Geriatrics PRN Focus Session—Geriatric Assessment: A Focus on Medications and Falls

Activity No. 0217-0000-11-083-L01-P (Knowledge-Based Activity)

Monday, October 17
3:45 p.m.–5:45 p.m.
Convention Center: Spirit of Pittsburgh Ballroom B

Moderator: Olga Hilas, Pharm.D., BCPS, CGP
Associate Clinical Professor, Clinical Pharmacy Practice, St. John's University, Queens, New York

Agenda

3:45 p.m.	Geriatric Assessment: A Focus on Medications *Joseph T. Hanlon, Pharm.D., M.S., BCPS* Professor, Department of Medicine, University of Pittsburgh, Pittsburgh, Pennsylvania
4:45 p.m.	Geriatric Assessment: A Focus on Falls *Patricia W. Slattum, Pharm.D., Ph.D.* Associate Professor; Director, Geriatric Pharmacotherapy Program; Vice Chair, Graduate Studies, Virginia Commonwealth University, Richmond, Virginia

Faculty Conflict of Interest Disclosures

Joseph T. Hanlon: no conflicts to disclose.
Patricia W. Slattum: no conflicts to disclose.

Learning Objectives

1. Discuss the considerations for medication use in the elderly.
2. Determine the appropriateness of a medication regimen in the elderly.
3. Perform appropriate medication therapy reviews for elderly patients.
4. Develop appropriate medication action plans for elderly patients.
5. Discuss the risk factors for falls in the elderly.
6. Describe the consequences of falls in the elderly.
7. Determine appropriate nonpharmacologic interventions for high-risk patients.
8. Determine appropriate pharmacologic interventions for high-risk patients.

Self-Assessment Questions

Self-assessment questions are available online at *www.accp.com/am*

Geriatric Assessment: A Focus on Medications

Joseph T. Hanlon, Pharm.D., M.S., BCPS

Professor, Departments of Medicine (Geriatrics), Pharmacy and Therapeutics, and Epidemiology

University of Pittsburgh

and

Health Scientist, Pittsburgh VA

CHERP and GRECC

Topics for Discussion*

- Describe the principles and important components of geriatric assessment including the medication history.
- Perform medication therapy reviews for older adults
- Develop and enact appropriate medication action plans for older adults.

* Some slides courtesy of a few friends-

Thank you Demetra Antimisiaris PharmD,

Harvey Cohen, MD and Christine Ruby, PharmD !

Comprehensive Geriatric Assessment

ELEMENTS	EVALUATION
Physical	Medical diagnosis, geriatric syndromes, nutrition, drugs, perception
Psychological	Cognition, depression, values
Socio-Economic	Social skills, financial resources, support network, caregivers
Environmental	Home safety and adequacy
Functional Status	ADL, IADL, mobility

Principles of Geriatric Assessment

- Age per se is not a medical problem, it merely raises the statistical likelihood of certain events
- Multiple medical conditions and medications are the norm
- Certain syndromes/conditions (e.g., falls, dementia) are confined to older adults
- Vague or Nonspecific Symptoms (altered presentation)
- Medication-related adverse patient events are common and often preventable (i.e., due to medication errors)
- Maximize functional independence
- Assist in matching needs to resources

Steps Involved In Providing Pharmaceutical Care for Ambulatory Older Patients

- Take Patient Medication History
- Conduct Drug Regimen Review
- Document Problems & Formulate Therapeutic Plan
- Consult with Physician Regarding Problems/Concerns
- Review Any Medication Changes, Provide Counseling and Consider Compliance Aides
- Document Interventions and Monitor Patient Progress

Potential Difficulties in Taking Histories from the Elderly

- Communication (impaired hearing, vision)
- Underreporting (health beliefs)
- Reliance on Caregiver for History
- Lack of Medication Vials
- Lack of Standardized Approach
- Lack of Training

TIMER©: Tool to Improve Medications in the Elderly via Review

Confirm all current medications, including Prescription, Herbal remedies, Vitamins and OTCs, and how patients are taking them.

A. COST AND COVERAGE *(generic and therapeutic substitution)*

Determine if patient has Rx insurance and consider formulary considerations. Upon review, determine if a lower-cost product would be appropriate.

B. ADHERENCE *(Determine adherence by asking screening questions and reviewing dispensing records)*

1. SCREENING Select from: Never; Rarely; Sometimes; Often; Very often

1. "Everyone forgets to take their medicines. How often does this happen to you?"
2. "Everyone says that they miss out a dose of their medication or adjust it to suit their own needs. "How often do you do this?" "Why?"
3. "Has your physician told you to change how you take any of your medications?"
4. "Has your physician told you to stop taking any of your medications?"

2. RECOMMENDATIONS

1. If forgetful, consider adherence aids (medication boxes).
2. If intentional nonadherence, or noncompliance, determine cause and promote patient education.
3. Confirm whether the patient has stopped taking any medications without the knowledge of the physician.

References: Horne R, Weinman J. J Psychosom Res. 1999 Dec; 47(6):555-67. Morisky EE, Green LW, Levine DM. Med. Care 1986:24:67-74.

C. SAFETY *(Determine if there are any adverse effects or potentially inappropriate medications)*

1. ADVERSE DRUG EVENTS

"Describe what side effects, unwanted reactions, or other problems you may have experienced from medications taken in the last six months."

2. NEW OR PROBLEMATIC SCREENING FOR SYMPTOMOLOGY

Determine if any symptom is possibly attributable to allergy, side effect or adverse drug events:

a. "Tell me about any symptoms that you may have been experiencing in the past few months."

b. "In the past few months have you experienced any of the following?"

If symptoms are present, evaluate if any may be related to medications the patient is taking.

Reference: Weingart SN, et al. Arch Intern Med. 2005 Jan 24; 165(2):234-40.

Choose from 10 common symptoms due to adverse effects:

- Headache/pain
- Hives/rash
- Problems with sleep
- Dizziness/balance problems
- Incontinence/urinating problems
- Muscle aches
- Fatigue
- Change in mood
- Stomach or gastrointestinal problems
- Sexual problems

3. SCREENING FOR POTENTIALLY INAPPROPRIATE MEDICATION OR COMBINATIONS

DRUG INTERACTION

Review the patient's medications for potential drug interactions, including these top drug interactions based on prevalence or risk of adverse event .

Object drug	Precipitant Drug	Prevalence[1] (1-10 scale) 1 is most prevalent
Warfarin	NSAIDs	1
Warfarin	Sulfa drugs	2
Warfarin	Macrolides	3
Warfarin	Quinolones	4
Warfarin	Phenytoin	5
ACE inhibitors	Potassium supplements	6
ACE inhibitors	Spironolactone	7
Digoxin	Amiodarone	8
Digoxin	Verapamil	9
Theophylline	Quinolones	10

Reference: [1]M3 Project (Multidisciplinary Medication Management Project), Lesher, BA, "Clinically Important Drug Reactions", Prescriber's Letter 2004 Jun, 11: Detail-Document #: 200601

Object drug	Precipitant Drug	Risk of Adverse Event[2] (1-10 scale) 10 is greatest risk
Carbamazepine	Propoxyphene	8.4
Thiopurines	Allopurinol	8.0
Warfarin	Sulfinpyrazone	7.2
Benzodiazepines	Azole antifungal agents	7.0
Pimozide	Macrolide antibiotics	6.0
Nitrates	Sildenafil	6.0
Warfarin	Fibric acids	6.0
Warfarin	Cimetidine	6.0
Ergot alkaloids	Macrolide antibiotics	5.8
Pimozide	Azole antifungal agents	5.6
Anticoagulants	Salicylates	4.8
Anticoagulants	Thyroid hormones	5.6

Reference: [2]Malone DC, et al. J Am Pharm Assoc (Wash DC). 2004 Mar-Apr; 44(2):142-51.

DRUGS TO BE AVOIDED IN THE ELDERLY

Review the list "Drugs to be Avoided in the Elderly" (AVAILABLE UPON REQUEST FROM AUTHORS)

DUPLICATION SCREENING

Review the patient's medications, including OTCs to confirm there is no inappropriate therapeutic duplication, paying particular attention to multiple narcotics, multiple NSAIDS and combination products with analgesics. Ensure that duplicate usage is consistent with practice.

Reference: PCM and PSC data

RECOMMENDATION

If any safety indicator is present,

(especially important if it is a change within the last 6 months) action is required.

Potential Course of Action

1. Discontinue drug and recommend alternate drug therapy to physician.
2. Educate patient about what to watch for and what action to take

Comparison of 2007 with Proposed 2012 APhA MTM Certificate Training (1)

2007 Inaugural MTM Modules

- Primer on geriatric medication management considerations
  - Physiology of aging
  - PK changes
  - PD changes
  - Altered drug elimination
  - Geriatric syndromes
  - Elder Abuse
  - Assessment Tools

2012 Updated MTM Modules

- Major overhaul of the skills and knowledge section
  - expanded and includes references to the large volume of literature published on geriatric pharmacotherapy since 2007
- Additional sections on
  - Goals of care
  - Total drug burden
  - Risk/Benefit analysis

Comparison of 2007 with Proposed 2012 APhA MTM Certificate Training (2)

2007

- Introducing pharmacist to MTM
- Discussion of demonstration projects
- Possibilities for future practice models and opportunities
- Skills and knowledge section
  - How to approach MTM step by step
  - Goals of disease management/ adherence focused
- Compartmentalized discussion of geriatric pharmacotherapy concepts (approximately 10 pages)

2012

- Stronger emphasis on geriatric MTM skills
- Larger volume of information and materials
- Outcomes and demonstration project: impact on reimbursement
  - Update on practice models
- Skills and knowledge section
  - Compare/contrast adult vs geriatric MTM skills
  - More geri-patient specific to reflect the increasing geriatric (the old-old) patient cohort
  - More specific medication problems common to elders

PHARMACIST MEDICATION ASSESSMENT

Patient Code/Initials:_____ Age_____ Ht_____ Wt (lb)_____ Wt (lb)(1 yr ago)_____ If wt. loss Reason?_____
Date:_____/_____/_____ Pharmacist:_____ Visit Reason _____Communication barriers:_____

Medications: (Record for all Rx, OTC and herbal Medications)

	Name of Medication (length of time on)	Strength	Dosage Form/ Appear	Directions PRN freq	Indication(s)	Effective (Y/N?) (Why not?)	Adherence (Y/N?) Reason?	Adverse Effects (Describe)
Med 1:								
Med 2:								
Med 3:								
Med 4:								
Med 5:								
Med 6:								
Med 7:								
Med 8:								
Med 9:								
Med 10:								
Med 11:								
Med 12:								
Med 13:								
Med 14:								

(If more than 14 meds, use second sheet)

Who administers/assists with Meds?_____ Assistive device?_____
Does the patient see multiple MD's?_____(Y/N) technique OK? _____
Does the patient use multiple pharmacies?_____(Y/N)
Is the patient able to read prescription label (s)?_____(Y/N)
Is the patient able to open childproof caps?_____(Y/N)
Does the patient receive or need assistance with meds?_____(Y/N)
If yes, please describe_____

History of Med Allergies?_____(Y/N) Med(s) Involved:_____ _____ _____
Alcohol_____(Y/N) 1: Aspirin 4: Penicillin
Smoking_____(Y/N) 2: Sulfas 5: Other (specify):
Caffeine_____(Y/N) 3: Codeine _____

Adverse Effects (record any adverse/side effects related to past drug therapy).

Medication Involved	Description of Reaction

How to Effectively Take a Medication History

Ask open-ended questions:

- Do you take any prescription, over-the-counter or dietary supplements?
- Who manages your medications?
- What is your "system" for taking your medications? (Use a pillbox?)

For each medication show dosage form and ask:

- What is the name of this tablet or capsule?
- How do you take this medicine? Or What time of the day do you take this medicine?
- What is your understanding about how this medicine may help you?
- How helpful do you believe this medication is?

Items to Observe/Determine From the Medication Vials

- Date filled
- Quantity filled/Quantity remaining in the vial
- More than one physician
- More than one pharmacy
- More than one type of medication in the vial
- Ability to open safety caps, read label

Reliable/Valid Approach to Discover Potential Adverse Drug Events in Older Adults

- Have you had any side effects, unwanted reactions or other problems from any of your medications?

  Chrischilles EA, et al. Ann Intern Med 1992;157: 2089–2096

- Also probe for drug allergies (Type B ADRs) due to common drugs (e.g., sulfa, codeine, penicillin, etc)

Reliable/Valid Methods to Detect Medication Adherence Problems

- Assess medication management
- Self-report of drug adherence
- Pill counts
- Microelectronic monitoring (MEMS)
- Pharmacy records
- Drug levels
- Biologic response

Medication Management Instrument for Deficiencies in the Elderly (MedMaIDE)

- 20 items in 3 domains
  - Knowledge of medications
  - How to take medications
  - How to get medications
- Takes 30 min to complete
- Good reliability
- PPV with med adherence measured by pill count=0.83

Orwig D, et al. Gerontologist 2006; 46:661-668

Medication Adherence Scale

- Do you ever forget to take your medicine?
- Are you careless at times about taking your medicine?
- When you feel better do you sometimes stop taking your medicine?
- Sometimes if you feel worse when you take the medicine, do you stop taking it?

Morisky DE, et al. Med Care 1986;24:67-74

Cost-Related Nonadherence Measure

- During the last x months have you:
  - skipped doses of a medicine to make the prescription last longer?
  - taken a smaller dose of medicine so that the prescription would last longer?
  - decided not to fill or refill a medicine because it was too expensive?

Safran DG, et al. Health Affairs 2005; W5:152-166.

Topics for Discussion

- Describe the principles and important components of geriatric assessment including the medication history.
- Perform medication therapy reviews for older adults
- Develop and enact appropriate medication action plans for older adults.

Steps Involved in Medication Therapy Reviews in Older Adults

1. Match problem list with drug list

2. If on drug but no match with problem list consider whether drug is necessary

3. If has a chronic condition and not on a medication consider whether there is an evidence based drug to tx the condition (e.g., ACOVE/START criteria, AOU)

4. Assess remaining drugs for appropriateness (e.g., STOPP, Beers, MAI)

5. Repeat step 4 when adding a new drug to regimen

Unnecessary Drug Use in Elderly Outpatients

- Setting: 11 VAMCs
- Sample: 397 fail veterans
- Design: cross-sectional
- Methods: unnecessary drug use determined by 1+ inappropriate rating for MAI indication, effectiveness or duplication ?'s
- Results: 44.3% had 1+ unnecessary drugs;
  Lack of indication most common reason;
  GI, CNS, Min/Elect. most common drug classes; risk increases with multiple drugs and prescribers

Hajjar E, Hanlon J et al. J Am Geriatr Soc 2005;53:1518-23.

ACOVE-3 Quality Indicators for Underuse of Medications

Prevention

Ca+/Vit D/bisphos if on steroids

DM-aspirin

DM and proteinuria-ACEI

Flu, Pneumococcal, Tdd vaccines

Laxatives if on opioids

PPI or Misoprostol if high risk (75+, NSAID, steroid, warfarin use or hx PUD/GI bleed)*

JAGS 2007;55:S247-487

Recommended Drugs

AFib-anticoagulant

CHF-ACEI, selective β blocker

COPD-inhaled long acting bronchodilator/steroid

CVA-antithrombotic

HTN & IHD- β blocker

HTN & DM/HF/CK-ACEI

IHD/MI-antiplate. β block., statin

OA-APAP

Osteoporosis-bisphosphonate

Application Of ACOVE Criteria

- One study found that 50% of 372 vulnerable adults not prescribed an indicated medication
- Biggest problems with no gastroprotective agent for high risk NSAID users, no ACE-I in diabetics with proteinuria, no calcium\Vit. D for those with osteoporosis

Higashi T et al. Ann Intern Med 2004;140:714-20

START Criteria for Chronic Conditions

- CV

ACE-I-CHF

ACE-I-s/p MI

ASA /Warfarin-Afib

ASA/clopidogrel-ASCD, CVD, PVD

Beta blocker-chronic stable angina

BP meds when systolic>160

Statin-ASCD, CVD, PVD

- CNS

Antidepressants-depression sx's>3mo

L-Dopa-Parkinson's

- Endocrine

ACE-I/ARB-DM with nephropathy

Antiplatet-DM w/ CV risk factor

Metformin-DM ± metabolic syndrome

Statin-DM w/ CV risk factor

Gallagher P et al. Int J Clin Pcol Ther 2008;46:72-83

START Criteria for Chronic Conditions

- GI

Fiber suppl.-diverticular dx w/constipation

PPI-GERD/stricture requiring dilation

- MS

Bisphos-maintenance steroid use

CA w/Vit D-osteoporosis

DMARD- active mod/sev RA

- Respiratory

Beta agonist or antichol-mild/mod asthma/copd

Inhaled costicosteroid-mod/sev asthma/copd

Gallagher P et al. Int J Clin Pcol Ther 2008;46:72-83

Under Use (START criteria) in Elderly Outpatients

- Setting: 3 general practices
- Sample: 1329 older primary care patients
- Design: cross-sectional
- Methods: under use determined by START criteria
- Results: 22.7% had evidence of underuse; aspirin, CA w/Vit D, statin most common underused drugs; no increased risk with multiple drugs

Ryan C et al. Br J Clin Pharmacol 2009;68: 936–947,

Assessment of Underutilization of Medication (AOU)

Is there an omission of a needed drug for an established active disease/condition?

1. Disease/ Condition_____

A_____ B_____ C_____ Drug Class_____

No drug omitted Drug omitted

2. Disease/ Condition_____

A_____ B_____ C_____ Drug Class_____

No drug omitted Drug omitted

Jeffery S et al. Cons Pharm 1999; 14:1386-9.

Undertreatment of Chronic Conditions in Elderly Outpatients

- Setting: 11 VAMCs
- Sample: 384 fail veterans
- Design: cross-sectional
- Methods: Undertreatment determined by application of AOU by PharmD-MD pair; discordances resolved via consensus
- Results: 62% had 1+ omitted necessary drugs; CV, Blood Modifiers, Vitamins, CNS most common drug classes; risk increased with comorbidity and ADL limitations; d/c from Medicine vs Surgery service was protective

Wright RM, et al. Am J Geriatr Pharmacother 2009;7:271-280.

Methods to Detect Inappropriate Prescribing

- Explicit Criteria
  a. Drugs that should be avoided (Beers et al; IPET; HEDIS; CMS; STOPP; Laroche et al)
  b. Dosing of Renally Cleared Medications (Hanlon et al)
  c. Drug-disease interactions (Lindblad et al; HEDIS, STOPP)
  d. Drug-drug interactions (Malone D et al; CMS)

- Implicit Clinical Review Based Process Measure
  a. Medication Appropriateness Index (MAI)

Drugs to Avoid List Defined by Explicit Criteria- Beers MH, et al. 1991&7

- CARDIOVASCULAR
  Reserpine, Methyldopa, Disopyramide
- ANTIPLATELETS
  Dipyridamole, Ticlopidine
- DEMENTIA TREATMENTS
- GASTROINTESTINAL
  Antispasmodics (e.g., Donnatal®)
  Trimethobenzamide (Tigan®)
- ANALGESICS
  Indomethacin , Phenylbutazone
  Propoxyphene , Pentazocine, Meperidine
- ORAL HYPOGLYCEMICS
  Chlorpropamide (Diabinese®)
- PSYCHOTROPICS
  Long acting benzodiazepines
  Meprobamate, Barbiturates
  Amitriptyline, Doxepin
  Antidepressant/neuroleptic Comb.
- SKELETAL MUSCLE RELAXANTS
- ANTIHISTAMINES
  Diphenhydramine (Benadryl®)
- GU ANTISPASMODICS
  Oxybutynin

Additions to Drugs to Avoid List Defined by 2003 Beers Criteria

- ANALGESIC
  - Ketorolac
  - Naproxen
  - Oxaprozin
  - Piroxicam
- CARDIOVASCULAR
  - Amiodarone
  - Clonidine
  - Doxazosin
  - Ethacrynic acid
  - Guanadrel or Guanethidine
  - Nifedipine (short acting)
- ENDOCRINE
  - Estrogens (oral)
  - Methyltestosterone
  - Thyroid (desiccated)
- GASTROINTESTINAL
  - Cimetidine
  - Laxatives (i.e., Bisacodyl, Cascara sagrada, Castor Oil, Mineral Oil)
- MISCELLANEOUS.
  - Nitrofurantoin
- PSYCHOTROPICS
  - Dextroamphetamine
  - Fluoxetine (daily)
  - Mesoridazine
  - Thioridazine

Fick D, et al. Arch Int Med 2003;163:2716-24.

Some Potential Additions to Beers Drugs to Avoid List-2012

- ANALGESIC
  Non Cox-2 selective
  NSAIDs unless receiving
  gastro-protection

- CARDIOVASCULAR
  ASA for primary prevention
  Dabigatran *
  Dronedarone
  Prasugrel*

* Caution in those 75+

- ENDOCRINE
  Glyburide (Glibenclamide)
  Sliding scale insulin

- GASTROINTESTINAL
  Metoclopramide

- MISCELLANEOUS.
  Megestrol

- PSYCHOTROPICS
  All antipsychotics in those with dementia
  All BZD receptor agonists regardless of t ½

Some STOPP Criteria Drugs Not Part of Any Beers Criteria List

- ANALGESIC
  - Powerful opiates for mild/mod. pain
  - Chronic NSAIDs for gout/OA
- CARDIOVASCULAR
  - Loop diuretic as 1st line for HTN
- ENDOCRINE
  - Long term corticosteroids for COPD/RA/OA
- GASTROINTESTINAL
  - Diphenoxylate, Loperamide
- MISCELLANEOUS.
  - Chronic colchicine
  - Theophylline monotherapy

Gallagher P, et al. Int J Clin Pharm Ther 2008; 46: 72–83.

Beers vs STOPP Criteria at Hospital Admission

- N=715 inpatients
- STOPP identified 336 PIMs affecting 247 patients (35%)
- Beers' criteria identified 226 PIMs affecting 177 patients (25%)

Gallagher P, O'Mahony. Age Ageing 2008;37:673-679

Consensus Drugs to Avoid in Older Adults with Reduced Creatinine Clearances

Drugs	est Crclr (ml/min)	
Chlorpropamide	<50	
Colchicine	<10	
Glyburide	<50	
Meperidine	<50	
Nitrofurantoin	<60	
Probenecid	<50	
Propoxyphene	<10	(off US market)
Spironolactone	<30	
Triamterene	<30	

Consensus Reduction in Oral Dosing of Primarily Renally Cleared Drugs in Older Adults

Drug	est Crclr (ml/min)	Max. Dosage (mg)
Acyclovir	10-29	800 q8h
	<10	800 q12h
Amantadine	30-59	100 qd
	15-29	100 q48h
	<15	100 q7d
Ciprofloxacin	<30	500 q24h
Cotrimoxazole	15-29	1 DS tab qd
Gabapentin	30-59	600 bid
	15-29	300 bid
	<15	300 qd

Hanlon JT et al., JAGS 2009;57:335–340

Consensus Reduction in Oral Dosing of Primarily Renally Cleared Drugs in Older Adults

Drug	est Crclr (ml/min)	Max Dosage (mg)
Memantine	<30	5 bid
Ranitidine	<50	150 q24h
Rimantadine	<50	100 qd
Valacyclovir	30-49	1000 q12h
	10-29	1000 q24h
	<10	500 q24h

Hanlon JT et al., JAGS 2009;57:335–340

Prescribing Problems for Primarily Renally Cleared Medications

Variable	eCrclr (%)	eGFr (%)
Any Contraindicated	4.98	2.91
Any High Dosage	7.06	3.22
Any Problem	11.89	5.98

J Am Med Dir Assoc 2011; 12:377-83

Clinically Important Drug-Disease Interactions

Drug	Disease
– Alpha blockers	Syncope
– Anticholinergics	BPH, constipation, dementia, glaucoma (narrow angle)
– Aspirin	PUD
– Barbiturates	Dementia
– Benzodiazepines	Dementia, falls
– Bupropion	Seizures
– CCB 1st generation	CHF (systolic dysfunction)
– Corticosteroids	DM
– Digoxin	Heart block

Lindblad C, Hanlon J et al. Clin Ther 2006;28:1133-43.

Clinically Important Drug-Disease Interactions

Drug	Disease
– Metoclopramide	Parkinson's disease
– Non-aspirin NSAIDs	CRF, PUD
– Opioid analgesics	Constipation
– Sedative/hypnotics	Falls
– Thioridazine	Postural hypotension
– Tricyclic antidepressants	BPH, constipation
	dementia, falls, heart block, postural hypotension
– Typical antipsychotics	Falls

Lindblad C, Hanlon J et al. Clin Ther 2006;28:1133-43.

Overall Prevalence and Most Common Drug-Disease Interactions (n=1340)

DDI	n	%
CHF and CCB	50	3.7
ASA and PUD	49	3.7
BZD and Falls	30	2.2
Any overall	205	15.3

Lindblad C, Hanlon J et al. Clin Ther 2006;28:1133-43.

STOPP Drug-Dx Interactions Not Excluded or Included in Lindblad et al, 2006 List

Drug	Disease
– Alpha blockers	UI, frequent in males
– Antihistamines, 1st gen.	Falls
– Estrogen	Breast CA, VTE
– Prochlorperazine	Parkinson's disease
– Opioid analgesics	Falls
– Vasodilators	Postural hypotension

Gallagher P, et al. Int J Clin Pcol Ther 2008;46:72-83

CMS Drug-Drug Interactions

Drug Effected	Precipitant Drug (s)
ASA	NSAIDs
ACE-I	K supplements, K sparing diuretics
Anticholinergic	Anticholinergic
Antihypertensives	levodopa, nitrates
Antiplatelet	NSAID
CNS med	CNS med
Digoxin	amiodarone, verapamil
Lithium	ACEI, thiazide diuretics, NSAIDs
Meperidine	MAOI
Phenytoin	imidazoles
Quinolones	Type IA,C, II antiarrhythmics
SSRI	tramadol, st john wort
Sulfonylureas	imidazoles
Theophylline	imidazoles, quinolones, barbiturates
Warfarin	amiodarone, NSAIDs, sulfonamides, macrolides, quinolones, phenytoin, imidazoles

Epidemiology of Drug-Drug Interactions

- Incidence of potential drug-drug interactions ranges from 2-17% of all Rx's and up to 6-42% of elderly patients.

- Incidence of potentially clinically significant drug interactions is low in the elderly (usually must involve narrow therapeutic range drug and inhibitor/inducer of drug metabolism or renal excretion)

Medication Appropriateness Index (MAI)

Criterion

1. Is there an indication for the drug?
2. Is the medication effective for the condition?
3. Is the dosage correct?
4. Are the directions correct?
5. Are the directions practical?
6. Are there clinically significant drug-drug interactions?
7. Are there clinically significant drug-disease interactions?
8. Is there unnecessary duplication with other drugs?
9. Is the duration of therapy acceptable?
10. Is this drug the least expensive alternative compared to others of equal utility?

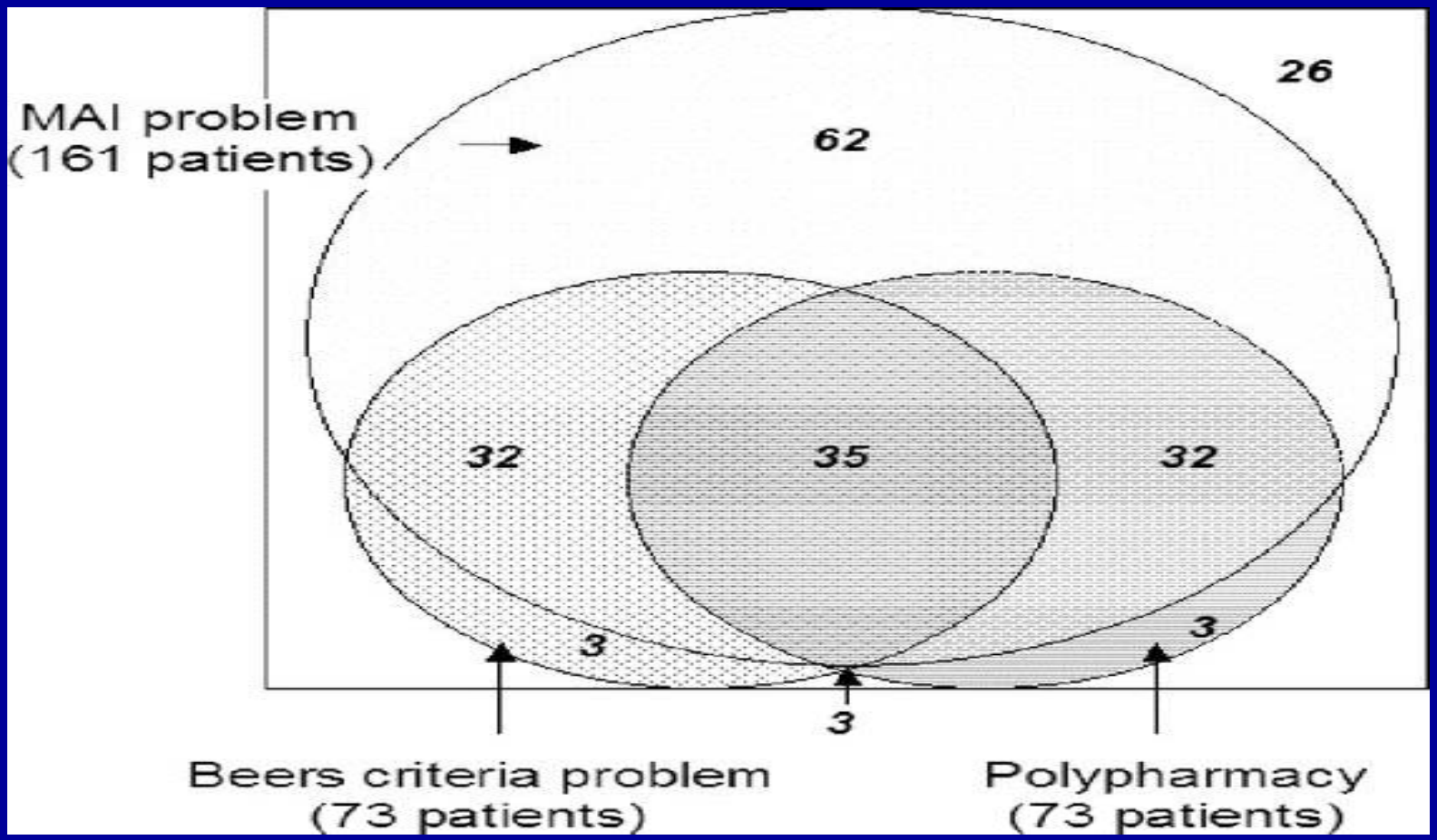
Hanlon JT et al. J Clin Epidemiol 1992;45:1045-1051.

MAI Ratings of Medication Prescribing Frail Hospitalized Elders

MAI Criteria	% of Medications (n=2796)	% of Patients (n=397)
Drug-drug interaction	1.2	6.3
Duplication	2.1	10.6
Effectiveness	3.2	18.1
Drug-disease interaction	3.5	20.4
Correct directions	7.8	37.5
Indication	8.9	42.6
Duration	10.2	47.1
Dosage	11.5	50.9
Practical directions	12.4	55.2
Cost	18.1	70.0
Total	78.3	91.9

Hanlon JT et al. Ann Pharmacother 2004;38:9-14.

Conflicts and Concordance Between Measures of Medication Prescribing Quality

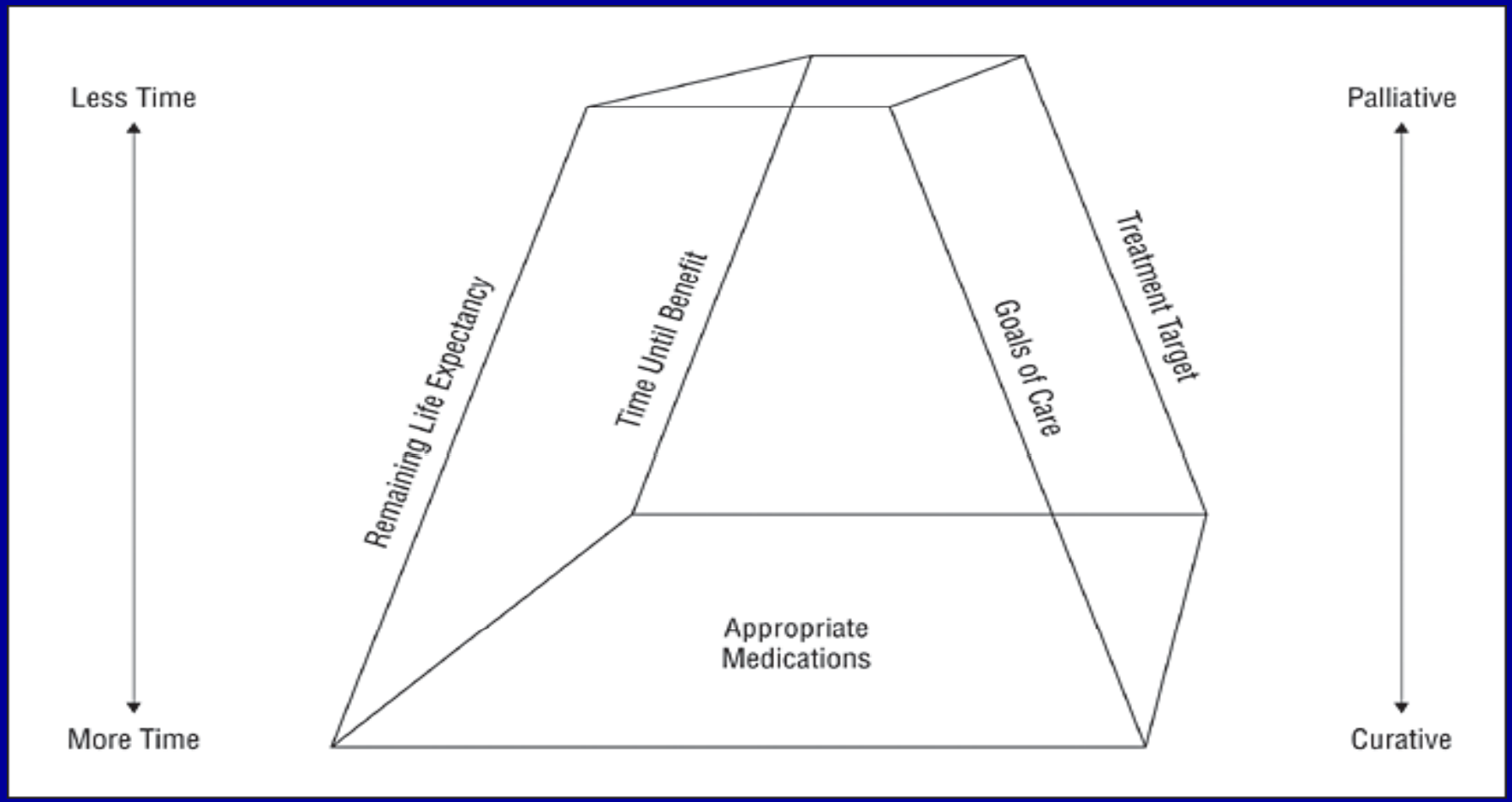


Steinman M et al. Med Care 2007;45:95-99

Topics for Discussion

- Describe the principles and important components of geriatric assessment including the medication history.
- Perform medication therapy reviews for older adults
- Develop and enact appropriate medication action plans for older adults.

A Model for Appropriate Prescribing for Patients Late in Life



Holmes HM, et al. Arch Intern Med 2006;166:605-609.

Drugs that Should be Tapered D/c to Avoid ADWE's

- Alpha-antagonist antihypertensive
- Angiotensin-converting enzyme inhibitor
- Antianginal
- Anticonvulsant
- Antidepressant
- Antiparkinson agent
- Antipsychotic
- Baclofen
- Benzodiazepine
- Beta-blocker
- Corticosteroid
- Digoxin
- Diuretic
- Histamine-2 blocker
- Nonsteroidal antiinflammatory drug
- Opioid Analgesics
- Sedative/hypnotic
- Statin

Bain KT, et al. JAGS 2008;56:1946-1952.

Consult with Physician Regarding Problems/Concerns

- Present Prioritized Problems, Make Recommendations, Present Rationale
- Keep Conversations Brief (limit to no more than 3 suggestions, 10 minutes)
- Solicit Physicians' Involvement
- Offer Published Literature and Provide Written Consult
- Type of Drug Therapy Recommendations May Influence Acceptance (most likely to d/c drug or change dose)

Review Any Medication Changes Provide Counseling, and Consider Adherence Aides

- Provide new medication list that includes any changes.
- Provide written medication information for any new drugs
- Recruit active patient/family involvement in adherence
- Consider the use of adherence enhancing aides
- Encourage patients to also discuss their medications with their physicians

What Info/Methods Do Community Dwelling Elders Receive/Use to Help Adhere to Medications

- Of 4955 community dwelling elders taking a NTR drug (i.e.,warfarin, digoxin, phenytoin) only 35% received instructions from primary care MD, 45% received instruction from RPh; 54% used a pill box to organize meds

  Metlay JP, et al. JAGS 2005;53:976-982

- 257/337 (76.3%) elders have a system to manage their medications; most common strategies in rank order: 1) used pill box; 2) lay out whole days meds in am or at meal times; 3) put meds in place to remind them; 4) checklist or calendar

  Stoehr GP, et al. AJGP 2008;6:255-263

Adherence Aides

- Prescribing generics
- Specify easy off caps/containers
- Cues tied to daily routine
- Verbal information
- Written information
- Lists
- Calendars
- Pill box
- Special packaging
- Electronic reminder devices

Topics for Discussion

- Describe the principles and important components of geriatric assessment including the medication history.
- Perform medication therapy reviews for older adults
- Develop and enact appropriate medication action plans for older adults.

Geriatric Assessment: A Focus on Falls

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American College of Clinical Pharmacy Annual Meeting 2011

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Learning Objectives

After completion of this session, participants will be able to:

- Discuss the risk factors for falls in the elderly.
- Describe the consequences of falls in the elderly.
- Determine appropriate nonpharmacologic interventions for high-risk patients.
- Determine appropriate pharmacologic interventions for high-risk patients.

Geriatric Syndromes

- Clinical conditions in older persons that do not fit into exact disease categories
- Geriatric syndromes include:
  - Falls
  - Delirium
  - Frailty
  - Dizziness
  - Syncope
  - Urinary incontinence

Inouye SK, Studenski S, Tinetti ME, Kuchel GA. JAGS 2007;55:780-91
Sleeper RB. Consult Pharm 2009;24:447-462.

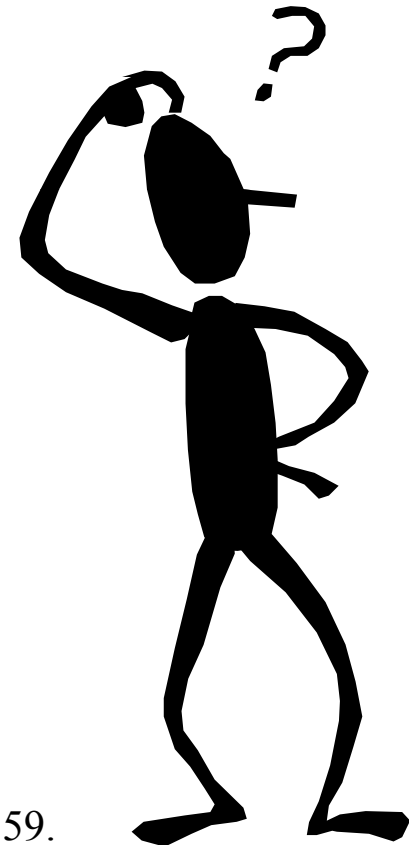
Geriatric Syndromes

- Highly prevalent, especially in frail older adults
- Substantially impact quality of life and disability
- Caused by multiple underlying factors
- Challenge the traditional way of viewing clinical care
- Can be mistaken for normal aging
- May be caused or worsened by medications

Inouye SK, Studenski S, Tinetti ME, Kuchel GA. JAGS 2007;55:780-91.
Sleeper RB. Consult Pharm 2009;24:447-462.

Atypical Presentation of Adverse Drug Events in Older Adults

- Altered mental status/confusion
- Fatigue
- Falling
- Constipation
- Urinary Incontinence
- Depression
- Dizziness



Tangiisuran B, et al. Age and Ageing 2009;38:358-359.
Weingart SN, et al. Arch Intern Med 2005;165:234-240.
Schmader KE, et al. Am J Med 2004;116:394-401.

Falls

Consequences of Falls

- Approximately 1/3 of community dwelling older adults fall each year.
- About 10% of these falls result in major injury.
- Falls are a major contributor to functional decline:
  - For fall without injury, increased risk of nursing home placement by 3-fold
  - For fall with serious injury, increase risk of nursing home placement by 10-fold.

Tinetti and Kumar. JAMA 2010;303(3):258-266

Consequences of Falls

- Decline in the ability to care for oneself and to participate in social activities may also result from falls.
- Fear of falling is a major contributor to these outcomes among those who do not suffer serious injury from their fall.

Tinetti and Kumar. JAMA 2010;303(3):258-266

Selected evidence-based reviews of fall prevention

- Cochrane reviews
- CDC
- USPSTF
- AGS

Outcome: Reduction in fall incidence is attainable but falls will not be eliminated entirely.

Cochrane 2009: Community

http://www.ncbi.nlm.nih.gov/pubmed/19370674

- Effective
  - Exercise interventions
  - Medication modifications
  - 1st cataract surgery
- Unproven efficacy
  - Multifactorial risk factor reduction interventions
  - Vitamin D supplementation (unless deficient)
- Not effective
  - Home safety modifications

Cochrane 2010: NH & Hospital

http://www.ncbi.nlm.nih.gov/pubmed/20091578

Nursing Home

- interventions targeting multiple risk factors were not clearly effective in preventing falls
  - may be so when these interventions are provided by a coordinated team of health workers.
- vitamin D and review of medication by a pharmacist may reduce falls.
- no evidence that targeting single risk factors reduce falls and this includes exercise interventions

Hospital

- interventions targeting multiple risk factors are effective
- supervised exercises are effective

CDC

Stevens JA, Sogolow ED. Preventing Falls: What Works? A CDC Compendium of Effective Community-Based Interventions From Around the World. Atlanta: National Center for Injury Prevention and Control, Centers for Disease Control and Prevention; 2008. http://www.cdc.gov/HomeandRecreationalSafety/Falls/preventfalls.html

- Recommends 3 categories of interventions:
  - exercise-based,
  - home modification for hazard reduction,
  - multifaceted (including medical screening for visual impairment and medication review)

USPSTF (Draft)

- http://www.uspreventiveservicestaskforce.org/uspstf11/fallsprevention/fallsprevart.htm
- The USPSTF recommends each of the following interventions to prevent falls in adults ages 65 years and older at increased risk for falls: grade B recommendation
  - Exercise or physical therapy
  - Vitamin D supplementation
- No single recommended tool or approach that can reliably identify older adults at increased risk for falls
- Does not recommend automatically performing multifactorial risk assessment/management because likelihood of benefit is small
  - May be appropriate in individual cases, based on circumstances of prior falls, medical comorbidities, and patient values
    - grade C recommendation

AGS/BGS Guidelines

http://www.americangeriatrics.org/health_care_professionals/clinical_practice/clinical_guidelines_recommendations/2010/

- All older Americans be asked about falling once a year
- Persons who have fallen should have gait & balance assessed using one of the available evaluations;
- Those who cannot perform or perform poorly on a standardized gait and balance test should be given a multifactorial fall risk assessment.
  - focused medical history,
  - physical examination,
  - functional assessments,
  - environmental assessment.

AGS/BGS Clinical Practice Guideline : *Prevention of Falls in Older Persons (2010)*

AGS/BGS, Interventions

- Community
  - Adaptation or modification of home environment [A]
  - Withdrawal or minimization of psychoactive medications [B]
  - Withdrawal or minimization of other medications [C]
  - Management of postural hypotension [C]
  - Management of foot problems and footwear [C]
  - Exercise, particularly balance, strength, and gait training [A]
- Nursing Home:
  - Multifactorial/multicomponent interventions [C]
  - Exercise programs (C)
  - Vitamin D, > 800 IU/day, proven or suspected vitamin D insufficiency [A]
  - Vitamin D, > 800 IU/ day, abnormal gait/balance or increased risk [B]

AGS/BGS Clinical Practice Guideline : *Prevention of Falls in Older Persons (2010)*

Guidelines Summary

- Multiple organizations recommend fall assessment and prevention
- Recommendations conflict
  - Differences in search strategies & inclusion of studies for review
  - Incomplete understanding, research gaps
  - Complexity
- Bottom Line: Evidence base for fall prevention exists and should be examined for translation into practice

Fall Risk Factors

- Classified as intrinisic versus extrinsic
- There is an interaction and probable synergism among multiple risk factors.
- Risk of falling increases as the number of risk factors increases
  - 27% community dwelling with no or one risk factor
  - 78% community dwelling with four or more risk factors
  - Similar results in nursing home settings

AGS/BGS Clinical Practice Guideline : *Prevention of Falls in Older Persons (2010)*

Intrinsic Risk Factors

- Lower extremity weakness
- Previous falls
- Gait and balance disorders
- Visual impairment
- Depression
- Functional and cognitive impairment
- Dizziness
- Low body mass index
- Urinary incontinence
- Orthostatic hypotension
- Female sex
- Being over age 80

AGS/BGS Clinical Practice Guideline : *Prevention of Falls in Older Persons (2010)*

Extrinsic Risk Factors

- Medications
  - polypharmacy (i.e., taking over four prescription medications)
  - psychotropic medications
- Environmental hazards
  - poor lighting
  - loose carpets
  - lack of bathroom safety equipment

AGS/BGS Clinical Practice Guideline : *Prevention of Falls in Older Persons (2010)*

Methodological Issues in Determining Risk Factors for Falling

- Some factors are consequences as well as risk factors (ex: fear of falling).
- Many studies are too small to evaluate multiple risk factors.
- Falls are often under-reported, particularly those without injury.
- There are many factors that are common in older adults that affect the risk of falling with weak or moderate odds ratios.
- There are potentially relevant factors that have not been considered in very many studies (anemia, low vitamin D, footwear).
- There is a need for consensus on methodology to assess some factors (muscle weakness, environmental hazards).

Deandrea S et al., Epidemiology 2010;21:658-668.

Most Significant Contributors to Risk in Community Dwelling Older Adults

- Recurrent fallers vs. All fallers
- Factors associated with a 3-fold higher risk:
  - History of falls
  - Fear of falling
  - Use of walking aids
- Factors associated with a 2-fold higher risk:
  - Dizziness and vertigo
  - Gait problems
  - Antiepileptic drug use
  - Cognitive impairment

Deandrea S et al., Epidemiology 2010;21:658-668.

Known Risk Factors Identified in AGS/BGS Guidelines

- History of falls
- Taking multiple medications (particularly psychotropic medications)
- Problems with gait, balance, or mobility
- Impaired vision
- Other neurological impairments
- Reduced muscle strength
- Problems with heart rate or rhythm
- Postural hypotension
- Foot problems

AGS/BGS Clinical Practice Guideline : *Prevention of Falls in Older Persons (2010)*

Modifiable Risk Factors for Falling Medications

- There have been no randomized controlled trials to study the effect of medications on risk of falling.
- Interpretation of the studies in this area have been complicated by variation in fall definitions, evaluation of drug exposure and confounding by indication.
- The use of sedatives and hypnotics, antidepressants, and benzodiazepines demonstrated a significant association with falls in elderly individuals.

Wolcott JC, et al. Arch Intern Med 2009;169:1952-1960.

Modifiable Risk Factors for Falling Medications

- Several of the most frequent manifestations of adverse drug events are risk factors themselves for falling:
  - Postural hypotension
  - Cognitive changes
  - Dizziness
- Falling may represent the final common pathway of cumulative adverse drug events.

Agonstini J. JAGS 2002;50:1744-5.

The Medication History

- An accurate medication history is important and can take some detective work to obtain!
- The current medication list should include
  - Prescription medications
  - Over the counter medications
  - Dietary supplements or herbal products
  - Alcohol
- For each medication, record the dose, time (s) taken each day, frequency of use for “as needed” medications, and indication.

http://www.medsandaging.org/documents/PersonalMedList_000.pdf

The Medication History

- Little evidence to support any one specific method of medication review
- Discrepancies between patients' understanding of what they should be taking, what they actually are taking, and what physicians record on their medication lists are common
- The "Brown Bag" review offers an opportunity to determine how the patient is actually taking medications and to inquire about medication effectiveness and possible adverse events.

JAMA. 2010;304(14):1592-1601

Screening for Medication- Related Fall Risk

- Taking more than four medications?
- Taking psychotropic medications?
- Taking medications that can cause orthostatic hypotension?
  - Antihypertensives
  - Phenothiazines
  - Tricyclic antidepressants
  - Anti-Parkinsonian drugs
  - Diuretics
  - Any phosphodiesterase-5 enzyme inhibitor

•AGS/BGS Clinical Practice Guideline : *Prevention of Falls in Older Persons (2010)*
•www.geriatricsatyourfingertips.org

Screening for Medication-Related Fall Risk

- Taking medications that cause bradycardia?
  - Digoxin
  - β Blockers
  - Non-Dihydropyridine Calcium Channel Blockers (Diltiazem, Verapamil)
  - Amiodarone

Sperling S, et al. A Quality Improvement Project to Reduce Falls and Improve Medication Management. Home Health Care Services Quarterly 2005, 24: 1, 13-28.

www.geriatricsatyourfingertips.org

Lexi-drugs

Psychotropic Drugs Associated with Falls

- Sedatives and hypnotics
- Antidepressants
- Benzodiazepines
- Antipsychotics

Arch Intern Med. 2009;169(21):1952-1960

Screening for Medication Risk

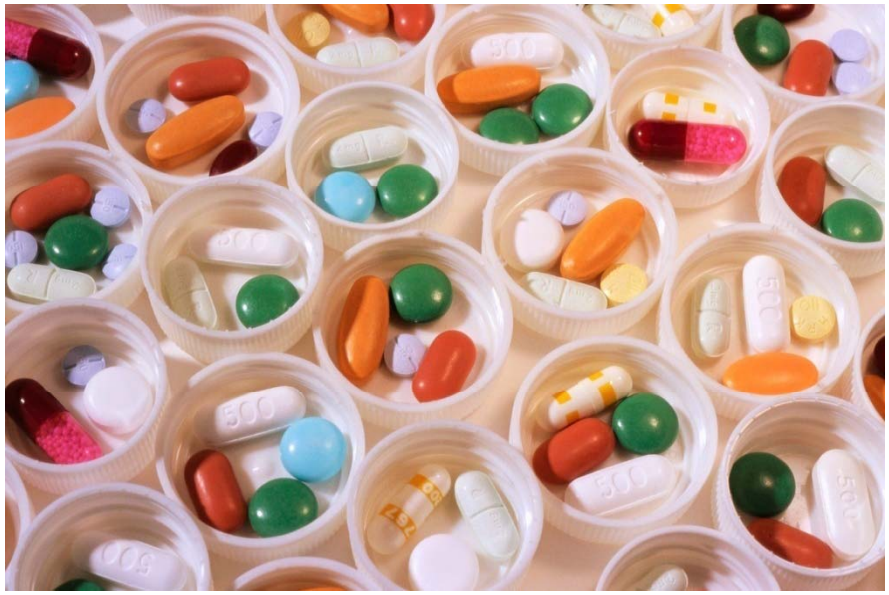
- Experiencing symptoms that might be an adverse drug event?
  - Blurred vision
  - Dizziness or lightheadedness
  - Sedation, decreased alertness
  - Confusion, impaired judgment
  - Compromised neuromuscular function
  - Anxiety

http://www.cdc.gov/HomeandRecreationalSafety/images/CDC_Guide-a.pdf

Pharmacist Assessment Summary

- Verify accurate, complete med list
  - May take a fair amount of work
  - Brown bag (or home visit) helps
- Look for falls red flags
  - Psychotropics
  - Meds that cause drop in BP or pulse
  - Diuretics
  - Polypharmacy, 4 or more (interactions)
- Consider which other team members need to be involved in care plan

Managing the Older Adult's Drug Regimen to Reduce Fall Risk



Recommendation: Minimize Medications*

- Psychoactive medications (including sedative hypnotics, anxiolytics, antidepressants) and antipsychotics (including new antidepressants or antipsychotics) should be minimized or withdrawn, with appropriate tapering if indicated. [B]
- A reduction in the total number of medications or dose of individual medications should be pursued. All medications should be reviewed, and minimized or withdrawn. [B]

*As a component of a multifactorial intervention

AGS/BGS Clinical Practice Guideline : *Prevention of Falls in Older Persons (2010)*

Evaluating the Medication Regimen

- Review each medication for:
  - Indication
  - Effectiveness
  - Safety
  - Monitoring
  - Overuse
  - Underuse
  - Appropriateness
  - Adverse effects
  - Adherence

Consult Pharm 2008;23:538-47.

Discontinuing Medications

- Four steps in discontinuing medications:
  - Recognizing an indication for discontinuing medication(s)
  - Identifying and prioritizing the target medication(s) for discontinuation
  - Proper planning, communicating and coordinating of the decision with the patient
  - Careful monitoring of the patient for beneficial or harmful effects

Bain KT, et al. JAGS 2008;56:1946-52.

Discontinuing Medications

- The majority of medications can be discontinued without causing an adverse drug withdrawal event.
- Following long-term use, some drugs should be tapered slowly over days to weeks
    - Benzodiazepines
    - Antidepressants
    - Other psychotropic drugs
    - Beta Blockers

Bain KT, et al. JAGS 2008;56:1946-52.

Vitamin D to Reduce Fall Risk

- There is a protective effect of vitamin D supplementation on fall prevention in community-dwelling older adults.
- An overall RR of 0.86 (95% CI50.79–0.93) suggested a 14% lower risk of falls.
- The effect of vitamin D on fall reduction was significant:
  - duration longer than 6 months
  - dose of 800 IU or greater, and
  - cholecalciferol therapy (Vitamin D3)

Kalyani RR et al., JAGS 2010;58:1299-1310

Vitamin D in Nursing Homes

- Vitamin D supplements of at least 800 IU per day should be provided to older persons residing in long-term care settings with proven or suspected vitamin D insufficiency. [A]
- Vitamin D supplements of at least 800 IU per day should be considered in older persons residing in long-term care settings who have abnormal gait or balance or who are otherwise at increased risk for falls. [B]

AGS/BGS Clinical Practice Guideline : *Prevention of Falls in Older Persons (2010)*

Case Study

ES is an 89 year old female who lives alone in a single story home in the community. She reported having fallen several times in the past few weeks. The first fall she said occurred when “her legs felt about to give way” so she decided to sit on the floor. The second time she was in the kitchen with her daughter, felt lightheaded and was lowered to the floor by her daughter. The third fall occurred in the morning when she rose from the chair and suddenly found herself on the floor. She was orthostatic and due to her complex medical problems she was admitted to the hospital.

After her hospital stay she was transferred to the nursing home. Her admission diagnosis to the nursing home was “medication-related falls”. When she refused to engage in therapy and was not making progress at the nursing home, she was discharged to the ALF with physician orders for physical and occupational therapy evaluation. No changes were made in her medication regimen except to add a medication for sleep during her nursing home stay.

ES is 5’5’’ tall and weighs 171 lbs. Her sitting blood pressure on admission to the ALF was 140/63. Her chronic disease conditions included hypothyroidism, depression, hypertension, asthma and anxiety. She also received treatment for symptoms including dizziness, pain, and constipation. She is ambulating household distances independently but used a cane in the community. Her static balance was fair and dynamic balance poor.

Medications on Admission

- Aspirin 81 mg EC tablet daily
- Caltrate 600 mg with Vitamin D twice daily
- Citalopram 20 mg daily
- Clonazepam 1 mg at bedtime for anxiety.
- Dicyclomine 10 mg three times per day
- Meclizine 25 mg four times per day
- Ipratropium 0.06% 1 spray in each nostril twice daily.
- Levothyroxine 88 mcg daily
- Metoprolol 25 mg twice daily hold for systolic BP < 100 or diastolic BP < 50
- Vitamin D 50,000 Units 1 every 3 months

PRN Medications on Admission

- Promethazine 25 mg every 6 hours as needed for nausea
- Senna 2 tablets daily as needed for constipation
- Acetaminophen 650 mg every four hours as needed for pain. Not to exceed 4 grams of acetaminophen in 24 hours.
- Vicodin 5/500 every 8 hours as needed for pain.
- Fleets enema daily as needed for constipation.
- Zolpidem 5 mg at bedtime as needed for sleep.

- What are ES's risk factors for falling?

- What are your recommendations regarding her drug regimen?

Summary

- Geriatric syndromes, such as falls, are common among older adults and have a significant negative impact on quality of life.
- Medications are among the many possible factors contributing to geriatric syndromes.
- During MTM encounters, assess for the presence of geriatric syndromes and evaluate the drug regimen for opportunities to reduce or discontinue medications when appropriate.