Does the regimen include drugs prescribed for an adverse reaction? (prescribing cascades) If so, can the original drug be withdrawn?
4. Is the present dosage likely to be subtherapeutic or toxic because of the patient's age and renal status? Are we using the correct dose and regimen?
5. Are any significant drug-drug or drug-illness interactions present?
6. Does the patient take their medications properly? Does he/she have any problem to do it?
7. Is the treatment duration correct?
8. Are there any untreated conditions? (+ *START criteria*)
9. Are there more cost-effectiveness alternatives?
10. Is the use of this drug adequate in the physical, mental and life expectancy conditions of the patient? (patient care goal)

Adapted from Hamdy RC et al. *South Med J* 1995; 88:534-8 and Arriola E., Beobide I. *Pharmacotherapeutic guide for geriatric patients. Gerontological Centers Gipuzkoa. Health and consumer Department, Basque Government. 2012*


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Results

- 234 patient
- Medication appropriateness
 - 2469 admission medications
 - 2344 discharge medications
- 802 drugs discontinued (32.5%)
- Improvement ($p \leq 0.001$)
 - Polypharmacy (-10.2%, 95% CI -15.3, -5.2)
 - Hyperpolypharmacy (-16.6%, 95% CI -22.3 -11.0)
 - Number of medications (-1.4, 95% CI -1.8, -1.0)
 - STOPP criteria (-19.2%, 95% CI -24.9, -13.6)
 - START criteria (-6.8%, 95% CI -10.1, -3.5)
 - Medication-related problems (-2.7, 95% CI, -2.9, -2.4)

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Conclusions

- A systematic pharmacist-led intervention at hospital admission with a comprehensive geriatric assessment was associated with a decrease in polypharmacy, medication-related problems, and potentially inappropriate prescribing

Anticholinergics

- Reduced clearance
- Tolerance
- Risk
 - Confusion
 - Dry mouth
 - Constipation
- Diphenhydramine may be used sparingly

Anticoagulants

- Warfarin
 - Interactions
 - Antibiotics
 - Anticonvulsants
 - Amiodarone
 - Diet – Vitamin K
 - NSAIDs – Aspirin
 - Monitoring
 - Fall/bleed risk
- Direct-oral anticoagulants
 - Preferred if appropriate
 - Still fall/bleed risk

Antidiabetic

- Goal HgA1c < 7%?
- NO GLYBURIDE!!!
- Titrate insulin carefully
- Watch for hypoglycemia
- Consider ADE
 - Thiazolidinediones
 - SGLT2 inhibitors

Practical Considerations

- Avoid medications to treat effects of other medications
- Ask about OTC medications
- Review lists regularly
- “Start low and go slow”
- Use Beers list, STOPP, and START criteria

Questions

