

Preventing and managing drug-related problems in long-term care

1.5
CEUs

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Learning objectives

Upon successful completion of this lesson, you should be able to:

1. assess some of the more common risks of drug-related problems in long-term care residents with Alzheimer disease, Parkinson's disease, chronic obstructive pulmonary disease, pain and heart failure
2. proactively identify potential problems with medication therapy for common conditions of elderly residents of long-term care facilities by performing a detailed medication review
3. make recommendations to optimize both specific medication therapies and outcomes for long-term care residents with Alzheimer disease, Parkinson's disease, chronic obstructive pulmonary disease, pain and heart failure.

To successfully complete the post-test for this lesson, you may need access to the *Compendium of Pharmaceuticals and Specialties (CPS)*.

According to a 1999 Statistics Canada survey, 76% of Canada's seniors living at home took at least one medication and 53% used two or more medications in the two days prior to the survey.¹ Seniors comprised approximately 12% of the Canadian population but received about 40% of all prescriptions.^{2,3}

A small percentage—about 14%—of Canadian seniors over the age of 75 reside in long-term care (LTC) facilities, including nursing and retirement homes, and chronic care facilities.⁴ Although the number of seniors living in LTC facilities in Canada is relatively low, the number of drug-related problems that occur is high in LTC facilities.⁵ Pharmacists who provide pharmaceutical care services to residents of LTC facilities face

unique challenges but also have great opportunities to impact upon the health outcomes and overall quality of life of these residents.

Pharmacists in various clinical settings, including community and hospital practice, may have the opportunity to care for patients receiving LTC. This lesson will focus on key areas in which pharmacists can work to prevent and manage drug-related problems in elderly LTC residents.

Medication use in long-term care

On average, a LTC resident will receive approximately seven to eight medications per month.⁶ Although adherence is not a major problem, since medication administration follows a schedule and is usually done by a nurse

or caregiver, there are a number of other potential problems that may occur. These are generally related to medical conditions and the medications prescribed, misinformation of caregivers, medication incidents and lack of monitoring.

Pharmacists have a critical role in both prescribing and resident outcomes in LTC. The American Society of Consultant Pharmacists' Fleetwood Project was conducted to demonstrate the impact of consultant pharmacist services on resident outcomes and costs in LTC facilities. Phase I of this study showed that drug regimen reviews conducted by consultant pharmacists saved \$3.6 billion (U.S.) per year and increased optimal therapeutic outcomes by 43%.⁷

A study in London, Ont., demonstrated that pharmacist intervention (achieved by identifying prescribing problems and writing a letter to the physician and suggesting alternatives) was well-received by physicians. Ninety-two percent of physicians involved indicated that they found the pharmacist's letter "somewhat helpful" or "very helpful" in improving prescribing, and 37.9% of potentially inappropriate prescriptions were modified by physicians.⁸

Conditions commonly associated with drug-related problems

Admission to a LTC facility is usually associated with a difficulty managing indepen-

Instructions

1. After carefully reading this lesson, study each question and select the one answer you believe to be correct. Circle the appropriate letter on the attached reply card.
2. To pass this lesson, a grade of at least 70% (14 out of 20) is required. If you pass, your CEU(s) will be recorded with the relevant provincial authority(ies). (Note: some provinces require individual pharmacists to notify them.)

Answering options

- A. For immediate results, answer online at www.pharmacygateway.ca.
- B. Mail or fax the printed answer card to (416) 764-3937. Your reply card will be marked and you will be advised of your results within six to eight weeks in a letter from *Pharmacy Practice*.

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TABLE 1 Comparison of cholinesterase inhibitors¹³

Medication	Dosing
donepezil	5–10 mg daily; more adverse effects at 10 mg dose
rivastigmine	1.5 mg BID up to 6 mg BID
galantamine	4 mg BID up to 12 mg BID or 8–24mg ER capsule once daily; avoid in severe renal or hepatic impairment

TABLE 2 Medications with anticholinergic effects*

- tricyclic antidepressants (e.g., amitriptyline, imipramine)
- antispasmodics (e.g., hyoscine)
- benzodiazepines (e.g., diazepam, alprazolam)
- oxybutynin
- antihistamines (e.g., diphenhydramine, hydroxyzine)
- antipsychotics (e.g., thioridazine)
- MAOIs (e.g., phenelzine)
- atropine
- opioids (e.g., codeine, oxycodone)

* Adapted from reference 13; not a complete list.

dently at home. There are a number of conditions that are commonly seen in LTC facilities and each presents a unique opportunity for monitoring medication therapy and prevention of drug-related problems. Among these conditions are Alzheimer disease (AD), Parkinson disease (PD), stroke, chronic obstructive pulmonary disease (COPD), arthritis, and heart failure (HF).⁹ Pharmacists, through their regu-

lar visits, medication reviews and monitoring, can help manage these conditions while minimizing problems that can commonly occur.

Alzheimer disease and other types of dementia

About one-half of people living with dementia reside in LTC facilities.¹⁰ Medication therapy can include agents to slow cognitive decline (e.g., cholinesterase inhibitors), in addition to those aimed at managing behavioural problems associated with this dementia.

Pharmacists should be able to assess patient outcomes related to cholinesterase inhibitor therapy, as well as provide recommendations with respect to dose and duration of therapy. Cholinesterase inhibitors, in general, have been shown to delay the onset of behavioural problems and delay nursing-home placement, as well as improve cognition.^{11, 12} Measurement of outcomes can be difficult to do, particularly if there is no baseline Folstein Mini-Mental Status Examination (MMSE) result on file. In a resident who is no longer responding, there may be consistent declines in MMSE scores and increased behavioural disturbances, as well as increasing difficulty with global functioning and activities of daily living (ADLs).^{11,12} It is important to note that although there is no well-documented guideline for duration of therapy with cholinesterase inhibitors, it has been suggested that the medication may be effective for up to five years.¹³ However, residents should remain on it for only six to 12 months if deterioration continues.¹³ Nonetheless, many patients remain on these medications without further benefits for several years. If a resident cannot tolerate an optimal dose of one of the available agents, it is feasible to switch to another one. Table 1 compares dosing of the available

cholinesterase inhibitors. It is important to note that no washout period is required when switching between agents. Currently, there is no evidence to support the use of combination cholinesterase therapy for patients with AD. Adherence is important with all of these therapies because benefits could be lost very quickly (i.e., in 6 weeks) if the medication is stopped.¹⁴

Memantine is an N-methyl-D-aspartate (NMDA) receptor antagonist that is indicated for the treatment of moderate to severe Alzheimer or vascular dementia. This agent has been studied alone or in combination with donepezil.¹⁵ Memantine has been shown to improve cognitive, functional and global end points in moderate to severe Alzheimer dementia by reducing NMDA activity that occurs due to glutamate excess in AD. Further study is needed to determine the impact of combining memantine with other cholinesterase inhibitors.¹⁶

Anticholinergic medications, or those with anticholinergic effects, can contribute to confusion and further impaired cognitive status in patients with AD.¹⁷ Pharmacists should review patient profiles to ensure that anticholinergic load is minimized where possible (Table 2).

Behavioural disturbances are commonly associated with dementias. Pharmacists can play an important role in helping to identify behaviours that can respond to medication therapy and those that generally do not respond to medications. Agitation, depression, insomnia and hallucinations are manifestations that can be effectively treated with medications including anxiolytics, antidepressants, hypnotics and antipsychotics (newer agents with a lower incidence of extrapyramidal symptoms and anticholinergic effects). Clinicians should not attempt to treat other types of behaviours—including wandering, calling out and repetitive

CE Faculty

This month

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Reviewers

All lessons are reviewed by a minimum of six pharmacists for accuracy, currency and relevance to current pharmacy practice.

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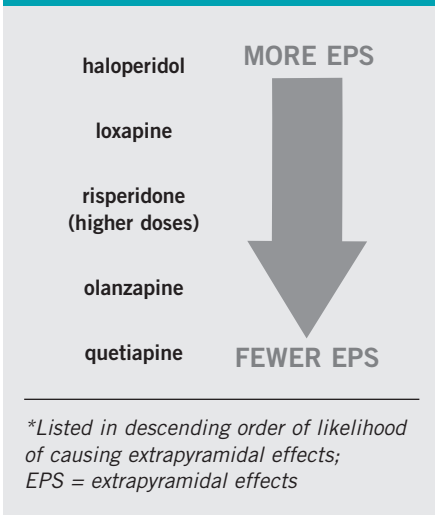
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FIGURE 1
Antipsychotics and incidence of extrapyramidal symptoms*.²³



vocalizations—with medications.¹⁹ Other strategies should not involve the use of medications to sedate the patient; instead, they should involve an assessment of the potential reason for the behaviour and subsequent plans to minimize it.

Parkinson's disease

Another condition that causes significant functional impairment in later stages is PD. The hallmark symptoms of tremor, rigidity, akinesia and postural instability can impair an individual's ability to perform ADLs and lead to institutionalization as the disease progresses. Medication management of PD can be challenging, particularly when motor fluctuations begin to develop after two to five years of levodopa therapy.²⁰ Pharmacists should be aware of strategies for managing these fluctuations to help optimize symptom control (Table 3).

Drug-disease interactions can occur in patients with PD. Of note are medications that can cause extrapyramidal symptoms (EPS)—commonly, the antipsychotic medications.²¹ Since dementia often develops concurrently in patients with PD, pharmacists can play an important role in selecting medication therapies if they are required for symptoms such as hallucinations and delusions. Figure 1 outlines the relative risk of a resident experiencing extrapyramidal effects with various antipsychotics. The agents with a lower risk of EPS (newer, or atypical antipsychotics) should be used in residents with PD.²²

Medications with anticholinergic effects, such as amantadine and trihexiphenidyl, although often useful for the management of tremor in PD, are not recommended for patients who are older (over 50 years of age),

TABLE 3 Motor fluctuations complicating Parkinson's disease²⁰

Motor fluctuation	Management	Rationale
on-off phenomenon (sudden lack of symptom control, not associated with last medication dose)	<ul style="list-style-type: none"> • add dopamine agonist • modify distribution of dietary protein (can reduce absorption of levodopa) • add entacapone 	<ul style="list-style-type: none"> • increasing availability of dopamine in the brain can minimize on-off fluctuations
peak dose dyskinesia (abnormal involuntary movements; time to peak varies, approximately 1–2 hours)	<ul style="list-style-type: none"> • discontinue selegiline • switch from CR to regular levodopa • decrease levodopa dose • add or increase dopamine agonist • add amantadine, if appropriate 	<ul style="list-style-type: none"> • selegiline can aggravate peak dose dyskinesia • CR may be more likely to cause dyskinesias than regular levodopa • dopamine agonist and/or amantadine can allow for a reduction in levodopa dose without contributing to dyskinesias
diphasic dyskinesia (at beginning and end of levodopa response cycle)	<ul style="list-style-type: none"> • switch from CR to regular levodopa • increase dose of dopamine agonist • spread out levodopa dosing in several early day or midday doses 	<ul style="list-style-type: none"> • CR more likely to cause dyskinesias • redistribute levodopa or increase dopaminergic therapy to smooth out resulting dopamine levels
wearing off effect (predictable decline in effectiveness at end of levodopa dosing interval)	<ul style="list-style-type: none"> • add dopamine agonist • increase frequency and/or dose of levodopa • add or substitute CR levodopa • add entacapone • decrease or redistribute protein 	<ul style="list-style-type: none"> • increase dopaminergic effect • CR will extend duration of action • entacapone prolongs effect of levodopa and increases bioavailability • dietary protein may decrease bioavailability of levodopa
freezing (difficulty initiating gait)	<ul style="list-style-type: none"> • if at peak, increase dopaminergic (i.e., levodopa and/or dopamine agonist) therapy • if during off time*, see wearing off effect • if during on time**, use sensory cues (e.g., moving towards a target on the ground, singing a marching song) 	<ul style="list-style-type: none"> • increase dopaminergic therapy to increase effectiveness • if during on time, will not be affected by medication dosing
dystonia (cramping, muscle stiffness)	<ul style="list-style-type: none"> • if early morning, use CR levodopa or dopamine agonist at night; add entacapone • if at peak of levodopa levels, decrease levodopa dose or add dopamine agonist 	<ul style="list-style-type: none"> • extend the duration of action of dopaminergic therapy if in the morning • high individual levodopa dose can contribute to dystonia

CR = controlled release; *off time is when the patient's functioning is affected by PD symptoms; **on time is when the patient is functioning well

due to the greater risk of serious adverse effects in this population.^{20,24} Some of the older dopamine agonists, such as pergolide and bromocriptine, are more likely to cause psychiatric symptoms (e.g., hallucinations, paranoia) which can worsen behavioural problems in patients with dementia.²⁰ Switching from regular levodopa preparations to controlled release (CR) formulations requires a dosage adjustment (30% more is required if switching from regular to CR).²⁰ Entacapone, a catechol-O-methyltransferase (COMT) inhibitor, is often added to levodopa therapy to enhance availability of dopamine in the brain. When adding

entacapone to levodopa therapy, it is important to note that a dosage reduction of approximately 25% of the levodopa product may be required to reduce the risk of dyskinesias that can occur when entacapone is added.²⁵

Stroke

Monitoring and followup of the patient post-stroke requires attention to the management of stroke complications, as well as secondary prevention of stroke.

The functional impairment that can result from stroke is a common cause of institutionalization. Pharmacists should review medi-

TABLE 4 Secondary prevention of stroke²⁶

Patient history	Secondary prevention strategy
TIA or stroke, noncardio-embolic	ASA 50–325 mg OD <i>Alternatives:</i> clopidogrel 75 mg OD, dipyridamole 200 mg/ASA 25 mg BID
TIA or stroke with atrial fibrillation	warfarin to INR 2–3 (or ASA 50–325 mg OD if contraindicated)

TIA = transient ischemic attack

TABLE 5 American Geriatrics Society anticoagulation guidelines for the elderly patient³⁰

starting oral anticoagulation	<ul style="list-style-type: none"> • baseline INR • determine if potential drug interactions • start < 5 mg per day
monitoring therapy	<ul style="list-style-type: none"> • INR daily until stable (5–7 days) • then 2–3 times weekly for 1–2 weeks • then weekly for 1 month • then monthly thereafter
more frequent monitoring	<ul style="list-style-type: none"> • medication changes • diet changes

managing high INR:

INR 3–5, no bleeding	<ul style="list-style-type: none"> • hold one dose • resume therapy when INR in therapeutic range
INR 5–9, no bleeding	<ul style="list-style-type: none"> • hold 1–2 doses • resume when INR in therapeutic range • consider vitamin K 1–2.5 mg PO if at increased bleeding risk
INR > 9, no bleeding	<ul style="list-style-type: none"> • hold warfarin • give vitamin K 3–5 mg PO • additional vitamin K if INR not reduced in 1–2 days
bleeding at any INR	<ul style="list-style-type: none"> • discontinue warfarin • give vitamin K 10 mg IV infusion (may repeat Q12H)

INR = international normalized ratio;
IV = intravenous

cations that can exacerbate symptoms such as incontinence (e.g., diuretics, lithium, sedatives), confusion (e.g., anticholinergics, cen-

tral nervous system [CNS] depressants) and dysphagia (e.g., antipsychotics, anticholinergics).

Secondary prevention of stroke should include the use of antithrombotic agents, including ASA, clopidogrel, warfarin or dipyridamole/ASA.²⁶ Ticlopidine is not recommended due to the risk of neutropenia with no added benefits.²⁷ An important role of the pharmacist is to ensure appropriate monitoring and international normalized ratio (INR—a standardized representation of prothrombin time [PT] that replaces the measurement of PT) levels for patients on warfarin in LTC, as well as avoidance of drug interactions. This is an important area of education for nurses and caregivers in LTC. Warfarin tends to be underused in the elderly LTC facility population due to perceived high risk of bleeding.²⁸ It is important to note that cardiovascular benefits have not been shown to be achieved at INR levels below established therapeutic ranges (i.e., INR 2–3).²⁹ Table 5 presents monitoring guidelines from the American Geriatrics Society for older patients on warfarin.

Chronic obstructive pulmonary disease

Another condition commonly encountered in the elderly LTC resident is COPD, which often occurs as a result of a long history of smoking. Therapy is generally given via inhalation device and this, in itself, is a common source of drug-related problems in LTC. Pharmacists are required to ensure that nurses and caregivers, as well as the patient, if capable, are educated in the proper technique for using dry-powder inhalers, and metered-dose inhalers (MDIs) with spacers. Some patients may have difficulty with the inspirational drive required to use dry-powder inhalers. It has been recommended that all elderly individuals who must use an MDI use a spacer with them.³¹ Technique is most important with this device and is often overlooked in a busy facility, thus resulting in less than optimal outcomes for the patient. Patients with arthritis, tremor or other conditions that impair their fine motor abilities may have difficulty with inhaled dosage forms.

The use of nebulizers to manage patients with COPD is questionable in many circumstances. For the patient who has an acute exacerbation, many trials (note that most trials are in children) show that the delivery of medication through this route is no better than via a MDI plus a spacer.^{32,33} Some patients find comfort in the mist of the nebulizer, but increased costs and sometimes less than optimal medication delivery, make this option less favourable.

Another potential problem in residents with COPD is the use of CNS depressant medica-

tions. Medications that can cause respiratory depression, such as long-acting benzodiazepines and propranolol, may aggravate symptoms of COPD and have been identified in the Beers criteria as potentially inappropriate drug/diagnosis combinations in the elderly.²⁷ Long-term use of long-acting benzodiazepines should be avoided where possible, and alternative strategies to managing insomnia or other indications should be sought.

Arthritis and chronic pain

Osteoarthritis is the most common type of arthritis to affect people later in life.³⁴ In the LTC setting, pain due to arthritis and other conditions (e.g., chronic, nonspecific musculoskeletal pain; cancer pain) is prevalent and often overlooked. Pain can manifest as behavioural changes in patients with cognitive impairment or dementia, in the form of facial cues, increase or decrease in movements, restlessness and vocalizations.³⁵ Other types of manifestations of pain in cognitively impaired patients are listed in Table 6. Improving pain symptoms can help to improve day-to-day functioning, reduce disruptive behaviours in some residents, relieve caregiver burden and maximize quality of life.

Pharmacists can assist in optimizing pain management in LTC facilities through the evaluation of medication therapies as well as the implementation of pain assessment scales and tools to assist nurses and caregivers in evaluating pain control. Common pain scales used for patients who are not cognitively impaired and are able to express themselves include visual analogue scales (i.e., rate your pain on a scale of 1–10), faces scales (e.g., Wong-Baker scale), and descriptive scales (i.e., rate your pain on a scale from no pain to the worst pain possible).³⁷ For patients who continue to experience pain while on medication therapies, pharmacists should determine the effectiveness of the medication. For example, if the medication provides relief but only for a short time, the patient may benefit from a change in dosing interval, and may not require a change of medication.

Ensuring that appropriate medication therapies are used for specific types of pain is also an important role of the pharmacist. For instance, neuropathic pain may not respond well to traditional analgesics such as opioids but may be more effectively managed with anti-convulsants (e.g., gabapentin, carbamazepine) or antidepressants (e.g., nortriptyline, desipramine).³⁸ The long-term use of analgesic and anti-inflammatory medications should be assessed regularly to ensure the patient has the best pain control possible with no or mini-

TABLE 6 Behaviours in cognitively impaired individuals experiencing pain*

Category	Specific behaviours
facial expressions	frown, grimace, rapid blinking
vocalizations	moaning, calling out, verbal abuse
body movements	fidgeting, pacing, gait changes
changes in interactions with others	social withdrawal, aggressive behaviour, resisting care
change in activity levels	wandering, appetite changes, sleep pattern changes
mental status changes	confusion, irritability

* adapted from reference 36

mal adverse effects. Long-term use of long half-life, nonselective nonsteroidal anti-inflammatory drugs (NSAIDs) (e.g., naproxen, piroxicam) at full dosages is not recommended due to the increased risk of bleeding in this population.²⁷ All NSAIDs, whether COX-2 selective (e.g., celecoxib) or not, can worsen poor renal function, so pharmacists should ensure that renal function is monitored regularly (i.e., serum creatinine and estimated creatinine clearance). Opioid use can exacerbate constipation that may already be a problem for many elderly people due to reduced activity levels and mobility. Those taking chronic opioids for pain should be receiving laxative therapy on a regular basis to prevent constipation. Senna is often the laxative of choice in this case. Patients with chronic pain should also be prescribed “as needed” immediate-acting pain medication to be used for breakthrough pain.

Misconceptions about the use of opioids (e.g., fears about addiction and abuse, excessive sedation) in this population are common, so pharmacists must be prepared to address any factors that prevent appropriate use of these medications for the management of chronic pain where warranted.

Heart failure

HF can result from damage to the myocardium or from other causes. Due to the progressive nature of this condition, many residents of LTC facilities are in the later stages of HF by the time of admission.

One of the greatest challenges with management of HF is the need for multiple medications. In the latest American College of Cardiology/

TABLE 7 Pharmacist medication review process⁵²

Process step	Example	Pharmacist's action
Are all drugs indicated?	Ranitidine is not indicated for cytoprotection with an NSAID.	Review effectiveness of pain management strategy. If effective, recommend discontinuing ranitidine and starting a PPI medication for cytoprotection.
Are there conditions that should be treated with medications that are not?	No antiplatelet agent for a patient with a history of ischemic stroke.	Recommend ASA, clopidogrel, ticlopidine, dipyridamole/ASA or warfarin depending on the patient's history.
Are medications and dosages appropriate?	The use of hydrochlorothiazide (HCTZ) 100 mg daily (maximum 25 mg recommended) for hypertension.	Review monitoring parameters (blood pressure, electrolytes) and recommend decreased dose of HCTZ (taper down to 25 mg daily). HCTZ is not effective and should not be used when creatinine clearance is < 30mL/minute.
Is medication safety optimized (i.e., are there drug interactions, adverse effects?)?	Resident appears to be experiencing digoxin toxicity at a dose of 0.25 mg daily.	Review digoxin levels and electrolytes. Review indication for digoxin. If indicated, recommend reduced dose of 0.125 mg daily.
Are the correct monitoring parameters being followed? Are the results optimal?	INR measurements are consistently below 2 in a post-stroke patient on warfarin.	Recommend increase in dose of warfarin and monitoring q3–5 days until therapeutic INR achieved (i.e., INR 2–3).
Have any medication errors occurred?	Resident has been receiving selegiline at bedtime resulting in insomnia.	If selegiline is providing benefit for the resident, recommend that it be given morning and noon to reduce impact on sleep.
Are there any cost/coverage issues to be addressed?	Waiting for coverage of medication through provincial plan.	Depending on the circumstances, follow up with either prescriber or pharmacy regarding coverage details.
Have recommended vaccinations been given?	No documentation of pneumococcal vaccination in a resident over 65 years of age.	If resident or caregiver is not certain if it was given, recommend that resident receive pneumococcal vaccination.

HCTZ = hydrochlorothiazide; INR = international normalized ratio; NSAID = nonsteroidal anti-inflammatory drug; PPI = proton pump inhibitor

American Heart Association (ACC/AHA) guidelines for chronic heart failure, HF patients in stage C or D (i.e., those with structural heart disease with prior or current symptoms of HF, or those with refractory HF) require drug therapy with diuretics, angiotensin converting enzyme (ACE) inhibitors and beta-blockers, at the very least. In addition to this, many residents may also require spironolactone, an angiotensin receptor blocker (ARB), digoxin or a hydralazine/nitrate combination. Many of them have other underlying conditions that are related to their condition that require drug therapy (e.g., hypertension, smoking, dyslipidemia).³⁹

In light of the complex nature of the care of residents with HF, pharmacists need to stay apprised of current therapies and monitoring parameters. For specific medications, ensuring

that residents initiated on ACE inhibitor therapy are titrated slowly to a tolerable dose with maximal benefits will help to avoid orthostatic hypotension.³⁷ If a resident is also taking spironolactone, pharmacists should ensure that renal function and potassium levels are monitored regularly.³⁹ Recent concerns of increased morbidity and mortality associated with hyperkalemia in elderly people have arisen in light of increased use of spironolactone as a result of RALES (a trial that demonstrated mortality reduction when spironolactone was added to heart failure therapy in later stages) data.^{40,41}

Digoxin is commonly used for HF in LTC facility residents.⁴² In most cases, this is reasonable to continue in light of data to support a decrease in hospitalizations in HF patients on digoxin.⁴³ However, the elderly resident

tends to be more sensitive to the effects of digoxin and it is thought that the administration of digoxin in doses over 0.125 mg daily can increase the risk of adverse effects due to decreased renal clearance.²⁷

For a resident who has been receiving a dose higher than 0.125 mg daily, it may be prudent to suggest a decrease in dose and follow up by monitoring the digoxin level.^{44,45} Digoxin toxicity in the elderly can manifest with nausea, headache, bradycardia and behavioural disturbances (in those with dementia) and can occur at lower serum digoxin levels (as low as 1.54 nmol/mL in one study).⁴² Drug interactions can occur and, where alternative therapy can be used, should be recommended. However, where it is not possible to use another medication, the resident should be monitored closely for any signs of digoxin toxicity. Interacting drugs include amiodarone, quinidine, antifungals, calcium channel blockers, macrolide antibiotics, NSAIDs and diuretics.⁴²

Influenza outbreaks

A common concern in the LTC setting is the risk of influenza outbreaks. The risk of spread of illness is high in these enclosed settings and the residents have a high likelihood of becoming ill with influenza or developing complications such as pneumonia.

An outbreak of influenza in a LTC facility has been defined as three or more residents in a nursing unit with an influenza-like illness and an oral temperature of at least 37.7°C (100°F) or a rectal temperature of at least 38.3°C (101°F) within a three-day period.^{46,47} Measures that have been recommended for management of influenza outbreaks in LTC facilities include isolation of residents with influenza-like illness or influenza, offering vaccines to unvaccinated residents or staff, reinforcement of frequent handwashing by staff and using chemoprophylaxis for influenza A outbreaks.^{46,47} Pharmacists should note that facilities may restrict visitor access during an influenza outbreak, and this could affect the ability to provide on-site consultation services for pharmacists servicing multiple facilities.

The role of the pharmacist in helping to prevent and manage influenza outbreaks is multifocal. As a member of the multidisciplinary team, it is important that all pharmacists working in LTC receive an annual influenza vaccination unless otherwise contraindicated. Also, education of residents and staff about influenza, vaccination, complications and treatment is essential. Only 70–91% of LTC facility residents receive flu shots.⁴⁸ Pharmacists may be called upon to comment

on drug interactions with the influenza vaccination. Warfarin and theophylline have been known to potentially interact with the vaccine, however, this is not a contraindication to the vaccine; closer monitoring of INR and theophylline levels may be required for concomitant use of the vaccine with these agents.⁴⁹

The Public Health Agency of Canada (PHAC) recommends that antivirals be used for prophylaxis of patients in the control of influenza outbreaks in LTC facilities. In an outbreak, both residents who are not ill and nursing staff who have not been vaccinated should receive either oseltamivir or zanamivir. Recent testing in the current flu season has shown that most influenza virus isolates are resistant to amantadine; consequently, PHAC has recommended that it not be used for prophylaxis or treatment of influenza.⁵⁰

For prophylaxis, oseltamivir is given as 75 mg once daily until the outbreak has been declared complete.⁴⁶ If creatinine clearance is 10–30 mL/min, the dosage should be reduced to 75 mg every other day. Treatment with neuraminidase inhibitors such as oseltamivir is used for residents who have confirmed influenza and are at risk of complications.⁴⁶ It is prudent to have preprinted or prewritten orders available in the event of an outbreak in order to avoid delays in receiving medications, particularly since oseltamivir is most effective for treatment if given within 72 hours of the onset of symptoms.⁴⁸

The pharmacist's role

Some of the more common conditions that require pharmacist intervention in long-term care facilities include AD, PD, COPD, stroke, pain and HF. Pharmacists should regularly assess appropriateness of medication therapies, outcomes and adverse effects for long-term care residents.

Medication review is an important component of the pharmacist's role in providing pharmaceutical care for residents of LTC facilities. This is often referred to as drug-regimen review, which is defined as a review of the patient, medical conditions and drug therapy in order to determine whether to continue treatment.⁵¹ Table 7 outlines the specific activities involved in a medication review by a pharmacist. The results of a review should be documented in the resident's medical chart.

The patient-focused goals of a medication review are improvement in therapeutic outcomes for the patient through optimizing control of chronic medical conditions, improvement in quality of life and functioning, and reduction in adverse effects, drug interactions, hospitalization, or need for enhanced care or transfer.⁵²

The frequency of medication reviews is often dictated by provincial or facility requirements, or simply by the discretion of the physician or pharmacist in the LTC facility. Many pharmacists perform medication reviews quarterly for LTC facility residents. It is not, however, mandated that pharmacists perform medication reviews with a physician, so pharmacists are often faced with the challenge of demonstrating their value in this process.

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Questions

1 Which of the following would increase the anticholinergic load in an elderly nursing-home resident with Alzheimer dementia?

- a) doxepin
- b) memantine
- c) levodopa
- d) zanamivir

2 AJ is an 89-year-old female nursing-home resident with long-standing COPD and arthritis. She has recently had a stroke and has been having difficulty taking her medications. Nursing staff have reported that she is having choking episodes frequently. Which of the following actions would be the highest priority in helping AJ manage this particular problem?

- a) ensuring that AJ is not taking medications that can aggravate COPD, such as hypnotics, since this could be causing her choking episodes
- b) reviewing her medication list to determine whether or not she is taking anything that can exacerbate dysphagia that can occur as a result of a stroke
- c) recommending that she be prescribed warfarin to prevent subsequent stroke
- d) ensuring that she has had a pneumococcal vaccination

3 PT is a 77-year-old male with PD and dementia. He is currently taking levodopa-carbidopa 100/25 five times per day, risperidone 1 mg daily, selegiline 5 mg BID, magnesium hydroxide 30 mL HS, and acetaminophen 325 mg QID PRN. He appears to be more agitated in the past few days. Which of the following is/are the most appropriate question(s)/intervention(s) by the pharmacist?

- a) When is PT taking selegiline? If taken at night, it could be disrupting his sleep and a lack of sleep may be causing agitation.

b) Does he have any pain? The pharmacist should complete a pain questionnaire with PT to evaluate potential pain symptoms in light of his prescription for acetaminophen as needed.

c) How well are his symptoms of PD controlled? The pharmacist should evaluate a symptom log (if kept by a caregiver) and review all of the possible solutions related to medication therapies if symptoms are not well-controlled.

- d) all of the above
- e) a and c

4 JG is a 79-year-old male with HF—stage C, as well as hypertension and dyslipidemia. He is currently taking ramipril 5 mg daily, atenolol 25 mg daily, atorvastatin 40 mg daily, ASA 325 mg daily, digoxin 0.25 mg daily and a multivitamin daily. JG has been experiencing increasing shortness of breath and swelling of his ankles over the past few days. Which of the following is the highest priority drug-related issue for the pharmacist to address?

- a) JG should be taking lower dose ASA (i.e., 81 mg daily) to reduce his risk of bleeding.
- b) JG's digoxin level should be measured to rule out toxicity as a cause of his symptoms.
- c) JG should be receiving a diuretic to help control his HF symptoms; recommend furosemide 40 mg daily to start.
- d) JG should be prescribed spironolactone in addition to his other therapies for heart failure.

5 MC is an 82-year-old female with chronic back and hip pain who was admitted to the LTC facility after a fall last year that led to a hip fracture. Her mobility is very limited and she usually sits in her chair all day. She is on long-acting morphine sulphate 15 mg BID for pain as well as

calcium carbonate 1250 mg BID, vitamin D 800 IU daily and alendronate 70 mg once a week. In the past week, she has been quieter and has indicated that she has greater pain (now a 7 on a scale of 1–10; previously it was a 5). What should the pharmacist recommend?

- a) A more detailed pain assessment to determine if the pain is relieved at all with morphine, since she has been experiencing a fair amount of pain.
- b) Switch her pain medication to gabapentin since she is probably experiencing neuropathic pain that may not respond to opioids.
- c) Add diclofenac 50 mg BID to augment the current analgesic.
- d) none of the above

Upon performing a detailed medication review for KJ, an 80-year-old female nursing-home resident, the pharmacist notes the following list of medications and diagnoses: allopurinol 200 mg OD, naproxen 500 mg BID, ranitidine 150 mg HS, metoprolol 25 mg OD, warfarin 2 mg OD and nitroglycerin spray 0.4 mg SL PRN; and a history of gout, hypertension, atrial fibrillation, angina and falls.

6 Which of the following is an appropriate comment for the pharmacist's review of KJ?

- a) She should be taking ASA rather than warfarin due to her history of falls.
- b) Allopurinol should not be used long term for the prevention of gout attacks.
- c) There is no indication for ranitidine, thus it should be discontinued. Instead, a proton pump inhibitor should be considered for prophylaxis of NSAID-induced ulcer.

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d) Warfarin should be increased to a therapeutic dose of at least 2.5 mg daily.

7 Which lab test results for KJ should be reviewed by the pharmacist and ordered if not available?

- a) MMSE
- b) INR
- c) PT
- d) folic acid

8 The pharmacist reads in KJ's chart that her renal function is declining (last estimated creatinine clearance was 40 mL/minute [normal is 50–125 mL/minute]). What drug-related problem should be addressed?

- a) KJ is taking a medication for which there is no indication. Warfarin should be discontinued.
- b) KJ's dose of warfarin is inappropriate based on her current renal function.
- c) KJ is taking a medication that may be worsening her renal function. Naproxen should be discontinued.
- d) none of the above

9 Which of the following is the most important way a pharmacist can help to prevent drug-related problems that can occur during an influenza outbreak in a facility?

- a) vaccinating all residents and staff of the facility
- b) ensuring that oseltamivir is dosed appropriately for prophylaxis
- c) teaching all residents the technique for use of the zanamivir inhaler device
- d) ensuring that all residents have an order for amantadine for prophylaxis of influenza

10 LP is a 79-year-old man with PD. He has had PD for about seven years and has been taking levodopa-carbidopa CR 100/25 QID for the past three years. He is also taking pramipexole 0.125 mg daily, docusate sodium 100 mg daily and lactulose 30 mL daily for constipation. Over the past few weeks, he has been experiencing episodes during which he is unable to move or take a step forward a couple of hours after taking his levodopa-carbidopa. What should the pharmacist recommend?

- a) Discontinue pramipexole as it can be causing dyskinesia.
- b) Add amantadine 100 mg daily to help control the symptoms.
- c) Add selegiline to help control his symptoms.
- d) Increase the dose of levodopa-carbidopa to help control the freezing.

11 DC is an 87-year-old male who has atrial fibrillation, osteoarthritis, hypertension, diabetes and history of stroke. He is currently taking warfarin 3 mg daily, celecoxib 100 mg BID, hydrochlorothiazide 25 mg daily and metformin 500 mg BID. He just received his annual influenza vaccination. DC's INR is now measured every month. On his last INR test, the result was 6.2; previously, he was well-controlled with an INR averaging 2.6. DC has no signs of bleeding. What should the pharmacist recommend?

- a) Discontinue warfarin and start ASA 325 mg daily.

- b) Decrease the dose of warfarin to 2.5 mg daily.
- c) Hold two doses of warfarin and re-evaluate the INR in one to two days.
- d) Administer 10 mg vitamin K to reverse the effect of warfarin on the INR.

12 Upon reviewing the medical chart of SV, an 85-year-old female with AD, the pharmacist notes the following information: SV has had increasingly difficult behaviours manifested as shouting out and resisting care. Since she started receiving risperidone 0.5 mg daily she has been calmer; however, her family has indicated that she is not the same and somewhat "dopey." What should the pharmacist recommend?

- a) Investigate other potential causes of these behaviours (e.g., pain, constipation) which may eliminate the need to medicate SV with risperidone.
- b) Switch from risperidone to olanzapine 7.5 mg daily.
- c) Increase the dose of risperidone to 1 mg daily to better manage her behaviours.
- d) Discontinue risperidone.

13 Which medication-related problem has been identified increasingly in the elderly population?

- a) bleeding with warfarin therapy
- b) exacerbation of COPD due to inappropriate use of inhalers
- c) motor fluctuations with selegiline
- d) hyperkalemia with spironolactone use to manage HF

14 Which of the following is true regarding prophylaxis of influenza in a nursing-home outbreak situation?

- a) Zanamivir should not be used to prevent influenza infection in nursing-home staff if an outbreak has been identified.
- b) Oseltamivir has been associated with more resistance than amantadine when used for prophylaxis.
- c) Oseltamivir requires no dosage reduction in residents with impaired renal function when used for prophylaxis.
- d) Amantadine should not be used for prophylaxis or treatment of influenza infection.

15 Which of the following should always be included in a pharmacist's medication review for a resident of a LTC facility?

- a) a suggestion for how to reduce the number of medications the resident is taking
- b) an interview with the resident's physician to get an accurate history
- c) a review of medical conditions to ensure that the resident is receiving all necessary therapies
- d) all of the above

16 Which of the following is true regarding pain symptoms and their management in LTC facility residents?

- a) It is difficult to assess specific pain symptoms in cognitively impaired residents; signs such as irritability and vocalizations can help to

signal the presence of pain.

- b) The long-term use of anticonvulsants for chronic neuropathic pain in the elderly is not recommended.
- c) Short-term use of traditional NSAIDs with cytoprotection (i.e., proton-pump inhibitor or misoprostol) should not be used for pain management in this population.
- d) Celecoxib should not be used in this population due to the increased risk of cardiovascular adverse effects with this medication.

17 Which of the following is a potential medication-related problem encountered by residents with PD?

- a) freezing with anticholinergic medications
- b) paranoia with pergolide
- c) suboptimal dosing when switching from CR levodopa to regular-acting levodopa due to decreased bioavailability of the regular levodopa
- d) all of the above

18 NF, an 80-year-old male resident of a LTC facility has had COPD for several years and is now having difficulty with exacerbations of this condition. He is taking ipratropium bromide 2 puffs QID, salbutamol 2 puffs BID PRN and theophylline SR 200 mg daily. Which of the following should the pharmacist recommend?

- a) NF should receive his inhalation medications via nebulizer to ensure that he is getting maximal dosing.
- b) NF should be using a spacer device, preferably with mask, with his inhaled medications to ensure that he is getting adequate amounts of each dose of his medication.
- c) Theophylline should be discontinued as it offers no additional benefit for residents like NF with COPD.
- d) NF should receive a benzodiazepine at night to help control anxiety associated with his exacerbations.

19 Upon review of AP's chart, the pharmacist notes that the 87-year-old male has AD and has been taking donepezil 10 mg daily for at least five years. Which of the following is an appropriate recommendation by the pharmacist?

- a) Discontinue donepezil as it is no longer effective.
- b) Switch to galantamine as it is better in later stages of disease.
- c) Decrease the dose of donepezil to reduce the likelihood of adverse effects.
- d) Evaluate the benefits of donepezil by reviewing MMSE results compared to baseline.

20 In a resident with chronic pain, the pharmacist should ensure that:

- a) the resident has a doctor's order for a laxative
- b) there is an order for "prn" analgesic in addition to regular analgesic
- c) the resident is on an anticonvulsant or antidepressant
- d) the resident is not receiving chronic opioid therapy

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