

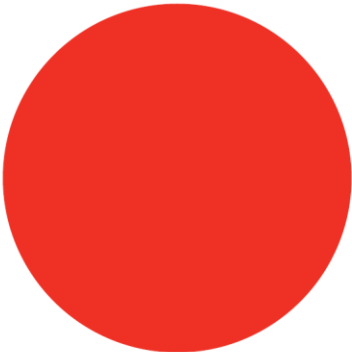


A Primer on the Value of Pharmacy Services in Long- Term Care Settings in Canada

Presented to:

The Neighbourhood Pharmacy Association of Canada

The Conference Board of Canada



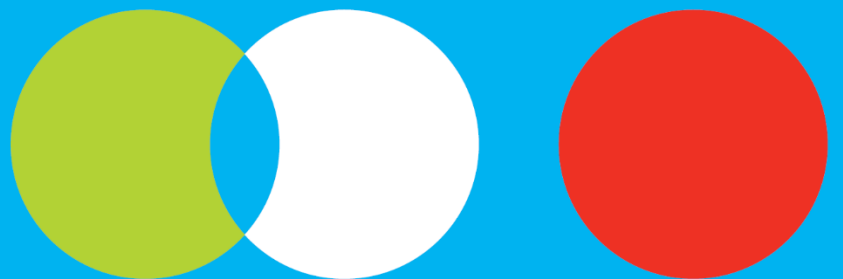
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Executive Summary



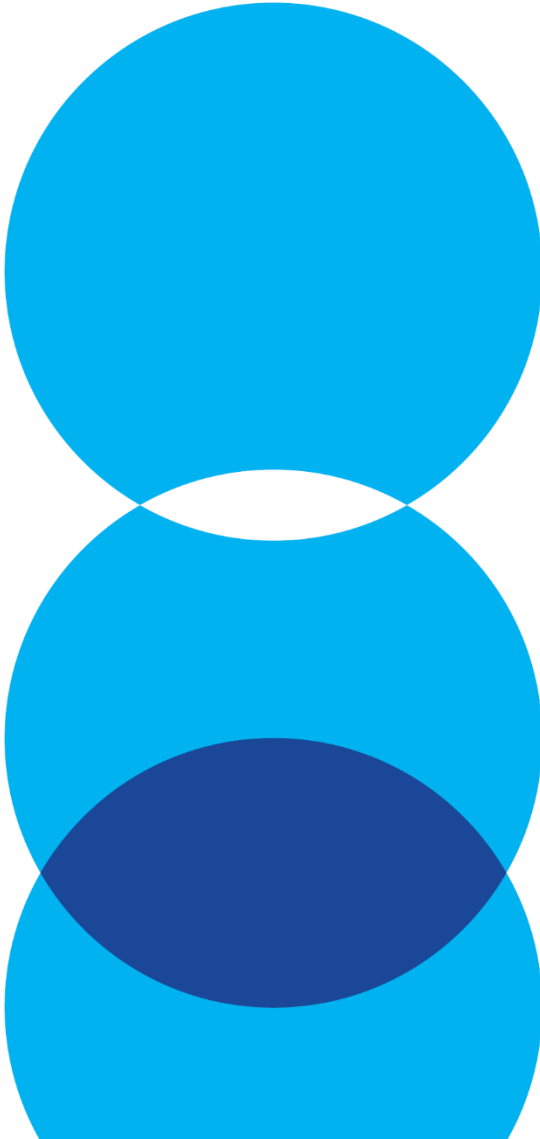
Canada's aging population is restructuring health system demand and services delivery and, more specifically, is contributing to ongoing discussion related to the distinct value propositions made by pharmacists in long-term care (LTC) facilities. Indeed, pharmacists and medications management play integral roles in supporting LTC patients due to key factors like higher morbidity rates, clinical complexities and health fragility. As such, this primer explores and explains why LTC pharmacy is critical to successful long-term health services. Our analysis relies on empirical findings and sound judgmental analyses related to LTC pharmacy including ongoing population trends; academic literature; and thoughtful discussion with the LTC pharmacy industry, LTC home operators and government representatives.

Our analysis indicates that LTC pharmacies and pharmacists are leveraging new technologies, like automation, to manufacture highly specialized medications on-demand to ensure improved patient outcomes. Of course, LTC pharmacies have and are continuing to invest significant capital and operational resources towards developing new warehousing and distribution centers to specifically cater to LTC patients. LTC pharmacies also employ clinical consultant pharmacists who work directly with LTC staff, residents and patient families to accommodate patient needs. These consultants are critical to ensuring that patients, residents, and LTC staff understand the medications that are being prescribed.

While long-term services are negotiated differently across Canada, our ongoing analysis and discussion with LTC stakeholders indicate that patient outcomes can be measurably improved through further integrating pharmacies, pharmacists, and pharmacy technicians into the broader patient experience. Here, it is believed that well-integrated pharmacists can more accurately understand patient needs and, by extension, more accurately prescribe patient medications. Furthermore, LTC pharmacists can improve patient outcomes by playing increasingly large roles in medications reconciliation – the process by which health professionals catalog patient drug intake – to ensure timely patient transitions and prescription safety.

Indeed, pharmacists and pharmacies are already integral to delivering optimal health services to LTC patients. Over time, it is anticipated that these service providers will become increasingly important and critical to successful patient health outcomes. Health system stakeholders, including all levels of government, should consider the distinct value propositions related to LTC pharmacy to determine whether this approach to long-term health services is more or less effective than what is currently being offered to LTC patients.

Introduction



Long-term care (LTC) facilities are distinct health environments that provide care primarily to older adults who are often dealing with significant health issues and health fragility. Many of these adults also have multiple chronic conditions, referred to as comorbidity or multimorbidity, that compromise their health. Patients with multimorbidity are typically prescribed multiple medications that require careful management of medications to ensure each medication works as intended. Optimal medications management has been empirically shown to be critical in maximizing positive resident outcomes.

As such, it is crucial that all relevant stakeholders understand why optimal medications management is so critical to LTC residents. Our primer explains this relationship, against the backdrop of an aging population, through three central discussions:

- LTC operations in Canada; including leading approaches to positive patient outcomes.
- LTC and population health impacts; how long-term health services contribute to patient wellbeing.
- LTC programming and future population health trends; challenges, opportunities and policy priorities.

Our primer is based on several lines of evidence, including: grey literature, peer-reviewed academic literature, and thoughtful discussions with representatives from the LTC pharmacy industry, LTC residents, and government officials. Empirical data are included where available and appropriate.

Long-Term Care in Canada



LTC homes¹ are analogous to nursing homes and residential care facilities which typically provide comprehensive accommodation and supports for people who require 24-hour nursing, personal support, and other therapeutic care.² These facilities can be privately-funded or publicly-funded and operate under many business practices including non-for-profits, municipal; charitable, and private-for-profit. Additionally, LTC homes might be independent or belong to broader facility networks or hospitals.³

It is estimated that nine per cent of seniors in Canada live in LTC.⁴ Most of these patients are aged 80 years or more, are predominantly female, and are likely to live in their long-term residence until death. (See Table 1.)^{5,6} Importantly, the number of persons demanding LTC services across Canada is rising. In Ontario, for example, there were close to 34,000 patients waiting to access LTC services at an average wait time of 143 days in October 2017.⁷ The Conference Board of Canada has modelled the demand for LTC services, typically referred to as ‘beds’, based on various continuing-care-reporting system (CCRS) data and alternative level of care (ALC)⁸ data. Our research indicated that 263,000 beds were demanded in 2016 – which translates to a significant number of seniors waiting for LTC access and critical services. In the long-term, concurrent with aging demographics in Canada, our modelling also indicates that an additional 199,000 beds will be needed by 2035 – almost double the number of beds currently available.⁹

Table 1
Number of Facilities and Residents in LTC (CCRS) by Province or Territory: 2015-16

Indicator	NL	NS	ON	MB	SK	AB	YT	Total
Number of Facilities	36	3	629	39	155	301	5	1,342
Number of Residents	3,591	942	114,082	7,836	12,718	44,209	396	205,113
Average Age	81	89	83	85	83	85	79	83
Young than 65 (%)	7.9	2.8	6.9	4.1	9.2	4.8	11.1	6.7
85 and Older (%)	43.1	76.8	54.2	59.4	52.0	59.7	37.4	55.2
Female (%)	64.3	59.3	67.4	70.4	62.1	64.5	55.3	65.9
Died in Facility (%)	81.2	77.7	48.1	72.5	63.2	76.6	20.6	56.6

Source: Continuing Care Reporting System, 2015-16, Canadian Institute for Health Information.

¹ LTC homes are also referred to as Special Care Homes in Saskatchewan.

² Canadian Institute for Health Information, *Residential Care*.

³ Ibid.

⁴ Canadian Institute for Health Information, *Seniors in Transition*.

⁵ Canadian Institute for Health Information, *Residential Care*.

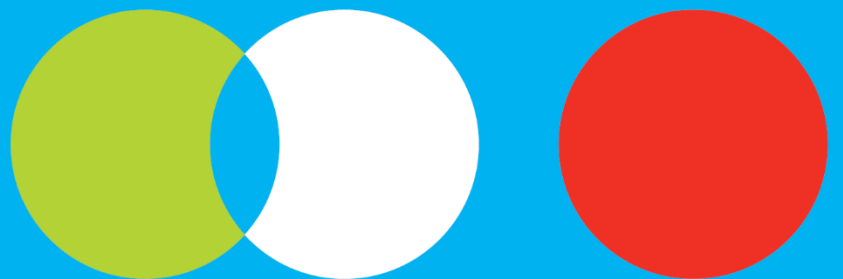
⁶ Gibbard, *Sizing Up the Challenge*.

⁷ Ontario Long-Term Care Association, *This is Long-Term Care 2018*.

⁸ Many ALC patients require long-term care but are in acute care settings because of a lack of LTC beds.

⁹ Gibbard, *Sizing Up the Challenge*.

Population Health and Long-Term Care Residents



Population health dynamics related to LTC residents are critical in understanding why these patients require careful medications management and highly catered pharmaceutical care. Roughly one-third of all seniors in Canada are living with three or more multiple chronic conditions¹⁰, typically referred to as multimorbidity, and therefore require several medications to treat various conditions.¹¹ Over time, multimorbidity rates have increased gradually and are now identified in most persons at death – with two-thirds of Ontarians, for example, dying with five or more chronic conditions.¹² Likewise, research from Alberta indicates that adults 65 years and older living with three or more chronic conditions increased significantly from 33.7 per cent in 2003 to 50.2 per cent in 2012.¹³ Among these conditions, persons living with dementia rose from 6.2 per cent to 8.3 per cent over the same interval, leading the authors to conclude that “...age, burden of morbidity and dementia together [strongly] correlate with adverse health outcomes and a proxy for loss of independent living.”¹⁴

Upward trends in multimorbidity rates are particularly relevant to the broader LTC community, where it is estimated that roughly 97 per cent of all seniors in LTC facilities are living with two or more chronic conditions such as heart disease.¹⁵ Multimorbidity rates in all recorded chronic conditions are rising steadily among LTC patients, as well. In Ontario, for example, the prevalence of circulatory disease increased by 6.9 per cent between 2009-10 and 2015-16, while chronic hypertension and gastrointestinal disease rose by 10.4 per cent and 8.7 per cent, respectively.¹⁶ Of course, seniors living with chronic conditions such as these typically have significant physical and/or cognitive challenges that may no longer be fully supported by home-care. Indeed, roughly 90 per cent of LTC residents have some form of cognitive impairment, while one-third are severely cognitively impaired.¹⁷ Over time, and in response to these trends, LTC facilities have gradually increased their eligibility criterion to service patients with higher and more complex needs.¹⁸

Patient frailty is another major consideration. It is estimated that 50 per cent of nursing home residents are frail, indicating that these persons are living in a “...state of increased vulnerability, with reduced physical reserve and loss of function across multiple body systems... reducing their ability to cope with normal or minor stresses, which can cause rapid and dramatic changes in health.”¹⁹ Indeed, factors such as frailty and multimorbidity influence the length of stay for persons living in long-term nursing facilities. In Manitoba, for example, LTC patients typically spend 2.2 years in their respective nursing home.²⁰ Our

¹⁰ Canadian Institute for Health Information, *Commonwealth Survey 2017*.

¹¹ Rosella and others, “Accumulation Of Chronic Conditions.”

¹² Ibid. Included ages 18 years and older.

¹³ Tonelli and others, “Multimorbidity, dementia and health care.”

¹⁴ Ibid, E630.

¹⁵ Ontario Long-term Care Association, *This is Long-Term Care*, 3.

¹⁶ Ontario Long-term Care Association, *This is Long-Term Care*, 4.

¹⁷ Canadian Institute for Health Information (2016). *CCRS Continuing Care Reporting System: Profile of Residents in Continuing Care Facilities 2015-2016*. Ottawa: CIHI.

¹⁸ Ontario Long-term Care Association, *This is Long-Term Care*, 5.

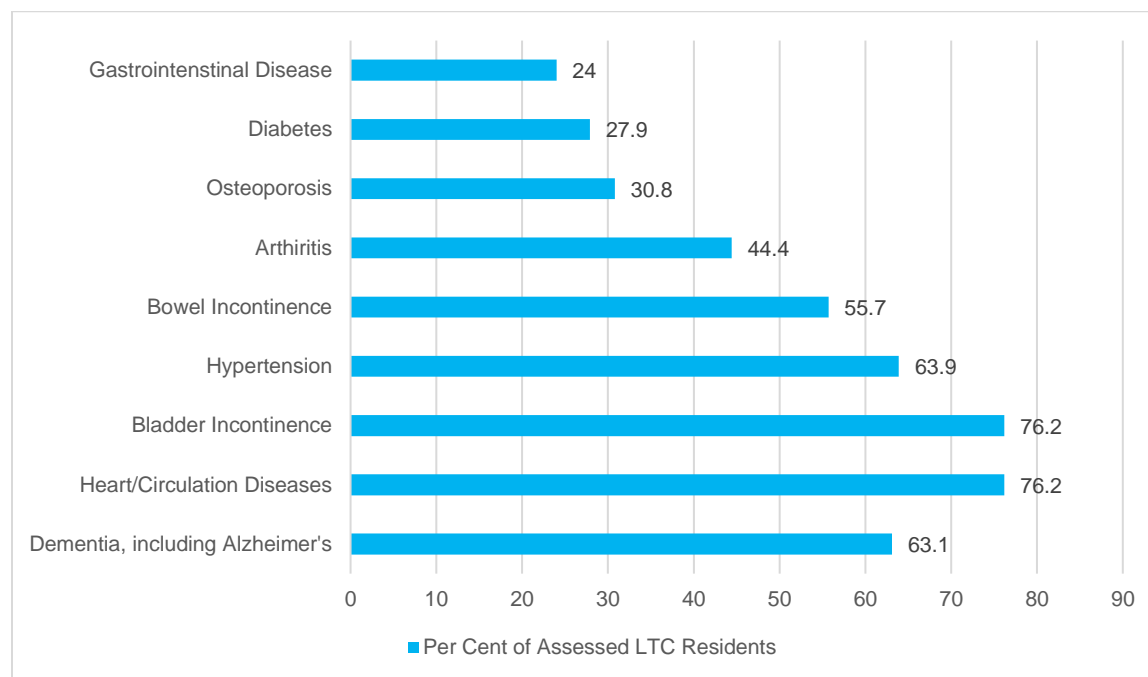
¹⁹ Kojima, “Prevalence of Frailty.”

²⁰ Government of Manitoba, *Annual Statistics 2014-2015*.

analysis indicates that patients are spending less time in nursing homes, which might be connected to an increase in chronic disease prevalence rates. (See Chart 1.)

Chart 1

Health Condition Prevalence Rates of LTC Residents: 2015-16



Source: Canadian Institute for Health Information, Continuing Care Reporting System (CCRS 2009-2010 and CCRS 2015-16)

An increasingly large proportion of seniors entering LTC facilities are living with advanced disease. These persons are typically looking for very late-life to end-of-life services²¹ and, as such, are raising do-not-resuscitate directives.²² End-of-life care, commonly referred to as palliative care, is therefore highly interconnected with LTC services. In Ontario, for example, it is estimated that 23.5 per cent of palliative care patients die in community homes (i.e., assisted living) while 11.7 per cent die in LTC facilities.²³ Based on these data and trends, LTC facilities have shifted towards offering more palliative services to ensure greater patient access and, specifically, for patients who demand do-not-resuscitate conditions. Currently, there are few LTC options available to patients that provide robust palliative care service²⁴ and, among those that do provide these services, most are non-prescriptive.²⁵

Ongoing discussions in the broader LTC network indicate a shift towards supporting palliative care patients and, in turn, ensuring that LTC staffers understand the distinct

²¹ Muscedere and others, "Screening for Frailty." 285.

²² Canadian Institute for Health Information, *A Snapshot*, 4.

²³ Health Quality Ontario, *Palliative Care at the End of Life*.

²⁴ Williams and others, "Tracking the evolution."

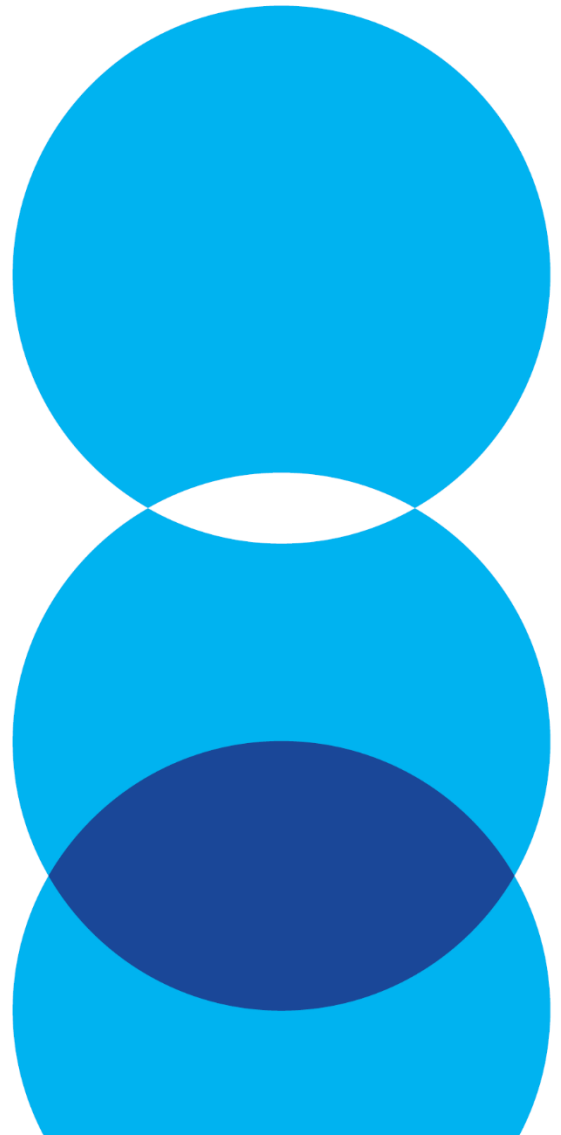
²⁵ Interview Findings. LTC Staff.

medications management related to these persons.²⁶ Indeed, LTC stakeholders are now recognizing the critical importance of careful and preventative pharmacological interventions among palliative care patients.²⁷ Combined, these results indicate that medications management is changing rapidly in LTC. Pharmacies, pharmacists, and pharmacist technicians are now playing increasingly important roles for patients close to death, and for patients that require highly specialized medication packages.

²⁶ Interview Findings. LTC Staff.

²⁷ Interview Findings. LTC Industry Stakeholder.

Medication Use in Long-Term Care Facilities



Medications are a significant part of the treatment for the multiple conditions common among LTC residents. According to CIHI, seniors living in LTC facilities were prescribed an average of 9.9 classes of drugs in 2016, a decrease from 10.5 in 2011.²⁸ The proportion of seniors prescribed 10 or more different drug classes was 48.4 per cent in 2016. This is a decrease from 53.4 per cent in 2011 but is still nearly double the proportion among the general senior population.

Some critical characteristics related to the LTC community include:

- Most LTC seniors are prescribed antidepressants, followed by proton pump inhibitors. (See Table 2).
- Natural Opium Alkaloids, like prescribed morphine or codeine, are used by more seniors in LTC homes than elsewhere at 35.0 per cent and 14.7 per cent, respectively.
- Prescribed narcotics use is much higher in the LTC community; largely explained by an increase in demand for palliative care.
- These prescription patterns are presenting new challenges to medications management due to different class types, controls, and audit practices for different medication bundles, and so on.²⁹

Pharmacies and pharmacists are shifting towards collating their data and prescription patterns to more effectively service LTC patients through improved service usage, quality, and cost adjudication, and ameliorated policy decision-making. This is visualized in Table 3 which presents prescription trends that were developed collaboratively by three service providers. Over time, data and database sharing are anticipated to rise concurrently with the need to treat increasingly complex patient profiles.

²⁸ Canadian Institute for Health Information, *Drug Use Among Seniors*.

²⁹ Interview Findings. LTC Stakeholder.

Table 2
Top 10 Drug Classes Prescribed to Seniors Living in LTC: 2016

Drug Class	Common Uses	LTC Facility
		Rate of Use- Per Cent
Other antidepressants	Depression	39.20
Proton Pump Inhibitors	Gastroesophageal reflux disease. Peptic ulcer disease.	38.30
Natural Opium Alkaloids	Management of moderate to severe pain	35.00
Selective Serotonin Reuptake Inhibitors (SSRIs)	Depression	34.10
Sulfonamide Diuretics	High blood pressure, heart failure	28.50
HMG-CoA Reductase Inhibitors (Statins)	High cholesterol	28.00
Beta-Blocking Agents, Selective	High blood pressure, heart failure, angina (chest pain)	26.20
Thyroid Hormones	Hypothyroidism	25.30
Angiotensin, Converting Enzyme (ACE) Inhibitors, Excluding Combinations	High blood pressure, heart failure	24.00
Fluoroquinolones	Antibiotics	30.50

Source: National Prescription Drug Utilization Information System Database, Canada Institute for Health Information

Prescription trends between 2015-17 indicate that, on average, the number of claims per senior living in LTC has decreased from 449.4 to 426.3, respectively. This is explainable by several factors including improved medications management, ameliorated medication reconciliations and, possibly, less inappropriate medication prescriptions.³⁰ Indeed, this trend is also understood through LTC facilities that have worked towards lowering the use of proton-pump inhibitors, benzodiazepines, and antipsychotics.^{31 32} As well, advocacy work conducted by the Canadian Foundation for Healthcare Improvement (CFHI) and the Institute for Safe Medication Practices (ISMP) is now focusing on deprescribing unsafe and/or

³⁰ Specifically, this relates to medications that might not be completely necessary to successful patient outcomes – or, alternatively, a reduction in the total number of medications prescribed due to improved drugs added to market.

³¹ Canadian Deprescribing Network 2016)

³² Ontario Ministry of Health and Long-Term Care.

unnecessary drug use for LTC patients³³. Another explanation related to fewer prescriptions per LTC resident includes the relationship between multimorbidity and drug costs, whereby some LTC patients cannot afford to purchase all their prescribed medications.

Table 3
Trends in Ontario LTC Medication Pharmacy Coverage: 2014-17

Trend	Definition	2015	2016	2017
Number of Prescriptions per Resident	Number of prescriptions dispensed, average over one year.	449.4	439.8	426.3
Number of Paid Medication Reviews per Resident	Number of paid medication review claims divided by the number of residents served.	3.4	3.2	3.1
Number of Paid Medication Review Follow-Ups per Resident	Number of paid follow-up claims divided by the number of residents served.	0.1	0.1	0.1
Number of Paid Dispensing Claims per Resident	Number of paid claims divided by the number of beds fully served.	402.7	388.8	380.6
Average Cost per Claim	Total amount from all payors divided by the number of paid claims.	\$9.56	\$9.00	\$9.10
Average Drug Cost per Claim	Total drug costs claimed from all payors divided by the number of paid claims.	\$4.51	\$4.54	\$4.64

Source: The Neighbourhood Pharmacy Association of Canada.

³³ With that said, deprescribing can lead to drug price increases. If the demand for a drug falls considerably due to deprescription, its price will necessarily increase to offset losses in demand.

Medication Management, Pharmacies and Pharmacists



Medications management and pharmacological interventions are critical to positive patient outcomes for persons living in LTC. Typically, LTC operators contract with qualified pharmacy networks and, in some instances, LTC specialty pharmacies to supply medications and medication equipment (e.g., carts used by nurses to dispense medications) and to support broad medication management needs. Combined, there are several critical steps in medications management:

- Prescribing.
- Transcribing.
- Dispensing.
- Administering.
- Monitoring.
- Educating.³⁴

Pharmacies, pharmacists, and pharmacist technicians are critical to each medication management process. Pharmaceutical expertise is used to ensure that patients receive accurate prescriptions and that these prescriptions are administered, monitored, and evaluated comprehensively to support distinct patient needs.

Medication management is regulated differently across Canada, though must adhere to well-defined standards and protocols.³⁵ In some jurisdictions, for example, pharmacists must authenticate how medications are dispensed and administered to patients living in nursing homes to ensure safe and secure medications management. This process usually involves government representatives as well, who support community pharmacists in ensuring optimal medications distribution.³⁶ Medications management in LTC is distinguished by the intimate relationships that are developed between pharmacists, patients, families, and other service providers.³⁷ Community pharmacists usually work with the same patients living in LTC facilities for several years and, in turn, create deeply personalized and well-understood medication management portfolios.³⁸ Combined, community pharmacists provide distinct value to all patients living in LTC through highly personalized treatment, carefully procured medication management portfolios, and interdisciplinary cooperation.

³⁴ Here, pharmacists are critical in educating LTC patients and staff in understanding the entire medications management process.

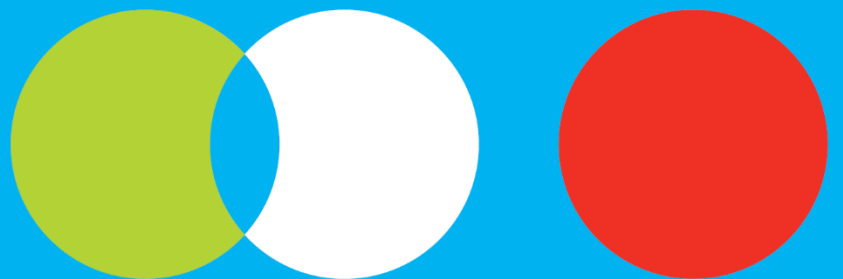
³⁵ Interview Findings. LTC Government Representative.

³⁶ Interview Findings. LTC Industry Stakeholder.

³⁷ De Angelis and Ng, *Transitioning your career*.

³⁸ Interview Findings. LTC Industry Stakeholder.

Medication Supply



Medication supplies and access for patients living in LTC is highly modernized. Over time, community pharmacists have integrated technological innovations in dispensing activities, prescription authentication and information retrieval, prescriptions delivery, and personalized medication procurements.³⁹ Pharmacies that specialize in LTC medications procurement are structured similar to production warehouses that include work stations for computer entry and prescription processing, automated packaging machines, and shipping equipment.⁴⁰ Today, technology and automation are leveraged to fully maximize operational efficiencies to proactively respond to distinct LTC patient demand.

Electronic medication administration records (eMARs), for example, are commonly used between pharmacies and LTC facilities.⁴¹ Technological tools like this enable 'live 24/7' medication management where prescribing changes and medication dispensing services can be updated immediately and/or remotely. Stakeholders in the LTC industry indicate that these technological services also allow for improved safety and efficiency which result in ameliorated patient outcomes.⁴² Specialized multi-dose packaging products, like strip or pouch packing (see Figure 1), are typically used to optimize safety, administration and efficiency. These individually sealed and secured pouches contain all the medications for a resident for specific times.

Figure 1
Strip and Pouch Packaging Examples for Residents in LTC



Source: The Conference Board of Canada.

Resident medications are typically delivered on a weekly basis by community pharmacists, dispensary pharmacists or registered pharmacy technicians to accommodate for frequently changing patient needs.⁴³ Community pharmacists also provide on-demand daily and emergency access to supplies and medication to ensure successful patient outcomes. Most

³⁹ Thomas, M. et al. *Nursing Time Devoted to Medication Administration in Long-Term Care*.

⁴⁰ De Angelis and Ng, *Transitioning your career*.

⁴¹ Institute for Safe Medication Practices Canada, ISMP Canada Safety Bulletin, October 24, 2018.

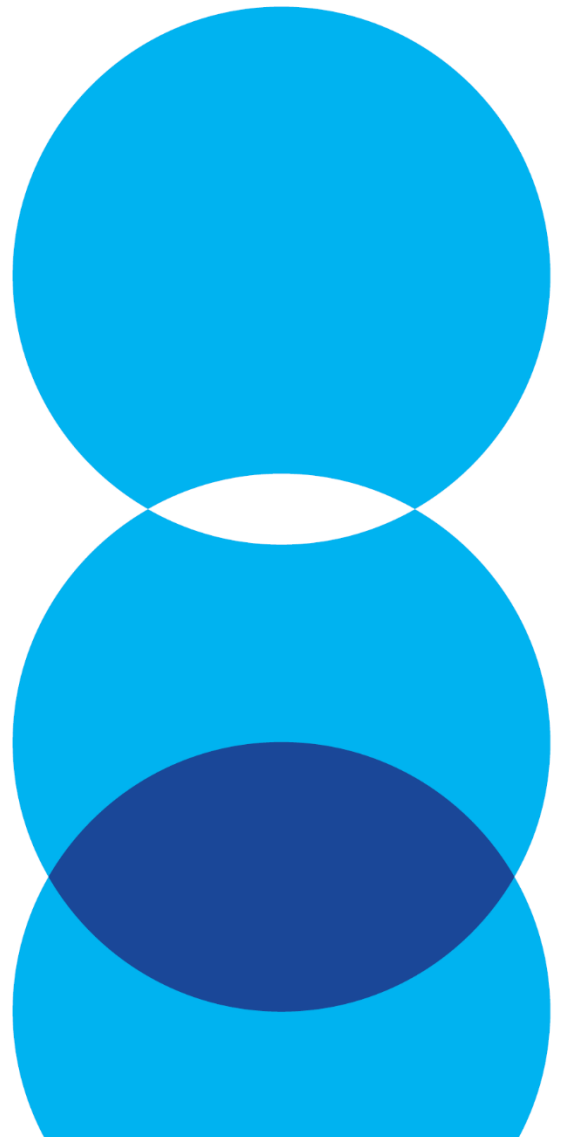
⁴² Interview Findings. LTC Industry Stakeholder.

⁴³ Interview Findings. LTC Operator.

LTC facilities typically hold medications and medication supplies for emergency situations, as well, to reinforce patient security and safety. Dispensary pharmacists and pharmacy technicians are most critical in supplying patients living in LTC with their personalized medication needs. These pharmacists typically verify and process prescription orders, dispense appropriate medications, and carefully monitor prescription transactions to ensure LTC residents are receiving timely access to their medication supplies. Over time, LTC facilities and community pharmacists have developed strong working relationships based on interdisciplinary collaboration.⁴⁴

⁴⁴ Interview Findings. LTC Operator, LTC Industry Stakeholder.

Medication Safety in Long-Term Care



Above all else, pharmacists prioritize careful medications procurement to ensure their patients living in LTC consume their medications safely and appropriately. Of course, medications safety is a shared responsibility between community pharmacists, nurses, health directors, and others due to the distinct health dynamics related to residents living in LTC which include higher rates of:

- Polypharmacy;⁴⁵
- Multimorbidity;
- Health frailty and fragility.

Medications safety is interconnected and involved in each medication management process including assessments, prescriptions, dispersions, storage, deliveries, and patient monitoring. Despite this, data indicate that medication error rates are higher for patients living in LTC⁴⁶ and that many of these errors go unreported.⁴⁷ For errors that are reported, it is estimated that 42 per cent relate to incorrect drug dosages due to administrative inefficiencies, 24 per cent to missing dosage, 12 per cent to incorrect drug prescription, and six per cent to incorrect patient prescriptions.⁴⁸ Other empirical literature suggests that proactive staff beliefs related to medications management,⁴⁹ special attention on ordering and monitoring,⁵⁰ and technological innovations⁵¹ can improve medications safety for patients living in LTC.

Technological innovations are supporting community pharmacists in ensuring safe medication management practice.⁵² Automated dispensing services, for example, are empirically superior to non-automated dispensing services due their ability to work continuously without needing to break which, in turn, enables nurses and community pharmacists to spend their time elsewhere.⁵³ Medication safety and errors have broader implications, as well. Higher polypharmacy rates for patients living in LTC carries an increased risk of adverse drug reactions (ADR) and hospitalizations.⁵⁴ As such, ongoing research is seeking to determine appropriate dosage levels, polypharmacy rates, and age-related medication distinctions for persons living in LTC to reduce the rate at which these individuals experience ADRs. In Ontario, for example, elderly patients living in LTC were found to be 200 per cent more likely to suffer from an adverse drug event compared to non-LTC seniors.⁵⁵ Other risks to medications safety that warrant attention include safe drug testing, inappropriate prescribing, and over-prescribing.

⁴⁵ Refers to scenarios where patients are prescribed more than five prescriptions.

⁴⁶ Institute of Medicine, *Preventing Medication Errors*, Washington, DC: National Academies Press, 2006

⁴⁷ Handler and others, "Medication Error Reporting."

⁴⁸ Institute for Safe Medication Practices Canada, *ISMP Canada Safety Bulletin*. 2010

⁴⁹ Handler, S.; Nace, D.; Studenski, S.; Fridsma, D. Medication error reporting in long-term care, *The American Journal of Geriatric Pharmacotherapy*, 2004, Vol 2, No 3, pp 190-196.

⁵⁰ Gurwitz, J. and others, The incidence of adverse drug events in two large academic long-term care facilities, *The American Journal of Medicine*, 2005, Vol 118, No 3, pp 251-258

⁵¹ Szczepura, A.; Wild, D.; Nelson, S. Medication administration errors for older people in long-term residential care, *BMC Geriatrics* Vol 11, No 1, p. 82

⁵² Interview Findings. LTC Operator, LTC Stakeholder.

⁵³ Baril, C.; Gascon, V.; St-Pierre, L.; Lagace, D., Technology and medication errors: impact in nursing homes, *International Journal of Health Care Quality Assurance*, 2014, 27, 3, 244-258

⁵⁴ Field and others, "Risk factors."

⁵⁵ Wu and others, "Incidence and Economic Burden."

Long-Term Care Clinical Pharmacy Services



Clinical consultant pharmacists are typically employed by pharmacies that specialize in servicing patients living in LTC. These pharmacists work closely with residents, families, and LTC staff to:

- Complete medication reviews and medication reconciliation for residents;
- Conduct in-service education for staff;
- Complete prescription audits;
- Support LTC facility accreditation processes;
- Participate in interdisciplinary committees, such as pharmacy and therapeutic teams;
- Attend additional meetings with facility management, physicians and pharmacists;
- Contribute to policy design and procedures;
- Fulfil drug stewardship requirements.

Medication reviews are critically important services provided by consultant pharmacists who serve patients living in LTC.⁵⁶ These reviews are usually conducted independently, though can be collaborative, and evaluate various health areas including: therapeutic effectiveness; drug interactions; adverse reactions; swallowing ability; pain control and tolerance; behavior management; and opportunities for drug compressions (a reduction in the number of times a medication is administered).⁵⁷ Additionally, medication reviews occur at different frequencies across Canada. In Ontario, for example, some residents living in LTC are eligible for a program called MedsCheck LTC which enables these individuals to receive quarterly medication reviews from specific pharmacy contractors.⁵⁸ Most residents typically receive two medication reviews per year, though can consult with their insurance programs or LTC facility to procure additional visits by consultant pharmacists depending on their medical profile. Ideally, medication reviews should be completed collaboratively by consultant pharmacists, nurses, care directors, and facility physicians to reduce review duplication and streamline review sharing.⁵⁹

Interdisciplinary collaboration is also critically important. Many consultant pharmacists are already integrated into LTC facilities; however, it is believed that further integrating pharmacists into LTC could ameliorate patient outcomes through improved medications management and labor management.⁶⁰ Nurses in LTC, for example, currently spend approximately one-third of their time towards medication administration⁶¹ and therefore stand to benefit substantially if consultant pharmacists were to play larger roles in both medications' administration and reconciliation. Ongoing research at both the University of Windsor⁶² and the Health Quality Ontario IDEAS Program (BOOMR)⁶³ is seeking to determine how these proposed changes might impact LTC in Canada. Tentative findings indicate that increased collaboration between consultant pharmacists and LTC staff leads to

⁵⁶ The Conference Board of Canada, *A Review of Pharmacy Services*.

⁵⁷ De Angelis and Ng, *Transitioning your career*.

⁵⁸ Ontario Ministry of Health and Long-Term Care, *Professional Pharmacy Services*.

⁵⁹ Interview Findings. LTC Pharmacist, LTC Operator.

⁶⁰ Interview Findings. LTC Government Representative.

⁶¹ Institute of Safe Medication Practices Canada, *ISMP Safety Bulletin*, October 24, 2018

⁶² Daniel, D., "Tele-pharmacists improving med reconciliation in LTC."

⁶³ Vuong, V. and others, "BOOMR: Better Coordinated Cross-Sectoral Medication Reconciliation for Residential Care."

improved service timeliness, operational communications, workflow efficiencies, and reduced health system expenditures.⁶⁴

Our literature review indicates that additional high-quality research and controlled trials are needed to more effectively understand LTC medication reviews and their potential impacts on reducing mortality and hospitalizations.⁶⁵ We specifically reviewed eight studies on medications review – six focused exclusively on consultant pharmacists – with each study indicating that medication reviews do not statistically reduce mortality rates or hospitalization rates for residents living in LTC. Indeed, more Canadian research and data are necessary to determine how best to incorporate consultant pharmacists into the broader LTC framework.

Polypharmacy

Polypharmacy is used to define scenarios where patients are consuming more than five prescribed medications simultaneously to treat different chronic conditions.⁶⁶ This scenario is true for many persons living in LTC that require several prescription drugs to treat multiple chronic conditions. Research indicates that polypharmacy is associated with an increase in adverse drug events, hospital admissions, and death.⁶⁷ Our systematic literature review found evidence that persons living in LTC are vulnerable to inappropriate prescribing – which is typically associated with increased all-cause hospitalizations.⁶⁸ Higher hospitalization and death rates for persons consuming five or more prescription medications can also be associated with their broader health condition – as opposed to their medication management to treat their chronic conditions. Ongoing discussion in the LTC community is seeking to determine how best to approach this theme.⁶⁹

Deprescribing

For some multimorbid individuals living in LTC, deprescribing can help manage polypharmacy and improve health outcomes.⁷⁰ Deprescribing is typically introduced when pharmacists, physicians, nurses, and other health personnel determine that a patient's health status might improve if he or she were to consume fewer prescribed medications, and to offset overprescribing and/or inappropriate prescribing.⁷¹

Current research indicates that deprescribing is safe for many multimorbid patients, though may result in unintended outcomes like worsened patient frailty and reduced life expectancy.⁷² As such, community pharmacists play critical roles in supporting physicians and nurses in determining whether patients may benefit from consuming fewer prescription

⁶⁴ Critically, LTC pharmacists could add further value to nursing home patients if they were recognized by Health Canada as practitioners. This would allow nurses to accept prescription orders from LTC pharmacists without additional approval required.

⁶⁵ Wallendstedt and others, "Medication reviews for nursing home residents."

⁶⁶ Farrell and others, "Clinical vignettes," 1257

⁶⁷ Thompson and Farrell, "Deprescribing: What Is It," 201.

⁶⁸ Wang and others, "Medications and Prescribing Patterns as Factors."

⁶⁹ Interview Findings. LTC Government Representative.

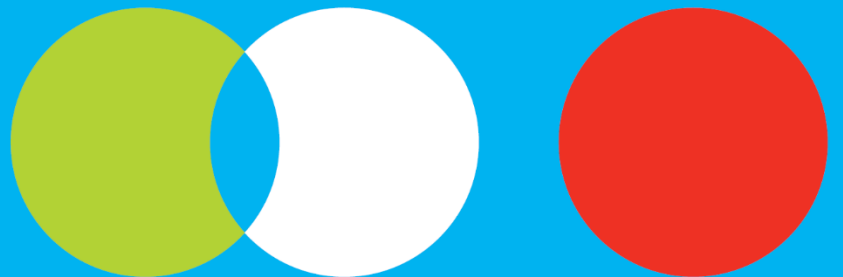
⁷⁰ Thompson and Farrell, "Deprescribing: What Is It," 201.

⁷¹ Morgan and others, "Frequency and cost."

⁷² Tannenbaum and others, "An Ecological Approach."

medications. Pharmacists who specialize in LTC should consider medication rationalization as an optimal strategy in caring for senior patients. This strategic perspective on LTC assumes that each patient is highly distinct and therefore requires specific treatment – which might not include polypharmacy.

Long-Term Care Pharmacy Programs and Reimbursement



Each Canadian jurisdiction differs in its approach to medications management for persons living in LTC. These programs are differentiated by their eligibility criterion, processes for reimbursement, procurements for medication supply and pharmacy services, and jurisdictional health objectives. Reimbursement programs in British Columbia, for example, use a capitated model where British Columbia residential care (Plan B) insures permanent residents belonging to licensed residential care facilities that are on the list of approved Plan B facilities, and pharmacies providing services to nursing homes which receive \$43.75 per bed monthly.⁷³ ⁷⁴ Manitoba also uses a capitated approach, providing \$47.80 per LTC bed, per month in Winnipeg, and \$48.70 per bed, per month in rural areas.⁷⁵

Long-term care homes in Alberta receive daily amounts per bed from government financing and, in turn, negotiate with pharmacists for per-resident amounts and hours per week.⁷⁶ A mixed approach is favored in Ontario where contracted pharmacies receive dispensing fees (between \$7.57 and \$11.99) for medications supply and compensation fees for MedsCheck LTC (\$90 for initial consultations and \$50 for quarterly reviews.)⁷⁷ In other jurisdictions, like Nova Scotia, pharmacies simply receive dispensing fees for resident medications. Long-term care pharmacies are responsible for stewardship programs that include the responsibility and fees for destroying medications that are unused by residents. Combined, better transparency and policy standardization in LTC could support industry stakeholders in more effectively supporting their patients.⁷⁸

Program Constraints and Opportunities

There are advantages and disadvantages related to each jurisdictional approach to LTC. One major challenge for pharmacists and pharmacies is that many nursing home networks work towards service standardization which, in turn, lead to reimbursement discrepancies.⁷⁹ As a result, many pharmacies that specialize in LTC are led to either discontinue their services in specific jurisdictions or instead restructure their international operations to accommodate for various provincial requirements.⁸⁰

In jurisdictions where dispensing fees are the primary means of reimbursement, some noted there are challenges in finding fair representation for the dispensing costs that have risen with advances in technology, coupled with the rising expectations for the services they are responsible to provide. In some cases, there is a disconnect between billing, which may be monthly, and dispensing and delivery, which may be weekly. Also, under this approach, deprescribing activities have the consequence of reducing the reimbursement the pharmacy receives through dispensing fees, when medications are eliminated. One view was that the dispensing model may not be the right approach for incentivizing deprescribing behavior in

⁷³ Government of British Columbia, *Pharmacare for B.C. Residents*.

⁷⁴ Canadian Institute for Health Information, *National Prescription Drug*, 13.

⁷⁵ *Ibid*, 35.

⁷⁶ Pharmacies in Alberta are also compensated for cognitive services; medication review; medication prescribing; and medication adaptations.

⁷⁷ Ontario Ministry of Health and Long-Term Care, *Professional Pharmacy Services*, 20.

⁷⁸ Interview Findings. LTC Industry Stakeholder.

⁷⁹ Interview Findings. LTC Stakeholder.

⁸⁰ Interview Findings. LTC Stakeholder.

LTC pharmacy. Finding the right kind of incentive that encourages the appropriate and careful removal of medications is essential.

Ontario's LTC program is designed transparently to account and reimburse for variations in medications and clinical service requirements.⁸¹ Our interviewees also indicated that Ontario is actively exploring value-based health care and bundled payment approaches to provide better provider opportunities, more effectively manage patient outcomes, and support improved patient outcomes.⁸² Ontario's LTC program design, as well as those across Canada, typically include some form of dispensing fee approach where a community pharmacist supplies his or her client face-to-face; though face-to-face interactions are often missing in LTC environments due automated supply, location remoteness, and the complexities of LTC population groups.⁸³

Furthermore, capitation approaches, such as per bed fees, have the potential to stimulate cost effectiveness by encouraging providers to consider the costs associated with their products and services. Critically, capitation approaches can help promote appropriate balances in payments that ensure the best quality of care available to LTC patients.⁸⁴ Another major opportunity for pharmacists in LTC would be to develop and standardize a pan-Canadian LTC formulary to encourage knowledge sharing and improve medications access for all nursing home patients.

Within the context of increasing demand for LTC in Canada and rising demand for LTC pharmacy programs and services, leaders and decision-makers need evidence-based insights on the health and economic impacts of these programs to improve the wellbeing of nursing-home residents, and to add value to the broader Canadian health system.

Options for Restructuring LTC Pharmacy Services

Research has shown that pharmacist interventions in LTC homes lead to the identification of medication problems and overall improvements in medication appropriateness⁸⁵; however, there is less available research related to the impact these interventions have on long-term patient outcomes. Other research indicates that pharmacist interventions and services in LTC programs contribute to the broader health system and economy through effective medications management.⁸⁶

Our interviewees indicated that the services they deliver are informed by intensive data gathering and analysis.⁸⁷ This includes data at the resident- and facility-level which includes information on health and function (e.g., falls, diabetic control), medication changes, and

⁸¹ Interview Findings. LTC Stakeholder.

⁸² Interview Findings. LTC Stakeholder.

⁸³ Interview Findings. LTC Government Stakeholder.

⁸⁴ Interview Findings. LTC Industry Stakeholder.

⁸⁵ Alldred and others, "Interventions to optimise prescribing."

⁸⁶ Dalton and Byrne, "Role of the pharmacist."

⁸⁷ Interview Findings. LTC Government Stakeholder, Industry Stakeholder.

medication errors. Data cleaning is central for LTC providers so that it can be effectively used in team meetings, strategic planning, and policy development.⁸⁸

Some governments and health regulators collect and report on various LTC performance indicators. Health Quality Ontario, for example, collects data on antipsychotic medication use, falls, pain, and depression.⁸⁹ This data is critical in monitoring LTC patient wellbeing and in quantifying the performance of LTC facilities. Despite most provinces having adequate data collection and analysis here, some health professionals working in government suggest that this data is often isolated from the rest of the country.⁹⁰ Additionally, economic impact research is lacking related to the data that is collected by health regulators across Canada. From the literature, a systematic review into medication-related quality of care indicators in LTC found that although a wide array of indicator sets exist, none addressed all components of medication-related quality of care in LTC settings.⁹¹ Medication appropriateness was the most common indicator. No indicators were found for evaluating medication use for individuals with limited life expectancy. In addition, the researchers noted a gap in indicators that encompass the patient-centered care approach (e.g., prioritizing patient preferences and quality of life), as well as those that address the detection and monitoring of adverse events (not just falls).⁹²

One additional theme arising from our interviews was the importance of viewing medication management services, the funding for those services, and the health professionals who deliver those services, from a broader, integrated perspective rather than in the silo of LTC homes. Retirement homes and assisted living/supportive-housing are part of a continuum of settings, along with LTC homes, that provide services, including medication management. In some cases, these facilities are co-located within an LTC home and are serviced by the same LTC pharmacy business. Each setting may have differing regulations for medication administration and funding approaches for pharmacy services (e.g., differences in reimbursement for medication reviews in community settings versus in LTC). Better integration of these approaches is called for to improve resource utilization. Indicators and outcomes that reflect this broader, integrated approach would help inform health system policy and sustainability discussions.

⁸⁸ Online data collection, reporting and monitoring is another major opportunity to inform future health policy decisions in LTC.

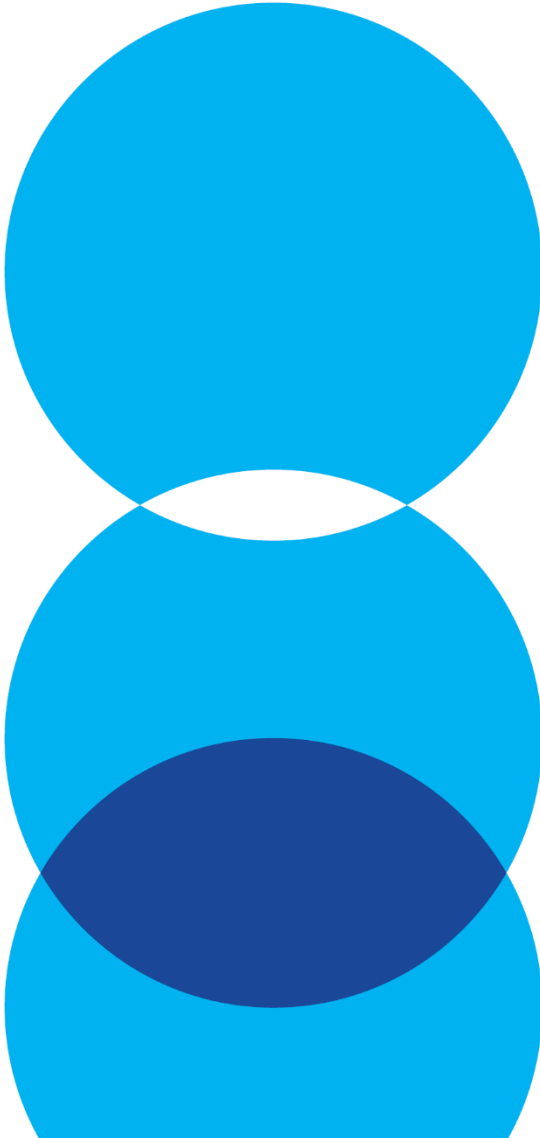
⁸⁹ Health Quality Ontario, "Antipsychotic Medication Report."

⁹⁰ Interview Findings. LTC Government Representative.

⁹¹ Hillen and others, "Evaluating medication-related quality of care."

⁹² Although LTC homes are required to report Adverse Drug Reactions, reporting in the LTC space is limited.

Implications



This primer has shown that the landscape of LTC and LTC pharmacy is complex. LTC pharmacy services are a critical part of care and support for the frail and vulnerable Canadians with significant medication management needs residing in LTC homes. These services are instrumental to ensure that LTC residents have their medication needs met in a safe and efficient manner. In addition, they are integral to the objectives of the government and LTC provider of optimizing medication management and health outcomes for residents while ensuring health system sustainability. The insights garnered from the literature and stakeholder inputs for this primer suggest several implications for governments, LTC pharmacies and residences, residents/families, and providers.

Clinical pharmacy services are a key component of LTC pharmacy. There is a greater sense of what the 'gold standard' in LTC clinical pharmacy services looks like. LTC homes operate in a highly regulated environment, are knowledgeable about this standard, and express this in their expectations from pharmacy providers. LTC pharmacies are working to leverage efficiencies in dispensing, made possible for some through technology and automation, to generate capacity for these services. While they are committed to delivering high quality services, sustainability is a rising concern.

Meanwhile, government and public expectations for medication safety and associated initiatives are growing and impacting the LTC pharmacy services needed. With growing demand for LTC beds expected in the coming years, these issues will become more acute, requiring workable and scalable solutions. All LTC stakeholders should consider the appropriateness of programs, policies, funding and reimbursement approaches for the objectives sought, including addressing safe medication use, optimizing resident outcomes, reducing medication related adverse events, and polypharmacy. Stakeholders should also ensure there is good transparency about the programs, service expectations, and reimbursement structures.

LTC pharmacy has a strong legacy of innovation, especially for dispensing, leveraging technology to enhance safety, and create dispensing efficiencies. Innovation in service delivery is equally relevant. There is growing interest, for example, in looking at medication compression and administration times (e.g., bedtime to potentially minimize impact of any side effects). Work is also needed to ensure services are integrated and not duplicative, as is finding the right mix of services, appropriate delivery model, and regulations within the context of all health providers in the LTC settings. Innovation in processes such as pre-admission medication reviews is emerging and is particularly relevant for those coming from other continuing care settings, such as assisted living or retirement homes, where medication administration is part of the services they may receive.

Research and data are needed alongside initiatives for innovation. The LTC pharmacy sector would benefit greatly from enhanced data and outcome reporting. There are significant shortfalls in this respect which creates challenges for developing evidence-based programs and funding. Supportive high-quality data and reporting on medication changes due to resident complexity would be valuable information for payers as they review LTC pharmacy programs and reimbursement approaches. Reporting on medication errors is

also needed to improve LTC pharmacy services. Research projects that leverage pharmacist services to improve resident health and functionality and help prevent emergency room visits or hospitalizations are under development within some pharmacies. Further research on LTC pharmacy and resident/health system outcomes and economic impacts is needed to help inform program and policy development.

With the aging of the population and growing demand for LTC, pharmacies and pharmacists will increasingly be called upon to provide medication-related services for LTC residents. Meeting these needs will be challenging and will require attention to adaptive policies and programs, regulations, and funding approaches.

Appendices A-C



Appendix A

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Disclaimer

The findings and conclusions of this report do not necessarily reflect the views of the funder or reviewer. Any errors or omissions in fact or interpretation remain the sole responsibility of The Conference Board of Canada.

Appendix B

Detailed Tables

Table 1
Number of Facilities and Residents in LTC (CCRS) by Province or Territory: 2015-16

Indicator	NL	NS	ON	MB	SK	AB	YT	Total
Number of Facilities	36	3	629	39	155	301	5	1,342
Number of Residents ‡	3,591	942	114,082	7,836	12,718	44,209	396	205,113
Average Age	81	89	83	85	83	85	79	83
Young than 65 (%)	7.9	2.8	6.9	4.1	9.2	4.8	11.1	6.7
85 and Older (%)	43.1	76.8	54.2	59.4	52.0	59.7	37.4	55.2
Female (%)	64.3	59.3	67.4	70.4	62.1	64.5	55.3	65.9
Died in Facility (%) **	81.2	77.7	48.1	72.5	63.2	76.6	20.6	56.6

Notes

‡ Based on LTC residents who were either admitted, assessed or discharged in 2015-16.

** As a per cent of residents discharged in 2015-16.

Results for Newfoundland and Labrador, Ontario, Alberta, British Columbia and Yukon include all publicly funded facilities in each respective jurisdiction. Other provincial results reflect partial coverage (i.e., not all facilities submit data). Also, discharge and admission policies vary by province and or territory.

Resident counts based on record date. Residents are identified as unique within a facility only. If a person is assessed in two facilities, that person is counted twice.

Source: Continuing Care Reporting System, 2015–16, Canadian Institute for Health Information.

Table 2
Top 10 Drug Classes Prescribed to Seniors Living in LTC*: 2016

Drug Class	Common Uses	LTC Facility
		Rate of Use- Per Cent
Other antidepressants	Depression	39.20
Proton Pump Inhibitors	Gastroesophageal reflux disease. Peptic ulcer disease.	38.30
Natural Opium Alkaloids	Management of moderate to severe pain	35.00
Selective Serotonin Reuptake Inhibitors (SSRIs)	Depression	34.10
Sulfonamide Diuretics	High blood pressure, heart failure	28.50
HMG-CoA Reductase Inhibitors (Statins)	High cholesterol	28.00
Beta-Blocking Agents, Selective	High blood pressure, heart failure, angina (chest pain)	26.20
Thyroid Hormones	Hypothyroidism	25.30
Angiotensin, Converting Enzyme (ACE) Inhibitors, Excluding Combinations	High blood pressure, heart failure	24.00
Fluoroquinolones	Antibiotics	30.50

Notes:

*Based on five LTC jurisdictions that submit claims in the NPDUIS Database (2017): Prince Edward Island, New Brunswick, Ontario, Manitoba and British Columbia.

Source: National Prescription Drug Utilization Information System Database, Canada Institute for Health Information

Table 3
Trends in Ontario LTC Medication Pharmacy Coverage: 2014-17

Trend	Definition	2015	2016	2017
Number of Prescriptions per Resident	Number of prescriptions dispensed, average over one year.	449.4	439.8	426.3
Number of Paid Medication Reviews per Resident	Number of paid medication review claims divided by the number of residents served.	3.4	3.2	3.1
Number of Paid Medication Review Follow-Ups per Resident	Number of paid follow-up claims divided by the number of residents served.	0.1	0.1	0.1
Number of Paid Dispensing Claims per Resident	Number of paid claims divided by the number of beds fully served.	402.7	388.8	380.6
Average Cost per Claim	Total amount from all payors divided by the number of paid claims.	\$9.56	\$9.00	\$9.10
Average Drug Cost per Claim	Total drug costs claimed from all payors divided by the number of paid claims.	\$4.51	\$4.54	\$4.64

Notes:

* 2013-14 data was unavailable for one agency analyzed.

** Annual prescriptions divided by the number of beds served: assuming beds are constantly served.

*** Assuming beds are constantly full.

Source: The Neighbourhood Pharmacy Association of Canada

Appendix C

Bibliography

- Alberta Health Services. 2013. *Long-Term Care Formulary: Formulary Rationale and Principles*. Calgary: Alberta Health Services.
- Allred, D., M. Kennedy, C. Hughes, T. Chen, and P. Miller. 2016. "Interventions to optimise prescribing for older people in care homes (Review)." *Cochrane Database of Systematic Reviews* (2).
- Baker, G, and P. Norton. n.d. *Patient Safety and Healthcare Error in the Canadian Healthcare System*. Toronto: Health Canada.
- Baril, C, V Gascon, L St-Pierre, and D Lagace. 2014. "Technology and medication errors: impact in nursing homes." *International Journal of Health Care Quality Assurance* 27 (3): 244-258.
- Beuscart, J., L. Pont, S. Thevelin, B. Boland, O. Dalleur, A. Rutjes, J. Westbrook, and A. Spinewine. 2017. "A systematic review of the outcomes reported in trials of medication review in older patients: the need for a core outcome set." *British Journal of Clinical Pharmacology* 83: 942-952.
- British Columbia Ministry of Health Pharmaceutical Services Division. n.d. "Understanding PharmaCare Plans." *Government of British Columbia*. Accessed May 2018. <https://www2.gov.bc.ca/assets/gov/health/health-drug-coverage/pharmacare/7-3to7-11.pdf>.
- Canadian Deprescribing Network (CaDeN). n.d. *Canadian Deprescribing Network (CaDeN)*. Accessed 2 13, 2019. <https://www.deprescribingnetwork.ca/canadian-deprescribing-network/>.
- Canadian Deprescribing Network. 2016. *Annual Report 2016*. Canadian Deprescribing Network.
- Canadian Foundation for Healthcare Improvement. n.d. *Reducing Antipsychotic Medication Use in Long Term Care*. Accessed 2 13, 2019. <https://www.cfhi-fcass.ca/WhatWeDo/recent-programs/reducing-antipsychotic-medication-use-collaborative>.
- Canadian Frailty Network. 2013. *What is Frailty*. Accessed March 5, 2018. <http://www.cfn-nce.ca/frailty-in-canada/>.
- Canadian Institute for Health Information. 2016. *A Snapshot of Advance Directives in Long-Term Care: How Often Is "Do Not" Done?* Canadian Institute for Health Information.

2018. "Commonwealth survey 2017 chartbook." *Canadian Institute for Health Information*. Accessed March 21, 2018. <https://www.cihi.ca/en/seniors-think-canadas-health-care-systems-have-room-to-improve-survey-finds>.
- Canadian Institute for Health Information. 2016. *Drug Trends in LTC*. Canadian Institute for Health Information.
- Canadian Institute for Health Information. 2014. *Drug Use Among Seniors on Public Drug Programs in Canada, 2012 Revised October 2014*. Canadian Institute for Health Information.
- Canadian Institute for Health Information. 2017. *National Prescription Drug Utilization Information System Database Plan Information Document*. Canadian Institute for Health Information.
- "Residential Care." *Canadian Institute for Health Information*. Accessed March 20, 2018. www.cihi.ca/en/residential-care.
- Canadian Institute for Health Information. 2017. *Seniors in Transition: Exploring Pathways across the Care Continuum*. Canadian Institute for Health Information.
- Dalton, K., and S. Byrne. 2017. "Role of pharmacist in reducing healthcare costs: current insights." *Integrated Pharmacy Research and Practice* 6: 37-46.
- Daniel, D. 2018. *Tele-pharmacists improving med reconciliation in LTC*. Canadian Healthcare Technology. July 3. <https://www.canhealth.com/2018/07/03/tele-pharmacists-improving-med-reconciliation-in-ltc/>.
- De Angelis, B., and A. Ng. 2015. "Transitioning your career to residential and long-term care practice." *Canadian Pharmacists Conference 2015*. Canadian Pharmacists Association; Ontario Pharmacists Association.
- De La Maisonneuve, C., and J. Oliveira Martins. 2013. *Public spending on health and long-term care: a new set of projections*. Paris: Organisation for Economic Co-operation and Development.
- Farrell, B., S. Shamji, A. Monahan, and V. Merkley. 2013. "Clinical vignettes to help you deprescribe medications in elderly patients." *Canadian Family Physician* 59: 1257-1258.
- Field, T., J. Gurwitz, J. Avorn, D. McCormick, S. Jain, and M. et al Eckler. 2001. "Risk factors for adverse drug events among nursing home residents." *Archives of Internal Medicine* 161 (13): 1629-34.
- Gibbard, R. 2017. *Sizing Up the Challenge: Meeting the Demand for Long-term Care in Canada*. Ottawa: The Conference Board of Canada.

- Government of Alberta. 2017. *2015/2016 Alberta Long-Term Care Resident Profile*. Government of Alberta.
- Government of British Columbia. n.d. "Pharmacare for B.C. Residents: Who We Cover." *Government of British Columbia*. Accessed May 2018. <https://www2.gov.bc.ca/gov/content/health/health-drug-coverage/pharmacare-for-bc-residents/who-we-cover>.
- Government of New Brunswick. 2018. "New Brunswick Drug Plans Formulary." *Government of New Brunswick Health*. March. <http://www2.gnb.ca/content/dam/gnb/Departments/h-s/pdf/en/NBDrugPlan/NewBrunswickDrugPlansFormulary.pdf>.
- Gurwitz, J. H., T.S. Field, J. Judge, P. Rochon, L. Harrold, C. Cadoret, M. Lee, et al. n.d. "The incidence of adverse drug events in two large academic long-term care facilities." *The American Journal of Medicine* 118 (3): 251-258.
- Handler, S., D. Nace, S. Studenski, and D. Fridsma. 2004. "Medication Error Reporting in Long-Term Care." *The American Society of Geriatric Pharmacotherapy* 2 (3): 190-196.
- Handler, S.M., D.A. Nace, S.A. Studenski, and D.B. Fridsma. n.d. "Medication error reporting in long term care." *The American Journal of Geriatric Pharmacotherapy* 2 (3): 190-196.
- Health Quality Ontario. 2017. *Measuring Up 2017*. Health Quality Ontario.
- Health Quality Ontario. 2016. *Palliative Care at the End of Life*. Toronto: Queen's Printer for Ontario.
- Heppenstall, C., J. Broad, M. Boyd, J. Hikaka, X. Zhang, J. Kennedy, and M. Connolly. 2016. "Medication use and potentially inappropriate medications in those with limited prognosis living in residential aged care." *Australasian Journal on Ageing* 35 (2): E18-E24.
- Hillen, J., A. Vitry, and G. Caughey. 2015. "Evaluating medication-related quality of care in residential aged care: a systematic review." *SpringerPlus* 4 (220).
- Institute for Safe Medication Practices Canada. 2018. "Safer Medication Use in Older Persons Information Page." *ISMP Canada*. Accessed April 9, 2018. https://www.ismp-canada.org/beers_list/.
- Institute for Safe Medicine Practices Canada. 2018. "Design of eMAR Systems with End-Users in Mind: Learning from a Fatal Incident in Long-Term Care." *ISMP Canada Safety Bulletin* 18 (8). <https://www.ismp-canada.org/download/safetyBulletins/2018/ISMPCSB2018-i8-eMAR.pdf>.

- Institute of Medicine . 2006. *Preventing Medication Errors*. Washington, DC: National Academies Press.
- Kojima, G. 2015. "Prevalence of Frailty in Nursing Homes: A Systematic Review and Meta-Analysis." *Journal of Post-Acute and Long-Term Medicine* 16: 940-945.
- Kong, J., and Certina Ho. 2017. "Medication safety in long-term care." *Home and Long-term Care News*, September 12. <http://homeandlongtermcare.ca/medication-safety-in-long-term-care/>.
- Maclagan, L., C. Maxwell, S. Gandhi, J. Guan, C. Bell, D. Hogan, N. Daneman, et al. n.d. "Frailty and Potentially Inappropriate Medication Use at Nursing Home Transition." *Journal of the American Geriatric Society* 65 (10): 2205-2212.
- Manitoba Health, Seniors and Active Living. 2015. *Annual Statistics 2014-2015*. Government of Manitoba. <http://www.gov.mb.ca/health/annstats/as1415.pdf>.
- Matlow, J., S. Bronskill, A. Gruneir, C. Bell, N. Stall, N. Herrman, D. Seitz, et al. 2017. "Use of Medications of Questionable Benefit at the End of Life in Nursing Home Residents with Advanced Dementia." *Journal of American Geriatric Society* 65 (7): 1535-1542.
- McDerby, N., M. Naunton, A. Shield, K. Bail, and S. Kosari. 2018. "Feasibility of Integrating Residential Care Pharmacists into Aged Care Homes to Improve Quality Use of Medicines: Study Protocol for a Non-Randomised Controlled Pilot Trial." *International Journal of Environmental Research and Public Health* 15 (499).
- Medisystem. 2016. "Medisystem Newsletter Deprescribing Resident-Centred Care." October. Accessed April 10, 2018. [http://www.medisystempharmacy.com/pdfs/1_LTC_DEPRESCRIBING2_D_OCT13_\(2\).pdf](http://www.medisystempharmacy.com/pdfs/1_LTC_DEPRESCRIBING2_D_OCT13_(2).pdf).
- Ministry of Health and Long-Term Care. 2016. *Professional Pharmacy Services Guidebook 3.0*. Ministry of Health and Long-Term Care. <http://www.health.gov.on.ca/en/pro/programs/drugs/medscheck/docs/guidebook.pdf>.
- Morgan, S., J. Hunt, J. Rioux, J. Proulx, D. Weymann, and C. Tannenbaum. 2016. "Frequency and cost of potentially inappropriate prescribing for older adults: a cross-sectional study." *Canadian Medical Association Journal Open* 4 (2): E346-E351.
- Muscedere, J., P. Kim, P. Aitken, M. Gaucher, R. Osborn, B. Farrell, J. Holroyd-Leduc, et al. 2017. "Proceedings of the Canadian Frailty Network Summit: Medication Optimization for Frail Older Canadians." *Canadian Geriatrics Journal* 20 (4).
- Muscederre, J., M. Andrew, S. Bagshaw, C. Estabrooks, D. Hogan, J. Holroyd-Leduc, S. Howlett, et al. 2016. "Screening for Frailty in Canada's Health Care System: A Time for Action." *Canadian Journal on Aging* 35 (3): 281-297.

- Neighborhood Pharmacy Association of Canada. 2018. "Pharmacy Health and Beauty Expo Program: Community Pharmacists as Catalysts for Deprescribing - Results of a Pilot Study." *Neighbourhood Pharmacy Association of Canada*. April 3. Accessed April 9, 2018. <http://pharmacyhealthandbeautyexpo.ca/program/>.
- Ontario Long Term Care Association. 2018. *This is Long Term Care 2018*. Ontario Long Term Care Association.
- Ontario Long Term Care Association. 2016. *This is Long-Term Care 2016*. Ontario Long Term Care Association.
- Ontario Ministry of Health and Long-Term Care. 2011. *A Guide to the Long-Term Care Homes Act, 2007 and Regulation 79/10*. Toronto: Queen's Printer for Ontario.
- "Notice from the Executive Officer: Supporting Sustainability and Access for the Ontario Drug Benefit Program." *Ontario Ministry of Health and Long-Term Care: Ontario Public Drug Programs*. Accessed April 16, 2018. http://www.health.gov.on.ca/en/pro/programs/drugs/opdp_eo/notices/exec_office_20150917_3.pdf.
2016. "Professional Pharmacy Services Guidebook 3.0." *Ontario Ministry of Health and Long-Term Care*. July. Accessed April 13, 2018. <http://www.health.gov.on.ca/en/pro/programs/drugs/medscheck/docs/guidebook.pdf>.
- Ontario Ministry of Health and Long-Term Care. . n.d. *MedsCheck*. Accessed 2 13, 2019. http://www.health.gov.on.ca/en/pro/programs/drugs/medscheck/ltc_residents.aspx.
- Palagyi, A., L. Keay, J. Harper, J. Potter, and R. Lindley. 2016. "Barricades and brickwalls - a qualitative study exploring perceptions of medication use and deprescribing in long-term care." *BMC Central Geriatrics* 16 (15).
- Pierson, S., R. Hansen, S. Greene, C. Williams, R. Akers, M. Jonsson, and T., Carey. 2007. "Preventing medication errors in long-term care: results and evaluation of a large scale web-based error reporting system, *Quality and Safety in Health Care*." 16 (4).
- Poss, J., J. Chi-Ling, G. Grinchenko, and J. Blums. 2017. "Location, Location, Location: Characteristics and Services in Long-Stay Home Care Receptients in Retirement Homes Compared to Others in Private Homes and Long-Term Care Homes." *Healthcare Policy* 12 (3).
- Reeve, E., W. Thompson, and B. Farrell. 2017. "Deprescribing: A narrative review of the evidence and practical recommendations for recognizing opportunities and taking action." *Eurpoean Journal of Internal Medicine* 38: 3-11.
- Rochon, P. 2018. *Drug Prescribing for Older Aults*. November. Accessed December 10, 2018. <https://www.uptodate.com/contents/drug-prescribing-for-older-adults>.

- Rosella, L., K. Kornas, A. Huang, C. Bornbaum, D. Henry, and W. Wodchis. 2018. "Accumulation of Chronic Conditions At The Time Of Death Increased In Ontario From 1994 To 2013." *Health Affairs* 37 (3): 464-472.
- Sluggett, J., J. Ilomaki, K. Seaman, and M. Corlis. 2017. "Medication management policy, practice and research in Australian residential aged care: Current and future directions." *Pharmacological Research* 116: 27-35.
- Szczepura, A., D. Wild, and S Nelson. 2011. "Medication administration errors for older people in long-term residential care." *BMC Geriatrics* 11 (1): 82.
- Tannenbaum, C., B. Farrell, J. Shaw, S. Morgan, J. Trimble, J. Currie, J. Turner, P. Rochon, and J. Silvius. 2017. "An Ecological Approach to Reducing Potentially Inappropriate Medication Use: Canadian Deprescribing Network." *Canadian Journal on Aging* 36 (1): 97-107.
- The Conference Board of Canada. 2016. *A Review of Pharmacy Services in Canada and the Health and Economic Evidence*. Canadian Pharmacists Association.
- The Institute for Safe Medication Practices Canada. 2010. "Medication Incidents Occuring in Long-Term Care." *ISMP Canada Safety Bulletin*, December 10. <https://www.ismp-canada.org/download/safetyBulletins/ISMPCSB2010-09-MedIncidentsLTC.pdf>.
- The Long-Term Care Homes Public Inquiry. 2018. *The Public Inquiry into the Safety and Security of Residents in the Long-Term Care Homes System*. Accessed December 10, 2018. <https://longtermcareinquiry.ca/en/>.
- Thomas, M., Andrea, G., Lee, M., Baril, J., Field, T., Gurwitz, J., and Rochon, P. "Nursing Time Devoted to Medication Administration in Long-Term Care: Clinical, Safety, and Resrouce Implications", *The American Geriatrics Society* 57 (2009): 266-272. <https://interruptions.net/literature/Thomson-JAmGeriatrSoc09.pdf>
- Thompson, W., and B. Farrell. 2013. "Deprescribing: What Is It and What Does the Evidence Tell Us?" *Canadian Journal of Hospital Pharmacy* 66 (3).
- Todd, A., and H. Holmes. 2015. "Recommendations to support deprescribing medications late in life." *International Journal of Clinical Pharmacology* 37: 678-681.
- Tonelli, M., N. Wiebe, S. Straus, M. Fortin, B. Guthrie, M. James, S. Klarenbach, et al. 2017. "Multimorbidity, dementia and health care in older people: a population-based cohort study." *Canadian Medical Association Journal Open* 5 (3): E623-E631.
- van der Meer, H., K. Taxis, and L. Pont. 2018. "Changes in Prescribing Symptomatic and Preventive Medications in the Last year of Life in Older Nursing Home Residents." *Frontiers in Pharmacology* 8 (990).

- Vuong, V., D. O'Donnell, H. Navare, D. Merrill, M. Racki, S. Burton, L. Anderson, and C. Beaton. 2017. "BOOMR: Better Coordinated Cross-Sectoral Medication Reconciliation for Residential Care." *Healthcare Quarterly* 20 (1).
- Wallerstedt, S., J. Kindblom, K. Nylén, O. Samuelsson, and A. Strandell. 2014. "Medication reviews for nursing home residents to reduce mortality and hospitalization: systematic review and meta-analysis." *British Journal of Clinical Pharmacology* 78 (3): 488-497.
- Wang, K., E. Chen, J. Gilmartin-Thomas, and J. Ilomaki. 2018. "Medications and Prescribing Patterns as Factors Associated with Hospitalizations from Long-Term Care Facilities: A Systematic Review." *Drugs Aging*.
- Whitty, R., S. Porter, K. Battu, P. Bhatt, E. Koo, C. Kalocsai, P. Wu, et al. 2018. "A pilot study of a Medication Rationalization (MERA) intervention." *Canadian Medical Association Journal Open* 6 (1): E87-E94.
- Williams, A., V. Crooks, K. Whitfield, M. Kelley, L. DeMiglio, and S. Dykeman. 2010. "Tracking the evolution of hospice palliative care in Canada: a comparative case study analysis of seven provinces." *BMC Health Services Research* 10 (147).
- Wu, C., C. Bell, and W. Wodchis. 2012. "Incidence and Economic Burden of Adverse Drug Reactions among Elderly Patients in Ontario Emergency Departments." *Drug Safety* 35 (9): 769-781.

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