Administering Medications to Elderly Patients, Part 3: Discharge Planning

This course has been awarded four (4.0) contact hours.

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Medications and the Elderly, A 3-Part Series

Administering Medications to Elderly Patients, Part 3: Discharge Planning explores issues related to patient teaching, polypharmacy, compliance, adherence and social issues that often affect elderly persons and adherence to therapy.

The other two courses are:

Administering Medications to Elderly Patients, Part 1: The Physiology of Aging is the first in a series of three courses that explore medication therapy with persons 65-years-old and older.

Administering Medications to Elderly Patients, Part 2: Administering and Monitoring Medication Therapy addresses concerns related to administering and monitoring response to medications which elderly persons commonly receive.

Each course presents case studies for practice in critical thinking.

Each course includes the same five appendices:

1. Beers Criteria 1: Potentially Inappropriate Medication Use in Older Adults – High-Severity
2. Beers Criteria 1: Potentially Inappropriate Medication Use in Older Adults – Low-Severity
3. Beers Criteria 2: Drug-Disease Interactions – High-Severity Concerns
4. Beers Criteria 2: Drug-Disease Interactions – Less-Severe Concerns
5. Resources for Further Information

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Purpose and Objectives

Administering Medications to Elderly Patients, Part 3: Discharge Planning educates healthcare professionals about preparing elderly patients and their caregivers to manage self-administration of medications and appropriate monitoring after discharge from a healthcare facility.

After successful completion of this course, you will be able to:

1. Identify essential medication therapy content for teaching elderly patients and their caregivers including:
    a. Medication effects
    b. Potential interactions (other medications, foods, herbals, etc.)
    c. Monitoring requirements
    d. Routes of administration and related precautions
    e. Pain management
2. Describe effective approaches for educating elderly persons and their caregivers about medication therapy.
3. Identify medication-related problems and adverse events that occur among elderly persons.
4. Describe approaches to preventing polypharmacy and associated complications.
5. Explain factors that affect compliance and adherence to medication therapy among elderly persons.
6. Identify social issues that impact medication therapy for elderly persons.
7. Describe the purpose and process of collaboration in discharge planning for elderly patients.
8. Name resources for further information about drug therapy for elderly patients.

Introduction

Life expectancy in the United States is at an all-time high. As of 2015, the Centers for Disease Control and Prevention (CDC) predicts the **average life expectancy** for the total population to be 78.8 years:

- 75.4 years for men
- 80.4 years for women.

According to data compiled by the Social Security Administration (SSA):

- A man reaching age 65 today can expect to live, on average, until age 84.3.
- A woman turning age 65 today can expect to live, on average, until age 86.6.
- And those are just averages. About one out of every four 65-year-olds today will live past age 90, and one out of 10 will live past age 95 (Social Security Administration [SSA], 2015).

The fastest-growing segment of the population is the age group 85 and older (Arias, 2007). The older adult population age 65 and older is expected to nearly double between 2006 and 2030, increasing from 37 million to 71 million (Accius, 2010).

Patients aged 65 years and older are more likely to be seen in the emergency department as a result of an adverse drug event than as a result of an automobile accident (Ventura, Laddaga, Cavallera, Pugliese, Tummolo, Buquicchio,....& Passalacqua, 2010).

About the Elderly

Although many elderly persons reside in skilled nursing facilities, increasing numbers of older persons live in the community in their own homes independently or with caregivers in assisted living situations. Many elderly persons suffer from multiple chronic illnesses that require complex medication regimes. Exacerbations of these illnesses, previously undiagnosed ailments or injuries sustained in falls or other accidents may necessitate admission to an acute care facility.

During the hospitalization, providers re-evaluate the medication profile and frequently prescribe new medications upon discharge. Nurses in the acute care setting play an important role in preparing elderly patients and their caregivers to administer and monitor medication therapy safely and effectively.

Literature related to administration of medications to the elderly defines the term ‘elderly’ to include persons aged 65 years and older. This course uses that definition.

The Challenge of Self-Administered Medication Therapy for Elders

Nurses face a challenge in preparing elderly persons and their caregivers for safe and effective therapy after discharge. These challenges include:

In 2005 The Joint Commission added medication reconciliation to its list of National Patient Safety Goals as large discrepancies frequently exist between prescribed medication regimens and the medications the patient actually takes (The Joint Commission [TJC], 2006 & Mueller, Sponsler, Kripalani, & Schnipper, 2012).

A typical American, aged 65 or older uses 4.5 prescription medicines and 2 over- the-counter medicines daily (Lucado, Piez, & Elixhauser, 2011).

Barriers to effective medication use among older adults include vision loss, cognitive impairment and excessive financial expense. Polypharmacy, poor patient--healthcare provider relationships, toxic interactions and pharmacokinetic changes associated with aging also contribute to medication problems and non-adherence, and can lead to hospitalizations in 25% of persons age 80 and older (Petrone & Katz, 2005; Laroche et al., 2007).

The World Health Organization (WHO) reported that only approximately 50% of people follow their doctors' orders for taking prescribed drugs. Even fewer persons follow instructions for taking drugs to treat certain diseases, including asthma, depression, hypertension and AIDS (World Health Organization [WHO], 2010). Pharmaceutical Research and Manufacturers of America (PhRMA), 2011, states that nearly 75% of all adults are do not fully adhere to a physician's prescription.

Readmitted to Hospital

The New England Journal of Medicine reported that 20% of Medicare patients are readmitted to the hospital within a month of being discharged. The findings suggest that patients are not properly prepared to take care of themselves before discharge. Patients with heart failure and pneumonia were readmitted most frequently (Thomas, 2009).

Acute Care: An Opportunity

The admission of an elderly person to a healthcare facility signals an opportunity to improve that person's health over and above solving the specific problem which caused the admission. Healthcare professionals can evaluate the patient's current medication profile and practices, including:

- Monitoring to assess safety and effectiveness.
- Establishing a clear and present need for each medication.
- Identifying interactions between medications and between medications and other substances.
- Assessing the patient's functional and cognitive capabilities related to self-administration of medications.
- Assessing compliance and adherence to the prescribed regime.
- Assessing patient and caregiver knowledge related to specific medications and appropriate monitoring.

The results of this evaluation may lead to adjusting dosages and dosage forms, discontinuing some medications, initiating others and educating patient, family and caregiver about the regime to be followed upon discharge (Mueller, et al., 2012 & Murphy, Oxencis, Klauck, Meyer, & Zimmerman, 2009).

Evaluating the Medication Profile: Beers Criteria

One helpful tool to evaluate a patient's medication profile is Beers Criteria. Beers Criteria lists potentially inappropriate medications for elderly patients, also sometimes called potentially inappropriate prescriptions for elderly patients or the Gray List.

Beers Criteria I list medications that have side effects that create risks for elderly persons. Appendices A and B contain the complete list.

Beers Criteria II lists medications that have adverse effects in specific disease conditions that are common among elderly persons. Appendices C and D contain the complete list.

Potential inappropriate medications are ***potentially*** inadvisable for elders. For an individual elderly patient, the benefits of taking a particular medication may outweigh the risks.

Possible Reasons for Inappropriate Prescribing

Although Beers Criteria was first published in 1991, researchers continue to find that elders are receiving many potential inappropriate medications . There are multiple reasons for this, including communication issues, patient attitudes etc. (Kaplan & Porter, 2011).

Possible Reasons for Inappropriate Prescribing and Insufficient Patient Counseling (Earthy, 2006)

1. A focus on acute care and limited information transfer between primary and secondary care
2. Providers' passive attitudes about achieving learning outcomes related to medicine management
3. Paternalistic decision making fuelled by perceptions of patient conservatism and inability to comprehend, ageism, and reluctance to interfere with colleagues' treatment decisions.

Reducing Risks of Adverse Drug Events

At least 15% of adverse drug events occur in the elderly patients presenting to the offices, hospitals or long-term care facilities. Of these events and estimated 50% are potentially avoidable (Pretorius, Gataric, Swedlund, & Miller, 2013). Researchers have documented risks related to community-based elderly persons' use of medications and have made recommendations to reduce risks.

Prevent adverse drug events by:

- Carefully evaluating prescriptions for the elderly for both suitability of the drug and the prescribed dose
- Monitoring elderly patients closely for therapeutic and toxic effects
- Educating patients more thoroughly regarding their medications

To reduce prevalence of adverse drug events:

- Limit drug prescription to essential medications
- Make sure that use of prescribed agents is clearly explained to the patient
- Give drugs for as short a period as possible
- Periodically re-evaluate all use of drugs in the elderly (Pretorius et al., 2013)

Concomitant prescriptions from major drug categories that may potentially increase fall risk are prescribed for hospitalized patients, and those being discharged home. Anti-epileptics, antidepressants, antipsychotics and anti-Parkinson's drug classes were prominent (Farrell, Szeto, & Shamji, 2011).

Assessing with Discharge in Mind

Your assessment findings with your elderly patient are highly pertinent to help the prescriber arrive at the best choices and doses of medications.

In addition, assessment findings can guide discharge plans that are most likely to result in safe, effective compliance with the prescribed regime. Gather data to answer these questions:

- Does the patient have the functional, visual and cognitive capability to prepare and administer medications as prescribed? If not, will assistive devices overcome limitations, or will someone else prepare and administer medications? Who will assist? Explore need for home health assistance.
- What social issues impact this patient's compliance and adherence? Finances? Social isolation? Substance abuse? Explore need for social worker assistance early on.
- Is the dosage form ordered the form that will best promote compliance after discharge? For example:
  - Would a liquid form be more palatable?
  - Are enteric coated sprinkles preferable to a large enteric-coated tablet?
  - Is an extended-release form available that could limit the medication to once per day? Research has shown that taking less prescriptions per day leads to improved compliance.

Collaborate with the prescriber to make current orders as similar to discharge prescriptions as is possible. Advocate for your patient to receive a discharge regime that he can manage (Mesteig, Helbostad, Setvold, Rosstad, & Saltvedt, 2010).

Administering Medications to Elderly Patients, Part 2: Administering and Monitoring Medication Therapy **addresses concerns related to administering and monitoring response to medications which elderly persons commonly receive.**

Assessing Patient and Caregiver Knowledge

Ask your patients or their caregivers to tell you what they know about their medications and how the medication regime will differ from their pre- hospitalization regime after discharge.

The Indian Health Services (2011) developed a counseling program that includes the use of three questions to assess the patient's understanding. These questions are helpful for all patients:

- What is this medication for?
- How did your doctor tell you to use this medication?
- What did your doctor tell you to expect?

The answers to these questions can provide a good starting point for patient education. Other strategies include a review of the physical medication that is brought in, and use of drawings or written material (Mueller et al., 2013).

Give information about any new medications, both written and verbal. Emphasize the differences between the new regime and the previous one. Ask the patient and/or caregiver to explain these changes to you.

Many elders obtain information about medications from the Internet, word of mouth, and from advertising. They may have received misinformation or misinterpreted information. Elders may obtain their medicines through the mail and have no contact with a pharmacist. Use the opportunity of this hospitalization to clarify the patient's understanding.

Tap Into Resources for Discharge Planning

Elderly patients often leave the hospital with new prescriptions and complex care needs. Even when they are relatively capable of performing activities of daily living, many feel bewildered by the burden of managing, monitoring and paying for their drug therapy.

It is **NOT** realistic to expect that as a nurse in an acute or long term care setting, you can provide all of the education and discharge planning that the elderly patient needs to succeed after discharge.

But you will be much more effective in assisting your patient to manage after discharge if you connect him with appropriate resources as soon as possible. Resources differ from one facility to another:

- Some facilities have discharge planners or case managers.
- Some insurance companies provide case management services.

Ask your Nurse Manager about resources and procedures in your facility.

Knowledge Check 1

It is realistic to expect that as a nurse in an inpatient care setting you can provide all the education and discharge planning your elderly patient needs.

True
False

Case Study #1: Mrs. Jefferson - Osteoarthritis Pain

Read Mrs. Jefferson's situation and the questions suggested on the next screen. Click on the Check Answer button to view answers.

- Are you asking similar questions to those suggested?
- Are there other, more thought-provoking questions that should be asked?
- In addition to the questions, what orders do you think might be indicated?

Mrs. Jefferson, a frail 92-year-old who weighs only 90 pounds, has just been admitted due to shortness of breath and possible pneumonia. She reports that at home she uses an inhaler for asthma. She complains that the acetaminophen (Tylenol®) she takes at home no longer relieves her osteoarthritis pain, even though she has been taking twice as much as she is supposed to take.

Her doctor orders celecoxib (Celebrex®) 200 mg po every 12 hours. After you explain the new medication to her, she asks what the co-payment will be for this medication because her current health insurance uses a three-tiered system of different co-payments, depending on the drug.

Research shows that taking fewer prescriptions per day leads to improved compliance.

Case Study #1: Mrs. Jefferson - Osteoarthritis Pain

1. What effects of aging have implications for the drugs this patient is receiving?

    - *Celecoxib (Celebrex®) remains in contact with gastrointestinal mucosa longer in elderly patients.*
    - *Reports of fatal cardiovascular events and GI bleeding caused the withdrawal of rofecoxib in 2004. Other coxib drugs remain available, but with additional warnings and the recommendation that prescribers use them judiciously. The effects of aging increase cardiovascular and gastrointestinal risks.*
    - *Studies have shown that people older than 65 years have about a 50% higher maximum concentration of celecoxib (Celebrex®) compared to younger people.*
    - *Because they generally weigh less than men, elderly women have higher blood concentrations of celecoxib (Celebrex®) than do men.*
    - *Elderly patients weighing less than 50 kg should start at the lowest dose (100 mg po daily) of celecoxib (Celebrex®) and increase the dose with caution.*

2. Does this patient's medication profile comply with recommended guidelines and standards?
    The American College of Rheumatology recommends treating arthritic pain with a nonsteroidal anti-inflammatory agent if acetaminophen (Tylenol®) is ineffective (Hochberg, Altman, Toupin April, Benkhalti, Guyatt….& Tugwell, , Altman, Toupin, Benkhalti, Guyatt….& Tugwell, et al., 2012).

3. What disease processes affect metabolism and action of drugs for this patient?
    Use of celecoxib (Celebrex®) may exacerbate asthma.

4. How are you evaluating this patient's response to his medications?
    The effectiveness of pain control may be impossible to evaluate until the patient resumes normal activities of daily living at home.

5. What laboratory tests or other means of monitoring response to drug therapy will the patient need now and after discharge?
    Baseline and periodic liver function tests and hemoglobin and hematocrit are recommended when using celecoxib (Celebrex®) long term.

6. What factors will influence this patient's compliance and adherence to drug therapy?
    Once daily dosing may be effective and enhance compliance.

7. Has this patient been compliant with medications prior to this hospitalization?
    History of self-medication with higher-than-prescribed doses of acetaminophen (Tylenol®) increases the likelihood that she will also be noncompliant with celecoxib (Celebrex®).

8. What social issues affect drug therapy for this patient?
    - *High co-payment may make celecoxib (Celebrex®) unacceptable.*
    - *Refer the patient for re-assessment of her current drug coverage plan.*

9. How will this patient's medication profile change upon discharge? Any new drugs, dosage

changes or discontinuations?

Refer the patient for re-assessment of her current drug coverage plan.

10. What does the patient know about the changes in her medication regimen?
    - *Instruct patient not to take with aspirin.*
    - *Instruct her to discontinue acetaminophen (Tylenol®).*
    - *Instruct her to recognize and report the signs and symptoms of gastrointestinal bleeding.*
    - *Instruct her to report to her primary care provider the effectiveness of her pain control.*

Identify the Content for Patient Teaching: General Issues

Use these questions to help identify what to teach your patient and/or his caregiver.

- How will this patient's medication profile change upon discharge? New drugs, dosages or dosage forms? Discontinuations?
- How will this patient's care be managed and monitored after discharge?
- What factors will influence this patient's compliance and adherence to drug therapy?
- Has this patient been compliant with medications prior to this hospitalization?
- What social issues affect drug therapy for this patient?
- What does this patient know about the changes in his medication regimen?
- What are your resources for connecting the patient with needed support after discharge?

Plan to instruct your patient, family members and caregivers in monitoring the individual for adverse effects and in minimizing the risk of falls in the home environment.

Physical limitations such as visual, auditory and mobility deficits may interfere with managing medications at home. Plan for practice with assistive devices that the patient will use at home, such as medication organizers and magnifiers. Other devices for medication administration (such as syringes or multi-dose inhalers) or monitoring devices (such as glucometers) also require practice and validation that the patient and caregiver use them appropriately.

Plan to provide written information for reference and to ask the patient or caregiver to explain plans for administering and monitoring medication therapy (Potter et al., 2013).

Tips for Seniors on Safe Medication Use

These are tips that you can review with your patient (Food and Drug Administration [FDA], 2012):

- Learn about your medicines. Read medicine labels and package inserts and follow the directions If you have questions, ask your doctor or other healthcare professionals.
- Make sure you follow the directions for medications exactly.
- Talk to your team of healthcare professionals about your medical conditions, health concerns and all the medicines you take (prescription and over the counter [OTC] medicines), as well as dietary supplements, vitamins and herbals. Don't be afraid to ask questions.
- Do not start taking any new OTC medicines, dietary supplements, vitamins or herbals without consulting a healthcare professional.
- Keep track of side effects or possible drug interactions and let your doctor know right away about any unexpected symptoms or changes in the way you feel.
- Make sure to go to all doctor appointments and to any appointments for monitoring tests done by your doctor or at a laboratory.
- Use a calendar, pill box or other tools to help you remember what you need to take and when. Write down information your doctor gives you.
- Take along a friend or relative to your doctor's appointments if you think you might need help to understand or to remember what the doctor tells you.
- Have a "Medicine Check-Up" at least once a year. Get rid of old or expired medicines. Ask your doctor or pharmacist to go over all the medicines you now take. Tell them about all the OTC medicines, any vitamins, dietary supplements and herbals you take.
- Keep all medicines out of the sight and reach of children.

Another person accompanying the patient to doctor’s appointments can be an important resource to protect patient safety.

Teaching to Prevent Medication-Related Problems

Plan to instruct the patient and/or caregiver about how to **detect** and **prevent**:

- Adverse drug reactions
- Lack of effective response to medications
- Interactions of medications with one another and between medications and other substances
- Polypharmacy

Plan to teach the patient and/or caregiver about pain assessment and management.

Unless otherwise contraindicated, advise your elderly patient to follow oral medications with a generous amount of water to facilitate absorption and prevent gastric irritation.

Medications often involved in preventable injuries included heart medications, diuretics, pain medications, diabetes medications and blood thinners. Common adverse drug events that could have been prevented included gastrointestinal side effects, kidney problems and internal bleeding.

Use various strategies for teaching, including verbal and written information. Pictures and diagrams may be helpful. Make sure that a “teach-back” method is used, where the patient repeats back information to ensure that they understand (Potter et al., 2013).

Knowledge Check 2

Which type of medication is often involved in preventable injuries to elderly persons?

a. Anti-coagulants
b. Psychotrophic medications
c. Hormones
d. Seizure medications

Identify the Content for Patient Teaching: Drug-Specific Issues

Identify the ***critical*** information patient or caregiver needs about **each** prescribed medication.

Consider specific evidence of:

- **Therapeutic effect**: How can you tell the medication is working?
- **Toxic effect**: How can you tell if the patient is getting too much?
- **Adverse effect**: Is this patient particularly vulnerable to any specific adverse effects?

Determine**:**

- What blood tests and measurements, at a lab or at home are indicated? What is the plan to accomplish this testing?
- What are the implications of dosage form, such as do not crush or chew?
- Which other medications, foods, herbs and other substances interact with this medication?
- Are there important sequences such as administering saline eye drops before medicated drops?
- Are there implications related to time of day or relationship to meals?
- What does the route imply? Rotate sites? Massage after injection? Flush the enteral feeding tube before and after each medication?
- What warnings labels are there for the specific medications, such as drowsiness?
- Is the medication one that will be discontinued (such as antibiotic) or tapered?
  (American Medical Association [AMA] Commission to End Health Care Disparities, 2011)

Warfarin (Coumadin®) and Insulin

Among patients aged 65 years and older, insulin or warfarin (Coumadin®) was the cause of:

- One in every three adverse drug events that resulted in an emergency department visit.
- 41.5% of adverse drug event-related hospitalizations (Budnitz, Pollock, Weidenbach, Mendelsohn, Schroeder, & Annest, 2006).

Plan to emphasize critical aspects of monitoring related to these and other specific medications.

Warfarin (Coumadin®)

- Regular blood draws for INR
- Consistent intake of Vitamin K and Vitamin E in food and supplements
- Safety precautions because of risk for bleeding and bruising

Insulin

- Blood glucose monitoring. Plan for patient or caregiver to demonstrate with equipment to be used at home. Regular blood draws for hemoglobin A1c (HA1c or HgbA1c), as ordered.
- Signs and symptoms of hypo- and hyperglycemia. Be certain to emphasize those symptoms that this particular patient usually experiences when blood glucose fluctuates.
- Rotating sites of subcutaneous administration.
- Diabetic teaching resources concerning skin care, foot care, diet and other aspects of managing diabetes.

(Lacy, Armstrong, Goldman, & Lance, 2011)

Analgesics and Atypical Antipsychotics

Analgesics for Chronic Pain

- Regular dosing is recommended, rather than PRN
- There is a risk for respiratory depression. Monitor quality and rate of respiration.
- A bowel program is needed to prevent constipation
- NSAIDs, such as ibuprofen (Advil®) and naproxen (Aleve®), are generally not recommended for the elderly because of GI irritation and possible effect on the renin-angiotensin system in the kidney which can raise blood pressure. One study found that NSAIDs given 6+times/week were associated with a 38% higher risk of developing hypertension; acetaminophen (Tylenol®) increased the risk by 34%. Therefore, monitoring blood pressure is critical.
- Alternatives to analgesics include OTC arthritis cream, prescription topical NSAIDs such as diclorenac (Voltaren®), and anti-inflammatory effects of fish oil supplements. Explore alternatives with patient and provider during hospitalization. (Graedon & Graedon, 2009)

Atypical antipsychotics, prescribed for schizophrenia and bipolar disorder

Aripiprazole (Abilify®), clozapine (Clozaril®), and risperidone (Risperdal®) may increase blood sugar indirectly due to weight gain. Report excessive thirst, hunger or frequent urination to the physician (Lacy et al., 2011).

Home BP Monitoring

When beginning a medication that may affect BP, begin BP monitoring 3 times/day, taper to 1 time/day or 2 times/week unless otherwise advised by provider (American Heart Association [AHA], 2014).

Anticholinergics and Beta-blockers

Over The Counter Decongestants and other Anticholinergics

- Anticholinergic properties can cause confusion, urinary retention and other problems.
- Pseudoephedrine (Sudafed®) can raise BP.
- Alternatives include saline nasal spray. Explore alternatives with patient and with provider during hospitalization.
- Elders may use benztropine (Cogentin®) to treat Parkinson's disease, tolterodine (Detrol®) to treat overactive bladder, and other anticholinergic medications identified in Beers I Criteria (Appendices A and B).
- Researchers found that 50% of elders taking anticholinergics showed mental decline. (Graedon & Graedon, 2009). Monitor mental status, and report changes to provider.

Beta-blockers

Atenolol (Tenormin®), sotalol (Betapace®) prescribed for hypertension, arrhythmias, and thiazide diuretics, such as chlorothiazide (Diuril®) and indapamide (Lozol®) prescribed for hypertension and congestive heart failure can increase the risk of diabetes. Report excessive thirst, hunger or frequent urination to provider.

Alternatives for diabetics and pre-diabetics include ACE inhibitors such as ramipril (Altace®), enalapril (Vasotec®) or an angiotensin receptor blocker (ARB) such as losartan (Cozaar®) (Lacy et al., 2011).

Corticosteroids, ED Medications and HRT

Corticosteroids

Corticosteroids such as prednisone and methylprednisone (Medrol®) prescribed for arthritis or asthma increase blood sugar. Long-term high doses can exacerbate or cause diabetes. Report symptoms of hyperglycemia such as excessive thirst, hunger or frequent urination.

Corticosteroids may cause build up of ocular pressure and cause glaucoma or cataracts. Plan for regular eye exams.

Erectile Dysfunction (ED) Medications

Sildenafil (Viagra®), tadalafil (Cialis®) and other ED medications may cause visual and hearing disturbances. Report these symptoms to the provider.

Hormone Replacement Therapy (HRT)

- May raise blood pressure and increase risk of blood clots.
- Use of the lowest dose for the shortest time is recommended.

Alternatives include herbals such as pine bark extract. Explore alternatives with patient and provider during hospitalization (Graedon & Graedon, 2009).

Because so many medications are excreted via the kidney, it is important for elderly patients to have renal function assessed regularly. Impaired renal function may require adjustment of medication dosages.

Statins and CHF Medications

Statins

Atorvastatin (Lipitor®), simvastatin (Zocor®) and other statins may create very low levels of cholesterol. Very low cholesterol may lead to depression, memory loss and confusion. If at risk for these symptoms, consult with provider about alternatives.

Statins may cause liver damage. Plan for regular blood draws for liver function tests, as well as for serum cholesterol (Lacy et al., 2011).

Congestive Heart Failure (CHF) Medications

Patients who take digoxin (Lanoxin®) and diuretics are at risk for electrolyte imbalances. Hypokalemia increases the risk of digoxin toxicity. Plan for regular blood tests to monitor serum electrolytes and the need for potassium supplements.

CHF patients need to monitor BP and pulse daily. Daily weights are recommended to assess fluid retention.

Cognitive, functional and financial difficulties can be caused by medications. Patient and caregivers need to regularly assess mental and functional status, and seek cost-effective solutions. In addition to the impact on quality of life, these problems can interfere with compliance (Molony, 2009).

Inhalers and Enteral Feeding Tubes

Inhalers

Difficulties with dexterity and with breathing may interfere with proper use of inhalers. Yet, proper use of inhalers is important for all patients who use them.

Observe your elderly patient using the inhaler while in the hospital and give corrective feedback if needed. For example:

- When using a multi-dose inhaler (MDI), the patient should shake the container to distribute the drug evenly in solution so that when the device is activated, the patient receives the proper dose.
- Using a spacer device with an MDI is highly desirable because it facilitates the distribution of the inhaled medication into the airways (Lareau & Hodder, 2012).

Enteral Feeding Tubes

When administering oral medications via nasogastric or gastric tube, flush with sufficient water (keeping in mind any fluid restrictions) not only to clear the tube of the medication and prevent blockage, but also to facilitate absorption (Boullata, 2009).

Palatability

Improve the palatability of some oral liquids such as isosorbide (Ismotic®) by pouring the medication over ice and instructing the patient to sip it.

Some pharmacies prepare liquid medications with a choice of flavorings upon request. Many commercial pharmacies make this service available. Even if the hospital pharmacy does not have this option, alert patients and caregivers to this possibility to help improve their compliance after discharge.

Mixing some medications with food may reduce gastric irritation associated with some drugs and may make medication less distasteful and easier to swallow. However, assure that mixing with food does not interfere with the action of the drug.

When it comes to making medications more palatable, take the perspective of a salesman.

- What is the customer's objection to the medication?
- How can this objection be countered?

Perhaps another dosage form, an alternative that has less of a distressing side effect would increase the likelihood of compliance after discharge.

Collaborate with your pharmacist and the patient's provider to explore alternatives (Olsen, Tindall, & Clasen, 2007).

Nutritional Implications

Certain drugs have dietary implications, including foods to avoid and nutrients that are essential. Some medications should be taken on an empty stomach, some with food.

Collaborate with the nutritionist to help patient and caregiver identify:

- Food sources of vitamins K and E for the patient who takes coumadin (Warfarin). Intake of these vitamins should remain consistent.
- Food sources of and need for supplementation of potassium for the patient who takes diuretics and/or digoxin.
- Food sources of and need for supplementation of calcium for patients who take proton pump inhibitors or H_2-blockers. Risk of hip fracture is increased among elderly patients who take proton pump inhibitors such as lansoprazole (Prevacid®), esomeprazole (Nexium®) and omeprazole (Prilosec®) and to a lesser extent by H_2-blockers such as cimetidine (Tagamet®) and famotidine (Pepcid®). Adequate intake of calcium is needed to help prevent fractures that might result from falling (Associated Press, 2006).
- Interactions between medications the patient is taking and any food and herbal substances. Many herbal substances increase bleeding tendency. Grapefruit juice interacts with a number of medications.

Nutritional supplements that could reduce need for medication, such as chamomile tea to promote sleep however be careful as this could also interact with prescribed medications such as coumadin (Coumadin (Warfarin®)] Rivlin, 2007).

Case Study #2: Mrs. Jessup - Dosage Form

Read Mrs. Jessup’s situation and the questions suggested. Click on the Check Answer button next to each question to view answers.

- Are you asking similar questions to those suggested?
- Are there other, more thought-provoking questions that should be asked?
- In addition to the questions, what orders do you think might be indicated?

Mrs. Jessup, age 69 years, has difficulty swallowing since she had a cerebral vascular accident this morning. She cannot communicate well due to aphasia. Her medications include divalproex sodium delayed-release tablets (Depakote®) 500 mg po twice daily. She started taking the medication three months ago when she experienced a period of acute mania. Now she can't swallow the Depakote® tablets.

Case Study #2: Mrs. Jessup – Questions

What are the implications of the dosage form the patient is receiving?

- Crushing delayed-release tablets may increase gastric upset as well as increasing the drug's peak concentration, while lowering its trough concentration.
- The drug's liquid formulation must be administered more frequently and may cause gastric upset. Depakote® Sprinkles capsules may be opened and mixed with a small amount of soft food and swallowed without being chewed (Lacy, et al., 2011).

What are your resources for further information about the drugs your patient is receiving?

- *Family members may provide information about how she takes medication at home.*
- *The Pharmacy or the Drug Information Center can provide information about alternative formulations and its effect on the dose and timing of administration. Or they may suggest alternative medications.*

With whom will you collaborate to assure safety and effectiveness of this patient's drug therapy?

- *The prescriber may order an alternative formulation of the medication.*
- *An Occupational Therapist or a Speech Pathologist may advise techniques to improve swallowing.*

What laboratory tests or other means of monitoring response to drug therapy will the patient need now and after discharge?

- *Thrombocytopenia and elevated liver enzymes are the most common laboratory abnormalities.*
- *The drug's efficacy is based on the patient's clinical response and trough drug concentrations.*

What side effects and adverse effects is this patient most likely to experience?

- *Nausea, vomiting, and gastric upset are the most likely new adverse effects related to changing the formulation of the drug.*
- *Gastric irritation may be reduced by administering the medication with food.*

How will this patient's medication profile change upon discharge? Any new drugs, dosage changes or discontinuations?

- *If a new formulation is administered while the patient's swallowing function is impaired, will the formulation be changed as her ability to swallow improves?*
- *If the new formulation is still administered at the time of discharge or transfer to another facility, ensure that the patient or family knows to discontinue the previous formulation*

The Teaching Process: Seize Every Opportunity

Use your judgment to identify those medications and dosage forms which the patient will most likely continue after discharge.

Communicating even one piece of information ***each time you administer medications*** to a patient can help prepare for safer care after discharge.

- Ask the patient and caregiver to tell you something about his medications at the time you administer them.
- Ask, “How do you take your medications at home?” The most practical method of medication adherence assessment for most elderly patients may be to interview the patient or caregiver using open-ended, nonthreatening and nonjudgmental questions.
- Clarify misunderstandings or important knowledge deficits.
- Caution patient and caregiver to keep certain drugs intact. They might otherwise decide to cut pills or tablets or open capsules for various reasons.
- Clarify the necessary monitoring associated with each medication.
- Help patient and caregiver make realistic plans for managing care at home.
- Reinforce health practices that support effective medication therapy, such as adequate fluid intake and sufficient intake of nutrients (Mesteig et al., 2010; Ziaeian, Araujo, Van Ness, & Horwitz, 2012).

The Teaching Process: The Transition to Home

The Joint Commission National Patient Safety Goals emphasize the risk for adverse medication reactions when a patient moves from one setting to another. The transition from acute care to the home setting creates risk for:

- Duplication of medications if more than one prescriber is involved.
- Medication interactions – especially with OTC products and other substances.
- Potential for failure to continue certain maintenance prescriptions after discharge.
- Potential for resuming medications used prior to admission despite the discontinuation or change of dosage during hospitalization.

The Teaching Process: Medication Differences Upon Discharge

Ask patient and caregiver to explain the changes they will make in the patient's routine (Mesteig et al., 2010; Ziaeian, et al., 2012).

Emphasize any differences between the patient's former medication regime and the regime to be followed after discharge. Just supplying the new information is not enough. Differences need emphasis. Identify exactly what is changed:

- New dosage form?
- New dose?
- New medication?
- New dietary recommendations?
- Medications that need to be discarded?

The Teaching Process: Individualized

Ask the caregiver or a significant other to bring in medication boxes, magnifiers, syringes, monitoring devices or other items that will be used at home to administer medication and monitor response. Validate that the patient or caregiver uses devices correctly.

Individualize teaching to the patient's routine. Tailored education is more effective than standardized education for changing some medication-related behaviors (Gates, Setter, Corbett, & Baker, 2005).

Integrating medication therapy with the patient's daily routine is extremely important in supporting the patient's adherence.

Supply printed information for reinforcement and reference. But, do not substitute printed information for thorough discussion with patient and caregiver. If you use standardized materials, such as might be provided by a pharmaceutical company, assure that the information applies to the patient's situation or make any necessary corrections.

Review the information with patient and caregiver to assure correct understanding.

Patient and caregiver will need access to resources for clarification and further information. Assure that patient and caregiver are advised of resources and when to consult the provider (Mesteig et al., 2010; Ziaeian, et al., 2012).

Case Study #3: Mrs. Zimmerman - Digoxin Toxicity

Read Mrs. Zimmerman's situation and the questions suggested. On the next screen, click on the Check Answer button next to each question to view answers.

- Are you asking similar questions to those suggested?
- Are there other, more thought-provoking questions that should be asked?
- In addition to the questions, what orders do you think might be indicated?

Mrs. Zimmermann, 84-years-old, was diagnosed with congestive heart failure in 1992 and since then she has taken digoxin (Lanoxin®) 0.25 mg po daily. Recently she had a urinary tract infection. Last night, she was admitted through the Emergency Department with signs of digitalis toxicity, including visual disturbances, weakness and feeling of fatigue. She also seemed confused and apathetic. Her pulse was 50, but otherwise her ECG was unremarkable.

Electrolytes drawn in the ED were within normal limits, but her creatinine clearance was moderately elevated.

Case Study #3: Mrs. Zimmerman - Questions

1. Is this patient receiving any potentially inappropriate medications?
   Beers Criteria recommends that digoxin dose for the elderly not exceed 0.125 mg per day.

2. What effects of aging have implications for the drugs this patient is receiving?
   In general, the elderly are less able to eliminate drugs through their kidneys. The rate of glomerular filtration gradually declines by about 40% from age 20 to 80 years.

Because digoxin (Lanoxin®) is renally excreted, people with decreased renal function may need a lower dose.

- *Because the elderly have less muscle mass, the volume of distribution for digoxin (Lanoxin®) is decreased, which may lead to side effects from an otherwise therapeutic dose.*
- *Decreases in serum proteins in the elderly may bind and inactivate less digoxin (Lanoxin®) than in younger people.*

3. Does this patient exhibit cognitive impairment that could be drug-related?
   Confusion and apathy may be signs of digitalis toxicity, signs of depression, or side effects from other medications. If confused, she may have inadvertently taken too much digoxin (Lanoxin®).

4. Has this patient been compliant with medications prior to this hospitalization?
   Before determining a safe long-term dose of digoxin (Lanoxin®), the patient's compliance with the last prescribed dose must be established.

Medication-Related Risks for Elderly Patients

Certain safety risks are of particular concern when elderly persons take their medications in the home setting. These include:

- Interactions between medications and other substances, including foods, herbals, OTC medications and substances such as the caffeine found in coffee and chocolate, nicotine in cigarettes and the alcohol in alcoholic beverages.
- Polypharmacy
- Pain Management
- Social Issues
  - Finances
  - Social Isolation
  - Substance Abuse
- Compliance and Adherence (Cresswell et al., 2007; Mesteig et al., 2010)

Much of the primary data on drug-drug interactions is based on in vitro testing and rarely takes into account the effects of more than two interacting agents. It may be difficult to gain a clear understanding of the clinical impact of drug-drug interactions (Mesteig et al., 2010).

Interactions

Medications may interact in a variety of ways that create risks for the elderly patient.

A medication may interact with:

- Another prescribed medication.
- OTC medications.
- Foods.
- Substances such as alcohol, caffeine and nicotine
- Herbal substances.
- Disease states – see Appendices C and D for potential drug-disease interactions.

Most interactions between medications and other substances result from the affect of a medication or other substances upon the enzymes that metabolize medications. The affect may be either to increase the rate of metabolism of the medication, resulting in the medication being active for a shorter period of time, or to decrease the rate of metabolism of the medication, resulting in the medication remaining active for a longer period (Cresswell, Fernando, McKinstry, Sheikh, 2007; Mesteig et al., 2010).

Example: Verapamil (Isoptin®) Interactions

One drug metabolized by the CYP3A3/4 enzyme is verapamil (Isoptin®), which is used in the treatment of arrhythmias and hypertension. When a patient receives verapamil (Isoptin®) and receives medications or substances that affect this enzyme, some will increase the effect of verapamil (Isoptin®), and others will decrease the effect.

The increased effect occurs when the other substance inhibits the enzyme and therefore inhibits the metabolism of verapamil (Isoptin®). When verapamil (Isoptin®) is metabolized more slowly, more active drug is circulating and causes an increased effect. For example, grapefruit juice inhibits the CYP3A3/4 enzyme and therefore, may increase serum levels of verapamil (Isoptin®).

However, St John's Wort, induces the CYP3A3/4 enzyme which speeds up the metabolism of verapamil (Isoptin®) and; therefore, lowers the serum concentration of verapamil (Isoptin®).

Twenty different drugs and substances induce the CYP3A3/4 enzyme, including nafcillin and phenobarbital.

More than 60 different drugs and substances inhibit the CYP3A3/4 enzyme and verapamil (Isoptin®) metabolism, including amiodarone and erythromycin.
In addition, verapamil (Isoptin®) acts on CYP enzymes and through this action increases levels of some drugs, such as digoxin, simvastatin and midazolam, and decreases levels of other drugs, including lithium (Lacy et al., 2011).

Interactions with Coumadin (Warfarin®)

Many medications and substances which elders commonly use have high potential for interactions. For example, warfarin (Coumadin®) interacts with numerous drugs and herbs.

Vitamin K is the antidote for warfarin (Coumadin®) and foods high in vitamin K decrease the anticoagulant effect of coumadin (Warfarin®). However, a patient who receives warfarin (Coumadin®) is ***NOT*** advised to eliminate vitamin K from the diet. Instead, a patient who receives warfarin (Coumadin®) should maintain a consistent intake of vitamin K. Regular monitoring of PT and INR allows the warfarin (Coumadin®) dose to be regulated with the usual dietary intake of vitamin K.

When a drug known to interact with warfarin (Coumadin®) is indicated, the provider monitors INR to determine whether the patient's dosage needs to be adjusted to accommodate for an increase or decrease in the rate of metabolism of coumadin (Warfarin®).

Consult drug references to identify clinically significant interactions in the medication profiles of your elderly patients. Consult the pharmacist to clarify any concerns you may have about potential drug interactions.

Although there are many potential interactions involving medications, not all are clinically significant (Lacy et al., 2011).

Knowledge Check 3

Which vitamin is the antidote for warfarin?

Vitamin K

Drugs and Substances with High Potential for Interactions

Amiodarone
Beta-adrenergic blockers
Bile acid sequestrants
Carbamazepine
Cimetidine
Digoxin
Diuretics
Erythromycin
Fluoroquinolones
Grapefruit juice
Ketoconazole
Monoamine oxidase inhibitors
Nitrates
Phenobarbital
Phenytoin (Dilantin®)
Simvastatin
Theophylline
Coumadin (Warfarin®)

(Lacy et al., 2011)

Case Study #4: Mr. Mays - Medication Interactions

Read Mr. May's situation and the questions suggested. On the next screen, click on the Check Answer button next to each question to view answers.

- Are you asking similar questions to those suggested?
- Are there other, more thought-provoking questions that should be asked?
- In addition to the questions, what orders do you think might be indicated?

Mr. Mays, 67-years-old, was admitted with chest pain. He was diagnosed with chronic atrial fibrillation two years ago and had remained stable until today. Although he was too embarrassed to admit this to his doctor, he confided to you that earlier this evening he borrowed a sildenafil (Viagra®) of an unknown dose from a friend in preparation for his wedding anniversary.

Based on his description of the tablet, you guessed that it was the highest strength, 100 mg. The anniversary celebration began at a restaurant, where with dessert Mr. Mays took cimetadine (Tagamet®) to ease his heartburn.

He also takes digoxin (Lanoxin®), warfarin (Coumadin®) , atenolol (Tenormin®) and atorvastatin (Lipitor®). His wife brought him to the Emergency Department after he first fainted during sexual intercourse and then complained of severe chest pain when he regained consciousness.

Case Study #4: Mr. Mays - Questions

What creates risks for drug-drug interactions for this patient?

- *The recommended dose of sildenafil (Viagra®) is 25 mg for men older than 65 years because the drug is active for a longer time and/or remains at a higher plasma level longer than for a younger man.*
- *Cimetadine (Tagamet®) may inhibit the metabolism of sildenafil (Viagra®) through competitive inhibition of P-450 CYP 3A4. The half-life of sildenafil (Viagra®) could be prolonged and the peak concentration may rise (Lacy et al., 2011).*

What social issues create polypharmacy for this patient?

- *Taking a medication prescribed for someone else resulted in an overdose of sildenafil (Viagra®).*
- *He may be reluctant to discuss erectile dysfunction with his primary care provider.*

What actions do you take when you suspect polypharmacy?

Notify the attending physician of the patient's use of sildenafil (Viagra®).

What references and resources are available to you to address the problem of polypharmacy?

An evaluation for erectile dysfunction may result in a prescription for sildenafil (Viagra®) and instruction for its safe use.

Polypharmacy

Polypharmacy is the use of medications that are not clinically indicated. Because elderly persons often have multiple co-morbidities, it is probably counterproductive to attempt to set appropriate limits for numbers of medications (Jokanovic, Tan, Dooley, Kirkpatrick, & Bell, et al., 2015).

Criteria to specify excessive or unnecessary use include:

- Use of medications without indication.
- Use of duplicate medications to treat the same condition.
- Concurrent use of interacting medications.
- Use of an inappropriate dosage.
- Use of medications to treat side effects or adverse reactions of other medications.

Polypharmacy may simulate diseases like delirium and hypertension, and cause nonspecific complaints that are attributed to aging. Polypharmacy may also result in:

- Increased total medical expenses
- Increased incidence of adverse drug effects
- Decreased patient compliance
- Decreased social activity
- Increased incidence of depression
- Diminished cognition
- Increased incidence of eventual nursing home placement
- Increased prescribing errors

At Risk for Polypharmacy

Risks for polypharmacy include:

- Advanced age
- Number of medications taken daily
- 50% risk of adverse drug response when 5 drugs are taken
- Almost 100% risk of adverse drug response when 8 or more drugs are taken
- Living alone or without regular assistance
- Female gender
- Multiple prescribers
- Multiple pharmacies
- Lack of recommended monitoring

Eliminating polypharmacy is the role of the prescriber. However, nurses' observations often identify the problem:

- Be especially alert for polypharmacy when risk factors pertain to your patient.
- When your patient exhibits signs or symptoms which may be due to polypharmacy, consult with your pharmacist or the patient's physician.

Consult with your pharmacist or the patient's provider if you identify risks for polypharmacy in discharge plans. Alternatives may be available to reduce the risks, such as larger labels, less frequent dosing or other means of increasing safety (Jokanovic, et al., 2015).

Encourage the patient to use only one pharmacy. Many pharmacies have systems that monitor duplications and interactions, but use of multiple pharmacies eliminates this safety feature.

Polypharmacy Assessment

- Name every medication and substance that the patient uses. Include over-the-counter drugs, herbals, alcohol, caffeine (include coffee, tea, chocolate, soft drinks that contain caffeine), tobacco and home remedies.
- What is the indication for each drug this patient is taking?
- What physical limitations, such as visual deficits, create risk for mistakes when self-administering medications?
- Is the patient benefiting from each drug he is taking?
- Is the patient receiving drugs to treat the side effects of other drugs?
    - If so, are there alternatives to this practice?
- What creates risks for drug-drug interactions for this patient?
- What creates risks for food-drug interactions for this?
- What social issues create polypharmacy risks for this patient? Consider alcohol use, finances, accessibility, depression, cognitive impairment, use of drugs prescribed for others, outdated drugs or drugs the prescriber believes have been discontinued.
- What references and resources are available to you to address the problem of polypharmacy?
- How will you approach a pharmacist or prescriber with concerns related to polypharmacy?

(Bushart, et al., 2008)

Prescription Drug Use

Four out of five Americans take at least one prescription medicine daily.

Two out of three Americans use prescription drugs for a long-term health condition. Elderly persons in nursing homes receive an average of 6 medications per day; over 20% receive more than 10 medications per day (**Petrone & Katz, 2005; Laroche et al., 2007).**

Drugs Given to Treat the Side Effects of Other Medications

The following list includes common medications prescribed to treat the side effects of other medications:

- Alpha$_1$-adrenergic antagonists, such as terazosin or tamsulosin, to treat urinary retention related to anticholinergic agents.
- Anti-emetics to treat nausea associated with digoxin.
- Anti-tussives to treat cough induced by ACE inhibitors, such as captopril.
- Chronic use of antacids, H_2-receptor antagonists, such as ranitidine or proton pump inhibitors, such as omeprazole, to treat dyspepsia related to use of aspirin or NSAIDs, such as ibuprofen.
- Laxatives to treat verapamil (Isoptin®), -induced constipation.
- Sedative agents, such as amitriptyline, to manage the activating effects of some antidepressants, such as fluoxetine (Lacy et al., 2011).

Polypharmacy Prevention: Nine Key Questions for Prescribers to Ask

The Nine Key Questions (Bushardt et al., 2008)

1. Is each medication necessary?
2. Is the drug contraindicated in the elderly? Beers Criteria should be used in conjunction with clinical judgment and knowledge of an elderly patient's specific risks and benefits from therapy.
3. Are there duplicate medications?
4. Is the patient taking the lowest effective dosage?
5. Is the medication intended to treat the side effect of another medication?
6. Can I simplify a drug regimen?
7. Are there potential drug interactions?
8. Is the patient adherent?
9. Is the patient taking an OTC medication, an herbal product or another person's medication?

Preventing Polypharmacy *WITH* the Patient

Preventing and identifying polypharmacy requires alert collaboration by prescribers, pharmacists, nurses and patients.

A well-informed and motivated patient can act as his own safety net in preventing adverse drug events. Patients, who lack adequate information and commitment to their regime, can contribute to polypharmacy if they:

- Alter or omit dosages for a variety of reasons.
- Use home remedies and OTC medications without consulting the provider.
- Fail to follow prescribed directions.
- Fail to report all medications, herbals. or OTC products used.
- Borrow or trade medication with other persons.
- Decide to continue medications or use of substances after the provider has discontinued a medication or advised against its use.

Use the time of hospitalization to explore medication-related information and concerns with the patients and caregivers. A well-informed patient is a fine safeguard against the dangers of polypharmacy (Bushardt et al., 2008; Laroche et al., 2007; Jokanovic, et al., 2015).

Knowledge Check 4

Polypharmacy occurs when a patient is taking more than 5 medications concurrently.

True
False

Correct. Polypharmacy is the use of medications that are not clinically indicated. Although risk of polypharmacy is increased with an increased number of medications, polypharmacy is not defined by a specific number.

Pain Management

Elderly patients may fail to report their symptoms for many reasons:

- They accept them as part of old age or signs that nature is taking its course.
- They want to avoid the label of complainer.
- They may fear that reporting a symptom will result in uncomfortable diagnostic procedures or treatments.
- They feel that they may be looking for trouble and fear a poor prognosis.

For all of these reasons, elderly patients may not receive optimal treatment and pain management.

Pain Management and Prescription Medication Costs

Cost of prescription analgesics may also interfere with adequate pain management.

- The average expenditure for persons with at least one prescription medicine purchase of an outpatient analgesic nearly tripled, rising from $83 to $232, when comparing 1996 to 2006.
- The average expenditure per drug purchase of an outpatient prescription analgesic more than doubled from 1996 to 2006, rising from $26 to $57 (Stagnitti, 2009).

Teaching About Pain Management

- Instruct patients and caregivers in the use of a pain log to record regular entries for pain intensity, medication use, response to treatment and associated activities.
- Administer pain medication at regular intervals, rather than on a PRN basis. The exception to regular administration is NSAIDs, which should be used with caution in the elderly, if at all.
- Prevent complications caused by side effects to which the elderly are particularly susceptible. For example, opioids such as morphine (Roxanol®) and oxycodone (Oxycontin®) cause constipation. Teach patient and caregiver how to prevent and manage constipation with a bowel program.
- Treat breakthrough pain. Facilitate collaboration with the provider and the patient to obtain a prescription for breakthough pain.
- Reassess regularly for improvement, deterioration or complications attributable to treatment (McLiesh, Mungall, & Wiechula, 2009).

Non-Pharmacologic Pain Relief Measures

Set a goal of pain-free patients!

Consult with resource persons to investigate non-pharmacologic pain relief measures including:

- Relaxation techniques
- Cognitive-behavioral therapy
- Hypnosis, distraction therapy
- Guided imagery
- Biofeedback
- Exercise, such as walking and mild resistance training
- Hydrotherapy
- Alternate hot and cold
- Massage therapy
- Acupuncture or acupressure
- Chiropractic manipulation
- Transcutaneous electrical nerve stimulation (TENS)

If not contraindicated, and if acceptable to the patient, initiate and practice non-pharmacological pain relief during hospitalization, per provider orders and facility policies and procedures (McLiesh et al., 2009).

Case Study #5: Mr. Kaufmann - Pain Management

Read Mr. Kaufmann's situation and the questions suggested. Click on the Check Answer button next to each question below to view the answers.

- Are you asking similar questions to those suggested?
- Are there other, more thought-provoking questions that should be asked?
- In addition to the questions, what orders do you think might be indicated?

Mr. Kaufmann, an 84-year-old complained that the pain in his back was "unbearable." He had been diagnosed with lung cancer six months ago. Despite chemotherapy, the cancer spread to his spine. His primary care provider just ordered oxycodone extended-release (OxyContin®) 10 mg po every 12 hours.

Case Study #5: Mr. Kaufmann - Questions

What effects of aging have implications for the drugs this patient is receiving?

- *Reduced gastric mobility may increase the risk of constipation in the elderly taking oxycodone extended-release (OxyContin®). Although tolerance to pain relief often develops over time, constipation remains a side effect regardless of the duration of therapy.*
- *Compared to younger men, elderly men with benign prostatic hypertrophy are more susceptible to urinary retention when taking oxycodone extended-release (OxyContin®).*

Does this patient's medication profile comply with recommended guidelines and standards?

- *Elderly patients should start a bowel program to prevent constipation as soon as treatment begins with oxycodone extended-release (OxyContin®).*
- *Patients taking extended-release narcotics may also need a faster-acting analgesic to relieve breakthrough pain (McLiesh et al., 2009).*
- *Pain relief may also require treatment with antidepressants (McLiesh et al., 2009).*

What are the implications of the dosage form the patient is receiving?

Because of the extended-release formulation, instruct patient to swallow the tablet whole without chewing, breaking, or crushing the tablets (Lacy, et al., 2011).

How do you evaluate this patient's response to his medications?

Monitor relief of breakthrough pain and background pain separately.

What side effects and adverse effects is this patient most likely to experience?

The most common side effects include constipation, respiratory depression, nausea, dizziness, vomiting, pruritis, weakness and headache.

Does this patient exhibit cognitive impairment that could be drug-related?

Opioid analgesics may cause cognitive impairment and increase the risk for falls

What social issues affect drug therapy for this patient?

- *Instruct patient not to use alcohol while taking oxycodone extended-release (OxyContin®) because it increases dizziness, cognitive impairment, and the risk for falls.*
- *Discuss the patient's perceptions of the potential for narcotic dependence.*

How will this patient's medication profile change upon discharge? Any new drugs, dosage changes or discontinuations?

Oxycodone extended-release (OxyContin®) will be continued after discharge.

What does this patient know about the changes in his medication regimen?

Instruct the patient to:

- *Take oxycodone extended-release (OxyContin®) to prevent pain.*
- *Differentiate breakthrough pain from background pain and to use the appropriate medications.*
- *Instruct him to follow bowel program to prevent constipation.*
- *Notify primary care provider if pain relief is inadequate.*

Social Factors

In an attempt to save money, elderly persons often take drugs prescribed for another family member or friend, fail to fill prescriptions or take less medications frequently or in a lower dose than prescribed.

As one elderly patient stated, “Well that settles it! I have a doctor’s appointment tomorrow, but I’m not going to tell her about this numbness and tingling in my arm. Every time I tell her about something, I get either a new pill or a referral and then a new pill.”

Research findings support this statement: 75% of physician visits end in a prescription (Joyce, Carrera, Goldman, & Sood, 2011).

Elders Bewildered at Medication Costs

Elders are often bewildered at the cost of their prescription medications and create unsafe situations in their attempts to control costs, such as:

- Substituting an over-the-counter drug, which they believe is similar to the prescribed medication.
- Reducing the dose in order to make a refill last longer.
- Using outdated drugs or drugs prescribed for someone else.

Connect the patient with resources within your facility such as a discharge planner, case manager or social worker. Suggest community resources such as the Office of Aging or other community-specific agencies.

The Financial Impact of Medication Therapy

In attempt to control costs, patients may ask themselves:

- “What disease conditions am I willing to live with?”
- “What living expenses can I cut out in order to pay for my medicines?”

Medicare and health insurance companies have structured a variety of plans to assist with costs. But elders may find the plans complex and the coverage incomplete.

Governmental agencies, university-based research foundations and organizations such as the American Association of Retired Persons (AARP) maintain websites that offer information.
If your elderly patients use online or mail-order pharmacies, counsel them to be certain to keep the pharmacy informed of all medications filled at any pharmacy, as well as any OTC or herbal medications. Only use credible organizations affiliated with their provider, insurance company or endorsed by a reputable organization such as the AARP. The use of a single pharmacy helps to prevent polypharmacy.

Many low-income seniors mistrust generic medications, especially African-Americans and seniors with low health literacy. Educational efforts to promote generic medications need to explore patients’ literacy and cultural influences (Iosifecsu, et al., 2008).

Knowledge Check 5

Which is a dangerous practice that elderly patients might engage in when attempting to save money on prescription medications?

a. Using only one pharmacy
b. Requesting prescriptions for generic medications
c. Taking medications prescribed for others
d. Purchasing all prescriptions at the same time

Social Isolation

Social isolation often leads to depression, lack of motivation to optimize health and lack of a routine with which to connect taking medications. Use the resources of the discharge planner, case manager and/or community resources for the elderly to assist your patient to engage with others.

If you identify symptoms of depression or cognitive impairment in your elderly patient, take the necessary steps to obtain an evaluation. Identifying and treating these conditions can markedly improve the patient's physical and mental health and quality of life. Depression and cognitive impairment also place the patient at risk for non-compliance (Bowling, 2007).

Substance Abuse

Overuse and abuse of prescription drugs is more frequent among patients with a history of drug or alcohol abuse. Alcohol use may also lead to forgetting doses. Forgetting may result in under dosing or in overdosing if patients forget that they have taken their medication and take another dose.

Alcohol use is also a significant factor in polypharmacy. Alcohol use is common among the elderly. The effects of aging on the liver increase the sensitivity of the elderly to alcohol. Ask your elderly patients about their alcohol use.

Prescription and street drug abuse also occurs more frequently among elders than you might suspect. Because of the risks associated with alcohol use and drug abuse, assess your elderly patients for both alcohol use and substance abuse (Institute of Alcohol Studies, 2010).

Compliance and Adherence to Medication Therapy

Compliance = Initial acceptance of the regimen
Adherence = Continuation of treatment, integrating the treatment into the lifestyle
Maintenance = Continuation of treatment with little supervision and in the face of conflict

Although these definitions are precisely correct, the term compliance often refers to accepting and continuing the prescribed regime both initially and ongoing. This course uses the term compliance to refer to following the treatment plan at any time during treatment.

A nurse in acute care and other settings, see the results of non-compliance and non-adherence to therapy. Many elderly persons are hospitalized for exacerbations of illness or medication-related problems as a direct result of failure to comply with therapy.

Many elderly persons return to the hospital shortly after discharge because of complications related to medication therapy. In fact, over a two-year period, 1/3 of Emergency Department (ED) visits by elderly patients for adverse drug events were caused by coumadin (Warfarin®), insulin and digoxin. Centers for Disease Control and Prevention recommend that EDs implement interventions to improve medication safety for these three drugs (Budnitz et al., 2011).

The Ultimate Heart Pill: An Aid to Compliance
Research findings support the efficacy of a polypill: a combination of atenolol, ramipril, a thiazide diuretic, a statin, and low dose aspirin. The polypill proved to be as effective as nearly all of its components taken alone, with no greater risk of side effects. The opportunity to take only one low-cost pill rather than five different medications will promote compliance. Researchers will continue to study the polypill. The developers of the polypill will seek FDA approval when sufficient evidence has been assembled (Marchione, 2009).

Non-compliance and the Elderly

Common forms of non-compliance with drug therapy in the elderly include:

- Underuse due to forgetting and other reasons, **the** most common noncompliant behavior.
- Overuse and abuse.
- Alteration of schedules and dosages.

Inappropriate drug discontinuation occurs in 40% of prescribing situations, especially during the first year of treatment.

Forty percent of seniors fail to take medications as directed. The provider who is unaware of non-compliance might increase a dose and if the patient complies, an overdose may result.

Elderly patients perceive different levels of importance for their medications based on factors beyond clinical efficacy. Their perception of importance influences how they perceive their medications' worth, especially for medications of high costs. Understanding how patients perceive medication importance may help in the development of interventions to reduce cost-related non-adherence (Lau, Briesacher, Mercaldo, Halpern, Osterberg, Jarzebowski,…. & Mazor, 2008).

Compliance Research

Most research related to medication compliance in the elderly has studied promoting knowledge and skills for medication-taking and adherence. Few studies address memory aids and self-monitoring strategies. Researchers recommend further development of interventions addressing medication and administration factors influencing adherence. Most interventions studied are geared toward self-medicating patients and fail to address caregivers administering medications. Interventions studied have not addressed variations in patterns of adherence among older adults (Ruppar, Conn, & Russel, 2008).

At Risk for Non-compliance

- A prescription for three or more medications per day puts the elderly at risk for non-compliance. At least 25% of elders take three or more drugs. When hospitalized, the elderly receive an average of eight drugs per day.

- Other risks for non-compliance include:
  - Depression and dementia
  - Failure to understand the reason for the medication
  - Unpleasant/unacceptable side effects
  - Increased sensitivity to the medication
  - Changes in prescriptions
  - Living alone
  - Alcohol or substance abuse
  - Inability to open the medicine container
  - Cost of drugs
  - Use of multiple pharmacies
  - Prescriptions from multiple prescribers

"Every pill you see in your hand makes you feel five years older. Patients really object to 'pill burden' and respond by skipping doses." James Stein, MD (in Marchione, 2009).

Knowledge Check 6

An elderly patient is at risk for noncompliance if he has prescriptions for how many medications or more per day?

Three

Assessing for Compliance

Ask your elderly patient about past compliance. Analyze reasons for non-compliance and plan with the patient and other team members for greater success when the patient leaves the hospital. Practice a technique well-known to successful salespersons – find out why the customer does not want to buy and then modify the product to counter those objections.

Assess your elderly patient for the known risks for non-compliance and address those risks that you identify.

Ask the patient to state any differences between his previous medication regime and anticipated discharge plans. Ask him to tell you how he will adjust his self-care to incorporate these changes.

One good predictor of future behavior is past behavior. Compliance is no exception. A patient who has failed to comply in the past is at risk for non-compliance in the future (Marchione, 2009).

Non-compliance: It's *NOT* Only an Education Problem

Patients may be unwilling to comply because of unpleasant side effects or intentionally choose non-compliance for some other reason.

Patients may have adequate knowledge and be willing to comply, but may lack the money to pay for the prescriptions or may not have access to a pharmacy for refills.

Even when knowledge, willingness and resources are all in place, the prescribed treatment may be ineffective. Instead of notifying the doctor and obtaining new orders, many patients simply cease taking medications or alter the medication regime on their own.

Sometimes finding out what the patient's priorities are provides a meaningful connection and motivator for the patient to comply with therapy. For example, if your patient cherishes weekly breakfast meetings with contemporaries at a neighborhood snack shop, emphasize the relationship between the effect of specific medications and the patient's ability to retain the necessary mobility and stamina for these social events (Olsen et al., 2007).

Patients who do not understand <u>WHY</u> they are taking a particular medication are at increased risk for non-compliance.

Additional Reasons for Non-compliance

Investigate other reasons for non-compliance and address your findings: perhaps a different drug with a different side effects profile can be substituted; perhaps the patient needs to connect with resources to assist with financial difficulties.

A World Health Organization (WHO) report stated that lack of compliance was not related to education or income. The report noted that some patients do not record instructions sufficiently or forget the instructions. Though there was not a significant effect of economics, economics is probably a factor, among others, in the case of elderly persons who have limited income and many prescriptions. The study identified fear of side effects to be the major reason for lack of compliance and adherence (WHO, 2010; PhRMA, 2011).

Knowledge Check 7

According to a WHO report, what were the 2 factors unrelated to non-compliance?

a. Gender and age
b. Income and gender
c. Age and education
d. Education and income

Improving Patient Compliance and Adherence to Medication Therapy

Compliance improves when:

- Patients can assimilate a new medication regimen into their daily routine.
  - Connect medication doses with the patients' routine, such as upon arising, at breakfast or other times that are a part of the patient's routine.
- The number of daily doses is minimized by using extended-release forms.
- Medications are grouped together at one time of day.
- Patients perceive their medicine as secondary prevention: beneficial to prevent a recurrence of illness. For example, when a patient who has had a myocardial infarction understands that compliance with the medication regimen will reduce the risk of a second heart attack, compliance is more likely.
- Doses are scheduled rather than PRN.
- Doses are prepared for a week or longer at a time, rather than daily.

Various devices, such as weekly pill boxes and computerized dispensing/reminder systems, are readily available to assist elders in managing their own medications at home. Some systems even include a function to alert designated caregivers when patients miss their doses.

Refer your patients to a social worker, case manager, home health agency or other appropriate resource to learn about possible devices and systems to assist them with compliance (George, Elliot & Stewart, 2008).

Be realistic about the lasting impact of inpatient instructions about taking medications at home. Most patients will require reinforcement once they begin to take the medications on their own. Assure that the patient has resources for information and for assistance with monitoring and compliance.

Compliance: Recent Research

Researchers have found that:

- Perceived effectiveness, perceived partnership, perceived reality and interpersonal influences all contributed to patients' compliance. Building partnerships between patients and healthcare professionals, and encouraging supportive interpersonal contacts facilitated compliance (Chen, Wu, Yen, & Chen, 2007).
- Belief-laden variables including self-efficacy (which is the belief that one can perform a specific behavior under differing conditions), medication efficacy, confidence in the physician's knowledge, perceptions about natural products and home remedies, beliefs of control over one's health and illness perceptions were significantly related to medication adherence among older adults (Chia Schlenk, & Dunbar-Jacob,2006).
- Almost all of the interventions that were effective for long-term care were complex, including combinations of more convenient care, information, reminders, self-monitoring, reinforcement, counseling, family therapy, psychological therapy, crisis intervention, manual telephone follow-up and supportive care. Even the most effective interventions did not lead to large improvements in adherence and treatment outcomes (Haynes, Ackloo, Sahota, McDonald, &Yao, 2009).

Knowledge Check 8

Research findings show that compliance with medication therapy is positively related to:

a. Educational level.
b. Income level.
c. Partnership with healthcare professions.
d. Scheduling doses at 3 or more times per day.

Compliance with Monitoring

Many elderly patients leave the hospital with prescriptions for drugs that require ongoing monitoring, such as:

- Periodic INR measurements for patients taking warfarin (Coumadin®) .
- Hemoglobin A1C measurements for diabetics.
- Periodic serum levels and CBC liver function tests for patients taking phenytoin (Dilantin®) (Dilantin®).
- Serum cholesterol and liver function tests for patients taking statins.

In addition to blood tests done in laboratories, patients may need to monitor certain parameters themselves such as blood glucose or blood pressure.

Making arrangements for ongoing monitoring is certainly beyond the scope of your responsibilities as a staff nurse. However, teaching patients about the necessary monitoring and importance of following through with monitoring can provide opportunities to raise questions that aid greatly in achieving compliance (Mesteig et al., 2010).

Collaboration

When collaborating with the patient, the family, caregivers and your professional colleagues, you often play the role of patient advocate, as well as express your professional perspective and interpretations of your assessment findings. Your holistic picture of your patients places you in a unique position to advocate for a plan with which the patient will comply.

Identify and collaborate with resource persons specific to your patients' discharge planning, including a discharge planner, case manager or other resource persons. Seek recommendations early to allow time to implement discharge plans.

Verify with your elderly patient what aspects of the medication regimen are most important. It is likely that your patient's priorities will include costs, ease of compliance (which implies fewer doses and fewer medications) and minimal side effects. Explore the patient's perspective to identify any opportunities to increase the likelihood of compliance.

Collaborate with the pharmacist to suggest alternatives such as an alternative dosage form or a drug with fewer side effects. If one medication is ordered to treat a side effect of another medication, consult with the pharmacist to find out if an alternative drug with a different side effect profile could be recommended to the prescriber. Drugs to treat side effects of other drugs can lead to disease-drug interactions, drug-drug interactions and non-compliance (Agency for Healthcare Research and Quality [AHRQ], 2008).

Studies have shown that consultation with pharmacists and active involvement of unit-based pharmacists dramatically decreases medication errors and adverse drug reactions.

Resources at Your Facility

Know about resources are available at your facility and how to access them. If you identify a deficit in unit-based resources, make recommendations to your manager or pharmacist.

Some facilities have networked computerized systems for flagging potential hazards, such as PIMs and drug-disease interactions when an order is entered.

Some facilities have safety systems that automatically alert a clinical pharmacist when certain lab values, dosages or other triggers occur.

Many facilities have placed their formularies on their intranet systems. Other facilities may rely on package inserts and reference books such as the *Physician's Desk Reference.*

Make a commitment to use a comprehensive reference for reviewing information about the medications you administer frequently. For every medication you administer, know dose range, action, side effects and toxic effects.

The facility's pharmacy usually has the most recent annual update of two USP publications:

- *Drug Information for the Healthcare Professional*.
- *Advice for the Patient: Drug Information in Lay Language*.

Current References are Crucial

The pharmaceutical industry moves quickly. The FDA approves new medications frequently and with less scrutiny than it has previously used.

Manufacturers also withdraw medications from the market based on research-based safety information. For example, troglitazone (Rezulin®) was withdrawn from the market in March 2000, after safety study results revealed that other medications [rosiglitazone (Avandia®) and pioglitazone (Actos®)] offered the same benefits in the treatment of type 2 diabetes without the risk of liver damage (Lacy, Armstrong, Goldman, & Lance,, et al., 2011).

A medication may be withdrawn from the market and then returned, but with additional warnings as was the case with certain coxib medications.

In addition, pharmacological research produces new pharmacodynamic and pharmacokinetic information on an ongoing basis. Emerging information may indicate new safety hazards such as previously unknown drug-disease or drug-drug interactions.

Always use CURRENT drug references.

Conclusion

Many elderly patients suffer adverse drug events that result in hospitalization. Careful assessment and proactive discharge planning increase the likelihood that elderly patients and their caregivers can manage the medication regime effectively after discharge.

Use the hospitalization as an opportunity to improve overall management of your elderly patients' health and medication regime.

The role of the staff nurse is critical in beginning the process of discharge teaching and planning. Equally critical is connecting the patient with appropriate resources for questions, reinforcement and follow-up after discharge.

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Appendix A: Beers I, High-Severity Concerns

Adapted from The Merck manual of diagnosis and therapy, (Kaplan & Porter, 2011) and Geriatric pharmacotherapy: A guide for the helping professional (Olsen, Tindall, & Clasen, et al., 2007).

* When a category or class of drugs is named, the precaution applies to the entire category or class and not only the example given.

Drug or Classification*	***Usual Indication***	***Risk for Patients Age 65 and Older***
Amiodarone (Cordarone®)	Arrhythmias	Lack of efficacy older adults. Risk of QT interval problems and provoking torsades de pointes.
Amitriptyline (Elavil®) and combinations e.g., with chlordiazepoxide (Limbitrol®), perphenazine-amitriptyline (Triavil®)	Depression; migraine headaches	Strong anticholinergic and sedating properties. Anticholinergic effects include ataxia, urinary retention, constipation, dry mucus membranes, visual disturbances, confusion, increased temperature and heart rate.
Amphetamines Excluding methylphenidate hydrochloride (Concerta®, Metadate®, Ritalin®) and anorexics	Narcolepsy, attention-deficit/hyperactivity-disorder (ADHD), CNS depression, respiratory depression	Risk of dependence, hypertension, angina and MI. Adverse CNS stimulation effects.
Antihistamines such as chlorpheniramine in combinations such as with phenylephrine (Histatab Plus®), with acetaminophen (Coricidin®), with pseudoepheldrine (Allerest®, Chlor-Trimeton®, Triaminic®) with acetaminophen and phenylephrine (Actifed®); diphenhydramine (Benadryl®), hydroxyzine (Vistaril®, Atarax®), cyproheptadine (Periactin®), promethazine (Phenergan®), tripelennamine (PBZ®), dexchlorpheniramine (Polaramine®)	Nasal and sinus congestion, colds, flu, allergies	Potent anticholinergics. Many cough and cold preparations are available without antihistamines. Anticholinergic effects include ataxia, urinary retention, constipation, dry mucus membranes, visual disturbances, confusion, increased temperature and heart rate.
Anticholinergic:	Muscle spasms	Anticholinergic effects include ataxia, urinary

muscle relaxants such as cyclobenzaprine (Flexeril®), methocarbomol (Robaxin ®), carisprodol (Soma®), chlorzoxasone (Paraflex®), metaxalone (Skelaxin®)		retention, constipation, dry mucus membranes, visual disturbances, confusion, increased temperature and heart rate.
urinary antispasmodics such as Tolterodine (Detrol®), flavoxate (Urispas®), oxybutynin (Ditropan®), not including extended release (Ditropan-XL®)	Urinary spasms, urinary frequency, urgency, urge incontinence	Poorly tolerated by elderly. Weakness and sedation. Questionable effectiveness at doses tolerated by elderly.
GI antispasmodics such as dicyclomine (Bentyl®, Antispas®), hyoscyamine (Anaspaz®), propantheline (Pro-Banthine®), belladonna alkaloids (Donnatal®), belladonna alkaloids with opium (B&O supprettes®), clidinium with chlordiazepoxide (Librax®)	Disturbances of GI motility such as irritable bowel syndrome	Highly anticholinergic; questionable effectiveness; especially avoid long-term use.
Barbiturates such as pentobarbital (Nembutal®) except phenobarbital and except to control seizures	Seizures; need for sedation	Cause more side effects than most other sedatives and hypnotics. Should be used only to control seizures. Highly addictive.
Chlordiazepoxide (Librium®) and combinations such as chlordiazepoxide-amitriptyline (Limbitrol®); also Long-acting benzodiazepines: clidinium- chlordiazepoxide (Librax®), diazepam (Valium®), quazepam (Doral®), halazepam (Paxipam®), chlorazapate (Tranxene®)	Anxiety; chlordiazepoxide for alcohol withdrawal in acute alcoholism	Long half-life in the elderly (often days), produces sedation and increased incidence of falls. Short- or intermediate-acting benzodiazepines are preferred if benzodiazepines are required.
Chlorpropamide (Diabinese®)	Type II diabetes	Prolonged half-life; can cause prolonged, serious hypoglycemia. Only hypoglycemic causing inappropriate secretion of antidiuretic hormone.

Diphenhydramine (Benadryl®)	Allergic reaction; sometimes used to produce sedation.	Potent anticholinergic, confusion and sedation. For allergic reaction use lowest dose. Additional anticholinergic effects include ataxia, urinary retention, constipation, dry mucus membranes, visual disturbances, increased temperature and heart rate.
Disopyramide (Norpace®), not including extended release formulation	Arrhythmias	Most potent negative inotrope of all antiarrhythmics, which may induce heart failure in the elderly. Also, strong anticholinergic. Anticholinergic effects include ataxia, urinary retention, constipation, dry mucus membranes, visual disturbances, confusion, increased temperature and heart rate.
Doxepin (Sinequan®)	Anxiety; depression	Strong anticholinergic and sedating properties. Anticholinergic effects include ataxia, urinary retention, constipation, dry mucus membranes, visual disturbances, confusion, increased temperature and heart rate.
Fluoxetine (daily) (Prozac®)	Depression	Long half-life; risk of CNS stimulation, sleep disturbance, increasing agitation.
Flurazepam (Dalmane®)	Need for sedation	Extremely long half-life in the elderly (often days), produces sedation and increased incidence of falls. Short- or intermediate-acting benzodiazepine preferred.
Guanadrel (Hylorel®)	Hypertension	Risk for orthostatic hypotension
Guanethedine (Ismelin®) – no longer available in the USA	Hypertension	Risk for orthostatic hypotension, dizziness, fainting.
Indomethacin (Indocin®)	Inflammatory diseases and rheumatoid disorders, arthritis; pain	Most CNS side effects of any NSAID.

Ketorolac (Toradol®)	Pain	GI effects – many elderly persons have asymptomatic GI pathology
Long-term use of stimulant Laxatives such as bisacodyl (Dulcolax®), cascara sagrada (herbal), castor oil preparations such as Neoloid® - except with opioid therapy	Constipation	May exacerbate bowel dysfunction
Lorazepam (Ativan®) 3 mg, oxazepam (Serax®) 60 mg, alprazolam (Xanax®) 2 mg, temazapam (Restoril®) 15 mg, triazolam (Halcion®) 0.25 mg	Anxiety, need for sedation	Total daily doses should not exceed these recommendations. Smaller doses may be effective as well as safer due to increased sensitivity of the elderly to benzodiazepines.
Meperidine (Demerol®)	Pain	Not effective orally; more disadvantages than other narcotics. Causes confusion.
Meprobamate (Miltown®, Equanil®)	Anxiety	Addictive, sedation.
Mesoridazine (Serentil®)	Schizophrenia, psychosis	CNS and extrapyramidal adverse effects.
Methyldopa (Aldomet®) and combinations [e.g., with hydrochlorothiazide (Aldoril®)]	Hypertension	May cause bradycardia and exacerbate depression in the elderly.
Methyltestosterone (Adroid®, Virilon®, Terstrad®)	Male: Impotence, climacteric symptoms Female: Palliative in metastatic breast cancer	Potential for prostatic hypertrophy and cardiac problems.
Mineral oil	Constipation	Potential for aspiration, may interfere with absorption of drugs and nutrients.
Long-term use of full dose of longer half-life, non-Cox NSAIDS, such as naproxen (Naprosyn®, Avaprox®, Aleve®), oxaprosin (Daypro®), piroxicam (Feldene®)	Inflammatory diseases, arthritis; pain	Risk of GI bleeding, renal failure, hypertension, heart failure.
Short-acting nifedipine (Procardia®, Adalat®)	Angina, hypertension, pulmonary hypertension	Risk for hypotension and constipation.
Nitrofurantoin (Macrodantin®)	Urinary tract infection	Potential for renal impairment.

Orphenadrine (Norflex®)	Muscle spasm, Parkinson's disease	More anticholinergic effects and sedation than alternatives. Anticholinergic effects include ataxia, urinary retention, constipation, dry mucus membranes, visual disturbances, confusion, increased temperature and heart rate.
Pentazocine (Talwin®)	Pain, need for sedation	Mixed narcotic agonist/antagonist; Causes confusion, hallucinations more commonly than other narcotics.
Thioridazine (Mellaril®)	Schizophrenia, psychosis	Increased risk for adverse CNS and extrapyramidal effects.
Dessicated thyroid (natural thyroid), not the synthetic preparations such as levothyroxine (Synthroid®)	hypothyroidism	Risk for cardiac effects.
Ticlopidine (Ticlid®)	Thrombosis, stroke and stroke prevention	No better than aspirin to reduce clotting, but more toxic.
Trimethobenzamide (Tigan®)	Nausea and vomiting	One of least effective antiemetics, but can cause extrapyramidal side effects such as drowsiness and dizziness.

Appendix B: Beers I, Low-Severity Concerns

Adapted from The Merck manual of diagnosis and therapy, (Kaplan & Porter, 2011) and Geriatric pharmacotherapy: A guide for the helping professional (Olsen, et al., 2007).

* When a category or class of drugs is named, the precaution applies to the entire category or class and not only the example given.

Drug or Classification*	***Usual Indication***	***Risk for Patients Age 65 and Older***
Cimetidine (Tagamet®)	Gastric hypersecretory states, including gastric ulcers, gastroesophageal reflux disease	Adverse CNS effects, including confusion.
Clonidine (Catapres®)	Hypertension; migraine headache prophylaxis	Risk for orthostatic hypotension and adverse CNS effects including drowsiness and dizziness.
Digoxin (Lanoxin®)	Congestive heart failure, arrhythmias	Decreased renal clearance of digoxin in the elderly may lead to toxic effects. Doses should rarely exceed 0.125 mg daily, except in treating atrial arrhythmias.
Short-acting dipyridamole (Persantine®), not including long-acting. Exception: patients who have artificial heart valves.	Thrombosis. Used with warfarin (Coumadin®) post-heart valve replacement.	Causes orthostatic hypotension in the elderly. Proven beneficial only in patients who have artificial heart valves.
Doxazosin (Cardura®)	Hypertension	Risk for hypotension, dry mouth and urinary problems.
Ergoloid mesylates With caffeine (Cafergot®) (Hydergine®) cyclandelate (Cyclospasmol®) not commercially available in USA	Migraine headache Cerebrovascular insufficiency Peripheral vascular disease	Have not been shown effective in the doses studied for the treatment of dementia or any other condition. Lack of efficacy. Risk for dizziness.

Estrogens, only (that is, not estrogen in combination with progesterone) oral (Cinestin®)	Menopause	Evidence of carcinogenic (breast and endometrial cancer) in women and lack of cardioprotective effect in older women
Ethacrynic acid (Edecrin®)	Edema associated with congestive heart failure, hepatic cirrhosis, renal disease and other conditions	Risk for hypertension, fluid imbalance. Safer alternatives available.
Iron supplements, e.g. ferrous sulfate (Feosol®)	Iron-deficiency anemia	Doses >325 mg rarely needed. At higher doses, absorption not substantially increased, but constipation is more likely.
Isoxsurpine (Vasodilan®)	Peripheral vascular disease	Lack of efficacy.
Reserpine (Serpasil®) at doses greater than 0.25 mg/day and combinations [with chlorothiazide (Diupres®)]	Hypertension	Risk for depression, impotence, sedation, and orthostatic hypotension.

Appendix C: Beers II, High-Severity Concerns in Drug-Disease Interaction and the Elderly

Adapted from The Merck manual of diagnosis and therapy, (Kaplan & Porter, 2011) and Geriatric pharmacotherapy: A guide for the helping professional (Olsen, et al., 2007).

* When a category or class of drugs is named, the precaution applies to the entire category or class and not only the example given.

Disease or Condition	***Drug or Classification****	***Usual Indication***	***Risk for Patients Age 65 and Older***
Anorexia and malnutrition	CNS stimulants such as dextroamphetamine +Amphetamine (Adderall®), methylphenidate (Ritalin®), methamphetamine (Desoxyn®) Non-amphetamine stimulants, such as pemoline (Cylert®) Selective serotonin reuptake inhibitors (SSRIs), such as fluoxetine (Prozac®)	Narcolepsy, attention-deficit/hyperactivity-disorder (ADHD), CNS depression, respiratory depression Depression	Further suppression of appetite
Arrhythmias	Tricyclic antidepressants: imipramine hydrochloride (Tofranil®), doxepin hydrochloride (Sinequan®), amitriptyline hydrochloride (Elavil®)	Depression, Migraine headaches	Proarrhythmic effects and may produce QT interval changes
Bladder outflow problems, including benign prostatic hypertrophy (BPH)	Anticholinergic: Muscle relaxants such as cyclobenzaprine (Flexeril®) Urinary antispasmodics such as Tolterodine (Detrol®), oxybutynin (Ditropan®), flavoxate (Urispas®) Antidepressants such as amitriptyline (Elavil®) Antihistamines and decongestants such as pseudoephedrine (Actifed®)	Muscle spasms Urinary frequency, incontinence Depression Nasal, sinus and lung congestion Disturbances of GI motility such as	Anticholinergic effects include ataxia, urinary retention, constipation, dry mucus membranes, visual disturbances, confusion, increased temperature and heart rate.

	Gastrointestinal antispasmodic drugs such as dicyclomine (Bentyl®)	irritable bowel syndrome	
Blood-clotting disorders or receive anticoagulant therapy	Anti-platelet agents such as clopidogrel (Plavix®), dipyridamole (Persantine®), ticlopidine (Ticlid®) Nonsteroidal anti-inflammatory drugs (NSAIDs) such as ibuprofen (Advil®) and aspirin	Atherosclerosis, thrombosis, and to prevent second thrombotic event (MI, CVA)	May cause bleeding due to anti-platelet activity. May prolong clotting time and elevate INR. Increased risk of GI bleeding.
Chronic obstructive pulmonary disease (COPD) COPD, asthma	Long-acting benzodiazepines: chlordiazepoxide (Librium®), chlordiazepoxide-amitriptyline (Limbitrol®), clidinium-chlordiazepoxide (Librax®), diazepam (Valium®), quazepam (Doral®), halazepam (Paxipam®), chlorazapate (Tranxene®) Beta blockers such as propranolol (Inderal®)	Anxiety, need for sedation Hypertension; arrhythmias	CNS adverse effects; May induce, cause, or exacerbate respiratory depression. May slow respirations and increase CO_2 retention. May produce bronchospasm, respiratory distress.
Cognitive impairment	Barbiturates such as pentobarbital (Nembutal®) except phenobarbital for seizures Antispasmodics drugs such as dicyclomine (Bentyl®), Tolterodine (Detrol®) Muscle relaxants such as cyclobenzaprine (Flexeril®) CNS stimulants such as dextroamphetamine +Amphetamine (Adderall®), methylphenidate (Ritalin®), methamphetamine (Desoxyn®), pemoline (Cylert®)	Need for sedation GI, urinary spasms Muscle spasms Attention-deficit/hyperactivity disorder; narcolepsy	CNS-altering effects.
Constipation	Calcium channel blockers verapamil (Isoptin®), (Isoptin®)	Hypertension	May exacerbate constipation.

	Tricyclic antidepressants (TCAs): imipramine hydrochloride (Tofranil®), doxepin hydrochloride (Sinequan®), amitriptyline hydrochloride (Elavil®)	Depression	
Depression	Long-term benzodiazepine use – Long-acting benzodiazepines: chlordiazepoxide (Librium®), chlordiazepoxide-amitriptyline (Limbitrol®), clidinium-chlordiazepoxide (Librax®), diazepam (Valium®), quazepam (Doral®), halazepam (Paxipam®), chlorazapate (Tranxene®) and short- and intermediate-acting such as estazolam (ProSom®), flurazepam (Dalmane®), temazepam (Restoril®), and triazolam (Halcion®) Sympatholytic agents: methyldopa (Aldomet®), reserpine (Serpasil®) at doses greater than 0.25 mg/day, guanethidine (Ismelin®), Guanethidine no longer available in USA	Anxiety, insomnia Hypertension	May produce or exacerbate depression. Long-term use interferes with balance, alertness, energy level and produces tolerance to the drugs. May produce or exacerbate depression.
Heart failure	Disopyramide (Norpace®), not including extended release formulation High sodium-content drugs such as drugs containing sodium salts, including sodium -alginate -bicarbonate, -biphosphate, -citrate, -phosphate, -salicylate, and -sulfate	Arrhythmias Variety of uses including electrolyte and metabolic disturbances; selected salts are antidotes for specific overdoses; GI disturbances and constipation	Negative inotropic effect. Potential fluid retention and exacerbation of heart failure.
Hypertension	Phenylpropanolamine HCl (Dexitrim®) and a variety of cold remedies), off the market in 2001; pseudoephedrine, diet pills: amphetamines, dextroamphetamine (Dexedrine®)	Desire to increase metabolism for weight loss or increased alertness	Elevation of blood pressure secondary to increased sympathomimetic activity.

Insomnia	Decongestants Theophylline (Theodur®), Methylphenidate (Ritalin®) Monoamine oxidase inhibitors (MAOIs) such as phenalzine (Nardil®) Amphetamines such as dextroamphetamine (Dexedrine®)	Nasal or lung congestion Asthma Attention-deficit/hyperactivity disorder Depression Desire to increase metabolism for weight loss	CNS stimulation will aggravate insomnia.
Parkinson's disease	Metoclopramide (Reglan®) Conventional antipsychotics such as fluphenazine (Prolixin®), haloperidol (Haldol®), chlorpromazine (Thorazine®) Tacrine (Cognex®)	Gastroesophageal reflux disease, diabetic gastric stasis Schizophrenia, psychosis Haloperidol – also Tourette's disorder Chlorpromazine – also nausea and vomiting; mania Mild to moderate dementia of Alzheimer's type	Antidopaminergic and anticholinergic effects. Anticholinergic effects include ataxia, urinary retention, constipation, dry mucus membranes, visual disturbances, confusion, increased temperature and heart rate. Extrapyramidal effects. May produce ataxia.
Seizures, seizure disorder, epilepsy	Bupropion (Wellbutrin®), clozapine (Clozaril®), chlorpromazine (Thorazine®), thioridazine (Mellaril®), thiothixene (Navane®)	Depression Schizophrenia, psychosis Thorazine also anti-emetic, mania	May lower seizure thresholds.

Stress incontinence	Long-acting benzodiazepines: chlordiazepoxide (Librium®), chlordiazepoxide-amitriptyline (Limbitrol®), clidinium-chlordiazepoxide (Librax®), diazepam (Valium®), quazepam (Doral®), halazepam (Paxipam®), chlorazapate (Tranxene®) Anticholinergics (see Bladder outflow listing above) Alpha-blockers, doxazosin (Cardura®), prazosin (Minipress®), terazosin (Hytrin®) Tricyclic antidepressants: imipramine hydrochloride (Tofranil®), doxepin hydrochloride (Sinequan®), amitriptyline hydrochloride (Elavil®)	Anxiety, need for sedation Nasal congestion associated with allergy, cold or prevent respiratory complications of anesthesia; disturbances of GI motility Hypertension Depression; Migraine headache	May produce polyuria and worsening of incontinence
Syncope or falls	Long-acting benzodiazepines: chlordiazepoxide (Librium®), chlordiazepoxide-amitriptyline (Limbitrol®), clidinium-chlordiazepoxide (Librax®), diazepam (Valium®), quazepam (Doral®), halazepam (Paxipam®), chlorazapate (Tranxene®) Short- to intermediate-acting benzodiazepines: alprazolam (Xanax®), lorazepam (Ativan®), oxazepam (Serax®) Tricyclic antidepressants (TCAs): imipramine hydrochloride (Tofranil®), doxepin hydrochloride		May produce ataxia, impaired psychomotor function, syncope, and additional falls.

	(Sinequan®), amitriptyline hydrochloride (Elavil®)		
Ulcer disease, gastritis, gastroesophageal reflux disease (GERD)	Nonsteroidal anti-inflammatory drugs (NSAIDs) such as ibuprofen (Advil®) and aspirin (ASA) greater than 325 mg/day. Coxibs excluded, such as celecoxib (Celebrex®)	Pain; arthritis	GI irritation can exacerbate GI problems and lead to GI bleeding.

Appendix D: Beers II, Less Severe Concerns in Drug-Disease Interaction and the Elderly

Adapted from The Merck manual of diagnosis and therapy, (Kaplan & Porter, 2011) and Geriatric pharmacotherapy: A guide for the helping professional (Olsen, et al., 2007).

* When a category or class of drugs is named, the precaution applies to the entire category or class and not only the example given.

Disease or Condition	***Drug or Classification****	***Usual Indication***	***Risk for Patients Age 65 and Older***
Obesity	Olanzapine (Zyprexa®)	Schizophrenia, bipolar mania, psychosis	May stimulate appetite and increase weight gain
Secretion of syndrome of inappropriate antidiuretic hormone secretion (SIADH)/ hyponatremia	Selective serotonin uptake inhibitors (SSRIs): fluoxetine (Prozac®), citalopram (Celexa®), fluvoxamine (Luvox®), paroxetine (Paxil®), sertraline (Zoloft®)	Depression	May cause or exacerbate SIADH

Appendix E: Resources for Further Information

Government Resources

- The Agency for Healthcare Research and Quality (AHRQ), a federal agency, has published many clinical practice guidelines, including disease-specific guidelines and the guideline, *Improving Medication Management for Older Adult Clients*, which grades the quality of the available evidence supporting use of the Beers criteria and lists strategies to improve medication management. http://www.guideline.gov/.
- USFDA (nd) Medicines and older adults. http://www.fda.gov/opacom/lowlit/medold.html

Professional Organizations: Clinical Practice Guidelines and Recommendations

- The American Geriatrics Society has published clinical practice guidelines and clinical practice recommendations. http://www.americangeriatrics.org/
- The American College of Cardiology and the American Heart Association have established guidelines jointly. http://www.acc.org/
- The American Diabetes Association http://www.diabetes.org/home.jsp
- The American College of Rheumatology http://www.rheumatology.org/
- Professional nursing societies' clinical guidelines, such as:
    - Wound, Ostomy, and Continence Nurses Society (WOCN) http://www.wocn.org/
    - American Association of Critical Care Nurses (AACN) http://www.aacn.org/
    - Oncology Nurses Society (ONS) http://www.ons.org/

Geriatric Nursing Resources

- Assessing the Care of Vulnerable Elders (ACOVE) Indicators. 22 indicators of quality of care for the elderly. http://www.rand.org/pubs/research_briefs/2005/RB4545-1.pdf
- Hartford Foundation:
- http://www.hartfordign.org/ ; http://www.ConsultGeriRN.org
- Nurses Improving Care for Healthsystem Elders (NICHE) program.
- http://www.nicheprogram.org
- University of Minnesota http://www.nursing.umn.edu/CGN/ResearchPractice/
- University of Iowa http://www.nursing.uiowa.edu/excellence/gerontology/

Medication-Related Resources

- Medication Management Improvement System, a model which includes software and a pharmacist consultant to manage medications in the home care setting. http://www.homemeds.org

Assessment and Research Tools such as:

- Medication Appropriateness Index. A valid and reliable tool for assessing drug indication, effectiveness, dosage, correct and practical directions, drug–drug interactions, drug–disease interactions, duplication, duration and cost. See:

- Spinewine, A., et al. (2007). Effect of a collaborative approach on the quality of prescribing for geriatric inpatients: A randomized, controlled trial. *Journal of the American Geriatric Society, 55*(5), 658 – 665.
- Lata, H., & Alia, L. (2007). Ageing: Physiological aspects. *JK Science, 9*(3), 111-115.

- Drug Burden Index. Specific to sedating and anticholinergic agents, this index considers frequency and dosage as well as mechanism of action. Useful to predict adverse effects. See:
  - Hilmer, S.N., et al. (2007). A drug burden index to define the functional burden of medications in older people. *Archives of Internal Medicine, 167*(8), 781 – 787.

Assessment and Research Tools such as:

- Drug Regimen Unassisted Grading Scale (DRUGS). A standardized assessment of medication-related function that predicts the need for focused nursing intervention or increased support. See:
  - Farris, K.B. & Phillips, B.B. (2008). Instruments assessing capacity to manage medications. *Annals of Pharmacotherapy, 42*(7), 1026 – 1036.
  - Kripalani, S., et al. (2006). Predictors of medication self-management skill in a low-literacy population. *Journal of General Internal Medicine, 21*(8), 852 – 856.
  - Ryan, C., O'Mahony, D., Kennedy, J., Weedle, P., Gallagher, P., & Byrne, S. (2009). Appropriate prescribing in the elderly: An investigation of two screening tools, Beers criteria considering diagnosis and independent of diagnosis and improved prescribing in the elderly tool to identify inappropriate use of medicines in the elderly in primary care in Ireland. *Journal of Clinical Pharmacy and Therapeutics, 34*, 369–376.
  - Olsen, C.G., Tindall, W.N., & Clasen, M.E. (2007). *Geriatric pharmacotherapy: A guide for the helping professional.* Washington, DC: American Pharmacists Association.
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Expert panels frequently create targeted recommendations, such as:

- The Expert Panel on Detection, Evaluation and Treatment of High Blood Cholesterol in Adults recently updated practice guidelines to expand the indications for intensive therapy with lipid-lowering agents. http://www.nhlbi.nih.gov/guidelines/cholesterol/

New resources continually become available and Web addresses may change. Search the Internet for new credible resources for care of the elderly and for particular medications and conditions that are pertinent in the care of your patients.

Please Read:

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Note: All dosages given are for adults unless otherwise stated. The information on medications contained in this course is not meant to be prescriptive or all-encompassing. You are encouraged to consult with physicians and pharmacists about all medication issues for your patients.