Joint-Effort Clinical Pharmacy Services in Rural Hospitals

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INTRODUCTION

Studies in the literature support the practice of having clinical pharmacists work in direct patient care and the value of these services within the health care system.[1,2] Although most pharmacists want to provide pharmaceutical care in collaboration with other health care professionals, some hospitals lack the staff that would be necessary. In Canada, the burden of a recently documented shortage of pharmacists[3] has been felt across the country, but it has also prompted the innovative use of pharmacy technicians and expansion of their role.[4-6] For example, some rural hospitals have empowered pharmacy technicians to fulfill medication dispensing requirements in rural settings, without on-site pharmacists.

A clinical pharmacy technician has been described as a technician who takes on the clerical responsibilities of the pharmacist[7] (including medication history-taking,[6] drug-use evaluation, investigational drug services,[4] and clinical management tasks[5]), thereby allowing the pharmacist to provide more clinical services. Most experiences with this practice model have been in larger centres where pharmacists are on site.[4-6] Rural centres present a unique opportunity to enhance patient care at sites where a pharmacy technician is present but clinical pharmacy services would not otherwise be possible. This model may free up pharmacist time for other tasks, enhance patient care, increase the number of proactive interventions by an off-site pharmacist, and increase utilization of pharmacy technicians' skills at a time when pharmacists are in short supply. With direction and training, technicians would be able to alert nurses to potential pharmaceutical problems and triage problems for the clinical pharmacist (i.e., assign values to problems and alert the pharmacist according to their severity and urgency). Technicians would also be able to collect information more efficiently, giving off-site pharmacists more time to review patients at their own sites.

A project was conceived whereby an off-site pharmacist would work with on-site pharmacy technicians to provide clinical pharmacy services intended to optimize patient care. The purpose of the project was to increase and assist with pharmacists' clinical interventions by educating pharmacy technicians to identify clinical pharmacy problems and collect patient information.

DESCRIPTION OF THE PROGRAM

The study involved 2 hospital sites within a single health region. In the pre-intervention phase, the regional hospital used videoconferencing to provide pharmacy services to the 2 rural hospital sites, each of which had 1 full-time equivalent (FTE) on-site pharmacy technician (P.H., K.P.), one with an additional 0.2 FTE on-site pharmacy technician, as described below. Clinical pharmacy services were not routinely provided, because collecting the necessary information about patients from a distance (by telephone, e-mail, or videoconference) is time-consuming and difficult. Technicians at the 2 hospitals were already involved in direct patient care by attending nursing report, checking patients' own medications on the floor, clarifying orders for order entry (obtaining or verifying height, weight, or allergy status; verifying incorrect dosage forms or routes; and clarifying ambiguous or illegible orders), assisting with the double-check of medication calculations, providing general drug information, assisting with the implementation of regional policies, and acting as a liaison between nurses or physicians and the regional pharmacy. As such, the technicians had excellent working relationships with the doctors and nurses. Despite the expanded role of the technicians at these hospitals, the respective roles of the off-site pharmacist

and the technicians were not well defined, which resulted in ambiguity about service delivery and role definition.

The first site had a primarily elderly patient population, with 20 acute care beds and 20 beds in the extended care unit. Two technicians staffed the pharmacy satellite on Mondays, and one technician worked from Tuesday to Friday. The second site, which had 20 beds, had a younger and more transient inpatient population. One pharmacy technician staffed the satellite pharmacy from Monday to Friday. At the time, this site also provided distribution services for a health clinic, a doctor's office, and a dialysis unit. All 3 technicians received, entered, and prepared medications from orders faxed from the ward, in addition to the direct patient care role described above. At the time, the role of the off-site pharmacist was to verify orders online and double-check medication packaging by videoconference.

In January 2006, a unique 0.5 FTE off-site clinical pharmacist position was created at a third rural hospital site. Duties of the position included on-site clinical pharmacy services for the third rural hospital, off-site clinical pharmacy services without the benefit of a pharmacist or a pharmacy technician at a fourth rural site, and online order verification for all 4 rural sites, including the 2 rural sites with pharmacy technicians described above. For the month of January, this pharmacist (J.S.T.) provided clinical pharmacy services with minimal use of the pharmacy technicians. In February 2006, the project, conceived as a collaborative effort between the pharmacist and the technicians, was initiated through initial discussions among these individuals. The discussion was intended to ascertain the pharmacy technicians' impressions of providing a clinical pharmacy service for which they would be jointly responsible. After this discussion, a meeting was held at each of the sites, with the following components:

- The technicians were given training on the role of the clinical pharmacist.
- The technicians were given examples of clinical pharmacy care plans and types of interventions.
- An agreement was reached as to which clinical services would be targeted as the joint responsibility of the pharmacy technicians and the pharmacists (termed "joint-effort clinical services" or JECS).
- The technicians were asked to develop their own data collection and workflow system (which included taking advantage of established relationships with other health care providers).
- The pharmacist's and technicians' responsibilities in the delivery of clinical pharmacy services were clarified and documented.

Documented clinical interventions at the sites to date were reviewed for examples of JECS that might be provided in the future, and the following possibilities were discussed: rational use of antibiotics, monitoring of renal function and adjustment of dosages according to the results, therapeutic drug monitoring, allergy clarifications (including distinguishing between true allergy, insignificant allergy, not a true allergy, and adverse drug reaction), medication reconciliation, and laboratory monitoring. Rational use of antibiotics was selected as the first area for implementation of JECS, as most patients admitted to the hospitals were given antibiotics. Clinical interventions that could be recorded in the Meditech patient profile system (Meditech, Westwood, Massachusetts) included pharmacist-initiated interventions related to choice of drug therapy and in cases for which there was no indication for treatment, an untreated indication, duplicate treatment, a drug interaction, or an incorrect dose of drug therapy, as well as clarification of ambiguous orders, assessment of allergy or adverse drug reaction, or consultation with another health care provider (either requested or pre-emptive).

Descriptive statistics were used in the analysis. The data collected included technician and pharmacist time to gather clinical information and perform the clinical administrative tasks associated with each intervention. Clinical information was reported by the technician to the pharmacist. The pharmacist documented the time taken, the clinical information, and the intervention in the Meditech system. A statistical report was generated by the system at the end of the project; the data for the technicians were added manually to the computer-generated report. Pre-intervention statistics (for the 3-month period December 1, 2005, to February 28, 2006) were generated retrospectively by the Meditech system.

Data collection for the 3-month intervention phase ran from March 1 to May 31, 2006. The data collection responsibilities of the pharmacist and pharmacy technician were clearly delineated and documented to allow formulation of care plans and follow-up (Table 1). Clinical interventions were charted in the electronic medical record and placed in the progress notes of the patient chart by the technician. All patients identified as candidates for JECS (i.e., those receiving antibiotics) were followed daily by both the pharmacist and the pharmacy technician as outlined in Table 1.

A total of 69 interventions were recorded in patients' charts by regional pharmacists during the pre-intervention phase, whereas 115 interventions were

Table 1. Distribution of Duties for Joint-Effort Clinical Pharmacy Services for Rational Use of Antibiotics

Action	Person Responsible	Timeframe
Laboratory testing, culture	Pharmacist and technician	Daily
Forward clinical flow sheet (by fax or scanner)	Technician	Daily
Forward progress notes (by fax or scanner)	Technician	Daily
Ascertain height, weight, age (from chart, nurse, physician, patient)	Technician	At start of treatment, daily for children
Ascertain diagnosis for antibiotic (from chart, nurse, physician)	Technician	At start of treatment
Determine allergy status (from chart, nurse, physician, or patient)	Technician	At start of treatment
Patient assessment (from nurse or licensed practical nurse during daily rounds)	Technician	Daily
Prepare pharmacy care plan, define monitoring parameters	Pharmacist	Daily

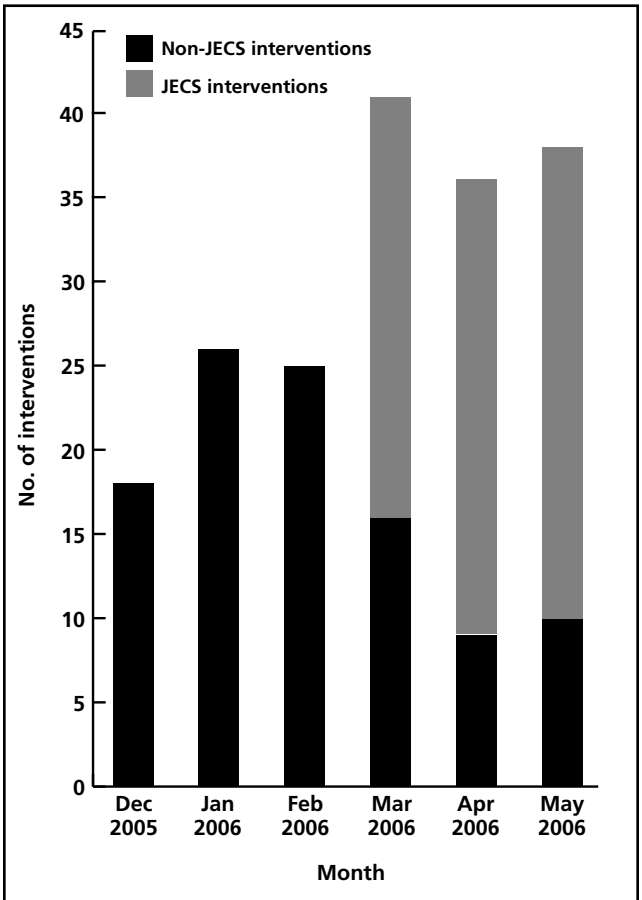

Figure 1. Contributions of joint-effort clinical pharmacy services (JECS) to total interventions. December to February = pre-intervention phase (retrospective), March to May = intervention phase.

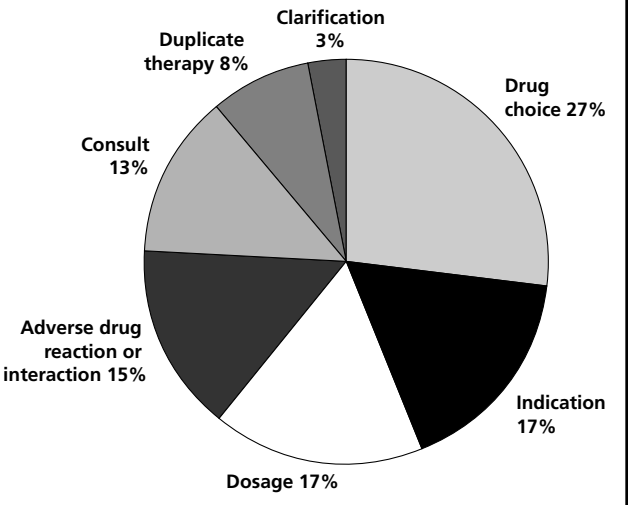

Figure 2. Distribution of intervention types in joint-effort clinical pharmacy services.

completed by the off-site pharmacist and on-site pharmacy technician team during the intervention phase. The latter total included 80 JECS interventions (Figure 1). Pharmacists spent a total of 5085 min completing interventions in the pre-intervention phase and 1751 min during the intervention phase; of the latter total, 517 min was spent on JECS interventions alone. The project required 1336 minutes of technician time.

The most common type of intervention was related to drug choice (Figure 2), and the most common antibiotic involved in interventions was cefotaxime

Table 2. Antibiotics Associated with Joint-Effort Clinical Pharmacy Services Interventions (Rational Use of Antibiotics)

Antibiotic	No. of Interventions*
Cefotaxime	12
Cefazolin	11
Azithromycin	9
Ciprofloxacin	8
Clindamycin	8
Levofloxacin	7
Metronidazole	6
Clarithromycin	6
Gentamicin	5
Cefuroxime	5
Cephalexin	4
Nitrofurantoin	3
Penicillin	3
Amoxicillin	2
Moxifloxacin	2
Ceftriaxone	2
Norfloxacin	1
Ampicillin	1
Cotrimoxazole	1
Cloxacillin	1
Tobramycin	1

*Some interventions involved more than one antibiotic.

Table 3. Interventions for the Drugs Most Commonly Associated with Joint-Effort Clinical Pharmacy Services (Rational Use of Antibiotics)

Drug	Intervention	No. of Interventions
Cefotaxime	Choice of drug therapy	5
	Duplicate therapy	2
	No indication for therapy	1
	Untreated Indication	1
	Dose too high or too low	1
	Allergy	1
	Consult	1
Cefazolin	Choice of drug therapy	4
	Duplicate therapy	4
	Consult	3
Azithromycin	Interaction	4
	Untreated indication	2
	Choice of drug therapy	1
	No indication for therapy	1
	Consult	1

(Table 2). The interventions associated with the 3 drugs most commonly involved in JECS interventions are listed in Table 3.

DISCUSSION

We found that the number of interventions increased with the use of pharmacy technicians: there were 46 more interventions in the intervention phase than the pre-intervention phase (both of which were 3 months long). One limitation of the study was that the intervention-phase pharmacist was involved in clinical interventions during a portion of the pre-intervention phase, which might have biased the number of interventions before and after initiation of the project. Another consideration in interpreting these results is that both pharmacy technicians were highly experienced. Both had received pharmacy technician training at a well-recognized college, had worked previously as a care aide and licensed practical nurse, respectively, and had been working in a unique pharmacy practice requiring careful consideration of and decisions about what required a pharmacist's intervention and what could be dealt with locally. As such, a certain level of independence had developed in this environment.

Although the literature includes reports of training programs for clinical pharmacy technicians, there is still a need for this type of training in Canada if pharmacy technicians are to be used to their full capacity.[8] In this study, technicians further developed their skills and knowledge while performing data collection. At the time of writing, a training program was being developed for a different health region in British Columbia, but it must be validated and adapted for use in other health authorities.

With a shortage of pharmacists at practice sites, it is difficult to balance the pharmacy workload. Pharmacy technicians offer a means to provide additional patient care. Some of the issues that might limit this expansion of the pharmacy technician's role include concerns of provincial regulatory bodies, requirements for technician training and certification, attitudes of pharmacists, and resources available. These issues are offset by the number of technicians who are available to work at this time.

After the study, the technicians and pharmacist analyzed the systems used for data collection and communication. This analysis led to a number of improvements to the workflow system, none of which required additional financial resources; these included giving the technicians access to the Meditech clinical intervention field, laboratory test results, and microbiology test results. Reports of potassium, international normalized ratio, creatinine clearance, and clinical interventions are automatically generated at the sites, and the technicians work with the pharmacist to identify abnormal results. In addition, JECS has been expanded to include allergy interventions, laboratory monitoring, anticoagulation, and medication reconcilia-

tion. Care plans are now shared via a secure network, to reduce the need for faxing and scanning.

In addition, the site that formerly provided distribution services to the health unit and dialysis unit no longer does so; that site is also preparing fewer blister packs for acute care inpatients. With these 2 changes, more time has become available to perform the expanded JECS. Further study of the current workflow systems will be needed.

In conclusion, a variety of benefits were achieved with the JECS program. With technicians performing data collection, the number of clinical interventions increased, and the amount of time required for the pharmacist to perform clinical interventions was reduced. JECS allowed more interventions on behalf of rural patients being cared for at a hospital without an on-site pharmacist, and those interventions were realized in a more time-efficient manner.

References

1. McLean W. Pharmaceutical care evaluated: the value of your services. *Can Pharm J* 1998;131(5):34-40.
2. Virani A, Crown N. The impact of a clinical pharmacist on patient and economic outcomes in a child and adolescent mental health unit. *Can J Hosp Pharm* 2003;56(3):158-162.
3. Scollard N. Profession seeks prescription for solving pharmacist shortage. *CMAJ* 2001;165(6):809.
4. Tierney MG, Brunet AM. Pharmacy technician support of clinical drug trials and drug use evaluation. *Can J Hosp Pharm* 1994; 47(5):228-231.
5. Koch KE, Weeks A. Clinically oriented pharmacy technicians to augment clinical services. *Am J Health Syst Pharm* 1998;55(13): 1375-1381.
6. Michels RD, Meisel SB. Program using pharmacy technicians to obtain medication histories. *Am J Health Syst Pharm* 2003;60(19): 1982-1986.
7. Miller DA, Zarowitz BJ, Petitta A, Wright DB. Pharmacy technicians and computer technology to support clinical pharmacy services. *Am J Hosp Pharm* 1993;50(5):929-934.
8. Foss T, Gant R. Development of a clinical pharmacy technician training course. *Hosp Pharm* 2003;10:9-10.

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