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COMPARISON OF DRUG BENEFITS PROVIDED BY VETERANS AFFAIRS CANADA AND THE CANADIAN FORCES HEALTH SERVICES GROUP

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ABSTRACT

Background
Drug benefits are provided at public expense to all actively serving Canadian Armed Forces (CAF) personnel, with ongoing drug coverage offered by Veterans Affairs Canada (VAC) for selected conditions following termination of employment. Differences in drug coverage between these programs could introduce risks for treatment disruption.

Objectives
Work was undertaken to establish a process that would allow systematic comparison of the entire VAC and CAF formularies, and to identify and explain discordant listings in 14 therapeutic categories that pose risk of adverse outcomes with sudden treatment interruption.

Methods
Lists of medications were created for each program, including regular benefit and restricted use drugs, using files obtained from the claims processor in January 2015. Products were coded using the AnatomicTherapeutic-Chemical (ATC) system. Degree of alignment within therapeutic categories was assessed based on the percentage of fifth-level ATCs covered in common. Discordantly listed drugs in 14 categories of concern were reviewed to identify similarities in product characteristics.

Results
A total of 1124 medications were identified in 80 therapeutic categories. Coverage of medications was identical in 11 categories, and overall, almost three-quarters of identified drugs (73.4%, $n = 825$) were covered by both plans. Many discordant listings reflected known differences in the programs' operating procedures. A number of discrepancies were also identified in newer therapeutic categories.

Conclusions
There is significant overlap in the medications covered by the CAF and VAC drug benefit programs. Application of the ATC coding system allowed for discrepancies to be readily identified across the entire formulary, and in specific therapeutic categories of concern.

Key Words: *drug benefit plans, formularies, military, veterans*

There is increasing recognition that transitions of care introduce risks for disruption of drug therapy, with consequent negative impacts on patient health.[1–3] Members of the Canadian Armed Forces (CAF) who are concluding their military careers will often experience significant changes in how they access and receive health care, during a time of significant personal and professional transition.[4,5] While most individuals will complete this transition without issue, it is estimated that roughly 25% of Canadian military personnel will report difficulty in adjusting to civilian life, particularly when health conditions preclude continued employment in the military.[6] In a 2011 survey of Canadian military veterans, physical

health conditions were noted to be present in over 90% of respondents, and a mental health condition among half.[7] While all survey respondents stated they had prescription drug coverage,[7] no distinction was made between those with full versus partial coverage. Ensuring that veterans have ongoing and reliable access to drug therapy, particularly for conditions which are likely to pose risks of worsening due to treatment delays or interruptions, is therefore particularly important during the transition period.[8]

The challenges that can be encountered by veterans – and the negative outcomes that can ensue – have been highlighted in the lay press[9,10] and have been the subject of many government reports as well.[11–13] The survey cited above also identified concerning trends in the health status of individuals who have undergone the transition from military employment to civilian status after 2006. Compared to earlier retirees, newer veterans reported lower rates of employment and social support, and perceived themselves to have less mastery (i.e., ability to exert control over factors affecting their lives) overall.[7] Such individuals could be less effective in advocating for their health needs in an unfamiliar health care system, and thus additional efforts to ensure seamless coverage of established drug therapy are likely to prove beneficial.[14,15] Both the Department of National Defence (DND) and Veterans Affairs Canada (VAC) have committed to work jointly on initiatives that will promote effective health care for new veterans.[16,17]

The DND and VAC drug benefit programs currently share many similarities in their operating parameters, which should facilitate joint work. Both programs operate nation-wide, using a common third-party processor for claims adjudication. The formularies of both programs are structured similarly, using established drug- and product-specific coding systems, and with identified subsets of both Regular Benefit and Special Authorization items. Each program also maintains procedures for exceptional coverage of non-benefit medications. However, the programs differ significantly in the mechanisms used to supply drugs to patients, with the CAF program relying predominantly on its internally run pharmacies located at military bases, while VAC clients receive all medications via provincially licensed (civilian) pharmacies. There are also important differences in the types of medications eligible for coverage through the programs, with DND providing more comprehensive coverage for medications,[18] and VAC generally providing more limited coverage of drugs for *service-related* medical conditions.[19] As well, because CAF personnel are ineligible for coverage under provincial health plans, its drug plan must also include items which would be provided by (and billed through) provincially regulated hospitals.

A thorough comparison of the CAF and VAC drug benefits had not been conducted prior to this report. Because the programs are operated independently by two different government departments – subject to separate legislation – it is likely that discrepancies would exist in the coverage of medications between them. Identifying such discrepancies would allow both programs to improve their services in important ways. Medications which are covered by the CAF, but not by VAC, present a high risk for treatment interruption among individual clients, and identification of these discrepancies could enable DND clinicians to take measures to arrange for pre-approval of coverage – either through VAC, employer-based or privately purchased insurance – before the individual's coverage is eliminated. Conversely, identifying medications which are included in the VAC benefit set, but not that of the CAF, could identify possible gaps in the CAF's efforts to ensure comprehensive health coverage. Furthermore, if the two benefit sets are very similar, there is potential for departmental decision-making structures to be brought into closer alignment, which could allow for system efficiencies.

Given the potential benefits outlined above, the analysis described in this paper was undertaken. Its primary objective was to apply a systematic approach to compare all medications listed by the two drug benefit programs. As a secondary objective, additional analysis was undertaken of discordant listings in selected therapeutic categories which pose particular risk with treatment disruption, to identify trends and patterns associated with selective listing of products by one program or the other.

METHODS

In January 2015, a copy of the benefit sets for both the VAC and CAF programs was generated by the third-party claims processor (Medavie Blue Cross), and provided to the authors as Microsoft Excel files. Files representing Regular Benefit (RegBen) or Special Authorization (SA) drugs were merged to create a single formulary for each program. Duplicate listings, where a unique product name and drug identification number (DIN) was associated with multiple codes (e.g., in different provinces), were consolidated into a single entry.

Each of the items listed in the CAF and VAC benefit sets was associated with a pre-assigned code drawn from the World Health Organization's Anatomical-Therapeutic-Chemical Classification (ATC) drug classification system. This coding system regroups each medication at the anatomic, therapeutic, drug class, and chemical level, and allows for population-level review of drug utilization and comparison across different health regions. The hierarchical structure of the ATC coding system also ensures that products containing the same medication for significantly different indications (e.g., gentamicin drops for eye infections vs. gentamicin injectable solution for systemic infections) can be readily distinguished from each other. For this project, 2nd-level ATC codes (i.e., therapeutic-level groupings) were used to define therapeutic categories of medications, while 5th-level ATC codes were used to identify specific medications using their common chemical names.

To report the degree of alignment within a single therapeutic category, we calculated the unadjusted percentage of identified drugs covered by a single plan (We refer to this as "ATC concordance" in this paper.). This calculation is analogous to the unweighted percentage of drugs covered that was used as a measure of the breadth of formulary coverage in an earlier publication by Morgan and colleagues.[20] Where ATC concordance in a therapeutic category is calculated to be zero, this indicates that the medication(s) in question are covered by only one program. Where both programs cover the same chemical entities within a single therapeutic category, the ATC concordance would be reported as 100% (representing perfect alignment).

ATC concordance rates were calculated for all therapeutic categories that were represented by at least one product on either the VAC or CAF formulary. A second analysis was then undertaken to assess coverage of specific medications within six anatomic groupings which contain drug categories known to pose risk of adverse outcomes with treatment interruption. Particular focus was placed on the 14 categories defined in parentheses below:

(A) Alimentary tract and gastrointestinal system hypoglycemic agents; gastric acid reducers);
(B) Blood and blood-forming organs (antithrombotics);
(C) Cardiovascular system (anti-arrhythmics; beta-blockers; calcium channel blockers; other antihypertensives;
(M) Musculoskeletal system (anti-inflammatory drugs; muscle relaxants);
(N) Nervous system (psycholeptics; psychoana-leptics; opioids/analgesics; anti-epileptics); and
(R) Respiratory system (drugs for obstructive airways disease).

RESULTS

In January 2015, seven files were provided for review from the claims processor (3 for CAF, and 4 for VAC). RegBen and SA drugs were represented by 10,353 and 2730 line entries respectively for the CAF program, while the VAC lists contained 12,359 RegBen and 3282 SA entries. After removal of duplicate entries, the CAF formulary was condensed to 10,743 discrete items, and the VAC formulary to 12,274.

Using chemical names specified at the fifth level of the ATC coding system, 1,124 distinct medications were identified across both formularies, with roughly three-quarters of the identified medications covered by both plans (73.4%, $n = 825$). Medications were distributed across 13 anatomic groups and 80 therapeutic categories (Table 1). Drug coverage was identical for 11 of the 80 therapeutic categories (13.8%), two of which (drugs acting on the renin-angiotensin system, and corticosteroids) are commonly used, and 9 in specialty areas with a relatively limited number of treatment options (Table 2). A further six categories were covered by only one of the plans. VAC provided coverage in two categories defined as "preparations for wounds and ulcers" and "medicated dressings," while

the CAF provided exclusive coverage in the following four categories: (1) anti-obesity drugs [orlistat], (2) throat preparations [lidocaine for endotracheal use]; (3) levocarnitine [a supplement used in dialysis patients]; and (4) immune globulins for treating tetanus and thrombocytic purpura. ATC concordance rates in the remaining 63 therapeutic categories ranged from 13.3% to 95.0% (Figure 1).

Within the 14 therapeutic categories which were specifically identified as being of higher concern for treatment interruption, similar patterns in coverage were generally observed (Table 3). Overall, 76.4% of medications (233 of 305) were covered in common by both programs. The majority of medications covered by one program were provided by the CAF (40 of 72, 55.6%). Injectables represented 42.5% of the

TABLE 1 Number of Therapeutic Categories and Medications Identified, within All Anatomic Groups

Anatomic Grouping	Number of Therapeutic Categories in Group	Number of Medications in Group	ATC Concordance (Medications Covered in Common) *N* (%)
(A) Alimentary and Metabolism	13	150	105 (70.0)
(B) Blood and Blood-Forming Organs	4	49	34 (69.4)
(C) Cardiovascular	9	115	96 (83.5)
(M) Musculoskeletal	6	57	36 (63.2)
(N) Neurological	7	172	131 (76.2)
(R) Respiratory	5	64	47 (73.4)
(D) Dermatological	11	110	66 (60.0)
(G) Genito-Urinary	4	72	57 (79.2)
(H) Systemic Hormone Therapy	5	25	22 (88.0)
(J) Anti-Infective	6	136	91 (66.9)
(L) Antineoplastic/ Immunomodulators	4	87	76 (87.4)
(P) Antiparasitic/ Insecticides	3	16	13 (81.3)
(S) Sensory Organs	3	71	51 (71.8)
TOTAL	**80**	**1124**	**825 (73.4)**

ATC = anatomic-therapeutic-chemical.

FIG. 1 Number of therapeutic categories with different ATC concordance rates

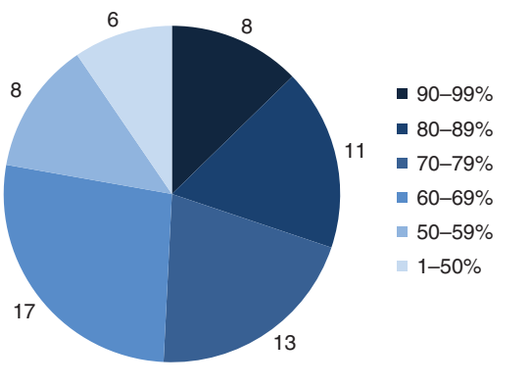

TABLE 2 Therapeutic Categories with Identical Coverage by both CAF and VAC

ATC Code	Therapeutic Category	Example of Medication in Therapeutic Category
A01	Stomatological preparations	Chlorhexidine oral rinse
A04	Antiemetics and antinauseants	Ondansetron
A05	Bile and liver therapy	Ursodiol
B02	Antihemorrhagics	Vitamin K
C09	Agents acting on the renin-angiotensin system	Enalapril
H02	Corticosteroids for systemic use	Dexamethasone
H04	Pancreatic hormones	Glucagon
H05	Calcium homeostasis	Calcitonin
J04	Antimycobacterials	Rifampin
N04	Anti-Parkinson's drugs	Levodopa/carbidopa
P02	Antihelmintics	Mebendazole

CAF = Canadian Armed Forces; VAC = Veteran's Affairs Canada.

TABLE 3 Drug Coverage in Selected Therapeutic Categories

Therapeutic Category	Medications in Category	Medications in Common	Covered by CAF Only	Covered by VAC Only
Diabetes	26	18	3	5
Gastric Acid Disorders	20	19	1	–
Antithrombotics	21	15	6	–
Cardiac Therapy	18	13	5	–
Beta-Blockers	14	13	1	–
Antihypertensives (Various)	10	6	2	2
Calcium Channel Blockers	6	5	1	–
Anti-Inflammatory Drugs	21	15	–	6
Muscle Relaxants	13	5	4	4
Psycholeptics	44	40	3	1
Psychoanaleptics	33	26	4	3
Opioids and Analgesics	29	20	3	6
Antiepileptics	20	15	4	1
Obstructed Airways Disease	30	23	3	4

CAF = Canadian Armed Forces; VAC = Veteran's Affairs Canada.

CAF's sole-coverage medications (17 of 40), including 6 antithrombotics, 5 cardiac therapies (4 pressor agents and adenosine), 4 skeletal muscle relaxants, the beta-blocker esmolol, and one insulin analogue. The CAF program also provided exclusive coverage for some medications in therapeutic categories that are not generally considered to be attributable to military service, namely attention deficit disorder (the drugs atomoxetine, amphetamine, and lisdexamfetamine) and pulmonary arterial hypertension (treprostinil, ambrisentan, sildenafil). The CAF was also covered a number of medications that have been marketed relatively recently, and which are known to be used for management of mental health disorders. Included here are four anti-epileptics (oxcarbazepine, rufinamide, lacosamide, and perampanel), two atypical antipsychotics (paliperidone, lurasidone), one antidepressant (desvenlafaxine), and the short-acting sedative zolpidem. Not surprisingly, VAC provided exclusive coverage for three medications for Alzheimer's disease (donepezil, rivastigmine, and galantamine).

Review of single-coverage medications in these selected categories also identified a number of older medications that are no longer in common use, but which remained actively listed among products on the programs' benefit sets. Examples include the long-acting oral hypoglycemic agents tolbutamide and chlorpropamide, the bronchodilators theophylline and aminophylline, agents previously used for refractory hypertension (reserpine, oral minoxidil) and a number of products classed as controlled substances (e.g., pentazocine, opium-based products, and ASA-containing narcotic combinations). A small number of codes were identified which appear to be "artifacts," representing products that were historically compounded by pharmacies (e.g., topical formulations of NSAIDs and oral methadone), but that have since been supplanted by commercial formulations.

DISCUSSION

In this report, comparison was undertaken of two publicly funded drug programs, which together provide sequential coverage of drug products for individuals with Canadian military service. Given the differences in the programs' mandates, complete agreement in drug listings is not and cannot be expected. It is therefore encouraging to see that, overall, roughly three-quarters of all identified chemical compounds were being covered in common by both programs. Closer evaluation of completely discordant listings – of entire therapeutic categories and within specific categories of clinical concern – has identified many discrepancies which are expected to arise due to differences in characteristics of the programs and the supported populations. Some discrepant listings introduced by the CAF program, in particular, involve health conditions which do not necessarily arise due to military service, and which would normally not be eligible for coverage by VAC. Coverage for such conditions would, however, be in keeping with the CAF's aim to enhance given individuals' ability to serve effectively in the military (e.g., orlistat is often prescribed as part of a comprehensive treatment program for obesity, as a precursor to bariatric surgery; drug therapy may be initiated for attention deficit disorder which had not been diagnosed prior to enrolment).

Discrepancies in formulary listing status also frequently arose with specialty medications because of the different reimbursement mechanisms in place for VAC clients as opposed to CAF personnel. The CAF program covered a large number of injectables and medications typically administered to patients in hospital-based settings, while the VAC program included codes for wound care supplies and related products that are commonly processed via community pharmacies for their clientele. In such cases, the non-listing program is known to have alternate mechanisms in place, which do not involve filling of prescriptions at pharmacies, to ensure equivalent coverage of the necessary products for their clientele.

To our knowledge, this paper is the first to provide a comparison of two publicly funded, federally managed Canadian formularies, in their entirety. Earlier reports of formulary comparisons have assessed provincial formularies only,[20–23] with specific emphasis on programs that address the needs of those receiving social assistance or over the age of 65 years. Two of these earlier reports further restricted the scope of their reviews to subsets of newly marketed medications,[21,22] while Morgan's paper reported more closely on frequently used medication categories, to better quantify the impact of discordant listings on patient access and

potential out-of-pocket expenses.[20] The current report provides another viewpoint on an additional "risks" associated with discordant drug plan listings: namely, that system inefficiencies may be introduced with discordant listings, due to extra processes required for pre-authorization and individualized review. The results of this analysis have stimulated additional discussion between VAC and CAF program personnel, informed by specific examples of medications that were listed discordantly in therapeutic areas of concern.

The results of this analysis may be of interest to other individuals working in the public and private sectors of the health care and pharmaceutical industries. Many formulary analyses are done to inform decisions related to a specific medication, in a defined therapeutic area, to determine whether it should be listed on a drug plan or hospital formulary. In contrast, a more "global" review of individual formularies – undertaken after a number of years have elapsed and numerous formulary decisions have been made across multiple drug classes – can allow other types of system improvements to be made. Broader evaluation of formularies may allow for identification of older medications whose roles in therapy have been supplanted by newer agents, thus representing opportunities for rational "delisting" decisions and potential cost savings.[24,25] Rationalization of the medications within a given drug class would be expected to streamline the administrative burden associated with formulary management for drug plan personnel, and may also lead to improvements in the perceived quality of drug plans among prescribers.[26,27]

Our work provides another example of how the WHO's ATC system can be applied to rapidly assess and pinpoint areas for improvement. Although the ATC system is not commonly used in day-to-day clinical practice in North America, it is very well-suited to conduct broad analysis of drug utilization patterns. In our case, use of this system allowed the work to be completed very efficiently, in a relatively limited time span, using readily available data, and by individuals without specialty training in health economics, pharmacoepidemiology, or other related fields. Broader use of the ATC coding system among clinician-scientists could potentially allow for enhanced analysis of formularies, drug utilization patterns, and associated health outcomes by drug plan personnel, thus increasing the capacity for evidence-informed decision-making related to medications.

Analyses like this will likely continue to be of interest, given ongoing calls for a national pharmacare program to be established in Canada.[28–30] Extension of our methodology to analyze both existing provincial and privately funded, employer-based drug benefit sets could allow commonly covered products to be identified relatively quickly. This would support efforts to delineate a "common core formulary" of essential medications that could be prioritized for universal coverage. At the same time, differences in coverage between programs can also be better justified, by linking these more explicitly with client characteristics or with program-specific goals and objectives.

Although comprehensive, the work presented here is not without limitations. Its results provide a high-level overview of drug coverage between two publicly funded Canadian drug plans, using drug benefit lists identified at a *single point in time*. We did not attempt to track changes that occurred in the listing status of specific products prior to finalizing our report, and the exact listing status of many of the products discussed here have changed since our initial calculations. However, while specific numerical results will no longer be accurate, we believe that the findings reported for overall coverage of medications, and the patterns noted among discordant listings in the six anatomic groups of concern, remain an accurate reflection of the degree of alignment between the two programs.

Unfortunately, due to timeframe limitations, no distinction could be made to distinguish between products listed as Regular Benefits and those subject to SA criteria. Since it was expected that significant variability could exist in the wording of SA criteria between programs, it was not possible to reliably codify criteria in a manner would permit rigorous analysis within our project's timeframe. Thus, despite the fairly high level of concordance identified between the programs, there may be additional barriers to drug access and ongoing risks associated with possible treatment disruption which our report does not identify.

Our calculation of ATC concordance also does not allow for assessment of coverage against all products

that are commercially available in Canada. At the time our analysis was initiated, a comprehensive list of all prescription and non-prescription medications was not readily available to serve as a reference point for comparison. Thus, any products that were commercially available in Canada, but not covered by either program, would not have been identified for review. Since our review, many non-prescription medications have been added to Health Canada's Drug Product Database, or are being catalogued in the Natural Health Product database. This analysis can therefore be repeated against the full range of marketed products that have been approved for use in Canada. This could potentially identify further gaps in drug plan coverage among the two programs.

CONCLUSIONS

Based on review of January 2015 drug plan listings, there appears to be a reasonably high level of similarity in the medications covered by the CAF and VAC drug benefit programs. Application of the WHO's ATC coding system allowed for rapid identification of discordantly listed medications on both plans, a small number of which were in therapeutic areas that may pose risks to health with treatment interruption. Further use of this methodology could prove helpful in improving drug plan alignment, identifying products for delisting, and supporting efforts to establish a national drug formulary in Canada.

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