

The Role of Home Care Pharmacists in the Edmonton Zone: A Retrospective Study

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ABSTRACT

Background: Despite the rising demand for home-based health care services in Canada and the increasing medical complexity of elderly patients, there is limited literature exploring the role of home care pharmacists and the clinical activities they perform.

Objectives: The primary objective was to describe the types and frequencies of clinical activities (both interventions and recommendations) performed by home care pharmacists upon initial consultation. The secondary objective was to determine which patient characteristics resulted in the highest number of clinical activities.

Methods: This study was a retrospective review of adult patients who had an initial in-person or telemedicine consultation with home care pharmacists from June 2018 to May 2019 in the Edmonton Zone of Alberta Health Services.

Results: Of the 355 patients whose records were screened, 318 (89.6%) were included in the analysis. Of these, 191 (60.1%) were female, and the median age was 79 years (interquartile range [IQR] 68–86 years). The median numbers of medical conditions and medications were 6 and 10, respectively. Of the total of 1172 clinical activities, there was a median of 3 (IQR 2–5) per patient, irrespective of the patient's medical conditions, including those with the most common conditions. The most common activities were patient counselling ($n = 160$, 13.7%), collaboration with another health care professional ($n = 157$, 13.4%), and deprescribing ($n = 140$, 11.9%). Across all activities, pharmacists performed a total of 562 interventions and made 610 recommendations. Each additional year of age and each additional medication on a patient's medication list resulted in an increase in the number of clinical activities (by 0.01 for each additional year of age [$p = 0.003$] and by 0.03 for each additional medication [$p < 0.001$]).

Conclusions: Home care pharmacists in the Edmonton Zone performed a wide range of clinical activities, particularly for older patients and those with more medications. Further research is required to evaluate the outcomes of pharmacist consultations.

Keywords: clinical pharmacy service, home care pharmacist, clinical activity, pharmacy practice, Alberta, home visit

RÉSUMÉ

Contexte : Malgré l'augmentation de la demande de services de soins de santé à domicile au Canada et la complexité médicale croissante des patients âgés, il existe peu de documentation examinant le rôle des pharmaciens au sein de l'équipe de soins à domicile et leurs activités cliniques.

Objectifs : L'objectif primaire consistait à décrire le type et la fréquence des activités cliniques (interventions et recommandations) effectuées par les pharmaciens à domicile lors de la consultation initiale. L'objectif secondaire consistait quant à lui à déterminer les caractéristiques des patients qui ont entraîné le plus grand nombre d'activités cliniques.

Méthodes : Cette étude était une revue rétrospective de patients adultes ayant eu une première consultation en personne ou par télémédecine avec des pharmaciens de soins à domicile de juin 2018 à mai 2019 dans la zone d'Edmonton des services de soins de santé de l'Alberta.

Résultats : Sur les 355 patients dont les dossiers ont été examinés, 318 (89,6 %) ont été inclus dans l'analyse. Parmi eux, l'âge médian était de 79 ans (écart interquartile [IQR] 68–86) et 191 (60,1 %) étaient des femmes. Le nombre médian de problèmes médicaux et de médicaments était respectivement de 6 et 10. Sur les 1172 activités cliniques au total, le nombre médian était de 3 activités (IQR 2-5) par patient, indépendamment de ses problèmes médicaux, y compris ceux présentant les maladies les plus courantes. Les activités les plus courantes étaient le conseil aux patients ($n = 160$, 13,7 %), la collaboration avec un autre fournisseur de soins de santé ($n = 157$, 13,4 %) et la déprescription ($n = 140$, 11,9 %). Toutes activités confondues, les pharmaciens ont effectué 562 interventions et fait 610 recommandations. Chaque année d'âge supplémentaire et chaque médicament ajouté à la liste des médicaments donnaient lieu à une augmentation du nombre d'activités cliniques (de 0,01 pour chaque année d'âge supplémentaire [$p = 0,003$] et de 0,03 pour chaque médicament supplémentaire [$p < 0,001$]).

Conclusions : Les pharmaciens de soins à domicile de la zone d'Edmonton effectuaient un large éventail d'activités cliniques, en particulier pour les patients âgés et ceux prenant plus de médicaments. Des recherches supplémentaires sont nécessaires pour évaluer les résultats des consultations des pharmaciens.

Mots-clés : service de pharmacie clinique, pharmacien de soins à domicile, activité clinique, pratique de la pharmacie, Alberta, visite à domicile

INTRODUCTION

The increasing costs of delivering acute care health services has prompted a shift toward optimizing the care of community-dwelling patients.¹ These efforts are aimed at keeping patients in their own homes for longer, to avoid unnecessary hospitalizations and emergency room visits.^{1,2} As the number of older adults (over the age of 65 years) continues to rise in the next decade, the strains on the health care system will be further magnified, and the utilization of alternatives to facility-based care will parallel this increase.^{3,4} The changing landscape of health service delivery, with greater emphasis on community-based care, is in line with the preferences of many older Canadians, who wish to live in their own homes for as long as they are able.⁵

Continuing care programs across the country seek to address this demand by providing an array of nursing and medical services to enable individuals to receive care within the safety and comfort of their own homes.⁵ Data gathered from home care programs in Canada have revealed that many home care patients are older adults, living with multiple medical conditions and correspondingly complex medication regimens.^{2,4} In 2011, approximately 24% of older adults reported having 3 or more formally diagnosed chronic conditions, and according to public drug program data, nearly two-thirds of adults over the age of 65 had claims for more than 5 medications.⁴ Furthermore, older adults are at increased risk of hospitalization due to adverse drug events.⁶⁻⁸ Many of these adverse drug events may be preventable at transitions of care from the hospital to the community.⁷ Once in the community, these patients may be seen by different prescribers and may be unable to regularly access office-based primary care services for a variety of reasons, including physical limitations.^{9,10}

Thus, home care pharmacists have the opportunity to optimize drug therapy management for patients who are at increased risk of adverse medication-related events and serve as a critical link between inpatient and community care by reconciling medication-related issues. Not only do home visits allow pharmacists to connect face to face with patients who may be unable to travel or leave their homes, but they also allow the pharmacists to gain insight into patients' use of compliance aids and medication storage.¹¹ Pharmacists in Alberta, in particular, are uniquely positioned to independently address multiple medication- and health-related concerns. With their expanded scope of practice in the province, pharmacists have the ability to administer drugs by injection, prescribe Schedule I medications, and order laboratory tests.^{12,13}

In the Edmonton Zone, home care services encompass professional consultative service providers (e.g., pharmacists, registered dietitians, speech language pathologists, occupational therapists, physical therapists, nurse practitioners, respiratory therapists, and recreation therapists)

and various support services, such as personal care services (e.g., bathing, grooming).¹⁴ As personnel functioning within a consult-based service, Edmonton Zone home care pharmacists receive patient referrals from home care case managers for any actual or perceived medication-related concerns. Case managers are responsible for assessing and managing all aspects of a patient's care. Given that pharmacists serve as core members on consultative teams, they commonly work with other home care health professionals and make clinical recommendations or initiate interventions. In this practice, pharmacists are generally involved in patient care for a limited time, addressing specific medication-related concerns relayed by the case manager. Within Alberta, no assessment has been done to qualify patient characteristics that are more likely to result in pharmacist interventions and recommendations.

Over the past 2 decades, various iterations of pharmacist-delivered services in the home setting have been described in the literature; these have largely consisted of pilot programs and research-based initiatives.^{10,11,15-25} The context of service delivery has ranged from post-hospital discharge visits by community pharmacists to referral-based and structured medication review programs.^{15,16,18,26} In general, findings from these studies have revealed that pharmacists were engaged in providing a number of clinical services, mostly consisting of medication reviews and medication reconciliation.¹⁵ Other clinical activities have included deprescribing, patient education, assessment of cognition, compliance support, and recommendations for laboratory monitoring.¹⁵ Notably, these services represent only a portion of the activities authorized under Alberta's scope of practice for pharmacists.²⁷

The current published literature provides limited insight into the range of clinical activities performed by pharmacists as members of a multidisciplinary home care team. Therefore, the primary objective of this study was to describe the types and frequencies of clinical activities (both interventions and recommendations) performed by home care pharmacists in the Edmonton Zone upon initial consultation. The secondary objective was to determine which patient characteristics resulted in the highest number of clinical activities.

METHODS

Study Design and Patient Population

This study was a retrospective chart review of home care patients referred by case managers for home care pharmacist services in the Edmonton Zone from June 1, 2018, to May 31, 2019. Patients were eligible for inclusion if they were registered under 1 of the 4 Edmonton Zone Home Care Networks and had received home care pharmacy services during the study timeframe. Patients were excluded if they were younger than 18 years of age, did not have a

pharmacist involved in their care, or did not have clinical documentation in their chart.

Data Sources and Data Collection

A list of patients registered to receive pharmacy services from June 1, 2018, to May 31, 2019, was generated from the electronic charting system (Meditech). Data were obtained from the electronic chart of each patient. In each case, the pharmacist's clinical documentation was obtained from the initial consultation notes, scanned documents (such as medication reconciliation records), and faxed consultation notes to physicians, at or near the time of the first consultation during the study time period. If patients had multiple consultations during the study period, only the first consultation was included. The following data were entered directly into a Research Electronic Data Capture (REDCap) database: age at time of initial consultation or home care pharmacy service, sex assigned at birth, main home care network, number and type of medical conditions, number of medications, type and frequency of clinical activities (see Appendix 1, available at <https://www.cjhp-online.ca/index.php/cjhp/issue/view/213>), and number of pharmacist-initiated interventions or recommendations.

Outcomes

The primary outcome was the overall median number (with interquartile range [IQR]) of pharmacist clinical activities performed per patient at the time of initial consultation; the activities were also detailed as the proportion of each type of clinical activity performed in relation to all activities (Appendix 1). The clinical activities encompassed both interventions and recommendations. A clinical activity was classified as an intervention if the pharmacist initiated an action or was actively managing the patient's therapy. A clinical activity was classified as a recommendation if the pharmacist made suggestions for changes to patient therapy or management. For example, provision of patient education and making changes to drug therapy were classified as interventions, whereas a suggestion to use an over-the-counter or nonprescription medication was classified as a recommendation. Pharmacists' recommendations were provided to other care providers, which could include the case manager, nurse practitioner, home care physician, primary care physician, or specialist physician, or were given directly to the patient. Therefore, the clinical activities analyzed in this study encompassed both recommendations made by the pharmacist and interventions or changes initiated by the pharmacist. Other examples of clinical activities included prescribing, changing a medication dose, ordering a laboratory test, and providing seamless care.

Secondary outcomes included the disease states for which the most clinical activities were performed, the median number of clinical activities performed per patient for each of the 5 most common medical conditions, and the

median number of pharmacist-initiated interventions and recommendations per patient. Another set of secondary outcomes consisted of the differences in number of clinical activities performed for patients stratified by age, sex, number of medications, and whether they were receiving Medication Assistance Program (MAP) services. The MAP is a program available to home care patients who require assistance to take their medications. Before any patient receives MAP services, medication reconciliation is completed by a health care professional.

Statistical Analysis

Descriptive statistics generated in REDCap and Microsoft Excel software were used to define the study group. Percentages and medians (with IQR) are reported, where applicable. Poisson regression was performed by Alberta Strategy for Patient Oriented Research (using R software, version 4.0.0) to determine the influence of the following patient characteristics on the number of clinical activities: age, sex, number of medications, and whether patients received MAP services. This study was approved by the University of Alberta Health Research Ethics Board (Pro00094658).

RESULTS

Patient Characteristics

From among the 355 patient records screened, 318 (89.6%) patients were included in the study; the other 37 patients were excluded because pharmacists' clinical documentation was not available in the chart. The median age was 79 years, and 191 (60.1%) of the patients were female (Table 1). The median number of medical conditions was 6 (IQR 4–8). The 5 most prevalent medical conditions were hypertension (62.9%), followed by type 2 diabetes (39.9%), osteoarthritis (39.6%), depression (29.2%), and dyslipidemia (28.9%). The median number of medications was 10 (IQR 7–14), and 53.5% of patients were receiving MAP services at the time of the initial pharmacist consultation. Most of these patients required full assistance and supervision (level 3 MAP) to administer at least 1 medication (Table 1).

Clinical Activities

Pharmacists performed a total of 1172 clinical activities at initial consultation, with a median of 3 (IQR 2–5) clinical activities per patient. The most common clinical activities were patient/caregiver counselling (13.7%), collaborating or intending to collaborate with another health care professional (13.4%), deprescribing (11.9%), and adjusting medication doses (9.4%) (Table 2). There were no differences in the median number of clinical activities performed per patient among those with any of the 5 most common medical conditions (median of 3 clinical activities per patient).

Furthermore, for each additional year of age and each additional medication, there was an increase in the number

TABLE 1. Demographic Characteristics of Home Care Patients Who Received Clinical Pharmacy Services

Characteristic	No. (%) of Patients ^a (n = 318)	
Age (years) (median and IQR)	79	(68–86)
Sex, female	191	(60.1)
No. of medications (median and IQR)	10	(7–14)
Medication Assistance Program client ^b	170	(53.5)
Level 1	2	(1.2)
Level 2	23	(13.5)
Level 3	145	(85.3)
No. of medical conditions (median and IQR)	6	(4–8)
Most common medical conditions		
Hypertension	200	(62.9)
Diabetes mellitus, type 2	127	(39.9)
Osteoarthritis	126	(39.6)
Depression	93	(29.2)
Dyslipidemia	92	(28.9)
Hypothyroidism	82	(25.8)
Chronic obstructive pulmonary disease	79	(24.8)
Gastroesophageal reflux disease, peptic ulcer disease, gastritis	79	(24.8)
Chronic pain	63	(19.8)
Coronary artery disease	58	(18.2)
Cognitive decline, unspecified	52	(16.4)
Atrial fibrillation	49	(15.4)
Chronic kidney disease	46	(14.5)
Osteoporosis	45	(14.2)
Congestive heart failure	45	(14.2)

IQR = interquartile range.

^aExcept where indicated otherwise.

^bIndicates the highest level of medication assistance required for any medication, where level 1 (reminder) = the patient requires a verbal reminder to take their medications and is otherwise independent; level 2 (some/partial assistance) = the patient does not require supervision to take their medications as they are able to manage their own medications with minimal assistance, but the patient may require assistance opening containers; and level 3 (full assistance) = a health care aide takes medications out of the packaging and assists and supervises the patient to ensure the medications are taken. The percentage for each level is based on the number of patients who were clients of the program (n = 170).

of clinical activities performed: by 0.01 (95% confidence interval [CI] 0.001–0.014) for each additional year of age ($p = 0.003$) and by 0.03 (95% CI 0.01–0.04) for each additional medication on their medication list ($p < 0.001$). A small effect of sex on pharmacist clinical activities was also observed, whereby female sex was correlated with a slightly higher number of clinical activities (1.24 activities/patient among female patients versus 1.11/patient among male patients, 95% CI for the ratio 0.95–1.31, $p = 0.08$). In contrast, receiving medication assistance through the MAP was associated with a slightly lower number of clinical activities performed (0.86/patient, 95% CI 0.74–1.01, $p = 0.012$).

TABLE 2. Clinical Activities Performed by Home Care Pharmacists and Frequency of Total Clinical Activities Per Patient^a

Clinical Activity ^b	No. (%) of Activities (n = 1172)
Patient/caregiver counselling or education	160 (13.7)
Collaborate or intent to collaborate with another health care professional	157 (13.4)
Deprescribe/discontinue medication	140 (11.9)
Medication dose change	110 (9.4)
Recommend an over-the-counter/nonprescription medication	109 (9.3)
Formulation or medication change	86 (7.3)
Referral to another health care professional	84 (7.2)
Prescribing	76 (6.5)
Order laboratory test(s)	71 (6.1)
Seamless care	66 (5.6)
Change in medication timing	58 (4.9)
Medication adherence	54 (4.6)
Administer injection ^c	1 (0.1)
No. of clinical activities per patient (median and IQR)	3 (2–5)

IQR = interquartile range.

^aClinical activities were performed for a total of 304 patients.

^bDefinitions of the clinical activities appear in Appendix 1 (available at <https://www.cjhp-online.ca/index.php/cjhp/issue/view/213>).

^cHome care pharmacists are generally not involved in administering or assisting with the administration of medications, including injections.

Pharmacist-Initiated Interventions and Recommendations

In this study, pharmacists initiated a total of 562 interventions for 284 patients, for a median of 2 (IQR 1–3) per patient (Table 3). A large proportion of pharmacist-initiated interventions involved patient education/counselling (28.5%) and collaborating with another health care professional (27.9%).

Pharmacists also made 610 recommendations for 216 patients (median of 2 [IQR 1–4] per patient). Deprescribing was the most frequent type of recommendation (21.1%) (Figure 1, Table 3). Recommending an over-the-counter or nonprescription medication was the second most commonly suggested change to drug therapy (17.9%).

DISCUSSION

In this study, older patients with multiple medications were more likely to have greater involvement of pharmacists in their care. The pharmacists' substantial role in

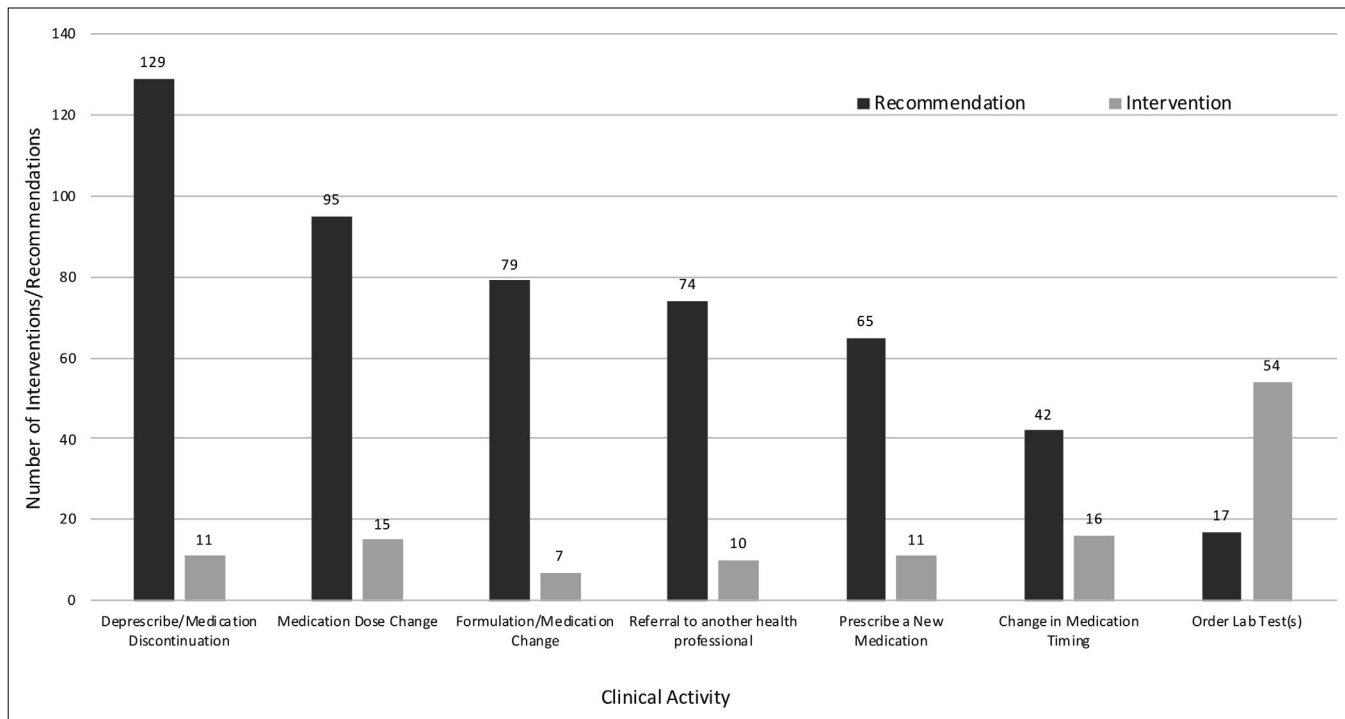


FIGURE 1. Relative frequency of selected pharmacist-initiated activities that could be classified as either an intervention or a recommendation.

managing medication therapy for home care patients is further supported by previous findings that advanced age and higher number of medications are risk factors for adverse medication-related events.²⁸ Furthermore, although many patients had cardiovascular disease, an array of other medical conditions was seen in this population. Considering that the median number of clinical activities was the same for patients with the 5 most common medical conditions as for all patients combined, the presence or absence of certain disease states is not a good indicator to identify patients who should be referred to a home care pharmacist. Case managers who are triaging patients requiring professional care services could instead consider placing greater emphasis on the patient's age or number of medications when determining whether to initiate a referral for pharmacy services.

The overall characteristics of our patient population were similar to those of other home care patient populations in Canada and those observed in previous studies examining in-home pharmacy services.^{2,4,6,28} Patients referred for home care pharmacy services were generally elderly individuals, with a complex array of medications and medical conditions, as well as high rates of hypertension (62.9%) and diabetes (39.9%). Many also had higher-level care needs, often requiring assistance with medication administration; as such, they constituted a population at risk for adverse medication-related events. Although patient education (13.7%) and collaborating with another health care professional (13.4%) were the most common clinical activities, pharmacists provided a number of other services, with the frequencies of these activities being fairly evenly distributed.

In addressing medication-related issues, home care pharmacists made recommendations and performed interventions. Almost two-thirds of all pharmacist recommendations (62.7% [410/610]) involved a suggestion to alter medication therapy in some way. This total encompassed recommendations to change medication doses, timing, or formulation, as well as recommendations for prescribing and deprescribing medications. Pharmacists also made use of their expanded scope of practice in Alberta to perform a variety of active interventions, including preparation of laboratory test requisitions to monitor medication therapy. Home-bound patients may be unable to easily access laboratory services; therefore, home care pharmacists have the opportunity to initiate in-home lab collections and ensure timely monitoring of patients' health status and response to medications. Home care pharmacists were also largely involved in recommending or initiating deprescribing, thus demonstrating their role in mitigating polypharmacy. The use of multiple medications continues to be a growing concern among elderly patients because of the increased risk of drug-related problems.^{28,29} Our findings suggest that home care pharmacists may play an important role as liaisons between primary and tertiary care, as well as providing care to patients who may be home-bound or unable to regularly visit other health care providers.

The need for patient education among home-bound patients is illustrated by the fact that approximately half of all patients received medication-related education, similar to rates described in previous studies of home visit and consultant pharmacy programs.^{15,26} Home care pharmacists

TABLE 3. Frequency of Pharmacist Interventions and Recommendations

Intervention or Recommendation	No. (%)
Intervention	
	<i>n</i> = 562
Patient/caregiver counselling or education	160 (28.5)
Collaborate or intent to collaborate with another health care professional	157 (27.9)
Seamless care	66 (11.7)
Medication adherence	54 (9.6)
Order laboratory test(s)	54 (9.6)
Change in medication timing	16 (2.8)
Medication dose change	15 (2.7)
Prescribing	11 (2.0)
Deprescribing	11 (2.0)
Referral to another health care professional	10 (1.8)
Formulation/medication change	7 (1.2)
Administer injection	1 (0.2)
No. of interventions per patient (<i>n</i> = 284 patients)	Median 2 (IQR 1–3)
Recommendation	
	<i>n</i> = 610
Deprescribing	129 (21.1)
Recommend over-the-counter or nonprescription medication	109 (17.9)
Medication dose change	95 (15.6)
Formulation/ medication change	79 (13.0)
Referral to another health care professional	74 (12.1)
Prescribing	65 (10.7)
Change in medication timing	42 (6.9)
Order laboratory test(s)	17 (2.8)
No. of recommendations per patient (<i>n</i> = 216 patients)	Median 2 (IQR 1–4)

IQR = interquartile range.

may also play a role in reinforcing medication education for patients recently discharged from hospital. These individuals may be at a particularly increased risk of medication errors upon discharge as a result of misunderstandings related to medication changes during the hospital stay.³⁰ This finding emphasizes that the home care pharmacist's role in patient care goes beyond the number of medication changes or interventions made or recommended, and further illustrates how pharmacists may facilitate care in the transition between inpatient and outpatient care settings. The ability to speak directly with other caregivers in the home, assess the patient's living environment, and review medication adherence techniques and storage of medications gives the home care pharmacist valuable opportunities to evaluate and address potential or actual drug-related problems.

Interprofessional collaboration was another highly prevalent activity in home care pharmacy practice. These findings are in alignment with a recent review of 75 studies, which concluded that a majority of home visit programs involved pharmacist collaboration with a physician

or other health care professional.¹⁵ Beyond communicating with the referring case manager, home care pharmacists also frequently engaged with other providers to promote collaboration, with a view to resolving concerns and facilitating continuity of care. Given the pharmacist's role as a consultant on the home care team and the varied level of interprofessional collaboration with other providers, each pharmacist exercises discretion in determining the appropriateness of initiating an intervention and/or making a recommendation. In some instances, the pharmacist is involved in the patient's care for only a brief period and thus performs a consultative role and relays recommendations to other health care providers, whereas in other instances the pharmacist will implement clinical activities. This is exemplified by the balance seen in terms of the overall proportions of clinical activities that were classified as interventions (48%) and recommendations (52%).

Our study had some limitations. As it was a retrospective record review, we were reliant on documentation within the patients' charts. Also, the clinical activities that we identified could not be linked to specific medical conditions or medications. Therefore, the frequency of clinical activities for patients with the top 5 medical conditions reflected the overall number of clinical activities performed, rather than activities directed at optimizing the management of particular medical conditions. Given that our study was designed to capture initial consultations, we did not follow charts forward to determine whether pharmacists' recommendations were implemented. Our inability to quantify economic, clinical, or humanistic outcomes was an additional limitation. Finally, the study was limited to patients served within the greater Edmonton Zone, and the findings will have limited generalizability to other home care programs.

CONCLUSION

To our knowledge, this is the first study in Alberta to elucidate the role of home care pharmacists and to capture the clinical activities that they perform. Limited international studies have outlined the role of the pharmacist in an established home care team.^{6,15,26} This study demonstrates that home care pharmacists are engaged in various clinical activities, including activities related to an expanded scope of practice, such as prescribing, which underlines the need for medication management services among home care patients. In collaboration with the multidisciplinary home care team, home care pharmacists play a large role in optimizing therapy for older patients who are taking several medications, and future referrals by case managers should target such patients. Optimizing the referral process will lead to more efficient use of limited pharmacist resources for the patients who need them most. Further research is warranted to determine the rates of acceptance and implementation of pharmacist recommendations and their

impact in achieving treatment targets for various medical conditions alongside desired clinical outcomes, as well as to measure patient satisfaction with services.

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