

**Development of
Drug Utilization Indicators:
A Feasibility Study Using Existing
Aggregated Administrative Databases**

April 2002

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Disclaimer

The views expressed herein do not necessarily represent the official policy of the organizations that contributed to the project through the participation of some of their members.

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Executive Summary

The report describes the Prescription Drug Utilization Standards and Reporting System (PDUSRS) project, an initiative undertaken by the Canadian Institute for Health Information (CIHI) in consultation with a variety of stakeholders. The purpose of the project was to develop an initial set of drug utilization¹ indicators and to examine the feasibility of compiling these indicators using existing aggregated administrative databases. The scope of this project included the use of public, private and out-of-pocket drug claims data from across Canada. Experiences using currently available administrative data are shared and future activities are described. This work represents a starting point in the development of comparable population-based² drug utilization indicators across jurisdictions.

Over the last decade, there has been considerable interest and activity around indicator development and use in health care. Indicators are quantitative measures, often expressed as rates, ratios, or percentages, and include or imply a numerator and denominator. Indicators, along with other tools for monitoring the quality and performance of health services, can contribute to the planning, management and evaluation of drug utilization.

The interrelationship of numerous factors affecting drug utilization (Table 1) presents important challenges for the development of indicators to monitor drug utilization trends and results. A model was developed to conceptually describe a dynamic process and a continuum for the development of drug information over time (Figure 1). The model integrates key concepts of the Roadmap Health Indicators Framework³.

An initial set of indicators (Table 2) that provide information about expenditure trends and product-based and population-based drug utilization trends is proposed to achieve a broad picture of drug utilization. In essence, these indicators reflect the combined effects of the multiple factors that affect drug utilization. The use of stratification variables such as age groups, gender and geography, allows for more focused calculations of the indicators.

A single comprehensive administrative database that could support the calculation of the initial nine indicators is currently not available in Canada. As a result, two different sources of aggregated administrative data were accessed to conduct this feasibility study:

- The drug expenditure data compiled in the CIHI-maintained National Health Expenditure (NHEX) database; and
- Anonymized, aggregated drug prescription claims data compiled by RxCanada.

The drug utilization indicators related to expenditure provide valid and reliable trend information as well as high-level standardized comparators that are used internationally. Better information on drug utilization is needed to complement drug expenditure information for use in planning, policy development, decision-making and evaluation:

¹ As per the World Health Organization (WHO) definition of drug utilization: the marketing, distribution, prescription, and use of drugs in a society, with special emphasis on the resulting medical, social, and economic consequences.

² Population-based refer to people-oriented information.

³ Canadian Institute for Health Information. National Consensus Conference on Population Health Indicators Final Report. Ottawa: CIHI, 1999.

- More information on both prices and volume of utilization of health products and services would be needed to better assess the relationship between each of the health sectors in order to assess how changes in one sector will affect the others.
- In order to generate a complete picture of product and user/population-based drug expenditure information, a data source incorporating both expenditure and utilization data is needed, including information on eligible population and users.

For a better understanding of how drugs are used by people, the unit of measurement for the denominator must be person (population)-oriented (e.g. the number of users, the eligible population or the whole population). This allows for the calculation of rates that can be used to quantify drug use within and between populations.

All proposed drug utilization indicators related to prescription claims data can be calculated by individual drug plans because the eligible population is defined and the number of claimants is known. However, the integration or the linkage of two or more sources of prescription claims data presents unresolved challenges, including:

- Some of the Canadian population receives coverage from more than one drug plan (coordination of benefits may apply). In the absence of a unique identifier that can distinguish unique claimants and/or claims, the aggregation of multiple sources of drug claims data could potentially over-estimate the number of claimants and/or claims.
- The development and use of unique identifiers must conform to legislation and policies regarding privacy and confidentiality issues in relation to the collection, the notification, and/ or consent procedures, uses and disclosures of patient data.

Drug utilization can be quantified by a variety of volume measures, including number of claims (or filled prescriptions), number of different drugs, quantity dispensed, prescribed daily dose (PDD) and defined daily dose (DDD). None of these measures alone gives a complete picture of drug utilization in Canada; however, used in combination, they may serve to address a variety of questions.

The ability to compare drug utilization across populations, geographical locations and jurisdictions requires standardized information. Some areas requiring standardization include Product Identification Numbers (PINs) and coordination of benefits.

“In order to measure drug use, it is important to have both a classification system and a unit of measurement.”⁴ For this reason CIHI has adopted the internationally recognized Anatomical Therapeutic Chemical Classification System (ATC) and the Defined Daily Dose statistic (DDDs), which has been developed to work with the ATC system.

A number of exciting initiatives are currently under way that will assist in addressing the need for enhanced data standards and access to standardized data for drug utilization analysis and reporting.

⁴ World Health Organization Collaborating Centre for Drug Statistics Methodology. ATC Classification and DDD Assignment. Oslo, Norway: World Health Organization, 2001.

Work and effort is under way to improve and implement standards for collecting drug data. The findings in this feasibility study augment the need to foster and encourage initiatives regarding standards. For example, the National e-Claims Standard Initiative (NeCST) was established to address the current need for standardization of electronic health claims information, including drug claims.

An anonymized claims level database that captures data from across Canada irrespective of payor is needed for effective analysis of drug use and costs. The Canadian Institute for Health Information (CIHI), in collaboration with the Patented Medicine Prices Review Board (PMPRB)⁵, is taking the lead in the establishment of the National Drug Utilization Information System (NPDUIS), a major step in providing standardized drug data.

The purpose of NPDUIS is to provide accurate and timely national prescription drug utilization information to support public drug programs in the establishment of sound pharmaceutical policies and the effective management of Canada's public drug benefit programs. Using data from public plans will be a major step in providing standardized drug data. This database will serve as an important data source for the compilation of the drug utilization indicators related to volume and intensity of use. Many of the issues identified in assessing the feasibility of using existing aggregate drug data will be addressed through this initiative. This database will also have the potential to complement and support other national initiatives such as the *Common Drug Review, Best Practices and Post-Marketing Surveillance*.

Ultimately, as unique identifiers across plans will be developed and privacy and confidentiality legislation/ policies will address related issues, this national repository could evolve to become a single source for drug utilization data across Canada irrespective of public or private payor.

⁵ The Patented Medicine Prices Review Board (PMPRB) had been doing analytical work on behalf of Pharmaceutical Issues Committee's (PIC) Working Group on Drug Prices using data from federal/ provincial/ territorial drug programs (under a Memorandum of Understanding with Health Canada).

1.0 Introduction

This report describes the Prescription Drug Utilization Standards and Reporting System (PDUSRS) project, an initiative undertaken by the Canadian Institute for Health Information (CIHI) in consultation with stakeholders, to develop drug utilization indicators and to examine the feasibility of compiling these indicators using existing aggregated administrative databases.

This work represents a starting point in the development of comparable population-based drug utilization indicators across jurisdictions. The scope of the PDUSRS project includes the use of public, private and out-of-pocket drug claims data from across Canada. Experiences using currently available administrative data are shared and future activities are described.

Over the last decade there has been considerable interest and activity around indicator development and use in health care. Indicators are quantitative measures, often expressed as rates, ratios, or percentages, and include or imply a numerator and denominator. Indicators, along with other tools for monitoring the quality and performance of health services, can contribute to the planning, management and evaluation of drug utilization.

“Drugs are a critical component in the modern health care system.”⁶ “The past two decades have witnessed the introduction of a myriad of new pharmaceutical products that have revolutionized medicine. Not surprisingly, as the effectiveness of drug therapies has grown, so too has their share of overall health spending in Canada.”⁷ This raises important questions about the sustainability and affordability of the health care system.

In fact, drug expenditure now ranks as the second largest sector of health care spending in Canada, after hospitals.⁸ But are these increasing drug expenditures translating into improved health outcomes for Canadians? Addressing this question is dependent upon the recognition and understanding of the multiple factors that affect drug utilization and upon sound drug utilization data that can support the generation of insightful indicators.

1.1 Factors Affecting Drug Utilization

Changes in total drug expenditure are affected by changes in drug prices and changes in drug utilization. Consumption of larger quantities of drugs can result in increased expenditure even if prices go down. Similarly, shifts in prescribing practices from older and often less expensive drug therapies to newer and often more expensive drug therapies result in increased costs.

Numerous factors, many of which are interrelated, may affect drug expenditure, drug utilization, and ultimately health outcomes. Some of these factors are presented in Table 1. These factors present important challenges for the development of indicators to monitor

⁶ MacLeod S. The optimal drug therapy national symposium 2001: A call for action. *Can J Clin Pharmacol* 2001; 8 (Suppl A):2A-5A.

⁷ Canadian Institute for Health Information. Roadmap Initiative ... Launching the process. 1999.

⁸ Canadian Institute for Health Information. Drug Expenditures in Canada, 1985-2001. 2002.

trends and results that affect not only the performance of the health care system, but also the health of the population.

Table 1. Factors That May Affect Drug Expenditure and Utilization

<p><i>Prices</i></p> <p><i>Entry of New Drug Chemicals</i></p> <p><i>Volume of Drug Use</i></p> <ul style="list-style-type: none">➤ <i>Population-related</i><ul style="list-style-type: none">◆ Changes in total population◆ Changes in population demographics<ul style="list-style-type: none">▪ Age, gender and ethnicity◆ Changes in health status of a population<ul style="list-style-type: none">▪ Emergence of new diseases▪ Epidemics➤ <i>System-related</i><ul style="list-style-type: none">◆ Changes and transition associated with health system reform and restructuring<ul style="list-style-type: none">▪ Move towards shorter hospital stays and home/community care (shift of drug provision from hospital to community)◆ Changes in policies and programs<ul style="list-style-type: none">▪ The extent of formulary listings▪ Eligibility and co-payments◆ Availability of third party insurance coverage➤ <i>Research and technology-related (clinical and informational)</i><ul style="list-style-type: none">◆ New treatment approaches<ul style="list-style-type: none">▪ Drugs replacing surgery▪ Drug therapy for previously untreatable diseases▪ Availability of more and/or improved diagnostic technology▪ Outcomes research, evidence-based preventive or curative approaches in diagnosis or treatment◆ Use of programs and technology in monitoring patients➤ <i>Pharmaceutical industry</i><ul style="list-style-type: none">◆ Development of new drug products (e.g., new strengths, new drug forms and presentations)◆ Promotion of drugs to physicians◆ Drug sampling◆ Direct to consumer advertising➤ <i>Practice and people-related (health care providers and consumers)</i><ul style="list-style-type: none">◆ Changes in prescribing and dispensing practices◆ Number and mix of prescribers (specialists, general practitioners, nurse practitioners and others)◆ Multiple doctoring◆ Consumers' expectations and behaviours◆ Wastage
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1.2 Beginning the Journey

1.2.1 A Model for the Development of Drug Utilization Indicators

Drug utilization is a dynamic and complex matter. A better understanding of the relationship between expenditure, entry of new drugs on the market and utilization is evolving. Nonetheless, there are many questions left unanswered about drug therapy in Canada. For example: Are drugs accessible? Are they being appropriately prescribed and utilized? Are they effective? Are they safe? Work is required to identify what measures or indicators should be used to answer these questions, how they should be used, and what data is required to compile these indicators. We need to have a better picture about what cost-effective drug therapy is and whether drugs are being used optimally.

To support this work now and in the future, a foundation of comparable, complete and affordable data about drug utilization is key. Access to standardized data on actual utilization and costs of pharmaceuticals for reporting and analysis, on a national basis, are considered key to improving the capabilities for population-based⁹ drug utilization studies. Without this foundation a meaningful and informed interpretation of drug utilization patterns and outcomes is challenging.

Figure 1 depicts how information needs or requirements support the vision for the transformation of data into information, and further into knowledge. The model conceptually describes a process and a continuum for the development of drug information over time. It also integrates key concepts of the Roadmap Health Indicators Framework.¹⁰ Within this model, each stage of the process builds on the previous one and enhances the ability to analyze the impact of multiple factors that may affect drug utilization, as identified in Table 1. This relationship is dynamic and the different stages must constantly be evaluated and adapted to reflect new data and the best information at that point in time. Information needs support the vision of transforming data into information and knowledge. Comparability, as well as privacy, confidentiality and security, guide the evolution of this vision.

⁹ Population-based refer to people-oriented information.

¹⁰ Canadian Institute for Health Information. National Consensus Conference on Population Health Indicators Final Report. Ottawa: CIHI, 1999.

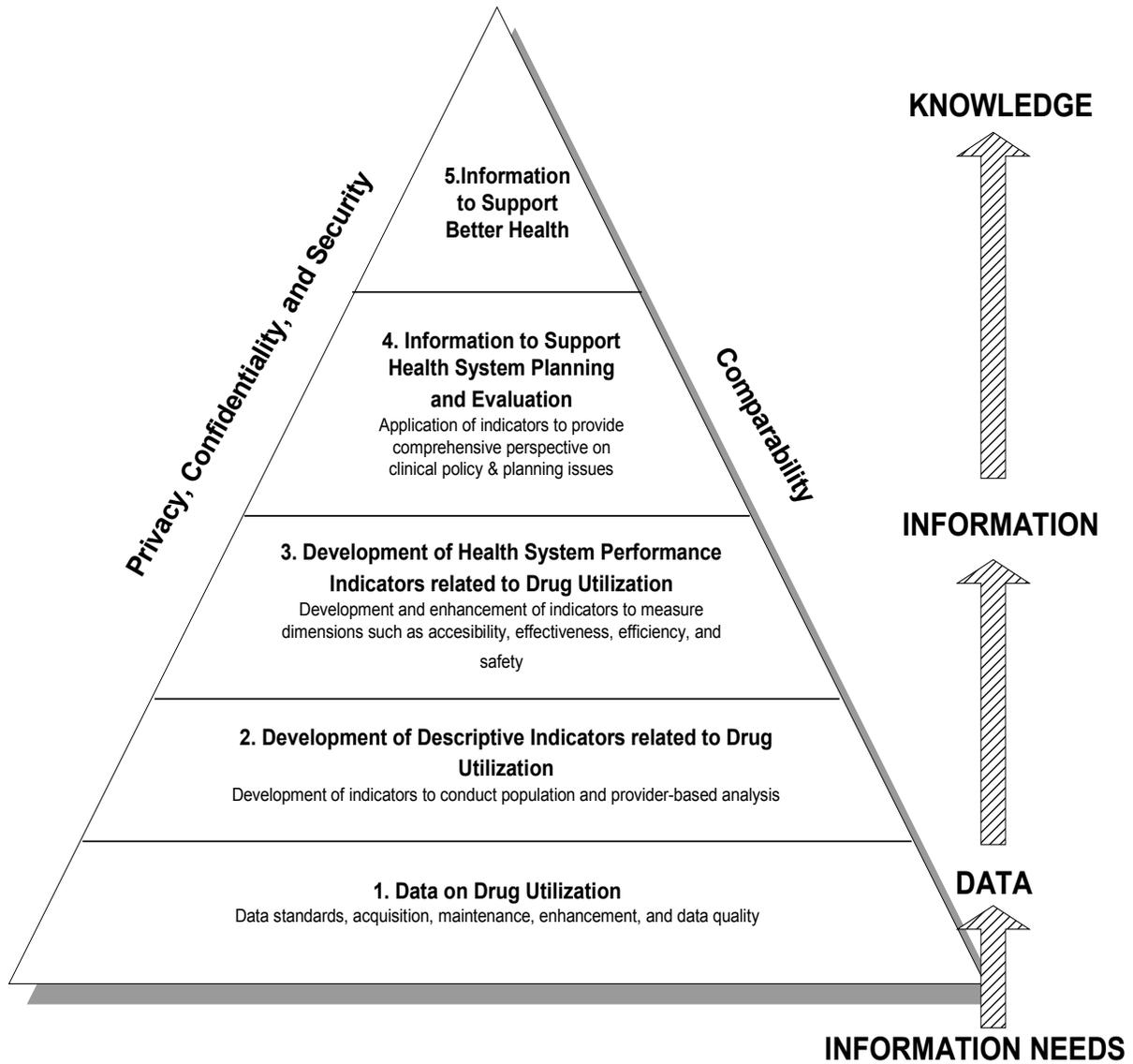


Figure 1. A Model for the Development of Drug Utilization Indicators

The following outlines the PDUSRS project, an initiative undertaken by the Canadian Institute of Health Information (CIHI) in consultation with stakeholders, to develop an initial set of drug utilization indicators and to examine the feasibility of compiling these indicators using existing aggregated administrative databases.

1.2.2 Initiation of the Prescription Drug Utilization Standards and Reporting System Project (PDUSRS)

The Roadmap Initiative is a national vision and action plan for strengthening Canada's health information system. It is a collaborative effort among CIHI, Statistics Canada, Health Canada and many other key groups at all levels. The Prescription Drug Utilization Standards and Reporting System (PDUSRS) project was launched as one of many Roadmap Initiatives.

1.2.3 Goals and objectives

The goal of this project was to study the feasibility of developing national standards for reporting of prescription drug utilization data. In practical terms, this goal was to be realized through the identification of meaningful drug utilization indicators and the evaluation of the feasibility of their compilation using existing administrative databases.

Drug utilization indicators will provide information on the current trends in drug utilization and serve as a foundation to inform on the key issues and debates that surround pharmaceutical use. These indicators will provide descriptive trends in drug use that will form the foundation for more detailed reporting and analysis. Comparing the indicators among jurisdictions and drug programs will help to identify opportunities to improve the effective and efficient use of drugs. Given the differences in drug programs across this country, presenting contextual information to support the review of indicators will be key to understanding these differences. The indicators will serve as a starting point and later, as an integral part of a results-based accountability system by providing standardized information for monitoring and analysis by various stakeholders, and for enhancing public awareness about the use of health care dollars directed towards drugs.

Specific objectives of the project include:

- Assessment of stakeholder key information requirements;
- Identification and development of an initial set of indicators for national comparative reporting;
- Identification of potential data sources;
- Evaluation of an initial set of indicators.

1.2.4 Overview of the Report

The report is organized in the following sections:

- *The Project*: description of the process of identifying and developing an initial set of indicators and of identifying potential data sources.
- *Drug Utilization Indicators Related to Expenditure Data*: discussion about the observations arising from the feasibility of calculating drug utilization indicators, using the National Health Expenditure database.
- *Drug Utilization Indicators Related to Prescription Claims Data*: discussion about the observations arising from the feasibility of calculating drug utilization indicators, using RxCanada drug claims data.
- *Future Activities*: description of initiatives to support better data and reporting on drug utilization in Canada.

2.0 The Project

The following information describes the steps and activities undertaken during the Prescription Drug Utilization Standards and Reporting System (PDUSRS Project).

2.1 Background

The PDUSRS project builds on work that has been done to date. The CIHI Roadmap Initiative and the Options for Prescription Drug Utilization Study (OPUS) provide relevant background for this project.

2.1.1 CIHI Roadmap Initiative

In 1998, the Federal Minister of Health's Advisory Council on Health Infostructure, CIHI, and Statistics Canada brought together over five hundred people across the country to identify priority health care information requirements.¹¹ The Roadmap Initiative, which outlines a shared vision for modernizing health information in Canada, emerged from this consultation. A large number of projects related to health information were initiated, including the PDUSRS project which is designed to address a significant drug information gap.

2.1.2 Options for Prescription Drug Utilization Study (OPUS)

The first phase of the Options for Prescription Drug Utilization Study (OPUS) project¹², resulted in the development of a system prototype and a comprehensive data model, and data dictionary. These tools provided the building blocks for further development. Phase two of the project¹³ studied the feasibility and value of creating a national drug utilization database as a tool for assisting drug plan managers in analyzing drug costs, utilization and outcomes across public drug plans. The OPUS project was sponsored by the Advisory Committee on Health Services. It was funded by the Health Transition Fund and CIHI, and was completed in September 2000.

This project successfully demonstrated the feasibility of creating and maintaining a national drug utilization repository using claims from the public drug plans. It did this by melding claims data from four provincial and one federal insurer into a database with common definitions and content. Many important lessons about creating such a database were learned and were applicable in the development of the PDUSRS project.¹³

2.2 Scope of Project

The scope of this project encompasses the development of drug utilization indicators and the assessment of the feasibility of compiling these indicators using existing aggregated administrative databases. Unlike the OPUS project, which used provincial drug plan data only, the scope of the PDUSRS project includes the use of public, private and out-of-pocket drug claims data from across Canada.

¹¹ Canadian Institute for Health Information, Health Information Roadmap, Beginning the Journey, www.cihi.ca

¹² National Prescription Drug Utilization Model: High Level Feasibility Report (Phase 1). 1999.

¹³ Detailed Feasibility Study Report for a Nation Drug Utilization Repository. Options for Prescription Drug Utilization Study (OPUS), OPUS Project Team. September 15, 2000.

2.3 Project Management Organization

2.3.1 Project Team

The project core team was comprised of a manager, a consultant and a senior analyst. It was supported by an extended team with experience and expertise in health expenditure, data quality, data analysis, information systems, development of information standards and communications. In addition, external consultants were contracted to support background research.

2.3.2 National Drug Utilization Advisory Group (NDUAG)

The National Drug Utilization Advisory Group was established to provide advice to CIHI throughout the project. This group was assembled to ensure both a breadth of input and regional representation. The membership included those with expertise in drug utilization, consumer representation, professional associations, academics and researchers, policy makers, public and private plan administrators and representation from the Patented Medicine Prices Review Board (see Appendix A).

2.4 Assessment of Stakeholder Key Information Requirements

2.4.1 Survey of Information Needs

Current and future needs of stakeholders involved in the analysis of drug utilization databases were examined through a survey of major stakeholders and a literature review. The stakeholders in this consultation included a wide range of academics, associations, pharmaceutical manufacturers, benefit managers, consultants and others.

The identified information needs are broad in scope. It is apparent that not all needs can be met, especially in the short term. Most stakeholders expressed interest in gaining access to data on actual utilization and costs of pharmaceuticals with a view to enhancing the ability to analyze the impact of multiple factors: changes in policy, formulary listings, technological advancement, educational efforts aimed at health care providers and the consumer demographic shifts, and other factors. Providing standardized data for reporting and analysis, on a national and comprehensive basis, however, is seen as a major step in improving the capabilities for drug utilization studies.¹⁴

¹⁴ www.cihi.ca/Roadmap/Prescript_Drug/pdf/Current_and_Future_Needs.pdf

2.5 Identification and Development of an Initial Set of Indicators for National Reporting

2.5.1 Environmental Scan of Indicators

A literature search and environmental scan were undertaken to provide a synopsis of the current state of national and international activity in indicator development for drug utilization¹⁵.

It was found that indicators of population-based drug utilization are still in their early stages of development with few broad based and validated indicators available. Many drug utilization studies exist but indicators or measurement criteria are study-specific and do not lend themselves to transposition to other studies. Few medication-related indicator studies were identified and only a few indicators appear to be evaluative in their use. A major contributor to this area is the World Health Organization.¹⁶

Ultimately, the development of drug utilization *outcome* indicators is needed. Use of these indicators would necessitate the linkage of dispensing data with clinical data. Such linkages, however, present some challenges in terms of privacy and confidentiality issues.

2.5.2 Health Indicators Framework

The Roadmap Health Indicators Framework provides a structure for the development of the indicators (see Appendix B). As a starting point, the drug utilization indicators will fall within the Community and Health System Characteristics domain. These descriptive indicators will allow for the monitoring and the evaluation of profiles and trends in drug utilization. In the future, together and with additional information, more indicators will be developed to address questions about Health System Performance. Ultimately, these indicators will act as a measurement tool, screen, or flag to serve as a guide to monitor, evaluate and improve quality of care, clinical support services and organizational functions which affect client/ patient outcomes.¹⁷

2.5.3 External Field Review

An external field review¹⁸ was conducted to solicit feedback from key stakeholders on the *clarity, usefulness, scope, and present use* of a draft set of initial indicators. Based on a 60% response rate, the overall reaction was favourable. From the survey results several themes emerged:

- The initial set of prescription drug utilization indicators is a good starting point for describing trends in the population's use of prescription drugs, and will serve to

¹⁵ Drug Information and Research Center. Report on Drug Utilization Indicators for the Canadian Institute for Health Information. 2000.

¹⁶ Anon. The use of essential drugs. Eighth report of the WHO Expert Committee (including the revised Model List of Essential Drugs). World Health Organ Tech Rep Ser 1198:882:1-77.

¹⁷ Canadian Council on Health Services Accreditation, 1996, A Guide to the Development and Use of Performance Indicators

¹⁸ http://www.cihi.ca/Roadmap/Prescrip_Drug/pdf/FinalExtFieldResult.pdf

highlight areas for further study. Each of the different indicators is being used by 34 to 60% of the survey respondents.

- The 'limitations' section attached to each indicator requires expansion where possible to include information or references that will assist in the interpretation of the indicators.
- The data sources used must be explicitly defined.
- No significant changes to the draft indicators were identified. Very valuable input was received on some of the cautions, limitations and issues to be considered during the analysis and report writing phases of this project.

2.5.4 Initial Set of Indicators

The initial set of indicators was developed in consideration of potential access to existing administrative drug claims data. Indicators that provide information about expenditure trends and product-based and population-based drug utilization trends are proposed to achieve a broad picture of drug utilization. In essence, these indicators reflect the combined effects of the multiple factors (Table 1) that affect drug expenditure and volume/intensity of use. The initial set of nine core indicators is shown in Table 2. Refer to Appendix C for a detailed description of the indicators.

Table 2: Initial Set of Indicators

<p><i>Drug Expenditure Trends in Canada</i></p> <p>A. Total drug expenditure as a percentage of health care spending</p> <p>B. Prescription drug, non-prescription drug, and hospital drug expenditure as a percentage of total health care spending</p> <p>C. Prescription drug expenditure per capita</p> <p>D. Publicly insured, privately insured, and out-of-pocket expenditure as a percentage of prescription drug expenditure</p> <p>E. Average cost per prescription claim</p>
<p><i>Volume Changes and Mix in Prescription Drugs in Canada</i></p> <p>F. Percentage of total expenditure and volume of claims by therapeutic class</p>
<p><i>Intensity of Drug Use in Canada</i></p> <p>G. Average number of claims per claimant</p> <p>H. The percentage of the population that has made at least one claim</p> <p>I. Average number of Defined Daily Doses (DDD) per 1000 residents per day</p>

2.6 Identification of Potential Data Sources

In keeping with the goal and the scope of the project, potential sources of administrative data that could support the development and the generation of the initial set of indicators were explored and considered.

Ideally, the calculations of the indicators would be derived from a single administrative aggregated database that would provide data:

- On total health spending;
- On actual prescribed and non-prescribed drugs;
- About drugs consumed in the community as well as in hospitals and other health care institutions or settings;
- About the entire population of Canada (or a recognized random sample of);
- Regardless of payor or source of finance (public, private, out-of-pocket);
- Using standardized definitions of utilization and cost data;
- With actual counts of unique claims and claimants;
- That permits flexible aggregation of data based on stratification variables such as age groups, gender and geography;
- That complies with the highest standards related to privacy, confidentiality and security requirements.

A single comprehensive administrative database, reflecting the above needs and supporting the calculation of the initial nine indicators, is currently not available in Canada. Whereas drug expenditure data are compiled nationally and are included in the National Health Expenditure (NHEX) database, there is no national compilation of drug prescription claims data. As a result, the assessment of the feasibility of using existing aggregated administrative databases examined first drug expenditure, and then drug prescription claims data sources.

2.6.1 Drug Expenditure Data Source(s)

The most comprehensive, currently available, nationally based source of drug expenditure data are included in the National Health Expenditure (NHEX) database. It is maintained by CIHI and contains a macro level series on health spending in Canada. It contains health expenditure estimates from the public sector (Provincial/ Federal/ Municipal government sectors and Social Security Funds, e.g., Workers' Compensation Boards) and the private sector (data from private health insurance firms and household out-of-pocket expenditure). Drug expenditure data are compiled in this NHEX database from a variety of sources but without the benefit of drug claims data.

Methodologies and definitions within the NHEX database have been previously established and recognized. Section Three of this report presents a discussion on the use of the NHEX data to generate some of the drug utilization indicators related to expenditure.

2.6.2 Drug Prescription Claims Data Source(s)

After reviewing several options regarding data sources, it was decided that the Rx Canada database best met the project needs. The RxCanada database represents a convenient, single source of public, private and out-of-pocket claims data. RxCanada is a data repository for eight retail pharmacy chains and two independent groups, representing approximately 2700 community pharmacies across Canada. The mission of RxCanada is to promote the profession of pharmacy and demonstrate its value.

While this database accurately reflects a considerable volume of unique drug claims in Canada (~40% of drug claims in Canada in 2000), it constitutes a non-random sample. Although the anonymous claimants are identified *uniquely* within each pharmacy that supplies data, the total number of claimants in the database is unavailable. In fact, the roll-up of the number of claimants results in the overestimation of the number of unique claimants, given that a claimant may access prescriptions from more than one pharmacy. Furthermore, the catchment population (eligible population) is also unavailable.

With these limitations in mind, a data quality and methodology plan was developed to test the feasibility of using the RxCanada data to generate drug utilization indicators. Experience and findings resulting from the assessment of using existing aggregated drug claims data for the calculation of the initial drug utilization indicators are reported in the “Drug Utilization Indicators Related to Prescription Claims Data” section of the report.

As a result of requiring two types of data sources for the generation of the nine core indicators, observations arising from the feasibility of the calculation of the indicators are presented in the two following sections:

- Drug utilization indicators related to expenditure data (using the NHEX database)
- Drug utilization indicators related to prescription claims data (using RxCanada data)

3.0 Drug Utilization Indicators Related to Expenditure Data

This section deals with the feasibility of generating the proposed drug utilization indicators related to expenditure using the existing NHEX database. Within the initial set of indicators, the following drug utilization indicators are included in this section:

- Total drug expenditure as a percentage of health care spending
- Prescription drug, non-prescription drug, and hospital drug expenditure as a percentage of total health care spending
- Prescription drug expenditure per capita
- Publicly insured, privately insured, and out-of-pocket expenditure as a percentage of prescription drug expenditure

The existing NHEX database conforms to the international standard for reporting drug expenditure, i.e., the “Drugs” category in NHEX is intended to measure final consumption, outside an institutional setting, of drugs purchased by consumers or third party payers on their behalf, generally from retail outlets.¹⁹ The provincial/territorial/federal drug expenditure data are obtained from the public accounts per fiscal year in current dollars. Private health insurance expenditure data are obtained through special tabulations of data from private health insurance firms. Out-of-pocket expenditure data for prescribed drugs are acquired from the Survey of Household Spending undertaken by Statistics Canada. Out-of-pocket expenditure for non-prescribed drugs are purchased from A.C. Nielsen. These aggregate data are available for the period 1985 to 1999 and forecast data are available for 2000 and 2001.

In consideration of the data that are available and the methodology that is used in the production of the National Health Expenditure (NHEX) database, revisions are recommended to the proposed initial set of drug expenditure indicators and are presented in Table 3. These revisions reflect a practical approach for the generation of the selected indicators using the NHEX database.

¹⁹ Canadian Institute for Health Information. Drug Expenditures in Canada 1985-2001. Ottawa: CIHI, 2002.

Table 3. Recommendations for the Revision of the Proposed Indicators

Proposed Indicator	Revised Indicator	Comments
Total drug expenditure as a percentage of total health care spending	No change	
Prescription drug, non-prescription drug, and hospital drug expenditure as a percentage of total health care spending	Prescribed drug expenditure as a percentage of total drug expenditure	<ul style="list-style-type: none"> • Harmonization of definitions - Prescribed drugs include both prescription and non-prescription drugs • Revision of the denominator allowing for more meaningful/ specific rate calculations
	Non-Prescribed drug expenditure as a percentage of total drug expenditure	
	Hospital drug expenditure as a percentage of total hospital expenditure	<ul style="list-style-type: none"> • Different data source—the Annual Hospital Survey is used to estimate the drug component of the hospital expenditure ²⁰
Prescription drug expenditure per capita	Prescribed drug expenditure per capita	<ul style="list-style-type: none"> • Harmonization of definitions
Publicly insured, privately insured, and out-of-pocket drug expenditure as a percentage of prescription drug expenditure	Publicly insured drug expenditure as a percentage of prescribed drug expenditure	<ul style="list-style-type: none"> • Harmonization of definitions • Privacy and confidentiality agreements dictate that private drug expenditure for prescribed drugs cannot be broken into private insurers and out-of-pocket expenditure at the provincial level
	Privately insured drug expenditure (excluding out-of-pocket) as a percentage of prescribed drug expenditure – nationally	
	Out-of-pocket drug expenditure as a percentage of prescribed drug expenditure – nationally	
	Privately insured drug expenditure (including out-of-pocket) as a percentage of prescribed drug expenditure – provincially	

²⁰ Hospital drug expenditure include only the cost of the drug supplied. They do not include associated costs of hospital pharmacy pertaining to the requisitioning, storage, control, compounding, standardizing, distribution, and monitoring of drugs, and for acting as an information source on all pharmaceutical matters. The full cost of hospital pharmacy cannot be identified in the Annual Hospital Survey. While direct expenses of hospital pharmacy are reported, indirect expenses (e.g. housekeeping, heating, electricity, plant maintenance, capital related costs) are generally not allocated to hospital pharmacy in the survey.

The NHEX database was used to update the “Drug Expenditures in Canada, 1985–2001” Report, which was released in April 2002²¹. Future editions of this report will build on the experiences that are discussed herein.

Both product and population-based drug utilization information would be useful to further analyze and to interpret reported differences and trends in drug expenditure.

Observations related to the feasibility of calculating the indicators using the NHEX database are discussed under the following topics:

- The integration of product and population-based information
- Drug indicators within a continuum of care
- The challenges of comparability across jurisdictions

3.1 The Integration of Product and Population-based Indicators

Selected drug expenditure indicators based on NHEX data provide information about the overall spending and related trends for drug consumption in Canada. These indicators are based on economic standards and methodologies.

Three of the drug expenditure indicators are identified as product-centered, i.e., using rates where the denominator refers to the products, or an attribute of, in this case the cost:

- The proportion of Canadian health care spending that is allocated to drugs
- The proportion of drug spending that is allocated to prescribed and non-prescribed drugs
- The proportion of dollars spent on drugs paid by public and private sources

On the other hand, population-based indicators, i.e., the calculation of rates of drug expenditure using user or population-type of denominators, introduces the person-oriented approach to studying drug expenditure. The indicator *drug expenditure per capita* provides a population perspective of drug utilization. Although this indicator provides useful information, it has certain limitations. For example, drug expenditure per capita cannot provide information about the number of people exposed to drugs, the proportion of the users, and the intensity of use.

In order to generate a broader picture on product and user/population-based drug expenditure information, a data source containing expenditure and claims data as well as information about the catchment population and users is needed. Information to support the analysis of drug utilization using stratification variables such as age groups, gender and geography, allow for more focused calculations of the indicators.

²¹ A media release has been posted on the cihi website, www.cihi.ca

3.2 Drug Indicators Within a Continuum of Care

As major reforms affect the delivery of health services, information about shifts in expenditure and indicators to monitor cost-efficiencies in a continuum of care across health sectors (e.g., hospitals, other institutions, physicians, other professionals, community-based services) are evolving. Although the NHEX system for categorization of expenditure is not designed for this purpose, the analysis of the share of drug expenditure compared to other categories of expenditure is of interest.

It is suggested that some innovations may have contributed to new approaches in the delivery of health care services. For example, the introduction of new technologies such as new drugs and new surgical techniques may have contributed to some shifts towards day surgeries in hospitals or other settings. As well, new drugs have replaced costly invasive procedures (e.g., H₂-antagonists and proton pump inhibitors used to treat peptic ulcers).

More information on both prices and volume of utilization of health products and services are needed to assess the relationship between health expenditure categories and to evaluate how changes in one sector will affect the others.

Research is required to provide information about the following relationships:

- The degree to which hospital downsizing may affect community-based drug spending,
- The extent to which entry of new drug entities may affect lengths of stay for inpatient services, or the need for hospitalization, and
- The cost-effectiveness or improvement of health outcomes through the use of drugs.

3.3 The Challenges of Comparability Across Jurisdictions

One of the key criteria for the development of drug utilization indicators is 'comparability'. Numerous factors influence the comparability of expenditure data, including:

- **Data sources:** The use of different and/or multiple data sources may present challenges for the comparison of findings across jurisdictions. Claims and claimants may be replicated in more than one database to allow for coordination of benefits. The aggregation of data using multiple data sources across public and private drug plans may result in the overestimation of claims and claimants, and potentially expenditure. The extrapolation of data obtained from surveys may also have limitations.
- **Denominator:** Various denominators are used for calculating rates of drug expenditure. User or population-based rates may be expressed as per capita, per resident, per eligible population, per specific cohort, per active beneficiary (in a drug plan), per user, per claimant, etc. Based on information needs, adjusted-rates are used to enhance the comparability of drug expenditure rates across jurisdictions; adjustment factors include age, sex and socioeconomic variables.
- **Time period:** Comparisons using different time periods (e.g., calendar vs. fiscal year) may be an issue for comparability of drug expenditure.

- Price indices and inflation adjustment factors: The challenges of price measurement of pharmaceuticals have been documented by others^{22, 23}. There is no authoritative composite price index for all drugs sold in Canada. Existing price indices, which include Consumer Price Index, Industrial Product Price Index [IPPI (pharmaceuticals)] and Patented Medicine Price Index (PMPI), are calculated using traditional methods.²⁴
- Contextual factors: There is considerable variation in the level and growth of drug expenditure in different countries and across jurisdictions. These variations are influenced by several factors, which can include, for example, the degree of comprehensiveness, universality and accessibility of drug subsidy programs. Variations in the age and sex distribution of the population may also affect drug expenditure. They will also be affected by practice patterns, the health needs of targeted populations and the manner in which health care is delivered (including the balance between institutional and ambulatory care).

In conclusion, the drug expenditure indicators provide descriptive trend information as well as high-level standardized comparators that are used internationally. The factors that affect changes in drug expenditure are complex and interrelated. Better information on drug utilization is needed to complement drug expenditure information for use in planning, policy development, decision-making and evaluation.

²² S. Jacobzone, Organisation for Economic Cooperation and Development, *Pharmaceutical Policies in OECD Countries: Reconciling Social and Industrial Goals*, Labour Market and Social Policy; Occasional Papers, No. 40, April 2000, Paris.

²³ Steve Morgan, *Productivity Measurement in a Pharmaceutical Sector Sub-Market: The Real Cost of Treating Hypertension*, doctoral thesis, Department of Economics, University of British Columbia, April 2000.

²⁴ Canadian Institute for Health Information. Drug Expenditures in Canada 1985-2001. Ottawa: CIHI, 2002.

4.0 Drug Utilization Indicators Related to Prescription Claims Data

This set of indicators quantify the extent and variability of usage either from a product perspective (market share) or from a population-based (use) perspective. In the initial set of indicators, the following drug utilization indicators related to prescription claims data are identified:

<p><i>Drug Expenditure Trends in Canada:</i></p> <ul style="list-style-type: none">• Average cost per prescription claim
<p><i>Volume changes and mix in prescription drugs in Canada:</i></p> <ul style="list-style-type: none">• Percentage of total expenditure and volume of claims by therapeutic class
<p><i>Intensity of drug use in Canada:</i></p> <ul style="list-style-type: none">• Average number of claims per claimant• The percentage of the population that has made at least one claim• Average number of Defined Daily Doses (DDD) per 1000 residents per day

These indicators could not be calculated using RxCanada data to provide valid information on drug utilization in Canada. The non-random sample, unreliable cost information, unavailability of the number of claimants and lack of eligible population (i.e., denominators) precluded their calculation.

However, the proposed drug utilization indicators can be calculated by individual drug plans because the eligible population is defined and the number of claimants is known. It should be noted that most public and private plans have the ability to provide only a partial picture of drug utilization by the plan's eligible population. Generally, most plans collect only information about the drugs that are benefits under the program.²⁵ Some provinces (e.g., British Columbia and Manitoba) collect more comprehensive information about prescribed drug use by all provincial residents.

Valuable experience and useful insights were gained using existing aggregate administrative data. Experience was gained in developing and testing methodologies to assess data quality and to conduct data analysis. In addition, working with the RxCanada administrative database allowed for observations that could be generalized to other similar databases.

²⁵ Bacovsky RA. Federal, Provincial and Territorial Government-sponsored Drug Plans and Drug Databases. Background information prepared for the Conference on National Approaches to Pharmacare. December 2, 1997.

Observations arising from experience using RxCanada data are presented under the following topics:

- The integration of product and population-based indicators
- The need for a claims level database
- Drug utilization—units of measure
- The challenges of comparability across jurisdictions

4.1 The Integration of Product and Population-based Indicators

Studying drug utilization from a product perspective provides a picture of the market share of a drug or a class of drugs. By proxy, this provides a high level profile of the disease groups that are contributing most significantly to drug expenditure and volume of claims.

For a better understanding of how drugs are used by people, the unit of measurement for the denominator must be person (population)-oriented and may be the number of users, the eligible population or the whole population. This allows for the calculation of rates that can be used to quantify drug use by and across populations. In order to calculate these population-based indicators, the number of unique claimants and eligible population are required.

It is currently not feasible to combine multiple drug claims databases (i.e., to obtain a multi-source database) in order to get a picture of total drug utilization by a population within a certain geographic location (e.g., region, province, nationally). Unique identifiers are plan-specific and some of the Canadian population receives coverage from more than one plan. Consequently, the summation of claimants from multiple plans can potentially result in an over-estimation of the denominator for calculation of rates. Furthermore, an over-estimation of the number of claims can also potentially result where coordination of benefits occurs, that is, where the same claim is covered and recorded by more than one plan.

There is a need for the development of standards that will permit linkage of unique claimants and claims across drug databases. Currently, the drug plans uniquely identify eligible beneficiaries. The source of unique identifiers is the registry of individuals covered by the health plan. However, the element(s) that compose the unique identifiers may vary across public and/or private registries.

The development of unique patient identifiers and their use to link data from multiple drug databases raises privacy issues. Any initiative of this nature will need to address the requirements in applicable federal and provincial privacy legislation. This may include the preparation of privacy impact assessments, which would identify purposes and uses of unique identifiers, along with measures to enhance data protection when they are used for data matching.

4.2 The Need for a Claims Level Database

While aggregation of data may be useful for high-level descriptive analysis, claims level data is required for more detailed reporting and analysis, for example: studies following longitudinal drug utilization trends in specific populations; studies attempting to profile groups of users or providers, and studies on concurrent drug utilization. The availability of a claims level database allows for these studies.

An anonymized claims level database that captures data from across Canada irrespective of payor is needed for effective analysis of drug use and costs. Because public plans cover a significant proportion of Canadian prescription drugs, a National Prescription Drug Utilization Information System containing data from public plans will be created as a first step in this process. This approach will ensure uniqueness of claimants and claims. Ultimately, as unique identifiers across plans will be developed and privacy and confidentiality legislation/policies will address related issues, this national repository could evolve to become a single comprehensive source for drug utilization data.

While claims level data allow for a broader range of detailed analyses, it should be noted that claims level data has limitations as well. These limitations include: lack of indication for clinical use, clinical data for monitoring purposes, and variables that modify drug effect (socioeconomic variables, lifestyle variables).

4.3 Drug Utilization—Units of Measure

Drug utilization can be quantified by a variety of volume measures, including number of claims (or filled prescriptions), number of different drugs, quantity dispensed, prescribed daily dose (PDD) and defined daily dose (DDD). None of these measures alone gives a complete picture of drug utilization in Canada; however, used in combination, they may serve to address a variety of questions.

4.3.1 Claims

Counting the number of drug claims is one of the most common methods of measuring volume in Canada as this information is readily available from drug claims administrative databases. Number of claims indicates the frequency with which claims are submitted for payment.

Claims do not provide information about the number of people using drugs. A total of five claims could mean five claims for one person or one claim for five people. Quantities of drugs supplied vary from claim to claim. For example, one claim may be for 14 units while another claim may be for 28 units, yet each claim is counted as one. Furthermore, claims do not provide an insight into the length of exposure. Using the same example, if used once a day, the 14 units represent a 14-day supply and if used twice a day, the 28 units represent a 14-day supply as well. Administrative policies and prescribing practices are important in determining claim size. Despite these limitations, number of claims is widely used and provides a high-level picture of drug utilization.

4.3.2 Number of Different Drugs

Counting the number of different drugs used by a claimant provides another measure of drug use profile per claimant. The identification of drugs by DIN (Drug Identification Number) or by product name may over-estimate the number of different drugs used by a claimant. For example, as different strengths for a drug correspond to different DINs, a dose adjustment may result in the count of two different drugs used by the claimant. In the same way, a switch to another brand product may result in multiple counting of the same drug entity. For a meaningful picture, drugs must be identified at the chemical substance level. The ATC classification at the 5th level²⁶ allows the grouping of all strengths and dosage forms for a chemical substance. Counting the number of different drugs at the 5th level ATC classification will give one a measure of the number of different drugs.

4.3.3 Quantity Dispensed

Counting the number of dispensing units (tablets, inhalers, packages, grams, liters, etc.) can be used for quantifying drug utilization. This approach can be applied only when the use of one drug or a well-defined product is evaluated²⁶ as it is meaningless within and across classes. Counting dispensing units has other limitations. For example, tablets of the same drug may come in different strengths and thus it is inappropriate to combine them by merely summing the number of tablets. Often the same drug may be available in different dosage forms (e.g., tablets and liquids) thereby precluding a roll-up. Although this metric has limited application for quantifying drug use, it is required for computation of prescribed daily doses and defined daily doses.

4.3.4 Prescribed Daily Dose (PDD)

The prescribed daily dose is the average daily amount of a drug that is actually prescribed.²⁶ It can be calculated when administrative claims data provide information about quantity dispensed, strength and days supply. PDDs should be interpreted with knowledge of the diagnosis as the recommended dose can differ from one indication to another. Dosage can also vary by age and other factors. A limitation in calculating PDD is the inaccuracy, and in some instances the non-availability, of a “days supply” field in the claims data.

4.3.5 Defined Daily Dose (DDD)

The DDD is the assumed average maintenance dose per day for a drug used for its main indication in adults and does not necessarily reflect the recommended or actual dose used.²⁶ It is a technical unit of measurement assigned by the WHO Collaborating Centre for Drug Statistics Methodology and developed to work with the Anatomical Therapeutic Chemical Classification System. For some drugs, DDDs have not been assigned either because it is difficult to determine appropriate DDDs (e.g., dermatologicals) or because no requests have been made to the WHO Centre.

²⁶ World Health Organization Collaborating Centre for Drug Statistics Methodology. ATC Classification and DDD Assignment. Oslo, Norway: World Health Organization, 2001.

The DDD standardizes measurement of drug utilization within and across drug classes and can be used to describe drug utilization across a population and between provinces or countries. When the number of DDDs dispensed to the population is calculated, it provides a rough estimate of the proportion of the population receiving the drug at the average daily dose for the drug's major indication. For example, 10 DDDs/1000 resident/day indicates that 1% of population on average gets a certain drug daily. DDD rates can be used to approximate other measures of drug utilization in the population depending on the denominator. For example, five DDDs/resident/year indicates that the consumption is equivalent to the treatment of every resident with a 5-day course during a certain year.

The DDD provides for a reasonable mechanism for aggregating drug use across the different dosages of a specific drug (e.g., 50mg and 100mg tablets of sertraline) and aggregating use of a class of drugs (e.g., Selective Serotonin Re-Uptake Inhibitors).²⁷

To calculate DDDs, reliable quantity dispensed information as well as the number of distinct claimants or catchment population is required. The quantity dispensed for non-solid dosage forms is inconsistently reported in many drug claims databases. For example, the quantity dispensed for one 125 ml bottle of a drug product can be recorded as "1" (bottle) or 125 ml. Due to inconsistencies in this field, studies using DDDs are often done on solid dosage forms only.²⁸ Because the ATC and DDDs can be altered by the WHO, it is important to note which version of the index is being used for the calculations, particularly if comparisons are made over time.

4.4 The Challenges of Comparability Across Jurisdictions

The ability to compare drug utilization across populations, geographical locations and jurisdictions requires standardized information. Four areas where standardization needs to be addressed are identified and discussed as follows:

- Age/sex standardization
- Drug classification system
- Product identification numbers (PINs)
- Coordination of benefits

4.4.1 Age/Sex Standardization

Age/sex standardization is a tool that is used to enhance comparability of population-based indicators. As age and sex influence drug utilization, it is important when comparing rates of drug use between populations that differ in their age and gender composition, to correct for these by standardization. Standardization adjusts rates up or down to remove

²⁷ Goel V et al. Patterns of use of specific drugs in the elderly. Patterns of Health Care in Ontario. The ICES Practice Atlas. 2nd edition: 323-328. Canadian Medical Association, Ottawa, 1996.

²⁸ Metge C, Black C, Peterson S, Kozyrskyj AL. The population's use of pharmaceuticals. Med Care 1999; 37(6) : JS42-JS59.

differences that are due solely to differences in age or gender among populations.²⁹ Whether the direct or indirect method of standardization is employed, a defined catchment population is required.

4.4.2 Drug Classification System

“In order to measure drug use, it is important to have both a classification system and a unit of measurement.”³⁰ For this reason, CIHI has adopted the internationally recognized Anatomical Therapeutic Chemical Classification System (ATC). The ATC system is used by most researchers, but also organizations such as Health Canada, PMPRB, and by some drug plans and hospitals in Canada. In the ATC system, the drugs are divided into 14 different groups according to the organ or system on which they act and their chemical, pharmacological and therapeutic properties. Defined Daily Doses (DDDs) are developed to work with the ATC system and assigned to chemical entities at the 5th level. The WHO Collaborating Centre for Drug Statistics Methodology is responsible for the development and maintenance of the ATC/DDD system.

Currently, there are two other commonly used classification systems in Canada. Most hospitals and drug plans use the American Hospital Formulary System (AHFS) Pharmacologic – Therapeutic Classification, with local modifications. This is a hierarchical system that divides drugs into 30 pharmacologic-therapeutic classes. The American Society of Health-System Pharmacists (ASHP) administers this system. A third system is the Uniform System of Classification, which is used by IMS Health.

Significant variations exist amongst the classification systems, thereby, hampering the comparison of drug utilization trends using the different systems. However, it should be noted that the Drug Product Database, maintained by the Therapeutic Products Directorate³¹ contains both the AHFS and ATC classifications, linked to the Drug Identification Number (DIN). This allows for classification of drugs by either system.

4.4.3 Product Identification Numbers (PINs)

Product Identification Numbers (PINs) exist for a variety of purposes. For example, PINs are used to identify pharmaceutical products that do not have a DIN, but are subject to benefits (e.g., devices for the administration of drugs). PINs may serve as administrative means to differentiate drug product formats/sizes that would otherwise be identified by a unique DIN. PINs are also used to identify extemporaneous preparations that may comprise a combination of ingredients or DINs.

Standardization of PINs is necessary for the accurate identification of these products and the calculation of their utilization. Currently there is no standard definition of PINs in Canada. The same PIN may represent several products or several PINs may describe one

²⁹ Sketris IS, Metge C, Blackburn J et al. A Canadian guide for drug utilization studies using administrative pharmacy claims data: Focus on the WHO ATC System and Defined Daily Dose. (Health Transition Fund Report). Halifax: Dalhousie University's College of Pharmacy. 2001.

³⁰ World Health Organization Collaborating Centre for Drug Statistics Methodology. ATC Classification and DDD Assignment. Oslo, Norway: World Health Organization, 2001.

³¹ <http://www.hc-sc.gc.ca/hpd-dgps/therapeut/htmleng/dpd.html>

product. Use of UPC codes (bar codes) to identify commercially available non-drug products holds promise.

4.4.4 Coordination of Benefits

To determine coordination of benefits, claimants accessing more than one drug plan must be identified with the same unique identifier in all plans. Furthermore, each claim must be uniquely identified so that it can be followed across different plans. Work is currently under way on a national claim standard and once implemented, it may be possible to track a claim through various plans by its unique invoice number. Additional information on the pharmacy claim standard initiative is presented in the Future Activities section. The development of unique identifiers to link claimants across public and/or private drug plans will require more consideration, as discussed earlier in this report.

5.0 Future Activities

“The reliance of the Canadian health care system on drug therapy is increasing rapidly as drugs are recognized as a clear alternative to hospitalization, frequent professional visits and other costly interventions.”³² Undoubtedly, increasing drug utilization will be accompanied by increasing expenditure and this, with demands for greater accountability and questions about effectiveness, will fuel efforts to measure pharmaceutical performance and outcomes. Comparable, complete and affordable drug data will be the foundation for these future activities.

5.1 Collaboration

Administrative drug claims databases will continue to be a valuable and available resource for analysis and reporting. Partnerships and collaborations with a variety of stakeholders, including public and private drug plans, PMPRB, ministries of health, researchers, etc, will be essential to establish comparable, comprehensive information systems.

5.2 Development and Implementation of Data Standards

Work and effort is under way to improve and implement data standards for collecting drug data. The findings in this feasibility study augment the need to foster and encourage initiatives regarding standards. For example, in this project, the need for development and enhancement of standards for the following data elements have been identified:

- Claim unique identifier
- Claimant unique identifier
- Product Identification Number (PIN)
- Drug classification system
- Dispensing unit
- Days supply
- Method of payment/ source of finance, including variable(s) related to the coordination of benefits
- Cost data: drug cost, mark-up, professional fees (claimed, accepted, paid)

Most of the available drug utilization data are obtained from databases created for the purposes of drug benefit management and adjudication activities. Claim adjudicators have recognized the need for standardized data to more efficiently process claims from multiple sources, such as dental, drugs, physicians, etc.

³² MacLeod S, Optimal drug therapy National Symposium 2001: Reflections and conclusions. Can J Clin Pharmacol 2001;8 (Suppl A):55A-56A.

As a result, the National E-Claims Standard Initiative (NeCST) was established to address the current need for standardization of electronic health claims information³³, including drug claims. The e-claims standard will assist in the standardization of drug data. This standard is virtually completed at this time but its implementation in pharmacy practice is voluntary. Activities to promote the value of implementing this product need to be undertaken by a variety of stakeholders. As e-pharmacy, e-prescribing and the electronic health record evolve, the development of common standards for these applications must be harmonized with the e-claims initiative.

Drugs are only one tool used to improve health within the population. A study of their performance in an integrated health system will require an integrated and comprehensive electronic health system. In order to be linked or integrated, the various files (databases) will need to have common data elements that will uniquely identify patients.

5.3 A National Prescription Drug Utilization Information System (NPDUIS)

The Canadian Institute for Health Information (CIHI), with the collaboration of the Patented Medicine Prices Review Board (PMPRB)³⁴, are taking the lead in the establishment of the National Prescription Drug Utilization Information System (NPDUIS), a major step in providing standardized drug data. This initiative has been supported by Premiers as an important strategy for the effective management of pharmaceuticals.

The purpose of NPDUIS is to provide accurate and timely national prescription drug utilization information to support public drug programs in the establishment of sound pharmaceutical policies and the effective management of Canada's public drug benefit programs. Using data from public plans will be a major step in providing standardized drug data. This database will serve as an important data source for the compilation of the drug utilization indicators related to volume and intensity of use. Many of the issues identified in assessing the feasibility of using existing aggregate drug data will be addressed through this initiative. This database will also have the potential for complementing and supporting other national initiatives such as the *Common Drug Review, Best Practices and Post-Marketing Surveillance*.

The data standards required to support this database will need to consider existing data standards as well as emerging standards such as those developed through the NeCST initiative. Ultimately, as unique identifiers across plans will be developed and privacy and confidentiality legislation/policies will address related issues, this national repository could evolve to become a single source for drug utilization data across Canada irrespective of public or private payor.

³³ <http://www.cihi.ca/eclaims/intro.shtml>

³⁴ The Patented Medicine Prices Review Board (PMPRB) had been doing analytical work on behalf of PIC's Working Group on Drug Prices using data from federal/ provincial/ territorial drug programs (under a Memorandum of Understanding with Health Canada).

6.0 Conclusions

Spending on drugs continues to grow at a faster rate than the total health expenditure. As a result, drug expenditure now ranks as the second largest sector of health care spending in Canada, after hospitals.³⁵ In 2001, an estimated fifteen billion dollars was spent on pharmaceuticals and over the counter products. But are these increasing drug expenditure translating into improved health outcomes for Canadians? Addressing this critical question poses considerable challenges because of complex and interrelated factors that affect the means by which drugs are required, provided, developed, prescribed, and consumed within the health care system.

This project represented a starting point in the development of indicators to monitor drug expenditure trends and product-based and population-based drug utilization across jurisdictions. The feasibility of calculating the selected drug utilization indicators related to drug expenditure data was demonstrated. While the drug utilization indicators related to volume, mix and intensity of use were not calculated in this study, it is feasible for individual drug plans to calculate these indicators. Given the differences in drug plans across this country, it will be important to present contextual information along with indicator results to assist in the interpretation of reports.

The use of existing aggregated administrative data in this project yielded the following observations:

- To allow for the calculation of rates that can be used to quantify drug use by and across populations, the unit of measurement for the denominator must be person (population)-oriented, such as the number of users, the eligible population or the whole population. In order to calculate these population-based indicators, the number of unique claimants and eligible population are required.
- There is a need for the development of standards that will permit linkage of unique claimants and claims across drug databases. The development and use of such unique identifiers must conform to legislation and policies regarding privacy and confidentiality issues in relation to the collection, the notification, and/or consent procedures, uses and disclosures of patient data.
- Drug utilization can be quantified by a variety of volume measures, including number of claims (or filled prescriptions), number of different drugs, quantity dispensed, prescribed daily dose (PDD) and defined daily dose (DDD). None of these measures alone gives a complete picture of drug utilization in Canada; however, used in combination, they may serve to address a variety of questions.
- The ability to compare drug utilization across populations, geographical locations and jurisdictions requires standardized information. Some areas requiring standardization include Product Identification Numbers (PINs) and coordination of benefits.

A model was developed to conceptually describe a dynamic process and a continuum for the development of drug information over time and to integrate key concepts of the

³⁵ Canadian Institute for Health Information. Drug Expenditures in Canada 1985-2001. 2002.

Roadmap Health Indicators Framework³⁶ (Figure 1). An anonymized claims level database that captures data from across Canada irrespective of payor is needed for effective analysis of drug use and costs. The establishment of NPDUIS using data from public plans will be a major step in providing standardized drug data.

In conclusion, a number of exciting initiatives are currently under way that will assist in addressing the need for enhanced data standards (NeCST initiative) and access to standardized data for drug utilization analysis and reporting (NPDUIS). Although these initiatives will not address all the issues raised in this report, they will be an important step in moving the agenda forward. The ongoing development and production of meaningful drug utilization indicators will require the collaboration of multiple stakeholders.

³⁶ Canadian Institute for Health Information. National. Consensus Conference on Population Health Indicators Final Report. Ottawa: CIHI, 1999.

Appendix A

National Drug Utilization Advisory Group Members

National Drug Utilization Advisory Group Members

Albert Schumacher	Canadian Medical Association
Barb Shea	Drug Plan & Extended Benefits Branch, Saskatchewan Health
Brad Buxton	Health Policy & Communications Branch, Health Care Directorate, Health Canada
Colleen Metge	Faculty of Pharmacy, University of Manitoba
David Bougher	Pharmaceutical Policy and Programs, Alberta Health and Wellness
Irene Klatt	Health Insurance Policy, Canadian Life and Health Insurance Association Inc.
Ingrid Sketris	Pharmacy, College of Community Health and Epidemiology, Dalhousie University
Ivan Hale	One-Voice, Seniors Network
Jane Hutchison	Canadian Council on Health Services Accreditation
Jeff Poston	Canadian Pharmacists Association
Mira Gokhale	Drug Programs Branch, Ontario Ministry of Health and Long Term Care
Ron Corvari	Policy and Economic Analysis Branch, Patented Medicine Prices Review Board

Appendix B

Health Indicators Framework

Health Indicators Framework

Health Status			
Deaths	Health Conditions	Human Function	Well-Being
A range of age-specific (e.g. infant mortality) and condition specific (e.g. AIDS deaths) mortality rates, as well as derived indicators (e.g. life expectancy and potential years of life lost).	Alterations or attributes of the health status of an individual which may lead to distress, interference with daily activities, or contact with health services; it may be a disease (acute or chronic), disorder, injury or trauma, or reflect other health-related states such as pregnancy, aging, stress, congenital anomaly, or genetic predisposition. (WHO)	Levels of human function are associated with the consequences of disease, disorder, injury and other health related conditions. They include body function/structure (impairments), activities (activity limitations) and participation (restrictions in participation). (ICIDH-2, Beta 2 version)	Broad measures of the physical, mental, and social well-being of individuals.
Non-Medical Determinants of Health			
Health Behaviours	Living and Working Conditions	Personal Resources	Environmental Factors
Aspects of personal behaviour and risk factors that epidemiological studies have shown to influence health status.	Indicators related to the socio-economic characteristics and working conditions of the population, that epidemiological studies have shown to be related to health.	Measures the prevalence of factors, such as social support and life stress, that epidemiological studies have shown to be related to health.	Environmental factors with the potential to influence human health.
Health System Performance			
Acceptability	Accessibility	Appropriateness	Competence
All care/service provided meets the expectations of the client, community, providers and paying organizations, recognizing that there may be conflicting, competing interests between stakeholders, and that the needs of the clients'/patients' are paramount. (CCHSA)	The ability of clients/patients to obtain care/service at the right place and the right time, based on respective needs. (CCHSA)	Care/service provided is relevant to the clients'/patients' needs and based on established standards. (CCHSA)	An individual's knowledge and skills are appropriate to the care/service being provided. (CCHSA)
Continuity	Effectiveness	Efficiency	Safety
The ability to provide uninterrupted, coordinated care/service across programs, practitioners, organizations, and levels of care/service, over time. (CCHSA)	The care/service, intervention or action achieves the desired results. (CCHSA)	Achieving the desired results with the most cost-effective use of resources. (CCHSA)	Potential risks of an intervention or the environment are avoided or minimized. (CCHSA)
Community and Health System Characteristics			
Characteristics of the community or the health system that, while not indicators of health status or health system performance in themselves, provide useful contextual information.			

Appendix C

Core Drug Utilization Indicators

Core Drug Utilization Indicators

Drug Expenditure Trends in Canada

- A. Total drug expenditure as a percentage of health care spending.
- B. Prescription drug, non-prescription drug, and hospital drug expenditure as a percentage of total health care spending.
- C. Prescription drug expenditure per capita.
- D. Publicly insured, privately insured, and out-of-pocket expenditure as a percentage of prescription drug expenditure.
- E. Average cost per prescription claim

Volume Changes and Mix in Prescription Drugs in Canada

- F. Percentage of total expenditure and volume of claims by therapeutic class.

Intensity of Drug Use in Canada

- G. Average number of claims per claimant.
- H. The percentage of the population that has made at least one claim.
- I. Average number of Defined Daily Doses (DDD) per 1000 residents per day.

Drug Expenditure Trends in Canada

Indicator A: *Total drug expenditure as a percentage of health care spending.*

Use: Indicates the proportion of Canadian health care spending that is allocated to drugs.

Description: Total health care spending includes public and private spending (private includes out-of-pocket spending).

Methods and Data Collection: This indicator will be populated using public and private data from CIHI's National Health Expenditure (NHEX)³⁷ section. Public data sources include federal, provincial and territorial insurance data as well as data from Workers Compensation Boards. Private data sources include 12 not-for-profit private insurers, as well as tabulations for commercial insurance providers, supplied by the Canadian Life & Health Insurance Association (CLHIA), Statistics Canada Survey of Household Spending (SHS), and market analyses conducted by A.C. Nielson.

Indicator Calculation: The indicator is composed of a numerator and denominator, and is calculated as follows:

$$\frac{\text{(Total drug expenditure *nationally* and by *province/territory*)}}{\text{(Total health care expenditure *nationally* and by *province/territory*)}} \times 100$$

Level of Reporting: National, by province/territory and by calendar year.

Limitations:

What it can tell us: This indicator can be used to describe current spending on drugs and associated trends over time, relative to total health care spending.

What it cannot tell us: This indicator cannot measure cost-efficiency (whether levels of drug spending are appropriate given the relative health of the population). It cannot provide information about the mix of prescription drugs that comprise the cost, or the relative proportions of newer versus older medications.

³⁷ Canadian Institute for Health Information, Drug Expenditures in Canada (1985-2000), www.cihi.ca

Drug Expenditure Trends in Canada

Indicator B: *Prescription drug, non-prescription drug, and hospital drug expenditure as a percentage of total health care spending.*

Use: Indicates the proportion of Canadian health care spending that is allocated to prescription drugs, non-prescription drugs, and hospital drugs.

Description: For the purpose of this report a prescription drug is defined as any drug that is written by a licensed practitioner and filled by a licensed pharmacist. This definition of 'Prescription drug' does not cover prescriptions that were written by physicians but never filled (due to limitations in administrative data). A non-prescription drug is any drug or personal health supply that has been issued with a Drug Identification Number (DIN) by Health Canada, that is purchased without being dispensed by a licensed pharmacist. Non-prescription drugs do not refer to alternative medicines or 'herbal remedies'. Hospital drug is any drug that is supplied to a patient while in hospital. Total health care spending includes public and private (private includes out-of-pocket spending).

Methods and Data Collection: This indicator will be populated using public and private data from CIHI's National Health Expenditure (NHEX)³⁸ section. Public data sources include federal, provincial and territorial insurance data as well as data from Workers Compensation Boards. Private data sources include 12 not-for-profit private insurers, as well as tabulations for commercial insurance providers, supplied by the Canadian Life & Health Insurance Association (CLHIA), Statistics Canada Survey of Household Spending (SHS), and market analyses conducted by A.C. Nielson. CIHI's Annual Hospital Survey (AHS)³⁹ will be used to determine hospital expenditure for drugs.

Indicator Calculation: The indicator is composed of a numerator and denominator, and is calculated as follows:

$$\frac{\text{(Total expenditure for *prescription drugs*,
non-prescription drugs or *hospital drugs*)
nationally and by *province/territory*}}{\text{(Total health care expenditure *nationally* and by *province/territory*)}} \times 100$$

Level of Reporting: National, by province/territory and by calendar year.

Limitations:

What it can tell us: This indicator can be used to describe the current spending and related trends over time for prescription, non-prescription, and hospital drugs relative to spending on other health care sectors. It can be used to compare community versus hospital-based spending and associated trends.

What it cannot tell us: This indicator cannot be used to assess whether the proportions of prescription, non-prescription and hospital drug spending are optimal for the needs of the population. It cannot provide information about the mix of prescription drugs that comprise the cost, or the relative proportions of newer versus older medications.

³⁸ Canadian Institute for Health Information, Drug Expenditures in Canada (1985-2000), www.cihi.ca

³⁹ Canadian Institute for Health Information, Annual Hospital Survey, www.cihi.ca

Drug Expenditure Trends in Canada

Indicator C: *Prescription drug expenditure per capita.*

Use: Indicates the average cost of prescription drugs per person in Canada.

Description: For the purpose of this report a prescription drug is defined as any drug that is written by a licensed practitioner and filled by a licensed pharmacist. This definition of ‘Prescription drug’ does not cover prescriptions that were written by physicians but never filled (due to limitations in administrative data). Prescription drug expenditure includes public and private spending (private includes out-of-pocket spending).

Methods and Data Collection: This indicator will be populated using public and private data from CIHI’s National Health Expenditure (NHEX)⁴⁰ section. Public data sources include federal, provincial and territorial insurance data as well as data from Workers Compensation Boards. Private data sources include 12 not-for-profit private insurers, as well as tabulations for commercial insurance providers, supplied by the Canadian Life & Health Insurance Association (CLHIA), Statistics Canada Survey of Household Spending (SHS), and market analyses conducted by A.C. Nielson.

Indicator Calculation: The indicator is composed of a numerator and denominator, and is calculated as follows:

$$\frac{\text{Total expenditure for prescription drugs *nationally* and by *province/territory*}}{\text{Total population *nationally* and by *province/territory*}}$$

Level of Reporting: National, by province/territory and by calendar year.

Limitations:

What it can tell us: This high level indicator can be used to describe the overall spending and related trends for prescription drugs per person in Canada.

What it cannot tell us: This indicator cannot measure cost-efficiency on a per capita basis (whether levels of prescription drug spending are appropriate given the relative health of the population). It cannot provide information about the mix of prescription drugs that comprise the cost, or the relative proportions of newer versus older medications. It cannot define access to prescription drugs within the population by describing the proportion of the population that made a claim.

⁴⁰ Canadian Institute for Health Information, Drug Expenditures in Canada (1985-2000), www.cihi.ca

Drug Expenditure Trends in Canada

Indicator D: *Publicly insured, privately insured and out-of-pocket expenditure as a percentage of prescription drug expenditure.*

Use: Indicates the amount of dollars spent on prescription drugs paid for by public, private and out-of-pocket sources. This indicator provides information on shifts in insurance coverage between public and private sectors as well as shifts in insured versus out-of-pocket expenses.

Description: Public expenditure refers to all provincial, territorial, and federal spending for claims made to public plans. Private expenditure refers to private insurer spending for claims made to private plans. Out-of-pocket expenditure refers to cash paid for prescription drugs not covered or only partially covered by either public or private insurers.

Methods and Data Collection: This indicator will be populated using public and private data from CIHI's National Health Expenditure (NHEX)⁴¹ section. Public data sources include federal, provincial and territorial insurance data as well as data from Workers Compensation Boards. Private data sources include 12 not-for-profit private insurers, as well as tabulations for commercial insurance providers, supplied by the Canadian Life & Health Insurance Association (CLHIA), Statistics Canada Survey of Household Spending (SHS), and market analyses conducted by A.C. Nielson.

Indicator Calculation: This is a two-part indicator, each part composed of a numerator and denominator. Each part is calculated as follows:

$$\frac{\text{(Total *public* insurance or *private* insurance or *out-of-pocket* prescription drug expenditure in Canada)}}{\text{(Total prescription drug expenditure in Canada)}} \times 100$$

$$\frac{\text{(Total *public* or (*private* + *out-of-pocket*) prescription drug expenditure by province/territory)}}{\text{(Total prescription drug expenditure by province/territory)}} \times 100$$

Level of Reporting: National, by province/territory and by calendar year. Due to agreements with data providers the provincial/territorial level expenditures will be broken down by public and private source of funds (private spending includes private insurance expenditure and out-of-pocket expenditure).

Limitations:

What it can tell us: This indicator can be used to describe the source of funds that are used to pay for prescription drugs in Canada. It can be used to compare the changes in the level of publicly subsidized prescription drugs relative to that obtained through private sources of finance.

What it cannot tell us: This indicator cannot measure cost-efficiency (whether levels of drug spending are appropriate given the relative health of the population). It cannot provide information about the mix of prescription drugs that comprise the cost, or relative proportions of newer versus older medications. It cannot be used to describe the social characteristics of the individuals that make the most out-of-pocket payments.

⁴¹ Canadian Institute for Health Information, Drug Expenditures in Canada (1985-2000), www.cihi.ca

Drug Expenditure Trends in Canada

Indicator E: *Average cost per prescription claim.*

Use: Provides information about annual trends in average cost per prescription claim in Canada.

Description: Cost will be assessed in terms of amount claimed and amount paid. Cost will be broken down into actual prescription drug cost (including pharmacy mark-up where applicable) and professional fee.

Methods of Data Collection: Data for this indicator will come from CIHI's Drug Utilization database. Data sources will include public and private data providers.

Indicator Calculation: This is a four-part indicator, each part composed of a numerator and denominator. The parts are calculated as follows:

Total 'Professional Fee Paid' for all DINs by plan and program

Total 'Number of Claims' for all DINs by plan and program

Total 'Drug Cost Paid' for all DINs by plan and program

Total 'Number of Claims' for all DINs by plan and program

Total 'Professional Fee Claimed' for all DINs by plan and program

Total 'Number of Claims' for all DINs by plan and program

Total 'Drug Cost Claimed' for all DINs by plan and program

Total 'Number of Claims' for all DINs by plan and program

* DIN—Drug Identification Number

Level of Reporting: Program and plan levels by fiscal year.

Limitations:

What it can tell us: This indicator can be used to approximate the cost of a single claim. It can be used to assess the proportion of prescription drug costs that are generated by the cost of the actual drug. It can also be used to assess the proportion of prescription drug spending that is paid for by the insurer.

What it cannot tell us: This indicator cannot measure cost-efficiency (whether levels of drug spending are appropriate given the relative health of the population). It cannot provide information about the mix of prescription drugs that comprise the cost, or the relative proportions of newer versus older medications.

Volume Changes and Mix in Prescription Drugs in Canada

Indicator F: *Percentage of total expenditure and volume of claims by therapeutic class.*

Use: To assess dispensing patterns for the top therapeutic drug classes across Canada in terms of spending and volume of claims.

Description: The indicator will group drugs into therapeutic classes using the Anatomical Therapeutic Chemical (ATC) classification system as developed by the WHO Collaborating Centre for Drug Statistics and Methodology⁴². Therapeutic classes will be reported at the 2nd level. The second level groups together prescription drugs of different pharmacological classes that have the same main therapeutic use. Total expenditure will reflect the total dollars paid by the insurer, not the amount paid out-of-pocket. Volume of claims will reflect the total volume of claims that were made to public and private insurers.

Methods of Data Collection: Data for this indicator will come from CIHI's Drug Utilization database. Data sources will include public and private data providers.

Indicator Calculation: This is a two-part indicator, each part composed of a numerator and denominator. The parts are calculated as follows:

$$\frac{\text{'Total Plan Paid' for all DINs within each therapeutic class by plan and program}}{\text{'Total Plan Paid' for all DINs by plan and program}} \times 100$$

$$\frac{\text{Total 'Volume of Claims' for all DINs within each therapeutic class by plan and program}}{\text{Total 'Volume of Claims' for all DINs by plan and program}} \times 100$$

* DIN—Drug Identification Number

Level of Reporting: Program and plan levels by fiscal year.

Limitations:

What it can tell us: This indicator provides a profile of the disease groups that are contributing most significantly to prescription drug expenditures and claim volumes in Canada. It can be used to examine specific drugs within therapeutic classes that are prescribed most frequently or have the highest expenditure. This indicator is intended to provide direction and focus for future drug utilization studies.

What it cannot tell us: Volume of claims will be influenced by maximum fill legislation across jurisdictions. Therefore direct comparison across provinces should be interpreted with caution. This indicator cannot measure cost-efficiency (whether levels of drug spending are appropriate given the relative health of the population). It cannot provide information about the relative proportions of newer versus older medications within therapeutic classes.

⁴² WHO Collaborating Centre for Drug Statistics Methodology, Guidelines for ATC classification and DDD assignment (4th Ed.) (2001), www.whocc.nmd.no

Intensity of Drug Use in Canada

Indicator G: *Average number of claims per claimant.*

Use: To describe the average volume of claims for individual claimants.

Description: Volume of claims will reflect the total volume of claims that were made to public and private insurers. Claimants represent the number of individuals within a given program that made at least one claim during the adjudication year.

Methods and Data Collection: Data for this indicator will come from CIHI's Drug Utilization database. Data sources will include public and private data providers.

Indicator Calculation: The indicator is composed of a numerator and denominator, and is calculated as follows:

$$\frac{\text{Total 'Volume of Claims' for all DINs by plan and program}}{\text{Total \# of eligible individuals that made at least one claim by plan and program}}$$

* DIN – Drug Identification Number

Level of Reporting: Program and plan levels by fiscal year.

Limitations:

What it can tell us: This indicator can be used to describe the average number of claims made by a claimant and/or claimant group currently and over time.

What it cannot tell us: This indicator cannot distinguish between the claims that are refills (claims for the same drug) or new drugs. This indicator cannot describe the strength of drugs being dispensed (more than one claim might simply reflect multiple strengths of the same drug) or the quantity filled for each claim.

Intensity of Drug Use in Canada

Indicator H: *The percentage of the eligible population that has made at least one claim.*

Use: To describe the proportion of the eligible population that has made at least one drug claim to either a public or private insurer.

Description: The 'claiming' population refers to individuals that are eligible to make a claim that will be paid for by a public or private insurer.

Methods and Data Collection: Data for this indicator will come from CIHI's Drug Utilization database. Data sources will include public and private data providers.

Indicator Calculation: This indicator is composed of a numerator and denominator and is calculated as follows:

$$\frac{\text{Total number of 'Eligible, Registered Individuals Who Have Made at Least One Claim' by Program and Plan}}{\text{Eligible population by Program and Plan}} \times 100$$

Level of Reporting: Program and plan Levels by fiscal year.

Limitations:

What it can tell us: This indicator can approximate the extent of prescription drug use in the eligible population (assuming patient compliance). It can also provide an overview of the public and private growth in this sector.

What it cannot tell us: This indicator cannot tell us whether the proportion of the population using prescription drugs is optimal (whether drug consumption is appropriate given the relative health of the population). It cannot track multiple claims made for the same drug (i.e., refills or differing drug strengths) or quantity filled.

Intensity of Drug Use in Canada

Indicator I: *Average number of Defined Daily Doses (DDD) per 1000 residents per day.*

Use: Provides an estimate of the proportion of the population being treated daily with a specific drug or class of drugs.

Description: Defined Daily Dose is a technical unit developed by the World Health Organization (WHO)⁴³ which is based on “assumed average maintenance dose per day for a drug used for its main indication in adults”. DDD is based on averages and therefore may not reflect the actual prescribed dose. Patient compliance is assumed. Drugs are categorized using the ATC classification system. For the purpose of this report only solid dosage forms will be included. DDD’s provide a fixed unit of measurement, independent of price and formulation. They are commonly presented as the number of DDD’s/ 1000 residents / day. For example, 10 DDD’s/1000 residents/day indicates that 1% of the population is being treated daily with a specific drug.

Methods and Data Collection: Data for this indicator will come from CIHI’s Drug Utilization database. Data sources will include public and private data providers. Defined Daily Dose (DDD) will be used according to the WHO’s Guidelines for ATC classification and DDD assignment (4th ed.).⁴⁶

Indicator Calculation: This indicator is composed of a numerator and denominator and is calculated as follows:

$$\frac{\text{‘Total Quantity Dispensed’} / (\text{DDD} / \text{Drug Strength}) / 365 \text{ days}}{\text{Total Population by Province/Territory}} \times 1000$$

by Program and/or Plan

It should be noted that quantity measurement units must be consistent for all Drug Identification Numbers included in the calculation

Level of Reporting: Program and/or plan levels by fiscal year.

Limitations:

What it can tell us: This indicator can provide standardization of drug groupings and a stable drug utilization metric to enable researchers to assess trends in relative prescription drug therapy. It can be used to compare within and across therapeutic groups and populations. It is intended as an indicator that can be used to highlight areas for future research.

What it cannot tell us: This indicator cannot provide information about therapeutic equivalence and therefore should not be used to assess cost effectiveness. It does not address drug efficacy or compliance. Interpretation may be difficult where the dosage range is large and/or where the medication has multiple indications. Caution must be applied when interpreting DDD for seniors because a high percentage of seniors are prescribed lower dosage ranges relative to the DDD’s maintenance adult dose.

⁴³ WHO Collaborating Centre for Drug Statistics Methodology, Guidelines for ATC classification and DDD assignment (4th Ed.) (2001), www.whocc.nmd.no

Glossary

Glossary

Active beneficiary

An eligible beneficiary who has received at least one drug plan benefit within the year.

Claimant

An eligible beneficiary who has claimed reimbursement for a benefit or on whose behalf reimbursement has been claimed.

Coordination of benefits

A sequential reimbursement process whereby one claim can be submitted to more than one drug plan for adjudication for reimbursement. This situation occurs when an individual is an eligible beneficiary and participates in more than one drug plan.

Coordination of benefits (COB) provisions are designed to avoid instances of over-insurance. Over-insurance occurs when a person insured under two or more insurance policies can collect total benefits in excess of actual losses incurred. COB provisions are included in all group contracts. The COB provision defines the plan that is the primary provider (first payor) of benefits in situations in which the insured group member has duplicate group medical expense coverage.

Cost⁴⁴

The value of the inputs needed to produce goods and services (i.e., relates to value of production).

Defined Daily Dose⁴⁵

The assumed average maintenance dose per day for a drug used for its main indication in adults.

Drug

A drug as defined in federal legislation under the Food and Drug Act and Regulations and the Controlled Drugs and Substances Act and Regulations.

According to the Canada Food and Drugs Act, a drug is:

Any substance or mixture of substances manufactured, sold or represented for use in

- (a) the diagnosis, treatment, mitigation or prevention of disease, disorder or abnormal physical state, or the symptoms thereof, in man or animal,
- (b) restoring, correcting or modifying organic functions in man or animal, or
- (c) disinfection in premises in which food is manufactured, prepared or kept.

⁴⁴ Black J. Oxford dictionary of economics. 1997.

⁴⁵ World Health Organization Collaborating Centre for Drug Statistics Methodology. ATC classification and DDD assignment. Oslo, Norway: World Health Organization; 2001.

Drug Identification Number (DIN)

A number assigned to a drug product that has been evaluated by the Therapeutic Products Directorate (TPD) and approved for sale in Canada.

Drug utilization

As per the World Health Organization (WHO) definition: the marketing, distribution, prescription and use of drugs in a society, with special emphasis on the resulting medical, social and economic consequences⁴⁶.

Eligible beneficiary

An individual who is eligible to receive identified benefits of a drug plan.

Expenditure

Expenditure is how much is spent by consumers and governments etc. on goods and services (i.e., relates to value of consumption).

First payor

The drug plan that is responsible for paying the full benefit amounts promised under the plan. Once the plan designated as the first payor (primary provider) has paid the full benefit amounts promised, then the insured can submit to the secondary plan (1) the claim and (2) a description of the benefit amounts paid by the primary plan. The secondary plan will then determine the amount payable for the claim under the terms of its coverage.

Indicator

A quantitative expression which can be expressed as a rate, ratio or percentage. It includes or implies a numerator and a denominator of an expression.

Non-prescribed drugs

For the purpose of this report, refers to over-the-counter drugs and personal health supplies.

Non-prescription drug

A substance considered being a drug under the Food and Drugs Act that is sold for human use and does not require a prescription by either federal or provincial legislation. Non-prescription drugs are often referred to as over-the-counter (OTC) drugs. Provincial legislation can impose conditions of sale, such as storage in the dispensary and sale only by the pharmacist, storage and sale from the self-selection area of a pharmacy or sale from any retail outlet.

⁴⁶ WHO Expert Committee. The Selection of Essential Drugs. Technical Report Series No. 615. Geneva, World Health Organization, 1997

Outcome indicator

A quantitative measure of an aspect of patient care that is 'end-result' based (i.e., an effect that manifests as a change in health status)⁴⁷. It may assess only a portion of the total outcome.

Over-the-counter drug

A non-prescription drug, usually purchased through customer self-selection in a pharmacy or other retail outlet.

Prescribed daily dose

The average daily amount of a drug that is actually prescribed.⁴⁸

Performance indicators

Quantitative expressions used to point to program quality within the areas of concern.⁴⁹

An assessment tool used to monitor and evaluate important governance, management, clinical and support functions that affect patient outcomes.⁵⁰

Prescribed drug

A drug or medical supply or equipment item that is supplied to a patient where a prescription was written by a licensed prescriber, filled by a licensed pharmacist and paid for by cash, public insurer or private insurer or any combination thereof.

Prescription drug

A drug which, according to federal or provincial legislation, requires a prescription from a licensed prescriber in order to be dispensed.

Price

The amount of money paid per unit for a good or service.

Ratio⁵¹

The value obtained by dividing one quantity by another. The important difference between a proportion and a ratio is that the numerator of a proportion is included in the population defined, this is not necessarily so for a ratio.

⁴⁷ Cox JL. The challenge with tracking health outcomes. Can J Clin Pharmacol. 2001; 8(Suppl A):10A-16A.

⁴⁸ World Health Organization Collaborating Centre for Drug Statistics Methodology. ATC classification and DDD assignment. Oslo, Norway: World Health Organization; 2001.

⁴⁹ Performance Indicators for the Rehabilitation Programs, Version 1.1, August 1998.CARF

⁵⁰ Joint Commission on Accreditation of Health care Organizations. Primer on indicator development and application: Measuring quality in health care. Chicago, JCAHO, 1992.

⁵¹ A Dictionary of Epidemiology 3rd Edition, John M. Last (ed.), 1995.

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for Health Information
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d'information sur la santé

Development of Drug Utilization Indicators A Feasibility Study Using Existing Administrative Databases

Feedback Sheet

We welcome comments and suggestions on this report. Please complete this feedback sheet and return it to us at your earliest convenience.

By Fax: (613) 241-8120 Attention: Lynn Brousseau

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1. To what extent have you reviewed the report?

- Have browsed through the entire report
- Have browsed through the entire report and examined specific sections of the report
- Have examined the entire report

2. How satisfied are you with the following aspects of the report?

- | | | | | |
|-------------------------|-------------------------------------|--------------------------------------|--------------------------------------|-----------------------------------|
| (a) Level of detail | <input type="checkbox"/> Too Little | <input type="checkbox"/> About Right | <input type="checkbox"/> About Right | <input type="checkbox"/> Too Much |
| (b) Clarity/readability | <input type="checkbox"/> Excellent | <input type="checkbox"/> Good | <input type="checkbox"/> Fair | <input type="checkbox"/> Poor |
| (c) Organization/format | <input type="checkbox"/> Excellent | <input type="checkbox"/> Good | <input type="checkbox"/> Fair | <input type="checkbox"/> Poor |

3. How useful did you find each section of the report?

- | | | | | |
|--|--------------------------------------|--|-------------------------------------|---|
| (a) Executive Summary | <input type="checkbox"/> Very Useful | <input type="checkbox"/> Somewhat Useful | <input type="checkbox"/> Not Useful | <input type="checkbox"/> Did Not Review |
| (b) Introduction | <input type="checkbox"/> Very Useful | <input type="checkbox"/> Somewhat Useful | <input type="checkbox"/> Not Useful | <input type="checkbox"/> Did Not Review |
| (c) The Project Review | <input type="checkbox"/> Very Useful | <input type="checkbox"/> Somewhat Useful | <input type="checkbox"/> Not Useful | <input type="checkbox"/> Did Not Review |
| (d) Drug Utilization
Related to Expenditure | <input type="checkbox"/> Very Useful | <input type="checkbox"/> Somewhat Useful | <input type="checkbox"/> Not Useful | <input type="checkbox"/> Did Not Review |
| (e) Drug Utilization
Related to Volume,
Mix and Intensity of Use | <input type="checkbox"/> Very Useful | <input type="checkbox"/> Somewhat Useful | <input type="checkbox"/> Not Useful | <input type="checkbox"/> Did Not Review |
| (e) Future Activities | <input type="checkbox"/> Very Useful | <input type="checkbox"/> Somewhat Useful | <input type="checkbox"/> Not Useful | <input type="checkbox"/> Did Not Review |
| (e) Conclusion | <input type="checkbox"/> Very Useful | <input type="checkbox"/> Somewhat Useful | <input type="checkbox"/> Not Useful | <input type="checkbox"/> Did Not Review |

**Development of Drug Utilization Indicators
A Feasibility Study Using Existing
Administrative Databases
Feedback Sheet (cont'd)**

6. How have you, or are you likely to, use the information in this report?

7. How would you improve this report? What suggestions do you have for future reports?

Thank you for completing and returning this feedback form.