

ADOPTION OF THE NOVA SCOTIA (CANADA) COMMUNITY PHARMACY MEDICATION MANAGEMENT PROGRAM, 1-YEAR POST-INITIATION

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ABSTRACT

Background

Pharmacists conduct medication reviews to optimize drug therapy. Each jurisdiction implements and funds these programs differently.

Objective

To describe the uptake of the first year of a community pharmacy medication review program reimbursed by the publically insured seniors' drug benefit program in Nova Scotia, Canada.

Methods

This retrospective analysis included 294 pharmacies and 105,000 beneficiaries enrolled in the Nova Scotia Seniors' Pharmacare Program. Prescription and service claims data from this program were analyzed to determine type and number of beneficiaries receiving a medication review, number and predictors of pharmacies completing reviews, and number of prescribed medications 6-months before and 6-months after the review.

Results

428 medication reviews were conducted and billed by 33% of Nova Scotia pharmacies (1–50 reviews per pharmacy per year). The mean number and range of medications before the review were 10.8 (4–28) and following the review 10.4 (0–24), with an average decrease of 0.4 medications (95% CI 0.1–0.6), $p = .0043$. Patients receiving a review had a mean age of 75.2 years; 64.9% were female. Most pharmacies conducted reviews when patients reached their annual copayment (93%).

Conclusions

Approximately 33% of pharmacies billed at least one medication review in the first year of the program. In spite of a \$150 reimbursement per community pharmacy medication review, only 428 reviews were conducted over a 13-month period for a population of over 100,000 seniors.

Results suggest financial reimbursement alone is not sufficient to implement a medication management program; health systems need to determine patient, pharmacist, pharmacy and health system level strategies to implement medication reviews more broadly.

Key words: *medication management review, pharmacy reimbursement, medication therapy management, pharmacy services*

Preventable drug-related morbidity is a concern in older persons causing adverse drug events, decreased quality of life and increased health services utilization.^{1–10} Older persons may have misuse, underuse, and unnecessary use of medications.^{11–13} Various factors contribute to prescription drug-related adverse events. Seniors develop multiple chronic illnesses^{1–3,5–7,9,10} with 24% of seniors having at least 3 chronic diseases.¹⁴ These older persons with multiple chronic illnesses take an average of 6 prescription medications and have twice the rate of visits to family physicians and nearly 3 times the rate of visits to emergency departments as seniors with only one chronic illness.¹⁵ They may also have altered kidney and liver function as well as

pharmacodynamic changes making them more likely to experience adverse drug effects. They may be seeing several different prescribers and receiving prescriptions at several pharmacies.¹⁶ As the number of physicians seen by older people increases, the risk of potentially inappropriate drug combinations also increases.^{17,18}

Several approaches have been adopted to optimize drug therapy.¹⁹ One promising approach is the increased role of the pharmacist.^{20–30} However, studies to support the expanded role of pharmacists are limited in the community pharmacy setting.^{21,31,32}

Medication reviews have the potential to increase the safety, effectiveness, and affordability of medicines. Medication management programs have been implemented in various jurisdictions. For example, in the US in 2006, the federal Centers for Medicare and Medicaid introduced a Medicare Prescription Drug Benefit (Medicare Part D) with the goal to optimize drug therapy and improve patient adherence.^{33,34} Individual US states and integrated health care systems also developed community pharmacy led medication management initiatives.^{35–42} In England, community pharmacists provide new medicine reviews as well as medication use reviews which are advanced services requiring specific training.^{43,44} In Australia, collaborative medication reviews provided by general practitioners and accredited community pharmacists⁴⁵ have been implemented.^{28,46–49}

In Canada, the patients eligible for publically funded pharmaceutical drug benefits, the type of pharmacist patient centred services and its reimbursement, as well as its integration into primary care vary by province. While roles and responsibilities for health care are shared between federal/provincial and territorial governments, the administration and delivery of health care is primarily a provincial/territorial government responsibility. Provincial governments develop their own drug insurance policy instruments and use various reimbursement approaches and rates for medication management services provided by pharmacists. In addition, each province has its own pharmacy legislation and regulatory body with specific standards of practice. Both the type of program and the reimbursement vary.

Community pharmacists have increased their scope of practice and now have authority and responsibility in a number of areas including prescribing and medication management. Comprehensive medication

management has been defined as “a patient-centred, systematic process of:

- patient assessment
- assessment of medication therapies for appropriateness, effectiveness, safety and adherence
- identification of drug-related problems
- create and implement care plan, with patient
- collaboration and communication with other health care professionals
- evaluation, documentation and continuous follow-up.”⁵⁰

The Canadian Pharmacists Association’s *Blueprint for Pharmacy*⁵¹ noted that some form of medication assessment/review/management was occurring in 9 of the 10 Canadian provinces (British Columbia, Alberta, Saskatchewan, Ontario, Quebec, New Brunswick, Nova Scotia, Prince Edward Island and Newfoundland). Each province has its own legislative framework and pharmacare program.

In Nova Scotia, a pharmacist coordinated medication review service became an insured service under the Nova Scotia Seniors’ Pharmacare Program (NSSPP) in April 2008. The Medication Review Program was developed by the Nova Scotia Department of Health and Wellness in consultation with Pharmacy Association of Nova Scotia (PANS).⁵² The criteria for patients to be in the program included any patient enrolled in the NSSPP who were: in agreement they are a suitable candidate for the service; not living in a nursing home, residential care facility, or home for special care or receiving medications in compliance packages; taking ≥ 4 medications (or taking one of a list of several medications considered to be inappropriate in this patient population); and having at least one of the following chronic diseases: asthma, arthritis, diabetes, congestive heart failure, chronic obstructive pulmonary disease, hyperlipidemia, or hypertension. The total cost of the medication review billed to the Nova Scotia Department of Health and Wellness was \$150, and the patient paid 30% copayment unless the maximum copayment had been met. Each patient was allotted one medication review per year. Initially, the program included follow-up and had a process for documentation of follow-up.

The purpose of the study was to describe the uptake of the NSSPP Medication Review Program, from April 1, 2008 to April 30, 2009. The objectives

were to determine: (1) the number of medication reviews performed by pharmacies; (2) the number and demographic information of the patients who received a medication review; (3) the number and type of medications dispensed and the number of unique prescribers 6 months pre- and post-medication review; (4) the percentage of community pharmacies in the province that provided medication reviews and the rate of reviews per pharmacy; and (5) the geographic variation in rate of service provided based on urban/rural designation of pharmacy and the differences between the pharmacies with respect to prescription volume.

METHODS

Study Design

A retrospective population based study using Nova Scotia administrative health claims data which linked patient and pharmacy variables was conducted using data from April 1, 2008–April 30, 2009. The Dalhousie Research Ethics Board granted approval in February 2010 and subsequent renewals were obtained. (Dalhousie Ethics #2010-2148)

Study Population: Nova Scotia, a province of about 940,000 persons, provides hospital care and physician services to all insured persons. For seniors, it provides pharmaceutical drug coverage and related services for those who do not have drug insurance from another source. Approximately 100,000 of the 140,000 seniors in Nova Scotia are insured by the NSSPP. This program has an annual premium which is waived for lower income seniors and an annual maximum copayment. In 2009 the annual maximum premium was \$424 and the annual maximum copayment was \$382 (Personal correspondence, Nova Scotia Department of Health and Wellness). Community pharmacies are privately owned. The study population included all

beneficiaries of the NSSPP ≥ 66 years of age who received a medication review in a community pharmacy in Nova Scotia between April 1, 2008 and April 30, 2009. There were 294 community pharmacies in Nova Scotia. This was a retrospective study. Anonymized data from administrative prescription claims databases were used to determine: the demographic information of the beneficiaries of the NSSPP who had a medication review completed by a community pharmacist from April 1, 2008 to April 30, 2009; the percentage of community pharmacies that provided at least one medication review; and the number of medication reviews completed by each pharmacy as well as their urban/rural designation. The number and type of medications 6-months before and 6-months after the medication review were determined.

Measures and Data Analysis

Patient and Prescription Variables: The following demographic information of patients who received a medication review was determined for analysis and included: age; sex; and if the patient's maximum copayment for drug coverage was met at the time of the review. The number and type of medications dispensed, and the number of unique prescribers were determined for the 6-month period prior to, and following, the medication review. The number and type of medications the patients were dispensed 6 months before and after the medication review was used to provide information on whether the medication review service resulted in any change. The number and type of medications were defined by The World Health Organization (WHO) Anatomical Therapeutic Chemical (ATC) Classification system (http://www.whocc.no/atc_ddd_index/?code=C)*CA&showdescription=no) which classifies drug molecules into a hierarchy of 5 levels. Consider the following example in Table 1:

TABLE 1 Classification of Drug Molecules

Level	ATC Code	Example
1st	C	Cardiovascular system
2nd	C08	Calcium channel blockers
3rd	C08C	Selective calcium channel blockers with mainly vascular effects
4th	C08CA	Dihydropyridine derivatives
5th	C08CA01	amlodipine

Source: WHO Collaborating Centre for Drug Statistics Methodology

Drugs recorded in the NSSPP database are assigned WHO ATC codes. We analyzed the data at the 5th level, such as the chemical substance or unique medication to determine the number of drugs each person received. To determine if overall there were any types of drugs that increased or decreased in utilization after a medication review was completed we used the 3rd level ATC codes.

Pharmacy Variables: The number of community pharmacies in the province that completed at least one medication review from April 1, 2008 to April 30, 2009 was determined. The number of medication reviews completed by each pharmacy was also determined including the urban/rural designation of the pharmacy based on the first 3 digits of the pharmacy's postal code (FSA). Pharmacy prescription volume defined as low-, medium-, or high-volume by tertiles was determined based on prescriptions billed to Pharmacare in each pharmacy during the study period.

Data Analysis: The study used descriptive analysis to describe both patient and pharmacy-level information. The analysis included the mean/median (range, standard deviation) for the variables of interest using the statistical software program SAS Version 9.2 (SAS Institute Inc., Cary, NC, USA). Chi-squared and Analysis of Variance (ANOVA) were performed for categorical variables and t-tests for continuous variables to measure the relationship of patient and pharmacy-level variables to the number of medication reviews completed across the province. A chi-square test of independence was used to determine if the categorical variables were associated by comparing the observed and expected rates in a contingency table. Analysis of variance was used when the dependent variable (number of medication reviews) was continuous. For patient-level variables this includes grouping the study population into: age groups (66–69 years; >69–74 years; >74–79 years; and greater than 79 years); sex (male, female); number of medications (before/after medication review) and type of medications (before/after medication review); total number of unique prescribers; and if the patients' maximum copayment was met at the time of the medication review (yes/no). These variables were used to determine if there was any difference in the number of medication reviews completed by patient age or sex. For pharmacy-level variables this

included grouping the study population into: urban/rural location (urban, rural), and volume of prescriptions billed to Pharmacare per day (low-, medium- or high-volume). These variables were used to determine if there was any impact of rural/urban location of pharmacy, and store volume (Pharmacare claims only) on rate of medication review service provided. We calculated a difference between the mean number of medications used before the medication review and after the medication review and constructed a 95% confidence interval.

RESULTS

A total of 428 medication reviews were completed by a community pharmacist working in one of the 294 community pharmacies in Nova Scotia from April 1, 2008 to April 30, 2009 (Table 2). The patient population had a mean age of 75.2 years (range 66 to 93 years) and 64.9% were female. The majority of the patients (93%) had met their maximum copayment prior to the medication review and thus did not pay out of pocket for the service. After the medication review, at the WHO ATC classification 5th level: 23.9% of patients were dispensed an increased number of medications; 45.4% of patients were dispensed fewer medications; and 30.7% of patients resulted in no change compared to before the medication review. There was an average decrease of 0.4 medications (95% CI 0.1–0.6, $p=0.0043$) per person after the medication review as compared to before the medication review and a small decrease in the number of prescribers (0.4). There was found to be no change in the types of medications dispensed at the WHO ATC Classification 3rd level when comparing before and after the medication review ($p=0.0943$). The data was also examined to determine if any relationship existed between the number of medication reviews and age or sex but neither was found to have a statistically significant relationship.

The median number of medication reviews provided per community pharmacy was found to be 3 (range 1–50). Only 33% (97/294) of community pharmacies provided at least one medication review.

The majority of community pharmacies completed 1 to 5 medication reviews (Figure 1) with the majority located in an urban area (75%). The data was also examined to determine if any relationship

TABLE 2 Uptake of Medication Reviews in Nova Scotia Seniors' Pharmacare Beneficiaries During the First Year Following Implementation (April 2008-April 2009)

TABLE 2A Potential and Actual (Percentage) Involvement with Medication Reviews By Eligible Seniors and Community Pharmacies

	Seniors under Nova Scotia Seniors' Pharmacare Program	Pharmacies in Nova Scotia
Number enrolled	105,000	294
Actual uptake†	428	97 (33%)

TABLE 2B Description of Number of Medications and Number of Prescribers Before and after the Medication Review

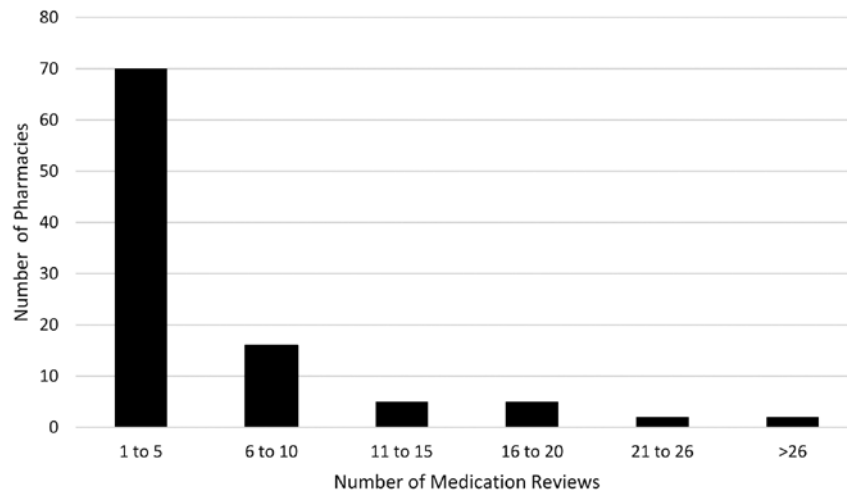
	Pre-medication review Mean (Range)††	Post-medication review Mean (range)††
Number of medications†††	10.8 (4-28)	10.4 (0-24)
Number of prescribers	2.5 (0-10)	2.1 (0-9)

†Not all seniors enrolled in the NSSPP were eligible for medication review under the NSSPP guidelines.

††6-months before and 6-months after review.

†††Medications were defined at the 5th level of the World Health Organization Anatomical Therapeutic Chemical Classification system.

FIG 1 Distribution of medication reviews provided by community pharmacies in Nova Scotia.



existed between the number of medication reviews completed and (1) urban/rural pharmacy designation, and (2) pharmacy volume of Pharmacare prescription claims. No statistical significance was found for either relationship.

DISCUSSION

Our study documented the uptake of the medication review service by community pharmacists in the first 13 months of its reimbursement by the NSSPP. Approximately 30% of pharmacies became early adopters^{53,54} and conducted medication management reviews in the first year; only 428 reviews

were conducted. This is well below the number of patients who could potentially benefit from these reviews, based on the percentage of seniors in Canada who had chronic conditions similar to the eligibility criteria for the medication review service: high blood pressure (47%), arthritis (27%), asthma (9%), heart disease (19%), diabetes (17%), and chronic obstructive pulmonary disease/emphysema 4%.¹⁴ Our uptake is lower than a study in the United Kingdom that involved 590 patients over 65 years of age and showed that a pharmacist who clinically reviewed patients through medication reviews intervened in nearly 50% of the patients.⁵⁵

Reasons for the relatively low uptake in the first year may include pharmacist reluctance to ask patients to pay for this service if they had not reached their annual maximum copayment. Since 93% of patients did not pay out of pocket for this service pharmacists may have waited to approach patients until they reached their maximum copayment.

The Nova Scotia program, an advanced/comprehensive medication review, we studied differs from the Nova Scotia basic medication review as well as other Canadian programs. For example, the Ontario MedsCheck program, a basic/standard medication review had several features which may have increased program uptake compared to our program. The MedsCheck program was available to all Ontario residents taking 3 or more prescription medications for chronic conditions and there was no patient copayment. In Nova Scotia, pharmacists needed to determine patient eligibility for the NSSPP (approximately 28% of seniors are not part of the pharmacare program), and if patients needed to pay a copayment or if their maximum annual deductible had been reached. Some pharmacists may have been reluctant to ask patients to pay part of the cost of the program. In addition, Ontario pharmacists received a single \$950 fee when they submitted their first MedsCheck annual service to cover start-up costs and the type of review differed. In the MedsCheck program the intention was to provide patients with a complete medication list, assist patients in understanding their medications and treatment adherence.

As of Sept 2014, pharmacies in British Columbia were reimbursed \$60 per Medication Review-Standard and \$70 for a Medication Review-Pharmacist Consultation, in Alberta they were reimbursed as a component of the \$100 Comprehensive Annual Care Plan, in Saskatchewan they were reimbursed \$60 per Medication Assessment, in Ontario they were reimbursed \$60 per MedsCheck (with higher fees for specific types of MedsCheck) and in New Brunswick they were reimbursed \$52.50 per PharmaCheck. Prince Edward Island reimbursed \$52.50 per Medication Review and Newfoundland and Labrador reimbursed \$52.50 for Medication Review with some specifications related to patient eligibility with up to 72 reviews per pharmacy per year. Quebec and Manitoba did not have specific

provincially funded programs for pharmacist medication management at that time (For further information see www.cfpnet.ca.)

In our Nova Scotia study, most community pharmacies were reimbursed for only 1 to 5 medication reviews in the thirteen month period. Some pharmacists may have tried several reviews, but did not incorporate the medication review service into their regular practice. One qualitative study in Switzerland showed that lack of time and lack of self-confidence were the most commonly perceived barriers to the implementation of a community pharmacist-led medication review service.⁵⁶ In a North Carolina medication therapy management program pharmacists learned to be more effective at documentation, making recommendations and communicating with prescribers after 3 years of involvement.⁵⁷

Our study involved NSSPP beneficiaries dispensed medications for chronic conditions, with a reimbursement of \$150 per review, which was higher than found in some studies. A study by Barnett et al analyzing medication management services over a 7-year period in 47 US states found those services involving chronic medications increased over time. They found that the mean pharmacy reimbursement was \$8.44 per review.³⁸ In a study of the Minnesota Department of Human Services medication therapy management programs Smith et al report a range of reimbursement rates: \$52–\$148 for an initial visit with \$34–\$130 for a follow-up visit.⁴¹ A first patient face-to-face encounter (up to 15 minutes) is reimbursed \$52; and a follow-up encounter with the same patient receives \$34 for the first 15 minutes with an additional \$24 for additional increments of 15 minutes of time. Larson et al reported growth over a 6-year period in Minnesota in uptake (from 329 to 2427 claims for medication management) and average compensation for initial and follow-up visits of \$99.23 and \$77.06 respectively.⁵⁸ Given that the NSSPP provided funding at the rate of \$150 for each advanced medication review, barriers to adoption need to be identified and targeted.

Our study found a small reduction (0.4) in the mean medications per patient, at the WHO ATC classification 5th level, following the medication review service. This was similar to a pharmacist home-based medication review in primary care for persons over

80 years of age, taking 4 or more medicines and with at least one additional medicine-related risk factor.⁵⁹ Lenaghan et al., found at 6 months the mean number of medicines prescribed per patient was 0.87 less in the intervention than in the control group.⁵⁹

This study has several strengths. It is a naturalistic observational study where medication management services were conducted face-to-face, and available to all eligible pharmacare beneficiaries who met specific criteria. The administrative claims databases used were comprehensive and provided accurate individual patient and pharmacy-level data, capturing approximately 85% of the senior population in the province. This decreased the probability of selection bias which can occur when only those pharmacies which perform medication reviews are included. Unlike studies based on surveys of pharmacists performing medication reviews, the observational pharmacare database study had limited response bias; this bias would occur only if pharmacists did not submit documentation of their review for reimbursement. Unlike prescribing data with electronic health records, the pharmacy dispensing data note that the patient has been dispensed the prescription at the pharmacy. Also, the pharmacist dispensing data were linked to both patient-level data (age/sex) and pharmacy-level data such as urban versus rural location and prescription volume.

However, there are several limitations. The date the medication review was billed may not be the actual date the medication review was completed. Some pharmacies may have completed the review but not the billing. Also, we were unable to determine changes in pharmacy licensure for this time period. A unique licence number is assigned any time there is a new pharmacy opening or a change in pharmacy ownership, e.g. between April 2015 and September 2016 there were 21 new pharmacy licence numbers assigned in Nova Scotia. (personal communication, Melissa Rhodes, Manager of Registrations, Nova Scotia College of Pharmacists, September 27, 2016)

Prescriber data based on actual number of prescribers instead of number of practices is another limitation. Additionally, the number of medications dispensed, based on WHO ATC classification, were within a 13-month time period and not concurrent. We were unable to determine: the prescribed medications

not filled; if medications were consumed; the use of medication samples; and any medications dispensed but not reimbursed by Pharmacare. This data also does not capture any patient hospital admissions which also could have led to a change in the number of medications. Another limitation is the possibility that any of the patients who received the medication review service could have moved to another province, relocated to a southern location for the winter months, or expired within the year. The rate of medication reviews provided was not standardized by age or sex and the impact of medication reviews on health outcomes or medication costs was not determined. In addition, we did not assess the actual cost or the patient's willingness-to-pay for this service,^{60,61} nor did we assess facilitators and barriers. We used a before and after study design related to the effect of the medication reviews and were unable to account for temporal trends including the month of the medication review related to the end of the period to calculate annual maximums. In future, with further data, we would like to use time series analysis. We also did not conduct multivariate analysis related to differences in number of medications before and after the medication review and were unable to determine the relationship between variables.

It would be useful to determine the knowledge, skills, self-efficacy and incentives for pharmacists to perform the service, the pharmacy workflow and the availability of pharmacy infrastructure and resources (e.g. private counselling room, current and easily accessible drug information resources, computerized decision support tools, and continuing professional development programs).

CONCLUSION

A study of the uptake of the medication review service funded by the government of Nova Scotia through the NSSPP determined that in spite of a \$150 reimbursement policy only 33% of pharmacies billed at least one medication review in the first 13 months with a range of 1 to 50 medication review services completed per pharmacy. Future research is needed to identify perceived barriers and facilitators to providing this valued service at the patient, pharmacist, pharmacy and health system levels, the accuracy of

the medication review service and the effect of the service on patient outcomes and health care costs.

CONFLICT OF INTEREST

The authors have no conflict of interest.

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