GERIATRICS PRIMER:
THE PHARMACISTS ROLE IN OPTIMIZING MEDICATION-RELATED OUTCOMES IN OLDER ADULTS

MD-ASCP 22nd Annual Mid-Atlantic Conference
August 7 – 9, 2015

Speakers

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Pharmacist Learning Objectives

- Define the pharmacist's role in identifying, prioritizing, resolving and preventing medication related problems in older adults across the continuum of care
- Describe considerations in medication dosing related to age-associated changes in pharmacokinetics/pharmacodynamics
- Use geriatric assessment skills/tools to identify and evaluate common medication induced geriatric syndromes
- Given a patient case, be able to apply principles of aging and rational medication use to identify and develop recommendations for medication related problems in an older adults

Pharmacy Technician Learning Objectives

- Review age-related changes and medication properties that increase the risk of medication-related problems in older adults
- Recognize potential adverse effects with medications commonly associated with geriatric syndromes in older adults
- Assist pharmacists in the identifying patients who may be experiencing medication related problems
- Given a patient case, apply strategies to promote wellness and disease prevention in older adults (ie. fall prevention)

Interactive Session

- Open your web browser and go to **http://rwpoll.com**
- Session ID: Will be located on the bottom of the screen

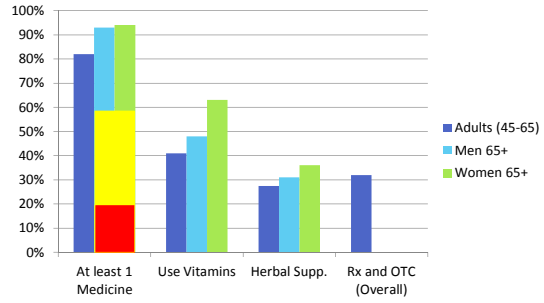
Which setting do you practice in?

1. Ambulatory Care
2. Community
3. Independent Consulting
4. Long-term care
5. Health system

What percentage of adults >65 are taking 5 or more medications?

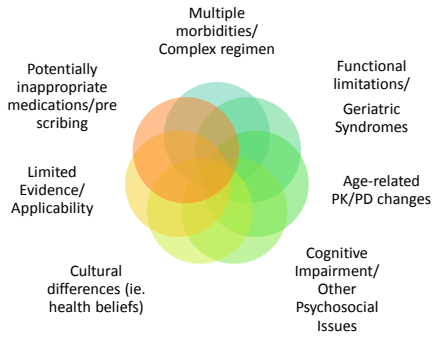
1. 20%
2. 60%
3. 80%
4. 100% in my world!

Slone Survey 2006: Patterns of Medication Use in the U.S.



Adapted from Figure 1. Use of medications during the preceding week among U.S. Adults. Patterns of medications use in the United States 2006: a report from the Slone Survey. Retrieved June 30, 2015 from, http://www.bu.edu/slone/files/2012/11/SloneSurveyReport2006.pdf

The Geriatric Patient: Complex Encounter



What is the Pharmacist's role in Caring for the Geriatric Patient?

Pharmacists Value as part of the Geriatrics Team

Lee JK, Slack MK, Martin J, Ehrman C, Chisholm-Burns M. Geriatric patient care by U.S. pharmacists in healthcare teams: systematic review and meta-analyses. *J Am Geriatr Soc*. 2013;61:1119-1127.

Baseline Competencies of a Geriatric Pharmacist

Attitudes and Values

- Awareness of cultural influences on age
- Ability to function within an interdisciplinary team
- Compassion for older adults and respect for their autonomy

Knowledge

- Pharmacokinetic/Pharmacodynamic changes with age
- Common geriatric syndromes (cause, presentation, treatment and prevention)
- Atypical presentation/Common diseases and disorders in older adults

Skills

- Perform basic geriatric assessment and drug therapy monitoring
- Interpret physical, laboratory, and diagnostic test results
- Provide medications and wellness counseling and education

Odegard PS, Breslow RM, Koronkowski MJ, Williams BR, Hudgins GA. Geriatric Pharmacy Education: A Strategic Plan for the Future. *American Journal of Pharmaceutical Education*. 2007;71(3):47.

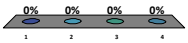
"A baseline minimum competency in geriatrics is a requirement for *ALL* pharmacists to assure provision of effective pharmaceutical care to this growing population"[1]

1. Odegard PS, Breslow RM, Koronkowski MJ, Williams BR, Hudgins GA. Geriatric Pharmacy Education: A Strategic Plan for the Future. *American Journal of Pharmaceutical Education*. 2007;71(3):47.

Where do Certified Geriatric Pharmacists rank among National Board Certifications?

1. 1st
2. 2nd
3. 3rd
4. 4th

2500 CGPs as of 2014, second only to Board Certified Pharmacotherapy Specialists



Where do Certified Geriatric Pharmacists rank among National Board Certifications?

1st	• Board Certified Pharmacotherapy
2nd	• Certified Geriatric Pharmacist
3rd	• Board Certified Ambulatory Care
4th	• Board Certified Oncology

Board of Pharmaceutical Specialties Fact Sheets. http://www.bpsweb.org/news/factsheet.cfm
Commission for Certification in Geriatric Pharmacy.
CCGP Annual Meeting 2014 http://www.ccgp.org/resources/policies-and-documents

Pharmacists' Patient Care Process: Collaborate – Communicate – Document

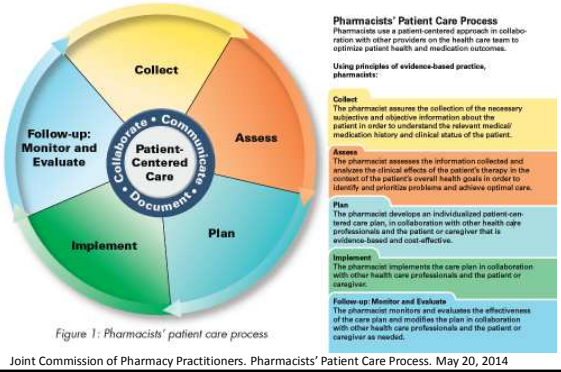


Figure 1: Pharmacists' patient care process

Joint Commission of Pharmacy Practitioners. Pharmacists' Patient Care Process. May 20, 2014

Meet Mr. Samuel

- Mr. Samuel is a 76 year-old man with a past medical history significant for hypertension, osteoarthritis, benign prostatic hypertrophy (BPH), and diabetes. After having a fall earlier this year, he uses a cane to ambulate.

Prescribed Medications:

Aspirin 81 mg tablet once daily

HCTZ 50mg once daily

Insulin Glargine 50 units at bedtime

Oxycodone/APAP 5/325mg tablet three times daily

Terazosin 1 mg capsule at bedtime

Over-the-counter

Advil PM one capsule at bedtime PRN (if he feels any aches at bedtime)

Case Question

- What additional information would be useful to evaluate appropriateness of therapy?

Collecting Additional Information

- Past medical history (eg. geriatric syndromes)
- Medication History (Hx MRPs, ADRs)
- Review of systems (clinical signs/symptoms)
- Laboratory data
- Vital signs
- Geriatric Assessment
- Other??

Templates are very useful to ensure complete data collection

In this presentation we will review/apply…

Clinically significant age-related changes

Common medication-induced geriatric syndromes

Tools to evaluate appropriateness of medication use in older adults

Strategies to optimize regimens in older adults with multimorbidities

Apply principles of geriatric drug therapy to a patient case scenario

Principles of Aging

The Aging Process

- Heterogenicity
- Chronologic age is not predictive of "physiologic age"

Physiologic Changes of Aging

- Affect drug pharmacokinetics and pharmacodynamics
- Use this knowledge but still consider the individual patient
- Apply to decisions for appropriate medication choices and dosing considerations

PK/PD Changes with Aging

<u>Pharmacokinetics</u>

- How the body affects medication
  - Absorption, Distribution, Metabolism, Excretion

Most significant changes are in renal excretion.

<u>Pharmacodynamics</u>

- How the medication affects the body

The Importance of Recognizing Physiologic Changes with Aging

Avorn,J. JAMA 2010;304 (14): 1606-1607

"Changes in drug metabolism, excretion and receptor sensitivity, along with a higher prevalence of comorbidity and potentially interacting drugs, mean that elderly patients are far more likely to experience adverse effects from their prescribed regimens, causing considerable morbidity and mortality".

Gastrointestinal changes can affect absorption

- Decreased production of gastric acid
- Decreased blood flow to GI tract
- Slowing of transit through GI tract
- ↓ Active transport & bioavailability for some drugs
- ↓ First pass effect & ↑ bioavailability for some drugs (propranolol)

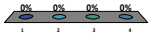
Hutchinson LC, O'Brien DE. Changes in pharmacokinetics and pharmacodynamics in the elderly patient. *J Pharma Pract*. 2007;20(1):4–12

Transdermal absorption

- Decreased skin hydration
- Decreased surface lipids
- Decreased peripheral circulation
- Possible decreased absorption from transdermal patches

In an older adult, which of the following changes is expected with calcium absorption?

1. Increased due to higher pH
2. Increased due to lower pH
3. Decreased due to higher pH
4. No clinically significant change due to passive absorption



Body Composition / Drug Distribution

Age-related changes in body composition

- ↓ Total body water
- ↓ Lean body mass and skeletal muscle
- ↓ Production of creatinine
- ↑ % Body fat

Hutchinson LC, O'Brien DE. Changes in pharmacokinetics and pharmacodynamics in the elderly patient. *J Pharma Pract*. 2007;20(1):4–12

Body Composition / Drug Distribution

- ↓ Vd (Volume of distribution) and ↑ plasma concentration of water-soluble drugs
  - Digoxin, lithium, alcohol
- ↑ Vd and ↑ T ½ for fat soluble-drugs
  - Takes longer to reach steady state
  - Diazepam, verapamil, amiodarone
- **↓↔ Serum albumin**
  - Decreased serum albumin and ↑ free fraction of highly protein bound drugs

(Hutchinson LC, et al. 2007)

Hepatic Metabolism

- Decreased liver mass and blood flow
- ↓ Clearance and ↑ T ½ (half life) for some oxidatively metabolized drugs
- ↓ Clearance and ↑ T ½ of drugs with high hepatic extraction ratios

(Hutchinson LC, et al. 2007)

Renal Excretion

- ↓ Glomerular filtration rate
- ↓ Renal blood flow
- ↓ Tubular secretory function
- ↓ Renal mass

- ↓ Clearance and ↑ T ½ of renally eliminated drugs and active metabolites

(Hutchinson, et al. 2007)

Renal Excretion

- Amantadine
- Aminoglycosides
- Digoxin
- Nitrofurantoin
- Gabapentin
- Normeperidine
- Lithium
- Vancomycin

Hepatic Metabolism

- Diazepam
- Lidocaine
- Verapamil
- Imipramine
- Propranolol
- Morphine

(Starner, 2008)(Hutchinson, 2010)

Pharmacodynamics

- Not as well understood as pharmacokinetics
- Altered drug response or "sensitivities"
- More variable than pharmacokinetics
- Changes are seen in:
  - Numbers of receptors
  - Sensitivity (affinity) of receptors
  - Post receptor alterations
  - Increased sensitivity to anticholinergic effects
  - Homeostatic (counter-regulatory) mechanisms

(ex. Orthostatic hypotension with vasodilators)

(Starner, 2008)(Hutchinson, 2010)

Pharmacodynamics

Increased Sensitivity	Decreased Sensitivity
Benzodiazepines	β - adrenergic agonists
Anticoagulants	β - adrenergic antagonists
Antipsychotics	Vasodilators (decreased compensatory mechanism)
Sedative hypnotics	
Opioid analgesics	

(Starner, 2008)(Hutchinson, 2010)

Interpreting Signs and Symptoms in a geriatric patient is a complex process.

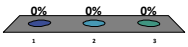
Need to differentiate between:

- Normal progression of chronic disease
- Atypical disease presentation
- Medication induced "disease"
- Geriatric patient may not show classic symptoms for some common diseases

Patient CM – in skilled care facility
- ❑OAB - New order for tolterodine
- ❑Insomnia - New order for eszopidone

Are the new diagnoses of OAB and Insomnia…?

1. Normal disease progression
2. Atypical disease presentation
3. A medication induced disease



Interpreting Signs and Symptoms in a geriatric patient is a complex process.

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

Gurwitz J, Monane M, Monane S, Avorn J. *Brown University Long-term Care Quality Letter* 1995 Polyphamacy. In: MorrisJN, Lipsitz LA, Murphy K, Bellville-Taylor P, eds. *Quality Care in the Nursing Home*. St. Louis, MO: Mosby-Year Book; 1997:14-25

Common Coexisting Conditions

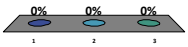
- Hypertension
- Renal Impairment
- Ischemic Heart Disease
- Osteoporosis
- Alzheimer's Disease
- Chronic Constipation
- Urinary Incontinence
- Art/Venous Insufficiency
- Diabetes
- Osteoarthritis
- Heart Failure
- Frail Gait
- Sleep Disturbance
- Cognitive Impairment
- Depression
- Chronic pain

Interpreting Signs and Symptoms in a geriatric patient is a complex process.

- Geriatric patient may not show classic symptoms for some common diseases
- Take for example: Respiratory Infection
- What are some common signs of pneumonia in a younger population?

An older adult with pneumonia who dose not present with symptoms of severe cough and elevated temperature is an example of…?

1. Normal disease progression
2. Atypical disease presentation
3. A medication induced disease



Atypical Disease Presentation

Acute myocardial infarction
- weakness
- confusion
- syncope

Respiratory infection
- lethargy
- confusion
- anorexia

Congestive Heart Failure
- lethargy
- restlessness
- confusion

UTI
- incontinence
- nausea/abdominal pain
- confusion

Geriatric Syndromes – The I's of Geriatrics

- Immobility - Inanition (malnutrition)
- Intellectual impairment - Isolation
- Impaction - Impotence
- Incontinence - Impaired Senses
- Immunodeficiency - Infection
- Instability - Insomnia

Watch for Signs of Medication Related Problems

- Confusion
- Depression
- Insomnia
- Parkinson's-like movements
- Loss of appetite
- **New onset of symptoms**

Falls
Delirium
Incontinence
Weakness or lethargy
Changes in speech

In Summary

To identify medication related problems pharmacists/technicians should:

Be aware of typical signs of normal disease progression.

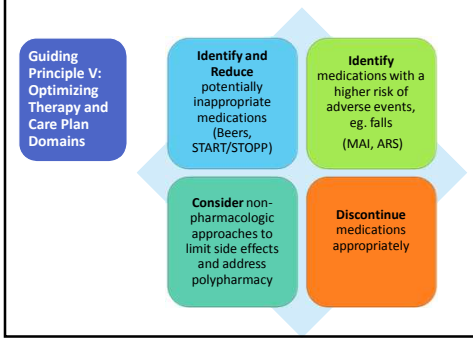
Recognize possibility of atypical disease presentation, but

Always keep in mind the possibility that a new sign or symptom could be the result of a medication.

Tools and Evidence-Based Strategies

Guiding Principles for the Care of Older Adults with Multimorbidities

American Geriatrics Society Expert Panel on the Care of Older Adults with Multimorbidity. Guiding principles for the care of older adults with multimorbidity: an approach for clinicians. J Am Geriatr Soc. 2012 Oct;60(10):E1-25.



Medication-Related Problems (MRPs) in the Elderly: Questions to Ask/Factors to Consider

Prescriber Level	Does the electronic record match what the patient is taking?
	Is this medication appropriate?
	Have medications been adjusted based on age/renal function?
	Does the patient need additional therapy to treat an untreated condition?
Medication Factors	Does the patient present with any signs/symptoms of ADRs, DDIs or geriatric syndromes?
	Is the patient receiving multiple drugs for a condition when a fewer drugs will suffice?
Patient Level	Is the patient adherent to their medications?
	Does the patient have trouble remembering when or how to take the medication?
	Are treatment goals being met?

Simonson W, Feinberg J. Medication-related problems in the elderly: Defining the issues and identifying solutions. Drugs Aging 2005;22(7):559-569

Medications Commonly Implicated in MRPs in Older Adults

Adverse Events
- Anticoagulants
- Digoxin
- Antihyperglycemics
- Diuretics
- Analgesics
- Psychotropics

Prescribing Cascades
- Antibiotics
- Antimuscarinics
- Sedatives
- Diuretics
- ACE Inhibitors
- Cholinesterase Inhibitors

Inappropriate prescribing
- Amiodarone
- Antihistamines
- Antipsychotics
- Benzodiazepines
- NSAIDS
- Nitrofurantoin

Geriatric Assessment/Screening Tools

Medication Appropriateness Index

Questions rated for each medication as:
appropriate, marginally appropriate or inappropriate

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

Hanlon JT, Schmader KE, Samsa GP, et al. A method for assessing drug therapy appropriateness. *J Clin Epidemiol.* 1992;45:1045-1051.

American Geriatrics Society Beers Criteria*

Classifies *"potentially inappropriate"* medications (PIMs) in older adults by:

- Organ system/Category of Drugs
- Disease/Geriatric Syndrome
- Specific Drugs to use with caution

*Updated Criteria to be released Summer 2015

AGS Beers Criteria for potentially inappropriate medication use in older adults. American Geriatrics Society. http://www.americangeriatrics.org/files/documents/beers/PrintableBeersPocketCard.pdf

START-ing/STOPP-ing Medications

START Criteria

Screening **T**ool to **A**lert doctors to **R**ight **T**reatment

- Evidence-based tool to detect therapeutic omissions in older adults

STOPP Criteria

Screening **T**ool of **O**lder **P**ersons potentially inappropriate **P**rescriptions

- Recommends appropriate therapeutic alternatives

PL Detail-Document, STARTing and STOPPing Medications in the Elderly. Pharmacist's Letter/Prescriber's Letter. September 2011.

The Anticholinergic Risk Scale*

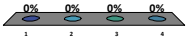
3 Points	2 Points	1 Point
• Amitriptyline	• Amantadine	• Carbidopa-levodopa
• Chlorpheniramine	• Baclofen	• Entacapone
• Diphenhydramine	• Cetirizine	• Mirtazapine
• Hydroxyzine	• Cyclobenzaprine	• Paroxetine
• Imipramine	• Desipramine	• Ranitidine
• Meclizine	• Loperamine	• Selegeline
• Oxybutynin	• Loratadine	• Trazadone
• Promethazine	• Nortriptyline	• Quietiapine
	• Tolterodine	• Ziprasidone

*** Identify medications, add total number of points to calculate score**

Excerpt from Table 4. Anticholinergic Risk Scale[a]
Rudolph JL, Salow MJ, Angelini MC, McGlinchey RE. The Anticholinergic Risk Scale and Anticholinergic Adverse Effects in Older Persons. *Arch Intern Med.* 2008;168(5):508-513. doi:10.1001/archinternmed.2007.106.

Which of the following screening tools would you use to assess appropriateness of Mr. Samuel's medication regimen?

1. Beers List
2. Start Criteria
3. STOPP Criteria
4. ARS



It Depends…

Beers	• Potentially inappropriate medications
START	• Additional medications indicated
STOPP	• Identifies more appropriate therapeutic alternatives
ARS	• Specifically focused on potentially inappropriate/over use of anticholinergic agents

Limitations of Tools

- Do not address all potential drug interactions
- Appropriate dosing for renal impairment
- Indicate when the medication IS appropriate

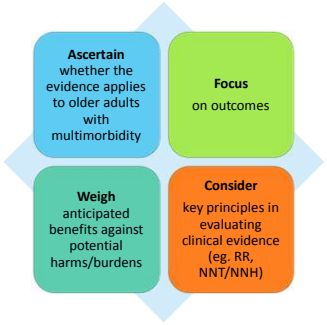
"All prescribing criteria have limitations and do not substitute for good clinical decision making…"

Medicinewise New. September 2013. NPS Medicinewise Professional

Guiding Principles for the Care of Older Adults with Multimorbidities

American Geriatrics Society Expert Panel on the Care of Older Adults with Multimorbidity. Guiding principles for the care of older adults with multimorbidity: an approach for clinicians. J Am Geriatr Soc. 2012 Oct;60(10):E1-25.

Guiding Principle II: Interpreting the Evidence Domain



"Recognizing the limitations of the evidence base, interpret and apply the medical literature specifically to older adults with multimorbidity"

Relevance of Clinical Practice Guidelines to Older Adults with Multimorbidities

- Key Considerations:
  - Type of patient considered – older adult health status
    - # of comorbidities, cognitive and functional status
  - Potential disease/drug treatment interactions with compliance to guidelines
  - Quality of evidence
  - Specific recommendations for older adults, older adults with multiple conditions
  - Time needed to treat to benefit in the context of life expectancy

Boyd CM, Darer J, Boult C, Fried LP, Boult L, Wu AW. Clinical Practice Guidelines and Quality of Care for Older Patients With Multiple Comorbid Diseases: Implications for Pay for Performance. *JAMA*. 2005;294(6):716-724. doi:10.1001/jama.294.6.716.

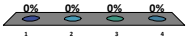
ADA/AGS 2012 Consensus Report: Diabetes in Older Adults

Patient Health Status	Rationale	Reasonable A1C Goal	Blood Pressure	Lipids
Healthy Few chronic illnesses, intact functional status and cognition	Long remaining life expectancy	< 7.5%	< 140/80	Statin
Complex/ Intermediate Multimorbidity, impaired 2+ instrumental ADL or mild-mod cognitive impairment	Intermediate life expectancy, high treatment burden, risk hypoglycemia, fall risk	<8.0%	< 140/80	Statin
Very complex/ Poor health Long-term care or end-stage chronic illnesses, dependent 2+ ADL, mod-severe cognitive impairment	Limited life expectancy makes benefit uncertain	<8.5%	< 150/90	Consider benefit (secondary >primary)

Adapted from Table 1. Framework for considering treatment goals for glycemia, blood pressure, and dyslipidemia in older adults with diabetes. Diabetes in Older Adults: A Consensus Report. *JAGS*, 60: 2342–2356.

Which of the following should be Mr. Samuel's A1C goal at this time?

1. < 7%
2. < 7.5%
3. < 8.0%
4. < 8.5%



Mr. Samuel Revisited

- Mr. Samuel is a 76 year-old man with a past medical history significant for hypertension, osteoarthritis, benign prostatic hypertrophy (BPH), and diabetes. After having a fall earlier this year, he uses a cane to ambulate.

Prescribed Medications:

Aspirin 81 mg tablet once daily

HCTZ 50mg once daily

Insulin Glargine 50 units at bedtime

Oxycodone/APAP 5/325mg tablet three times daily

Terazosin 1 mg capsule at bedtime

Over-the-counter

Advil PM one capsule at bedtime PRN (if he feels any aches at bedtime)

In Summary

Use of geriatric assessment tools may be tailored to a specific setting/patient population to assess appropriateness of pharmacotherapy (eg. medications indicated vs. inappropriate)

Clinical practice guidelines provide a framework for managing individual disease states but may have limited applicability/feasibility in older adults with multimorbidity

Screening tools and clinical practice guidelines should be used in combination with guiding principles for the care of older adults with multimorbidity (eg. patient goals, life expectancy, cognition)

Case Review – Mr. Samuel

Mr. Samuel – ED Visit

Mr. Samuel was admitted to the hospital by the ED after having a fall at home. The patient admits to having more dizziness and episodes of hypoglycemic events 2-3x/week OR low readings 70, 80. He admits to omitting doses of insulin.

Vital Signs:
Sitting BP: 146/84 mmHg, pulse 76
Standing BP: 130/70 mmHg, pulse 88

Most recent labs:
A1C= 6.9, Scr= 2.1

Physical Exam/Geriatric Assessment:
Gen: Dizziness, mild gait disturbance
Timed Up and Go Score is 18 seconds

What are Mr. Samuel's risk factors for MRPs and geriatric syndromes?

Mr. Samuel – Short Term Rehab Admission

- Today, Mr. Samuel is being admitted to a short term rehab facility after being hospitalized for a fall. In addition to his chronic medications, new medications initiated upon discharge include: amlodipine 10mg tablet daily for blood pressure management and zolpidem 10mg tablet at bedtime, as needed for insomnia

Case Questions

- Was his outpatient adherence considered prior to initiating a new antihypertensive?
- Which problem would be your top priority to address at this time?
- Make at least 1 recommendation to adjust Mr. Samuel's medication regimen (also consider agents that should be START-ed)
- What other professionals would become involved?

Pharmacist and Technician Resources

Geriatric Pharmacist Resources

- ASCP Geriatrics Practice Resources
  - https://www.ascp.com/practice-resources
- CCGP: Key Resources in Geriatric Pharmacotherapy
  - http://www.ccgp.org/geripharm
- App Corner:
  - Alzheimer's Association
    - Alzheimer's Disease Pocket Card
  - American Geriatrics Society
    - iGeriatrics
    - MCC GEMS
  - US Preventive Services Task Force Recommendations
    - ePSS

Pharmacist/Technician Education Resources

New Drug Facts Label

http://www.fda.gov/downloads/Drugs/ResourcesForYou/Consumers/

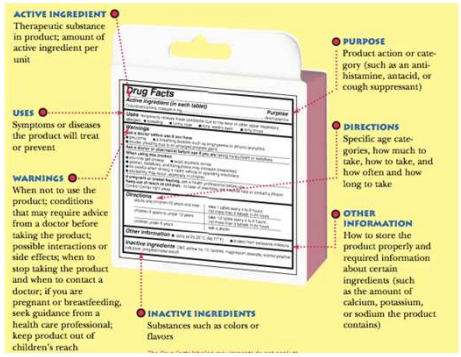
Ten Medicines Older Adults Should Avoid or Use with Caution

www.healthinaging.org

STEADI Toolkit

http://www.cdc.gov/homeandrecreationalsafety/Falls/steadi/about.html

The New Drug Facts Label



The new over-the-counter medicine label. http://www.fda.gov/downloads/Drugs/ResourcesForYou/Consumers/BuyingUsingMedicineSafely/UnderstandingOver-the-CounterMedicines/UCM349215.pdf

Healthinaging.org

Trusted Information. Better Care.

Expert information from Healthcare Professionals Who Specialize in the Care of Older Adults

Ten Medications Older Adults Should Avoid or Use with Caution

Because older adults often experience chronic health conditions that require treatment with multiple medications, there is a greater likelihood of experiencing unwanted drug side effects. Older people can also be more sensitive to certain medications. To help you make better informed decisions about your medications, and to lower your chances of overmedication and serious drug reactions, the American Geriatrics Society Health in Aging Foundation recommends that older people be cautious about using the following types of medications, including some that can be purchased without a prescription (over-the-counter).

- *If you are taking any of these medications, talk to your healthcare provider or pharmacist.*
- *Do not stop taking any medication without first talking to your healthcare provider.*

Medication	Reasons

Medications and Older Adults. www.healthinaging.org

STEADI Stopping Elderly Accidents, Deaths & Injuries

CDC's evidence-based fall prevention toolkit for healthcare providers and consumer education

- **ASK** patients if they've fallen in the past year, feel unsteady, or worry about falling.
- **REVIEW** medications and stop, switch, or reduce the dose of prescriptions that increase fall risk.
- **RECOMMEND** Vitamin D supplements of at least 800 IU/day with calcium.

Centers for Disease Control and Prevention, National Center for Injury Prevention and Control, Division of Unintentional Injury Prevention. Stopping elderly accidents, deaths, & injuries tool kit. http://www.cdc.gov/homeandrecreationalsafety/Falls/steadi/about.html.

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