



Pharmacists in Canada, 2010 Database Guide

October 2011



Who We Are

Established in 1994, CIHI is an independent, not-for-profit corporation that provides essential information on Canada's health system and the health of Canadians. Funded by federal, provincial and territorial governments, we are guided by a Board of Directors made up of health leaders across the country.

Our Vision

To help improve Canada's health system and the well-being of Canadians by being a leading source of unbiased, credible and comparable information that will enable health leaders to make better-informed decisions.

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About the Canadian Institute for Health Information

The Canadian Institute for Health Information (CIHI) collects and analyzes information on health and health care in Canada and makes it publicly available. Canada's federal, provincial and territorial governments created CIHI as a not-for-profit, independent organization dedicated to forging a common approach to Canadian health information. CIHI's goal: to provide timely, accurate and comparable information. CIHI's data and reports inform health policies, support the effective delivery of health services and raise awareness among Canadians of the factors that contribute to good health.

For more information and a list of the current members of CIHI's Board of Directors, visit our website at www.cihi.ca.

Acknowledgements

The Canadian Institute for Health Information (CIHI) would like to acknowledge and thank the many individuals and organizations that contributed to the development of this database.

We would like to express our appreciation to the regulatory authorities and national associations:

- Alberta College of Pharmacists
- Canadian Association of Chain Drug Stores
- Canadian Pharmacists Association
- Canadian Society of Hospital Pharmacists
- College of Pharmacists of British Columbia
- Government of the Northwest Territories
- Manitoba Pharmaceutical Association
- National Association of Pharmacy Regulatory Authorities
- New Brunswick Pharmaceutical Society
- Newfoundland and Labrador Pharmacy Board
- Nova Scotia College of Pharmacists
- Ontario College of Pharmacists
- Ordre des pharmaciens du Québec
- Prince Edward Island Pharmacy Board
- Saskatchewan College of Pharmacists
- Yukon Government

We also wish to extend our thanks and gratitude to all pharmacists who care for Canadians.

Pharmacist Database (PDB) publications represent the work of CIHI staff within the Health Human Resources department.

Production of this material has been made possible through a financial contribution from Health Canada. The views expressed herein do not necessarily represent the views of Health Canada. Please note that the analyses and conclusions in the present document do not necessarily reflect those of the individuals or organizations mentioned above.

Want to Know More?

Other PDB documents that may be of interest and are available free of charge in English and French on the CIHI website at www.cihi.ca:

- *Pharmacists in Canada, 2010*
 - *National and Jurisdictional Highlights and Profiles*
 - *Data Tables*
- Previous reports
 - *Pharmacists in Canada* series (2006 to 2009)
- Reference documents
 - *Data Dictionary*
 - *Data Submission Specifications Manual*
 - *Privacy Impact Assessment*

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About CIHI's Pharmacist Database

In order to determine the number of health professionals required in any jurisdiction, it is necessary to understand the current supply and how that supply is changing. Since 2006, the PDB has collected information on the supply and distribution, demographics, geography, education and employment of pharmacists in selected provinces and territories in Canada.

PDB Data Providers

The provincial regulatory authorities and territorial governments that participate in the PDB are the primary collectors of data compiled in the CIHI database. In 2010, all provincial regulatory authorities and territorial governments except those in Quebec and Nunavut participated in the PDB. Where possible, information on the supply of the workforce in these jurisdictions has been provided by CIHI's Health Personnel Database (HPDB).

Table 1: Pharmacist Database Data Providers

		2006	2007	2008	2009	2010
N.L.	Newfoundland and Labrador Pharmacy Board	X	X	✓	✓	✓
P.E.I.	Prince Edward Island Pharmacy Board	✓	✓	✓	✓	✓
N.S.	Nova Scotia College of Pharmacists	✓	✓	✓	✓	✓
N.B.	New Brunswick Pharmaceutical Society	X	X	X	✓	✓
Que.	Did not participate	X	X	X	X	X
Ont.	Ontario College of Pharmacists	✓	✓	✓	✓	✓
Man.	Manitoba Pharmaceutical Association	X	X	X	✓	✓
Sask.	Saskatchewan College of Pharmacists	✓	✓	✓	✓	✓
Alta.	Alberta College of Pharmacists	✓	✓	✓	✓	✓
B.C.	College of Pharmacists of British Columbia	✓	✓	✓	✓	✓
Y.T.	Government of Yukon	✓	✓	†	✓	✓
N.W.T.	Government of the Northwest Territories	✓	✓	✓	✓	✓
Nun.	Did not participate	X	X	X	X	X

Notes

X Did not participate in the Pharmacist Database.

† The Yukon did not submit data to the Pharmacist Database for 2008 only.

Aggregate data on the supply of the pharmacist workforce for the non-participating jurisdictions was provided to the PDB by the Health Personnel Database (HPDB) at CIHI. This data may include different membership categories for registrants and maybe useful for some purposes; however, it should be used within the limitations of the Methodological Notes section of *Canada's Health Care Providers, 2000 to 2009: A Reference Guide*.

Source

Canadian Institute for Health Information.

Official registration with the provincial regulatory authorities and territorial governments requires the completion of a registration form on an annual basis, in either written or electronic format. Registration forms typically contain details with respect to personal information, education credentials and employment history. The collection of these specific pieces of information tends to be common across jurisdictions. Other information collected on the form may vary according to the bylaws and business needs of the respective provincial regulatory authorities/territorial governments.

The administrative data collected by provincial regulatory authorities/territorial governments is well suited to informing health human resource planning and management in Canada. Collecting and collating this data provide a unique opportunity to examine aggregate information about pharmacists registered in Canada, which is essential to identifying supply-based issues for future health human resources planning.

In consultation with provincial regulatory authorities/territorial governments and other stakeholders, CIHI developed a standardized set of data elements to capture supply-based information on the pharmacist workforce in Canada. These data elements cover demographic, geographic and distribution characteristics, as well as education and employment details. From this consultation, a data dictionary containing specific information on the development process, data elements and associated values, as well as definitions and rationale for collection, was created.

The *Pharmacist Database Data Dictionary* is available for download on the CIHI website at www.cihi.ca.

Under the agreement with CIHI, a portion of the administrative information collected by the provincial regulatory authorities/territorial governments is submitted to CIHI on an annual basis. CIHI and the regulatory authorities/territorial governments jointly review the new data and apply rigorous principles of data quality assurance. Once data quality assurance is complete, CIHI adds the new data to the PDB for analysis and reporting. Over time, this information will provide a historical record of changes in the supply of the pharmacist workforce on a year-to-year basis.

Note: CIHI figures on pharmacists may not be the same as figures published by provincial regulatory authorities/territorial governments for the following reasons:

a. Collection period—The statistics typically released by provincial regulatory authorities/territorial governments include all registrations received during the 12-month registration period. In contrast, CIHI collects data as of October 1 of the data collection year. In consultation with provincial regulatory authorities/territorial governments, this point-in-time data collection was established to ensure timely and comprehensive information in spite of the different registration periods.

b. Reference population—For the PDB, provincial regulatory authorities and territorial governments submit data for active registrations received during the registration year. The active total presented in PDB publications represents the number of pharmacists deemed eligible to work by the regulatory authority in that particular jurisdiction in that year. Specifically, active registration includes those registration categories that authorize a registrant, based on the assessment and issuance by a regulatory authority or territorial government, to engage in professional practice, as defined by the relevant laws, regulations and/or policies associated with a specific jurisdiction. Information on inactive registrants is not submitted to CIHI for the PDB.

c. Exclusions from CIHI data—Active registrants fall into five categories: *employed in the profession of pharmacy, employed in other than the profession of pharmacy seeking employment in the profession of pharmacy, employed in other than the profession of pharmacy and not seeking employment in the profession of pharmacy, unemployed and seeking employment in the profession of pharmacy and unemployed and not seeking employment in the profession of pharmacy*. For this publication, CIHI removes registrants not employed in the profession of pharmacy (falling into any of the latter four categories), as well as those pharmacists for whom information on the data element Employment Status is missing or *unknown*.

d. Other exclusions from CIHI data—CIHI statistics might not include pharmacists who are on leave (for example, maternity/paternity leave) as of October 1 of the data collection year.

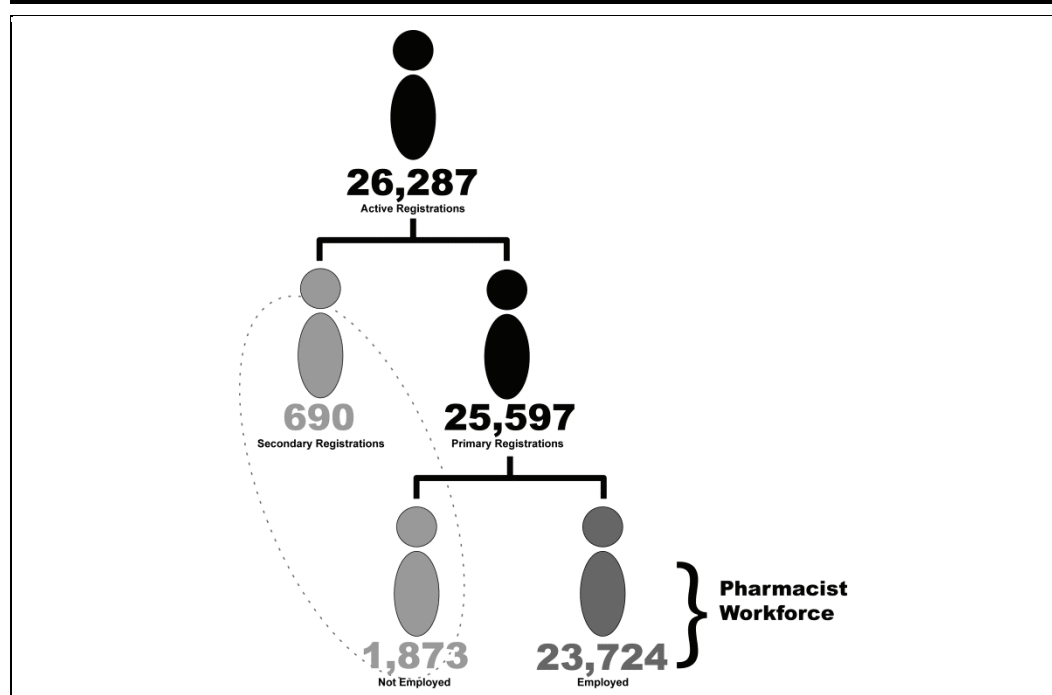
e. CIHI editing and processing—The CIHI database is not simply an amalgamation of data from the provincial regulatory authorities/territorial governments. When data files are submitted, CIHI attempts to remove those records for pharmacists who may be registered with more than one provincial regulatory authority and/or territorial government. For example, when a pharmacist has employment in both Alberta and British Columbia, she or he is required to register with both colleges. These registrants are called secondary registrations or interprovincial duplicates. This duplicate information is removed by CIHI according to the methodology described in the Methodological Notes section of this guide in order to avoid double-counting and to more accurately reflect the primary jurisdiction of employment.

f. Data quality processes—Some jurisdictions perform their data quality review at the end of their registration period. As CIHI receives the data in October for the data collection year, it is possible that some of the data quality activities of some jurisdictions are not yet completed. As a result, at the time of data submission, a jurisdiction may have records for which the information is unknown for some data elements. Although every reasonable effort is made to acquire the information at the time of data submission, the correction may not be reflected in the CIHI database.

CIHI's Definition of the Pharmacist Workforce in Canada

In CIHI's PDB publications, "pharmacist workforce" is defined as the total number of pharmacists holding active registrationⁱ in Canada who are employed and are not considered secondary registrationsⁱⁱ or interprovincial duplicates. For more detailed information on the inclusion and exclusion criteria, please see the Methodological Notes.

Figure 1: Defining the CIHI PDB Pharmacist Workforce, 2010



Notes

Data from Quebec and Nunavut was not available.

The Methodological Notes provide more comprehensive information regarding the collection and comparability of PDB data.

Source

Pharmacist Database, Canadian Institute for Health Information.

i. Active Registrations: Provincial regulatory authorities provided data to CIHI for the PDB for those pharmacists who held an active membership for 2010. This includes those specific membership categories authorizing a member as eligible to work in the particular jurisdiction in the particular year.

ii. Secondary Registrations: This group includes pharmacists who maintain provincial registration while living outside of Canada or whose Province of Residence and/or Province of Primary Employment is in a Canadian jurisdiction that is different from Province of Registration.

In 2010, information on 26,287 pharmacists in Canada was submitted by the provincial regulatory authorities and territorial governments (excluding Quebec and Nunavut). Of these, 690 (2.6%) were secondary registrations and 1,873 (7.1%) were either not employed in the profession of pharmacy or had an unknown Employment Status and so were removed from the analysis (see 2010 PDB Data Tables).

Methodological Notes

These notes outline the basic concepts behind the data provided in PDB publications and the underlying methodology of the data collection, as well as key aspects of data quality. They will help to provide a better understanding of the strengths and limitations of the data and show how the data can be used effectively. This information is of particular importance when comparisons are made with data from other sources and in regard to conclusions based on changes over time.

The Canadian Institute for Health Information relies on superior principles of data quality, privacy and confidentiality. CIHI's commitment to ensuring the collection of quality data in a privacy-sensitive manner is applied to data collection, processing, analysis and dissemination. For further details regarding CIHI's privacy principles, outlined in *Privacy Policy on the Collection, Use, Disclosure and Retention of Personal Health Information and De-Identified Data, 2010*, go to www.cihi.ca.

Background

Purpose of the PDB Publications

PDB publications will provide the reader with the most recent statistics on the pharmacist workforce, including information on demographic, geographic, education and employment dimensions. Analyses are supplemented with detailed information about the data collection process, pertinent limitations of the current data and an explanation of the analytical methods.

The information in PDB publications will be used by a wide variety of government and non-governmental organizations to better understand the changing supply and distribution of pharmacists throughout Canada. Accordingly, it will contribute to policy formulation and decision-making at both the pan-Canadian and provincial/territorial levels.

Value of the Information

The supply and distribution information presented here is a key component to health human resource planning at the pan-Canadian and provincial/territorial levels. Any planning or projection of the number of health professionals required for a particular jurisdiction must begin with an understanding of the current supply and how that supply is changing. The presentation of clear, objective data and data analysis enables informed decision-making and supports policy formulation.

History

Policy reports and research papers have consistently demonstrated that there is very little standardized data available on health professionals on a pan-Canadian basis, with the exception of physicians and regulated nurses. Based on consultations with federal and provincial/territorial ministries of health, the pharmacy profession has been identified as a priority for the development of standards to collect such data. The collection of data from across Canada for the Pharmacist Database (PDB) began in 2006.

Scope of the Data

Population of Interest

The population of interest for the PDB includes all pharmacists registering with a regulatory authority within a Canadian province or territory.

Population of Reference

The population of reference includes all pharmacists submitting active registrations with a Canadian provincial licensing authority or territorial government.

Period of Reference

For any given year, the population includes those pharmacists who registered between the start of the individual regulatory authority/territorial government registration period and October 1.

Data Inclusions

Data collected for the PDB includes the following:

- Registration information from the provincial registrars/territorial governments (except Quebec and Nunavut from 2006 to 2010 all other exclusions for specific years are listed below under Data Exclusions). When appropriate, CIHI's Health Personnel Database (HPDB) was used as the source of data for the excluded jurisdictions.
- All active registrations received by the participating jurisdictions before October 1, 2010.
- Depending on the individual business process, some provinces/territories include pharmacists who are on temporary leave (such as maternity/paternity leave or short-term illness/injury leave) and have maintained their active registration with their provincial regulatory authority or territorial government.

Data Exclusions

Data collected for the PDB does not include the following:

- For 2010, data from the province of Quebec and the territory of Nunavut.
- For 2009, data from the province of Quebec and the territory of Nunavut.
- For 2008, data from the provinces of Manitoba and Quebec and the territories of the Yukon and Nunavut.
- For 2007, data from the provinces of Manitoba and Quebec and the territory of Nunavut.
- For 2006, data from the provinces of Newfoundland and Labrador, New Brunswick, Quebec and Manitoba and the territory of Nunavut.
- Pharmacists who registered with a participating provincial regulatory authority or territorial government authority after October 1, 2010.
- Pharmacists with an inactive registration type.

Data Flow From Primary Data Collector to CIHI

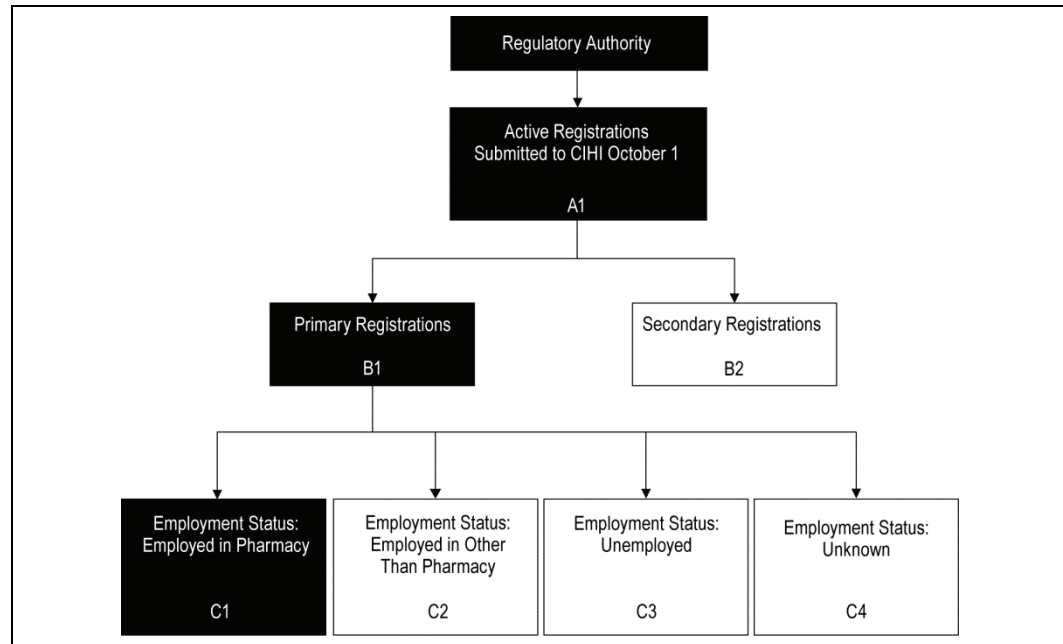
As part of their registration/licensing process, the regulatory authorities collect membership data on an annual basis. They collect data for all members applying for active and inactive registrations.

The purpose of this database is to gain information on the pharmacist workforce in Canada, so the population of reference for the PDB focuses on pharmacists who are currently authorized to engage in practice, meaning that they have active registration as of October 1, 2010.

Since the data collected by the provincial regulatory authorities and territorial governments is wider in scope than the population of reference for the PDB, a filtering methodology is applied by CIHI from the point of data collection through data processing. It targets the relevant records that meet the criteria for the population of reference for the PDB and also meet the information needs addressed in the analysis.

The figure below illustrates the data flow when this methodology is applied. Explanations of each step within the data flow are provided in the text following the diagram.

Figure 2: Tracing Data Flow From Primary Data Collectors to CIHI



Source

Pharmacist Database, Canadian Institute for Health Information.

The total number of registrations submitted by a pharmacist regulatory authority is composed of only the active registration type.

Box A1: Of all the registrations received by the provincial regulatory authorities and territorial governments, only the data of active registrants as of October 1 is submitted to CIHI.

Box B1: This represents the primary registrations, where the province or territory of registration is the registrant's primary jurisdiction of practice (see also Box B2).

Box B2: Pharmacists in Canada can work in more than one jurisdiction concurrently as long as they are registered/authorized by the proper authorities. In the interest of preventing double-counting of pharmacists who work in more than one jurisdiction, this box represents the secondary registrations or interprovincial duplicates. The methodology that identifies primary and secondary registrations is explained in detail in the Data Processing Methods section.

Boxes C1 to C4: In most cases, statistics produced by provincial regulatory authorities and territorial governments include all active practising registrations, regardless of employment status. In contrast, CIHI statistics typically include only those registrants who explicitly state their employment in pharmacy (Box C1). Those pharmacists employed in a profession other than pharmacy (Box C2), those not employed (Box C3) and those whose Employment Status is *unknown* (Box C4) are excluded from the final statistics.

Point-in-Time Data Collection

The point-in-time approach to data collection provides a snapshot of the pharmacist workforce across jurisdictions. Using the same point consistently will enable comparability in time, which is necessary for the accurate determination of a trend. However, depending on the jurisdiction, this approach may not capture the entire year-end totals equally in every province and territory.

Data collection begins at the onset of the data provider's respective annual registration period and ends on October 1. This collection period was identified as the period that captures most of the registrants renewing or applying for membership, including new graduates.

How CIHI Defines the Pharmacist Workforce

By carefully selecting the reporting population for the pharmacist workforce, CIHI is able to provide standardized comparable data suitable for analysis and trending purposes. As explained previously, population of reference includes all employed pharmacists who hold active registration authorizing them to practise as of October 1, 2010, and are not considered as secondary registrations.

The population of reference may differ from reporting by provincial regulatory authorities/territorial governments for various reasons, such as differences in the time frame used, inclusion of other registration types (such as inactive and others), differences in employment status (employed versus unemployed) and the inclusion of secondary registrations. Discrepancies between the data in the CIHI publications and data presented by provincial regulatory authorities/territorial governments (PDB data providers) are often the result of these differences. We therefore caution readers to be mindful of these differences when comparing PDB data with other data holdings and publications.

Data Collection Methods

Data Sources

The sources of data for the PDB are the provincial regulatory authorities and the governments of the Yukon and the Northwest Territories. Annual registration with a regulatory body is mandatory for pharmacists seeking employment in the provinces and territories. The data is held by the respective provincial regulatory bodies and the governmental authorities of the Northwest Territories and the Yukon, which are considered primary data collectors.

Data Collection

Paper or online registration forms completed by the registrant for registration/licensing purposes are the usual methods of primary data collection for the provincial regulatory authorities and the governmental authorities of the Northwest Territories and the Yukon. Once in electronic format, an extract of the data is prepared for submission to CIHI. Only those data elements defined in the *Pharmacist Database Data Dictionary* (available at www.cihi.ca) are submitted to CIHI. The data extract must conform to the specifications of the PDB, as outlined in the *Pharmacist Database Data Submission Specifications Manual* (available at www.cihi.ca). The data is transmitted from the data provider to CIHI via a secure online system. A letter of agreement governs CIHI's collection of pharmacist data. Each year, those provincial regulatory authorities and territorial governments participating in the PDB review the core set of elements each data provider collects on its registration form. Under the current agreement, each data provider agrees to make every reasonable effort to collect and submit the 38 data elements for each registrant according to the definitions outlined in the *Pharmacist Database Data Dictionary*.

Key Concepts and Definitions

Only data elements used in the analysis of this publication are described below. For a complete list of data elements in the PDB, as well as definitions, please visit the CIHI website (www.cihi.ca) to download the *Pharmacist Database Data Dictionary*.

Demographics

Gender

The reported gender category of a registrant at the time of registration or renewal, used for administrative purposes.

Year of Birth

Year of birth of the registrant.

Age

Derived from the Year of Birth of the registrant.

Geography

Province/Territory of Residence

At the time of registration or renewal.

Country of Residence

At the time of registration or renewal.

Province/Territory of Registration

Based on the jurisdiction of the organization submitting the data.

Urban/Rural/Remote (for Primary Employment)

Please see the definition for Postal Code of Employment (for Primary Employment).

Health Region

Please see the definition for Postal Code of Employment (for Primary Employment).

Education

Level of Basic Education in Pharmacy

Basic educational program used to prepare a pharmacist for practice. This refers to initial education in pharmacy used, in whole or in part, for consideration of licensure as a pharmacist in Canada. Master's and doctorate credentials would only be identified as initial education in pharmacy if the education permitted direct entry to practice (for example, entry-level PharmD). All other pharmacy-related post-secondary education is captured under Highest Level of Post-Basic Education in Pharmacy.

Year of Graduation for Basic Education in Pharmacy

The year of completion of an initial educational program that prepares a pharmacist for practice.

Canadian University of Graduation for Basic Education in Pharmacy

Name of the Canadian university where the initial educational program that prepares a pharmacist for practice was completed.

Country of Graduation for Basic Education in Pharmacy

Name of country of completion of initial educational program used to prepare a pharmacist for practice.

Highest Level of Education in Pharmacy

This includes other post-secondary education achieved in pharmacy, which resulted in a degree (such as bridging or upgrade education).

Current Level of Education in Pharmacy

This represents the highest and the most recently acquired level of education in pharmacy reported by the registrant. The Current Level of Education in Pharmacy is derived from the data elements Level of Basic Education in Pharmacy and Highest Level of Post-Basic Education in Pharmacy. If Highest Level of Post-Basic Education in Pharmacy exists, then the Level of Basic Education in Pharmacy is compared to the Highest Level of Post-Basic Education in Pharmacy. Whichever one is greater becomes the current level of education in pharmacy. If the Level of Basic Education in Pharmacy is the same as Highest Level of Post-Basic Education in Pharmacy, then whichever one is acquired later becomes the current level of education in pharmacy. However, if the Highest Level of Post-Basic Education in Pharmacy doesn't exist, then the Level of Basic Education in Pharmacy becomes the current level of education in pharmacy. The current level of education in pharmacy represents the highest and the most recently acquired level of education in pharmacy reported by the registrant.

Years Since Graduation From Basic Education in Pharmacy

This is derived from the difference between the data element Year of Graduation for Basic Education in Pharmacy and the current reporting year (2010) for each registrant.

Employment

Employment Status

A registrant's work status (employed or unemployed) at the time of registration or renewal.

Primary Employment

The employment, with an employer or in a self-employed arrangement, that is associated with the highest number of usual weekly hours worked.

Employment Category (for Primary Employment)

At the time of registration or renewal.

Province/Territory of Employment (for Primary Employment)

At the time of registration or renewal.

Postal Code of Employment (for Primary Employment)

The postal code assigned by Canada Post for a registrant's employment at the time of registration or renewal. It reflects the site where service is delivered, with the employer or business office postal code provided as an alternate (for example, if the employer or business office location is different from the site where service is delivered and only the employer or business office postal code is available). This refers to the location where the registrant is directly engaged in a pharmacy area of practice, direct service, client management, administration, education or research. The Postal Code of Primary Employment is used to derive the geographic distribution of the workforce into urban, rural and remote areas using the Postal Code Conversion File (PCCF) from Statistics Canada. For more information on the methodology used for this geographic classification scheme, please see the Analytical Methods section within the Methodological Notes. The PCCF is also used to assign health regions.

Position (for Primary Employment)

The main role within the place of employment (for registrants with multiple roles within an employment, reflects the role associated with the most worked hours) at the time of registration or renewal.

Place of Employment (for Primary Employment)

The primary place of employment, whether an employee or self-employed, at the time of registration or renewal. This is at the service-delivery level. Service-delivery level refers to the worksite where the registrant is directly engaged in employment associated with the profession of pharmacy, as a pharmacist or in a pharmacy-related field.

Range of Estimated Weekly Practice Hours (for Primary Employment)

At the time of registration or renewal, the range of usual (that is, typical or average) weekly hours of work in employment related to practice. For registrants in an employee–employer employment category, range indicated is inclusive of all practice hours but should not exceed the hours (including overtime) for which registrant is scheduled/approved and recognized. For registrants who are in a self-employed employment category, range indicated is inclusive of all practice hours (for example, travel time, preparation and service provision).

Data Processing Methods

File Processing

Once data files are received by CIHI, all records undergo two stages of processing before they are included in the national database. The first ensures that data is in the proper format and that all responses pass specific validity and logic tests. If the data submitted does not match the standardized CIHI codes, an exception report and data file summary (identifying and explaining the errors) is sent to the data provider. In addition, the data is tested for a logical relationship between specific fields. (For example, an error is identified in the exception report if the year of graduation is earlier than the year of birth). Errors are reviewed jointly by CIHI and the respective data provider representative. In cases where the data provider is not able to make the corrections, CIHI may make them directly with the explicit consent of the provider. If a correction cannot be made, the code is changed to the appropriate default/missing value.

Identification of Secondary Registrations

Once the file has passed all validity and logic tests, the second stage of processing begins. Since pharmacists are able to register simultaneously in more than one jurisdiction, a methodology has been developed to identify those pharmacists who are living outside of Canada or are registered in more than one province or territory in order to ensure an accurate count of the number of pharmacists registered and working in Canada only.

For example, there are administrative incentives for pharmacists to maintain their Canadian pharmacy licence while living and/or working outside of the country. A pharmacist living abroad may continue to register with a Canadian pharmacy regulatory authority each year, even though she or he may have no intention of returning to Canada in the subsequent 12-month period. CIHI must identify these pharmacists living abroad and remove their data from analysis, since it only reports on the pharmacist workforce within Canada.

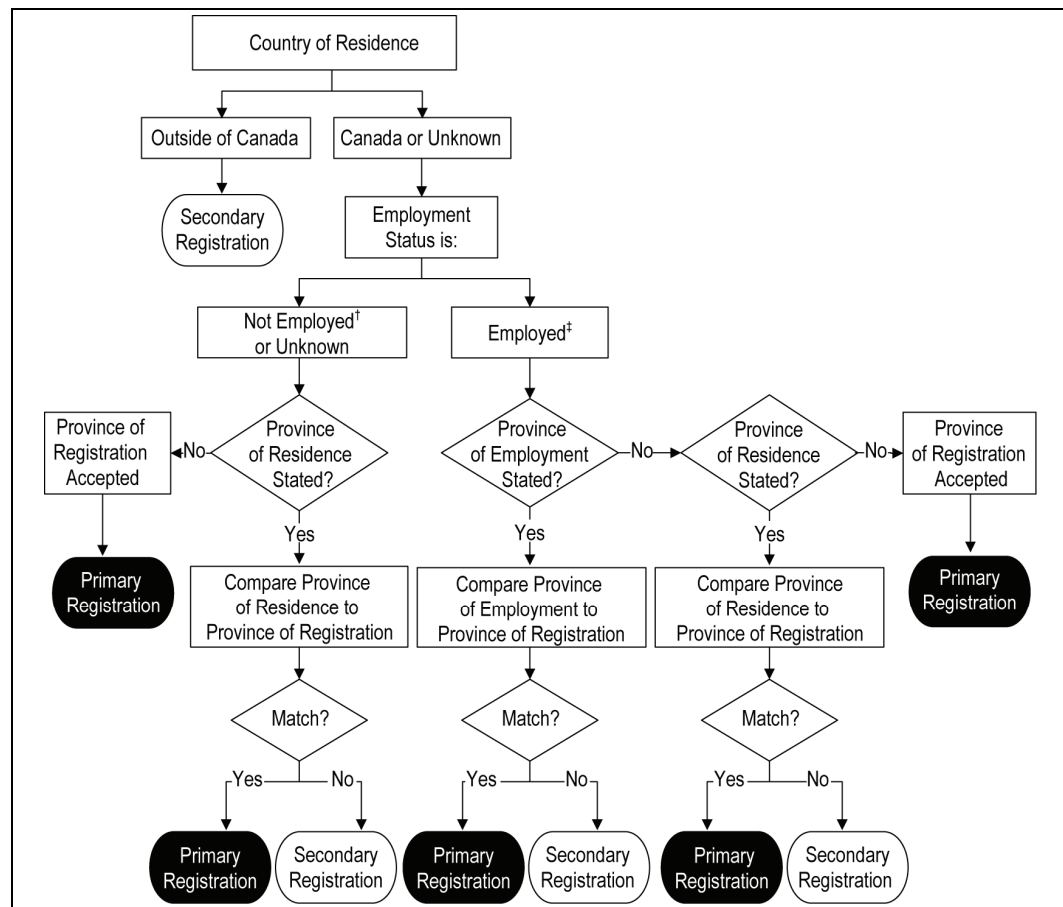
For those living and working in Canada, CIHI must also identify registrations that do not reflect the primary jurisdiction of practice. Similar to the international situation, there are administrative incentives for pharmacists to maintain their provincial/territorial pharmacy licence while living and/or working in another Canadian jurisdiction. To avoid double-counting, CIHI evaluates each registration to ensure that it reflects the primary jurisdiction of practice. These secondary registrations are also termed “interprovincial duplicates.”

Primary registrations are defined as records meeting the following conditions:

- Province/Country of Residence is either in Canada or *unknown*.
- For pharmacists employed in the profession of pharmacy, Province of Employment equals Province of Registration; if Province of Employment is *unknown*, then Province of Residence equals Province of Registration.
- For pharmacists not employed in the profession of pharmacy (or for pharmacists with Employment Status of *unknown*), Province of Residence equals Province of Registration; if Province of Residence is *unknown*, then Province of Registration is accepted.

The methodology for the removal of secondary registrations/interprovincial duplicates has remained relatively consistent over time. However, it is not without its limitations. For example, a pharmacist living in the United States but working in Canada will be erroneously removed as living abroad. Also, when a pharmacist is registered and employed in a Canadian province and decides to provide short-term relief staffing in another province, the temporary residence information may result in a double count.

Figure 3: Flow Diagram Illustrating the Process for Identifying Secondary Registrations



Notes

† Not Employed in the Profession of Pharmacy includes *employed in other than the profession of pharmacy, seeking employment in the profession of pharmacy, employed in other than the profession of pharmacy, not seeking employment in the profession of pharmacy, unemployed and seeking employment in the profession of pharmacy, unemployed and not seeking employment in the profession of pharmacy and unknown.*

‡ Employed in the Profession of Pharmacy.

Source

Pharmacist Database, Canadian Institute for Health Information.

Analytical Methods—Urban/Rural Statistics

For analytical purposes, urban areas are defined (in part) as communities with populations that are greater than 10,000 people and are labelled by Statistics Canada as either a census metropolitan area (CMA) or a census agglomeration (CA). Rural/remote is equated with those communities outside the CMA/CA boundaries and is referred to as rural and small town (RST) by Statistics Canada. RST communities are further subdivided by identifying the degree to which they are influenced, in terms of social and economic integration, by larger urban centres. Metropolitan influenced zone (MIZ) categories disaggregate the RST population into four subgroups: strong, moderate, weak and none. These urban/rural/remote categories are applied to those communities (cities, town, villages) that can be equated with the Statistics Canada designation census subdivision (CSD).

For the purpose of the PDB, the CMA/CA and MIZ categories were collapsed and may be interpreted in the following simple manner:

CMA/CA: large urban centre (urban).

Strong/moderate MIZ: small towns and rural areas located relatively close to larger urban centres (rural).

Weak/no MIZ: small towns and rural and remote communities distant from large urban centres (remote).

Details of the RST and MIZ classification schemes can be found in McNiven et al.,¹ du Plessis et al.² and CIHI.³

Missing Values in Urban/Rural Statistics

Missing values listed in the urban/rural statistics signify a sum of *not in PCCF* and *unknown* responses. For example, where the data provider has not submitted a postal code for a registrant, then it is coded as *unknown*. If the data provider has submitted a postal code for a registrant but it does not match the PCCF, then it is coded as *not in PCCF*.

Data Suppression

CIHI is committed to protecting the confidential information of each pharmacist. Guidelines have been developed to govern the publication and release of health information in order to safeguard the privacy and confidentiality of the data received by CIHI. These policies also govern CIHI's release of data through ad hoc queries and special analytical studies. To ensure the anonymity of individual pharmacists, cells with counts from 1 to 4 are suppressed in the data tables presented in this publication and have been replaced by a single asterisk (*). However, presenting accurate row and column totals also necessitates the suppression of a second value to prevent the reader from determining the suppressed value through subtraction. Therefore, in each row and column with a suppressed value, a second value is also suppressed, which generally is the next smallest value. However, if the second value suppressed is greater than 4, it must be replaced by a different symbol. In this case, the pharmacist publication uses a double asterisk (**). Note: Cell suppression does not apply to missing values (such as *not collected*, *not applicable* and *unknown*) in the data tables.

Symbols

Wherever possible, standard symbols and numerical presentations are used in PDB publications:

- * Value suppressed in accordance with CIHI's privacy policy; cell value is from 1 to 4.
- ** Value suppressed to ensure confidentiality; cell value is 5 or greater.
- Data not applicable or does not exist.
- .. Data not currently collected.

When necessary, other symbols are noted at the bottom of the respective tables or figures.

Data Quality Assessment

To ensure a high level of accuracy and usefulness, CIHI developed a framework for assessing and reporting the quality of data contained in its databases and registries. This framework focuses on the five dimensions of data quality: timeliness, usability, relevance, accuracy and comparability. The Methodological Notes section outlines the limitations of data interpretation in detail. Briefly, they are as follows:

- Timeliness is achieved by collecting data at a point in time determined and agreed upon by the data providers and which reflects a majority of total records. This allows CIHI to analyze and release the data in a timely manner.
- Usability includes the availability and documentation of the data and the ease of interpretation.

- Relevance of the data set includes the adaptability and value of the data when used by decision-makers, policy developers, researchers and the media.
- Accuracy is an assessment of how well the data reflects reality or how closely the data presented in this publication reflects the population of reference—specifically, those pharmacists holding active membership in Canada as of October 1 who are employed in the profession of pharmacy.
- Comparability measures how well the data for the current year compares to the data from previous years and how data from the PDB compares to data from other sources.

PDB publications present data from 2006 onward. In some cases, previous data years are only available in aggregate counts from the Health Personnel Database at CIHI. It is important to note that the levels of accuracy and completeness necessary to meet the financial and administrative requirements of a registry can differ from those required for research. An extensive mapping exercise took place collaboratively with each data provider to ensure alignment between the data collected on the registration forms and the data elements of the *CIHI Pharmacist Database Data Dictionary*. When discrepancies were detected, these differences were documented and accounted for in the analysis and described in either the Methodological Notes or the footnotes. In some cases, data providers included CIHI definitions of some of the data elements and/or values in their registration guides, which facilitated a higher level of data accuracy.

Definitions for Missing Values

Missing values are those attributed in instances where a data provider is unable to provide information for a registrant for a specific data element. This involves three potential situations:

- *Not collected*—where the information is not collected by the data provider on the registration form or a data provider cannot submit the information.
- *Unknown*—where the information was not provided by the registrant.
- *Not applicable*—where the data element is not relevant to the situation of the registrant. (For example, when a pharmacist resides in the United States, Province of Residence is *not applicable*.)

For the missing values *unknown* and *not applicable*, CIHI implemented the following validation and correction methodology:

- When a registrant provided valid data to one or more data elements within the same education or employment grouping and other related elements are missing values, then the value *unknown* (rather than *not applicable*) is appropriate.

- When a registrant did not provide any data for all data elements within the same education or employment grouping, the value not applicable (rather than *unknown*) is appropriate.
- When pharmacists are not currently employed in the profession of pharmacy, all employment data in the PDB is coded as *not applicable*.

The PDB findings remove all pharmacists not currently employed in the profession of pharmacy so that *unknown* values accurately represent non-responses for the pharmacist workforce. Some of the results with a large percentage of missing values were not included in the data analysis section of this publication, available on the CIHI website because their questionable accuracy limits their usability and opens the door to erroneous interpretations. In other cases, the number of missing values is clearly identified in the analysis and noted for explanation when necessary (see 2010 PDB Data Tables).

Under-Coverage

Under-coverage results when data that should be collected for the database is not included. There are no known sources of under-coverage for the PDB.

Over-Coverage

Over-coverage is the inclusion of data beyond the target population. Over-coverage may occur when a pharmacist is on leave for a certain reason, such as maternity/paternity leave, education leave or short-term illness or injury. She or he may have the option to register as on leave, active or inactive, or to not register at all. However, those who choose to register as active and submit employment information will be included in the workforce numbers when, in fact, they are not working. Data for all pharmacists submitted by the Newfoundland and Labrador Pharmacy Board for 2007 and by the New Brunswick Pharmaceutical Society for 2007 and 2008 was included as *employed in the profession of pharmacy*, as Employment Status was not available. For 2007, the New Brunswick Pharmaceutical Society submitted aggregate data for active pharmacists who registered between the start of their registration period and July 2, 2008. The data for New Brunswick may include different membership categories for registrants.

Non-Response

In the PDB, item non-response refers to the percentage of *unknown* responses for each data element (see 2010 PDB Data Tables).

Quebec and Nunavut Data

Quebec and Nunavut data was not available from 2006 to 2010; therefore, Quebec and Nunavut data is not included in the 2010 PDB.

In addition, not all data providers were able to align their registration forms to the data elements and values outlined in the *Pharmacist Database Data Dictionary*. As a result, some provinces and territories were not able to collect some data elements (see 2010 PDB Data Tables).

Data Limitations

In addition to the data limitations listed below, analytical findings may not include all jurisdictions due to lack of participation in the PDB, data quality issues and item non-response (unknown information and *not collected* data elements) (see 2010 PDB Data Tables).

Provincial/Territorial Participation

The major limitation of the data presented in this report is the lack of information regarding the pharmacist workforce in Quebec and Nunavut. The ultimate aim of the PDB is to provide a pan-Canadian profile of the pharmacist workforce that can be used to observe trends over time. Without full participation of all jurisdictions, the picture of the health human resource issues facing pharmacists today is incomplete. In addition, not all participating jurisdictions were able to completely align with the data standard specified in the *Pharmacist Database Data Dictionary*. Therefore, for some jurisdictions, some data elements were not collected for the 2006, 2007, 2008, 2009 and 2010 registration years.

- 2006—Newfoundland and Labrador, New Brunswick, Quebec, Manitoba and Nunavut did not participate in the PDB.
- 2007—Quebec, Manitoba and Nunavut did not participate in the PDB.
- 2008—Quebec, Manitoba, the Yukon, and Nunavut did not participate in the PDB.
- 2009—Quebec and Nunavut did not participate in the PDB.
- 2010—Quebec and Nunavut did not participate in the PDB.

Supply

- For 2007, data for all pharmacists submitted by the Newfoundland and Labrador Pharmacy Board was included as *employed in the profession of pharmacy*, as Employment Status was not available.
- For 2007 and 2008, data for all pharmacists submitted by the New Brunswick Pharmaceutical Society was included as *employed in the profession of pharmacy*, as Employment Status was not available.

Demographics

Year of Birth

- *Manitoba*—The Manitoba Pharmaceutical Association does not provide record-level information on birth year; however, aggregate data was provided by Manitoba Health for 2009 only.

Gender

- *Manitoba*—The Manitoba Pharmaceutical Association does not provide record-level information on gender; however, aggregate data was provided by Manitoba Health for 2009 only.

Employment

Employment Status for Primary Employment

- For 2008, data for all pharmacists submitted by the New Brunswick Pharmaceutical Society and, for 2007, data for all pharmacists submitted by the New Brunswick Pharmaceutical Society and the Newfoundland and Labrador Pharmacy Board was included as *employed in the profession of pharmacy*, as Employment Status was not available.
- The 2006 to 2010 PDB does not specifically identify registrants who are on leave.

Employment Category for Primary Employment

- For 2006 to 2008, the Ontario College of Pharmacists was unable to identify the employment categories and therefore assumed that 100% of its active registrants were permanent employees.

Privacy and Confidentiality

The Privacy Secretariat at CIHI developed a set of guidelines to safeguard the privacy and confidentiality of data received by CIHI. These policies govern the release of data in publications, media releases, the CIHI website and through ad hoc requests and special studies. The documents entitled *Privacy Policy on the Collection, Use, Disclosure and Retention of Personal Health Information and De-Identified Data, 2010* (Privacy Policy, 2010) and *Pharmacist Database Privacy Impact Assessment* can be found on the CIHI website (www.cihi.ca).

PDB Workforce Products and Services

The following publications relevant to the PDB may be downloaded in electronic (PDF) format, free of charge, at www.cihi.ca:

- *Pharmacists in Canada, 2010*
 - *National and Jurisdictional Highlights and Profiles*
 - *Data Tables*
- Previous reports
 - *Pharmacists in Canada* series (2006 to 2009)
- Reference documents
 - *Data Dictionary*
 - *Data Submission Specifications Manual*
 - *Privacy Impact Assessment*

Request for Services

CIHI completes ad hoc requests and special analytical projects on a cost-recovery basis using data from the PDB. Such requests are short queries that generally can be handled through standard reports and do not require major programming resources, while special analytical projects require project planning and the commitment of extra resources.

For an estimate of the costs associated with these products and services, please contact

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3. Canadian Institute for Health Information, *Supply and Distribution of Registered Nurses in Rural and Small Town Canada* (Ottawa, Ont.: CIHI, 2002), accessed fall 2009, from <http://secure.cihi.ca/cihiweb/dispPage.jsp?cw_page=download_form_e&cw_sku=SDRNRST2000PDF&cw_ctt=1&cw_dform=N>.

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