Canadian Geriatrics Society

PROBLEM-BASED DEPRESCRIBING: A PRACTICAL PATIENT-CENTRED APPROACH TO PROMOTING THE USE OF EXISTING DEPRESCRIBING RESOURCES IN FRONTLINE CARE

Frank J. Molnar
MSc, MDCM, FRCPC1
Geriatric Medicine, The Ottawa Hospital, University of Ottawa

Taleen Haddad
MD
Resident, Geriatric Medicine, University of Ottawa

Derek Dyks
B.Sc.Pharm, bCGP
Clinical Pharmacy Specialist, Geriatrics, The Ottawa Hospital, University of Ottawa

Barbara Farrell B.Sc.Pharm., Pharm.D., FCSHP4
Scientist, Bruyère Research Institute and CT Lamont Primary Health Care Research Centre

Corresponding Author:
Dr. Frank Molnar
fmolnar@toh.ca

Abstract

To date medication deprescribing in Geriatrics has primarily focused on the appropriateness of specific medications and medication classes in the older population. Seniors, however, more frequently present to their Primary Care Practitioners with specific clinical issues such as falls, weight loss, postural hypotension, cognitive impairment, and urinary incontinence rather than with a request to deprescribe medications. In recognition of this more common and more natural reason to present to Primary Care Practitioners this article presents a complementary approach to deprescribing, Problem-based Deprescribing, focused on the presenting clinical issues. Problem-based deprescribing is not in conflict or in competition with other methods of deprescribing but rather is a 'gateway' technique to then access the excellent deprescribing materials that have been circulated through sites such as www.deprescribing.org. Problem-based Deprescribing can facilitate the uptake of existing deprescribing resources.

This article has been peer reviewed.

Conflict of Interest: None.

This article was published in October 2018 and re-published in

May 2019.

Polypharmacy, which has been defined as using more medications or higher doses than clinically indicated [1], is more common in the geriatric population and increases the risk of adverse drug events (see www.canadiangeriatrics.ca/wp-content/uploads/2016/11/Better-Presribing-in-the-Elderly.pdf)[2]. Older patients are at greater risk of adverse drug events (ADEs) due to changes in body composition, as well as in renal and hepatic function that result in altered pharmacokinetic and pharmacodynamic properties of medications (see www.canadiangeriatrics.ca/wp-content/uploads/2016/04/Safer-Prescribing-in-Elderly-Patients.pdf)[3]. Often, this aspect of geriatric pharmacotherapy is not fully appreciated by clinicians, which can magnify the impact of polypharmacy as evidenced by the fact that ADEs contribute to up to 20% of hospitalizations in the elderly[4-7].

Some ADEs may present as geriatric syndromes such as weight loss, urinary incontinence, cognitive impairment and falls. This explains why '**M**edications' is the third **M** in the **GERIATRIC 5Ms** (see www.canadiangeriatrics.ca/wp-content/uploads/2017/04/update-the-public-launch-of-the-geriatric-5ms.pdf). Quite often, medications' impact on these clinical symptoms are overlooked. Accordingly, identifying and addressing these issues represents an opportunity to improve care and optimize prescribing that is frequently missed. It is proposed that a means to address this care gap is deceptively straightforward – *focus deprescribing efforts through the lens of the presenting clinical problems.*

Although historically not a common endeavour, the concept of medication deprescribing has become more prevalent in medical literature in the past few years. Validated deprescribing guidelines (see www.deprescribing.org/resources/deprescribing-guidelines-algorithms/) have been published[8-13], and continue to be developed, for high-risk medications and for medications that are known to be overprescribed representing giant leaps forward in acknowledging the negative impact of polypharmacy in our patients and society as a whole.

While resources such as Beers Criteria and STOPP/START criteria promote the use of deprescribing guidelines, their focus is on the medications themselves and, in general terms, their appropriateness in the geriatric population. A complementary approach to further enhance and prioritize deprescribing activities is presented in this paper – *Problem-Based Deprescribing*.

Seniors typically present to physicians for specific clinical and/or functional problems (e.g., falls, incontinence, cognitive changes or weight loss, etc.) more often than for a general review of medications. Unfortunately, patients and physicians may be unaware of the causal link between the clinical problems the patients are experiencing and the medications they are taking. The approach of *Problem-Based Deprescribing* described in this paper emphasizes that critical relationship.

Contextualizing deprescribing guidelines in the management of adverse drug events is dependent on first recognizing ADEs when they occur. *Routinely including ADEs in the differential diagnosis when a patient presents with a new symptom is imperative in avoiding prescribing cascades.* As stated previously, this unfortunately goes largely unappreciated in current practice.

Utilization of available information resources including discussions with your patient, a detailed medication history (including prescription, non-prescription, recreational drugs and alcohol), drug databases such as Lexicomp® and Micromedex®, as well as your patient's pharmacist, will all help in identifying ADEs. The community pharmacist, in particular, is an information resource that is often underutilized. The pharmacist can help identify medications that may be causing specific symptoms as well as suggest safe, effective tapering regimens for medications if indicated for your patient.

By focusing deprescribing efforts around clinical and functional problems that patients exhibit (e.g., *Problem-Based Deprescribing*) one can further enhance the uptake and utilization of the Beers and STOPP/START criteria as well as existing deprescribing guidelines (www.deprescribing.org/resources/deprescribing-guidelines-algorithms/). This enhancement represents another clinically practical approach to using tools that are already in the armamentarium of the optimal prescribing movement.

Operationalizing Problem-Based Deprescribing in the Real World

As stated earlier*, any new symptom a patient experiences should be screened as a potential adverse drug event*. To illustrate, patients who present with symptoms or events such as falls, incontinence, cognitive impairment or weight loss should be assessed as to whether some of the patient's medications could be contributing factors. If so, then the suspect medications should be assessed for deprescribing weighing risk vs. benefit and using evidence-based guidelines where available. Using a multidisciplinary patient-centred care approach, a working partnership between the patient, caregiver, physician and pharmacist is essential in creating an environment conducive to maximizing opportunities to successfully (and appropriately) deprescribe. Developing a therapeutic alliance between the patient, caregiver, physician and pharmacist will benefit all involved and optimize the patient's pharmacotherapy, decreasing the risk of ADEs and polypharmacy. All stakeholders should maintain focus on the ultimate goal of decreasing ADEs and increasing the patient's quality of life, while at the same time decreasing the financial impact on our health care system (e.g., achieving the IHI Triple Aim as described in www.ihi.org/engage/initiatives/TripleAim/Pages/default.aspx). This shared framework of *Problem-Based Deprescribing* focuses all partners on the same problem(s) and thus has the potential to strengthen the therapeutic partnership all of players involved.

The following fictitious cases are designed to illustrate how ADEs can present as geriatric syndromes and subsequently how to approach deprescribing potentially contributing medications in a *Problem-Based Deprescribing* manner.

CASE 1: Unexplained Weight Loss and Postural Hypotension

Mrs. H is a 77-year-old woman who is brought into your clinic with a two-year history of cognitive decline. She has a past medical history of osteoarthritis, diabetes, hypertension and hypothyroidism. Her medications include metformin 500 mg PO BID, ramipril 5 mg PO daily, levothyroxine 150 mcg daily, metoprolol 25 mg PO BID, pantoprazole 40 mg daily and the occasional acetaminophen. Over the past 6-8 months, however, her family has noticed that she has been getting lost while driving, forgetting to pay her bills and is having more difficulty cooking. You do a MOCA in the office and she scores 20/30. You diagnose possible Alzheimer's dementia and give her a prescription for donepezil 5 mg daily to increase to 10 mg after two months.

10 weeks later

When Mrs. H comes back to your clinic 12 weeks later her daughter tells you Mrs. H has experienced loss of appetite and postural dizziness. The daughter feels the donepezil has slowed cognitive decline and the MOCA is 22/30.

On physical examination, Mrs. H's weight has dropped 3 kg in the past six weeks. Her blood pressure is 120/76 supine and 79/58 standing. The postural BP drop brings on her reported sensation of dizziness.

You recognize that a cascade of events may have occurred (i.e., donepezil → loss of appetite → weight loss → postural hypotension). To review which medications may cause anorexia and weight loss you access two resources:

a. "Unintentional Weight Loss in Older Adults: A practical approach to diagnosis and management" www.canadiangeriatrics.ca/wp-content/uploads/2018/10/1_Jayna-Holroyd-Article-Formatted-Final.pdf[14]
b. www.cmaj.ca/content/172/6/773 (see Table 2)[15]

Recognizing a temporal relationship, you decide to start by focusing on donepezil – the most recently prescribed medication. To assist you with deprescribing you go to the www.deprescribing.org/resources/deprescribing-guidelines-algorithms/ website and specifically select the following resources:

- Cholinesterase Inhibitors and Memantine deprescribing guideline
- Cholinesterase inhibitor and memantine deprescribing algorithm

You start by decreasing the dose of donepezil and ask her daughter to push oral fluids.

2 weeks later

On a lower dose of donepezil (5 mg) appetite and oral intake have improved, weight is increasing and the postural hypotension has resolved. Her daughter feels cognitive decline has now ceased and that the patient is on a cognitive plateau.

Had Mrs. H not improved nor tolerated the lower dose of donepezil, it would have been appropriate to try a different cholinesterase inhibitor such as galantamine or rivastigmine or even move on to memantine.

CASE 2: Falls and Postural Hypotension

Mr. F is a 78-year-old man with a past medical history including diabetes, hypertension, Parkinson's disease and benign prostatic hypertrophy. He is on metformin 500 mg BID, hydrochlorothyazide 25 mg PO daily, terazosin 5 mg PO daily, Sinemet® 100/25 two tablets PO BID and ramipril 5 mg PO daily.

He presents with falls, postural dizziness and urinary incontinence. His BP is 110/70 supine and 83/55 standing (he reports light-headedness when standing).

For BP targets in frail older adults see www.canadiangeriatrics.ca/wp-content/uploads/2016/11/Can-We-Stay-on-Target-A-Review-of-Hypertension-Treatment-in-the-Elderly.pdf)[16].

With respect to the postural hypotension the obvious first step would be to stop the hydrochlorothyazide, which may be contributing to two problems (postural hypotension and urinary incontinence) while asking family to push fluids. If postural hypotension persists then other contributors (including medications) can be found at www.posturalhypotension.ca – specifically at www.canadiangeriatrics.ca/wp-content/uploads/2016/11/4D-AID-A-Practical-Approach-to-the-Assessment-of-Orthostatic.pdf[17].

Table 1: DDX of Postural Hypotension – 4D-AID Acronym

I. Causes associated with a compensatory tachycardia – 4Ds

- Deconditioning
- Dysfunctional heart
- Myocardium (very low left ventricular ejection fraction)
- Aortic stenosis
- Dehydration
- Disease (e.g., acute illness, adrenal insufficiency)
- Dialysis (post-dialysis dry weight too low)
- Drugs
- Diuretics
- Anorexic drugs – narcotics, digoxin, antibiotics, cholinesterase inhibitors
- Drugs – 6 ANTIs
- Anti-anginals
- Anti-parkinsonian medications (e.g., levodopa)
- Anti-depressants (e.g., anti-cholinergic effect)
- Anti-BPH (e.g., terazosin, tamsulosin)

II. Causes that present with lack of compensatory tachycardia – AID

- Autonomic dysfunction
- Diabetic autonomic neuropathy (consider if patient has peripheral neuropathy)
- Low B12
- Hypothyroidism
- ETOH abuse
- Parkinsonism (Parkinson's disease, progressive supranuclear palsy, multisystem atrophy; e.g., Shy-Drager syndrome)
- Amyloid
- Idiopathic (Bradbury-Eggleston)
- Depletion of norepinephrine from sympathetic nerve terminals
- Drugs
- Beta-blockers

Previously published as 3D-AID in Canadian Family Physician (F. Molnar, C. Simpson *Can Fam Physician* November 2010 56: 1123-1129) see www.cfp.ca/content/56/11/1123.full.pdf+html?sid=baceb3cf-98e2-4e10-972f-d43140ea9b01). Printed with permission of CFP.

If the urinary incontinence persists despite removal of hydrochlorothiazide, screening for additional causes is indicated. Causes of medication-related incontinence can be reviewed in Table 3 at www.canadiangeriatrics.ca/wp-content/uploads/2016/11/7_Urinary-Incontinence_William-Gibson.pdf[18], which is also displayed in table below.

Table 2. Drugs that may Predispose to Urinary Incontinence

Medications	Effects on continence
Alpha adrenergic agonists (e.g., midodrine)	Increase smooth muscle tone in urethra and prostatic capsule and may precipitate obstruction, urinary retention and related symptoms
Alpha adrenergic antagonists (e.g., terazosin, doxazosin)	Decrease smooth muscle tone in the urethra and may precipitate stress urinary incontinence (UI) in women
Angiotensin converting enzyme inhibitors	May cause cough that can exacerbate UI
Anticholinergics (see www.canadiangeriatrics.ca/wp-content/uploads/2016/11/Anticholinergic-Medications-in-the-Older-Adult.pdf and Table 5 of www.canadiangeriatrics.ca/wp-content/uploads/2016/11/Better-Presribing-in-the-Elderly.pdf)	May cause impaired emptying, urinary retention and constipation that can contribute to UI. May cause sedation, cognitive impairment and reduce effective toileting ability
Calcium channel blockers	May cause impaired emptying, urinary retention and constipation that can contribute to UI May cause dependent edema, which can contribute to nocturnal polyuria
Cholinesterase inhibitors	Increase bladder contractility and may precipitate urgency UI
Diuretics	Cause diuresis and precipitate UI
Lithium	Polyuria due to diabetes insipidus
Opioid analgesics	May cause urinary retention, constipation, confusion and immobility, all of which can contribute to UI
Psychotropic drugs Sedatives Hypnotics Antipsychotics Histamine[1] receptor antagonists	May cause confusion and impaired mobility and precipitate UI Anticholinergic effects Confusion
Selective serotonin re-uptake inhibitors	Increase cholinergic transmission and may lead to urgency
Others Gabapentin Glitazones Non-steroidal anti-inflammatory agents	Can cause edema, which can lead to nocturnal polyuria and cause nocturia and night-time UI

Mr. F's terazosin may also be contributing to his orthostatic hypotension. Tamsulosin is a more selective alpha blocker than terazosin and consequently would be less likely to impact Mr. F's blood pressure while still addressing his incontinence, if determined to be still required.

A third intervention would be to decrease or stop his ramipril. This would be addressed after the hydrochlorothiazide and the terazosin due to the known benefit of ACE inhibitors in diabetic patients.

CASE 3: Falls and Insomnia

Mrs. W is an 82-year-old woman who presents to your office with a history of falls. She has had four falls over the past six months. Her medical history includes overactive bladder, anxiety, hypertension and osteoporosis. Her physical exam is unremarkable (no postural hypotension).

She takes the following medications:

temazepam 30 mg QHS for insomnia, tolterodine 4 mg qhs for nocturia, calcium/ vitamin D daily and risedronate 35 mg weekly for bone health and amlodipine 5 mg daily for hypertension.

To look for medication-related causes of falls we recommend going to www.canadiangeriatrics.ca/wp-content/uploads/2016/11/Interventions-to-Reduce-Medication-Related-Falls.pdf[19]. Several classes of medication are known to contribute to falls as listed in Table 3 on the next page.

Table 3. Risk of Falling with Drug Use[19]

Class	Drugs	Odds Ratio (95% CI)
Psychotropics	Any	1.72 (1.52, 1.97)
	Antipsychotics	1.50 (1.25, 1.79)
	Sedatives, hypnotics	1.54 (1.40, 1.70)
	Benzodiazepines (any)	1.48 (1.23, 1.77)
	Short acting	1.44 (1.09, 1.90)
	Long acting	1.32 (0.98, 1.77)
	Antidepressants	1.66 (1.41, 1.95)
	TCAs	1.30 (1.23, 1.38)(HR)
	SSRIs	1.66 (1.58, 1.73)
	Others	1.39 (1.28, 1.52)
	Combination	1.70 (1.42, 2.05)
Cardiovascular	Type 1a anti-arrhythmics (e.g., quinidine, disopyramide, procainamide)	1.59 (1.02, 2.48)
	Digoxin	1.22 (1.05, 1.42)
	Diuretics (any)	1.08 (1.02, 1.16)
Analgesics	Opioids	0.97 (0.78, 1.12) NS
	NSAIDS	1.16 (0.97, 1.38) NS
Antidiabetics	Sulfonylureas	1.09 (0.52, 2.30) (RR) NS
	Insulin	2.76 (1.52, 5.01)(RR)
Anticonvulsants	Any	1.75 (1.13, 2.71)

NS – non-significant HR – expressed as hazard ratio, RR – expressed as relative risk, TCA = Tri-Cyclic Antidepressant, SSRI = Selective Serotonin Reuptake Inhibitor, NSAIDs = Non-Steroidal Anti-Inflammatory Drugs

As well, anticholinergic medications can contribute to falls. Accordingly, multiple anticholinergic medications have a cumulative impact on fall risk. The more anticholinergic medications a patient takes, the higher the risk of falling. Numerous anticholinergic risk scales have been validated and published including the Anticholinergic Risk Scale[19] depicted below.

Table 4. Anticholinergic Risk Scale[a]

3 Points	2 Points	1 Point
Amitriptyline hydrochloride	Amantadine hydrochloride	Carbidopa-levodopa
Atropine products	Baclofen	Entacapone
Benztropine mesylate	Cetirizine hydrochloride	Haloperidol
Carisoprodol	Cimetidine	Methocarbamol
Chlorpheniramine maleate	Clozapine	Metoclopramide hydrochloride
Chlorpromazine hydrochloride	Cyclobenzaprine hydrochloride	Mirtazapine
Cyproheptadine hydrochloride	Desipramine hydrochloride	Paroxetine hydrochloride
Dicyclomine hydrochloride	Loperamide hydrochloride	Pramipexole dihydrochloride
Diphenhydramine hydrochloride	Loratadine	Quetiapine fumarate
Fluphenazine hydrochloride	Nortriptyline hydrochloride	Ranitidine hydrochloride
Hydroxyzine hydrochloride and hydroxyzine pamoate	Olanzapine	Risperidone
Hyoscyamine products	Prochlorperazine maleate	Selegiline hydrochloride
Imipramine hydrochloride	Pseudoephedrine hydrochloride–triprolidine hydrochloride	Trazodone hydrochloride
Meclizine hydrochloride	Tolterodine tartrate	Ziprasidone hydrochloride
Oxybutynin chloride		
Perphenazine		
Promethazine hydrochloride		
Thioridazine hydrochloride		
Thiothixene		
Tizanidine hydrochloride		
Trifluoperazine hydrochloride		

[a]To calculate the Anticholinergic Risk Scale score for a patient, identify medications the patient is taking and add the total points for each medication.

In reviewing her medication for potential contributors to her falls, we can identify temazepam and tolterodine as high-risk medications. In discussion with the patient, she is not bothered by nocturia and it has never been that bothersome to her. An appropriate course of action would be to stop tolterodine completely and ask her to avoid fluids in the evening. If urinary symptoms return or worsen and Mrs. W finds it bothersome to the point that it is impacting her quality of life, a more selective anticholinergic such as fesoterodine or solifenicin can be initiated. Alternatively mirabegron,
a beta-3 agonist, can be started; however, patient expectations should be managed as the peak effect may not occur until eight weeks of therapy.

The temazepam should be slowly weaned off as Mrs. W has been taking it for more than a year. Typically for chronic use, decreasing a benzodiazepine by 25% every two weeks is recommended; however, the rate and duration of tapering depends on the patient and how long she has been taking it.

For certain medications, you are limited in available strengths when in capsule form, which can make appropriate weaning challenging. The community pharmacist is an excellent resource is determining different products and dosage forms.

In this case, it would be appropriate to switch to another benzodiazepine with a similar half-life that is available in tablet form that can be split. Temazepam 30 mg would be relatively equivalent to oxazepam 45 mg; therefore, oxazepam 30 mg (using 15 mg tablets) would be a reasonable starting point for the tapering process then to decrease by 7.5 mg every two weeks until done. Monitoring during the tapering process is vital. Increments can be lessened (oxazepam is also available as a 10 mg splitable tablet) and intervals can be extended, especially during the later stages of the tapering process.

It is critical to get the remainder of the original prescription back from the patient, and make sure the new prescription contains a “stop all refills of temazepam” order. This will prevent patients from stockpiling benzodiazepines or from taking two types of benzodiazepine at the same time.

Table 5: Benzodiazepine Comparison Chart[19]

	Available strengths	Splitable Y/N	Daily Dosage Range (mg)	Comparative Equivalent (mg)	Parent Drug t½ (h)	Active Metabolites (t½ - h)
Alprazolam (tablet)	0.25, 0.5, 1, 2 mg	Y	0.5-4	0.5	6-27	Y Minimal activity
Bromazepam (capsule)	1.5, 3, 6 mg	N	6-30	3	8-30	Y
Lorazepam (tablet)	0.5, 1, 2 mg	Y	1-10	1	8-24	N
Oxazepam (tablet)	10, 15, 30 mg	Y	15-120	15	3-25	N
Temazepam (capsule)	15, 30 mg	N	7.5-30	10	3-25	N
Triazolam (tablet)	0.125, 0.25 mg	Y	0.125-0.5	0.25	1.5-5	N
Chlordiazepoxide (capsule)	5, 10, 25 mg	N	15-100	25	4-29	Y (28-100)
Clonazepam (tablet)	0.25, 0.5, 2 mg	Y	0.5-20	0.25	19-60	N
Clorazepate (capsule)	3.75, 7.5, 15 mg	N	15-90	10	Inactive	Y (1.3-120)
Diazepam (tablet)	2, 5, 10 mg	Y	4-40	5	14-80	Y (30-200)
Flurazepam (capsule)	15, 30 mg	N	15-30	15	0.3-3	Y (40-250)
Nitrazepam (tablet)	5, 10 mg	Y	5-10	2.5	15-48	N

To deprescribe benzodiazepines go to the following resources:

a. www.canadiangeriatrics.ca/wp-content/uploads/2017/07/de-prescribing-benzodiazepines-in-the-elderly-a-review.pdf[20]

b. www.deprescribing.org/resources/deprescribing-guidelines-algorithms/

i. Benzodiazepine receptor agonist deprescribing guideline
www.cfp.ca/content/64/5/339?platform=hootsuite

ii. Benzodiazepine receptor agonist deprescribing algorithm
www.open-pharmacy-research.ca/wordpress/wp-content/uploads/deprescribing-algorithm-benzodiazepines.pdf

Mrs. W is fearful of not being able to sleep with 'you taking away her sleeping pill.'

There is a common perception that when you deprescribe, it has to be replaced with another medication. Often it is advisable to see how the patient does without the offending medication and then try something else if needed rather than automatically substituting with a new medication. It is important to explain the rationale and plan to the patient and caregiver to avoid the feeling of being left with nothing. If the patient and caregiver feel supported, they are more likely to buy in to the deprescribing process and subsequently more likely to successfully discontinue the medication in question. Your pharmacist can help you determine if a medication can safely be stopped vs. whether it requires a weaning schedule and can guide the latter.

To review non-pharmacological management of insomnia go to www.canadiangeriatrics.ca/wp-content/uploads/2016/11/insomnia-in-the-elderly-update-on-assessment-and-management.pdf[21].

CONCLUSION

The concept of *Problem-Based Deprescribing* is a natural augmentation of newly developed evidence-based deprescribing guidelines, facilitating their acceptance and uptake thereby allowing them to be utilized to their fullest potential.

The foundation of *Problem-Based Deprescribing* is built on medication review. Shifting the diagnosis paradigm to *routinely include ADEs in the differential when assessing new symptoms* is core to decreasing ADEs and avoiding prescribing cascades.

To address time and resource constraints, adopting a team approach by focusing on a shared clinical issue is the most efficient way of managing your patients' pharmacotherapy, especially with respect to identifying and managing adverse drug events. Build relationships with local community pharmacists and try to formalize the consultation process. Everyone wins – most importantly, your patients!

REFERENCES:

1. Huang, Allen R., Mallet, Louise (Eds.). 2016. Medication-Related Falls in Older People Causative Factors and Management Strategies p.41 •ISBN 978-3-319-32304-6

2. Lemay G, Dalziel B. Better Prescribing in the Elderly. Canadian Geriatrics Society CME Journal. 2012; 2(3): 20-26.

3. Hart M, Giancroce P. Safer Prescribing in Elderly Patients. Canadian Geriatrics Society CME Journal. 2015; 5(1): 16-22.

4. Hanlon, JT, Schmader, KE, Koronkowski, MJ, Weinberger, M, Landsman, PB, Samsa, GP and Lewis, IK. (1997), Adverse Drug Events In High Risk Older Outpatients. Journal of the American Geriatrics Society, 45: 945-948. doi:10.1111/j.1532-5415.1997.tb02964.x

5. Hamilton H, Gallagher P, Ryan C, Byrne S, O'Mahony D. Potentially inappropriate medications defined by STOPP criteria and the risk of adverse drug events in older hospitalized patients. Arch Intern Med. 2011;171(11): 1013-1019.

6. Hamilton HJ, Gallagher PF, O'Mahony D. Inappropriate prescribing and adverse drug events in older people. BMC geriatrics. 2009; 9:5.

7. Steinman Ma HJT. Managing medications in clinically complex elders: "There's got to be a happy medium." Journal of the American Medical Association. 2010; 304(14): 1592-1601.

8. Farrell B, Pottie K, Rojas-Fernandez C, Bjerre LM, Thompson W, Welch V. Methodology for developing deprescribing guidelines: using evidence and GRADE to guide recommendations for deprescribing. PLoS One 2016; 11(8): e0161248. doi: 10.1371/journal.pone.0161248. eCollection 2016.

9. Farrell B, Pottie K, Thompson W, Boghossian T, Pizzola L, Rashid FJ, Rojas-Fernandez C, Walsh K, Welch V, Moayyedi P. Deprescribing proton-pump inhibitors: an evidence-based clinical practice guideline. Canadian Family Physician 2017; 63(5): 354-364.

10. Farrell B, Black C, Thompson W, McCarthy L, Rojas-Fernandez C, Lochnan H, Shamji S, Upshur R, Bouchard M, Welch V. Deprescribing antihyperglycemic agents in older persons: an evidence-based clinical practice guideline. Canadian Family Physician 2017; 63(11): 832-842.

11. Bjerre LM, Farrell B, Hogel M, Graham L, Lemay G, McCarthy L, Raman-Wilms L, Rojas-Fernandez C, Sinha S, Thompson W, Welch V, Wiens A. Deprescribing antipsychotics for behavioural and psychological symptoms of dementia (BPSD) and insomnia: Evidence-based clinical practice guideline. Canadian Family Physician 2018; 64(1): 17-27.

12. Reeve E, Farrell B, Thompson W, Herrmann N, Sketris I, Magin P, Chenoweth L, Gorman M, Quirke L, Bethune G, Forbes F, Hilmer S. Evidence-based Clinical Practice Guideline for Deprescribing Cholinesterase Inhibitors and Memantine. Sydney: University of Sydney. 2018. Available at www.sydney.edu.au/medicine/cdpc/resources/deprescribing-guidelines.php

13. Pottie K, Thompson, W, Davies S, Grenier J, Sadowski CA, Welch V, Holbrook A, Boyd C, Swenson R, Ma A, Farrell B. Deprescribing benzodiazepine receptor agonists: Evidence-based clinical practice guideline. Canadian Family Physician 2018; 64: 339-351.

14. Holroyd-Leduc J. Unintentional Weight Loss in Older Adults: a practical approach to diagnosis and management. Canadian Geriatrics Society CME Journal. 2018. Available at www.canadiangeriatrics.ca/wp-content/uploads/2018/10/1_Jayna-Holroyd-Article-Formatted-Final.pdf

15. Alibhai S, Greenwood C, Payette H. An approach to the management of unintentional weight loss in elderly people. CMAJ 2005; 172(6): 773-780.

16. Goodarzi Z, Burback D. Can we stay on target? A review of hypertension treatment in the Elderly. Canadian Geriatrics Society CME Journal. 2015; 5(1): 9-15.

17. MacDonald MJ, Klair A, Khoury L, Molnar FJ. 4D-AID: A practical approach to the assessment of orthostatic hypotension in Older Patients. Canadian Geriatrics Society CME Journal. 2016; 6(1): 8-15.

18. Gibson W, Wagg A. Urinary Incontinence in the Frail Elderly. Canadian Geriatrics Society CME Journal. 2015; 5(2): 56-70.

19. Dyks D, Sadowski CA. Interventions to Reduce Medication-related Falls. Canadian Geriatrics Society CME Journal. 2015; 5(1): 23-31.

20. Gulbranson K, Lemay G, Molnar FJ. De-prescribing Benzodiazepines in the Elderly: A Review. Canadian Geriatrics Society CME Journal. 2017; 7(1): 12-20.

21. Chun S, Lee EK. Insomnia in the Elderly: Update on Assessment and Management. Canadian Geriatrics Society CME Journal. 2016; 6(1): 16-30.