

# Drug Therapy Management Series: Geriatric Disorders

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## **Purpose**

APRNs are increasingly taking on expanded roles in drug therapy management in a variety of setting and chronic diseases common in geriatric patients. APRNs should be familiar with drug therapy management dilemmas that arise in elderly patients, such as polypharmacy, inappropriate medication use, and physiologic and pharmacokinetic changes that impact drug therapy. This course will equip participants to help resolve these and other potential drug therapy problems that often arise in geriatric patients.

## **Learning Objectives**

After successful completion of this continuing education self-study course, the APRN will be able to:

1. Summarize the changing demographics in the elderly population in the United States.
2. Describe the epidemiology of aging in the United States.
3. Explain how and why polypharmacy is a greater problem in the elderly population, relative to younger patients.
4. List age-related changes in physiology that alter the effects of medications in the elderly.
5. Cite examples of pharmacokinetic and pharmacodynamic changes that occur in geriatric patients.
6. List examples of drugs that may be inappropriate for use in the elderly according to the Beers list.
7. Describe the socioeconomic impact of medication non-adherence.
8. Discuss strategies that APRNs can implement to improve medication adherence in geriatric patients.

## **Drug Therapy Management: Changing Demographics in the Elderly and the Epidemiology of Aging**

### **Demographics and Epidemiology of Aging in the United States<sup>1-3</sup>**

- The population age 65 and older was estimated at 43.1 million in 2012.
- This current numerical growth and proportion of older adults is unprecedented in US history.
- By 2050, it is predicted that the population aged 65 or older will be about 89 million.
- The rapid aging of the US population is driven by the fact that Americans are living longer. Also, there are proportionately more older adults alive now than in any previous generation.
- In 2030, when the last baby boomer turns 65, the US demographic landscape will have changed significantly in that one of every five Americans (~72 million people) will be an older adult.
- The proportion of those >85 years of age will continue to grow.
- By 2050, one in four older adults will be 85 years of age or older.
- During the next several decades there will be significant increases in racial and ethnic diversity.
- In 2010, 80% of adults aged 65 or older in the US were non-Hispanic white.

- By 2030, that percentage will have declined and older non-Hispanic white adults will make up 71.2% of the population.
- Hispanics will make up 12%, non-Hispanic blacks ~10.3% and Asians 5.4% of the population.

The decline in premature death in the elderly and their overall better health are likely due to:

1. Public health measures affecting all age groups, such as expanding immunizations and good prenatal care.
2. Advances in medical technology.
3. Promotion of a healthy lifestyle.
4. Improvements in living conditions.
5. Improved public health campaigns and screening.
6. Behavior changes (e.g. smoking cessation).

## Test Yourself

By 2050, one in four older adults will be age 85 or older.

- A. True
- B. False

**The answer is: A. True.**

## Aging in the United States

- Gender structure among the older population is expected to change in the future.
- Female life expectancy has long exceeded male life expectancy, with women outnumbering men in older age groups.
- Over the next four decades, the gap between the number of women and men is expected to narrow due to the more rapid increase in life expectancy for men that is projected over the next several decades.
- Among those 65 years and over in 2050, 55.1% are projected to be females, down from 56.4% in 2012.
- Among those 85 years and over, 61.9% are projected to be females in 2050, down from 66.6% in 2012.
- While most elderly individuals are self-sufficient and live in the community, as they age, the likelihood of living alone increases, more so for women than men.
- Only 4.5% of elderly reside in a long-term care facility, which is down from 5.1% in 1990.
- The increased use of alternative long-term care services, such as assisted-living facilities, home healthcare, and patient centered medical homes probably accounts for this. This trend is likely to increase in the years ahead. In addition, the elderly are living longer today than in past years as there have been major advances in medical technology and the promotion of healthier lifestyles.
- 45% of nursing homes patients are 85 years and older, compared to only 9.5% who are younger than 65 years.
- US expenditures for health care are already the highest among developed nations, but are expected to rise further as chronic diseases affect growing numbers of geriatric patients.
- Among healthcare costs for older Americans, 95% are for chronic diseases. The cost of providing health care for one person aged 65 or older is 3-5 times higher than the cost for someone younger than 65.
- By 2030, health care spending will increase by 25%, as the population ages. This estimate does not take into account inflation and the higher costs of new technologies.
- Medicare spending is projected to increase from over \$555 billion (2011 figure) to \$903 billion in 2020.

## Test Yourself

The decline in premature death in the elderly and their overall better health are likely due to:

- A. Advances in medical technology
- B. Promotion of a healthy lifestyle
- C. Behavior changes, such as smoking cessation
- D. All of the above

The answer is: D- All of the above.

## Drug Therapy Management: Challenges in Pharmaceutical Care of Geriatric Patients

### Causes of Mortality in the Geriatric Population<sup>1-3</sup>

- During the preceding century, a major shift occurred in the leading causes of death in older adults, from infectious diseases and acute illnesses to chronic diseases and degenerative illnesses.
- More than 65% of older Americans have multiple chronic conditions.
- Treatment for this population accounts for 66% of the US healthcare budget.
- Treatment of many chronic diseases in the elderly have become multimodal in nature.

More specifically, these chronic medical conditions were the leading causes of death among US elderly adults between the years of 2007-2009:

- Heart disease: 27.7%
- Cancer: 22.1%
- Chronic lower respiratory diseases: 6.5%
- Stroke: 6.4%
- Alzheimer's disease: 4.4%
- Diabetes: 2.8%
- Influenza and pneumonia: 2.6%

### Unique Challenges in Care of the Geriatric Population<sup>1-3</sup>

- Geriatric patients with chronic diseases (e.g. cardiovascular and COPD) may also have co-existing health problems, such as substance use disorders, psychiatric disease (e.g. depression, bipolar), dementia or other cognitive impairment, and developmental disabilities.
- The complex nature of these conditions leads to the need for multiple healthcare specialists, a variety of treatment regimens, and multiple prescription medications (polypharmacy) that need specialized monitoring.
- Geriatric patients with multiple disease states face an increased risk of conflicting medical advice, adverse drug effects, unnecessary and duplicative tests, and potentially avoidable hospitalizations.
- Hearing loss has been reported in 41% of older adults.
- Decreased visual acuity has been reported in 17% of elderly individuals.
- Moderate or severe memory impairment has been reported in 13% of elderly patients.
- The prevalence of memory impairment increases to 32% for those 85 years of age or older.

## Test Yourself

The leading cause of death among US elderly adults between the years of 2007-2009 was:

- A. Heart Disease
- B. Stroke
- C. Alzheimer's disease
- D. Diabetes

The correct answer is: A- Heart Disease.

## Polypharmacy in the Geriatric Population<sup>4,5</sup>

- Medications, including prescription, OTC, and herbal therapies are widely used by older adults.
- A recently-published survey of 3,005 community dwelling US adults 57-85 years of age was conducted using in-home interviews and medication logs.
- At least one prescription medication was used by 81% of individuals.
- Five or more prescription drugs were used by 29% of the overall survey population and by 36% of people aged 75-85 years.
- 40% of prescription users also took at least one OTC drug.
- Polypharmacy is the use of multiple medications, generally between 5-10 medications, by a single patient at the same time.
- Polypharmacy typically refers to prescribed medications, but one should also consider the number of OTC and herbal supplements used.
- An estimated 20% of Medicare recipients are diagnosed with five or more chronic medical conditions and 50% are receiving five or more medications.
- Increased use of medications is an independent risk factor for an adverse drug event.
- Polypharmacy in the elderly also raises the concern for potentially inappropriate or unnecessary medications.
- Inappropriate medications include prescribing an increased number of drugs, or a higher dosage than is clinically indicated, or drugs not needed.
- Polypharmacy increases the risk of adverse drug events, which can be misinterpreted as a new medical condition, resulting in additional drug therapy prescribed to treat this "new condition."

## Drug Therapy Management Goals in the Geriatric Population<sup>3</sup>

These special challenges in the geriatric patient can be managed by setting goals for pharmacotherapy in the elderly patient.

Drug therapy in the elderly should not be limited to attenuation of symptoms or disease management, but should encompass the following:

- Maintenance of independence and avoiding the need for institutionalization for as many years as possible.
- Improvement or maintenance of basic activities of daily living (ADLs).
- Improvement or maintenance of physical function.
- Improvement or maintenance of cognitive function.
- Improved medical treatment, both for acute and chronic illness, as well as health maintenance.
- Improvement in healthy behaviors, (e.g. smoking cessation, exercise, weight loss, nutrition, and vaccination).
- Identification of potentially inappropriate medications, drug-drug, drug-food, or drug-disease interactions, incorrect dosages, drug errors of omission, including vaccinations and preventative interventions.

## Test Yourself

Drug therapy management goals in the geriatric population include:

- A. Maintenance of independence for as long as possible.
- B. Improvement or maintenance of basic activities of daily living.
- C. Improvement or maintenance of cognitive function.
- D. All of the above.

The correct answer is: D- All of the above.

## Drug Therapy Management: Physiologic Changes in Aging that Impact Drug Therapy

### Physiologic Changes in the Elderly<sup>3, 7-9</sup>

#### Changes in body composition:

- Decreased total body water
- Decreased lean body mass
- Decrease in muscle mass
- Increased body fat
- Changes in drug binding proteins, such as serum albumin
- Increases in  $\alpha$ 1-acid glycoprotein

#### Cardiovascular changes:

- Decreased myocardial sensitivity to  $\beta$ -adrenergic stimulation
- Decreased baroreceptor activity
- Decreased cardiac output
- Increased total peripheral resistance
- Left ventricular hypertrophy

#### Central nervous system changes:

- Decreased weight and volume of the brain
- Cognitive decline
- Memory impairment
- Predisposition to falls
- Autonomic baroreceptor dysfunction

#### Endocrine changes:

- Thyroid gland atrophy
- Increased incidence of diabetes mellitus
- Increased incidence of thyroid disease
- Post-menopausal concerns in women secondary to reduced endogenous estrogen production
- Decrease in endogenous melatonin production by the pineal gland

#### Gastrointestinal changes:

- Increase in gastric pH (more basic or alkaline intraluminal pH)
- Decrease in gastrointestinal blood flow
- Delayed gastric emptying

- Decreased intestinal transit or decrease in gut peristalsis

#### **Hepatic changes:**

- Overall decrease in liver mass
- Decrease in liver blood flow
- Decrease in number of functional hepatocytes
- Reduction in function of certain mixed function oxidase enzymes
- Decreased production of endogenous clotting factors by the liver

#### **Respiratory tract changes:**

- Decrease in respiratory muscle strength
- Decrease in chest wall compliance
- Decrease in total alveolar surface
- Decrease in lung vital capacity
- Decrease in maximal breathing capacity
- Decrease in peak expiratory flow rate

#### **Renal changes:**

- Overall decrease in renal mass
- Decrease in number of functional nephrons
- Decrease in glomerular filtration rate
- Decrease in renal blood flow
- Decreased filtration fraction
- Decrease in tubular secretion
- Reduced basal renin levels

#### **Sensory changes:**

- Hearing loss
- Decreased visual acuity
- Accommodation of the lens of the eye resulting in farsightedness

### **Test Yourself**

Changes in body composition that occur in the elderly include:

- A. Increased total body water
- B. Decreased lean body mass
- C. Increase in muscle mass
- D. Decrease in body fat

**The correct answer is: B- Decreased lean body mass.**

### **Test Yourself**

Cardiovascular changes seen in the elderly include:

- A. Decreased myocardial sensitivity to  $\beta$ -adrenergic stimulation
- B. Increased baroreceptor activity
- C. Increased cardiac output
- D. None of the above

The correct answer is: A- Decreased myocardial sensitivity to  $\beta$ -adrenergic stimulation.

## Test Yourself

Relative to younger patients, gastric pH is decreased in the elderly.

True  
False

The correct answer is: B- False.

## Drug Therapy Management: Pharmacokinetic Alterations in Geriatric Patients

### Pharmacokinetic Alterations in the Elderly<sup>3,7-11</sup>

- Elderly individuals experience age-related changes in pharmacokinetics: changes in drug absorption, distribution, metabolism, and elimination (ADME).
- While considerable attention has been given to changes in pharmacokinetic changes in the elderly, most experts are calling on drug manufacturers and the FDA to include more geriatric-specific ADME data in premarketing trials.
- In general, the most important pharmacokinetic parameter that changes in elderly is drug elimination secondary to diminished renal function.
- Less information is available regarding altered pharmacodynamic changes in the elderly, relative to pharmacokinetics.
- There is some evidence of altered drug sensitivity in older adults, both increased and decreased sensitivity, depending on the drug, relative to younger individuals.
- Some evidence exists for changes in receptor density, receptor affinity, post-receptor alterations and age-related impairment of homeostatic mechanisms.
- Some drugs with muscarinic,  $\beta$ -adrenergic,  $\alpha$ 1-adrenergic and  $\mu$ -opioid receptors activity exhibit reduced receptor density with increasing age.
- The elderly may be more sensitive to the central nervous system effects of benzodiazepines and may have a greater analgesic response to opiates compared with younger patients.
- In addition to opiates, geriatric patients may also have an enhanced response to warfarin and heparin.
- The elderly may have a diminished response to  $\beta$ -agonists and antagonists.
- Diminished baroreceptor function may blunt some of the reflex tachycardia seen with vasodilators.

## Test Yourself

The elderly may be more sensitive to the central nervous system effects of benzodiazepines compared with younger patients.

A. True  
B. False

The correct answer is: A- True.

## Pharmacokinetic Alterations in the Elderly

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(Reference #'s 3, 7-11)

### **Absorption**

Changes in drug absorption:

- Little or no change in passive diffusion.
- Little or no change in bioavailability for most drugs.
- Potential decrease in absorption of iron salts, B complex vitamin, and azole antifungals due to decreased acidity.
- Decreased active transport for few drugs.
- Decrease in hepatic first-pass extraction for a few drugs (e.g. propranolol and morphine).

### **Distribution**

Changes in drug distribution:

- Decrease in the volume of distribution and increase plasma concentration of water-soluble drugs.
- Increase in the volume of distribution and increase in terminal half-life for fat-soluble drugs.
- Alteration of the free fraction of highly plasma protein-bound drugs.
- For example, for acidic drugs, such as naproxen, phenytoin, or warfarin, a decreased serum albumin might result in an increase in free fraction of the drug and potential increased drug effect.
- In another example, an increase in  $\alpha$ 1-acid glycoprotein might result decreased free fraction of basic drugs such as lidocaine, propranolol, quinidine and imipramine, and potential in decreased drug effect.

### **Metabolism**

Changes in drug metabolism:

- Decreased clearance and increased half-life for some drugs that undergo oxidative metabolism; examples include diazepam and theophylline.
- Decreased clearance and increased half-life for drugs with high hepatic extraction ratios. Examples include propranolol, lidocaine, and imipramine, due to reductions in hepatic blood flow.
- In both cases increased drug effect is possible.

### **Excretion**

Changes in drug excretion:

- Decreased clearance and increased half-life for drugs and metabolites eliminated by glomerular filtration.
- Many drugs require dosage adjustment because of the decrease in glomerular filtration rate (GFR) that accompanies the aging process.
- Dose adjustment requires the clinician to estimate creatinine clearance (CrCl) which is an approximation of GFR.

## **Test Yourself**

Potential decreases of absorption in iron salts, B complex vitamin, and azole antifungals may occur in the elderly due to decreased acidity.

- A. True
- B. False

The correct answer is: A- True.

## **Drug Therapy Management:** **Renal Dosage Adjustment in Geriatric Patients**

## Estimating Renal Function in the Elderly<sup>3,7-13</sup>

Accurate assessment of kidney function is an important component of determining appropriate drug dosing regimens. The Cockcroft-Gault (CG) Equation is the most common formula for determining creatinine clearance, which estimates glomerular filtration rate (GFR). Although this formula may over-estimate GFR by 10-20%, it still remains the standard for drug dosing adjustments, although it becomes less and less predictable as patients get older, especially after the age of 85.

- The Cockcroft-Gault (CG) method of estimating creatine clearance (CrCl) is based on the normal GFR of 90-120 ml/min.
- The CG method estimates GFR based on serum creatinine measurement which is a breakdown product of skeletal muscle; muscle mass is decreased in the elderly.

**Please note!**

**Renal blood flow decreases ~1% per year after age 50.**

- Creatinine is freely filtered by the glomerulus, but also actively secreted by the peritubular capillaries.
- While the Cockcroft and Gault method is helpful for initiating drug doses, clinical parameters and patient response should be heavily considered as well, for subsequent dosage adjustments.
- Before using this equation, it is important to understand the etiology of any underlying renal impairment and compare baseline results in elderly patients.

**Please note!**

**CrCl is a function of age, serum creatinine, weight, gender, and race.**

Caveats to using the Cockcroft and Gault method:

- It is not nearly as accurate as a measured 24-hour CrCl in the elderly.
- It will often overestimate actual renal function in the elderly.
- It becomes less and less accurate in settings where renal function is acutely changing and in conditions associated with renal hypoperfusion, such as sepsis, profound dehydration, cardiogenic shock, etc.
- $CrCl = [(140 - \text{age})(\text{IBW in kg})] / [(\text{Scr})(72)]$
- Multiply above by 0.85 for female patients
- $IBW = 45.5\text{kg} + 2.3\text{kg/inch} > 5 \text{ feet}$  (Use 50kg for males)

Example of a 75 year old African American female who is five foot tall and weighs 50kg with a serum creatinine of 1.8mg/dL:

- $CrCl = [(140 - \text{age})(\text{IBW in kg})] / [(\text{Scr})(72)]$
- $CrCl = [(140 - 75)(45.5)] / [(1.8)(72)] \times 0.85$
- $CrCl = 19.4\text{mg/dL}$  (estimated)
- Thus, even though this patient's serum creatinine is slightly elevated, due to her advanced age of 75, her estimated GFR is only about 20% that of a healthy young patient.

## Test Yourself

Which of the following statements is true?

- Creatinine is a breakdown product of skeletal muscle.
- Muscle mass is decreased in the elderly.
- Creatinine is freely filtered by the glomerulus.
- All of the above.

The correct answer is: D- All of the above.

## Estimating Renal Function in the Elderly<sup>3,7-13</sup>

A 24 hour urine CrCl is a more accurate method to determine GFR and adjust medications.

### MDRD (Modification of Diet in Renal Disease):

The most recently advocated formula for calculating the GFR is the Modification of Diet in Renal Disease (MDRD) formula. The most commonly used version of this formula is the “4-variable MDRD”, which estimates GFR using four variables: serum creatinine, age, ethnicity, and gender.

The MDRD equation has been validated in patients with chronic kidney disease; however it often underestimates actual renal function in patients with good renal function, and does not take into account height and weight. It has a correction factor for the African American race. The MDRD has not been extensively studied as a reliable method of drug dosing in renal impairment. It also has a complicated equation; that requires dosing using a calculator:

$$\text{GFR (mL/min/1.73m}^2\text{)} = 186 \times (\text{Scr})^{-1.154} \times (\text{age})^{-0.203} \times (1.742 \text{ if female}) \times (1.210 \text{ if African American})$$

Similar caveats apply with the MDRD, as with the Cockcroft and Gault equation.

Same example of a 75 year old African American female who is 5 foot tall and weighs 50kg with a serum creatinine of 1.8mg/dL:

- $\text{GFR (mL/min/1.73 m}^2\text{)} = 186 \times (\text{Scr})^{-1.154} \times (\text{age})^{-0.203} \times (0.742 \text{ if female}) \times (1.210 \text{ if African American})$
- Estimated GFR is 27.8ml/min adjusted for her body surface area
- Both methods are estimates only and become less accurate as patients get older, in obesity and in clinical scenarios where renal function is acutely changing, as discussed previously
- Online calculator for estimating renal function: [http://www.globalrph.com/multiple\\_crcl.htm](http://www.globalrph.com/multiple_crcl.htm)

## Test Yourself

The Cockcroft and Gault method will often underestimate actual renal function in the elderly.

- A. True
- B. False

The correct answer is: B- False.

## Drugs to Avoid or Needing Renal Dosage Adjustment in Geriatric Patients<sup>\*9,14,15</sup>

The following drugs should be avoided or the doses carefully adjusted when used in the geriatric population:

- Allopurinol
- Digoxin
- Angiotensin Converting Enzyme Inhibitors
- Glyburide
- Antimicrobials:
  - Most beta-lactams (penicillins cephalosporins)
  - Vancomycin, aminoglycosides, amphotericin, trimethoprim plus sulfamethoxazole
  - Many antivirals and quinolones (excluding moxifloxacin)

**\*Will be discussed in more detail later under the “Beers List”.**

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## Additional Drugs to Avoid or Needing Renal Dosage Adjustment in Geriatric Patients<sup>9,14,15</sup>

Lithium	Gabapentin, topiramate
Atenolol, nadolol	Metoclopramide
Procainamide (NAPA), lidocaine, quinidine	Enoxaparin
Cyclosporine, tacrolimus, sirolimus	Phenytoin (increased free, unbound fraction of drug)
Methotrexate, cisplatin, various chemo drugs	Diazepam (active metabolites are renally excreted)
Meperidine; codeine, methadone, fentanyl	First generation sulfonylureas, such as chlorpropamide
Amantadine	Insulin

## Drugs Potentially Needing Renal Dosage Adjustment in Geriatric Patients<sup>9,14,15</sup>

- There are other medications that geriatric patients with end stage renal disease should not receive, some examples included direct renin inhibitors, angiotensin receptors antagonists, spironolactone, and triamterene, and thiazides, which lose their efficacy at GFR <30ml/min.
- Other drugs requiring dosage
  - Metformin (increased risk of lactic acidosis)
  - Radiocontrast media
  - Certain statins due to the risk of muscle toxicity increasing with renal failure
  - Colchicine and probenecid

### Test Yourself

Relative to younger patients, renal clearance is increased in the elderly.

- A. True
- B. False

The correct answer is: B- True.

### Drug Therapy Management:

#### Inappropriate Medications in the Elderly: The American Geriatric Society's 2012 Beers Criteria

### Inappropriate Medications in the Elderly<sup>3,9,16</sup>

- The use of potentially inappropriate medications continue to be a problem in geriatric drug therapy management.

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- The American Geriatric Society publishes a list of inappropriate medications in the elderly known as the Beers List which was last updated in 2012.
- The Screening Tool of Older Person's Prescriptions (STOPP) and Screening Tool to Alert Doctors to Right Treatment (START) is an additional consensus paper to guide clinicians on proper use of medications in the elderly, but will not be discussed herein.
- The Beers List provides evidence and gives recommendations in the following three categories:
  1. Potentially inappropriate medications and drug classes to avoid in older adults.
  2. Potentially inappropriate medications and classes to avoid in older adults with certain diseases and syndromes that the drugs listed can exacerbate.
  3. Medications to be used with caution in older adults.

**The following tables summarize these recommendations, but does not represent a comprehensive listing of drugs.**

## Potentially Inappropriate Use in Older Adults: Beers Criteria 2012<sup>9</sup>

Drug	Reason	Guidance
<b>First Generation Anticholinergic Drugs:</b> <ul style="list-style-type: none"> <li>Hydroxyzine</li> <li>Brompheniramine</li> <li>Chlorpheniramine &amp; Doxylamine</li> </ul>	Highly anticholinergic, reduced clearance, tolerance develops when used as a hypnotic, risk of side effects such as dry mouth, confusion, constipation	Avoid
<b>Antispasmodics:</b> <ul style="list-style-type: none"> <li>Belladonna</li> <li>Dicyclomine</li> <li>Hyoscyamine &amp; Scopolamine</li> </ul>	Highly anticholinergic, uncertain efficacy	Avoid
<b>Nitrofurantoin</b>	Potential for pulmonary toxicity; safer alternatives available; lack of efficacy in patients with CrCl < 60mL/min	Avoid for long-term suppression and in those with CrCl <50
<b>Non-Selective Alpha<sub>1</sub> Blockers:</b> <ul style="list-style-type: none"> <li>Doxazosin</li> <li>Prazosin</li> <li>Terazosin</li> </ul>	High risk of orthostatic hypotension	Avoid use as an antihypertensive
<b>Central Alpha Blockers:</b> <ul style="list-style-type: none"> <li>Clonidine</li> <li>Methyldopa</li> </ul>	High risk of CNS effects; can cause bradycardia and orthostasis	Avoid clonidine as first-line antihypertensive

Drug	Reason	Guidance
<b>Antiarrhythmic Drugs:</b> <ul style="list-style-type: none"> <li>Amiodarone</li> <li>Dofetilide</li> <li>Dronedarone</li> <li>Procainamide &amp; Quinidine</li> </ul>	Rate control yields better balance of benefits & harms than rhythm control for most older adults; drugs like amiodarone have high toxicity	Avoid as first-line for atrial fibrillation
<b>Spironolactone</b> (at doses >25 mg/day)	In heart failure, the risk of hyperkalemia is higher in older adults, especially if taking >25 mg/d plus NSAIDs or ACEI/ARB or potassium supplements	Avoid in those with heart failure or those with CrCl <30 mL/min
<b>Tricyclic Antidepressants:</b> <ul style="list-style-type: none"> <li>Amitriptyline</li> <li>Doxepin</li> </ul>	Highly anticholinergic, sedation & causes orthostatic hypotension	Avoid
<b>Antipsychotics:</b> <ul style="list-style-type: none"> <li>Chlorpromazine</li> <li>Aripiprazole</li> <li>Fluphenazine, Asenapine, Haloperidol &amp; Clozapine</li> </ul>	Increased risk of stroke & mortality in persons with dementia	Avoid use for behavioral problems of dementia

## Test Yourself

In elderly patients with heart failure, the risk of hyperkalemia is higher if taking spironolactone >25 mg/d plus NSAIDs, or ACEI/ARB, or potassium supplements.

- A. True
- B. False

The correct answer is: A- True.

## Potentially Inappropriate Use in Older Adults: Beers Criteria 2012<sup>9</sup>

Drug	Reason	Guidance
<b>Benzodiazepines (BZD):</b> <ul style="list-style-type: none"> <li>• Alprazolam</li> <li>• Estazolam</li> <li>• Lorazepam</li> <li>• Clonazepam</li> <li>• Diazepam</li> </ul>	Older adults have increased sensitivity, slower metabolism; all agents increase fall risk, delirium, cognitive impairment, fractures & accidents; may be appropriate for alcohol withdrawal & treatment of seizure disorder	Avoid any BZD (short- or long-acting) for treatment of insomnia, agitation, or delirium
<b>Non-BZD Hypnotic:</b> <ul style="list-style-type: none"> <li>• Zaleplon</li> <li>• Zolpidem</li> </ul>	Similar adverse effects to benzodiazepines and minimal benefit to sleep latency and duration	Avoid chronic use, defined as >90 days
<b>Androgens:</b> <ul style="list-style-type: none"> <li>• Testosterone</li> <li>• Methyltestosterone</li> </ul>	Potential for cardiac problems and contraindicated in men with prostate cancer	Avoid unless used for moderate to severe hypogonadism
<b>Desiccated Thyroid</b>	Concerns about cardiac effects; safer alternatives available	Avoid

Drug	Reason	Guidance
<b>Hormones:</b> <ul style="list-style-type: none"> <li>• Estrogens</li> <li>• Progestins</li> </ul>	Carcinogenic potential; lack of cardiac & cognitive benefit; vaginal estrogens effective for vaginal dryness at low dose	Avoid oral & topical
<b>Insulin (sliding scale)</b>	Higher risk of hypoglycemia without improvement in hyperglycemia management	Avoid
<b>Megestrol</b>	Minimal effect on weight; increases risk of thrombotic events & possibly death	Avoid
<b>Glyburide</b>	Greater risk of severe prolonged hypoglycemia in older adults	Avoid
<b>Metoclopramide</b>	Extrapyramidal symptoms, including tardive dyskinesia	Avoid unless for gastroparesis

Drug	Reason	Guidance
<b>NSAIDs:</b> <ul style="list-style-type: none"> <li>• Aspirin &gt;325 mg/d</li> <li>• Diclofenac</li> <li>• Etodolac</li> <li>• Ibuprofen</li> <li>• Meloxicam</li> <li>• Nabumetone</li> <li>• Naproxen</li> </ul>	Upper GI ulcers, bleeding, or perforation occurs in ~1% of patients treated for 3-6 months & ~2-4% in those treated for 1 year; risk is especially high in those <75 years and taking corticosteroids, anticoagulants, or antiplatelet drugs	Avoid chronic use unless other options are not effective & patient can take PPI
<b>Indomethacin, Ketorolac</b>	Increase GI bleeding risk & peptic ulcer disease, as with other NSAIDs	Avoid
<b>Skeletal Muscle Relaxants:</b> <ul style="list-style-type: none"> <li>• Carisoprodol</li> <li>• Cyclobenzaprine</li> <li>• Metaxalone</li> <li>• Methocarbamol</li> </ul>	Most are poorly tolerated due to anticholinergic adverse effects, sedation, fracture risk	Avoid

### Miscellaneous Potentially Inappropriate Use in Older Adults: Beers Criteria 2012<sup>9</sup>

Other drugs and drug classes considered “inappropriate” for the elderly according to the Beers List include the following:

- Narcotics, such as meperidine and pentazocine
- Growth hormone
- Barbiturates and related drugs, such as phenobarbital, butalbital, meprobamate, and chloral hydrate
- Digoxin at doses >0.125mg daily
- First-generation antiparkinson agents, such as benztropine and trihexyphenidyl
- Mineral oil
- Nifedipine, immediate release



## Drugs to be Used with Caution in Elderly: Beers Criteria 2012<sup>9</sup>

Drug	Reason
Aspirin (when used for primary prevention)	Lack of evidence of benefit versus risk in those $\geq 80$ years of age
Dabigatran	Greater risk of bleeding than warfarin in those $\geq 75$ years; lack of evidence for safety & efficacy in $ClCr < 30$ mL/min
Prasugrel	Greater risk of bleeding in older adults
Antipsychotics <ul style="list-style-type: none"> <li>• Carbamazepine</li> <li>• Mirtazapine</li> <li>• Serotonin Norepinephrine Reuptake Inhibitors</li> <li>• Selective Serotonin Reuptake Inhibitors</li> <li>• Tricyclic Antidepressants</li> <li>• Some Antineoplastic Drugs (e.g. cisplatin)</li> </ul>	May exacerbate or cause inappropriate antidiuretic hormone secretion or hyponatremia; need to monitor sodium closely when starting or changing in older adults
Vasodilators	May exacerbate episodes of syncope in individuals with a history of syncope

## Potentially Inappropriate Medication Use in Older Adults Due to Drug-Disease Interactions Causing Exacerbation<sup>9</sup>

Disease	Drug	Reason	Guidance
Heart Failure	NSAIDs, diltiazem, verapamil, piolitzone, rosiglitazone, cilastazol, dronedarone	Promote fluid retention & can exacerbate heart failure	Avoid
Syncope	Anticholinergics, doxazosin, prazosin, terazosin, TCAs	Risk of orthostasis & bradycardia	Avoid
Delirium	All TCAs, anticholinergics, BZDs, H <sub>2</sub> antagonists, hypnotics, corticosteroids	Can induce or worsen delirium; taper to avoid withdrawal symptoms	Avoid
Dementia & Cognitive Impairment	Anticholinergics, BZDs, H <sub>2</sub> antagonists, zolpidem, antipsychotics	CNS effects, increased risk of CVAs with antipsychotics	Avoid

## Test Yourself

Drugs, such as pioglitazone and rosiglitazone promote fluid retention and can exacerbate heart failure.

- A. True
- B. False

The correct answer is: A- True.

## Potentially Inappropriate Medication Use in Older Adults Due to Drug-Disease Interactions Causing Exacerbation<sup>9</sup>

Disease	Drug	Reason	Guidance
History of Falls or Fractures	Anticonvulsants, antipsychotics, BZDs, non-BZD hypnotics, TCAs & SSRIs	Produce ataxia, impaired psychomotor function, syncope	Avoid unless safer alternatives are not available
Parkinson's Disease	All antipsychotics (except quetiapine & clozapine), antiemetics (metoclopramide)	Dopamine antagonists worsen symptoms	Avoid

Disease	Drug	Reason	Guidance
History of GI or Duodenal Ulcers	Aspirin (>325 mg/d), non-COX selective	May exacerbate ulcer disease	Avoid unless no other option and can take PPI
Chronic Kidney Disease (Stage 4 & 5)	NSAIDs, triamterene	May increase risk of kidney injury	Avoid
Urinary Incontinence	Oral & transdermal estrogen	Aggravation of incontinence	Avoid
Lower Urinary Tract Symptoms & Benign Prostatic Hyperplasia	Strongly anticholinergic agents except antimuscarinics for urinary incontinence	May decrease urinary flow & cause urinary retention	Avoid in men

## Test Yourself

According to the Beers list, which of the following would be potentially inappropriate in an elderly patient with a history of falls or fractures?

- A. Anticonvulsants
- B. Antipsychotics
- C. Benzodiazepines
- D. All of the above

**The correct answer is: D- All of the above.**

## Case Study

### Introduction

FH is an 80 year old female admitted to the hospital with a chief complaint of acute mental status changes.

1.
  - She complained of nausea and was vomiting for two days prior to admission, but had no abdominal pain.
  - At home FM became unresponsive while being fed, then was taken by EMS to the emergency department where she was found to be orthostatic.
2.
  - Rectal exam showed guaiac positive stool, but the nasogastric aspirate was negative for blood. Her past medical history included pain (secondary to osteoarthritis), hypertension, and angina.
3.
  - Her medication oxaprozin 600mg BID (NSAID) was increased from 600mg daily two months prior to admission, enalapril 10mg daily, isosorbide mononitrate XR 30mg daily, and sublingual nitroglycerin PRN. She does not use alcohol or tobacco products.
4.
  - On admission, HF's BP was 133/60mmHg supine and 95/49mmHg standing, she had dry mucus membranes, lungs were clear, guaiac positive stools, she was alert, and oriented times three.
5.
  - Her labs were remarkable for hemoglobin of 5.9gm/dL (low) and hematocrit of 17.9% (low).
  - An EGD (endoscopy) showed a 4-5mm ulcer on the fundus of the stomach; she was H. pylori negative.
6.
  - FH was transfused with a total of four units of packed red blood cells and hydrated. Within 48 hours, her hematocrit stabilized to 38.2% and she was discharged with all her medications except oxaprozin. Acetaminophen 500mg QID was added.
7.
  - Her creatinine went from 1.5mg/dL baseline to 3.0mg/dL on admission and 1.6mg/dL upon discharge.

## Case Study: Question and Answer 1

### Introduction:

FH was diagnosed with a gastric ulcer but did not have abdominal pain. Her chief complaint causing her to be admitted was acute mental status changes.

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**Question:**

- Why did she have mental status changes?

**Answer:**

- In the case study "FH became unresponsive while being fed." This mental status change was likely the result of her being dehydrated secondary to vomiting.

**Clinical Pearls:**

- Elderly individuals often manifest with a different clinical presentation, relative to younger patients.
- For example, a predominant clinical feature of dehydration in a geriatric patient is altered mental status.
- Elderly patients may not express pain as often as younger patients do, as in the case of FH. She had no complaint of abdominal pain.

## **Case Study: Question and Answer 2**

**Introduction:**

FH developed a gastric ulcer, but was found to be H. pylori negative.

**Question:**

- What caused FH's gastric ulcer?

**Answer:**

- FH's oxaprozin dose was doubled in the two months prior to her hospital admission. NSAID-induced ulcers are not uncommon in geriatric patients, especially when given chronically at higher doses.

**Clinical Pearls:**

- Elderly patients are particularly susceptible to the adverse GI effects of NSAIDs. These drugs inhibit prostaglandins which decrease cyclooxygenase (COX) enzyme. COX-1 is a constitutive or "house-keeping" isoform and is responsible for the production of normal, physiologically-active prostaglandins that protect the gastrointestinal tract and maintain normal platelet function.
- Elderly patients already have reduced gut blood flow and are predisposed to adverse GI effects of NSAIDs.

## **Case Study: Question and Answer 3**

**Introduction:**

- FH's serum creatinine went from 1.5 mg/dL at baseline to 3.0 mg/dl on admission, then returned to baseline.

**Question:**

- What cause the rise and fall in FH's serum creatinine?

**Answer:**

- The rise in creatinine likely reflects an acute drop in GFR caused both by dehydration and the use of NSAID. After FH was rehydrated & the oxaprozin stopped, her GFR returned to baseline.

**Clinical Pearls:**

- Elderly patients are particularly susceptible to the adverse renal effects of NSAIDs. These drugs inhibit prostaglandins which decrease cyclooxygenase (COX) enzymes. COX-1 appears to have a dominant role in the maintenance of glomerular filtration rate.
- Elderly patients are more dependent on renal vasodilating prostaglandins than younger patients. NSAIDs decrease the production of these prostaglandins, causing a temporary decrease in renal blood flow.

## Case Study: Question and Answer 4

### Introduction:

FH's has pain secondary to osteoarthritis. However, her NSAID needed to be discontinued and acetaminophen was used instead.

### Question:

- Was the use of acetaminophen appropriate and was the dosage appropriate?

### Answer:

- Yes, both the choice of acetaminophen and dosage are appropriate. Other options exist.

### Clinical Pearls:

- Recently the recommended maximum dose of acetaminophen in adults was decreased to no more than three grams daily.
- Other modalities, such as physical therapy or duloxetine may be indicated.
- Acetaminophen is much safer than NSAIDs for pain due to osteoarthritis in the elderly.

## Drug Therapy Management: Selected Topics in Geriatric Pharmacotherapy

### **Addressing Inappropriate Drug Use: Medication Appropriateness Index (MAI)<sup>17,18</sup>**

The Medication Appropriateness Index (MAI) is a screening instrument which uses implicit criteria to measure elements of appropriate prescribing.

This can be used as a tool to assess appropriateness of medications in the elderly, whereby each medication is scored using the method below.

### Questions for each individual medication are:

1. Is there an indication for this medication? (3 points)
  2. Is the medication effective for the condition? (3 points)
  3. Is the dosage correct? (2 points)
  4. Are the directions correct? (2 points)
  5. Are the directions practical? (2 points)
  6. Are there clinically significant drug-drug interactions? (2 points)
  7. Are there clinically significant drug-disease/condition interactions? (1 point)
  8. Is there unnecessary duplication with other medications? (1 point)
  9. Is the duration of therapy acceptable? (1 point)
  10. Is the medication the least expensive alternative with other of equal utility? (1 point)
- A weight of three is given for indication and effectiveness.
  - A weight of two is assigned to dosage, correct directions, practical directions, and drug-drug interactions.
  - A weight one of is assigned to drug-disease interactions, expense, duplication, and duration.
  - This results in a total combined score of 0-18 (0 = appropriate; 18 = maximal inappropriateness)
  - Each drug is scored and can be used for pharmacist-to-prescriber intervention; however "gaps" often exist if key patient data is unknown or unavailable.
  - MAI does not include direct input from the patient.

## Addressing Underutilized Therapy in Geriatric Patients<sup>3,19-20</sup>

- Increasing attention is being given to the fact that certain drug therapies aimed at treatment or prevention of disease may be underutilized by elderly patients.
- In the original publication, *Assessing the Care of Vulnerable Elders* (ACOVE) criteria included measures for underutilization of bisphosphonates, anticoagulants or antiplatelet therapy, angiotensin-converting enzyme inhibitors and beta-blockers, as may be needed in elderly patients.
- ACOVE-3 (third revision) is an updated and expanded set of quality indicators, including new conditions, such as COPD, colorectal cancer, breast cancer, sleep disorders, and benign prostatic hyperplasia.

## Applying ACOVE Quality Indicators<sup>3,19-20</sup>

### Applying ACOVE Drug Quality Indicators

- A patient on chronic (systemic) corticosteroids MAY NEED calcium and vitamin D.
- A diabetic with proteinuria MAY NEED an ACE inhibitor.
- For general health maintenance a patient MAY NEED influenza vaccine, Tdap, pneumonia vaccine, others.
- Chronic opioid users MAY NEED laxatives.
- A patient at high risk of GI bleed MAY NEED misoprostol or a proton pump inhibitor.

### Applying ACOVE Disease Quality Indicators

- A patient with atrial fibrillation MAY NEED an anticoagulant.
- A patient with heart failure MAY NEED a  $\beta$ -blocker and an ACE inhibitor.
- A patient with COPD MAY NEED bronchodilators (both short- and long-acting), as well as an inhaled corticosteroid.
- A patient with ischemic stroke MAY NEED antiplatelet agent(s).
- Patients with ischemic heart disease MAY NEED a  $\beta$ -blocker.
- Patients with osteoarthritis MAY NEED acetaminophen.
- Patients with osteoporosis MAY NEED a bisphosphonate, with calcium and vitamin D.

## Test Yourself

Which of the following is an example of an ACOVE quality indicator?

- A. A patient on a chronic (systemic) steroid may need calcium and vitamin D.
- B. A diabetic with proteinuria may need aspirin and an ACE inhibitor.
- C. A patient on a chronic opioid may need a laxative.
- D. All of the above.

The correct answer is: D- All of the above.

## Community-Based Interventions by APRNs in Elderly Patients<sup>21-26</sup>

- APRNs can improve suboptimal prescribing and medication adherence and decrease adverse drug reactions in the elderly by assisting with medication management.
- Examples of APRN interventions in community-dwelling elderly and other health-system settings include the following:
  - Conducting medication reconciliation (both outpatient and inpatient setting).
  - Performing drug regimen reviews.
  - Completing comprehensive geriatric assessment.
  - Performing collaborative medication management services in care transitions.

- Conducting geriatric home visits.

## Home Visit Strategies

When conducting home visits in elderly patients, APRNs can implement the following strategies:

1. Develop a comprehensive list of all prescriptions, OTC drugs, vitamins, herbals, and supplements.
2. Assess all medications for proper indication, effectiveness, safety (e.g. dosing, interactions), and assess patient adherence.
3. Review expiration dates and properly dispose of all expired and discontinued medications and supplements.
4. Review labels to determine the dispensing pharmacy and encourage single pharmacy use.
5. Review labels for prescribing physician to identify possible doctor-shopping patterns.
6. Evaluate drug storage locations and conditions.
7. Evaluate the patient's access to medications.
8. Evaluate food or nutrient drug interactions.
9. Develop a comprehensive list of drug allergies and drug intolerance.
10. Collaborate with the prescriber to resolve any issues.

## Home Health Strategies

The APRN can employ several strategies to limit drug-related morbidity in the elderly. By performing a therapeutic "untrial", which is the systematic, informed withdrawal of medications that are dubious value. Also, by paying close attention to individual medication regimes, the APRN can recognize precipitants and warning signs of drug toxicity, such as hypovolemia, dosage changes, and syncope.

1. The APRN can also try to maximize non-pharmacological treatment options, such as complementary and alternative medical practices.
2. The best methodology to limit drug-related morbidity in the elderly is to adopt a "Start low, go slow" approach with regard to dosing of medications, and frequently reassess the need for medication periodically.
3. It is also important for the APRN to utilize appropriate physiologic and lab monitoring parameters, and to recognize indications for temporarily holding medications.
4. It is advisable to probe medication history for non-compliance, drug allergies, OTC use, and history of medication intolerance, and to exercise caution with newly marketed drugs.
5. Always try to reduce the dose of renally-excreted drugs in the elderly, and anticipate drug-drug-food/nutrient interactions.
6. Use caution with drugs with low therapeutic index (e.g. warfarin, digoxin, theophylline, phenytoin, and heparin).

## Test Yourself

Numerous studies document the impact of comprehensive geriatric assessment by pharmacists, especially in the community settings.

- A. True
- B. False

**The correct answer is: A- True.**

## **Drug Therapy Management:** **Strategies to Improve Medication Adherence in the Elderly**

## Defining Medication Adherence Term<sup>27</sup>

- Compliance can be defined as the degree to which a patient's actual dosing schedule corresponds with the regimen prescribed.
- Adherence can be defined as the right drug in the correct dose at the right interval.
- Persistence can be defined as success at seeing the medication therapy through to its intended point of closure.

## Overview of Medication Adherence

- The problem of poor medication adherence should be regarded as one of the most important public health issues.
- Generally, more emphasis and attention in previous years has been on medication access. Examples include Medicare Part D coverage of medications.
- Many examples of poor medication adherence exist in the elderly population.
- Improving medication adherence is a critical factor toward generating favorable outcomes.
- Improving medication adherence should be regarded as a shared responsibility of everyone in healthcare.

## Incidence of Medication Non-Adherence<sup>28</sup>

50% of the 1.8 billion prescription medications dispensed annually in the United States are not taken correctly by patients.

## More Emphasis on Medication Adherence is Needed

- Considerable time and resources are spent on making a proper diagnosis and initiating proper treatment.
- Costly patient work-ups, along with the extensive training of prescribers and pharmacists are to some degree "wasted" if patients do not adhere to their medications.
- Many years and billions of dollars are spent on research and development of pharmaceuticals, as well as marketing expenditures, but the problem of adherence still persists.
- An underlying assumption is often made that patients are adhering to their medications as prescribed.

## Summary of Medication Adherence Studies<sup>29-39</sup>

Most research that has been done with chronic conditions such as hypertension, heart failure and dyslipidemia in various age groups.

Thus, extrapolating results of medication adherence studies to the elderly population is limited.

Medication non-adherence rates are highest in:

- Low socioeconomic status
- Ethnic minorities
- Low literacy rates
- Patients who cannot properly identify their medications
- Similar rates of non-adherence have been found in rural communities and is also problematic in affluent populations.

## Test Yourself

Medication non-adherence rates are highest in:

- A. High socioeconomic status
- B. Ethnic minorities
- C. High literacy rates



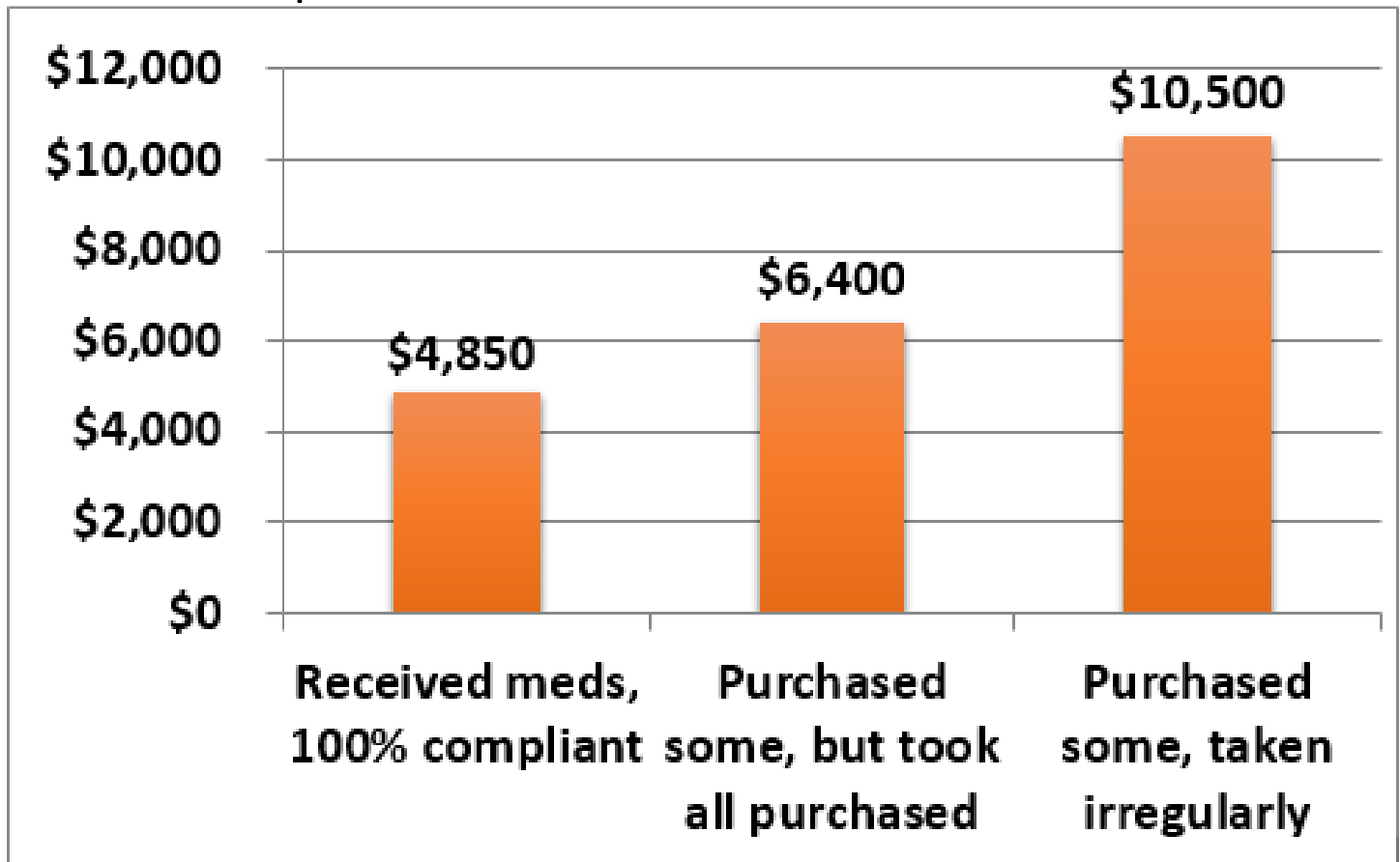
D. None of the above

The correct answer is: B. Ethnic minorities.

### Economic and Humanistic Toll of Noncompliance<sup>40</sup>

- About one-half of the prescriptions written annually are taken incorrectly by patients.
- Poor medication adherence is responsible for ~10% of all hospitalizations.
- Poor medication adherence is responsible for 23% of all nursing home admissions.
- Excessive treatments are associated with poor medication adherence, lost productivity, greater use of emergency care and even premature deaths.
- The cost of non-adherence is \$100-290 billion annually.

### Poor Adherence Impacts Total Costs<sup>28</sup>



### Test Yourself

Approximately 10% of hospital admissions are directly related to medication non-adherence.

- A. True
- B. False

The correct answer is: A. True.

## **Measuring Medication Adherence<sup>27,41-44</sup>**

- There is no gold standard for measuring medication adherence. The use of APRNs, pharmacists, and pharmacy technicians should be considered to improve medication reconciliation across patient care transitions as a method for improving adherence.
- The use of both electronic health records, along with patient or caregiver/guardian interview are needed.
- Selection of the adherence measurement tool depends on multiple factors, including the type of intervention being evaluated, the resources of the organization, as well as ethical and legal considerations as related to patient intervention and confidentiality.

## **Morisky Medication Adherence Scale<sup>45</sup>**

The Morisky Scale is a four-item, self-reported adherence tool (1 point each):

- Do you ever forget to take your medicine?
- Are you careless at times about taking your medication?
- 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?

The Morisky Scale addresses barriers to taking medication. This also allows the healthcare provider to reinforce positive adherence behavior. A score of >1 on the Morisky Scale requires further probing.

## **Modified Morisky Scale<sup>46</sup>**

The Modified Morisky Scale can be modified to include two additional yes or no questions:

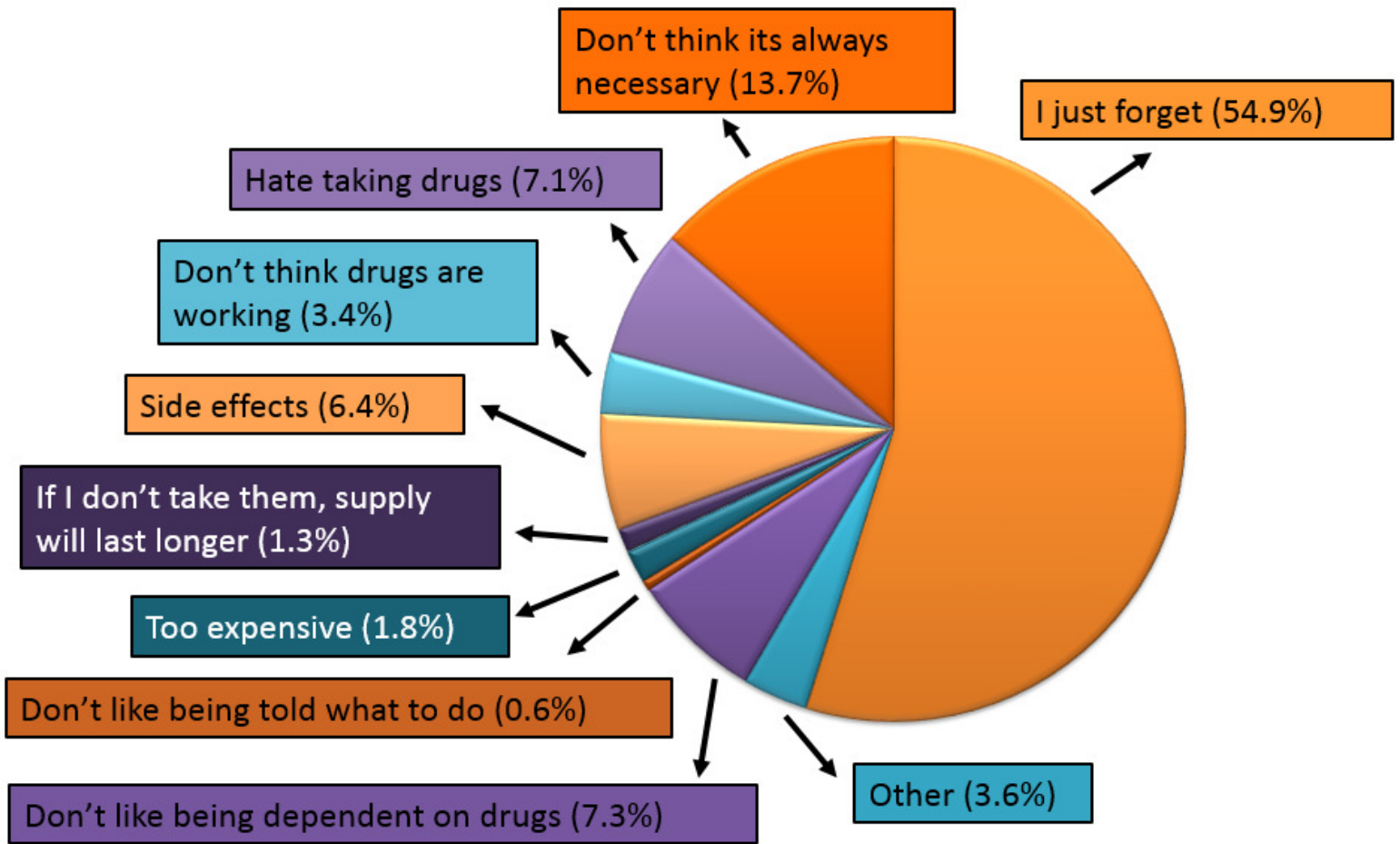
1. Do you know the long-term benefit of taking your medicine as told to you by your doctor or pharmacist?
2. Sometimes do you forget to refill your medication on time?

The scale can be tailored for a specific disease states and can help identify adherence problems, barriers and potential solutions, as well as reinforce positive adherence behavior.

### Compliance Rates by Disease State<sup>47</sup>

Therapeutic Area	# Reports	Mean Compliance Rate (%)	Range (%)
Cancer	5	80	35-97
<b>Cardiovascular (all)</b>	<b>26</b>	<b>71</b>	<b>39-93</b>
Hypertension	17	73	39-93
Epilepsy	3	70	46-88
Glaucoma	2	78	76-80
Infectious Disease	8	74	40-62
Medical - General (all)	14	75	51-85
<b>Diabetes</b>	<b>3</b>	<b>73</b>	<b>66-85</b>
Psychiatry	4	78	75-83
Respiratory (all)	10	54	37-92
Asthma	7	55	37-92
COPD	3	51	50-50

## Patient-Reported Reasons for Non-Compliance<sup>48</sup>



### Test Yourself

Side effects are the number one reason patients report for being non-adherent with their medications.

- A. True
- B. False

The correct answer is: B. False.

## Potential Barriers to Improving Adherence<sup>31</sup>

Poor Attitude	Denial
Memory deficits	Fear or embarrassment
Language	Side effects
Literacy	Religious beliefs
Cultural beliefs	Unable to “see” results of drug therapy
Alternative health benefits	Lack of choices
Poor support	Cost
Pride	

## How and Why do Patient’s Fail to Comply?<sup>49</sup>

### Refusal to take medication:

- Patient not convinced of need for drug
- Fear of adverse/side effects
- Cost
- Dislike of taking drugs

### Discontinuation of medication:

- Patient not convinced of drug’s benefit
- Intolerance of adverse effects
- Patient cannot remember to take drug
- Cost

### Reducing dosage to less than prescribed:

- Patient not convinced of drug’s benefit
- Intolerance of adverse effects
- Cost

### Increasing dosage:

- Perception that more is better
- Perception that drug makes the patient feel good
- To “hurry” the cure or treatment process

### Taking a drug holiday:

- Patient not convinced of drug’s benefit
- To achieve effect perceived as enjoyable
- To accommodate a transient life event
- Perception that drug interferes with certain events
- Inability to remember

### “Whitecoat” compliance:

- Patient not convinced of drug’s benefit
- To procure approval from clinician or avoid rebuke

## Addressing Forgetfulness<sup>31</sup>

Knowing that patients report forgetfulness as a top reason for poor adherence, the following methods should be considered:

### Simplify prescribed regimens:

- Once daily medications
- Taper or discontinue potentially inappropriate medications

### Recommend the use of organizers and reminders:

- Blister packs
- Calendars
- Dosage counters

### Consider using adherence-aiding strategies:

- Reminders via phone calls and email
- Medication diaries reviewed by healthcare provider

## Test Yourself

Forgetfulness is a main reason patients report for being poorly adherent with their medications.

- A. True
- B. False

**The correct answer is: A. True.**

### Novel Approaches to Improve Medication Adherence

- Automated refill reminder calls from community pharmacy
- Group patient education visits
- Use of technology:
  - Wireless electronic pill boxes
  - Text messages, PDA alarms, wristband alarms and timers
  - “Glow cap” pill bottles
  - Comprehensive listing of devices: <http://www.epill.com>
- Tools from American Society of Consulting Pharmacists:
  - [www.adultmedication.com](http://www.adultmedication.com)
- Pharmaceutical assistance programs:
  - <http://www.pparx.org>
- Nonprofit organizations providing medication assistance:
  - <http://www.needymeds.org>
  - <http://www.rxoutreach.org>

## Reinforcing the Value of Medicines with the Patient

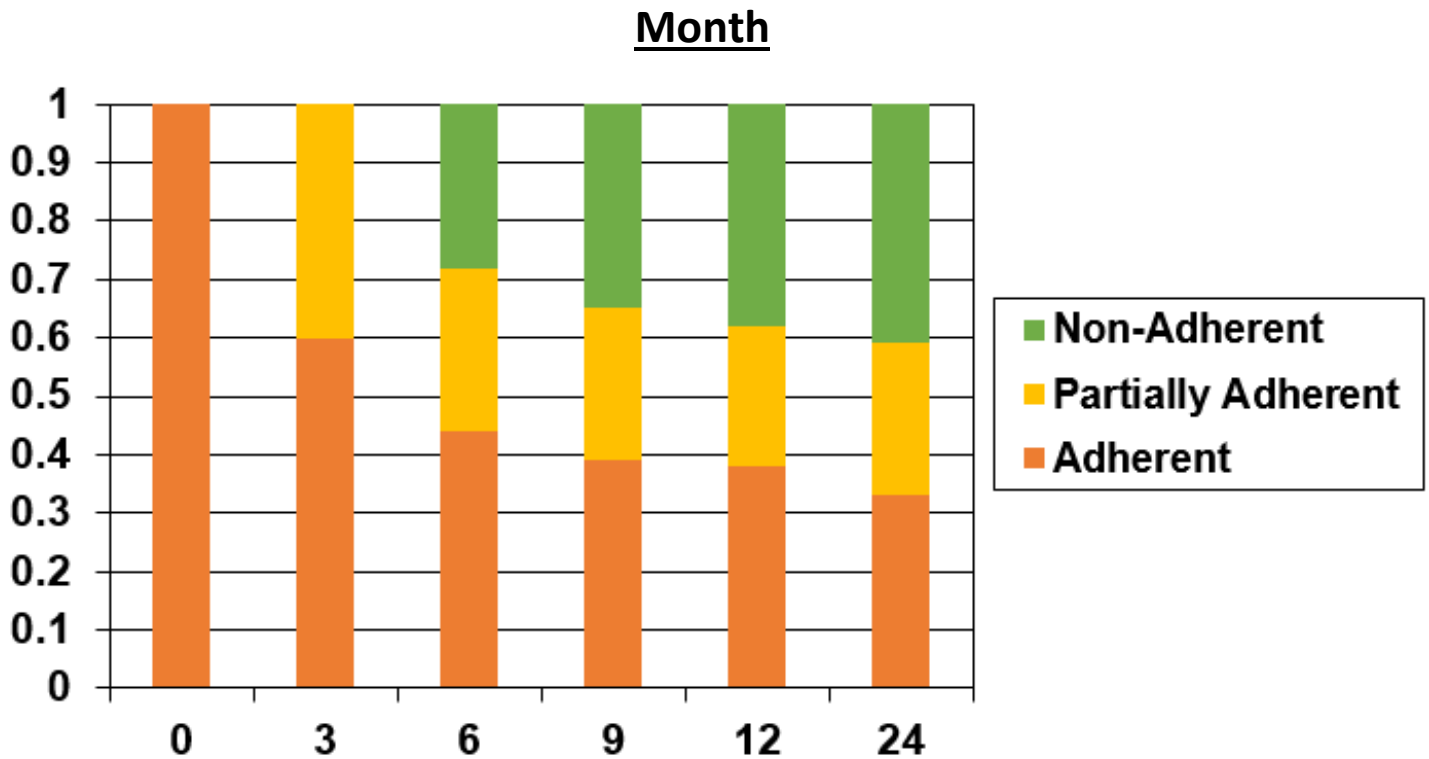
- It is important to educate the patient on the importance of taking medication as prescribed.
- Discuss what medication use can and cannot accomplish, set realistic goals and temper expectations.
- Provide clear indications of what may occur if the medication is not used properly, or not at all.
- Guard against making any statements that might undermine the relationship between a patient and his/her physician.
- Try to resolve potential drug related problems without putting the patient in the middle by contacting the prescriber directly.

## Medication Compliance Often Worsens with Time

- The graph on the following slide highlights results from a clinical trial that demonstrate a decline in medication adherence over time in patients on a statin medication.
- Persistence with statin therapy in the elderly declines substantially over time, with the greatest drop occurring in the first six months of treatment.

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- Interventions to improved adherence are needed early in treatment and among high-risk groups, including those who experience coronary heart disease events after initiating treatment.
- Disease states, such as dyslipidemia and hypertension may be asymptomatic, increasing the likelihood of poor adherence.



### Test Yourself

According to the previous study, persistence on a statin drug in elderly patients steadily decreased at all measured points.

- A. True
- B. False

The correct answer is: A. True.

### APRNs Can Improve Adherence

- APRNs are approachable and available, often on-demand and should provide patients with information and strategies to improve medication adherence.
- APRNs are knowledgeable in drug interactions, and have access to comprehensive electronic health records and patient prescription profiles.
- APRNs are trusted for providing accurate drug information.

### Improving Medication Adherence

#### Questions to Ask

- Can the patient identify each and every medication?
- Does the patient understand the benefits of his or her medications?

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- Can the patient access the medication and select the proper amount?
- Is the formulation appropriate given a patient's stated preference?
- Are any compliance aids necessary to improve medication adherence?
- What additional education is necessary for the patient and/or caregiver?
- Does the reading level of drug information handouts for patient education match the patient's reading level?

### **Strategies to Improve**

- Recall that health literacy does not equal intelligence.
- RNs should not assume that prescribers have explained medication use and side effects to patients.
- Avoid the use of medical verbiage and technical jargon.
- Even highly educated, non-medical professionals have difficulty understanding medical terms.
- Ask the patient to repeat instructions (teach-back method).
- Keep directions and labels simple, use only medical terms when necessary or if defined.
- Emphasize the importance of medication adherence at each encounter with the patient.
- Involve the patient's spouse or other immediate family members or guardian in medication counseling.

### **Access and Remove Adherence Barriers**

- Assure patients that they will be an integral part of their own therapy and will have choices to make.
- Provide pill keepers and calendars for patients with minor memory problems.
- Simplify the drug regimen as much as possible.
- Accommodate the needs of physically handicapped patients.
- Utilize language interpreters where necessary.
- Ask about transportation for picking up medication and arrange for prescription delivery where available.

### **Resources**

Electronic Medication Compliance Tools and Reminders

- <http://www.epill.com/>

FDA Consumer Info Sheet

- <http://www.fda.gov/downloads/ForConsumers/ConsumerUpdates/UCM165097.pdf>

National Council on Patient Information and Education

“Enhancing Prescription Medicine Adherence: A National Action Plan”:

- [http://www.talkaboutrx.org/documents/enhancing\\_prescription\\_medicine\\_adherence.pdf](http://www.talkaboutrx.org/documents/enhancing_prescription_medicine_adherence.pdf)

Pharmaceutical Assistance Programs

- <http://www.pparx.org>

### **Establish Trust**

- Build relationship with patient.
- Be available and approachable.
- Assess the patient’s willingness to learn from you.
- Be sincere and honest.
- Express a desire for patient to get well and maintain quality of life.
- Use a positive approach and exhibit confidence in the patient and treatment plan.
- Recall that past behavior is a good predictor of future adherence.



## Conclusion

By addressing patients' adherence issues and focusing on the value of their medicines, APRNs can make a significant difference in geriatric patients' healthcare outcomes.

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