

Development of a Pharmacist-Managed Preventive Medication Assessment Program in a Family Physician Office Setting: The Medication Checkup

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ABSTRACT

Objective: To design a pharmacist-managed preventive medication assessment program for a family practice clinic.

Methods: The study examined 3 main questions: What are the components and design of a preventive medication assessment program? Is such a program feasible and desirable from the perspective of pharmacists and patients? On the basis of preliminary program experience and assessment, what aspects of the program require modification? The study was conducted in three phases. During phase 1, initial program development, a literature review was conducted, objectives were developed, a conceptual model was created, new practice tools were developed, criteria to assess program feasibility and desirability were defined, promotional material was produced, and a pilot program was developed. During phase 2 a preliminary program assessment was performed by means of the pilot program, which involved patients in a family practice clinic. During phase 3, the program design was revised on the basis of the results of the pilot program.

Results: After development of the Medication Checkup Program, a total of 15 patients were referred to the pilot program, of whom 13 were assessed. Twelve (92%) of the patients had deficiencies in medication knowledge, and 5 (38%) had problems with adherence. On average, 1.5 (range 0 to 2) actual drug-related problems and 1.0 (range 0 to 3) potential drug-related problems were identified per patient.

Conclusions: The results of the pilot program indicated that the preventive medication assessment program was both feasible and desirable. The results will be used to guide broader implementation and comprehensive evaluation of the program.

Key words: pharmaceutical care, program implementation, program evaluation, health promotion, ambulatory care, family practice

RÉSUMÉ

Objectif : Élaborer un programme d'évaluation préventive des médicaments géré par le pharmacien, à l'intention d'une clinique de médecine familiale.

Méthodes : L'étude visait à répondre à trois grandes questions : Quels sont les éléments et le modèle d'un programme d'évaluation préventive des médicaments ? Un tel programme est-il réalisable et souhaitable pour les pharmaciens et les patients ? En se fondant sur les résultats et l'évaluation de programmes provisoires, quels aspects du programme devraient être modifiés ? L'étude comportait trois phases. Pendant la phase 1, le développement initial du programme, les chercheurs ont passé en revue la littérature, défini les objectifs, créé un modèle conceptuel, élaboré de nouveaux outils de pratique, définis les critères de faisabilité et développé un programme pilote. Au cours de la phase 2, les chercheurs ont procédé à une évaluation préliminaire du programme au moyen du programme pilote auprès de patients d'une clinique de médecine familiale. Finalement, la phase 3 était consacrée à revoir le modèle du programme à la lumière des résultats du programme pilote.

Résultats : Le programme de revue des médicaments préalablement développé a permis de diriger un total de 15 patients au programme pilote, dont 13 ont été évalués. De ce nombre, 12 (92 %) avaient une connaissance insuffisante des médicaments et 5 (38 %) éprouvaient des problèmes d'observance thérapeutique. En moyenne, les chercheurs ont identifié 1,5 (fourchette de 0 à 2) problèmes pharmacothérapeutiques réels et 1,0 (fourchette de 0 à 3) problèmes pharmacothérapeutiques potentiels par patient.

Conclusions : Les résultats du programme pilote indiquent que le programme d'évaluation préventive des médicaments était à la fois réalisable et souhaitable. Les résultats seront utilisés pour guider la mise en œuvre à plus large échelle et l'évaluation approfondie de ce programme.

Mots clés : soins pharmaceutiques, mise en œuvre du programme, évaluation du programme, promotion de la santé, soins ambulatoire, médecine familiale

INTRODUCTION

Primary care has been defined as “the coordinated, interdisciplinary provision of health care that consists of health promotion, disease prevention, comprehensive management of acute and chronic medical and mental health conditions, and patient education.”¹ Pharmacists should and do play important roles in primary-care-based interdisciplinary provision of health care, and over the past few years the number of pharmacists practising in family practice office settings has been increasing and their roles have been expanding. This increasing emphasis on primary-care-based activities is consistent with current health care trends in North America.

Early reports of pharmacist involvement in the primary care practice of family physicians and in general medicine clinics described the pharmacist’s role in reviewing the medication profile, monitoring and enhancing prescribing patterns, and implementing strategies to reduce medication costs.²⁻⁴ More recently, the provision of more comprehensive pharmaceutical care services in the family practice setting has been described.⁵⁻⁷ However, the profession of pharmacy must continue to develop new delivery models for ambulatory care, since the extent of drug-related morbidity and mortality occurring in ambulatory patients and its associated impact are significant.⁸

Several years ago a new primary care pharmacy practice model was developed and implemented within a series of team-based family physician office practices affiliated initially with The Wellesley Hospital and later with St Michael’s Hospital, when these institutions were amalgamated.⁹ In these practices, patients have access not only to family physicians but also to nurses, pharmacists, social workers, counsellors, and dietitians. The practices are located in the inner-city area of Toronto, Ontario.

The primary care model for pharmacy practice in this setting was first developed in 1994 and has evolved over the years since then. Its development has been guided by the philosophy of pharmaceutical care as defined by Hepler and Strand.¹⁰ The model is based on a problem-solving approach to assessing and managing patients’ medication-related problems. Patients are referred for a consultation with the pharmacist if there is any concern about their medications. Approximately 180 patients are seen in person each year for pharmaceutical care assessments, 180 are assessed by telephone, 300 follow-up assessments are completed either by telephone or in person, and an

additional 360 consults are provided to physicians on issues that do not involve a complete pharmaceutical care assessment. It was observed that many of the patients referred to the primary care pharmacist because of a specific medication-related issue or concern had various other medication-related problems not directly related to the issue that led to the pharmacy consult. These unexpected findings indicated potential medication-related problems that might not otherwise have been identified until they became more significant. Therefore, there appeared to be a gap in the existing delivery model for pharmacy care in this setting, which resulted in unmet patient needs. This realization led to the concept of adding to the existing pharmacy practice model a preventive medication assessment that would be undertaken in the absence of suspicion of significant medication-related problems. This approach was considered analogous to annual medical and dental checkups and was thought to be consistent with other health promotion and illness prevention strategies being implemented in primary care. The preventive medication assessment strategy would be an additional component to the primary care pharmacy practice, which already included comprehensive assessment, medication-related management of acute and chronic medical and mental health conditions, and medication-related education. Together, the new program and the existing services would address all of the domains of primary care.¹

A literature search was conducted for reports of pharmacy services provided in ambulatory care and family practice settings and involving preventive approaches, programs to determine patients’ medication knowledge and assess their adherence, and general health promotion.^{5-7,9,11-17} The aims were to identify preventive practice models and to inform the development of the objectives and conceptual model for the new program. A number of articles describing the provision of pharmacy services in family practice and ambulatory care clinics were identified.^{5-7,9,11-16} However, there were no readily available practice models based on pharmaceutical care and focusing on preventive medication assessment that could be implemented or adopted in this family practice setting. There was also an attempt to identify pharmacists’ participation in community health promotion and prevention strategies.¹⁸⁻²⁴ However, none of these articles described pharmacist-run health promotion and prevention programs focusing on comprehensive medication assessment.



Therefore, it was not known what content and format for a preventive medication assessment program would meet the needs of patients in this setting, would fill the gaps identified in the existing primary care pharmacy practice model, and could be effectively and efficiently implemented in a team-based family practice setting. This study was undertaken to identify appropriate content and format for such a program; to design and pilot-test the new program in a family practice clinic, using patients designated by health care providers as not having active medication-related issues; and to perform a preliminary assessment of the feasibility and desirability of the program.

This project addressed 3 specific research questions:

- What are the components and design of a preventive medication assessment program?
- Is such a program feasible and desirable from the perspective of pharmacists and patients?
- On the basis of preliminary program experience and assessment, what aspects of the program require modification?

The preventive medication assessment program was developed in 3 phases: initial program development, preliminary program assessment (pilot program), and revisions to the program design.

PHASE 1: INITIAL PROGRAM DEVELOPMENT

During this phase of the study, several activities were undertaken to determine the components and design of a preventive medication assessment program.

Program Objectives

Because the literature review yielded little significant or specific guidance on objectives and criteria for a preventive medication program, objectives were developed primarily on the basis of the authors' experience in providing care to patients in this practice setting. The following 5 objectives were developed:

- To update and consolidate patients' medication information and make it available to other members of the health care team.
- To assess patients' understanding of and adherence to their medication regimen.
- To identify patients at risk of nonadherence secondary to lack of understanding, functional ability, or cognitive status or because of specific attitudes.
- To identify patients who are at risk for drug-related problems.

- To assist patients in improving their ability to manage their medications.

Program Conceptual Model

An initial conceptual model for the program was designed according to the objectives that had been set and the authors' experience in providing pharmaceutical care in this practice setting (Figure 1). The key components of the conceptual model were patient selection criteria (guidelines), method of referral, the patient interview process, communication to health care providers, and mechanism for follow-up.

The patient selection criteria offered guidance to health care providers for referral of patients. Specifically, the criteria covered patients who were taking multiple medications and those with chronic medical conditions. These criteria are consistent with criteria for screening patients who may require pharmaceutical care for the detection and prevention of drug-related problems.^{5,17}

Physicians and nurses in 2 health centres referred patients who met these criteria to the pilot program. During the pilot program, appointments were initially offered on 2 days of the week at specified times. No more than 4 patients were booked each day, to ensure time to complete the interview, assessment, and documentation.

During the pilot period, 1 of the 2 primary care pharmacists (N.K. and J.B.) met with each patient and conducted the structured medication interview and preventive medication assessment. During this interview the pharmacist identified patient concerns, documented current and past medication use, assessed the patient's medication knowledge and adherence, and determined if there were any actual or potential drug-related problems. Patients' medication knowledge was assessed for 7 specific components, outlined in Table 1. Drug-related problems were classified according the drug-related problem categories proposed by Strand and colleagues.²⁵ A structured process for the assessment of medication knowledge and adherence was developed, on the basis of the pharmacists' previous experience and information in the literature.^{5,26-34} The medication history, obtained from the patient during the interview, was compared with the medication regimen recorded in the medical chart and the community pharmacy profile to identify inconsistencies. Each patient was also assessed for the potential of future drug-related problems on the basis of his or her knowledge of the medications and level of adherence, the types and causes of drug-related problems already identified, and the person's ability to communicate



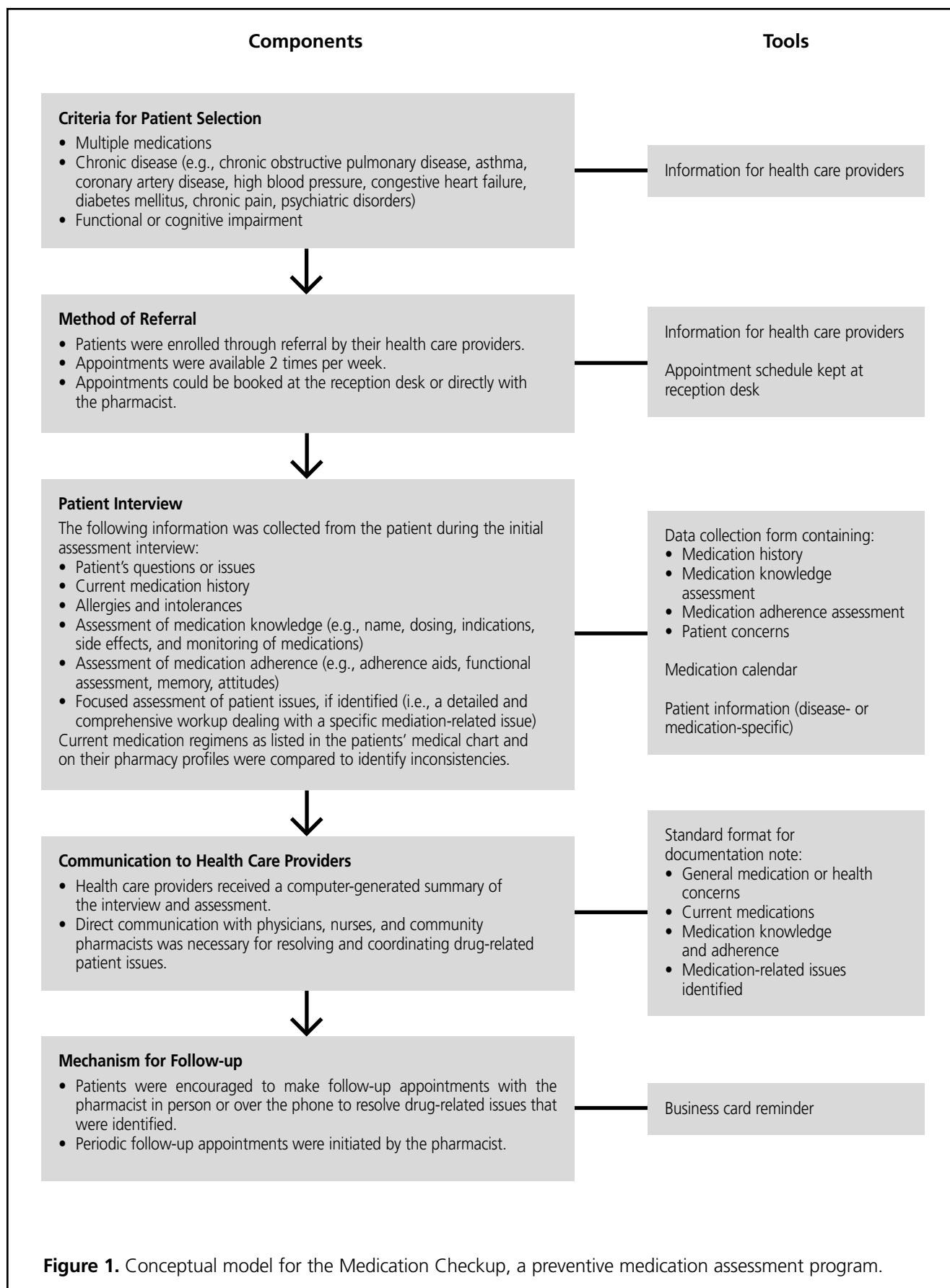


Figure 1. Conceptual model for the Medication Checkup, a preventive medication assessment program.



Table 1. Key Components for Medication Knowledge Assessment

Medication name and strength
Method of taking the medication
Purpose
Desired outcome
Precautions and side effects
Monitoring
Storage

effectively with health care providers about medication-related issues. Patients at high risk for drug-related problems were flagged for closer follow-up by the primary care pharmacist. All drug-related issues identified were addressed, and these issues were discussed with the patient, the physician, and other health care providers. The pharmacist provided targeted education to each patient regarding his or her medications, including the potential benefits, adverse effects, and possible drug interactions. All patients were encouraged to make follow-up appointments with the pharmacist. For high-risk patients, follow-up appointments were initiated by the pharmacist to resolve existing drug-related problems or for periodic preventive medication assessment.

The results of the preventive medication assessment were documented in the patient's medical chart, according to a standard method designed for this program. The documentation format reflected the uniqueness of the new program and ensured comparable documentation styles between the pharmacists (see Figure 1).

Program Name

The program was named the Medication Checkup to reflect the program's main elements: a global medication assessment performed by a pharmacist to identify current and potential drug-related problems. Specifically, the term "checkup" was selected to help the patient and other health care providers to realize that this program was intended to be analogous to dental and medical checkups.

Practice Tools

Practice tools (data collection forms) were developed for several components of the program (Figure 1). In particular, the data collection form for the patient interview ensured consistency between pharmacists in terms of patient information collected.

Promotional Materials

A variety of promotional materials were developed to facilitate enrolment into the program, including a letter to other health care providers describing the new pharmacy service and the method for making an appointment. Brochures were distributed to other health care providers, who were asked to give them to patients who met the selection criteria.

PHASE 2: PRELIMINARY PROGRAM ASSESSMENT (PILOT PROGRAM)

During the second phase of the study, a pilot program was undertaken to determine the feasibility and desirability of the program from the perspective of both pharmacists and patients.

Over a 6-month period health care providers were asked to refer patients who met the program selection criteria for a preventive medication assessment. These patients were contacted by telephone by a primary care pharmacist and invited for an assessment. For each patient who agreed to an assessment the following information was collected: age; sex; number of prescription medications, non-prescription medications, and alternative products; types of drug-related problems identified; and types of pharmacist interventions recommended.

The feasibility of the program was assessed according to the following criteria:

- Referral of patients to the program by health care providers (measured as number of patients referred).
- Patient participation (measured as number of patients who attended their appointments).
- Workload for each patient assessment compared with regular pharmaceutical care assessments (measured as time required for preparation, patient interview, interventions, and documentation).

The desirability of the service was evaluated according to the following criteria:

- Identification of deficiencies in patients' medication knowledge and adherence (measured as the number of patients identified by pharmacists as having deficiencies in medication knowledge and adherence).
- Identification of actual or potential drug-related problems (measured as number of actual and potential drug-related problems identified per patient).



- Patients' interest (measured as number of patients who asked questions during the initial interview).

A total of 15 patients (ranging in age from 45 to 85 years) were referred during the 6-month pilot program. All patients referred to the program met the selection criteria. At the time of referral, the referring health care provider did not have any specific concerns about or suspicions of problems with the patient's drug therapy. The mean number of prescription and nonprescription medications combined was 11.4 per patient (range 6 to 25). The mean number of prescription drugs per patient was 9.4 (range 4 to 22), and the mean number of nonprescription drugs was 2 (range 0 to 5). None of the referred patients were taking alternative preparations.

All 15 patients were contacted, and 13 came to the initial appointment. One patient did not attend the initial appointment because of problems travelling to the interview site, and the other patient changed to a physician who was not part of the practice where the project was taking place. The workload was approximately 3.5 h per patient, including 1 h for pre-interview preparation (a review of the patient's medical record) and the interview itself, 2 h for assessment and documentation, and 0.5 h for follow-up. The total mean time was comparable to the pharmaceutical care assessments already offered by the pharmacists for patients with suspected drug-related issues.

Twelve (92%) of the 13 patients enrolled in the program had deficiencies in medication knowledge (as outlined in Table 1). Deficiencies in medication knowledge ranged from relatively minor aspects such as not knowing the strength of the product to major aspects such as not knowing the purpose of the medication (e.g., one patient did not know that certain medications had been prescribed for diabetes). Five (38%) of the 13 patients had deficiencies in adherence. The pharmacists identified a total of 34 actual and potential drug-related problems in the 13 patients (Table 2). The most common actual drug-related problems were as follows: the patient required therapy for which he or she was not receiving any medications or the patient was receiving the wrong drug. Six (46%) of the patients had drug-related problems as a result of fragmentation of medication-related patient care, defined for the purpose of this study as health care providers in different practice settings having incomplete, incorrect, or conflicting medication-related information about the same patient. Patients participating in the pilot program were pleased with the opportunity to ask questions about their medications, and 7 patients (54%) took advantage of this opportunity.

Table 2. Preliminary Program Assessment (13 Patients)

Criterion	No. (and %) of patients or mean (and range)	
Patients' problems or concerns		
Deficiencies in medication knowledge	12	(92)
Deficiencies in adherence	5	(38)
Additional questions about medications	7	(54)
Drug-related problems identified per patient		
Actual	1.5	(0–2)
Potential	1.0	(0–3)

PHASE 3: REVISIONS TO PROGRAM DESIGN

During the third phase of the study, the results of the pilot program and the team's assessment of it were used to determine what aspects of the program needed modification. The data were reviewed individually by each of the 2 investigators to identify areas needing modifications. In addition, the investigators met several times to review each of the key components of the conceptual model and to recommend revisions to be incorporated into the final program design.

First, in addition to the initial selection criteria, it was determined that patients at risk for fragmentation of medication-related information might benefit from the service. The revised criteria for patient selection and referral were as follows:

- Patients receiving multiple (more than 3) medications
- Patients whose care involves many specialists
- Patients with demonstrated deficiencies in medication knowledge
- Patients with chronic medical conditions requiring frequent monitoring of drug therapy
- Patients with functional or cognitive impairment
- Patients who have recently been discharged from hospital

Second, because only a limited number of patients had been referred to the pilot program, an information brochure was developed to promote the program directly to patients (Appendix 1). In addition, a new information brochure was developed for health care providers to describe the various pharmacy services offered by the primary care pharmacists and to highlight the specific objectives and benefits of the Medication Checkup service. Also, direct in-services will be provided to staff and incoming students each year, so that everyone becomes more familiar with the program.



DISCUSSION

A conceptual model for a preventive medication assessment program was designed, and the design was assessed through a pilot program. The program, called the Medication Checkup, adds to the primary care pharmacy practice model within a family physician practice site. Because the focus of the Medication Checkup is on prevention of problems and identification of high-risk patients in the absence of suspected problems, this program expands the role of pharmacists within the family practice setting. The Medication Checkup is analogous to a medical or dental preventive checkup. A literature search did not reveal previous research on similar research questions, nor were there any reports of pharmacist-managed programs in family practice that focused primarily on preventive medication assessments. Therefore this study fills a gap in the pharmacy literature.

All 3 feasibility criteria were met or partially met during the pilot program. Therefore, it would be feasible to offer the Medication Checkup program as part of the services provided by primary care pharmacists. The first feasibility criterion was only partially fulfilled because although health care providers did refer patients to the program, the number of patients recruited was less than had been anticipated. Several reasons can be proposed to explain the lower-than-expected number of referrals. First, health care providers are not used to referring patients to a pharmacist if they do not suspect a problem with the medications. Second, none of the promotional materials were directed at patients, which would have limited self-referral and inquiries about the program. Finally, there is general difficulty in capturing patients for study purposes at this practice site. The second feasibility criterion was met because most of the patients who were referred to the program kept their appointments, and the 2 patients who did not keep their appointments had reasonable explanations. The third feasibility criterion was met because the workload was similar to or less than that usually required for comprehensive pharmaceutical care assessment of patients referred with a suspected medication-related concern. It is postulated that short, regular preventive appointments to identify and discuss with patients their medication-related issues may prevent the need for more extensive pharmaceutical care assessments and interventions.

Several challenges relating to feasibility were observed. Specifically, it was sometimes difficult to complete follow-up. Ongoing primary care follow-up

requires shared responsibility between the pharmacist and the patient. After critical medication-related issues were resolved, many patients did not adhere to the recommended follow-up. This behaviour is consistent with what tends to be observed at the 2 family practice clinics for other aspects of care.

During the pilot program, all of the desirability criteria were met, so it appears that the preventive medication program would also be desirable. Every patient assessed had actual or potential drug-related problems or had deficiencies in medication knowledge or adherence that were previously unrecognized by members of the primary health care team. The mean number of drug-related problems identified per patient (2.6) was the same as that reported by Lobas and colleagues⁵ (2.6) and higher than that reported by Wong and colleagues⁶ (0.5). The difference between those studies may have been in the type of patients enrolled or the manner in which patients were identified; neither of the 2 previous studies focused on preventive medication assessments. Finally, half of the patients asked additional questions during the interview.

Although the pilot data provide only preliminary measures of program outcomes, it is important to evaluate program structure and process in this way before an extensive assessment of patient outcomes is carried out.^{1,11,35,36} Specifically, in his structure–process–outcome framework for quality health care delivery, Donabedian clearly stated that patient outcomes cannot be optimized unless structure and process are evaluated and optimized.³⁵ Therefore a complete description, development, and evaluation of a conceptual model for the medication assessment program were necessary, to assess the structure and process of the program.

Assumptions and Limitations

For this study, it was assumed that the 2 pharmacists provided similar services and were consistent in identifying drug-related problems. They used the same practice models and tools and discussed the program in detail regularly to ensure consistency in approach. Also, it was assumed that relevant patient data were accurately extracted from the medical record or obtained from physicians, nurses, and the patient. The use of a structured interview and data collection form and extensive discussions between the pharmacists were intended to limit variability in data collection. The program and the pilot program were limited because they were specific to a family practice setting in which pharmacists have a consulting role; in addition, patients were referred to the program by other health care



professionals rather than through self-referral. The pilot program was also limited by the relatively low number of patients referred. A full program evaluation will be undertaken once the program has been modified according to the recommended revisions.

CONCLUSIONS

The components and design of a preventive medication assessment program were defined, and the pilot program indicated that such a program is both feasible and desirable. The results will be used to modify the program to guide broader program implementation, development of new program components, and comprehensive evaluation.

On the basis of the experience gained through the pilot program, several areas were identified for future research and development. To expand the program, it would be beneficial to design a process for referring patients to the Medication Checkup as a routine aspect of primary care. For example, new patients to the family practice could be referred to the pharmacist for a preventive medication assessment, and patients identified as being at high risk for potential drug-related problems could undergo yearly follow-up. In addition, to better assess and assist patients to manage their medications (for the prevention of future drug-related problems), it would be beneficial to develop a scale to assess patients' ability to self-manage their medications. Specific educational strategies and tools could then be developed to support patients in medication self-management. Finally, to more accurately assess the occurrence of drug-related problems in patients who generally do not need referral to a pharmacist, a preventive medication assessment could be offered to patients selected at random from within specific populations. The results of these additional investigations might provide more insight into the indicators of patients at high risk of drug-related problems.

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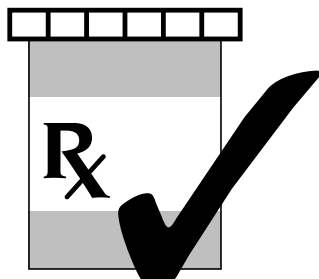
Presented as a poster at the Canadian College of Clinical Pharmacy Poster Session, June 9, 2000, Kananaskis, Alberta.



Appendix 1. Patient Promotional Brochure

Front and back of brochure

INTRODUCING THE MEDICATION CHECKUP



What should I bring to the appointment?

- Medications that you get with a prescription
- Medications that you have at home but are no longer using
- Medications that you buy in a pharmacy without a prescription
- Vitamins and herbal products
- Your own questions:

Inside of brochure

Are you taking medications?

- Yes No

Do you have questions about your medications, herbal products or vitamins?

- Yes No

Would you like to learn more about your medications?

- Yes No

Do you think that you may not be getting the full benefit from your medications?

- Yes No

Are you having problems or side effects from your medications?

- Yes No

If you answered **YES** to any of these questions, maybe our primary care pharmacist at the Health Centre can help you.

Why should I see the pharmacist?

We are starting a new program to help patients manage their medications, promote health and avoid problems with medications before they occur. This is similar to regular yearly dental and medical checkups.

This new program is called

MEDICATION CHECKUP



The Health Centre has its own primary care pharmacists. We work in the doctor's office with your doctors, nurses, and other health care providers.

What do I need to do?

Call to book an appointment at the reception desk at the Health Centre.

Do I have to pay for this service?

No. This is a service that the Health Centre provides to our patients.

How long will I meet with the primary care pharmacist?

For about one hour — time for us to complete the checkup and also answer your questions.

What will the pharmacist do during the appointment?

- Help you take your medications correctly
- Answer your questions
- Provide you with a complete list of all your medications
- Provide you with information about your medications