



Telephone: 866-970-7500 ext. 82203

Website: www.seniorscript.com

Fax: 800-887-4113

Telephone: 614-763-0036

Website: www.midwestcarealliance.org

Email: info@midwestcarealliance.org

“Lunch & Learn” Seminar — Independent-Study Program

Provided by SeniorScript and the

Midwest Center for Home, Hospice & Palliative Care Education

How to Tackle Polypharmacy (May 24, 2011) • Expires 05/31/13

SeniorScript and the Midwest Center for Home, Hospice & Palliative Care Education are pleased to announce that our very popular “Lunch & Learn” seminars are now available online as self study programs offering continuing educational (CE) credit. These learning modules are accessible to SeniorScript clients via www.seniorscript.com and to Midwest Care Alliance members via www.midwestcarealliance.org.

This recorded series has been available for quite some time, but did not offer the option of receiving continuing educational credit. We are delighted that in addition to offering excellent education in a format to be accessed at your convenience, we are now offering you and your staff members another source to assist you in meeting your CE requirements.

Each seminar (*beginning with 2009*) is available as an independent-study program and includes the documents needed to apply for CE credit within this handout. After listening to the seminar online, simply complete the CE Request Form which includes both an evaluation and post test. Once completed, submit it along with the processing fee of \$10 to request credit. In order to qualify for credit, a minimum score of 70% must be achieved on the post test.

Please be advised that credit for CE purposes may only be awarded to each person once per seminar. It is the responsibility of the student to keep his or her personal records to avoid repeating a module. Periodical audit reviews will also be conducted to determine any violations.

We hope you will find this convenient new format helpful and effective!

Disclosure Information:

Rebecca Wagner, PharmD Nothing to Disclose Disclosure

Employed by HospiScript and has agreed to present the information fairly and without bias.

No commercial support was received for this educational activity.

**Online Independent-Study Program • CE Request Form
 How to Tackle Polypharmacy/May 24, 2011**

Requesting CE Credit For: Nursing CE

**Upon submittal of the proper forms, this program offers 1 CE credit for nursing valid nationally (not valid for Iowa licenses).*

Criteria for Successful Completion: Listening to the audio seminar, submitting completed CE Request Form with processing fee, and achieving a minimum score of 70% on the post test.

Expiration: This program expires on May 31, 2013.

Part I - Participant Information *(please print legibly)*

Date Completed:	
Name:	
Employer:	
Occupation/Credentials: <i>(RN, LPN, SW/C)</i>	
Complete Mailing Address: <i>(Street, City, State, Zip)</i>	
Phone:	
Email Certificate To:	

Part II - Evaluation

Were the following objectives met?

1. Identify age related changes in older adults related to pharmacokinetics and pharmacodynamics. YES NO
2. Discuss the definition and implications surrounding Polypharmacy. YES NO
3. INSERT OBJECTIVE YES NO

This speaker demonstrated effective teaching on a scale of 5 (excellent) to 1 (poor):

Rebecca Wagner, PharmD: 5 4 3 2 1

Comments:	
Questions for Speaker:	

Part III - Post Test

1. Which of the following is NOT a risk factor for an adverse drug event in an elderly patient?
 - a. Male Gender
 - b. Use of 5 or more medications
 - c. Use of multiple pharmacies
 - d. Age > 85 years
2. Macrobid is an effective medication to use in patients with renal dysfunction. TRUE FALSE
3. Physiologic changes that occur as we age include increased hepatic enzyme production. TRUE FALSE
4. Which of the following should be considered when choosing a drug for an elderly patient?
 - a. Dosage adjustment for renal and hepatic impairment
 - b. Low risk of Drug-Drug and Drug-Food interactions
 - c. Convenient dosing schedule
 - d. All of the above
5. One way to avoid polypharmacy in the elderly is to ensure that each medication has a proper indication for use. TRUE FALSE
6. Length of time (IN MINUTES) to complete this self study: _____

Send this original completed form and \$10 processing fee to:
 SeniorScript, Attn: Mary Anne McDowell, 1460 Ann St., Montgomery, AL 36107

How to Tackle “Polypharmacy”



Rebecca Wagner, Pharm.D.
Clinical Pharmacist
SeniorScript
Division of Catalyst RX

Goals and Objectives

- Identify age-related changes in older adults
- Discuss changes in pharmacokinetics and pharmacodynamics in older adults
- Discuss appropriate prescribing in older adults

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

(Gurwitz et al. 1995)

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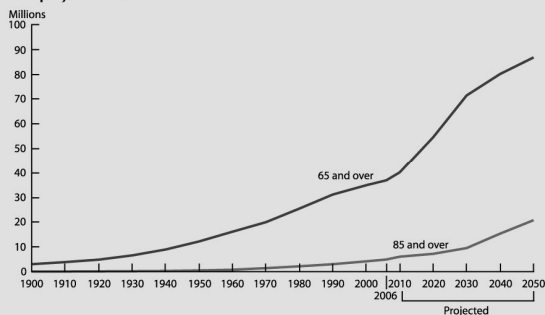
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- By 2050, half of Americans will live to 85y/o and comprise 5% of total population

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Number of people age 65 and over, by age group, selected years 1900–2006 and projected 2010–2050



Note: Data for 2010–2050 are projections of the population.
Reference population: These data refer to the resident population.
Source: U.S. Census Bureau, Decennial Census, Population Estimates and Projections.

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Hospitalizations

- Adverse Drug Events (ADE):
 - Noxious or unwanted response that occurs with a dose that usually would be therapeutic
- Nearly 1/3 of all hospitalizations of older adults are CAUSED by their medications
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- Age > 85 y/o
- Depression
- Female gender
- Low body weight or BMI < 22 kg/m²
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 - PK: What the body does to the drug
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Physiologic Changes in the Elderly

- General changes
- Gastrointestinal
- Hydration/Nutrition
- Hepatic
- Renal
- Central Nervous System (CNS)
- Cardiovascular
- Pulmonary

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General Changes

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 - Loss of height
 - Hair and nail growth decreases
 - Skin Changes
 - Transdermals & topicals affected: ↑ fat & ↓ water content
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Changes in Pharmacokinetics

- Absorption
 - Decreased/Less Acidic gastric fluids
 - Calcium absorption is decreased
 - Take Calcium supplements with food
 - Atrophy of intestinal epithelium
 - ↓ surface area for absorption
 - Slowed gastric emptying
 - Delays onset of action of some medications
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Hepatic Changes

- Affects metabolism of drugs
- Decreased hepatic enzyme production
- Decreased liver mass
- Hepatic blood flow decreases
- Decreased albumin production
 - Risk of toxicity: phenytoin, diazepam, warfarin, propranolol

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Hepatic Changes

- Metabolism of drugs:
 - Phase I: Reduced in the elderly
 - Oxidation
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 - Phase II: Conjugation: Unchanged in the elderly
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Pharmacokinetics: Metabolism

- Common drugs undergoing oxidation:
 - Alprazolam, diazepam, flurazepam, diphenhydramine, barbiturates, imipramine, desipramine, phenytoin, warfarin
- Effects can be prolonged
- Benzodiazepines metabolized by Phase II:
 - Lorazepam, temazepam
 - No age-related changes in effect

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Hydration and Nutrition

- ↑Body Fat –13-40%
- ↓Lean Muscle Mass –12-19%
- ↓Total Body Water –15%
- ↓Serum Albumin and Other Serum Proteins
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Changes in Pharmacokinetics

- Distribution
 - Medications that distribute in fluid become concentrated
 - Gentamycin, Digoxin, Caffeine, Theophylline, Lithium, Cimetidine
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 - ↓ in GFR d/t kidney impairment with acute and chronic diseases
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 - Do not rely on serum creatinine to estimate kidney function

$$\frac{(140 - \text{age})IBW}{72 * SCr} \quad \text{Note: } \times 85\% \text{ if } \text{♀}$$

SCr must be stable

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Drugs Highly Dependent on Renal Function for Excretion

- Aminoglycosides
- Cephalosporins
- Digoxin
- Furosemide
- Lisinopril
- Lithium
- Nitrofurantoin
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 - Metabolites
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CNS Changes

- Decreased weight/volume of brain
- Alterations in cognition
- Decreased blood supply due to atherosclerotic narrowing
- Atypical presentation of illness
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Changes in Pharmacodynamics: CNS

- Changes in metabolism of neurotransmitters
 - Gamma-aminobutyric acid (GABA) system
 - Increased sensitivity to Benzos
 - Increased sedation, postural instability
 - Acetylcholine system
 - Increased risk of anticholinergic effects
 - Dopamine
 - Increased risk of delirium by Dopamine agonists
 - Increased risk of Extrapyrimal Symptoms (EPS) by Dopamine antagonists

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Changes in Pharmacodynamics: CNS

- Continued:
 - Opioids
 - Prolonged pain relief at lower doses
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Case

- DD, a 74 y/o Female
- Presents with agitation, delirium, confusion
- PMH: DM, HTN, CHF, Hyperlipidemia, Stage III CKD, completed treatment three days ago for UTI with Macrobid 100 mg BID
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Case: Critical thinking

- Meds:
 - Glipizide XL 10 mg daily
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Case: Critical thinking

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- Physical exam: Temp: 100.3, skin clammy and cold, BP/HR WNL, stable
- Questions:
 - Initial urinalysis?
 - Culture report?
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- Could something else be causing symptoms?
 - Hypoglycemia
 - Lab related changes: hyperkalemia
 - Fluid status: Dehydration
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Cardiovascular Changes

- Decreased cardiac output
 - ↑ Left ventricle wall thickness: ↓ Cardiac output, ↓ organ perfusion, ↑ risk of Heart Failure
- Decreased circulation
- Increased peripheral vascular resistance
- Leads to reduced blood flow to liver and kidneys

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Pulmonary Changes

- Decreased respiratory muscle strength
- Decreased chest wall compliance
- Decreased total alveolar surface
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Changes in Pharmacodynamics:

Pulmonary

- Positive pressure inhalers
 - Propellants
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 - Require patients to breathe deeply
 - Advair
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- SC: 75 y/o man with late-stage COPD, oxygen dependent: 2 liters continuous
- PMH unremarkable
- CC: Mouth pain
- Meds: Advair 500/50 one puff BID, Spiriva 1 puff QD, Proair: 2 puffs every 4 hours PRN
- Physical exam: unremarkable except white patchy exudates in mouth

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Case 2: Critical thinking

- Observe patient using his inhalers
 - Proper technique?
 - Using effectively?
- Risk of oral thrush with inhaled steroids and improper technique
- Switch patient to nebulized medications?
- Candidate for long-term oral steroid?
- Treat oral candidiasis

33

Case 3

- ML: 83 y/o Female
- CC: Falls, decreased appetite, bruising, nosebleeds
- PMH: Parkinsons, DM, HTN, CAD, A-fib
- Social Hx: Lives alone, no alcohol/tobacco

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- Meds:
 - Sinemet 25/100 QID
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 - Diazepam 2 mg Q6H PRN
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Case 3

- Physical assessment: Thin, frail woman with slow gait, otherwise unremarkable
- Labs: INR: 3.4; HR: 55, glucose: 68, BP: 104/74; Scr: 1.5; K: 4.2
- 7 pound weight loss in last 6 weeks

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Case 3: Critical thinking

- Could symptoms be caused by her medications?
- Digoxin:
 - Decreased clearance and increased distribution
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 - Effects can be prolonged in the elderly: increased risk of bleeding/bruising
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 - Prolonged half-life and effects
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 - What is indication?
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 - Switch to lorazepam if a benzodiazepine is indicated?

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Case: Critical thinking

- Glyburide:
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 - Appetite is decreased and glucose is low
 - Should medication be reduced? Switched?
 - Hypoglycemia: Confusion and falls
- Toprol XL:
 - Bradycardia and hypotension: dizziness and falls
 - Reduce dose?

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Criteria for Drug Choices in the Elderly

- Established efficacy
- Compatible safety and adverse effect profile
- Low risk of drug or food interactions
- Hepatic and renal dosage adjustments
- Convenient dosing schedule

40

Special considerations

- Simplify regimen as much as possible
- CR/SR dosage forms may be preferred if possible
 - Reduces high peaks and low troughs
- Take a careful history of supplement use
 - OTC and Herbals
- Do not assume compliance with prescribed regimen
 - Pill Box

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Prescribing Cascade

Adverse drug reaction is misinterpreted as a new medical condition

Another drug is prescribed to treat

Risk for additional adverse events increases

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

(Gurwitz et al. 1995)

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MASTER - Rules for Rational Geriatric Drug Therapy

- Minimize number of drugs
- Alternatives should be considered
- Start low and go slow
- Titrate therapy
- Educate the patient
- Review regularly

The Consultant Pharmacist July 2008 ;Vol 23.(7); 544.

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Medication Appropriateness Index

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/condition 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 with others of equal usefulness?

Hanlon, et al. Method for assessing drug therapy appropriateness. *Journal of Clinical Epidemiology* 1992;45(10): 1045-51.

45

Medication Related Problems: Review to avoid PolyPharmacy

- Untreated indication
- Adverse drug reaction
- Improper drug selection
- Drug interaction
- Too little of the correct drug
- Improper drug administration
- Too much of the correct drug
- Drug use without indication

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Model for Appropriate Prescribing

- Remaining life expectancy
- Treatment targets
 - Aggressive vs palliative
- Time until benefit
 - Symptom management
 - Primary or secondary prevention
- Goals of care
 - Whose are most important?

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References

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- Mangoni A, Jackson S. Age-related changes in pharmacokinetics and pharmacodynamics: basic principles and practical applications. *Br J Clin Pharmacol* 2003;57(1):6-14.

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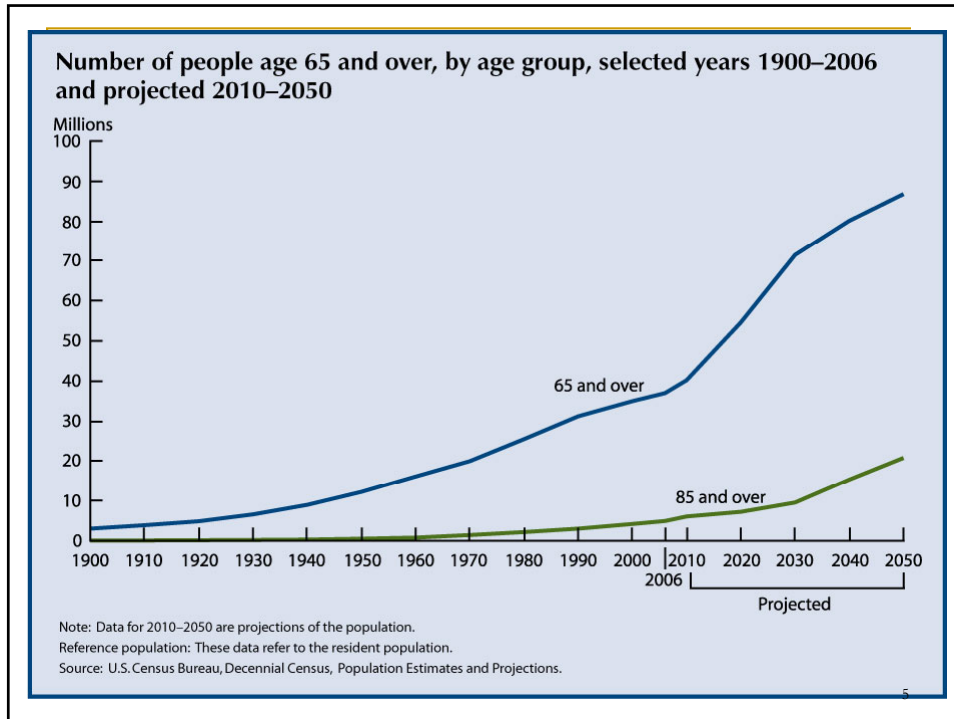
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- CR/SR dosage forms may be preferred if possible
 - Reduces high peaks and low troughs
- Take a careful history of supplement use
 - OTC and Herbals
- Do not assume compliance with prescribed regimen
 - Pill Box

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Prescribing Cascade

Adverse drug reaction is misinterpreted as a new medical condition

Another drug is prescribed to treat

Risk for additional adverse events increases

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

(Gurwitz et al. 1995)

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MASTER - Rules for Rational Geriatric Drug Therapy

- M inimize number of drugs
- A lternatives should be considered
- S tart low and go slow
- T itrate therapy
- E ducate the patient
- R eview regularly

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Medication Appropriateness Index

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/condition 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 with others of equal usefulness?

Hanlon, et al. Method for assessing drug therapy appropriateness. *Journal of Clinical Epidemiology* 1992;45(10): 1045-51. 45

Medication Related Problems: Review to avoid PolyPharmacy

- Untreated indication
- Improper drug selection
- Too little of the correct drug
- Too much of the correct drug
- Adverse drug reaction
- Drug interaction
- Improper drug administration
- Drug use without indication

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Model for Appropriate Prescribing

- Remaining life expectancy
- Treatment targets
 - Aggressive vs palliative
- Time until benefit
 - Symptom management
 - Primary or secondary prevention
- Goals of care
 - Whose are most important?

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