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Safe use of medications in seniors: how pharmacy technicians can help

by Certina Ho, RPh, BScPhm, MISt, MEd, and Calvin Poon, BScPhm Candidate

Learning Objectives:

After successful completion of this lesson, the technician will be able to do the following:

1. Understand the factors that place seniors at an increased risk of medication-related harm
2. Recognize medications and drug classes that are potentially harmful to seniors
3. Identify major themes and vulnerable practices associated with medication safety issues in seniors
4. Implement system-based practice changes to prevent future adverse incidents related to medication use in this population

Introduction

Owing to the ever-increasing use of medications in seniors, particularly as the population ages, there is a high incidence of drug-related harm in seniors. This lesson reviews common medication concerns in seniors and the role that technicians can play in reducing the risks.

Mr. S receives his medications in a blister pack every two weeks. While one of the pharmacy staff members was sealing his blister pack, one of the digoxin tablets "jumped" from one slot to another, resulting in one slot with no digoxin and another with a duplicate digoxin dose.

Although this scenario can happen to any patient in the pharmacy, seniors are more prone to these incidents, as they, their family members, and their healthcare providers more commonly request blister-pack services for their medications. This is only the tip of the iceberg. Many other potential near misses and medication-related adverse events relating to prescribing, order entry, dispensing, administration, and monitoring of drug therapy can happen to older patients within the medication distribution system.

In this lesson, we will discuss some of the common medication concerns in seniors by

reviewing a series of cases and medication incidents pertaining to elderly patients that were anonymously reported to the Institute for Safe Medication Practices Canada (ISMP Canada) Community Pharmacy Incident Reporting (CPhIR) Program (<http://www.cphir.ca>); identifying possible contributing factors or causes of common medication incidents that occur in seniors; and offering suggestions on how pharmacy technicians can play an important role in preventing these incidents from happening again in the future.

Background

Why are seniors at increased risk of medication-related harm?

Older people are more prone to having chronic medical conditions, such as high blood pressure, high cholesterol, diabetes, or cardiovascular disease. Medications are commonly required for these conditions. As a result, seniors tend to take more medications, and take them for longer periods of time, compared with younger patients. In general, seniors often take four to five prescription medications and two nonprescription (over-the-counter) medications on a regular basis.⁽¹⁾

TABLE 1 - Common themes in geriatric medication incidents.

THEMES	WHAT	HOW	SAMPLE CASE
Allergy	Sulfonamide allergy	Patients with sulfonamide allergy may be allergic to a spectrum of medications containing the sulfonamide functional group. Unlike other medication allergies (such as penicillin), a variety of medications (beyond antibiotics) may be potentially cross-allergenic with sulfonamides (Table 2). The elderly are at heightened risk, because although they may recognize that they are allergic to sulfonamide, they may not be aware that some other medications may also trigger cross-allergenicity with sulfonamides.	A physician prescribes trimethoprim-sulfamethoxazole DS for an elderly patient who has a sulfa allergy on his profile. The allergy was missed by both the physician and the pharmacy staff. Two days into therapy, the pharmacy staff discover the allergy. Fortunately, the patient is unharmed.
Blister packs	Frequently adjusted medications	Blister packs are a common administration aid in elderly patients taking multiple medications. Alterations in therapy for blister packs must be communicated to the pharmacy in advance. Changes to the blister pack are especially complicated by medications that may need to be dose-adjusted on a regular basis (eg, warfarin, levothyroxine, or pain medications).	A blister-pack patient has recent a change in levothyroxine dosing. The blister pack was, however, prepared using the out-of-date remaining refills of levothyroxine on the patient's profile.
	Dose omission	A blister pack with a missing medication is a common error, often due to prescription dispensing labels not being updated or not allocating the medication into the blister pack. Double-checking blister packs is a demanding process, and one may not be able to clearly see the entire contents of each of the slots.	Atorvastatin was missing in a patient's blister pack. After a few days, the patient went back to the pharmacy asking if there has been a change in his cholesterol medication since it was missing.
	Duplication	The double-checking step is easiest when the blister pack remains unsealed. However, medications may sometimes shift from one slot to another during the sealing process if the slots are shaken. An extra check is suggested when the blister pack is sealed and when the pack is given to the patient.	An elderly patient receives her medications in a blister pack. While her blister pack was being sealed, one of the digoxin tablets "jumped" from one slot to another, resulting in one slot with no digoxin and another with a duplicated dose.
	Labelling error	A blister pack often has multiple prescription dispensing labels (eg, on the front, inside, and on the vertical edge). Multiple labels can be confusing, especially if only one of the labels is checked by the pharmacy team.	A patient's husband brought back a blister pack for his wife. The blister pack was filled correctly. The label on the outside was correct but the label on the inside was for another patient.
Multiple medications	Alteration in therapy	Elderly patients may have frequent adjustments in their medications. From a healthcare practitioner perspective, a change in therapy may be obvious, but it is always important to ensure that the patient also understands this. Elderly patients with impaired cognitive function may not always remember to stop their previous medications when new ones are prescribed, resulting in a duplication of therapy.	An elderly patient was taking insulin NPH. The prescriber changed insulin NPH to insulin glargine. The patient was not aware that he was supposed to stop the insulin NPH while on insulin glargine. Upon the next check-up, the patient's blood glucose was very low.
	Copying from old prescriptions	Elderly patients may have an extensive list of medications on their profiles. When preparing a refill, it is a convenient or common practice to copy from an old prescription using one of the functions of the dispensing software. This is, however, a dangerous practice, especially when there are subtle changes to the new prescription(s).	An elderly patient was prescribed ramipril 10 mg. The pharmacist noticed that the patient had received ramipril in the past, so the old prescription was copied. The old prescription was prescribed as ramipril 5 mg, and the new dose was not updated.
	Confusion when refilling multiple medications	Elderly patients with chronic medical conditions may decide to refill their medications all at once for the sake of convenience. As a result, some patients will have multiple medications for pick-up. This may create confusion in the dispensing process, especially with look-alike medications (such as domperidone 10 mg versus metoprolol 50 mg, which are both white, round tablets), allowing the possibility of one medication being mixed up with another.	A patient requested a refill of domperidone 10 mg and metoprolol 50 mg. Two weeks later, the patient noticed that the prescription dispensing labels were switched, in that the bottle labelled domperidone has metoprolol in it and the bottle labeled metoprolol has domperidone in it.
	Abbreviations or suffixes to drug names	Two medications may be available in the same strength, but have multiple formulations. Abbreviations or suffixes are often used to denote the different formulations. Each abbreviation denotes a different formulation with different pharmacokinetics (see tables 3 and 4).	A patient was prescribed verapamil SR 120 mg daily. The pharmacy has filled verapamil 120 mg daily for a few months with the assumption that the SR formulation is the same as regular verapamil.

Increasing age and a higher number of prescribed medications tend to be the two most common risk factors for a medication discrepancy, which (in outpatient pharmacy practice) is described as the difference between what physicians prescribe and what patients are actually taking at home.⁽²⁾

The physiologic, including pharmacokinetic and pharmacodynamic, changes in elderly patients' bodies may make them more sensitive to medications and prone to potential adverse drug events.⁽³⁾ In addition, their internal organs, such as their liver and kidneys, may not be functioning at optimal capacity to metabolize or excrete medications. Consequently, when prescribing, dispensing, or administering medications to geriatric patients, safety measures should be in place in order to ensure or advance safe medication practices in geriatric medication use.

Which medications are potentially harmful in seniors?

The Beers Criteria, a list of potentially inappropriate medications for older persons, was developed with the objective of reducing preventable adverse drug events among senior patients.⁽⁴⁾ Since its publication, the Beers Criteria have been adopted or adapted by various jurisdictions in Canada. For example, Health Quality Ontario has posted a list of drugs not to be used in the elderly on its website at www.ohqc.ca/pdfs/list_of_drugs_not_to_be_used_in_the_elderly_

TABLE 2 - Medications with potential cross-allergenicity with sulfonamides^(11,12)

Therapeutic category	Examples
Antibiotics	Trimethoprim-sulfamethoxazole
Medications for inflammatory bowel disease	Sulfasalazine
Anti-inflammatory	Celecoxib
Hypoglycemic agents	Glyburide Gliclazide
Diuretics	Furosemide Hydrochlorothiazide
Migraine therapy	Sumatriptan

This is a sample list of medications; it is not a comprehensive list.

as_adopted_by_ohqc.pdf.⁽⁵⁾ This year the American Geriatrics Society updated the Beers Criteria for potentially inappropriate medication use in older adults (www.americangeriatrics.org/files/documents/beers/2012BeersCriteria_JAGS.pdf), with 53 medications or drug classes being flagged.⁽⁶⁾ Selected medications from the following drug classes can be found on the Beers list (note that the following list is not meant to be comprehensive):

- Analgesics
- Antidepressants
- Antihistamines
- Antihypertensives
- Antiplatelets
- Anxiolytics
- Hypnotics
- Muscle relaxants
- Nonsteroidal anti-inflammatory drugs

Typically, when an elderly patient is prescribed a drug on the Beers list, an alternate medication should be considered, or a nonpharmacologic intervention should be used instead.

On the other hand, healthcare practitioners should also be aware of high-alert medications that may put patients at increased risk of harm should a medication incident occur (that is, when the medication is used in error). A list of high-alert medications can be found at the Institute for Safe Medication Practices (ISMP) website at www.ismp.org/Tools/highalertmedications.pdf. The following are often considered as red-flag or high-alert medications in community pharmacy practice^(7,8):

- Anticoagulants (in particular, warfarin)
- Insulin
- Opioids (or narcotics)
- Digoxin

Although the aforementioned Beers Criteria and the list of high-alert medications primarily comprise prescription medications, it is important to note that over-the-counter medications, vitamins, supplements, and natural health products must also be considered when ascertaining safe use of medications in seniors. In general, when prescribing medications or selecting a therapeutic option for older patients, whether prescription or nonprescription, consider the ultimate patient-oriented outcomes and the patient's clinical presentation, such as past medical and medication history, comorbidities, and current organ

functions (with respect to metabolism and excretion, for instance).⁽⁹⁾ At the same time, monitoring measures should be in place, so that in case of adverse drug events, intervention by healthcare professionals can be provided in a timely manner.

Geriatric medication incidents in community pharmacy practice

Using a search criterion of "> 65 years" for age category of a medication incident, reports were retrieved from the ISMP Canada Community Pharmacy Incident Reporting (CPhIR) Program (www.cphir.ca). A qualitative analysis of these incidents revealed common themes in geriatric medication incidents, which are available in Table 1.⁽¹⁰⁾

Medication incidents are often due to failures in the medication distribution system that place healthcare practitioners, including pharmacy technicians, at heightened risk of making an error. Focusing on the system-based medication-use process, pharmacy technicians can play various roles in promoting safeguards at the stages of prescribing, order entry, dispensing, administration, and monitoring of drug therapy for elderly patients.

Prescribing and order entry

Pharmacy technicians are often the designated personnel at the "in-counter" or "prescription drop-off counter" at a pharmacy. Pharmacy technicians can be the gatekeepers in screening incoming prescriptions before the actual data are inputted at the order entry stage. By being familiar with the Beers Criteria (or any list of high-risk medications that might be inappropriate in the elderly) and the list of high-alert medications, pharmacy technicians can promptly identify any "red-flag" medications that are being prescribed by physicians and initiate dialogue with the pharmacist for therapeutic verification. Even better would be to have lists of high-alert medications built into the dispensing system, so that automatic alerts can be generated during the order entry stage. This way, necessary clinical interventions or double-checking by the pharmacist can be offered in the early stages of the medication distribution system.

Similarly, in the common cases of possible sulfonamide cross-allergenicity

TABLE 3 - Common formulation abbreviations or suffixes to drug names that may cause confusion

Abbreviation	Definition
CR	Controlled release
LA	Long acting
TR	Timed release
XL, XR, ER	Extended release
SR	Sustained release
DS	Double strength
EC	Enteric coated

and product mix-ups due to formulation abbreviations of drugs commonly used in geriatric patients, pharmacy technicians can enhance their knowledge of medications that are potentially cross-allergenic with sulfonamides (Table 2^(11,12)) and medication pairs that are known to cause confusion as a result of formulation abbreviations or suffixes to drug names (Tables 3 and 4). In addition, system-based modifications can be built into dispensing software, so that susceptible medications can be identified during the order entry stage; the pharmacist can then intervene accordingly.

Dispensing and administration

As previously stated, elderly patients are often prescribed multiple medications that need to be taken at different times of the day. Pharmacy technicians can suggest the use of compliance aids, which can be used to dispense the patient's medications. Dispensing medications in blister packs and dosettes are two common methods that community pharmacies can offer to senior patients. It is critical that independent checks are employed during the dispensing process. This is another safeguard in which pharmacy technicians can definitely play a significant role. Errors happen. A second check can decrease the potential for errors, but it needs to be completely independent. In other words, the first pharmacy technician must not communicate what he or she expects the second pharmacy technician or pharmacist to see or verify; otherwise, confirmation bias may be introduced, possibly reducing the likelihood of catching an error.^(13,14) The implementation of an independent double-checking system in the dispensing stage at the pharmacy is likely to decrease the

number of geriatric medication incidents that pertain to the common theme of "blister packs" as outlined in Table 2^(11,12) or the example described at the beginning of this lesson.

Monitoring

Monitoring usually takes place after the medication is dispensed to the patient. However, pharmacy technicians can still employ effective measures and safe medication practices at this stage, such as when patients or their caregivers come to pick up their prescriptions or refills. Involving patients as active proponents of their own health and safety can also help prevent medication incidents.⁽¹⁵⁾

When patients or their caregivers come to pick up their prescriptions, particularly their refills, the pharmacy technician can open the vial or box to show the actual appearance of the medication to the patient (or caregiver). This allows the opportunity for the patient (or caregiver) to identify or recognize the medication and ask any questions about the drug they will be taking at home. This patient-oriented independent double-check process will reduce the likelihood of geriatric medication incidents that pertain to the common theme of "multiple medications" as stated in Table 2,^(11,12) and also help initiate a dialogue with the patient to find out if there are any changes (including discontinuation) to the patient's usual drug therapy that will require the pharmacist's attention for subsequent follow-up or clinical intervention.

In Canada, several provinces have implemented medication review programs for senior patients—for example, Medication Review Services in British Columbia,⁽¹⁵⁾ Seniors' Medication Review Program in Nova Scotia,⁽¹⁶⁾ and MedsCheck in Ontario.⁽¹⁷⁾ These programs, which promote pharmacist-patient one-on-one interactions, are aimed at identifying, reconciling, and resolving medication discrepancies, which are known to be more common in older patients and those with a higher number of prescribed medications.⁽²⁾ Pharmacy technicians can facilitate and support these initiatives by proactively informing and explaining to their older patients the availability of such services at the pharmacy, scheduling patient appointments, reminding patients to

bring in their medications for their scheduled medication review session with the pharmacist, and preparing documentation and pre-printed education materials that may be helpful and valuable to the pharmacist's interview with the patient. In general, resolution of medication discrepancies is vital to monitoring and ensuring safe medication use by patients.

Conclusion

A vulnerable medication distribution system coupled with potential human errors can often lead to medication incidents⁽¹⁵⁾ Due to their increased use of medications and their relatively fragile physiologic parameters, elderly patients are highly susceptible to adverse drug events and are at increased risk of harm should a medication error occur. System-based changes are key to offering and establishing safe medication-cycle stages—prescribing, order entry, administration, and dispensing—that are resilient to human error. Pharmacy technicians can play a critical role in

TABLE 4 - Examples of medication pairs with suffixes to drug names that may cause confusion or product mix-ups

Medication pairs with suffixes	
Adalat® PA	Adalat® XL®
Metoprolol	Metoprolol SR
Biaxin®	Biaxin® XL
Bupropion SR	Bupropion XL
Cipro®	Cipro® XL™
Detrol®	Detrol LA™
Diclo	Diclo-rapide
Diltiazem	Diltiazem SR
Diltiazem CD	Diltiazem ER
Hyzaar®	Hyzaar® DS
Insulin NPH	Insulin 30/70
Levocarb	Levocarb CR
Maxalt® tabs	Maxalt® wafers
Mirtazapine	Mirtazapine RD or ODT (oral disintegrating tablets)
Naproxen	Naproxen EC
Prevacid®	Prevacid® FasTab
Sinemet®	Sinemet® CR
Twinrix®	Twinrix® Jr.
Wellbutrin® SR	Wellbutrin® XL
Zomig®	Zomig Rapimelt®

embracing a culture of safety and facilitating quality improvement measures in pharmacy practice.

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QUESTIONS

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

1. Which of the following is NOT a risk factor for medication incidents in seniors?

- a) Declining kidney function
- b) Increased sensitivity to medication adverse events
- c) Community-acquired pneumonia due to seasonal changes
- d) Increased number of medications
- e) Chronic medical conditions, such as diabetes

2. Which of the following medications are potentially harmful for seniors?

- a) Antihistamines
- b) Muscle relaxants
- c) Digoxin
- d) A and B
- e) All of the above

3. What is defined as a system-based approach to medication safety?

- a) Identifying individuals at fault
- b) Making sure we are more careful in checking all the details of a prescription
- c) Implementing an independent double-checking system
- d) None of the above

4. An elderly patient was prescribed trimethoprim-sulfamethoxazole. Upon asking the patient about his medication history, he reports having experienced mild gastrointestinal distress the last time he took a medication called celecoxib. He is also taking furosemide, but has had no issues with this medication. What is the most appropriate course of

action?

- a) Proceed to fill the trimethoprim-sulfamethoxazole prescription, as there is likely not an allergy issue—but consult a pharmacist to be sure
- b) Report the patient as allergic to sulfonamides
- c) Report the patient as allergic to penicillin
- d) The patient risks an adverse reaction—trimethoprim-sulfamethoxazole is on the Beers Criteria list

5. Why may certain patients who receive blister packs be at increased risk of medication incidents?

- a) Some medications, such as digoxin, are high-alert medications, according to the ISMP list, and should not be inserted into blister packs
- b) Some medications, such as insulin, cannot be inserted into blister packs
- c) Providing a vacation supply of blister packs is very labor intensive and staff may be prone to making errors due to fatigue while preparing them
- d) The dosage of certain drugs, such as warfarin, may change periodically

6. Which of the following are considered dangerous practices with regard to safe use of medications in seniors?

- a) Copying information from a previously filled prescription for a new medication
- b) Flagging a patient with multiple medication refills as high-alert

- c) Putting the labels of two blister-pack patients with similar last name on the same work station
- d) A and C
- e) All of the above

7. A patient has a true sulfonamide allergy. Which of the following medications contain a "sulfa" component in its chemical structure?

- a) Hydrochlorothiazide
- b) Furosemide
- c) Sumatriptan
- d) B and C
- e) All of the above

8. Which of the following common formulation abbreviations DOES NOT pertain to the way the medication is released or absorbed?

- a) CR
- b) XL
- c) DS
- d) LA
- e) TR

9. A technician finds a dispensing mistake in one of the slots of a blister pack. He asks his colleagues to double-check his findings to confirm the dispensing mistake. Is this an example of an independent double-check?

- a) Yes
- b) No

10. An elderly patient with dementia comes in to pick up her refill medications, including her weekly dose of alendronate. Which of the following practices are appropriate to ensure safe use of medications?

- a) Show the patient her medications when

QUESTIONS (Continued)

- she comes in for pick-up
- b) Ask the patient to return any medications that have been discontinued
- c) Use a medication calendar to remind the patient about her weekly doses of alendronate
- d) A and C e) All of the above

11. Consider the following example: A pharmacy often makes medication errors in filling blister packs, and doses in certain slots are often missed. Which of the following is a viable system-based solution?

- a) Reinforce the importance of accuracy by putting up a poster
- b) Have staff sign-off on a checked blister pack so when a mistake is discovered, the pharmacy knows who is responsible for it
- c) Highlight errors that are found and ask a second staff member to confirm the error
- d) Do not allow staff to review the blister packs during busy hours in case of interruptions, or allocate a dedicated quiet area for checking
- e) None of the above

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

12. How can we prevent errors in the order entry stage when filling a new prescription by copying a previously filled order?

- a) Enforce a policy in pharmacy to discourage copying from a previously filled order
- b) Ask the patient whether the prescription is a refill or new
- c) When patients drop off their prescription, ask the patient about any changes and highlight any changes in their prescriptions for the order entry staff
- d) A and C e) All of the above

13. An elderly woman taking multiple medications has mild cognitive impairment. Which of the following strategies can facilitate safe use of medications in this patient?

- a) Keep an accurate list of over-the-counter medications
- b) Ask if the patient would like to have her medications prepared in a blister pack
- c) Ensure frequent changes in warfarin doses are followed
- d) A and C e) All of the above

14. Why are elderly patients with a sulfonamide allergy at an increased risk of receiving an allergic drug compared with those with a penicillin allergy?

- a) Elderly patients and healthcare professionals may not recognize drugs that contain the sulfonamide group
- b) Sulfonamide medications are used 13% more frequently than penicillin
- c) Penicillin allergies pertain to the entire class of penicillins, whereas drugs with a sulfonamide-like structure can be found in several different therapeutic classes
- d) A and C e) All of the above

15. Seniors are at increased risk of medication incidents. Which of the following vulnerable practices are relevant to seniors?

- a) Preparing medications in blister packs
- b) Managing a complex patient profile with multiple medications
- c) Assessing sulfonamide allergy
- d) When there is a therapeutic change, ensure the patient understands to discontinue their previous drug or regimen
- e) All of the above

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Please help ensure this program continues to be useful to you by answering these questions.

- Do you now feel more informed about Safe use of medications in seniors: how pharmacy technicians can help? Yes No
- Was the information in this lesson relevant to you as a technician? Yes No
- Will you be able to incorporate the information from this lesson into your job as a technician? Yes No N/A
- Was the information in this lesson... Too basic Appropriate Too difficult
- How satisfied overall are you with this lesson?
 Very Somewhat Not at all
- What topic would you like to see covered in a future issue? _____

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