Geriatric Care Considerations in the Community Pharmacy Setting

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Target Audience
This continuing education activity was designed specifically for pharmacists.

Disclosure Statement
The authors do not have any conflicts of interest, or financial relationships with a commercial interest, related to the activity.

Learning Objectives
At the end of this activity, participants should be able to:

- identify three physiologic changes that occur in the elderly population.
- review a patient’s medication list based on the Beers list criteria.
- define polypharmacy and its implications in the community pharmacy setting.

As the population of the United States continues to grow, it is predicted that by 2030 more than 20 percent of the nation’s population will be comprised of people aged 65 or older (compared to 13 percent in 2010 and 9.8 percent in 1970). The life expectancy for elderly patients has increased over the years as well. At a patient’s 65th birthday, the median remaining life expectancy is 15-20 years. Due to many age and disease-related conditions, elderly patients are in need of special consideration when being treated with prescription and over-the-counter (OTC) medications. Age-related physiologic and pharmacokinetic changes can affect both a medication’s effectiveness and potential to cause adverse events, and certain prescription and OTC medications can cause or exacerbate adverse events in the elderly. Elderly patients tend to have more comorbid conditions, leading to an increased number of medications taken. This also increases the risk of adverse events due to duplication in therapy or unnecessary therapy. Due to the frequency and caliber of patient interactions available in the community pharmacy setting, community pharmacists have the ability to play an important and unique role in ensuring that their geriatric patients are being treated appropriately and impacting their overall quality of life.

Age-related Pharmacokinetic and Physiologic Changes

As a patient ages, the elasticity of the aorta and other major arteries is reduced, resulting in higher systolic arterial pressure. As a result of this decreased elasticity, left ventricular hypertrophy can develop leading to cardiac ischemia, or even myocardial infarction or heart failure. In the heart, aging also leads to a reduction in a patient’s intrinsic heart rate and increased sinoatrial node conduction time. When compensating for postural changes, the aged heart responds by increasing stroke volume, instead of the increased heart rate typically seen in younger patients. These factors can lead to decreased efficacy of certain cardiovascular medications, and increased risk of postural hypotension.

Glomerular filtration rate (GFR) decline is common in the aging population, though the rate of decline varies from patient to patient. Currently, it is unknown whether this age-related decrease in renal function is due to a patient’s comorbidities or physiologic decline related to advancing age. This GFR decline affects the clearance of many drugs, and must be carefully considered when dispensing medications with narrow therapeutic indexes and are primarily excreted by the kidneys (such as lithium or digoxin), as a small decrease in clearance may lead to toxicity.
Age-related hepatic decline is also common, due to decreased liver mass and reduced blood flow. As a result, first-pass metabolism is reduced, leading to the need to adjust doses of medications that undergo extensive first-pass metabolism. Conversely, elderly patients taking prodrugs that need to be activated in the liver (such as prednisone, enalapril or cyclophosphamide) may see reduced or delayed concentrations of these medications. Advanced age is associated with decreased release of gastric acids and gastric motility, contributing to decreased absorption of both nutrients and medications. Body composition changes, such as a decrease in lean body mass and total body water, and a relative increase in total body fat are also commonly associated with aging and can impact the way a drug is absorbed and distributed throughout the body.

STOP AND REFLECT
TS, an 80-year-old female with newly-diagnosed heart failure, presents to your pharmacy with a prescription for digoxin. Which age-related physiologic factors may affect the way her body metabolizes the drug?

Potentially Inappropriate Drugs to Use in the Elderly Population

The pharmacokinetic and physiologic changes that occur due to the aging process not only affect the effects of the drug in the body, but also the pharmacodynamic effect of the drug on the patient taking the medication. In 1991, Dr. Mark Beers published a list of medications deemed to be inappropriate for those in a long-term care facility due to their adverse effects on that population. Since then, the American Geriatric Society (AGS) has continually updated and revised the Beers Criteria to provide a list of medications that are potentially inappropriate for older adults greater than 65 years old across all health care settings. The Beers Criteria is split into three categories: potentially inappropriate medications for use in older adults, potentially inappropriate drugs due to drug-disease or drug-syndrome interactions, and drugs to be used with caution. In the community setting, it is important to understand the recommendations provided by AGS, recognize situations that may warrant contacting the provider, and be skilled in counseling patients on the safe and effective use of potentially dangerous medications.

Though the medications included in the Beers list put elderly patients at risk for a number of side effects depending on the drug’s mechanism of action, they are not absolute contraindications. Instead, they are listed to ensure that the pharmacist and physician are aware of other safer options available. Some possible adverse events include CNS symptoms such as worsening delirium, dementia, seizure risks, hypotension and syncope. Anticholinergic effects of numerous drug classes such as muscle relaxants or tricyclic antidepressants may lead to increased sedation and fracture risk, confusion, dry mouth, urinary retention and constipation. Use of alpha-1 blockers may lead to orthostatic hypotension, and NSAID use can lead to GI ulceration. It is important to note that the Beers list includes both prescription and over-the-counter (OTC) medications. See Tables 1 and 2 for common prescription and OTC drugs and their recommended alternatives. Community pharmacists are in a unique position to observe the patient’s OTC purchasing habits, and to intervene when necessary to recommend a more suitable alternative. Whenever possible, always include questions about OTC medication use when counseling elderly patients to ensure that they are not experiencing avoidable adverse effects.
<table>
<thead>
<tr>
<th>Therapeutic Class</th>
<th>High-risk Medication</th>
<th>Adverse Effect</th>
<th>Medication Alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First-generation Antihistamines</strong></td>
<td>Chlorpheniramine</td>
<td>Confusion, drowsiness, blurred vision, urinary retention and constipation</td>
<td>Intransal saline</td>
</tr>
<tr>
<td></td>
<td>Diphenhydramine</td>
<td></td>
<td>Intranasal steroids (fluticasone, mometasone)</td>
</tr>
<tr>
<td></td>
<td>Doxylamine</td>
<td></td>
<td>Second-generation antihistamines (cetirizine, fexofenadine, loratadine)</td>
</tr>
<tr>
<td><strong>Pain relievers - NSAIDs</strong></td>
<td>Ibuprofen</td>
<td>Increased risk of GI bleeds</td>
<td>Tylenol (acetaminophen)</td>
</tr>
<tr>
<td></td>
<td>Naproxen</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aspirin</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Oral decongestants</strong></td>
<td>Pseudoephedrine</td>
<td>Worsening insomnia, increased blood pressure</td>
<td>Intransal saline</td>
</tr>
<tr>
<td></td>
<td>Phenylephrine</td>
<td></td>
<td>Intranasal steroids (fluticasone, mometasone)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Beers High-risk Medication</th>
<th>Adverse Effect</th>
<th>Recommendation/Alternative</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Antiparkinson agents (benztropine, trihexyphenidyl)</strong></td>
<td>Anticholinergic effects, urinary retention</td>
<td>Avoid, do not use for treatment of extrapyramidal symptoms, use carbidopa/levodopa instead</td>
</tr>
<tr>
<td><strong>Antipsychotics</strong></td>
<td>Increased risk of stroke and mortality in those with dementia</td>
<td>Avoid unless absolutely necessary and patient is a threat to self and others</td>
</tr>
<tr>
<td><strong>Barbiturates</strong></td>
<td>High rate of dependence, greater risk of overdose</td>
<td>Avoid</td>
</tr>
<tr>
<td><strong>Benzodiazepines</strong></td>
<td>Cognitive impairment, fall risk</td>
<td>Avoid in treatment of insomnia, agitation, delirium</td>
</tr>
<tr>
<td><strong>Bupropion</strong></td>
<td>Lowers seizure threshold</td>
<td>Avoid, use SSRI or SNRI for anxiety or depression</td>
</tr>
<tr>
<td><strong>Non-DHP calcium channel blockers (verapamil, diltiazem)</strong></td>
<td>Fluid retention/worsening of heart failure</td>
<td>Avoid</td>
</tr>
<tr>
<td><strong>NSAIDs, Cox-2 Inhibitors</strong></td>
<td>Fluid retention/worsening of heart failure, GI bleeding risk, peptic ulcer disease</td>
<td>Avoid</td>
</tr>
<tr>
<td><strong>Skeletal muscle relaxants</strong></td>
<td>Anticholinergic effects, sedation, fall risk</td>
<td>Avoid</td>
</tr>
<tr>
<td><strong>Tramadol</strong></td>
<td>Lowers seizure threshold</td>
<td>Avoid if possible, use acetaminophen, topical agents</td>
</tr>
<tr>
<td><strong>Tricyclic antidepressants</strong></td>
<td>Highly anticholinergic, sedating, orthostatic hypotension</td>
<td>Avoid, use SSRIs or SNRIs for anxiety and depression</td>
</tr>
</tbody>
</table>

SSRI – *Selective serotonin reuptake inhibitor*, SNRI – *Serotonin norepinephrine reuptake inhibitor*
The Beers list does not account for indication, comorbidities or duration of therapy. Additionally, drug interactions or duplications in therapy as well as other patient-specific factors are not taken into account. The STOPP (Screening Tool for Older Persons’ potentially inappropriate Prescribing) and START (Screening Tool to Alert doctors to Right Treatment) criteria were developed to help with these additional concerns. The START/STOPP criteria are similar to the Beers list in that it includes potentially inappropriate medications for elderly patients and lists potential alternatives. However, it also includes medications that should be started or continued, based on patient disease states (for example, recommending an ACE-inhibitor or ARB in patients post-MI or with heart failure).

Unfortunately, in some situations the use of a medication included in the Beers list cannot be avoided. While the list of medications should not dictate what is prescribed, the risks must be weighed and taken into consideration to ensure that the treatment chosen is the best clinical option for that particular patient. In this case, preparation and counseling the patient and/or their caregiver is important in order to reduce the potential for adverse events or harm. Counseling the patient about the nature of the medication’s risks and potential benefits will help the patient better understand why the medication is being prescribed. Additionally, counseling will ensure that the patient and their caregiver(s) are aware of warning signs to watch out for in order to avoid experiencing negative outcomes. Equally important is counseling regarding the importance of communication with both the pharmacy and the physician about adverse effects, and to ensure the patient does not stop taking the medication abruptly without consulting with the physician first.

Constipation

Constipation is not a physiologic consequence of normal aging, but studies have found that its prevalence peaks after 70 years of age, affecting between 8 and 43 percent of the elderly population. Constipation is divided into two categories: primary and secondary. Primary constipation, known as functional constipation, is a result of physical changes or limitations in the GI tract causing slower transit times or pelvic floor dysfunction. Secondary constipation is commonly due to medications and common disease states including neurological and psychological disorders, diabetes, structural abnormalities of the colon and irritable bowel syndrome.

<table>
<thead>
<tr>
<th>Medications</th>
<th>Alternative/Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antacids</td>
<td>Avoid aluminum containing antacids</td>
</tr>
<tr>
<td>Calcium Channel Blockers</td>
<td>Avoid use unless no alternative</td>
</tr>
<tr>
<td>First-Generation Antihistamines</td>
<td>Second-generation antihistamines</td>
</tr>
<tr>
<td>Iron</td>
<td>Avoid</td>
</tr>
<tr>
<td>Narcotics</td>
<td>Avoid long-term use at high doses when using for severe pain, and use prophylactic constipation treatment</td>
</tr>
<tr>
<td>NSAIDs</td>
<td>Avoid long-term use at high doses, use acetaminophen as alternative pain treatment</td>
</tr>
<tr>
<td>Tricyclic Antidepressants</td>
<td>Use SSRI or SNRI medications</td>
</tr>
</tbody>
</table>

*SSRI – Selective serotonin reuptake inhibitor, SNRI – Serotonin norepinephrine reuptake inhibitor*

STOP AND REFLECT

JK, a 90-year-old male patient, comes to your window to pick up his prescription for ibuprofen 800 mg and lisinopril 40 mg. He also inquires about purchasing some Sudafed® 12 Hour due to some seasonal congestion he has been experiencing recently. What are some potential concerns regarding the patient’s medication therapy?
Treatment of constipation involves identification of potential causes in order to remove the offending drug or treat the associated disease state. In the event that a secondary cause cannot be identified or the medication causing the constipation cannot be removed, nonpharmacologic as well as pharmacologic therapy can be initiated.

**Nonpharmacologic Treatment**

Normal bowel habits vary greatly from person to person. While some may have a bowel movement each day, others will not. Encouraging patients to maintain a stool diary (including instances of straining, frequency and consistency) to help monitor their GI health and identify constipation. Nonpharmacologic treatment includes increasing daily fiber intake (25-30 grams daily) to help decrease colon transit time and add bulk to stools. Foods high in fiber include bran, fruits, vegetables, nuts and prune juice. It is important to counsel patients to slowly increase their fiber intake by about 5 grams daily each week to avoid GI distress including gas and bloating. Encouraging fluid intake may help prevent fecal impaction and is generally considered an important component to maintaining proper bowel health, although robust evidence is lacking to prove this.

Regular exercise should be encouraged in all patients to help prevent constipation, as studies have shown that patients with a sedentary lifestyle are at a twofold risk of developing constipation. A Nurses’ Health study found that physical activity two to six times per week was associated with a 35 percent lower risk of constipation. Always take into consideration the patient’s physical abilities when recommending activities to reduce risk of injury.

**Pharmacologic Treatment**

**Bulk Forming Laxatives**

Most bulk forming laxatives contain soluble and insoluble materials that are not absorbed from the GI tract. They work by promoting water absorption, which increases stool mass and softens stool consistency. These products are considered first line for most cases of constipation, as their mechanism closely mimics the normal colon physiology of promoting bowel movement and evacuation. Bulk forming agents have an onset of action of typically 12-72 hours and can cause abdominal cramping or flatulence. Patients should be counseled to ensure that they are maintaining adequate fluid intake while utilizing these type of laxatives, as water absorption is critical to their efficacy.

**Emollient Agents**

Emollient agents (such as docusate) increase the wetting efficiency of the GI tract and lower surface tension to help soften fecal mass. Commonly referred to as a “stool softener,” this drug takes 24-72 hours from oral administration to have its effect but can take up to five days for the patient to see a result. Stool softeners may be less useful in chronically constipated older adults and more useful in the instance of hemorrhoids or anal fissures. Adequate fluid intake is recommended with these medications as well.

**Osmotic and Stimulant Agents**

Saline and osmotic agents (such as Milk of Magnesia, magnesium citrate and PEG 3350) create a hyperosmotic concentration in the intestinal lumen to draw in water through osmotic action. These agents are not absorbed from the GI tract and work only locally in the intestinal lumen, and are generally considered safe. However, they should be used with caution in chronic kidney disease or heart failure due to their potential to cause electrolyte abnormalities and laxative abuse. Saline laxatives have an onset of 30 minutes to three hours when taken orally.

See Table 4 for a listing of laxative agents and their associated dosing and onset of action.
Table 4. Laxative Agents and Associated Dosing and Onset of Action¹¹,¹³,¹⁴

<table>
<thead>
<tr>
<th>Medication Class</th>
<th>Dosing (Adults)</th>
<th>Onset of Action</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bulk Forming Laxatives</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Methylcellulose (Citrucel)</td>
<td>4-6 grams daily</td>
<td>12-72 hours</td>
</tr>
<tr>
<td>Psyllium (Metamucil)</td>
<td>2.5-30 grams daily</td>
<td>12-72 hours</td>
</tr>
<tr>
<td><strong>Stool Softeners</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Docusate (Colace)</td>
<td>50-360 mg daily</td>
<td>24-72 hours</td>
</tr>
<tr>
<td><strong>Osmotic Laxatives</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Magnesium citrate</td>
<td>150-300 mLs</td>
<td>0.5-3 hours</td>
</tr>
<tr>
<td>Polyethylene glycol 3350 (Miralax)</td>
<td>17 grams in 8 oz. of water once daily</td>
<td>24-72 hours</td>
</tr>
<tr>
<td><strong>Stimulant Laxative</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bisacodyl</td>
<td>10-30 mg daily</td>
<td>6-10 hours</td>
</tr>
<tr>
<td>Senna</td>
<td>8.6-17.2 mg (sennosides) oral 30 mg (sennosides) rectal</td>
<td>6-10 hours oral 1 hour rectal</td>
</tr>
</tbody>
</table>

**Polypharmacy**

Polypharmacy is a common underlying cause of many medication-related adverse events in the elderly population.¹⁸ It is defined as the use of multiple medications or use of more medications than is clinically indicated. There is no standardized cut point in regard to the number of medications a patient must take for it to be considered polypharmacy, but the most commonly agreed upon number is four.¹⁶ In the case of medications, more is not always better, as they can be associated with many negative outcomes and risks to patient safety. The most common negative outcomes and risks associated with polypharmacy include increased cost of health care, increased adverse drug reactions, increased drug interactions and decreased medication adherence.¹⁶

Increased cost of health care can present in two ways: increased medication cost or increased frequency of medical visits. A retrospective cohort study found that polypharmacy was associated with an increased risk of outpatient visits and hospitalization resulting in a 30 percent increase in medical costs.¹⁷ The more medications that a patient takes, the more out-of-pocket expenses the patient will incur, and, at the same time, the cost to the insurance provider will also increase. Increased medication utilization also results in the need for increased patient monitoring by physicians, pharmacists or other qualified health care providers and may require more frequent laboratory testing. Patients taking multiple medications are at an increased risk for adverse effects and can also experience drug interactions that result in increased exposure to medications. Adverse drug reactions (ADRs) and drug interactions are the cause of one in every six hospital admissions in older adults, can lead to significant morbidity and mortality.¹⁸,²⁰ More than 80 percent of ADRs that cause hospital admission are dose-related. Many times, this is the result of an accentuation of the pharmacologic effect of the drug and, thus, is preventable.¹⁹ Anticoagulants, diuretics, benzodiazepines, anticonvulsants, benzodiazepine receptor agonists and hypoglycemic agents are all commonly used medications that can result in serious preventable ADRs. Elderly patients with hepatic or renal impairment are at an even higher risk for experiencing serious ADRs requiring hospitalization. In a population based study, patients taking five or more medications had an 88 percent increased risk of experiencing an ADR compared to those taking fewer medications.¹⁶ Health care providers need to exercise caution when initiating and continuing drug therapy and patients should be counseled to inform their providers of any ADRs they experience.

Reviews of literature state that the average adherence rate among developed countries is 50 percent.¹⁷ One study found that patients who take more than four medications have a nonadherence rate of 35 percent, meaning that 35 percent of the time a dose is missed or taken incorrectly.¹⁹ In
order for medications to have the desired outcomes, patients must take them correctly, and medication adherence seems to be higher for patients with acute conditions when compared to chronic conditions.\textsuperscript{19} As medication dosing schedules become more complex and the number of medications increase (as in the case of polypharmacy), adherence decreases.\textsuperscript{16} Poor medication adherence can further the problem of ADRs and drug interactions when doses are increased or another medication is added without addressing the issue of nonadherence. Many elderly patients experience cognitive decline and may require additional help when it comes to remembering to take medications.

The elderly generally have more chronic disease states and, thus, require more drug therapy than young adults, often resulting in polypharmacy. The elderly are often at a stage where they are not working full time and are usually on a limited income. Elderly patients with multiple chronic diseases may be on medications that are a duplication of therapy, contraindicated, interact with other diseases or drugs or may no longer be indicated for the patient. Many elderly patients are taking OTCs and/or herbal medications that may cause drug interactions with prescriptions they are taking that providers are unaware of. In addition, some patients may experience increased financial burden purchasing expensive OTC products, which lack evidence of therapeutic benefit. Many adverse effects like forgetfulness can be overlooked and attributed to the aging process by patients. Communication between patients, physicians and pharmacist is essential to help reduce the amount of medications that patients are taking when appropriate. Pharmacists can help patients with medication reviews, counseling on adverse effects, ask patients about OTCs and herbals to screen for drug interactions and assessing patient response to their medication regimens. In addition, pharmacists can communicate with these patients to learn more about symptoms common to this population that may be experienced, such as pain or urinary incontinence, but may not be reflected in their respective medication list as currently treated.

STOP AND REFLECT
You are meeting with PQ, an 87-year-old female, for the first time to conduct a comprehensive medication review (CMR). During the CMR, you find that she is taking seven prescription medications and five OTC medications. What potential concerns should you discuss with PQ regarding her medications?

Community pharmacists have a unique and important role to play in the care of their geriatric patients. They are likely to observe the patient’s OTC purchasing habits and can intervene to make suggestions at the time of purchase, and often can see the “big picture” of the patient’s medication use history. Many aspects of the medication use process can become problematic in the elderly population, and these patients need to be closely monitored to ensure that they are being treated appropriately. There are multiple physiologic and pharmacokinetic changes that occur in the aging body that can affect the medication’s action and incidence of adverse events, such as decreased hepatic and renal function, cardiac changes and decreased absorption of medication from the GI tract. Additionally, there are certain prescription and OTC medications that are not recommended for use in the elderly, due to the increased risk of adverse events and toxicity. The Beers list and START/STOPP criteria are two comprehensive lists that community pharmacists can utilize to evaluate appropriateness of a patient’s therapy, and to recommend potential changes to prescribers.

Constipation is not an age-related condition, but its incidence does increase, especially after age 70. Many elderly patients seek the advice of pharmacists in choosing the appropriate OTC therapy for constipation, and knowledge of the different options and counseling points is an important piece of information for a pharmacist to have in his or her repertoire. Lastly, many patients of advanced age have multiple comorbid conditions requiring drug therapy, creating an issue with polypharmacy. Studies have shown that nearly 50 percent of older adults take
one or more medications that are not medically necessary. This combination of multiple medications for multiple indications and possible unnecessary medication greatly increases the patient’s risk of drug interactions and adverse events.

References:
12. Dukas L, Willett W & Giovan E. Association between physical activity, fiber intake, and other lifestyle variables and constipation in a study of women. Am J Gastroenterol [Internet]. 2000: 1790-96


Continuing Education Self-assessment Questions

1. Drugs with a ____________ therapeutic index should be carefully monitored in elderly patients, due to an age-related decrease in GFR.
   a. Narrow
   b. Wide
   c. Large
   d. Small

2. Which of the following is a prodrug that may have decreased availability in the elderly due to decreased hepatic function?
   a. Amoxicillin
   b. Enalapril
   c. Citalopram
   d. Donepezil

3. Which of the following is true regarding the medications included in the Beers list?
   a. They should never be prescribed in a patient over the age of 65.
   b. They have been shown to cause death in elderly patients.
   c. Use of these medications in patients over the age of 65 should only be used when the benefits outweigh the risks and there is no safer or efficacious alternative available.
   d. They should always be prescribed to patients over the age of 65, as they have been shown to increase quality of life and decrease morbidity and mortality.

4. Which of the following foods can be recommended to a patient who wants to increase her fiber intake?
   a. Water
   b. Poultry
   c. Eggs
   d. Bran

5. Your patient MC, a 79-year-old male with a history of MI, type 2 diabetes mellitus and hypertension, comes to your pharmacy to pick up his prescriptions for lisinopril, warfarin and metformin. He also wants to purchase a box of diphenhydramine because he heard from a friend that it would help him sleep, but he wants your opinion first. Which of the following is the best response?
a. “Mr. C, diphenhydramine is a great choice for insomnia! Make sure you take it every day right before bedtime.”
b. “Mr. C, I don’t think diphenhydramine is the best choice for you, as it can sometimes make people feel groggy and unsteady the next morning. I would suggest using doxylamine instead; this is a safer option for you.”
c. “Mr. C, I don’t think diphenhydramine is the best choice for you, as it can sometimes make people feel groggy and unsteady the next morning. Do you have a moment to go over some other options to help you sleep?”
d. “Mr. C, diphenhydramine should be fine. Anything you buy OTC is safe for everyone to use.”

6. Which of the following medications should be avoided or used with caution to treat constipation in a patient with heart failure?
   a. Stimulant laxatives
   b. Osmotic agents
   c. Emollient agents
   d. Bulk forming agents

7. Which of the following can result from polypharmacy in the elderly?
   a. Increased medication cost
   b. Decreased adverse effects
   c. Decreased drug interactions
   d. Decreased health care costs

8. Medication adherence seems to be higher in patients treating ____________ conditions than those treating ____________ conditions.
   a. Life-threatening; non-life threatening
   b. Moderate; severe
   c. Acute; chronic
   d. Cardiac; endocrine

9. What is the definition of polypharmacy?
   a. The use of different pharmacies to fill prescriptions in order to get the best price
   b. Utilizing more than three OTC medications at any given time
   c. Utilizing multiple medications or more medications than is clinically necessary
   d. Using a different pharmacy chain each time a patient fills a prescription

10. Which of the following are common medications used in the elderly that can result in serious preventable adverse effects?
    a. Anticonvulsants, diuretics and hypoglycemic agents
    b. SSRIs, ACE-inhibitors and bulk forming laxatives
    c. ARBs, SSRIs and bulk-forming laxatives
    d. Anticoagulants, ACE-inhibitors and SNRIs