



Pharmacist Workforce, 2012—Methodology Guide

The page features decorative wavy lines in grey and teal that flow across the background, framing the central content area.

Our Vision

Better data. Better decisions.
Healthier Canadians.

Our Mandate

To lead the development and maintenance of comprehensive and integrated health information that enables sound policy and effective health system management that improve health and health care.

Our Values

Respect, Integrity, Collaboration,
Excellence, Innovation

Table of Contents

About CIHI's Pharmacist Data.....	iii
Companion Products on CIHI's Website.....	iii
Pharmacist Workforce, 2012	iii
Previous reports	iii
Reference documents	iii
Methodological Notes.....	1
Data Quality	1
Data Providers.....	1
Population of Interest	2
Population of Reference and Collection Period	2
Defining the Workforce	2
Data Processing Methods	4
File Processing	4
Identification of Secondary Registrations.....	4
Non-Response	5
Data Limitations	8
Key Concepts and Definitions	8
Analytical Methods.....	8
Urban/Rural Statistics.....	8
Missing Values in Urban/Rural Statistics	9
Methodological and Historical Revisions	9
Supply	9
Demographics.....	9
Year of Birth and Gender.....	9
Employment	9
Employment Status for Primary Employment.....	9
Employment Category for Primary Employment	9
References	11

About CIHI's Pharmacist Data

Collecting and reporting health human resources (HHR) data assists decision-makers in the planning and distribution of health care providers. Since 2006, CIHI has collected data on the supply, distribution and practice characteristics of pharmacists in selected provinces and territories in Canada.

Companion Products on CIHI's Website

The following companion products are available from CIHI's website at www.cihi.ca/hhr.

Pharmacist Workforce, 2012

- Provincial/Territorial Highlights (PDF)
- Provincial/Territorial Profiles (XLSX)
- Pharmacist Workforce, 2012 Presentation (PPTX)
- Data Tables (XLSX)
- Methodology Guide (PDF)

Previous reports

- *Pharmacists in Canada series*

Reference documents

- *Pharmacist Database Manual*
- Privacy Impact Assessment

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Methodological Notes

This guide will provide a better understanding of the strengths and limitations of the pharmacist data reported in *Pharmacist Workforce, 2012* and the ways in which the data can be effectively used and analyzed. This information is particularly important when making comparisons with other data sources and when drawing conclusions regarding changes over time.

Data Quality

CIHI is founded upon the principles of data quality, privacy and confidentiality. Data collection, processing, analysis and dissemination are guided by CIHI's commitment to publishing high-quality data in a privacy-sensitive manner. This section outlines the methodologies used to maximize the accuracy, comparability, timeliness, usability and relevance of the pharmacist data.

Data Providers

The provincial regulatory authorities and territorial governments that submit pharmacist data to CIHI are the primary collectors of this data. From 2009 to 2012, summary-level data on the supply of the pharmacist workforce in Quebec and Nunavut was obtained from the National Association of Pharmacy Regulatory Authorities (NAPRA).

Table 1: Pharmacist Data Providers

		2009	2010	2011	2012
N.L.	Newfoundland and Labrador Pharmacy Board	✓	✓	✓	✓
P.E.I.	Prince Edward Island Pharmacy Board	✓	✓	✓	✓
N.S.	Nova Scotia College of Pharmacists	✓	✓	✓	✓
N.B.	New Brunswick Pharmaceutical Society	✓	✓	✓	✓
Ont.	Ontario College of Pharmacists	✓	✓	✓	✓
Man.	Manitoba Pharmaceutical Association	✓	✓	✓	✓
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	✓	✓	✓	✓

Source

Canadian Institute for Health Information.

Official registration with a provincial regulatory authority or territorial government requires the completion of an annual registration form, in either written or electronic format. Registration forms typically contain details with respect to personal information, education credentials and employment history.

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, education and employment characteristics. More information on these data elements can be found in the *Pharmacist Database Manual* available for download on CIHI's website at www.cihi.ca/hhr.

Under an agreement, 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 database 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-over-year basis.

Note that the statistics reported by CIHI may differ from those reported by the regulatory authorities, even though the source of the data (annual registration forms) is the same. Differences are due to the population of reference, the collection period, exclusions from CIHI's data and CIHI's editing and processing methodologies, based on data quality principles.

Population of Interest

The population of interest for the pharmacist data includes all pharmacists registered with a regulatory authority within a Canadian province or territory. The population is further refined to include only pharmacists who submit active registrations.

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.

Population of Reference and Collection Period

CIHI takes steps to refine the reference population to more closely represent the population of interest. So that it can meet data quality guidelines for timeliness, CIHI collects data as of October 1 of the registration period in each participating jurisdiction. Therefore, the population of reference for pharmacist data is **all regulated pharmacists who submit an active-practising registration in a Canadian province or territory as of October 1**. The 12-month registration period varies among the provinces and territories, as each jurisdiction is responsible for setting the start and end dates of its own registration period.

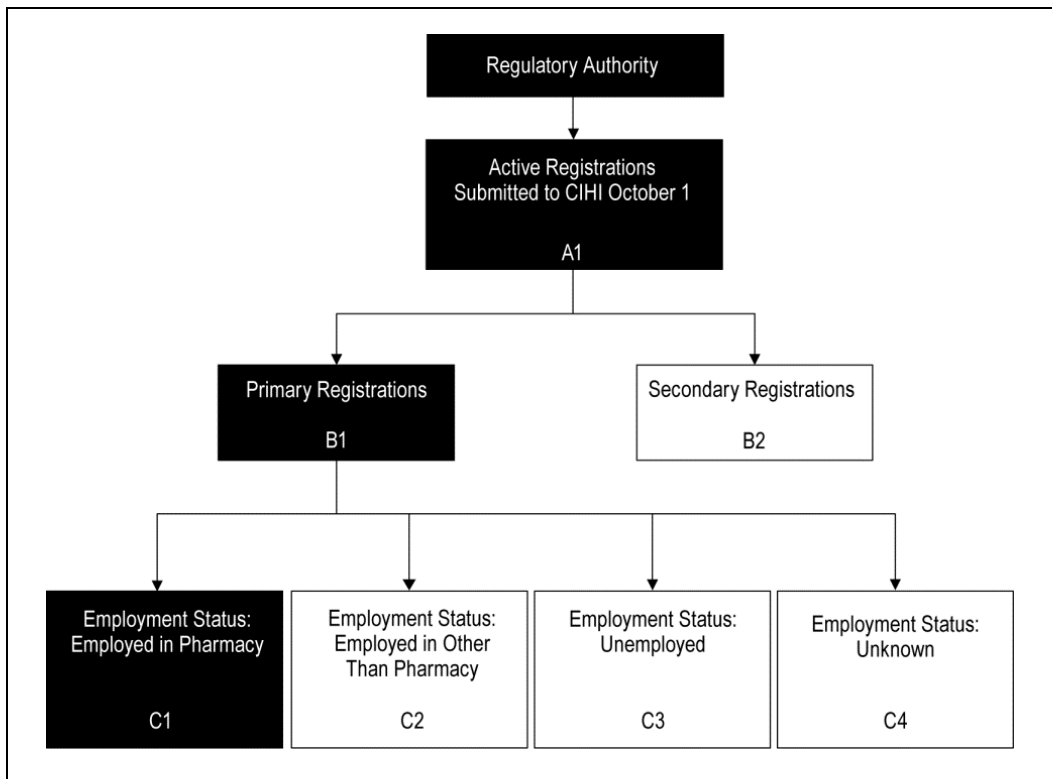
Defining the Workforce

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.

Since the data collected by the provincial regulatory authorities and territorial governments is wider in scope than CIHI's population of reference, 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 reference population 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 1: Tracing Data Flow From Primary Data Collectors to CIHI



Source

Canadian Institute for Health Information.

Only active registrations are submitted to CIHI. Inactive registrations are not submitted.

Box A1: Of all the registrations received by the provincial regulatory authorities and territorial governments, only the data from 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.

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 who are registered in more than one province or territory 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.

Table 2: Defining the CIHI Pharmacist Workforce, 2009 to 2012

	2009		2010		2011		2012	
	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage
Active Registrations	25,280	100.0	26,287	100.0	27,069	100.0	28,169	100.0
Primary Registrations	24,613	97.4	25,597	97.4	26,349	97.3	27,363	97.1
Secondary Registrations	667	2.6	690	2.6	720	2.7	806	2.9
Employed	23,082	93.8	23,724	92.7	24,467	92.9	25,268	92.3
Not Employed	1,531	6.2	1,873	7.3	1,882	7.1	2,095	7.7

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.

Non-Response

Table 3 presents the item non-response, or the percentage of unknown responses, for each data element. Only responses for pharmacists in the workforce are included in this report.

Table 3: Percentage of Pharmacist Records With Unknown Responses, by Data Element and Province or Territory of Registration, 2009 to 2012

Province/Territory of Registration																								
Newfoundland				Prince Edward Island				Nova Scotia				New Brunswick				Ontario				Manitoba				
2009	2010	2011	2012	2009	2010	2011	2012	2009	2010	2011	2012	2009	2010	2011	2012	2009	2010	2011	2012	2009	2010	2011	2012	
Gender (%)	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.7	0.0	0.0	0.0	0.0	0.0	12.7**	..	0.0**	0.0**
Year of Birth (%)	0.5	0.3	0.5	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6**	..	0.0**	0.0**
Year of Graduation for Basic Education in Pharmacy (%)	5.8	5.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	16.2§	0.0	0.0	0.0
Country of Graduation for Basic Education in Pharmacy (%)	5.8	5.2	0.5	0.0	0.0	0.0	0.0	2.6	2.8	3.3	3.3	2.0	0.0	0.0	1.3	0.1	0.4	0.5	0.5	0.4	0.0	0.0	0.0	0.0
Highest Level of Education in Pharmacy (%)†	5.8	5.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
University of Graduation for Highest Education (%)	5.8	5.3	0.2	2.7	0.0	0.0	0.0	0.6	0.3	0.3	0.0	0.0	0.0	0.0	1.0	0.3	11.7	0.0	0.4	0.3	0.0	0.0	0.0	0.0
Employment Category for Primary Employment (%)	1.2	3.5	0.8	1.1	0.0	0.0	0.0	0.4	2.1	0.1	0.1	0.7	0.1	0.5	0.5	0.9	0.0	0.0	0.0	0.0	0.3	0.2	0.2	0.0
Position for Primary Employment (%)	1.0	0.6	0.0	0.9	0.0	0.0	0.0	0.4	2.0	0.1	0.2	1.9	0.6	0.5	0.5	0.8	0.1	0.1	0.1	0.1	0.5	0.3	0.3	0.0
Place of Employment for Primary Employment (%)	1.0	0.6	0.0	0.2	0.0	0.0	0.0	0.0	1.9	0.0	0.0	88.5§	0.0	0.3	0.3	0.4	1.5	0.0	0.0	<0.1	0.0	0.0	0.5	0.2
Urban Versus Rural Flag (%)‡	1.4	1.0	0.3	0.8	0.0	0.0	1.2	4.9	2.6	0.7	0.6	3.5	1.0	0.4	0.4	2.1	0.0	0.0	0.0	0.0	4.0	2.6	1.7	0.0
Range of Estimated Weekly Practice Hours for Primary Employment (%)	5.4	10.1	11.4	9.4	0.0	0.0	0.0	0.8	2.3	0.2	0.4	3.1	0.7	0.9	0.9	2.6	..	..	..	0.7	0.5	0.7	1.5	0.5

(cont'd on next page)

Table 3: Percentage of Pharmacist Records With Unknown Responses, by Data Element and Province or Territory of Registration, 2009 to 2012 (cont'd)

	Province/Territory of Registration															
	Saskatchewan				Alberta				British Columbia				Yukon			
	2009	2010	2011	2012	2009	2010	2011	2012	2009	2010	2011	2012	2009	2010	2011	2012
Gender (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Year of Birth (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Year of Graduation for Basic Education in Pharmacy (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.2	0.0	0.0	0.0
Country of Graduation for Basic Education in Pharmacy (%)	2.2	2.1	0.0	0.2	0.0	0.0	0.0	0.0	0.6	0.5	0.5	0.5	17.2	0.0	0.0	0.0
Highest Level of Education in Pharmacy (%) [†]	0.3	0.3	0.0	0.4	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	..	..	0.0	0.0
University of Graduation for Highest Education (%)	3.2	2.0	0.9	0.0	0.0	0.0	0.0	0.0	15.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Employment Category for Primary Employment (%)	6.3	5.6	0.7	0.3	0.0	0.0	0.0	0.0	3.3	0.0	<0.1	0.0	..	..	0.0	0.0
Position for Primary Employment (%)	10.2	12.0	1.0	0.1	0.0	0.0	0.0	0.0	3.3	0.0	<0.1	0.0	..	..	0.0	0.0
Place of Employment for Primary Employment (%)	8.1	5.3	0.2	0.1	0.0	0.0	0.0	0.0	1.5	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Urban Versus Rural Flag (%) [‡]	4.0	4.6	4.2	2.8	0.2	0.2	0.1	0.2	1.9	0.2	0.2	0.2	0.0	0.0	0.0	0.0
Range of Estimated Weekly Practice Hours for Primary Employment (%)	10.9	11.4	0.6	0.4	0.0	0.0	0.0	0.0	3.6	0.0	<0.1	0.0	..	..	12.9	0.0

Notes

[†] Highest level of education is derived from the highest value submitted for Level of Basic Education in Pharmacy and the Highest Level of Education in Pharmacy.

[‡] Urban versus rural is derived from the Postal Code of Primary Employment.

[§] Excluded from the analysis due to high proportion of missing values.

** Aggregate data was provided.

.. Not collected or not submitted.

Source

Pharmacist Database, Canadian Institute for Health Information.

Data Limitations

Pharmacist data submitted to CIHI does not include the following:

- Data from Quebec and Nunavut.
- Pharmacists who registered with a participating provincial regulatory authority or territorial government authority after October 1 of the registration year.
- Pharmacists with an inactive registration type.

Key Concepts and Definitions

A complete list of data elements and definitions is available in the *Pharmacist Database Manual* at www.cihi.ca/hhr.

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 pharmacist data, 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*.

Methodological and Historical Revisions

Methodological and historical changes to the data make it difficult to compare data across time. CIHI and the regulatory authorities are continually striving to improve data quality; therefore, the following information must be taken into consideration when making historical comparisons and consulting previous CIHI publications. In all cases, comparisons should be made with caution and after giving consideration to the historical and methodological changes made.

Supply

The apparent decrease in the pharmacist workforce in Manitoba from 2010 to 2011 was due to the fact that 2010 data included both practising and non-practising pharmacists, whereas the 2011 data excluded non-practising pharmacists.

Demographics

Year of Birth and Gender

Manitoba—The Manitoba Pharmaceutical Association does not provide record-level information on birth year and gender; however, aggregate data was provided by Manitoba Health for 2009, 2011 and 2012.

Employment

Employment Status for Primary Employment

The CIHI database does not specifically identify registrants who are on leave.

Employment Category for Primary Employment

For 2009, 2011 and 2012, the Ontario College of Pharmacists was unable to identify employment categories and therefore assumed that 100% of its active registrants were permanent employees.

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