Key pharmacy indicators: Capturing workload and measuring operational performance in a Canadian Forces clinic

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Background

In today's world of government fiscal accountability, there is a growing and persistent requirement for Canadian Forces (CF) publicly funded pharmacies to justify their expenses while at the same time ensuring high-quality health care for their patients. However, no mechanism currently exists by which CF pharmacy managers can determine if they are meeting these objectives. It has been identified that they require a tool with which they can gather the information required effectively and efficiently.

The Canadian Forces (CF) Health Services Centre Ottawa is a primary care clinic serving a patient population of approximately 5500. The outpatient pharmacy is integral to the success of meeting the centre's needs. It is staffed by 4 full-time pharmacists and 5 technicians and operates between the hours of 7:30 a.m. and 4 p.m., 5 days a week.

In the fall of 2009, we identified that the workload measurement system (WMS) being employed at the Ottawa Clinic pharmacy was not meeting the pharmacy's needs. Despite using the system, pharmacy staff continually expressed concerns of feeling overworked and at times being unable to meet their patients' needs in a timely manner. Surveys indicated growing discontent among our patient population due to what they felt were unacceptable wait times to receive their prescriptions.¹

Our review of the current WMS found no clear explanation of why certain activities were

being tracked while others were not. In addition, there was no formal process for the analysis of the data and the understanding of how the measured activities related to performance outcomes.

We could not find any literature on existing workload and performance measurement systems for use in a primary care outpatient pharmacy environment. Therefore, we decided that a new system that allowed for ease of use, tracking of pharmacy workload by occupation, assessment of pharmacy performance and ease of modification had to be created. The creation team consisted of the pharmacy manager and a pharmacist from the CF Health Services Group Headquarters. There was strong agreement between the investigators that any system created had to be more than just a WMS and had to provide a method of ensuring that the needs of the Ottawa pharmacy's 3 main customer groups—patients, prescribers and the Canadian taxpayer—were being met.

Methods

Over a period of 4 weeks in November 2009, staff at the Ottawa pharmacy were directly observed to identify and map their activities. Clear definitions were created for each activity that identified their start and end points, as well as who performed the activity (i.e., pharmacist or pharmacy technician). A total of 21 pharmacy activities were identified (Box 1). It was quickly realized by investigators that the tracking of over 20 activities would be cumbersome and likely lead to an unusable system. In addition, strong

BOX 1 Pharmacy activities

- Filling a new prescription
- Refilling a prescription
- Ordering stock
- Receiving stock
- Returns
- Narcotics/Special Assess Program counts
- Reimbursements
- Remaining administration
- Invoices (specialty pharmacies)
- Finance reports
- Continuing care prescriptions
- Calls from patients
- Ordering lab tests
- Calling Canadian Forces Drug Exception Centre
- Medication reconciliation
- Transferring prescription
- Refill request forms
- Clinical interventions
- Calls from prescribers/physician assistants/nurse practitioners
- UNMO/GG/PMO kits
- Operational antimalarial requests

GG, Governor General; PMO, Prime Minister's Office; UNMO, United Nations Military Observer.

heterogeneity in terms of the time and resources required to solve each prescription problem that necessitated a pharmacist intervention meant that obtaining a standard time for each type of problem was likely impossible.

To simplify the system, pharmacy activities were grouped into 1 of the 3 categories below. These categories were designed to segregate activities into the technically intensive function of dispensing medications and the provision of clinical services/interventions. In addition, some activities, such as ordering and receiving stock, were combined due to their strong interdependency, allowing further reduction in the complexity of the system. The 3 categories are as follows:

Basic Activities (Table 1)

Encompasses all the activities associated with the dispensing of an “ideal” prescription by the pharmacy to the patient. The ideal prescription is defined as a situation in which the prescription is received, entered and filled by the technician and

then verified and dispensed by the pharmacist, with counselling of the patient, without any requirement to call the prescriber for clarification or to call the Canadian Forces Drug Exception Centre (CFDEC).

Pharmacy Interventions (Table 2)

A pharmacy intervention is defined as a drug therapy problem in the writing of the prescription (e.g., dose too high or low, patient has an allergy to the medication prescribed, etc.) or Canadian Forces requirement that prevents the prescription from being filled in an effective, safe and efficient manner. Due to the variation in each type of intervention and the time to solve these problems, it was decided that these issues should be captured only in a quantitative manner (i.e., number of occurrences) and that the goal of the pharmacy should be to reduce the occurrence of these activities toward zero.

Clinical/Base-specific Activities (Table 2)

These were determined to be activities conducted by pharmacy staff that investigators felt did not directly affect the dispensing of medications but were part of the pharmacy's other responsibilities.

Results

The list of standard times obtained for activities is located in Table 1. Ranges in completion times for the new and refilled prescriptions are likely due to the varying complexity of each prescription. Administrative activities are included in the category of Basic Activities. Due to the heterogeneity and unpredictable nature of administrative activities (e.g., budget meetings, human resource management, etc.), it was determined that attempting to capture the actual completion of these activities was not realistic. Nearly 100% of all administrative activities at the Ottawa clinic pharmacy are performed by the pharmacy manager, who represents approximately 11% of the pharmacy's total full-time equivalents (FTEs). The primary literature has identified that a mean $\pm$ SD of $8.5\% \pm 10.3\%$ of total staff time is required for management activities at community hospitals.¹ Therefore, an estimate of 11% of a pharmacy's total FTEs was used for the key pharmacy indicators (KPI).

No standard times were determined for medication reconciliation, antimalarial requests, lab tests or phone calls received, due to either too few occurrences or the heterogeneity of the

TABLE 1 Basic activities

		Pharmacy technician time, min	Pharmacist time, min
Filling new Rx <i>n</i> = 233	Total*	Mean: 2.75 per prescription	Mean: 1.43 per prescription Median: 1.37 per prescription Range: 0.56–3.47
	Part 1	Mean: 1.47 per prescription Median: 1.33 per prescription Range: 0.75–2.98	
	Part 2	Mean: 1.28 per prescription Median: 1.25 per prescription Range: 0.65–2.87	
Refilling Rx <i>n</i> = 171	Total*	2.92 per prescription	Mean: 1.18 per prescription Median: 0.76 per prescription Range: 0.15–3.00
	Part 1	Mean: 1.50 per prescription Median: 1.68 per prescription Range: 0.40–3.25	
	Part 2	Mean: 1.43 per prescription Median: 1.25 per prescription Range: 0.78–3.75	
Ordering/receiving stock <i>n</i> = 6 (255 line items)	Total†	4.71 per line item	
	PO formation/ sending	Mean: 1.87 per line item Median: 1.87 per line item Range: 1.17–2.57 per line item	
	Receipt/ verification/ storing	Mean: 2.99 per line item Median: 2.70 per line item Range: 2.21–4.24 per line item	
Returns <i>n</i> = 5 (266 items)		Mean: 3.74 per line Median: 3.51 per line Range: 2.14–5.76 per line	
Narcotics/SAP counts <i>n</i> = 1 (79 line items)		1.87 per line item	
Invoices <i>n</i> = 1 (44 invoices)			2.80 per invoice
Reimbursements <i>n</i> = 1 (11 receipts)			2.41 per patient request
Administration		Allowance factor: 11% of total FTEs per month	

FTE, full-time equivalent; PO, purchase order; SAP, Special Access Program.

*Pharmacy technician total time is based on addition of mean times for parts 1 and 2. Parts 1 and 2 correspond to the 2-part method by which technicians were observed. Total time to fill a prescription is the summation of the total times for both the pharmacy technician and the pharmacist.

†Total time is based on addition of mean times for part 1 (PO formation/sending) and part 2 (receipt/verification/storing).

TABLE 2 Clinical and pharmacy activities

Clinical/base-specific activities	Pharmacy interventions
Medication reconciliation	Calls to CFDEC
United Nations Military Observer Kit	Issue with sig code
Governor General's Kit	Dosing or frequency adjustment required
Prime Minister's Office Kit	Patient has allergy/intolerance to prescribed medication
Call from prescriber	Patient had adverse drug reaction
Call to or from a patient	Potential drug interaction
Operational antimalarial requests	Outside scope of practice (PA or NP)
Continuing care prescriptions	Pregnancy/lactation contraindication
Pharmacist ordering of lab tests	Drug availability—substitution
	CFDBL enforcement
	Miscellaneous

CFDBL, Canadian Forces Drug Benefit List; CFDEC, Canadian Forces Drug Exception Centre; NP, nurse practitioner; PA, physician assistant.

activity. Standard times were determined for continuing care prescriptions and lab tests, since these are quite homogeneous activities.

To track activities, investigators created pseudo-drugs within the Ottawa clinic's pharmacy software. The premise was that the capture of an activity would be performed by the dispensing of that activity on either the relevant patient profile or on a "unit" profile. This allowed for ease of monthly data extraction.

Discussion

With the newly designed KPI system, we hope that the information provided will allow the pharmacy manager to determine if the pharmacy is meeting the desired outcomes of its customers. First, the output from the Basic Activities section of the system is segregated into both technical and clinical functions. This allows for the calculation of pharmacist time that should be required to complete the Basic Activities (e.g., dispensing prescriptions) and, therefore, provides an estimate of the number of pharmacist FTEs required to complete these tasks. By comparing the estimated number of FTEs to the actual pharmacist staffing levels, the pharmacy manager will be able to determine the correct ratio of pharmacists to technicians required to dispense prescriptions. This should allow the pharmacy manager to estimate the amount of pharmacist time available for clinical services aimed at improving patient care and meeting the needs of their prescriber "customers." In addition, maximizing the use of the pharmacy

technicians to complete technical work should help to provide cost-effective pharmacy services for the Canadian taxpayer.

A key aspect of the new system is the capture of pharmacy interventions. Studies have shown that identification and resolution of drug therapy problems could potentially lead to improved patient outcomes and cost savings.²⁻⁵ Also, the identification of consistently occurring drug therapy problems can indicate a potential need for academic detailing to prescribers. By targeting the reduction in pharmacy interventions, the pharmacy manager can use an easily measurable surrogate marker to gauge how well staff are meeting their customers' needs.

Although a major benefit of the new KPI tool is its simplification, this is also a limitation. The simplified KPI tool does not capture all pharmacy workload, and therefore, infrequent activities such as staff assistance visits, prepackaging of medications and stock audits will not be captured. These activities only occur infrequently, however, and when they do, this can be noted by pharmacy staff and used to justify discrepancies in that month's workload statistics if required. Another limitation is that the observed times for activities might underestimate real-world values due to the Hawthorne effect, in which individuals improve their performance when they know they are being observed.⁶ Additionally, the mean times calculated for each activity are based on the observations of many staff members and, therefore, should

only be used as estimates, since individual performance will vary from the means based on abilities and experience.

It is the hope of the investigators that the trial of this system at the Ottawa clinic pharmacy will provide the pharmacy manager with the tools necessary to properly allocate staff and resources to provide effective,

safe, efficient and cost-effective health care. Although developed for the Canadian Forces, the KPI system could easily be adapted to any community pharmacy setting. It is based on existing functionalities of the off-the-shelf retail pharmacy application, and the activities being tracked can be customized to the practice setting. ■

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References

1. Gupta SR, Wojtynek JE, Walton SM, et al. Monitoring of pharmacy staffing, workload, and productivity in community hospitals. *Am J Health-Syst Pharm* 2006;63:1728-34.
2. Ernst F, Grizzle A. Drug-related morbidity and mortality: updating the cost-of-illness model. *J Am Pharm Assoc (Wash)* 2001;41:192-9.
3. Patel P, Zed PJ. Drug-related visits to the emergency department: how big is the problem? *Pharmacotherapy* 2002;22:915-23.
4. CM Hohl, Nosyk B, Kuramoto L, et al. Outcomes of emergency department patients presenting with adverse drug events. *Ann Emerg Med* 2011;58:270-9.
5. Vinks TH, Egbert TC, de Lange TM, et al. Pharmacist-based medication review reduces potential drug-related problems in the elderly: the SMOG controlled trial. *Drugs Aging* 2009;26:123-33.
6. Berthelot JM. The Hawthorne effect: stronger than the placebo effect? *Joint Bone Spine* 2011;78:335-6.