

TECH talk CE

THE NATIONAL CONTINUING EDUCATION PROGRAM FOR PHARMACY TECHNICIANS .75 CEU

FREE

ANSWER ONLINE FOR INSTANT RESULTS AT WWW.PHARMACYGATEWAY.CA

APRIL/MAY 2009

**APPROVED FOR
.75 CE UNITS**



Approved for .75 CE units by the Canadian Council on Continuing Education in Pharmacy. File #009-1008 Tech. Not valid for CE credits after Nov. 25, 2011.

Answer this CE online for instant results and accreditation. Visit www.pharmacygateway.ca

CE JUST FOR TECHNICIANS

Tech Talk CE is the only national continuing education program for Canadian pharmacy technicians.

As the role of the technician expands, use Tech Talk CE as a regular part of your learning portfolio. Note that a passing grade of 70% is required to earn the CE credit.

Tech Talk CE is generously sponsored by Novopharm Limited. Download back issues at www.pharmacygateway.ca or www.tevanovopharm.com.

ANSWERING OPTIONS

1. Answer the lesson online and get your results instantly at www.pharmacygateway.ca.
2. Use the reply card inserted with this CE lesson. Circle the answers on the card and mail in the prepaid, self-addressed card or fax to Mayra Ramos, 416-764-3937.

To pass this lesson, a grade of 70% (7 out of 10) is required. If you pass, you will receive .75 CEU's. You will be advised of your results in a letter from Tech Talk. Please allow 8 to 12 weeks.

CE FACULTY

CE Coordinator:

Margaret Woodruff, R.Ph,
B.Sc.Pharm., MBA
Humber College

Clinical Editor:

Lu Ann Murdoch, B.Sc.Pharm.

Author:

Rosemarie Patodia, BScPhm

Reviewer:

Tim Fleming, President, CAPT

The Aging Population and the Impact on Pharmacy

By Rosemarie Patodia, BScPhm, CGP Pharmacist and Manager, Pharmacy Marketing and Professional Services, Shoppers Drug Mart

Learning Objectives:

Upon completion of this lesson, the pharmacy technician will be able to:

1. Describe in general how physiological changes that occur with aging can impact on medication use and outcomes
2. Summarize common functional problems that elderly patients can develop, which can affect their daily lives and impact on their interactions with the pharmacy team
3. Discuss the role of the pharmacy technician in helping to optimize medication use in seniors

Introduction: The aging demographic in Canada

It is no surprise that the Canadian demographic is shifting toward an increasing number of people over 65 years of age. In 2001, one in every eight Canadians was over the age of 65; by the year 2021, one in five Canadians is expected to be 65 years of age or older.¹ Despite advancing age, an increasing number of older adults continue to be very active and healthy. The fastest growing segment of the population is people over 85 years of age, and the percentage of people in this age group is projected to rise to 4% (1.6 million people) by the year 2041 from the latest figure of 1.4% in 2001.¹ Most of these seniors reside in their homes (about 93%) rather than long-term care facilities.² This means that pharmacy technicians, particularly in community pharmacy settings, have an important role in helping to meet the health care needs of seniors.

Medication use in the elderly

Older patients are more likely to be taking

multiple medications than younger adults, and in fact, in Canada 20–40% of medications prescribed are used by people over 65 years of age.^{3,4} Various data demonstrate why it is important for healthcare providers to place more emphasis on medication management in this population. For instance:

- 11–46% of seniors receive at least one prescription considered inappropriate for this age group, per year;^{5,6}
- 19–28% of hospital admissions for people over 50 years of age are due to medication-related problems;^{7,8}
- in one study, more than 1/3 of hospital admissions in people over 50 were related to the use of warfarin, insulin and digoxin.⁹

The most common types of medication-related problems that have been documented in older patients are mood changes, constipation, falls, immobility, confusion and hip fractures.¹⁰

Beers criteria for appropriate medication use in the elderly have been developed to reflect expert opinions with respect to medications,

TABLE 1: Some examples of inappropriate medications in the elderly

Type of medication	Examples
long-acting benzodiazepines	diazepam, flurazepam, chlordiazepoxide
tertiary amine tricyclic antidepressants	amitriptyline
sedating antihypertensives	methylodopa, clonidine
muscle relaxants	cyclobenzaprine
nonselective NSAIDs used long term, without stomach protection	naproxen, ibuprofen, diclofenac
antispasmodics	dicyclomine, hyoscyamine

dosages or medication-disease combinations that should be avoided in this population. Healthcare professionals who care for elderly patients should follow these guidelines to minimize drug-related problems.¹¹ Some examples of medications that are considered inappropriate by this consensus group are listed in Table 1.

Physiological changes with aging

Inevitably, the human body changes with age, and a number of these changes can increase a person's risk of having medication-related problems.

Often the impact of these physiological changes on medication disposition is described using the acronym ADME (absorption, distribution, metabolism and excretion).

Changes that affect medication absorption:

As the body ages, there is a reduction in the amount of acid that is produced in the gastrointestinal system. An acidic environment is required to absorb certain medications, such as calcium supplements, so this change due to aging may result in reduced effectiveness of these medications. Also, in general, older people have reduced blood flow through the gastrointestinal system, thus potentially affecting how much drug is absorbed or how quickly it is absorbed.¹²

Changes that affect medication distribution:

With aging, the ratio of fat to muscle in the body increases, so older people are more likely to have a greater percentage of fat relative to muscle compared to when they were younger. This means that certain medications that are

fat-soluble can accumulate in the fat tissue, which may lead to longer-lasting effects in these individuals. Examples of some of these fat-soluble medications are benzodiazepines, lithium and theophylline.

Some elderly people, particularly those who are frail, produce reduced amounts of albumin, a protein that binds many medications. This results in less "protein-binding" of drugs that are considered "highly protein bound" and subsequently greater amounts of "free active drug" are available in the body, which leads to increased therapeutic effects and possible adverse effects or toxicity. Examples of highly protein bound drugs are NSAIDs and warfarin.¹²

Changes that affect medication metabolism:

The liver is a major organ responsible for metabolism or processing of medications. Certain enzymes in the liver help to break down medications and, as aging occurs, some of these enzymes become less effective. Medications cleared from the body in this manner subsequently become more likely to accumulate and cause adverse effects or toxicity. Examples of such medications include benzodiazepines and beta-blockers such as metoprolol. Also, decreased blood flow through the liver due to aging further reduces the metabolism of certain medications.¹²

Changes that affect medication elimination:

The kidneys are very critical for medication elimination. Kidney function declines with age and thus many older people are less effective at excreting certain medications, such as hydrochlorothiazide,

lithium and digoxin. As a result, they are more likely to experience prolonged effects or adverse effects, since these medications remain in circulation longer compared to younger people.¹²

Other changes that occur with aging include: sensory deficits (e.g., visual changes, hearing changes); greater sensitivity of the central nervous system due to reduced levels of chemicals in the brain called neurotransmitters; a decrease in the pressure sensitivity of the circulatory system (referred to as baroreceptor sensitivity); and a decrease in short-term memory.¹²

Common functional problems in older adults

Since the vast majority of older people in Canada live at home rather than in institutions, such as retirement homes and other long-term care facilities, they are often managing their health conditions and medications independently. Commonly, elderly people are increasingly isolated as a result of losing their spouse and other social supports such as friends and colleagues. In some cases, they may be fortunate to have a caregiver or other family member who plays an integral role in their health care.

Seniors are often faced with a variety of functional health-related problems—often referred to as "geriatric syndromes"—associated with age that are not always treated and recognized. Table 2 describes how some of these problems can affect a patient's medication therapy.

Other functional challenges can impact on medication taking in elderly people. The incidence of osteoarthritis increases with age and this can result in joint stiffness and reduced manual dexterity that can make it difficult to open prescription vials. People who have a history of stroke or Parkinson's disease, for example, may have swallowing difficulties that can create problems with oral medications. It is important to identify which medications can be split or crushed to facilitate medication administration for people with swallowing problems. Also, changes in visual and hearing abilities can impact on many older adults' knowledge and understanding of their medications.

Risks for Medication-Related Problems

It is important to consider how changes associated with aging manifest in the day-to-day lives of the older people that pharmacy technicians see in the pharmacy.

Changes in kidney, liver and gastrointestinal function, as well as body composition and central nervous system sensitivity, usually mean that dosages of medications should be lower, at least to start, for older patients. The general recommendation for geriatric medication dosing is “start low, go slow”. Dosages that are too high can lead to increased risk of adverse effects.

For a variety of reasons, elderly people tend to be more sensitive to the adverse effects of medications. This is particularly seen in response to medications that have central nervous system effects (e.g., those that can cause drowsiness or confusion), those with gastrointestinal effects (e.g., NSAIDs that can cause bleeding), and medications with anticholinergic effects (e.g., some antidepressants, antispasmodics). Anticholinergic effects include the spectrum of dry mouth, confusion, blurred vision, urinary retention and constipation. Some of these effects can be particularly detrimental to older people, especially those with pre-existing cognitive impairment or dementia.

Although memory loss is associated with Alzheimer’s dementia, it is important to note that some short-term memory impairment can occur as a result of aging alone, in the absence of dementia. This means that some instructions and information provided at the pharmacy could be forgotten later at home, potentially leading to medication-related problems due to taking the medication inappropriately.

Hearing loss is commonly associated with aging, although this may not be outwardly apparent in an older person. This change can have an impact on the elderly patient’s ability to understand instructions and other information provided during their visit to the pharmacy. Ultimately this can result in medication-related problems that could include taking too much or too little medication or

Functional problem	Impact
Cognitive impairment	Not necessarily dementia, but people can have memory loss and confusion that can be further worsened by certain medications. This can also affect their ability to take medications appropriately.
Falls	About 30% of Canadians over 65 years of age experience one fall each year. ¹⁸ This can lead to disability or fear of falling, which can limit the person’s trips to the pharmacy. Medications that cause drowsiness, low blood sugar or low blood pressure can increase this risk, as can conditions such as Parkinson’s disease. Falls can have significant impact on quality of life and can, in many cases, lead to institutionalization.
Depression	This is often not diagnosed for a variety of reasons. Elderly people can present with different symptoms than younger people; noted changes might include general aches and pains, social withdrawal and weight changes. They may also be less likely to report symptoms to their healthcare providers. Certain medications can worsen symptoms of depression (e.g., certain beta-blockers like propranolol, sedating medications like opioid pain relievers, and corticosteroids such as prednisone). Depression has also been associated with chronic medical conditions. Patients with mood changes may be less motivated to take medications appropriately.
Malnutrition	This can affect day-to-day functioning and may be aggravated by certain medications. For example, medications that cause swallowing problems (e.g., certain antipsychotics), nausea (e.g., digoxin) and taste disturbances (e.g., some seizure medications) may result in greater difficulty eating or less desire to eat.

simply taking it incorrectly.

Elderly people can be at higher risk of orthostatic hypotension (a significant decrease in blood pressure seen on rising, e.g., when getting out of bed), as a result of changes in their circulatory pressure sensitivity. People taking medications that can decrease blood pressure, such as antihypertensives, certain angina medications and medications for Parkinson’s disease, for example, should be monitored for these blood pressure changes and counselled by the pharmacist on strategies to reduce the impact.

Age-related changes in vision, as well as ophthalmologic conditions such as macular degeneration, can have an impact on the older patient’s ability to read prescription labels as well as print information. Once again, this can lead to errors in medication administration.

Specific criteria or risk factors for medication-related problems in the elderly have been identified through analysis in both nursing home and community settings. This

information can assist pharmacists and other healthcare providers in flagging patients who may require more intensive follow-up and monitoring to prevent problems. The following factors can increase the risk of medication-related problems:^{13,14}

- greater than 85 years of age;
- taking six or more medications;
- frail (low body mass index);
- prior history of adverse drug reactions;
- more than six chronic health conditions;
- cognitive impairment;
- reduced kidney function;
- living alone and with few social contacts or supports; and
- low literacy.

Considerations for pharmacy technicians

As pharmacy technicians are often the first-line contact for patients visiting the community pharmacy, they have an important role in ensuring that the needs of elderly patients are met in a timely fashion.

The following tips can help technicians optimize the care of their senior patients.

- Sensory changes that occur with aging can affect medication taking (e.g., inability to read labels, difficulty listening to instructions), so, where possible, adapt service and care to accommodate these differences. Be proactive by providing written information when available to support the pharmacist's counselling, trying to minimize background noise when communicating with the patient to maximize their ability to hear and increasing font sizes on prescription labels and accompanying materials where possible.
- In many cases, older patients may have a spouse or caregiver who handles their medications and administers them; it is important to ensure that communication is appropriate for this situation (e.g., in the event that instructions are conveyed to the patient by caregiver—written information is most helpful). Of course, it is important that patient confidentiality is considered when dealing with family members or other caregivers.
- Older patients tend to be on multiple medications. They may require extra attention to things such as specialized vial lids, pill splitting, dosettes or blister packs. Pharmacy technicians can help pharmacists determine what specific challenges the patient may have with respect to their medication schedule. For example, if they are confused about all of their medications and when to take them, dosettes or blister packs can help to minimize this issue. Patients who have difficulty taking their medications because the pills are too large to swallow may have improved adherence if the pharmacy team takes the initiative to help them by cutting their tablets in half when appropriate.
- Callbacks or refill reminder services can be beneficial to patients who are taking multiple medications; they may forget to refill their medications regularly, ultimately leading to medication-related problems
- Lack of awareness of their medications is a major reason for nonadherence.

Where feasible, pharmacy technicians can coordinate medication reviews with the pharmacist to help older patients sort through all of their medications and ensure that they have a good understanding of how and why they should be used.

- Pharmacy technicians usually have an opportunity to form close relationships with patients and thus are in a good position to note behavioural or physical changes in these people. In light of the fact that they may be more susceptible to medication-related problems, pharmacy technicians should discuss any significant changes or concerns with these patients with the pharmacist.
- Assist pharmacists in identifying and flagging potentially high-risk individuals as candidates for follow-up by the pharmacist.

Summary

An increasing number of patients visiting pharmacies over the next several years will be over the age of 65, and even over the age of 85, so it is important for pharmacy technicians to become familiar with some of the health- and medication-related challenges faced by this demographic. Through gaining a basic understanding of the unique needs of older adults, pharmacy technicians can help to optimize the care of these individuals.

REFERENCES

1. Public Health Agency of Canada. Division of Aging and Seniors. Canada's Aging Population. http://www.phac-aspc.gc.ca/seniors-aines/pubs/fed_paper/index_e.htm Accessed August 29, 2008.
2. Public Health Agency of Canada. Division of Aging and Seniors. Canada's Seniors at a Glance. http://www.phac-aspc.gc.ca/seniors-aines/pubs/seniors_at_glance/poster5_e.html#c Accessed August 29, 2008.
3. Quinn, K., Baker, M. and Evans, B. Clinical and Community studies. A Population Wide Profile of Prescription Drug Use in Saskatchewan 1989. Canadian Medical Association Journal, 1992, 146(12), 32.
4. Anderson G and Lavis J. Prescription drug use in the elderly: expenditures and patterns of use under Ontario and British Columbia provincial drug benefit programs. Queen's/University of Ottawa Economic Projects. February 1994.

5. Canadian Association on Gerontology. Policy Statement. Seniors and Prescription Drugs. 1999. http://www.cagacg.ca/publications/551_e.php Accessed August 29, 2008.
6. Steinman MA, Landefeld S, Rosenthal GE et al. Polypharmacy and prescribing quality in older people. *J Am Geriatr Soc* 2006;54(10):1516-1523.
7. Grymonpre RE, Mitenko PA, Sitar DS, Aoki FY and Montgomery PR. Drug associated hospital admissions in older medical patients. *J Am Geriatr Soc* 1988;36:1092.
8. Col N, Fanale JE, Kronholm P. The role of medication non-compliance and adverse drug reactions in hospitalizations of the elderly. *Arch Intern Med* 1990;150:841-845.
9. Hanlon JT, Schmadre KE, Koronkowski MJ et al. Adverse drug events in high-risk older patients. *J Am Geriatr Soc* 1997;45:945-948.
10. Budnitz DS, Shehab N, Kegler SR et al. Medication use leading to emergency department visits for adverse drug events in older adults. *Ann Intern Med* 2007;147(11):755-765.
11. Fick DM, Cooper JW, Wade WE et al. Updating the Beers criteria for potentially inappropriate medication use in older adults. *Arch Intern Med*. 2003;163:2716-2724.
12. Miller SW, Anderson RJ. Geriatric drug therapy. In: Herfindal ET, Gourley DR, editors. Textbook of therapeutics, drug and disease management. 6th ed. Baltimore: Williams and Wilkins, 1996.
13. Fouts M, Hanlon J, Pieper C et al. Identification of elderly nursing facility residents at high risk for drug-related problems. *Consult Pharm* 1997; 12(10).
14. McElnay JC, McCallion CR, Al-Deagi F et al. Development of a risk model for adverse drug events in the elderly. *Clin Drug Invest* 1997;13:47-55.
15. Flacker JM. What is a geriatric syndrome anyway? *Geriatrics and Aging* 2003;6(9):58-59.
16. Tinetti ME, Inouye SK, Gill TM et al. Shared risk factors for falls, incontinence, and functional dependence. Unifying the approach to geriatric syndromes. *JAMA* 1995;273(17):1348-53.
17. Inouye SK, Studenski S, Tinetti ME et al. Geriatric syndromes: clinical, research and policy implications of a core geriatric concept. *J Am Geriatr Soc* 2007;55(5):780-791.
18. Public Health Agency of Canada. Division of Aging and Seniors. Enhancing Safety and Security for Canadian Seniors. http://www.phac-aspc.gc.ca/seniors-aines/pubs/enhancing/chap3_e.htm Accessed August 29, 2008)

▶ QUESTIONS

1. Which of the following is one of the conditions that have been most commonly associated with medication-related problems in older people?

- a. Constipation
- b. Asthma flare-ups
- c. Dermatological problems
- d. Urinary incontinence

2. Which of the following is accurate?

- a. Kidney changes that occur with aging can affect the dose of medication required for older adults.
- b. The liver metabolizes medications more effectively with age thus increasing the risk of side effects.
- c. Elderly people are less likely to have low blood pressure due to diseases and medications than younger adults.
- d. Older adults produce more stomach acid than younger people.

3. Why do some medications stay in the system of an elderly person longer than they would in a younger person?

- a. Elderly people have more protein binding of medications which causes accumulation.
- b. Elderly people take higher doses of medications.
- c. Elderly people have more efficient metabolism by the liver.
- d. Elderly people have more fat than muscle, so are more likely to accumulate certain medications in fat tissue.

4. How can medications increase the risk of falls in an older person?

- a. Reduce blood pressure
- b. Reduce blood sugar
- c. Cause drowsiness
- d. All of the above

5. How can pharmacy technicians help older patients with memory impairment?

- a. Assist pharmacists in providing patients with written information about their medications.

Please select the best answer for each question or answer online at www.pharmacygateway.ca for instant results.

- b. Call them at home to reinforce medication instructions and refill times.
- c. Suggest that they use a dosette or offer specialized medication packaging if feasible.
- d. All of the above

6. Medication disposition can be affected by:

- a. Vision problems
- b. Hearing problems
- c. Stomach acid
- d. Social supports

7. Which of the following is an anticholinergic effect?

- a. Cough
- b. Dry mouth
- c. Urinary incontinence
- d. High blood pressure

8. What is orthostatic hypotension?

- a. A drop in blood pressure on rising
- b. High blood pressure at night
- c. Low blood sugar
- d. Drowsiness with blood pressure medications

9. Why is depression an issue in older people?

- a. Drug treatment is not recommended in this population
- b. It is often undiagnosed and not treated
- c. It can affect medication adherence
- d. B and C

10. Medication elimination is most affected by:

- a. Kidney function
- b. Stomach acid
- c. Muscle to fat ratio
- d. Hearing problems

11. How may nutritional status be affected by medication therapy?

- a. Medications can cause nausea, reducing appetite.
- b. Antipsychotics that cause swallowing difficulties can affect ability and desire to eat.

- c. Medications that affect taste in the mouth can reduce desire to eat.
- d. All of the above

12. Which of the following is an example of an antidepressant not recommended for the elderly?

- a. Diazepam
- b. Amitriptyline
- c. Digoxin
- d. Methylodopa

13. Why are elderly people more likely to experience digoxin toxicity?

- a. They're prescribed too high a dose of digoxin
- b. This medication is not safe in the elderly
- c. Digoxin may be eliminated less effectively
- d. Digoxin requires an acidic environment to be absorbed

14. Why are medication reviews a good idea for elderly people?

- a. They are at higher risk of medication-related problems, especially if they are taking several medications.
- b. They are more isolated and appreciate quiet time with the pharmacist.
- c. They are more likely to be on multiple medications and have some short-term memory impairment than younger people.
- d. A and C

15. Which of the following is correct?

- a. Older people who are overweight are at higher risk of medication-related problems than those who are frail.
- b. Most elderly people in Canada live in long-term care facilities.
- c. Seniors who are over 85 years of age are at high risk of medication-related problems.
- d. All of the above

For information about CE marking, please contact Mayra Ramos at (416) 764-3879 or fax (416) 764-3937 or email mayra.ramos@rci.rogers.com. All other inquiries about Tech Talk CE should be directed to Tanya Stuart at (416) 764-3944 or tanya.stuart@pharmacygroup.rogers.com.

To answer this CE lesson online

If currently logged into our Online CE Program, please return to the "Lessons Available Online" Page and click on "Link to questions" for this CE Lesson.

If not logged in but already registered to our Online CE Program, please click here: <http://ce.pharmacygateway.com/Pharmacy/login/index.asp>

If you have not registered for our Online CE Program and wish to answer online, please click here: <http://ce.pharmacygateway.com/Pharmacy/login/adduser.asp>

If you have any questions please contact:

Mayra Ramos

Pharmacy Practice, Pharmacy Post, Drugstore Canada, Novopharm CE Series, More CCCEP-approved CEs or Tech Talk CEs (English and French)

Fax: (416) 764-3937

Email: mayra.ramos@rci.rogers.com

Francine Beauchamp

Quebec Pharmacie and L'actualite Pharmaceutique

Fax: (514) 843-2183

Email: francine.beauchamp@rci.rogers.com