

Information Management

A System We Can Count On



The Health Analyst's Toolkit

January 2006

Health System Intelligence Project

Table of Contents

Acknowledgements

iv

Introduction

page 1

Section 1: Knowledge

page 5

1.1	Geography in Ontario	5
1.2	Local Health Integration Network (LHIN) Geography	8
1.3	Assignment of Local Health Integration Network (LHIN) Geography	10
1.4	Aggregation of Census Data to Local Health Integration Networks (LHINs)	11
1.5	Hospitalization Data Queries	13
1.6	Quality Assurance	16
1.7	The International Classification of Diseases (ICD): Conversion between ICD-9 and ICD-10	18
1.8	Health Indicators Methodology	21
1.9	Reporting of Incomplete Data Capture	22
1.10	Standardization	24
1.11	Using Surveys	26
1.12	Citing Data Sources	27

Section 2: Data

page 29

2.0	Content and Organization	29
2.1	The Discharge Abstract Database (DAD)	30
2.2	The National Ambulatory Care Reporting System (NACRS)	33
2.3	The National Rehabilitation Reporting System (NRS)	36
2.4	The Continuing Care Reporting System (CCRS)	39
2.5	Physician Claims	42
2.6	Vital Statistics – Live Birth Data	47
2.7	Vital Statistics – Mortality Data	50
2.8	The Canadian Census	53
2.9	Population Estimates	57
2.10	Population Projections	59
2.11	The Canadian Community Health Survey (CCHS)	61
2.12	The Ontario Cancer Registry (OCR)	65
2.13	The Guidelines for Management Information Systems in Canadian Health Service Organizations (MIS Guidelines)	69

Appendix A: Acronyms used in The Health Analyst's Toolkit	76
---	----

Health System Intelligence Project (HSIP)

This toolkit is produced by the Health System Intelligence Project (HSIP). HSIP consists of a team of health system experts retained by the Ministry of Health and Long-Term Care's (MOHLTC) Health Results Team for Information Management (HRT-IM) to provide the Local Health Integration Networks (LHINs) with:

- Sophisticated data analysis;
- Interpretation of results;
- Orientation of new staff to health system data analysis issues; and
- Training on new techniques and technologies pertaining to health system analysis.

The HRT-IM created HSIP to complement and augment the existing analytical capacity within the MOHLTC. The project team is working in concert with MOHLTC analysts to ensure that the LHINs are provided with the analytical supports they need for their local health system planning activities.

Report Authors:

- Sten Ardal, HSIP
- Linda Baigent, HSIP
- Nam Bains, HSIP
- Carley Hay, HSIP
- Paul Lee, HSIP
- Stephanie Loomer, HSIP

Acknowledgements

We gratefully acknowledge the assistance of the following individuals for their valuable comments and insights:

Paul Brochu	<i>Integrated Policy and Planning Division Knowledge Management and Reporting Branch Ministry of Health and Long-Term Care</i>
Michael Byrnes	<i>Community Health and Acute Services Division Finance and Information Management Branch Ministry of Health and Long-Term Care</i>
Matthew Norton	<i>Health Results Team for Information Management Ministry of Health and Long-Term Care</i>
Carol Paul	<i>Integrated Policy and Planning Division Knowledge Management and Reporting Branch Ministry of Health and Long-Term Care</i>
Mary-Anne Pietrusiak	<i>Durham Region Health Department</i>
Bill Reid	<i>Integrated Policy and Planning Division Knowledge Management and Reporting Branch Ministry of Health and Long-Term Care</i>
Jennifer Sarkella	<i>Health System Intelligence Project Ministry of Health and Long-Term Care</i>
Michael Spinks	<i>Cancer Care Ontario</i>
Graham Woodward	<i>Integrated Policy and Planning Division Knowledge Management and Reporting Branch Ministry of Health and Long-Term Care</i>

Introduction

The Health Analyst's Toolkit

The Health Analyst's Toolkit is specifically designed for analysts and epidemiologists working in, or for, Ontario's Local Health Integration Networks (LHINs). The toolkit has two sections; the **Knowledge** section covers a variety of important topics relevant to LHIN analyses, while the **Data** section identifies and describes highly relevant data sources.

The *Toolkit* is intended to be used by those with some data analysis experience and assumes familiarity with basic technical language and concepts. The contributors all have experience manipulating data to provide local area estimates, health status measures and health care utilization indicators. When considering the contents of a resource guide that would inform their work, the contributors identified the **Knowledge** and **Data** captured in this *Toolkit*.

With the introduction of LHINs in Ontario there is a need to develop an understanding of new geographic levels of analysis. The Health Analyst's Toolkit was created to meet this need. Much of the **Knowledge** section is devoted to methods relevant to LHIN level analysis. Because LHIN areas are not like historical geographies there is a considerable demand for re-calculation and new analyses that conform to LHIN boundaries. This guide is therefore most relevant to analysts working in, or for, LHINs.

Since this is intended as a resource, it is expected that users will be accessing information selectively over time. Each section is divided into discrete units that can be used independently and will stand separately from the rest of the document. To enable this, all references and sources have been included in each unit. There is no overall master reference list.

Knowledge Section

There are 12 different units in this section. Some are quite lengthy and detailed, such as the *LHIN Geography* unit, while others are fairly brief. The units cover a mix of topics, and include descriptions of methods, processes, guidelines and standards. Specific areas covered are:

- Geography in Ontario
- LHIN Geography
- Assignment of LHIN Geography
- Aggregation of Census Data to LHINs
- Hospitalization Data Queries
- Quality Assurance
- The International Classification of Diseases (ICD): Conversion between ICD-9 and ICD-10
- Health Indicators Methodology
- Reporting of Incomplete Data Capture
- Standardization
- Using Surveys
- Citing Data Sources

The **Knowledge** section provides the information needed to understand important issues and to apply a reasoned and consistent approach in data analysis.

Data Section

Many health related data sources are currently in use in Ontario. These have been identified and described in the *Ontario Health Planning Data Guide (Second Edition)*, which lists 86 different sources of administrative health care information, and the *Ontario Health Planning Survey Guide*, which describes about 70 survey data sources. These guides are excellent resources for identifying available information and were a starting point for the work in this section.

The contributors identified 13 data sources that are considered most relevant to the work of analysts and epidemiologists supporting Ontario LHINs. Selected data had to meet several criteria for inclusion to ensure that they would indeed support the needs of LHIN analysts. In order to meet the criteria for inclusion, the data source must be accessible in electronic format; and it must contain information relevant to health status, health care, population characteristics related to health, or external milieu that influence health. Furthermore, the unit of observation must be at the service provider or organization level, the individual population level, or at the aggregate or ecological level. Lastly, the data must provide information at the LHIN level.

Figure 1 displays the algorithm, based on work by Black et al (2005) ¹ that was used to select the databases for inclusion in this toolkit.

The data sources selected and described in the **Data** section are:

- The Discharge Abstract Database (DAD)
- The National Ambulatory Care Reporting System (NACRS)
- The Continuing Care Reporting System (CCRS)
- The National Rehabilitation Reporting System (NRS)
- Physician Claims
- Vital Statistics – Live Birth Data
- Vital Statistics – Mortality Data
- The Canadian Census
- Population Estimates
- Population Projections
- The Canadian Community Health Survey (CCHS)
- The Ontario Cancer Registry (OCR)
- The Guidelines for Management Information Systems in Canadian Health Service Organizations (MIS Guidelines)

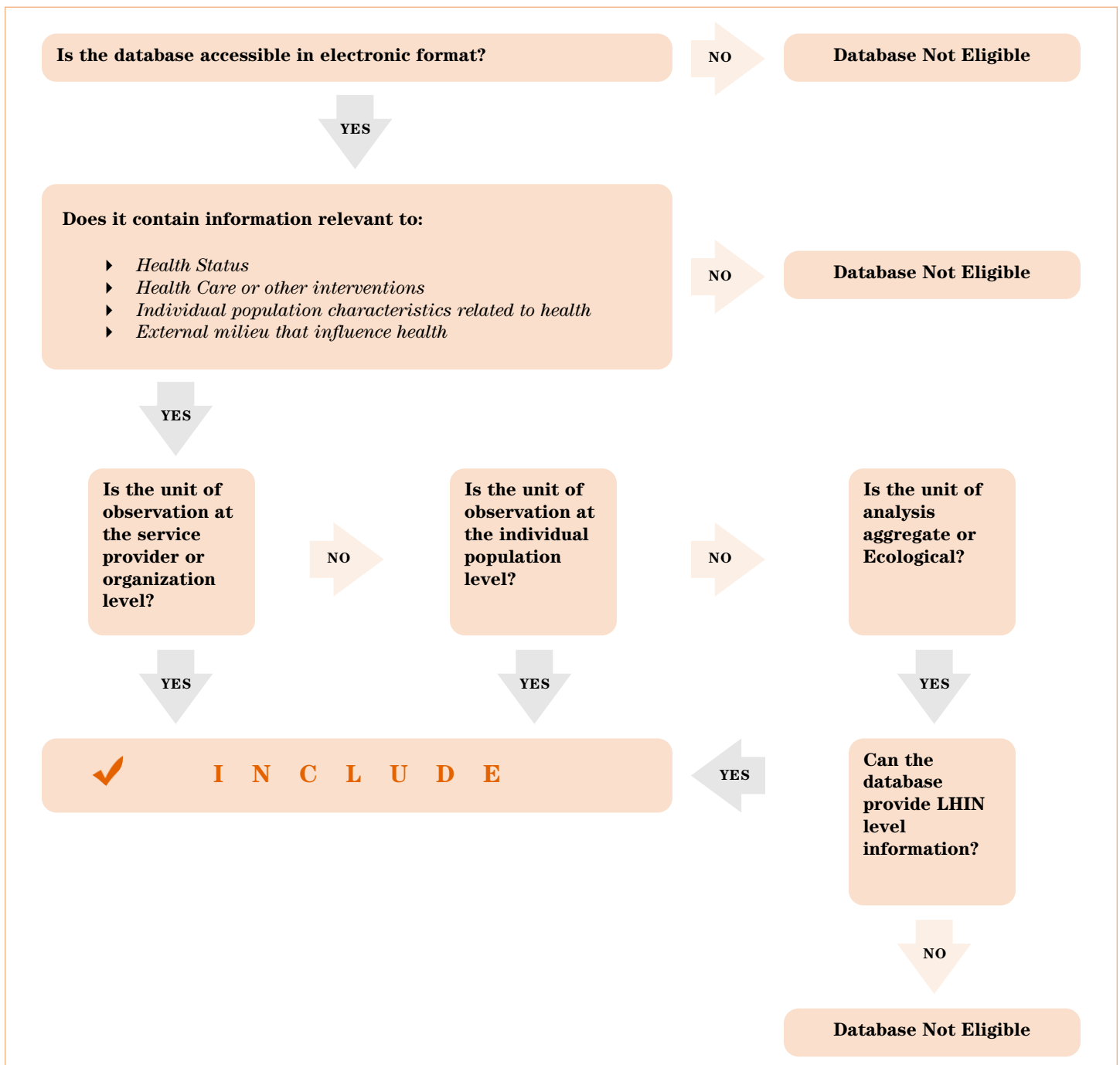
A common template is used to provide descriptions of data sources and related content. As well, notes on uses and known quality or interpretive issues are provided. Many of the data sets listed are used for widely published national and provincial indicators. These uses are also identified.

In some cases the same data set may be available in slightly different formats from different sources. This section only describes the source most likely to be accessed by LHIN analysts. References are included to identify sources and additional resources with more extensive information. Many of the resources listed are accessible through the internet.

The Future of The Health Analyst's Toolkit

It is anticipated that The Health Analyst's Toolkit will need to be updated on a regular basis as data sources are modified and expanded. The toolkit is initially being developed as a printed 'desktop' document, but will be adapted as a web-based resource to enable direct links to a broad array of supporting information. The next iteration will be designed with the participation of analysts engaged in supporting the needs of LHINs.

Figure 1: Planning Data – Decision Algorithm, adapted from Black et al, 2005. ¹



¹ Black C, McGrail K, Fooks C, Baranek P, Maslove L. Data, data, everywhere... : improving access to population health and health services research data in Canada. [Online]. 2005 Apr [cited 2005 Aug]; Available from: URL: <http://www.chspr.ub.ca/> or <http://www.cpm.org>

Knowledge

1.1 Geography in Ontario

Multiple levels of geography are used to describe populations in Ontario. Geographic boundaries associated with Local Health Integration Networks (LHINs) are the newest geographical classification in Ontario and will be discussed in the subsequent section. Other classification systems include the Ontario Ministry of Health and Long-Term Care's (MOHLTC) Residence Coding System, Statistics Canada's Standard Geographical Classification and Canada Post's Mail Delivery System.¹ These systems are interrelated and use some of the same geographic units as their basis. The following terms are the geographic units that form the geographical classification systems discussed:^{1,2}

Census divisions (CD): CDs are groups of neighbouring municipalities that are joined together for the purposes of regional planning. CD is the term used for provincially legislated areas such as counties or regional districts.

Census subdivisions (CSD): CSD is the general term for municipalities, as determined by provincial legislation, or areas treated as municipal equivalents, for example, First Nations Reservations.

Census tracts (CT): CTs are small and relatively stable areas that usually have a population of 2,500 to 8,000. They are located in large urban centres that have an urban core population of 50,000 or more.

Dissemination areas (DA): DAs are small and relatively stable geographic units composed of one or more neighbouring blocks. They are the smallest standard geographic area for which all census data are disseminated. DAs cover all of Canada. They are the new standard geographic area and replace the Enumeration area (EA) as a basic unit for dissemination.

Enumeration areas (EA): EAs are small areas composed of one or more neighbouring blocks. All of Canada is divided into EAs. The DA has replaced the EA as the basic unit of dissemination. They are only used by Statistics Canada for census data collection.

Ontario Ministry of Health and Long-Term Care Residence Coding System

Prior to the development of LHINs, the MOHLTC based all geographical classification on the Residence Coding System.¹

The *lowest level* of this system represents municipalities, townships, named settlements, First Nations Reservations and unorganized areas. These geographic units are the basis of the Public Health Unit (PHU) geography. The majority of data from Statistics Canada, including population estimates, population projections and vital statistics must be regrouped into residence codes based on CSDs. Some CSDs map to more than one residence code. Decisions regarding the assignment of CSDs to unique residence codes are made by the MOHLTC. Residence codes reflect changes in the municipal boundaries that occur between census years whereas Statistics Canada's data are based on CSDs from the most recent Census.^{1,3}

The *next highest* level of geography is the county/district. Counties are created by grouping 4-digit residence codes together and therefore differ somewhat from Statistics Canada's census divisions (based on groupings of CSDs). Most differences are related to where First Nations Reservations are placed. Statistics Canada splits reservations across CDs whereas MOHLTC selects one county to place the entire reservation. For the most part, counties correspond with the PHU geography in Ontario. In some cases, a county will fall into more than one PHU area. Therefore, when aggregating data that are based on census geography, it is preferable to group CSDs as opposed to CDs into the PHU geography.^{1,3}

The *highest* level of geography associated with the Residence Coding System is the health planning region. There are seven health planning regions. The boundaries of these regions differ from those of the Ministry of Environment and the Ministry of Community, Family and Children's Services.^{1,3}

Standard Geographical Classification

The Standard Geographical Classification (SGC) is Statistics Canada's official classification of geographic areas in Canada. The SGC is based on the classification system that was initially developed for disseminating statistics from the census of the population. ^{1,4}

The SGC is made up of a three-level hierarchy:

1. Province/Territory
2. CDs
3. CSDs

These levels are hierarchically related in that CSDs aggregate into CDs which aggregate into provinces and territories. For community level analyses, CTs, EAs and DAs can be useful for regrouping geographies into levels that are smaller than CSDs. ^{1,4}

Postal Codes

The Canadian postal code is an alpha-numeric combination of six characters. The characters are arranged in the format of 'ANA NAN' where 'A' represents an alphabetic character and 'N' represents a numeric character. The first three characters of a postal code are known as Forward Sortation Areas (FSAs). One way to distinguish rural FSAs from urban FSAs is by the second position of the FSA. Zeroes ('0') in this position indicate rural FSAs. ¹

Postal codes are included in many data sets. They are often used as an alternative means of geographic grouping by recoding using Statistics Canada's Postal Code Conversion File. ¹

Conversion Files

Conversion files are tools for integrating data from various sources. The MOHLTC produces conversion files that convert CSDs to residence codes (county or municipality, region, PHU) or postal codes to residence code and PHU. The MOHLTC conversion files are updated each year to reflect changes to postal codes and to update the conversion between CSDs and residence codes. Residence codes reflect municipal amalgamations and some of these areas are, therefore, now too large for health planning purposes (Toronto). Also, some CSDs map to more than one residence code and some residence codes map to more than one CSD. The matching of one residence code for each CSD is consequently relatively subjective and should not be considered 'official'. ¹

Statistics Canada produces the Postal Code Conversion File (PCCF) which provides a correspondence between the six character postal code and Statistics Canada's SGC. This file contains multiple records for a postal code when the postal code straddles more than one block-face or EA. Multiple records are quite common for rural postal codes and community mailboxes. The 'single link indicator' was created to assist users in dealing with multiple records. The method used to establish the single link indicator attempts to identify the geographic area with the majority of dwellings using the particular postal code. Users should be cautioned that only a partial correspondence between the postal code and other geographic areas is achieved when using the single link indicator. ¹

The PCCF is updated on a regular basis and is released every six months. The regular maintenance of the file takes the postal code changes continually introduced by Canada Post Corporation (CPC) and finds the corresponding census geographic areas. Every five years, after each census, the PCCF must be re-based to the new census geographic areas. The PCCF is a cumulative file and therefore includes both active and retired postal codes. ¹

The MOHLTC subscribes to annual updates of the PCCF and uses the correspondence between the postal code and CSD to create the conversion files from postal code to residence code and PHU. Some postal codes do not respect municipal and county boundaries, especially in rural areas. This is a problem when using postal codes to assign county or PHU. ¹

Other Systems

The Office of the Registrar General (ORG) has its own geographic coding system. Mortality, live birth and stillbirth data use the ORG system. Data produced by the ORG are sent to Statistics Canada before being distributed by the MOHLTC to PHUs. Statistics Canada reassigns records to census based geography based on the ORG code. The data file received by the MOHLTC contains the ORG code and the postal code. ¹

The Canadian Community Health Survey (CCHS) contains data at the PHU level and at the former DHC level for Cycles 1.1 (2000/01), 1.2 (2002) and 2.1 (2003). These cycles have not been designed to provide LHIN level coverage, however techniques have been developed to provide estimates at this level. Future cycles will be available at the LHIN geography. ¹

1 Provincial Health Indicators Work Group. Core indicators for public health in Ontario: geography in Ontario. [Online]. 2002 Sept 25 [cited 2005 Aug]; Available from: URL: <http://www.apheo.ca/indicators/index.html>

2 Statistics Canada. Census dictionary 2001. [Online]. 2004 Dec [cited 2005 Oct]; Available from: URL: <http://www12.statcan.ca/english/Census01/Products/Reference/dict/appendices/92-378-XIE02002.pdf>

3 Ontario Ministry of Health and Long-Term Care. Residence coding manual. [Online]. 2005 Apr [cited 2005 Oct]; Available from: URL: http://www.mohltcfim.com/cms/upload/a_7951/Res_Code_2005.pdf

4 Statistics Canada. Standard geographical classification (SGC) 2001. [Online]. 2005 [cited 2005 Aug]; Available from: URL: <http://www.statcan.ca/english/Subjects/Standard/sgc/2001/2001-sgc-index.htm>

1.2 Local Health Integration Network (LHIN) Geography

Background

Local Health Integration Networks (LHINs) are the newest level of geographic classification in Ontario. In 2004, 14 LHINs were established. The boundaries of each LHIN reflect the local areas where individuals naturally seek health care. Working in collaboration with the Institute for Clinical Evaluative Sciences (ICES), the Ontario Ministry of Health and Long-Term Care (MOHLTC) used the following evidence based methodology to establish the LHIN boundaries: ¹

Step 1

Established Hospital Service Areas (HSAs) based on a patient perspective: ^{1,2}

- ICES used postal codes from patient hospital discharge abstracts to locate a patient's home location. These were compared to the location of the hospital where services were received.
- For the basis of patient origin, patients' home locations were mapped to Statistics Canada's census dissemination areas (DAs).
- Each DA was then assigned to the one hospital where the majority of hospital admissions were made. Groupings were built up to form Hospital Service Areas (HSAs).
- HSA boundaries preserve geographic continuity.

Step 2

Once HSAs were determined, they were further grouped into larger Hospital Referral Regions (HRRs). A similar methodology was followed: ¹

- Admissions to the top 50 high volume (HV) hospitals in Ontario were used to determine regional travel patterns.
- The HRR boundaries formed the basis of the LHINs.
- From a system management perspective, the MOHLTC considered various options to determine the number of LHINs. The decision to have 14 LHINs was based on the effective management of the health care system and the experiences of other jurisdictions in Canada.

Step 3

The appropriateness of the 'fit' for each area was tested by calculating a 'Localization Index': ^{1,2}

- The Localization Index is a measure that shows what percentage of the population receives health services locally.
- For the LHIN areas, the Localization Index ranges between 59.1% and 97.2% and indicates an appropriate match between the new areas and where people receive their health care.

Following the initial announcement of the LHIN boundaries, the MOHLTC received feedback from various stakeholders in the province. The majority of the boundary issues that were raised related to concerns expressed by municipalities; to requests to move hospitals from one LHIN to another; and to requests to revise the boundaries to match current provider relationships and patient flow. The MOHLTC analyzed this feedback and where deemed appropriate, boundaries were adjusted. ³

The LHIN areas are unlike historical geographies as they are not based on postal codes and they do not match municipal boundaries. ² Consequently, there is considerable demand for re-calculation and new analyses that conform to LHIN boundaries.

Table 2.1 provides an example of LHIN to Public Health Unit (PHU) mapping. Note that several PHUs appear in more than one LHIN area.

1 Ontario Ministry of Health and Long-Term Care. Local Health Integration Networks, bulletin no. 1/ October 6, 2004. [Online]. 2004 [cited 2005 Sept]; Available from: URL: http://www.health.gov.on.ca/transformation/lhin/100604/lhin_bul_1_100604.html

2 Rothwell D. Using administrative data and mapping tools to create Local Health Integration Networks in Ontario. Proceedings of the 2005 Symposium: The Quality Agenda: Do Our Health Data Measure Up?; 2005 Jan 17-18 Toronto. [Online]. 2005 Jan 18 [cited 2005 Oct]; Available from: URL: <http://www.healthinformation.on.ca/symp2005/presentations/Rothwell%20Jan2005.ppt>

3 Ontario Ministry of Health and Long-Term Care. Local Health Integration Networks, bulletin no. 8/ March 15, 2005. [Online]. 2005 [cited 2005 Oct]; Available from: URL: http://www.health.gov.on.ca/transformation/lhin/031505/lhin_bul_8_031505.html

4 Association of Local Public Health Agencies. Provincial overview of LHINs and Public Health Units. [Online]. 2005 Aug [cited 2005 Oct]; Available from: URL: http://www.alphaweb.org/docs/lib_007501626.ppt

Table 2.1: Mapping Local Health Integration Networks (LHINs) to Public Health Units (PHUs).⁴

LHIN Name	PHU Name
Central East	Durham Region Health Department Haliburton, Kawartha, Pine Ridge District Health Unit Peterborough County-City Health Unit Toronto Public Health
Central West	Regional Municipality of Peel Health Department Wellington-Dufferin-Guelph Health Unit Toronto Public Health York Region Health Services Department
Central	York Region Health Services Department Toronto Public Health Simcoe Muskoka District Health Unit
Champlain	City of Ottawa – Public Health and Long-Term Care Branch Eastern Ontario Health Unit Renfrew County and District Health Unit Leeds, Grenville and Lanark District Health Unit
Erie St Clair	Chatham-Kent Public Health Services County of Lambton, Community Health Services Department Windsor-Essex County Health Unit
Hamilton Niagara Haldimand Brant	Brant County Health Unit City of Hamilton – Public Health and Community Services Department Regional Niagara Public Health Department Haldimand-Norfolk Health Unit Halton Region Health Department
Mississauga Halton	Halton Region Health Department Regional Municipality of Peel Health Department Toronto Public Health
North East	Algoma Health Unit North Bay Parry Sound District Health Unit Sudbury and District Health Unit Timiskaming Health Unit Porcupine Health Unit Renfrew County and District Health Unit
North Simcoe Muskoka	Simcoe Muskoka District Health Unit Grey Bruce Health Unit
North West	Northwestern Health Unit Thunder Bay District Health Unit Porcupine Health Unit
South East	Hastings and Prince Edward Counties Health Unit Kingston, Frontenac and Lennox and Addington Health Unit Leeds, Grenville and Lanark District Health Unit
South West	Oxford County Board of Health Elgin St. Thomas Health Unit Huron County Health Unit Middlesex-London Health Unit Perth District Health Unit Grey Bruce Health Unit Haldimand-Norfolk Health Unit
Toronto Central	Toronto Public Health
Waterloo Wellington	Region of Waterloo Public Health Wellington-Dufferin-Guelph Health Unit Grey Bruce Health Unit

1.3 Assignment of LHIN Geography

A 'Methodology Working Group' composed of members of the Health Results Team for Information Management (HRT-IM), the Health Data and Decision Support Unit (HDDSU), the Health Information Product Services Unit (HIPSU) and the Health System Intelligence Project (HSIP), agreed that a hierarchical method should be used when assigning Local Health Integration Network (LHIN) areas to health data, using the largest geographic areas known to map directly to LHIN in analyses.

When higher level geographies are available in a dataset, using postal codes to define LHIN areas should only be done within the eight municipalities in the province which are subdivided by LHIN boundaries. These municipalities are listed in **Table 3.1**. Please note that Standard Geographic Codes should be used when using federal datasets.

Geography Crosswalk Attributes

A comprehensive geography crosswalk has been created. It is a compilation of a hierarchical municipality/postal code to LHIN Crosswalk; a postal code to LHIN Crosswalk and the 2003 Postal Code Conversion File (PCCF). Variables included are postal code, county-municipality code, municipality name, county code, county name, Public Health Unit (PHU) code, PHU name, LHIN Code and LHIN name. There are null values in some postal code fields where postal codes for older municipality areas could not be discerned.

Discrepancies have been noted and relate to out dated postal codes and municipality codes, and their overlap with current values. Issues are also related to postal code data quality and its subsequent lack of specificity in non-metropolitan areas. In order to rectify this, the HRT-LHIN team documents, Canada Posts' current postal code listings and Statistics Canada's online geographic information tools were re-assessed. The following was found:

1. Two non-metropolitan municipalities known to be shared among LHINs were entirely assigned to a single LHIN. This appears to be due to a lack of specificity in postal codes.
2. There are 55 (non-metropolitan) postal codes for which the municipality they are mapped to differs with the assigned LHIN:
 - 9 are mapped incorrectly to municipality but correctly to LHIN.
 - 25 are mapped correctly to municipality but incorrectly to LHIN.
 - 21 are currently invalid and are probably older postal codes.
3. One postal code is assigned to both the wrong municipality and the wrong LHIN.

All errors have been rectified. In the case of the postal codes for which LHIN versus municipality discrepancies could not be rectified using the tools above, current LHIN assignments were used.

Table 3.1: Ontario Municipalities that are subdivided by LHIN Boundaries. ¹

County Municipality	Municipality Name	County Name	Standard Geographic Code
0731	Blue Mountains	Grey	42045
0739	Grey Highlands	Grey	42015
0740	West Grey	Grey	42004
0832	Norfolk County	Haldimand & Norfolk	28052
1811	Toronto	Toronto	20005
2721	Mississauga	Peel Reg. Mun.	21005
3319	Essa	Simcoe	43021
3905	Vaughan	York Reg. Mun.	19028

¹ Pacey M, Dall K, Bains N. HSIP research note. Aggregation of Census 2001 data to LHINs. Kingston: Health System Intelligence Project; 2005 June.

1.4 Aggregation of Census Data to LHINs

This section describes the methodology created by the Health System Intelligence Project (HSIP) to aggregate census data to Local Health Integration Networks (LHINs) before Statistics Canada released the 2001 census data by LHIN (based on Version 10 of the LHIN boundaries). The LHIN level estimates produced by HSIP are comparable to those of Statistics Canada; calculated indicators are generally identical or similar. However, the Statistics Canada data set is more complete given that Statistics Canada was able to work with the original 2001 census data. On the other hand, some of the data in the dissemination area (DA) and census subdivision (CSD) level files that HSIP used had been suppressed by Statistics Canada. Furthermore, the new Statistics Canada data set includes additional variables that were not available in the data used by HSIP, such as dwelling characteristics and expanded income distributions. As such, the Statistics Canada 2001 Census Profile should be considered to be the 'gold standard'. Further information about the Profile is available on the Statistics Canada website. ¹

The remainder of this section focuses on the development of the LHIN level Census 2001 dataset that was created by HSIP through the aggregation of census divisions (CDs), CSDs and DAs from the Census 2001 profiles. This dataset was used to calculate the LHIN Population Health Profiles.²

HSIP Methodology

There is more than one method available for aggregating census data to LHINs. The following section documents the process of producing the census-to-LHIN groupings. Three methods of aggregation are discussed, which for the sake of parsimony will be called Method 1, Method 2 and Method 3. ³

Method 1: DA Level Aggregation

The first method uses the LHIN boundary maps to aggregate data from DAs. The initial population estimates provided by the Ministry of Health and Long-Term Care (MOHLTC) used this method. The main problem with this method is that at the DA level, census variable counts are subject to random rounding of the last digit and suppression in the case where too few cases are available for reporting. While rounding errors should potentially cancel out if they are truly random, the potential for cumulative errors should be avoided if possible.

Method 2: CD-CSD Level Aggregation

CD and CSD data are presumably more accurate because the counts are not subject to the number of random errors that result from using DA data. The process is two-stage. First, CDs that fit completely within LHIN boundaries are identified and retained. Any CD that crosses a LHIN boundary is split into its constituent CSDs. Next, these CSDs are then allocated to the LHIN that contains the largest proportion of the CSD land area. The difficulty with this approach is that it is zero-sum; the entire population of a boundary-crossing CSD is assigned to a particular LHIN, and thus may undercount populations (and their associated characteristics) within a particular LHIN. Since populations are not evenly distributed through a CSD, the assumption that the CSDs can be allocated by proportional land area is not tenable.

Method 3: CD-CSD-DA Level Aggregation

The third approach is a refinement of Method 2. In this process, CDs completely contained within LHINs are allocated to that LHIN. Where a CD crosses a LHIN boundary, the CD is split into its component CSDs. As a further step, CSDs falling into two or more LHINs are split into the DAs nested within the CSD, which are then allocated to the appropriate region. Thus, the errors associated with DA-level data are minimized by only allowing such data to enter the aggregation when absolutely necessary. In all other cases, higher levels of census geography counts are utilized. For these reasons, this method is the preferred choice for aggregation.

Dissemination Areas

LHIN identifiers were attached to the appropriate DAs through a spatial join between the DA and LHIN boundary files.

The number of census geographic units attached to the LHINs is described in **Table 4.1**. Only one LHIN, Erie St. Clair, is comprised neatly of CDs; Champlain and South East are made up of only CDs and CSDs. Toronto Central, on the other hand, is entirely composed of DAs.

Creation of Master Data Files

A short-list of 125 selected 2001 census variables was exported in *.dbf format from the original census tables in Beyond 20/20. Three tables were generated containing all of the CDs, CSDs and DAs in the province. These files represent the census data from which the LHIN-specific aerial data were drawn.

In SPSS, the master ID files were match-merged to the census data files for CDs, CSDs and DAs separately. In each case, where the census geography identifiers from the master files matched the IDs in the province-wide census data, the record was extracted and matched to that unit of geography.

As a final step, each of the three resulting files was aggregated in SPSS using the LHIN identifier as the group variable. The net result of this process was three separate LHIN-level datasets comprised of 125 census variables.

Table 4.1: Census Geographic Units by LHIN. ³

LHIN	Dissemination Areas	Census Subdivisions	Census Divisions
01 - Erie St. Clair			3
02 - South West	60	5	6
03 - Waterloo Wellington	1	1	2
04 - Hamilton Niagara Haldimand Brant	65	4	3
05 - Central West	309	3	1
06 - Mississauga Halton	995	3	
07 - Toronto Central	1813		
08 - Central	1104	11	
09 - Central East	835		5
10 - South East		17	4
11 - Champlain		5	4
12 - North Simcoe Muskoka	38	17	1
13 - North East	1	4	8
14 - North West	68	57	2
	5289	127	39

1 Statistics Canada. Health regions: boundaries and correspondence with census geography. [Online]. 2005 Oct 20 [cited 2005 Oct]; Available from: URL: <http://www.statcan.ca/english/freepub/82-402-XIE/82-402-XIE2005001.htm>

2 Health System Intelligence Project. Population health profiles. [Online]. 2005 Aug [cited 2005 Oct]; Available from: URL: http://www.health.gov.on.ca/transformation/providers/information/profiles/im_profiles.html

3 Pacey M, Dall K, Bains N. HSIP research note. Aggregation of Census 2001 data to LHINs. Kingston: Health System Intelligence Project; 2005 June.

1.5 Hospitalization Data Queries

Hospitalization data are the most comprehensive and accessible source of morbidity information available to analysts and epidemiologists in Ontario. Hospitalization data can be accessed through the Provincial Health Planning Database (PHPDB). Additional information on the PHPDB is available in the **Data** Section. Data pertaining to inpatient discharges, emergency department visit, day procedure, medical day/night care, high cost ambulatory clinics, complex continuing care facilities and rehabilitation units in General Rehabilitation and Special Rehabilitation hospitals are available.

Before accessing hospitalization data using the PHPDB, it is valuable to be familiar with the way the data are laid out and organized. The following section primarily relates to the fields in the Inpatient Discharges Table, which are derived from the Discharge Abstract Database (DAD). This section does not include all of the fields that are found in the Inpatient Discharges Table as several more do exist. It is simply meant to highlight and explain characteristics of fields that are commonly used.

It is important to note that episodes of hospitalization are measured by 'separations'. A separation refers to a discharge, death, sign out or transfer. If a patient is transferred to another hospital, multiple separations will occur. Separations, rather than admissions, are used because hospital abstracts for inpatient and day procedure care are based on information gathered at the time of discharge. The terms 'separation', 'discharge', 'hospitalization' and 'stay' are often used interchangeably.

Commonly Used Fields in the Inpatient Discharges Tables of the PHPDB:

CIHI Key

- The 'CIHI Key' is the unique key recorded by the Canadian Institute for Health Information (CIHI) for an inpatient discharge or day procedure case. In the Inpatient Discharges Table, a query using COUNT DISTINCT on this attribute and a COUNT ALL of the rows should always return the same results. For confidentiality reasons, it has been encrypted.
- The 'CIHI Key' can be contrasted with 'Patient ID', which refers to a patient's health card number. The 'CIHI Key' represents an inpatient discharge while the 'Patient ID' represents an actual person.

Institution Number

- Some institutions have more than one institution (master) number as different numbers can be assigned to different units. This can be problematic if the institution crosses different LHINs or municipalities.

- In order to determine all of the institution numbers associated with a particular hospital, the 'Facility Key' can be used. This key refers to the Facility Number.
- For a list of numbers that correspond to hospitals and for changes that may have occurred in the numbering system, refer to the Ontario Ministry of Health and Long-Term Care's (MOHLTC) Master Numbering System. ²

Institution Type Code

- Different types of institutions exist. In analyses, it is important to identify the 'Institution Type' of interest. The following codes are used: ²
 - **AP** – Acute Care Treatment Hospital with Mental Health Unit
 - **AT** – Acute Care Treatment Hospital without Mental Health Unit
 - **MP** – Miscellaneous Mental Health Sites
 - **GR** – General Rehabilitation Hospital and Units of Hospital
 - **SR** – Special Rehabilitation Hospital and Units of Hospital
 - **CR** – Chronic Care Treatment Hospital

Time Periods – Fiscal Year versus Calendar Year

- Data are available by both fiscal year (April to March) and calendar year (January to December). Hospitalization data from the DAD are reported by fiscal year as opposed to calendar year.
- Data are usually updated (refreshed) by fiscal year (i.e. in the fall after the end of the previous fiscal years).
- It is important to be cautious when doing analyses that use both hospitalization data and other data sources, such as vital statistics data, which are typically analysed by calendar year.

Patient ID# and Source

- There are two values for the 'Patient ID Source Code'. 'H' identifies health numbers and 'D' is used for dummy numbers. A dummy number is assigned when the actual health or Ontario Health Insurance Plan (OHIP) number is not available. They should be excluded when counting patients or when trying to match patients across different data sources (e.g. Inpatient to Day Procedure). ¹

Patient Location versus Institution Location

- 'Patient Location' refers to patient's residence and is distinct from 'Institution Location'. It is important to determine if the geography of interest is the patients' residence or the location of the institution where the hospitalization occurred.

Homeless Indicator

- This field indicates if a patient is homeless. Data for this field are incomplete.

Age

- Data are available by single year of age and by age groupings. There are 22 different types of pre-defined age groupings available in the code tables.
- Applying age groupings as opposed to single years will result in faster queries and simpler results.

Newborns

- With newborns, issues of double counting (newborn + mother) may arise. Therefore, it is often desirable to exclude newborns from analyses.
- It is advised to use 'Entry Code' (Entry Code = N) as opposed to 'Admission Category' (Admission Category = N).
- If 'Admission Category=N' is used to exclude newborns from a query, not only will newborns be excluded, but babies admitted in the first '24 hours of life' will also be excluded. Therefore, for this purpose, it is advised to use Entry Code = N.
- The same can also be applied to stillbirths.

Readmission Code

- There is a readmission code in the PHPDB, however its use is limited as it only pertains to patients who are readmitted to the same institution. Patients who are discharged and subsequently readmitted to different institutions will not be captured by this field.

Discharge Disposition

- This field indicates where a patient was discharged to, for example, whether they are discharged home or transferred to another institution. The content of this field does vary by year, with more information being available for recent years.
- This field may be incomplete because hospitals record where they believe a patient is going after being discharged. However, hospitals rarely have the time to follow up and confirm that a patient was actually discharged to that location.

Alternate Level of Care (ALC)

- This concept is designed to separate true acute care patients from those patients who are considered to be non-acute, but are currently occupying acute care beds. ALC patients have finished the acute care phase of their treatment but remain in acute care beds.
- ALC can be expressed as the total number of ALC days or by the average ALC Length of Stay (ALOS) = Sum of total ALC days/number of separations.
- Newborns can be excluded in ALC calculations for the reasons previously listed and because newborns do not occupy acute care beds.

Most Responsible Diagnosis

- This field refers to the diagnosis that describes the most significant condition that caused a hospital stay.
- This diagnosis may not be related to the condition that was responsible for the patient being admitted. In a case where multiple diagnoses are classified as being the 'most responsible', the diagnosis responsible for the longest length of stay in the hospital is recorded. ³
- The 'Most Responsible Diagnosis' field (located in 'Inpatient Discharges Table') can be contrasted with the 'Patient Diagnoses' fields (located in 'Patient Diagnoses Table'), where 'all' diagnoses are listed. Other types of diagnoses are 'Primary' (pre-admit comorbidity), 'Complicating' (post-admit comorbidity) and 'Secondary' (a diagnosis that did not significantly contribute to length of stay). ³
- The 'Most Responsible Diagnoses Table' and the 'Patient Diagnoses Table' should never be used together as double-counting will occur.

International Classification of Diseases (ICD) Codes

- The PHPDB has both three character and four character ICD codes. It is important to be aware of the specificity/level being used as results may differ when using either.
- Conversion between ICD-9 and ICD-10 is possible. To ensure quality conversion, code tables should be consulted. Only backward conversion is recommended (ICD-10 ► ICD-9). ⁴
- Trending between years with different coding schemes is discouraged.
- ICD-10-CA has a greater number of codes compared to ICD-10. It is therefore important to check the code tables in the PHPDB and/or the CIHI resources for codes that are unavailable in ICD-10 manuals.
- The same trending and conversion issues are relevant to CCP (Canadian Classification of Diagnostic, Therapeutic and Surgical Procedures, ICD-9) versus CCI (Canadian Classification of Health Interventions, ICD-10).
- For more information on ICD codes, see 'International Classification of Diseases: Conversion between ICD-9 and ICD-10' in the **Knowledge** section.

Principal Intervention/Procedure

- The 'Principal Intervention/Procedure' field refers to the one procedure that describes the most important intervention or procedure a patient had during a hospital stay. It may not be the only intervention or procedure the patient had.
- This field can be contrasted with the 'Hospital Interventions/Procedures Table', where 'all' procedures are listed.
- These fields should never be used together as double-counting will result.

Commonly Used Fields in the Inpatient Discharges Tables of the PHPDB (continued)

Weights – CMGs, RIWs, PACs

- Case Mix Groups (CMG) are used to aggregate acute care patients into statistically and clinically homogeneous groups based on clinical and administrative data. The basis of health care organization comparisons and case mix adjusted resource utilization is formed by adjusting patients of different levels of acuity.⁵
- CMGs are assigned Resource Intensity Weights (RIWs) to measure the resources that are typically required for the case.⁶ RIWs are values that represent the relative cost between patient types. CIHI calculates RIWs annually.
- CIHI applies the CMG/Plx grouping methodology to acute inpatient data submitted to the DAD from Ontario hospitals. The CMG/Plx methodology assigns each inpatient record to one of 478 discrete groups (CMGs). Each group represents a clinically similar group of patients who have similar episode costs.
- Within CMGs, the Complexity (Plx) algorithm assigns patients into four levels of increasing patient complexity (and cost). The Plx methodology was formally applied to inpatient data submitted to CIHI's DAD in 1997.⁷
- Prospective Complexity Adjustment (PAC) cost weights are relative cost weights that were developed without the Plx adjustment. In Ontario, hospital funding is based on PAC weights and not RIWs, therefore, when examining hospital resources, PAC weights should be used wherever possible.⁷

- Multi year analyses should always use the same version of weights. If different versions of weights are used across years for trending analyses, the results can be misleading. It is common practice to scale each new generation of weights to facilitate annual comparisons. After the 2003/04 data were released in the PHPDB, feedback regarding the comparability of weights indicated potential scale issues. The weights were subsequently reviewed, which resulted in appropriate rescaling. All affected data and reference tables in the PHPDB have been updated accordingly. Notwithstanding, annual comparisons should be undertaken with care after considering variations in grouper logic, structural changes in hospital costs and differences in cost weights.¹

Day Procedures in Inpatient Discharges versus Ambulatory Visits

- Before 2003, day procedures (day surgeries) were considered part of hospitalization data and were available from the Inpatient Discharges Table. As of 2003, these data are reported in the Ambulatory Visits Table, which are derived from CIHI's National Ambulatory Care Reporting System (NACRS).

Medical versus Surgical versus Obstetrics

- Hospitalizations can be grouped as 'Medical', 'Surgical' or 'Obstetric'.
- The categories are commonly used to group hospital separations.
- These groupings are based on CMGs.

1 Ontario Ministry of Health and Long-Term Care. Provincial health planning database. [Online]. 2005 Sept [cited 2005 Oct]; Available from: URL: <http://portal.healthdss.moh.gov.on.ca/>

2 Ontario Ministry of Health and Long-Term Care. Ministry of Health and Long-Term Care Master Numbering System. [Online]. 2005 Apr [cited 2005 Oct]; Available from: URL: http://www.mohltcfm.com/cms/upload/a_8004/mns_book05.pdf

3 Central East Health Information Partnership. CIHI - hospital separation. [Online]. 2002 [cited 2005 Sept]; Available from: URL: <http://www.healthinformation.on.ca/DataInfo/cihi.htm>

4 Finance and Information Branch, Ontario Ministry of Health and Long-Term Care. Hospital administrative data, ICD-10-CA & data quality. [Online]. 2004 Apr 22 [cited 2005 Aug]; Available from: URL: http://www.mohltcfm.com/cms/upload/ac0a8070400000fa53a198d98001/MOHLTC_ICD10_and_Data_Quality.pdf

5 Canadian Institute for Health Information. Case mix. [Online]. 2004 Mar 31 [cited 2005 Aug]; Available from: URL: http://secure.cihi.ca/cihiweb/dispPage.jsp?cw_page=casemix_e

6 Canadian Institute for Health Information. Case mix groups with complexity overlay and age adjustment. [Online]. 2004 Nov 22 [cited 2005 Aug]; Available from: URL: http://secure.cihi.ca/cihiweb/dispPage.jsp?cw_page=casemix_cmgplx_e

7 Sutherland J. ICD-10 based relative cost weights, PAC-10. [Online]. 2004 Jan [cited 2005 Oct]; Available from: URL: <http://portal.healthdss.moh.gov.on.ca/>

1.6 Quality Assurance

Historically, health care services data were collected in the billing and payment process. Data were not purposely collected for other reasons. However, today health care services data are successively used to assess the quality and quantity of health care services. It is recognized that health care organizations and delivery can be improved through better planning, evaluation and system monitoring. This, however, is reliant on having access to high quality data to support informed decision making. ¹

High quality data are the result of solid quality assurance processes. There are several characteristics of high quality health care data that analysts should be cognisant of when working with the key data sources described in the **Data** section: ¹

Completeness

- Do data include all settings, providers, populations and events?

Comprehensive

- Are data available for most types of publicly funded health care services, such as prevention, childhood care, home care, drugs, diagnostics and palliative care?

Accurate

- How well do the data reflect what they are supposed to?
- Do data reflect actual utilization and patient-provider characteristics?

Timely

- Can the data be used for real-time management and planning?
- What is the time between the date the data are collected and when they are available for use?

Linkable

- Can the data be connected across different services that people receive to provide analyses that reflect the complexity of the health care system?

Anonymous

- Do the data adhere to strict privacy regulations?

Useable

- Do data analysts have access to data that are organized in a readily useable format?

Consistent over time

- Have standards changed from year to year?

Proposed Steps for Quality Assurance

Analysts can engage in several steps to ensure the quality of the estimates they produce. The following steps were adapted from Ontario District Health Councils' (DHCs) Local Health System Monitoring Project. ² They can be applied to census data, data from the Canadian Community Health Survey (CCHS), mortality data and hospitalization data.

1. Check for simple math: all rows and columns should add up.
 2. Within the spreadsheet, verify that percentages and rates have been calculated properly (using the appropriate numerators and denominators).
 3. Where possible, check the estimates against available benchmarks and/or published data. Due to the introduction of LHINs in Ontario, benchmarking may be difficult. However, the geography of the Erie St. Clair LHIN matches that of the Essex-Kent and Lambton District Health Council (DHC) thus estimates produced for this area of the province can be compared to previous published information that reports at the DHC level. Furthermore, the geographies of the Champlain LHIN and the Champlain DHC are similar, as are the geographies of the Central East LHIN and the Durham, Kawartha and Pine Ridge DHC. It is therefore possible to draw further comparisons using these geographies.
- For census data, Ontario level estimates can be verified against the Canadian Institute for Health Information (CIHI)/Statistics Canada Health Indicators Project website or Statistics Canada's Community Profiles website. ^{3,4}
 - For CCHS and mortality data, Ontario level estimates and rates can also be checked against the estimates on the CIHI/Statistics Canada Health Indicators Project website. ³ Estimates will not be identical because Statistics Canada uses the CCHS Master File but they should be similar. *
 - For Hospitalization Data, Ontario level estimates can be verified against indicators on the CIHI website. ⁵

4. To convey how an indicator was developed, the documentation that accompanies the estimates must be clear. Does it contain enough information to permit someone else to calculate the indicator in exactly the same way and obtain the same answer? If the indicator is part of the part of the Provincial Health Indicators Work Group's (PHIWG) Core Indicators for Public Health in Ontario Project, check the documentation on the Association of Public Health Epidemiologists in Ontario (APHEO) website to ensure that the calculation of the indicator is consistent with PHIWGs.⁷ If the indicator is part of the CIHI/Statistics Canada Health Indicators Project, review their technical notes to ensure comparability.⁸ If the indicator is not part of these aforementioned projects, it would be valuable to verify the estimates with individuals who work in the field in which the particular indicator is related to.
5. Using the methods outlined in the documentation, recalculate the indicator from the original data source for any three to four LHIN areas and Ontario. If possible, choose familiar LHIN area geographies in order to determine if the estimates obtained are similar to expectations based on one's knowledge of that region.

** There are three types of CCHS Microdata. The 'Master File' is confidential, remains at Statistics Canada and is only used by Statistics Canada employees or by some researchers if special permission is granted. The 'Share File' contains the same information as the Master File but all identifiable information is removed and respondents who do not wish to share information are excluded. Ministries of Health and their partners have access to the 'Share File'. The 'Public Use Microdata File' or 'PUMF' is public domain and data are aggregated.*⁶

1 Institute for Clinical and Evaluative Sciences. Improving health care data in Ontario. [Online]. 2005 January [cited 2005 Aug]; Available from: URL: <http://www.ices.on.ca/file/HealthData.pdf>

2 Clements K. Adapted from the Toronto local health system monitoring project. Toronto: Toronto District Health Council; 2002.

3 Statistics Canada. Health indicators. [Online]. 2005 Jun 8 [cited 2005 Aug]; Available from: URL: <http://www.statcan.ca/english/freepub/82-221-XIE/82-221-XIE2005001.htm>

4 Statistics Canada. Community profiles. [Online]. 2005 Oct 20 [cited 2005 Oct]; Available from: URL: <http://www.statcan.ca/bsolc/english/bsolc?catno=93F0053XIE>

5 The Canadian Institute for Health Information. [Online]. 2005 [cited 2005 Aug]; Available from: URL: http://secure.cihi.ca/cihiweb/dispPage.jsp?cw_page=home_e

6 Statistics Canada. Access to NPHS and CCHS products. Workshop by the Data Access Unit, NPHS/CCHS Statistics Canada; 2005 Jun 8, Ottawa ON.

7 Provincial Health Indicators Work Group. Core indicators for public health in Ontario. [Online]. 2004 [cited 2005 Aug]; Available from: URL: <http://www.apheo.on.ca/indicators/index.html>

8 Statistics Canada. Health indicators: data tables. [Online]. 2005 May 6 [cited 2005 Jul]; Available from: URL: <http://www.statcan.ca/english/freepub/82-221-XIE/00604/tables.htm>

1.7 The International Classification of Diseases (ICD): Conversion between ICD-9 and ICD-10

The International Statistical Classification of Diseases (ICD) is an international standard diagnostic classification for all epidemiological and many health management purposes. ¹ It is developed, maintained and published by the World Health Organization (WHO). ICD is used to analyze the health situation of populations and monitor the incidence and prevalence of diseases and health problems. The ICD system classifies diseases and health problems recorded on health and vital records, such as death certificates and hospital records; facilitates the storage and retrieval of diagnostic information for clinical and epidemiological purposes; and permits the systematic recording, analysis, interpretation and comparison of mortality and morbidity data. ¹⁻³

Since 1900, ICD has been revised every ten years. The purpose of revisions is to stay current with advances and changes in disease nomenclature and etiology. ⁴ The tenth revision (ICD-10) was approved in May 1990 by the Forty-third World Health Assembly. ¹ It came into use in WHO Member States in 1994. ⁵ ICD-10 expands beyond traditional causes of death and hospitalization. The content and specificity of conditions and situations that are not diseases are especially relevant for use outside of the hospital setting. ²

Canadian Scope

In order to ensure that the ICD-10 system evolves in such a way that it continues to reflect the practice patterns of the Canadian health care system, the WHO allowed Canada to reproduce, distribute and enhance the system. Accordingly, the Canadian Institute for Health Information (CIHI) developed the International Statistical Classification of Diseases and Related Health Problems – Tenth Revision, Canada (ICD-10-CA) and the Canadian Classification of Health Interventions (CCI). CIHI maintains and updates ICD-10-CA and CCI every two years. ^{5,6} In Ontario, ICD-10-CA and CCI were implemented for hospitalization data in April, 2002. ⁶

Before 2002, two standards were used at the national level for diagnosis classification – the International Statistical Classification of Diseases, Injuries, and Causes of Death, Ninth Revision (ICD-9) and the ICD-9-Clinical Modification (ICD-9-CM). There were also two standards for procedure classification: the Canadian Classification of Diagnostic, Therapeutic, and Surgical Procedures (CCP) and the procedure section of the ICD-9-CM. ⁵

ICD-9-CM is a Clinical Modification of ICD-9 published by the United States (US) government for morbidity coding in the US. ICD-9 was adopted in Canada in 1979. Clinical modification was needed to better describe the clinical picture of the patient. The codes are more precise than those needed only for statistical groupings and trend analysis. The diagnosis component of ICD-9-CM is completely comparable to ICD-9. ⁵

The Canadian Classification of Diagnostic, Therapeutic, and Surgical Procedures (CCP) was originally developed by Statistics Canada in 1978 to meet Canadian needs for a procedural classification to be used in conjunction with ICD-9. CCP is divided into two parts: the Tabular List and the Alphabetic Index. ⁵

Several differences exist between ICD-9 and ICD-10: ^{1,4,5}

- ICD-10 uses alphanumeric codes as opposed to just numeric codes. ICD-10 is far more detailed, for example, an increased number of conditions have been assigned perinatal codes.
- Chapters have been added and rearranged.
- The two supplementary classifications contained in ICD-9, the Supplementary Classification of External Causes of Injury and Poisoning (the E code) and the Supplementary Classification of Factors Influencing Health Status and Contact with Health Services (the V code), are no longer supplementary chapters in ICD-10. They are now included in the core classification. See **Table 7.1**.

Differences between ICD-10 and ICD-10-CA: ^{2,5}

- ICD-10-CA represents the broadest scope of any previous revision.
- To provide added specificity, ICD-10-CA includes the addition of fifth and sixth characters.
- ICD-10-CA includes two additional chapters in the tabular list. The Morphology of neoplasms is incorporated as Chapter XXII. Chapter XXIII captures provisional codes for research and temporary assignment. On rare occasions codes in ICD-10 and ICD-10-CA differ slightly. For example, for HIV, ICD-10 uses codes B20-B24 whereas in ICD-10-CA only B24 is used and B20-B23 do not appear at all.

The implementation of ICD-10-CA/CCI has several benefits. ICD-10-CA/CCI: ^{2,7}

- Provides Canada with a single set of national/provincial/regional standards.
- Ensures international comparison because equivalency tables to ICD-10 have been developed.
- Provides diagnosis codes with greater and improved specificity. ICD-10-CA introduced new terminology and clinical concepts and has therefore gained a higher level of clinical credibility and acceptance.
- Provides consistency for trending health interventions.
- Provides the capture of different approaches/devices for measuring outcomes.
- Allows for enhancements to accommodate newly discovered diseases.

Table 7.1: ICD-9 versus ICD-10. ⁶

# of Diagnosis Codes	
ICD-9	~ 7,000 codes
ICD-9-CM	~ 12,000 codes
ICD-10 (WHO version)	12,672 codes
ICD-10-CA (Canadian version 2003)	16,795 codes
# of Procedure Codes	
CCP	~ 3,330 codes
ICD-9-CM (volume 3)	~ 3,560 codes
CCI	~ 17,000 codes

The implications of the transition from ICD-9 to ICD-10

The introduction of ICD-10 caused major disruptions in the time series of health statistics. ² Many countries observed substantial differences in morbidity and mortality trending following the introduction of the revision. Consequently, the profiles of health problems and diseases have changed considerably.

With the implementation of ICD-10, trends and patterns will materialize that are discontinuous with those produced under ICD-9. ²

Consequently, CIHI developed a backward conversion of ICD-10 to ICD-9. Conversion involves ‘force fitting’ each code into a single code in the alternate classification. ⁶ One-directional conversions are recommended: ⁸

ICD-10-CA ▶ ICD-9-CM ▶ ICD-9
CCI ▶ ICD-9-CM ▶ CCP

The following tables are available: ⁸

ICD-10-CA ▶ ICD-9
ICD-10-CA ▶ ICD-9-CM
CCI ▶ CCP
CCI ▶ ICD-9-CM

Conversion tables are used for trending or grouping data against previous years and for grouping methodologies, such as Case Mix Groups (CMGs). However, conversion tables should be used with extreme caution. CIHI recommends that attempts to conduct historical trending using converted data should not be conducted as queries should be based on coding systems used for a particular data set. ⁸ As such, it is preferable to look at ICD-10-CA and ICD-9 data separately.

The Provincial Health Planning Database (PHPDB) provides both the new and the converted codes and discourages the use of ICD-9 codes. Running the same queries on pre and post ICD-10 codes is discouraged. ⁹

In Ontario, the introduction of ICD-10-CA also caused considerable changes in CMGs. As a result of the implementation of ICD-10-CA, the ‘same’ patients were assigned to different CMGs and the reliability of Resource Intensity Weights (RIWs) were compromised. Accordingly, the MOHLTC developed PAC-10 (Prospective Complexity Adjustment) cost weights to more accurately measure relative resource intensity. For more information on ICD-10-CA and CMGs, see References 6, 8 and 10 in this section.

Table 7.2: A Comparison of ICD-9 and ICD-10 Chapters and Codes. ⁵

ICD-9			ICD-10		
Chapter	Chapter Title	Codes	Chapter	Chapter Title	Codes
I	Infectious and Parasitic Diseases	001-139	I	Certain infectious and parasitic diseases	A00-B99
II	Neoplasms	140-239	II	Neoplasms	C00-D49
III	Endocrine, Nutritional, and Metabolic Diseases and Immunity Disorders	240-279	III	Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	D50-D59
IV	Diseases of Blood and Blood Forming Organs	280-289	IV	Endocrine, nutritional and metabolic diseases	E00-E99
V	Mental Disorders	290-319	V	Mental and behavioural disorders	F00-F99
VI	Diseases of the Nervous System and Sense Organs	320-389	VI	Diseases of the nervous system	G00-G99
VII	Diseases of the Circulatory System (Cardiovascular Disease)	390-459	VII	Diseases of the eye and adnexa	H00-H59
VIII	Diseases of the Respiratory System	460-519	VIII	Diseases of the ear and mastoid process	H60-H99
IX	Diseases of the Digestive System	520-579	IX	Diseases of the circulatory system	I00-I99
X	Disease of the Genitourinary System	580-629	X	Diseases of the respiratory system	J00-J99
XI	Complications of Pregnancy, Childbirth, and the Puerperium	630-676	XI	Diseases of the digestive system	K00-K99
XII	Diseases of the Skin and Subcutaneous Tissue	680-709	XII	Diseases of the skin and subcutaneous tissue	L00-L99
XIII	Diseases of the Musculoskeletal System and Connective Tissue	710-739	XIII	Diseases of the musculoskeletal system and connective tissue	M00-M99
XIV	Congenital Anomalies	740-759	XIV	Diseases of the genitourinary system	N00-N99
XV	Certain Conditions Originating in the Perinatal Period	760-779	XV	Pregnancy, childbirth and the puerperium	O00-O99
XVI	Symptoms, Signs, and Ill-Defined Conditions	780-799	XVI	Certain conditions originating in the perinatal period	P00-P99
XVII	Injury and Poisoning	800-999	XVII	Congenital malformations, deformations, and chromosomal abnormalities	Q00-Q99
Supp	Classification of External Causes of Injury and Poisoning	E800-E999	XVIII	Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	R00-R99
Supp	Classification of Factors Influencing Health Status and Contact with Health Services	V01-V82	XIX	Injury, poisoning and certain other consequences of external causes	S00-T99
			XX	External causes of morbidity and mortality	V00-Y99
			XXI	Factors influencing health status and contact with health services	Z00-Z99
			XXII	Morphology of Neoplasms	
			XXIII	Provisional Codes for Research and Temporary Assignment	U00-U99

- World Health Organization. International classification of diseases (ICD). [Online]. 2005 [cited 2005 Aug]; Available from: URL: <http://www.who.int/classifications/icd/en/>
- Canadian Institute for Health Information. ICD-10-CA. [Online]. 2004 Apr 2 [cited 2005 Aug]; Available from: URL: http://secure.cihi.ca/cihiweb/dispPage.jsp?cw_page=codingclass_icd10_e
- World Health Organization. (International classification of diseases and related health problems - 10th revision; vol 2). Geneva, Switzerland; 1993.
- Anderson RN, Minino AM, Hoyert DL, Rosenberg HM. Comparability of causes of death between ICD-9 and ICD-10: preliminary estimates. Natl Vital Stat Rep [serial online] 2001 May 18 [cited 2005 Aug]; 49(2). Available from: URL: http://www.cdc.gov/nchs/data/nvsr/nvsr49/nvsr49_02.pdf
- Provincial Health Indicators Work Group. Core indicators for public health in Ontario: International classification of diseases, tenth revision (ICD-10). [Online]. 2005 May 31 [cited 2005 Aug]; Available from: URL: <http://www.apheo.ca/indicators/index.html>
- Finance and Information Branch, Ontario Ministry of Health and Long-Term Care. Hospital administrative data, ICD-10-CA & data quality. [Online]. 2004 Apr 22 [cited 2005 Aug]; Available from: URL: http://www.mohltcfim.com/cms/upload/ac0a8070400000fa53a198d98001/MOHLTC_ICD10_and_Data_Quality.pdf
- Canadian Institute for Health Information. The Canadian enhancement of ICD-10. [Online]. 2001 Jun [cited 2005 Oct]; Available from: URL: http://secure.cihi.ca/cihiweb/en/downloads/codingclass_icd10enhan_e.pdf
- Tournay-Lewis L, Lalonde A. ICD-10-CA and CCI. What are they? How do they affect my work? [Online]. 2004 Sept 26 [cited 2005 Aug]; Available from: URL: [http://www.datausers.ca/downloads/Lynda_Tournay_Lewis_\(Workshop_B_and_E\).pdf](http://www.datausers.ca/downloads/Lynda_Tournay_Lewis_(Workshop_B_and_E).pdf)
- Ontario Ministry of Health and Long-Term Care. In: Provincial health planning database training manual 2004. Toronto: Ministry of Health and Long-Term Care; 2004.
- Canadian Institute for Health Information. Coping with the introduction of ICD-10-CA and CCI. [Online]. 2003 Oct [cited 2005 Aug]; Available from: URL: http://secure.cihi.ca/cihiweb/en/downloads/CopingwithICD-10-CAOct2003_e.pdf

1.8 Health Indicators Methodology

Two sources of indicators are identified as ‘standards’ in indicator development and methodology – the health indicators that are collaboratively developed by Statistics Canada and the Canadian Institute for Health Information (CIHI), and the Core Indicators for Public Health in Ontario, which are developed by the Provincial Health Indicators Work Group (PHWIG).

Health Indicators Project – Statistics Canada and the Canadian Institute for Health Information

In 1998, Statistics Canada and CIHI launched a collaborative process to identify what measures should be used to report on health and the health system in Canada. More than 500 individuals, including health administrators, researchers, caregivers, government officials, health advocacy groups and consumers, convened to identify health information needs.¹

The main goal of this project is “to support health regions in monitoring progress in improving and maintaining the health of the population and the functioning of the health system for which they are responsible through the provision of quality, comparative information on”:¹

- The overall health of the population served, how it compares with other regions in the province and country, and how it is changing over time.
- The major non-medical determinants of health in the region.
- The health services received by the region’s residents.
- Characteristics of the community or the health care system.

The health indicators developed by Statistics Canada and CIHI are applicable to Canada’s established health goals, and are based on standard and comparable definitions and methods. These indicators are broadly available; they are distributed electronically across Canada at regional, provincial and national levels. To date, over 80 indicators have been developed but not all continue to be updated.¹

For more information on this project, including definitions, data tables and information on data quality issues, refer to the CIHI/Statistics Canada Health Indicators Project website.¹

Core Indicators for Public Health in Ontario – The Provincial Health Indicators Work Group

The Core Indicators were developed in 1998 by PHWIG, which is comprised of Public Health Epidemiologists in Ontario, as well as staff from Ontario’s Health Intelligence Unit (HIU) Program, the Public Health Resources Education and Development Program (PHRED), the Institute for Clinical Evaluative Sciences (ICES), the Ontario Ministry of Health and Long-Term Care (MOHLTC) and Health Canada. The intent of the project is that Public Health Units (PHUs) and other organizations in Ontario adopt the indicators, apply the methods, and use the recommended data sources for the sake of consistency. This is a unique project as it is Ontario-specific and focuses on Ontario’s Mandatory Health Programs and Services Guidelines.²

The Core Indicators provide definitions, methods and resources for calculating estimates. Actual data are not presented. Each indicator describes if there is a corresponding national health indicator, highlights any differences in definitions, and provides a link to the appropriate page on the Statistics Canada website.

Over 120 indicators have been developed. They are grouped into the following categories: Population; Environment and Health; Mortality, Morbidity and Health-Related Quality of Life; Chronic Disease and Injuries; Behaviour and Health; Family Health; Mental Health; Infectious Diseases; and the Use of Health Services.

For more information on the Core Indicators for Public Health in Ontario, refer to the Core Indicators Project on the Association of Public Health Epidemiologists of Ontario (APHEO) website.²

1 Statistics Canada. Health indicators. [Online]. 2005 Jun 8 [cited 2005 Aug]; Available from: URL: <http://www.statcan.ca/english/freepub/82-221-XIE/82-221-XIE2005001.htm>

2 Provincial Health Indicators Work Group. Core indicators for public health in Ontario. [Online]. 2004 Nov 19 [cited 2005 Aug]; Available from: URL: <http://www.apheo.ca/indicators/index.html>

1.9 Reporting of Incomplete Data Capture

Population health data in Ontario have become increasingly available to analysts and epidemiologists due to the Canadian Community Health Survey (CCHS), the Provincial Health Planning Database (PHPDB) and the Canadian Institute for Health Information (CIHI)/Statistics Canada Health Indicators Project. However, there are certain areas where data gaps exist. A few notable cases are listed in this section, but this is not intended as a complete list. This section concludes with guidelines on reporting when information is known to be incomplete.

Mortality Data

In Ontario, the registration of deaths is considered to be virtually complete because of legal reporting requirements. However, mortality data that are accessed through the PHPDB are slightly incomplete as Ontario residents who die outside of the province are excluded. Nevertheless, Statistics Canada estimates that less than one percent of Ontario residents die outside of the province. Incomplete data capture for mortality data is predominantly a concern regarding the geographic location of the deceased's residence. ¹

The PHPDB contains geographic information pertaining to the deceased's usual place of residence at provincial, municipality and postal code levels. It has been noted that there are missing records for these various geographic levels. For example, in the 2000 and 2001 mortality data, almost 100% of records contained the municipality of the deceased's residence. However, for those same years, 17.8% of records did not contain postal codes. As such, almost 5% of the data could not be assigned to Local Health Integration Network (LHIN) geography (based on Version 10 of the LHIN boundaries). ¹

For LHIN assignment, where there is a clear match between a LHIN and a municipality, the PHPDB uses this information to assign death records to a LHIN. However, in instances where a municipality is shared by several LHINs, postal codes are used for assignment. This methodology is also used by other databases in the PHPDB (Ambulatory Visits, Inpatient Discharges, Day Procedures, CCC Admissions, Live Births, Stillbirths, Medical Services, Billing Physicians and Geo Names). ¹

The Health System Intelligence Project (HSIP) has examined the impact that these unassigned mortality cases have on overall mortality statistics at the LHIN level. It was found that mortality data are incomplete and questionable for the Central, Central East, Central West, Mississauga Halton and Toronto Central LHINs. Mortality may be underestimated in these areas by up to 22%. Because of this, indicators using mortality data for these LHINs were suppressed in the LHIN Population Health Profiles. ² Exemplar guidelines for suppression are outlined at the end of this section. ¹

Birth Data

Registration of live births in Ontario is incomplete and has resulted in suppression of some Ontario results in national reports. The registration process involves a combination of information provided by the attending physician and the parents, and the register is not updated until both forms are received. While most parents will eventually provide this information in order to obtain birth certificates and enable school registration, many parental forms are delayed resulting in the birth being absent in the formal registry information that is forwarded to Statistics Canada. A report published in the Canadian Journal of Public Health ³ suggested that this underreporting may be due to fees introduced in municipalities starting in 1996.

About three percent of Ontario births may not be captured. The rate varied with geography and the age of mother. Areas with high registration fees had more missing births and the highest rates were associated with young mothers, and babies of lower birth-weight. ³ Since birth data are used to calculate several indicators, caution should be exercised when interpreting this information.

Population Health Topic Area

Data are lacking in several population health areas. The Provincial Health Indicators Work Group (PHWIG) has documented these gaps. ⁴ Some areas are:

- Prevalence of Diabetes in Children
- Prevalence of Osteoporosis
- Prevalence of Asthma in Children
- Incidence of Non-malignant Skin Cancers
- Mammography Screening and Pap Smear Rates among Groups that are Under Screened
- Rate of Illicit Substance Abuse Use and Non-medical Use of Drugs and Other Psychoactive Substances
- Child and Health – Multiple Topics

Other areas identified as lacking data are mental health and primary care.

Aboriginal Peoples

Data capture for populations living on Aboriginal Reservations is considered incomplete. Health care services for these populations are provided by the federal government.⁵ Data are therefore not available in provincial databases and are not readily available to analysts and epidemiologists in Ontario. Furthermore, Aboriginal Reservations populations are also excluded in the CCHS.

Data pertaining to Aboriginal Reservation populations are collected by the Canadian Census and the Aboriginal Peoples Survey (Statistics Canada). However, these data are not typically captured in the data received by analysts and epidemiologists.

Prescription Drug Dispensing Information

The Ontario Ministry of Health and Long-Term Care (MOHLTC) only collects prescription drug dispensing data for individuals 65 years of age and older for specific populations that are covered under the Ontario Drug Benefits (ODB) Program. Given that data are not available for the entire population of Ontario, only a limited assessment of prescription drug use is possible.⁶

Guidelines for Incomplete Data Capture

The following guidelines are provided as an example of how decisions can be made when data are known to be incomplete. It is merely an example of how guidelines can be defined and applied.

Random error is “the portion of the variance in a measurement that has no apparent connection to any other measurement or variable, generally regarded as due to chance.”⁷

Systematic error “often has a recognizable source, such as faulty measurement, and is consistently wrong in a particular direction.”⁷

Table 9.1: Guidelines For Incomplete Data Capture

%	Random*	Systematic Distribution
0 to 5%	Use	Note there are errors, and use with caution
5 to 10%	Note there are errors, and use with caution	Do not use
10% to 20%	Note there are errors, and use with caution only with supporting evidence	Do not use
Over 20%	Do not use	

* If the nature of the error (random versus systematic) is unknown, assume systematic error.

When an estimate is not possible (known error, but unknown extent):

Always use with supporting information, otherwise conclusions and interpretation are not warranted.

1 Bains N. HSIP research note. Population health indicators: mortality geographic data quality, 2000 – 2001. Kingston: Health System Intelligence Project; 2005 Aug.

2 Health System Intelligence Project. Population health profiles. [Online]. 2005 Aug [cited 2005 Sept]; Available from: URL: http://www.health.gov.on.ca/transformation/providers/information/profiles/im_profiles.html

3 Woodward GL, Bienefeld MK, Ardal S. Under-reporting of live births in Ontario 1991 – 1997. *Can J Public Health* 2003;94(6): 463 – 67.

4 Provincial Health Indicators Work Group. Core indicators for public health in Ontario: data gaps in public health indicators in Ontario. [Online]. 2005 May 31 [cited 2005 Aug]; Available from: URL: <http://www.apheo.ca/indicators/pages/resources/DataGapsinPublicHealth.html>

5 Health Canada. First Nations and Inuit Health Branch. [Online]. 2005 Aug [cited 2005 Oct]; Available from: URL: http://www.hc-sc.gc.ca/ahc-asc/branch-dirgen/fnihb-dgspni/index_e.html

6 Institute for Clinical and Evaluative Sciences. Improving health care data in Ontario. [Online]. 2005 Jan [cited 2005 Aug]; Available from: URL: <http://www.ices.on.ca/file/HealthData.pdf>

7 Last JM. A dictionary of epidemiology. 4th ed. New York: Oxford University Press; 2001.

1.10 Standardization

Many diseases and health problems generally show a considerable relationship with age and often with sex. Consequently, crude incidence or mortality rates may be misleading when comparing disease patterns or health problems across regions or time periods where the age or sex composition of the population differs from one region to another and from one time period to another. ¹

Crude rates represent the ‘true’ picture of mortality or disease in a population. Crude rates are considerably influenced by the age structure of the particular population. Older populations are more likely to have higher crude mortality rates as opposed to younger populations, who are more likely to have higher crude birth rates. ² In order to account for differences in the composition of a population, disease and mortality rates can be standardized. Standardization is a set of techniques that are used to remove the effects of differences in age or sex, when comparing two or more populations. ³

Wherever possible, incidence and mortality rates are standardized to facilitate comparability across geographic areas and over time. Using a standard population results in more meaningful rate comparisons because variations in population age distributions over time and across different geographic areas are adjusted for. ^{2,4} Any possibilities that observed differences could be a result of age differences in a population are eliminated. ⁵

The 1991 Canadian Population is commonly used as a standard population. **Table 10.1** shows the 1991 Canadian Standard Population with both sexes combined, by five year age groupings. Using five year age groups is not a standard. In this instance, they are used strictly for exemplar purposes. ²

Table 10.1: The 1991 Canadian Standard Population, both sexes combined, by five year age groupings. ²

Age in years	Population	Age in years	Population
< 1	403,061	45 – 49	1,674,153
1 – 4	1,550,285	50 – 54	1,339,902
5 – 9	1,953,045	55 – 59	1,238,441
10 – 14	1,913,115	60 – 64	1,190,217
15 – 19	1,926,090	65 – 69	1,084,588
20 – 24	2,109,452	70 – 74	834,024
25 – 29	2,529,239	75 – 79	622,221
30 – 34	2,598,289	80 – 84	382,303
35 – 39	2,344,872	85 – 89	192,410
40 – 44	2,138,891	90 +	95,467
Total population = 28,120,065			

There are two main methods of standardization:

1. Direct Method – The specific rates in a study population are averaged, using the distribution of a standard population as weights. The directly standardized rate represents what the crude rate would have been in the study population if that population had the same distribution as the standard population with respect to the variable(s) for which the adjustment or standardization was carried out. ³

The direct method is generally used to compare a number of rates at the same time – for example, to compare mortality or disease rates in LHINs across Ontario or over time. This method requires that all comparators have relatively stable age-specific rates. ²

2. Indirect Method – Used to compare study populations for which the specific rates are either statistically unstable or unknown. The specific rates in the standard population are averaged, using the distribution of the study population as weights. ³

The indirect method is generally used to compare an area with another area – for example, a LHIN with Ontario. This method requires a comparator with a large population and stable age-specific rates. ²

Example Calculations

To best understand mortality and disease trends in a population, it is valuable to ascertain crude rates, age-specific rates and age-standardized rates. The following calculations were derived from the Core Indicators for Public Health in Ontario Project.^{2,6,7}

Example – Crude Mortality and Incidence Rates per 1000 population:

$$= \frac{\text{Total Number of Deaths (or New Cases)}}{\text{Total Population}} \times 1,000$$

Example – Crude Age-specific Cancer Incidence Rate per 1000 population:

$$= \frac{\text{Total Number of New Cancer Cases by ICD Code in an Age Group}}{\text{Total Population in that Age Group}} \times 1,000$$

Age **standardized rates** are advantageous as they provide a single summary number that permits different populations to be compared. However, they do represent an ‘artificial’ picture of mortality or disease in a population and it is therefore important to examine the data carefully before standardizing.

Direct Method (SRATES):

Example – Standardized Mortality Rate:

$$= \frac{\text{Sum of (Deaths in a given age group x 1991 Canadian population in that age group)}}{\text{Sum of Canadian population}} \times 10,000$$

Example – Standardized Age-specific Cancer Incidence Rate:

$$= \frac{\text{Sum of (Age-specific incidence rate in a given age group x 1991 Canadian population in that age group)}}{\text{Sum of 1991 Canadian population}} \times 10,000$$

Indirect Method (SMRs, SIRs):

Example – Standardized Mortality Rates:

$$= \frac{\text{Sum of deaths in the population}}{\text{Sum of (Ontario age-specific rate x population in that age group)}}$$

Example – Standardized Incidence Ratio:

$$= \frac{\text{Sum of new cancer cases by ICD code in the population}}{\text{Sum of (Ontario age-specific rate x population in that age group)}}$$

1 Standardization of rates: a methodological note. [Online]. 2001 Feb 26 [cited 2005 Aug]; Available from: URL: http://www.atlas.gc.ca/maptexts/map_texts/english/bc_age_e.html

2 Provincial Health Indicators Work Group. Core indicators for public health in Ontario: frequently asked questions. [Online]. 2004 Nov [cited 2005 Aug]; Available from: URL: <http://www.apheo.ca/indicators/index.html>

3 Last JM. A dictionary of epidemiology. 4th ed. New York: Oxford University Press; 2001.

4 Statistics Canada. Data quality, concepts and methodology. Health Indicators [serial online] 2003 May [cited 2005 Aug];2003(1). Available from: URL: <http://www.statcan.ca/english/freepub/82-221-XIE/00503/toc.htm>

5 Gordis L. Epidemiology. 2nd ed. United States: W.B. Saunders Company; 2000.

6 Provincial Health Indicators Work Group. Core indicators for public health in Ontario: all cause mortality indicator. [Online]. 2004 Dec 8 [cited 2005 Aug]; Available from: URL: <http://www.apheo.ca/indicators/index.html>

7 Provincial Health Indicators Work Group. Core indicators for public health in Ontario: cancer incidence. [Online]. 2004 Dec 1 [cited 2005 Aug]; Available from: URL: <http://www.apheo.ca/indicators/index.html>

1.11 Using Surveys

Several analytical points should be recognized before using survey data, such as the Canadian Community Health Survey (CCHS).

Estimates and Weighting

In order to guarantee that estimates generated from survey data are representative of the target population and not just the sample population, survey weights must be used. Survey weights are assigned to each respondent that is included in the final sample.¹ The survey weight corresponds to the number of individuals in the population that the respondent represents.¹ Sampling weights are not the same for all respondents.² If the appropriate weights are not utilized, the sample cannot be considered representative of the covered population.² CCHS weights are contained in the microdata file and should be used to obtain meaningful estimates.

Bootstrapping

To determine the quality of an estimate, the coefficient of variation (CV) and the standard deviation must be calculated. However, due to the complex survey designs of population health surveys such as the CCHS, simple formulas for calculating these variance estimates do not exist. Consequently, an approximate method called the Bootstrap Method is used. The Bootstrap Method is a weighted resampling procedure. It is appropriate for the commonly used population health surveys, such as the CCHS, because it considers the complex sample design when calculating variance estimates.^{1,3}

With the CCHS, the Bootstrap Method involves the selection of simple random samples known as replicates, and the calculation of the variation in the estimates from replicate to replicate. In each stratum, a simple random sample of (n-1) of the n clusters is selected with replacement to form a replicate. It is important to note that since the selection is with replacement, a cluster may be selected more than once. In each replicate, the survey weight for each record in the (n-1) selected clusters is recalculated. To obtain the final bootstrap weights, these weights are then post-stratified according to demographic information. The entire process is repeated B times. When analyzing the CCHS, B=500 is typically used to produce 500 bootstrap weights. To obtain the bootstrap variance estimator, the point estimate for each of the B samples must be calculated. The standard deviation of these estimates is the bootstrap variance estimator. Statistics Canada has developed a program that can perform all of these calculations for the user: the Bootvar program.¹

Release guidelines

Before any estimate is released, the number of respondents that contributed to the calculation of the estimate must be determined. It is recommended that if the number of respondents that contributed to the calculation of the estimate is less than 30, it should not be released regardless of the value of the coefficient of variation.²

Table 11.1 shows the sampling variability guidelines that should be followed for weighted estimates that are based on sample sizes of 30 respondents or greater.

Table 11.1 – Sampling Variability Guidelines.²

Type of Estimate	CV in %	Guidelines
Unqualified	0.0 – 16.5	Estimates can be considered for general unrestricted release and require no special notation.
Marginal	16.6 – 33.3	Estimates can be considered for general unrestricted release but should be accompanied by a warning that cautions of high sampling variability.
Unacceptable	>33.3	Estimates are of unacceptable quality. Conclusions based on these estimates will be unreliable, likely invalid and should not be published.

1 Statistics Canada. Canadian community health survey (CCHS). [Online]. 2005 [cited 2005 Aug]; Available from: URL: <http://www.statcan.ca/cgi-bin/imdb/p2SV.pl?Function=getSurvey&SDDS=3226&lang=en&db=IMDB&dbg=f&adm=8&dis=2>

2 Canadian Community Health Survey, guidelines for analysis and release of data, cycle 2.1 [2003], Statistics Canada, Ontario Share File, Ontario MOHLTC.

3 Statistics Canada. Data quality, concepts and methodology. Health Indicators [serial online] 2003 May [cited 2005 Aug];2003(1). Available from: URL: <http://www.statcan.ca/english/freepub/82-221-XIE/00503/toc.htm>

1.12 Citing Data Sources

The following section outlines different ways to cite the data sources discussed throughout The Health Analyst's Toolkit.

Short Citations may be used when referencing a data source in a table, map or figure that appears in a report. Long Citations (full citation) should appear if there is space in a report or in the detailed documentation that accompanies a short report.

Accurate citing of data files in publications is important. Others may wish to replicate or further investigate the reported findings or need the information provided in the citations to locate the correct data. Citations also provide a way to acknowledge those who contributed to the final data product.

Ideally, all parties who contributed to the production of a data product should be acknowledged.

Example: CCHS 1.1 data

Statistics Canada, Health Statistics Division. Canadian Community Health Survey, cycle 1.1 (2000/2001) [producer]. Ottawa, Canada. CCHS 2000/2001 Ontario Share file, Ontario Ministry of Health and Long-Term Care [distributor], 2003.

However, such citations can become cumbersome.

The Provincial Health Indicators Work Group (PHIWG) provides the following guidelines for data citation:¹

- In general, citations include the database name, distributor, and release or extraction date. Additional information such as the original source of the data may also be part of the citation. The citation is specific to the distribution source. Including all of this information allows others who may be replicating your results to determine exactly what data were used.
- It may not be necessary for the citation to specify the years used in the analysis if this information is clearly included in the report, table or graph. In that case, [years] is optional.
- Abbreviations are used for various databases such as CCHS with the understanding that database is more fully described elsewhere in the report. If this is not the case, include the full name of the database in the citation.
- If the data are obtained from a specific report, such as the Ontario Road Safety Annual Report, cite the report using standard style requirements.

Suggested data citations:

Population Estimates

From PHPDB (short):

Population Estimates, Ontario Ministry of Health and Long-Term Care, Provincial Health Planning Database.

OR

Population Estimates, Ontario MOHLTC PHPDB.

From PHPDB (long):

Population Estimates [years], Ontario Ministry of Health and Long-Term Care, Provincial Health Planning Database Ver [xx.xx], Extracted [month/year].

From Statistics Canada:

Population Estimates, Statistics Canada, Demography Division.

OR

Population Estimates, Statistics Canada, Demography Division, special tabulation.

Census Data

[Year] Census, Statistics Canada.

If data were obtained from a CANSIM table, the Statistics Canada website or purchased as a special tabulation, provide the catalogue number/CANSIM Table # or note 'special tabulation'.

[Year] Census, Statistics Canada. Cat. No. 97F0007XCB2001002.

Canadian Community Health Survey

Short:

Canadian Community Health Survey, cycle x.x [year],
Statistics Canada.

Long (share file):

Canadian Community Health Survey, cycle x.x [year],
Statistics Canada, Ontario Share File, Ontario MOHLTC.

Long (PUMF):

Canadian Community Health Survey, cycle x.x [year],
Statistics Canada, Public Use Microdata File,
Statistics Canada.

Cancer Incidence and Mortality

If using Seer*Stat from CCO (short):

Ontario Cancer Registry Incidence Data.
Ontario Cancer Registry Mortality Data.
Ontario Cancer Registry Survival Data.

If using Seer*Stat from CCO (long):

Ontario Cancer Registry Incidence data [years],
Cancer Care Ontario, Release: [number, date].

Data from PHPDB

Data table names:

Live Birth Data
Stillbirth Data
Death Data
Population Estimates
Population Projection
Medical Services Data
Ambulatory Visits Data
Inpatient Discharges Data
Day Procedures Data
CCC Admissions Data

From PHPDB (short):

[data table], Ontario Ministry of Health and Long-Term
Care, Provincial Health Planning Database.

OR

[data table], Ontario MOHLTC PHPDB.

From PHPDB (long):

[data table, years], Ontario Ministry of Health and
Long-Term Care, Provincial Health Planning Database
Ver [xx.xx], Extracted [month/year].

From Statistics Canada website:

Statistics Canada, [Table Title], CANSIM Table XXX-
XXXX.

OR

Statistics Canada, Vital Statistics, Birth Database.
Statistics Canada, Vital Statistics, Death Database.
Statistics Canada, Vital Statistics, Stillbirth Database.

Data

2.0 Content and Organization

Key Data Sources

HSIP identified the following key data sources:

- The Discharge Abstract Database (DAD)
- The National Ambulatory Care Reporting System (NACRS)
- The Continuing Care Reporting System (CCRS)
- The National Rehabilitation Reporting System (NRS)
- Physician Claims
- Vital Statistics – Live Birth Data
- Vital Statistics – Mortality Data
- The Canadian Census
- Population Estimates
- Population Projections
- The Canadian Community Health Survey (CCHS)
- The Ontario Cancer Registry (OCR)
- The Guidelines for Management Information Systems in Canadian Health Service Organizations (MIS Guidelines)

For each data source, the following information is provided:

- Keywords associated with the Data Content
- Description of the Data Source
- Agency who Collects the Data
- Distributor/Source of the Data
- Years Available/Frequency of Data Collection
- Population Described
- Data Collection Methods
- Geographic (or other level) of Data Collection
- Content of the Data Source
- Potential Indicators and Uses
- Data Quality Issues
- Suggested Citation

The Provincial Health Planning Database

The majority of the data sources described (excluding the CCHS, the OCR and the MIS Guidelines) in The Health Analyst's Toolkit are accessible through the Provincial Health Planning Database (PHPDB). The PHPDB is an information resource provided by the Health Data Decision and Support Unit (HDDSU), Knowledge Management and Reporting Branch of the Ontario Ministry of Health and Long-Term Care (MOHLTC). The PHPDB is one of the primary sources of morbidity and mortality data in Ontario. It is designed to make vast data holdings accessible to a variety of users, such as analysts, epidemiologists, planners, policy and decision makers and researchers. 'Data Warehouse' technology is used to store, manage and provide access to health-related information that has been consolidated from a range of sources. The end result is a database of standardized health information that can be collated and manipulated to satisfy specific needs. ¹

¹ Ontario Ministry of Health and Long-Term Care. Provincial health planning database. [Online]. 2005 Sept [cited 2005 Sept]; Available from: URL: <http://portal.healthdss.moh.gov.on.ca/>.

2.1 Discharge Abstract Database (DAD)

Keywords: Administrative Data/General Population/Hospitalization/Inpatient/Acute

Name of Data Holding: Discharge Abstract Database (DAD)
(Accessed through the Inpatient Discharges Table of the Provincial Health Planning Database)

Description:

National:

The Discharge Abstract Database (DAD) contains demographic, administrative, and clinical data for hospital discharges (inpatient acute, chronic, rehabilitation) and day procedures across Canada. ¹

Ontario:

The Inpatient Discharges Table in the Provincial Health Planning Database (PHPDB) is based on the DAD and includes both institution and patient information for Ontario. The population reported is shrinking because of the development of separate systems for different care types. By 2006/07 only acute care, paediatric rehabilitation and some paediatric mental health cases will be reported in the DAD. ²

Agency Collecting the Data:

The Canadian Institute for Health Information (CIHI) receives data directly from participating hospitals. The Health Data and Decision Support Unit (HDDSU) of the Ontario Ministry of Health and Long-Term Care (MOHLTC) receives data from CIHI.

Distributor/Source of Data:

The HDDSU maintains the PHPDB which includes the important/mandatory fields from the DAD. Other potential sources are CIHI and the Institute for Clinical Evaluative Sciences (ICES).

**Years Available/
Frequency of Collection:**

Currently covers the fiscal years of 1996/97 to 2004/05. Day procedures data are available only for 1996/97 to 2002/03; subsequent years are available through the National Ambulatory Care Reporting System (NACRS), which can be accessed through the Ambulatory Visits tables of the PHPDB. ²

Population Described:

Patients who have been discharged from the following types of hospitals (and their associated units) in Ontario:

- Acute Care with Psychiatric Unit (all years)
- Acute Care without Psychiatric Unit (all years)
- Miscellaneous Psychiatric (all years)
- Chronic Care (1996/97 only)
- Day Procedures (1996/97 – 2002/03)
- General Rehabilitation (1996/97 – 2002/03)
- Special Rehabilitation (1996/97 – 2002/03)
- Approved Mental Health Beds (1996/97 – 2005/06) – planned

Data Collection Methods:

After each patient is discharged from hospital, a medical records coder at the hospital completes an abstract according to the instructions outlined in the CIHI Abstracting Manual. Hospitals submit data to CIHI in one month batches. After validity checks and cleaning, CIHI supplies the year-to-date (current) file to the MOHLTC.

Geographic (or other)
Level of Data Collection:

Person Level:

- Province
- Region
- County
- Municipality
- Postal Code
- Forward Sortation Area (FSA)
- Local Health Integration Network (LHIN)
- Public Health Unit (PHU)
- District Health Council (DHC)

Institution Level:

- Region
 - County
 - Municipality
 - LHIN
 - PHU
 - DHC
 - MOHLTC Master and Facility numbers
-

Content:

The main elements collected by CIHI are: ¹

- Clinical Data (diagnoses, procedures, physician)
- Demographic Data (patient sex, date of birth, postal code, county and residence code)
- Administrative Data (institution/hospital number, admission category, length of stay, disposition, inter-institutional transfers from/to)
- Data used to evaluate Patient Length of Stay and Resource Consumption (as defined using Case Mixed Groups [CMG], complexity [Plx] and Resource Intensity Weight [RIW])
- Additional Data on Mental Health Inpatients (since 1998/99)

See the CIHI website for more information on data elements. ³

Some of principal data elements available from the PHPDB are: ²

- Encrypted Patient Identifier
- Institution/Master Number
- Patient Residence Location
- Date of Birth
- Age and Sex
- Dates of Admission and Discharge
- Admission Data
- Institution Transfer Data (from/to)
- Lengths of Stay (LOS) – Acute, ALC, Total
- Case Mix Group (CMG)
- Resource Intensity/Plx Weight (RIW)
- PAC Weight (MOHLTC alternative weight to RIW)
- Diagnosis Data (ICD-10-CA, ICD-9)
- Intervention Data (CCI, CCP)
- Blood Transfusion Data
- Special Care Unit Data
- Mental Health Psychiatric Data

A fiscal quarter attribute has recently been added. Data can be selected by quarter and compared across several years by quarter.

Potential Indicators & Uses:

Main data source for most hospitalization-based indicators. Examples can be seen on CIHI/Statistics Canada Health Indicators Project website. ^{4,5}

Name of Data Holding: **Discharge Abstract Database (DAD)**
(Accessed through the Inpatient Discharges Table of the Provincial Health Planning Database)

Data Quality Issues: The introduction of LHINs to Ontario affects the comparison of data from previous time periods and geographic groupings.

The transition from ICD-9 to ICD-10 is an area of concern. In fiscal year 2001/02, patient diagnoses and interventions were coded using ICD-9 and CCP. Beginning in 2002/03, patient diagnoses and interventions were coded using ICD-10-CA and CCI. Therefore trends prior to 2002/03 should not be carried out.

Institute numbers are not standardized and can change over time as institutes merge, reorganize and close. The same institution can have different institution numbers for different levels of care. Merged (or unmerged) institutions can be problematic as they can cross various geographic boundaries, for example, across two different LHINs. ⁶

Grouping methodology also changes from year to year. These changes impact trending, as well as grouping of institutions. ⁶

In the PHPDB, the Patient ID#, which refers to the health card number, is a highly sensitive field and is always encrypted. To perform linkages, it is important to ensure that the encryption is consistent from one year to the next. (Note – if data are obtained from ICES or CIHI, the health card numbers may or may not be encrypted) ⁶

Coding discrepancies occur because some patient service codes are hospital specific; not all hospitals use the same codes; and readmission codes are not coded by all hospitals.

CIHI has conducted a number of data quality re-abstraction studies in order to evaluate the quality of the DAD by returning to the original data sources and independently assessing them. Information sources that address these various data quality issues related to the DAD and the PHPDB Inpatient Discharges Table are available. ^{1,2,6-8}

Suggested Citation: [In-Patient Discharges and/or Day Procedures, years], Ontario Ministry of Health and Long-Term Care, Provincial Health Planning Database Ver [xx.xx], Extracted [month/year].

Note – Specify in both the citation as well as the body of the document whether data from in-patient discharges, day procedures, or both were extracted.

1 Canadian Institute for Health Information. Discharge abstract database. [Online]. 2005 Aug 12 [cited 2005 Oct]; Available from: URL: http://secure.cihi.ca/cihiweb/dispPage.jsp?cw_page=services_dad_e

2 Ontario Ministry of Health and Long-Term Care. Provincial health planning database: Ambulatory visits. [Online]. 2005 Sept 19 [cited 2005 Oct]; Available from: URL: <http://portal.healthdss.moh.gov.on.ca>

3 Canadian Institute for Health Information. Discharge abstract database data elements. [Online]. 2001 Apr 1 [cited 2005 Oct]; Available from: URL: http://secure.cihi.ca/cihiweb/en/downloads/services_dad_e_elements.pdf

4 Canadian Institute for Health Information. Health indicators. [Online]. 2005 Jun 8 [cited 2005 Oct]; Available from: URL: http://secure.cihi.ca/cihiweb/dispPage.jsp?cw_page=indicators_e

5 Statistics Canada. Health indicators. [Online]. [cited 2005 Oct]; Available from: URL: <http://www.statcan.ca/english/freepub/82-221-XIE/2005001/tables.htm>

6 Central East Health Information Partnership. CIHI hospital separation. [Online]. 2005 [cited 2005 Oct]; Available from: URL: <http://www.healthinformation.on.ca/DataInfo/cihi.htm>

7 Provincial Health Indicators Work Group. Core indicators for public health in Ontario: hospitalization data. [Online]. 2003 Jan 7 [cited 2005 Oct]; Available from: URL: <http://www.apheo.ca/indicators/index.html>

8 Institute for Clinical Evaluative Sciences. Improving health care data in Ontario. [Online]. 2005 Jan [cited 2005 Oct]; Available from: URL: <http://www.ices.on.ca/file/HealthData.pdf>

2.2 National Ambulatory Care Reporting System (NACRS)

Keywords: Administrative/Hospitalization/General Population/Ambulatory Care/Emergency Department

Name of Data Holding: National Ambulatory Care Reporting System (NACRS)
(Accessed through the Ambulatory Visits Table of the Provincial Health Planning Database)

Description:	<p>National:</p> <p>The National Ambulatory Care Reporting System (NACRS) contains administrative, clinical, financial and demographic data for ambulatory care visits in Canada.</p> <p>Ontario:</p> <p>The Ambulatory Visits Table in the Provincial Health Planning Database (PHPDB) is derived from NACRS. The services included are emergency department visits, day procedures, medical day/night care and high cost ambulatory clinics including dialysis, cardiac catheterization and oncology (including all regional cancer centres).^{1,2}</p>
Agency Collecting the Data:	<p>The Canadian Institute for Health Information (CIHI) receives data directly from participating hospitals. The Health Data and Decision Support Unit (HDDSU) of the Ontario Ministry of Health and Long-Term Care (MOHLTC) receives data from CIHI.</p>
Distributor/Source of Data:	<p>The HDDSU maintains the PHPDB which includes the important/mandatory fields from NACRS. Other potential sources are CIHI and the Institute for Clinical Evaluative Sciences (ICES).</p>
Years Available/ Frequency of Collection:	<p>Data available in the PHPDB currently cover the fiscal years of 2001/02 to 2003/04. Data collection for the various functional centres has been phased-in gradually. Collection of emergency visit data for Ontario hospitals began on April 1st, 2000; day procedures began on April 1st, 2003, and high volume clinics began on October 1st, 2003.²</p>
Population Described:	<p>Individuals who utilize ambulatory care services (emergency departments, day procedure, clinics) in Ontario hospitals.</p>
Data Collection Methods:	<p>Data are collected by the hospital at time of service and are submitted to CIHI for data validity checks and cleaning. CIHI subsequently supplies the data to the MOHLTC.</p> <p>MOHLTC defines the MIS Visit Functional Centres that must be reported within NACRS. Functional centres are subdivisions within an organization that are used in functional accounting to assign revenue and expense statistics to specific areas of activity.³ The list of mandatory visit functional centres that must be reported by Ontario hospitals is available from CIHI.⁴</p> <p>Hospitals can report activity for other non-mandated functional centres; however this activity will not be used for costing activities.</p>

Name of Data Holding:**National Ambulatory Care Reporting System (NACRS)**

(Accessed through the Ambulatory Visits Table of the Provincial Health Planning Database)

Geographic (or other)
Level of Data Collection:

Person Level:

- Province
- Region
- County
- Municipality
- Postal Code
- Forward Sortation Area (FSA)
- Local Health Integration Network (LHIN)
- Public Health Unit (PHU)
- District Health Council (DHC)

Institution Level:

- Region
- County
- Municipality
- LHIN
- PHU
- DHC
- Ambulatory Unit Master Number

Content:

Some of the principal data elements available within PHPDB are: ¹

- Encrypted Health Number
- Ambulatory Case Type (emergency cases, day procedures, clinics, etc.) (created for PHPDB)
- Institution Number
- Patient Residence Location
- Date of Birth
- Age and Sex
- Milestone Dates/Times (registration, triage, assessment, disposition)
- Triage Level/Case Severity (emergency visits only)
- Visit Functional Centre ID
- Institution Transfer Data (from/to)
- Diagnosis Data (ICD-10-CA, ICD-9)
- Main Problem and Reason for Visit
- Intervention Data (CCI, CCP)
- Provider Service (specialty of provider)
- Ambulance Type
- Visit Disposition
- CACS Grouper
- Ambulatory Cost Weights
- Blood Transfusions

A fiscal quarter attribute has recently been added. Data can be selected by quarter and compared across several years by quarter.

To perform analyses on specific types of care, such as emergency department visits or day procedures, the ambulatory case type variable is used. The codes for ambulatory case type are: ^{1,5}

- EMG – Emergency department visit
- EMS – Emergency department – Scheduled Visits (non-emergencies)
- SDN – Surgical Day/Night Care (day procedure in main OR or endoscopy rooms)
- MDN – Medical Day/Night Care (cardiac catheterization, oncology dialysis)
- CLN – Clinics (dialysis, oncology etc.)
- OTH – Any other visit functional centres

A full list of data elements in NACRS is available from CIHI. ⁶

-
- Potential Indicators & Uses:
- Emergency Department Visit, Day Procedure and Clinic Utilization Rates
 - Hospital-specific Utilization Rates
 - Wait Time/Length of Stay in the Emergency Department
 - Proportion of Patients seen in the Emergency Department who do not have a Regular Physician
 - Emergency Department Visits for Non-urgent Conditions
 - Proportion of Patients who arrive at the Emergency Department by Ambulance
-

Data Quality Issues: Data are incomplete. In 2003/04, 19 facilities in Ontario either did not submit or only submitted data for part of the year.¹ Some of these incomplete reports were due to facility mergers and restructuring.

There may be discrepancies in coding between facilities and there may be more missing/unknown values.¹

The introduction of LHINs to Ontario affects the comparison of data from previous time periods and geographic groupings.

In fiscal year 2001/02 patient diagnoses and interventions were coded using ICD-9 and CCP. Beginning in 2002/03, patient diagnoses and interventions were coded using ICD-10-CA and CCI. Therefore trends prior to 2002/03 should not be carried out.

Ambulatory case type is an experimental variable that is used to distinguish the different types of care. The case type is dependent on accurate coding of the visit functional centres. There are inconsistencies in the coding of visit functional centres and in these cases the most likely case type is assigned.¹ The MOHLTC defines the functional centres that must be reported through NACRS. Some hospitals may choose to report other activity (day procedures within non-mandated functional centres), therefore, caution should be exercised when making comparisons between facilities.

Since NACRS is a relatively new database and the data collection has been expanding gradually, data quality should improve with time and as coding issues are clarified.

Suggested Citation: National Ambulatory Care Reporting System Data [years], Ontario Ministry of Health and Long-Term Care, Provincial Health Planning Database Ver [xx.xx], Extracted [month/year].

1 Ontario Ministry of Health and Long-Term Care. Provincial health planning database: Ambulatory visits. Users guide version 1.0. [Online]. 2004 [cited 2005 Jun]; Available from: URL: [http://www.apheo.on.ca/indicators/pages/PHPDB AM - User Guide V1.0.doc](http://www.apheo.on.ca/indicators/pages/PHPDB_AM_-_User_Guide_V1.0.doc)

2 Canadian Institute for Health Information. Frequently asked questions about Ontario's ambulatory care data collection mandate. [Online]. 2004 Aug 5 [cited 2005 Jun]; Available from: URL: http://cihi.ca/cihiweb/dispPage.jsp?cw_page=services_nacrs_faq_e#intro

3 Ontario Case Costing Initiative. OCCP glossary of terms. [Online]. 2005 Sept [cited 2005 Aug]; Available from: URL: [http://www.occp.com/costing/glossary.htm#Functional Centre](http://www.occp.com/costing/glossary.htm#Functional_Centre)

4 Canadian Institute for Health Information. 2003/04 Ontario ambulatory care reporting requirements. [Online]. 2003 Mar 28 [cited 2005 Aug]; Available from: URL: http://secure.cihi.ca/cihiweb/dispPage.jsp?cw_page=bl_mis5mar2004_3_e

5 Provincial Health Indicators Work Group. Core indicators for public health in Ontario: National ambulatory care reporting system (NACRS). [Online]. 2005 May 31 [cited 2005 Jun]; Available from: URL: [http://www.apheo.ca/indicators/pages/resources/data%20sources/national AmbulatoryCare.html](http://www.apheo.ca/indicators/pages/resources/data%20sources/national_AmbulatoryCare.html)

6 Canadian Institute for Health Information. National ambulatory care reporting system 2003 product data element summary. [Online]. 2003 [cited 2005 Aug]; Available from: URL: http://secure.cihi.ca/cihiweb/en/downloads/services_nacrs_elements_2003_e.pdf

2.3 National Rehabilitation Reporting System (NRS)

Keywords: Administrative/General Population/Hospitalization/Rehabilitation

Name of Data Holding: National Rehabilitation Reporting System (NRS)
(Accessed through the Inpatient Rehabilitation Table of the Provincial Health Planning Database)

Description:

National:

The National Rehabilitation Reporting System (NRS) contains data on adult patients who were admitted to hospitals with designated rehabilitation beds. The NRS is an assessment system. There is little or no information on the treatments/services given to the patient. The emphasis is on the patient's condition at the beginning and end of the rehabilitation episode. ¹

Ontario:

The Inpatient Rehabilitation Table in the Provincial Health Planning Database (PHPDB) is based on the NRS and includes both institution and patient data for Ontario. ²

Agency Collecting the Data:

The Canadian Institute for Health Information (CIHI) receives data directly from participating hospitals. The Health Data and Decision Support Unit (HDDSU) of the Ontario Ministry of Health and Long-Term Care (MOHLTC) receives data from CIHI.

Distributor/Source of Data:

The HDDSU maintains the PHPDB, which includes important/mandatory fields from the NRS. Other potential sources are CIHI and the Institute for Clinical Evaluative Sciences (ICES).

**Years Available/
Frequency of Collection:**

Data in the PHPDB currently covers the fiscal years of 2002/03 (Quarter 3 and Quarter 4) to 2004/05 (Quarter 1). ²

Population Described:

Adult patients (18 years and older) who have been admitted to Inpatient Rehabilitation units from General Rehabilitation and Special Rehabilitation hospitals in Ontario. Children's rehabilitation services are reported as part of the Inpatient Discharges data in the PHPDB, which are derived from the Discharge Abstract Database (DAD).

Data Collection Methods:

Data are collected by service providers in participating facilities at time of admission and discharge. Data are subsequently submitted to CIHI for inclusion in the NRS. There is also an optional post-discharge follow-up data collection process. The NRS is 'admission based' which means that open cases which are still being treated at the time of reporting are part of the data. After validity checks and cleaning, CIHI supplies the data to the MOHLTC.

Geographic (or other)
Level of Data Collection:

Person Level:

- Province
- Region
- County
- Municipality
- Postal Code
- Forward Sortation Area (FSA)
- Local Health Integration Network (LHIN)
- Public Health Unit (PHU)
- District Health Council (DHC)

Institution Level:

- Region
- County
- Municipality
- LHIN
- PHU
- DHC
- MOHLTC Master and Facility numbers

Content:

Some of principal data elements available from the PHPDB for the Inpatient Rehabilitation Table are: ²

- Encrypted Health Number
- Rehabilitation Unit Institution Number
- Patient Residence Location (province, region, county, municipality, postal code, LHIN and PHU)
- Date of Birth
- Age and Sex
- Date of Admission/Discharge
- Institution Transfer Data (from/to)
- Patient Diagnostic Health Conditions
- Rehabilitation Client Group (RCG)
- Length of Stay for Discharged Cases only
- Admission Class
- Discharge Reason
- Functional Independence Measures (eating, grooming, bathing)
- Pain, Communications Levels
- Days of Care provided for a user specified period
- Active Cases for a user specified period

The main elements collected by CIHI for inclusion in the NRS are: ¹

- Demographic Information (e.g. age and sex)
- Administrative Data (e.g. referral, admission and discharge)
- Health Characteristics (e.g. Rehabilitation Client Group (RCG), most responsible health condition)
- Activities and Participation (e.g. ADL, communication, social interaction)
- Interventions

See the CIHI website for more information on data elements. ³

Potential Indicators & Uses:

The NRS is an important data source for indicators used in the Rehabilitation Reports of the Hospital Reports Project. ⁴

Name of Data Holding: **National Rehabilitation Reporting System (NRS)**
(Accessed through the Inpatient Rehabilitation Table of the Provincial Health Planning Database)

Data Quality Issues: The introduction of LHINs to Ontario affects the comparison of data from previous time periods and geographic groupings.

Data collection began in 1999 but submission by hospitals was voluntary. Submission became mandatory in October, 2002. Caution should therefore be exercised as the system is still relatively new. Using data from before October, 2002 is discouraged.

Because the NRS is 'admission based' and CIHI also allows for corrections and updates to any previously submitted records at a later date, numbers reported for any period or point in time may change if/when a query is rerun at a later date. ²

The NRS has developed its own diagnostic coding system called the Diagnostic Health Condition (DHC) which is designed to be similar to ICD-10-CA. The PHPDB recommends exercising caution when comparing this system with other sources of diagnostic coding. ²

The PHPDB website, and ICES and CIHI each address the various data quality issues related to the NRS. ^{1,2,5}

Suggested Citation: [Hospital Inpatient Rehabilitation Data, years], Ontario Ministry of Health and Long-Term Care, Provincial Health Planning Database Ver [xx.xx], Extracted [month/year].

1 Canadian Institute for Health Information. National rehabilitation reporting system. [Online]. 2005 Sept 14 [cited 2005 Oct]; Available from: URL: http://secure.cihi.ca/cihiweb/dispPage.jsp?cw_page=services_nrs_e

2 Ontario Ministry of Health and Long-Term Care. Provincial health planning database: inpatient rehabilitation. [Online]. 2005 Sept 19 [cited 2005 Oct]; Available from: URL: <http://portal.healthdss.moh.gov.on.ca>

3 Canadian Institute for Health Information. CIHI national rehabilitation reporting system listing of data elements. [Online]. 2001 Nov 30 [cited 2005 Oct]; Available from: URL: http://secure.cihi.ca/cihiweb/en/downloads/services_nrs_e_Sect2_2.pdf

4 Hospital Reports Project. Rehabilitation 2005. [Online]. 2005 [cited 2005 Oct]; Available from: URL: <http://www.hospitalreport.ca/HospitalReport2005RehabExec.html>

5 Institute for Clinical Evaluative Sciences. Improving health care data in Ontario. [Online]. 2005 Jan [cited 2005 Oct]; Available from: URL: <http://www.ices.on.ca/file/HealthData.pdf>

2.4 Continuing Care Reporting System (CCRS)

Keywords: Administrative/Hospital/Seniors/Complex Continuing Care/Chronic

Name of Data Holding: Continuing Care Reporting System (CCRS) formerly Ontario Chronic Care Patient System (OCCPS)
(Accessed through the Complex Continuing Care Tables of the Provincial Health Planning Database)

Description:

National:

The Continuing Care Reporting System (CCRS) collects detailed data, on a quarterly basis, of occupants of complex continuing care (CCC) beds (formerly chronic care) in freestanding CCC facilities and CCC units in acute care hospitals in continuing care beds in Canada. CCRS is the national version of the Ontario Chronic Care Patient System (OCCPS), which was based on Ontario complex continuing care facilities' data only.

Ontario:

The CCC tables in the Provincial Health Planning Database (PHPDB) are derived from the CCRS. CCC provides data on long-term complex medical care; geriatric assessment and rehabilitation; and psychogeriatric, palliative and respite care. ¹

Agency Collecting the Data:

The Canadian Institute for Health Information (CIHI), on behalf of the Ontario Ministry of Health and Long-Term Care (MOHLTC) collects data from participating hospitals. The Health Data and Decision Support Unit (HDDSU) of the MOHLTC receives data from CIHI.

Distributor/Source of Data:

The HDDSU maintains the PHPDB, which includes the important/mandatory fields from the CCRS.

**Years Available/
Frequency of Collection:**

Data available on the PHPDB currently cover the period of June 1996 to March 2005. Data from 1996 to 2002 were collected by the OCCPS and data from 2003 and onward were collected by the CCRS. Clients admitted to CCC prior to 1996 were coded as admissions with their original admission date.

Population Described:

Residents in CCC units within Ontario Hospitals.

Data Collection Methods:

Records within CCRS are assessment-based. A full assessment is completed for each patient within 14 days of admission to a CCC. Thereafter, assessments are completed annually, or if there is a significant change in clinical status or for significant corrections of a prior assessment. Residents also receive shorter assessments at three, six and nine month periods between full assessments. ¹⁻³ Assessments are completed by registered nurses using the internationally accepted assessment tool – interRAI's Resident Assessment Instrument Minimum Data Set version 2.0. The full assessment contains over 400 data elements documenting clinical and functional characteristics of clients including measures of cognition, communication, vision, mood and behaviour, well-being, physical functioning, diagnoses and nutritional status. ¹⁻³

The data available through PHPDB are a subset of the data that are collected by the CCRS.

Name of Data Holding: **Continuing Care Reporting System (CCRS) formerly Ontario Chronic Care Patient System (OCCPS)**
(Accessed through the Complex Continuing Care Tables of the Provincial Health Planning Database)

Geographic (or other)
Level of Data Collection:

Person Level:

- Province
- Region
- County
- Municipality
- Postal Code
- Forward Sortation Area (FSA)
- Local Health Integration Network (LHIN)
- Public Health Unit (PHU)
- District Health Council (DHC)

Institution Level:

- Region
- County
- Municipality
- LHIN
- PHU
- DHC
- MOHLTC Master and Facility numbers

Content:

The CCC tables in the PHPDB are subsets of the data collected by CIHI and supplied to MOHLTC. The file includes a single record for each admission that includes:

- Case Key/Unique Registration Number
- Encrypted Health Number
- Fiscal and Calendar Year of Admission
- Admission and Discharge Date
- Geographic Information Prior to Admission
- Age and Sex
- Institution from/to for Transfers
- Length of Stay for Discharged Patients
- Assessments Performed (yes/no)
- Discharge Disposition
- Days of Care in a Given Period (calculates # of days of care between user specified dates)
- Active Case (yes/no – indicates whether the resident was actively treated between specified dates)

Assessment Information includes a record for each assessment performed including:

- Case Identifier
- Fiscal/Calendar Year and Date of Assessment
- Age of Resident at Assessment
- Marital Status
- Type of Assessment (full or quarterly)
- Reason for Assessment (day 14, change, annual etc)
- Change in Needs Indicator (improved/deteriorated since assessment)
- Payment and Resident Care Responsibility
- Advanced Directives (yes/no)
- Assessment Scores for Activities of Daily Living, Cognitive Performance, Depression Rating Scale, Aggressive/Abusive Behaviour Scale, Personal Severity Index, Index of Social Engagement
- Resource Utilization Groups (RUG codes)
- RUG Categories
- Case Mix Index
- Health Status in the last 7 Days (yes/no for weight loss/gain, edema, fever and internal bleeding) and Stability of Health
- Accident Status (falls or fractures)
- Pain Status
- Medications/Injections (frequency in last 7 days and new medications in the past 90 days)
- Special treatment in last 14 days (e.g. chemotherapy, dialysis)
- Discharge Potential

The Resident conditions section identifies 60 separate conditions that are reported as part of the resident assessments – including diabetes, amputation, arthritis, Alzheimer’s Disease, cancer and renal failure.

Potential Indicators & Uses: CCC Admission/Discharge Rates
Discharge Disposition

Data Quality Issues: The introduction of LHINs to Ontario affects the comparison of data from previous time periods and geographic groupings.

There were significant start-up difficulties with OCCPS, which lead to more unknown/invalid codes. The MOHLTC therefore suggests that data from prior to 1998/99 should be used with caution. ²

Given that data collection is assessment-based and that CCC clients may be long-term residents of the unit, there can be multiple records for each resident, which complicates data analysis. Rather than providing data for a single episode of care for each individual, the records provide multiple point-in-time assessments for each resident, which can potentially be used to track changes over time.

Since CCRS is assessment-based there may be issues with inter-rater reliability. CIHI has not completed reabstraction of CCRS records; however international studies of the reliability of the assessment instrument indicate that the reliability achieved the 0.4 adequacy threshold for most indicators. ³ The CCRS includes more data quality edits than OCCPS, so data quality should improve over time. ^{1,3} CIHI is conducting data quality audits and training for assessors and coders to ensure that the data provided are valid. In a review of data quality for 2003/04, CIHI notes that of the 136 Ontario facilities with CCC beds, only one facility did not submit data to the CCRS. In the same data quality report, CIHI notes that less than 1% of records contained some ambiguous information that may indicate possible duplicate records and reports a 100% response for all mandatory data elements. For further information on data quality issues see Reference 3.

Suggested Citation: [Complex Continuing Care, years], Ontario Ministry of Health and Long-Term Care, Provincial Health Planning Database Ver [xx.xx], Extracted [month/year].

1 Canadian Institute for Health Information. Complex continuing care in Ontario – resident demographics and system characteristics. [Online]. 2004 Aug [cited 2005 Jun]; Available from: URL: http://secure.cihi.ca/cihiweb/dispPage.jsp?cw_page=AR_103_E

2 Ontario Ministry of Health and Long-Term Care. PHPDB complex continuing care/chronic hospitals, user pilot guide version 1.0. [Online]. 2005 Aug [cited 2005 Aug]; Available from: URL: http://portal.healthdss.moh.gov.on.ca/Whats_New/PHPDB%20CCC-%20User%20Guide%20V1.0.doc

3 Canadian Institute for Health Information. Continuing care reporting system (CCRS) 2003 – 2004 data quality documentation. [Online]. 2004 Dec [cited 2005 Jun]; Available from: URL: http://secure.cihi.ca/cihiweb/en/downloads/CCRS_DQ_Documentation_Report_2003-04.pdf

2.5 Physician Claims

Keywords: Physician Claims/OHIP/Medical Services/Doctors

Name of Data Holding: Physician Claims
(Accessed through the Medical Services Table of the Provincial Health Planning Database)

Description: The Medical Services Table of the Provincial Health Planning Database (PHPDB) contains service and payment data for physician services in Ontario.

Agency Collecting the Data: The Ontario Health Insurance Plan (OHIP), Ontario Ministry of Health and Long-Term Care (MOHLTC).

Distributor/Source of Data: The Health Data and Decision Support Unit (HDDSU) of the MOHLTC maintains the PHPDB which contains physicians claims data derived from OHIP databases.

**Years Available/
Frequency of Collection:** Currently covers the fiscal years of 2001/02 to 2003/04.

Population Described: Ontario residents who use physician and other licensed health professional services.

Data Collection Methods: The data in the Medical Services Tables in the PHPDB are derived from the OHIP Profiles System Detailed Claims files. These files include service and payment data for:

- Fee-for-service claims that are submitted by physicians and other licensed health professionals. ¹
- Some of the shadow billings from providers of organizations covered by alternate payment arrangements. ¹

There are three key OHIP claims databases:

Corporate Provider (CPDB) – health care providers

- Contains data about approximately 80,000 individual providers in Ontario (physicians, dentists, chiropractors, optometrists, chiropractists, pharmacists, midwives, nurse practitioners).
- Contains data about approximately 8,000 organizations (physician groups, public hospitals, independent health facilities, alternate payment providers, primary care providers, academic health science centres and private medical laboratories). ²

Registered Persons (RPDB) – health care recipients

- Used to collect and maintain information about individuals who are registered for OHIP.
- Each registered person is assigned a unique and randomly generated 10 digit Health Number which is kept for his/her lifetime.
- Approximately 12 million registrants. ²

Claims History (CHDB) – claims and service encounters

- CHDB is made up of approved services and claims from OHIPs Medical Claims Processing System.
- Services are maintained for 7 years + the current year.
- 180 million services/year are captured on the CHDB.
- CHDB is updated weekly (Note – the Medical Services Table in the PHPDB is not, however, updated weekly).
- Contains health service data submitted by:
 - Fee-for-Service Providers
 - Independent Health Facilities
 - Alternate Payment Providers
 - Primary Care Providers
 - Academic Health Science Centres
 - Private Medical Laboratories. ²

The PHPDB obtains data from these sources and amalgamates it for the Medical Services Table in the PHPDB. Medical services data consist of most of the major attributes that are recorded in the Profiles Record, however all payment fields and records for private medical laboratories are excluded.

Geographic (or other)
Level of Data Collection:

Patient Residence and Physician Location by:

- Province
 - Region
 - County
 - Municipality
 - Postal Code
 - Forward Sortation Area (FSA)
 - Local Health Integration Network (LHIN)
 - Public Health Unit (PHU)
 - District Health Council (DHC)
-

Name of Data Holding:**Physician Claims**

(Accessed through the Medical Services Table of the Provincial Health Planning Database)

Content:

There are two data tables in the PHPDB: Medical Services and Billing Physicians.

The Medical Services Table is the main data table and is linked to the Billing Physicians' Reference Table through the billing physician ID#.

Table 1 – Medical Services

The Medical Services Table is the main data table and is designed to provide most of the information to run most queries. Each row or record represents a unique service billed by a physician.

Major Attributes:

- Fiscal Year based on Service Date
- Calendar Year based on Service Date
- Patient ID# Source
- Patient ID# (encrypted health number)
- Age of Patient in Years (based on date of service)
- Sex of Patient
- Residence of Patient (province, region, county, county/municipality, LHIN, postal code, FSA, PHU)
- Service Date
- Fiscal Month (April = 1)
- Calendar Month (December = 12)
- Visit Number (Note – this is not part of the original claim. It is a unique number that is assigned to all records for one visit. It is assigned on the basis of the same-patient same physician service date [same patient ID# + same billing physician ID # + same service date = same visit number]. This allows the counting of # visits using COUNT DISTINCT).
- Billing/Referring Physician ID#
- Specialty Billed
- Fiscal Specialty of Billing Physician
- Physician/Practitioner Indicator
- Ontario License Code
- Group Number
- Group Number Indicator Code
- Fee Schedule Code (FSC) and FSC suffix
- Number of Services
- Number of Units
- Number of Services/Units (depending on FSC and FSC suffix)
- OHIP Diagnosis Code (4 and 3 characters)
- Institution Number

Table 2 – Billing Physician

The Billing Physician Table is directly lined to the Billing Physician Number in the Medical Services Table. It supplies demographic and related information on all physicians in the database, including those who have only referred.

Attributes:

- Fiscal Year
- Physician ID# (encrypted OHIP billing number)
- Date of Birth
- Age (in years, as of the start of the fiscal year)
- Sex of Physician
- Location of Physician (province, region, county, county/municipality, LHIN, postal code, FSA, PHU)
- Fiscal Specialty
- Physician/Practitioner Indicator
- Ontario License Code
- Billing Indicator

Potential Indicators & Uses: Used to describe province wide provider services. For example:

- Use of Physician Services (by age, sex and geographic location)
- Geographic Supply of Physicians
- Physician Supply by Specialty

Caveat – Data tables are much larger than any of the other tables in the PHPDB. Multi-year tables run very slowly and may not reach completion; it is recommended to run queries by each year separately. For this reason, there are two additional Medical Services Tables – one which contains data for the most recent fiscal year and one which contains data for one month. The purpose of the latter table is to provide a ‘test bed’ for developing complex queries prior to running them on the main Medical Services Table. ^{2,4}

Data Quality Issues:

Data Completeness: ¹⁻³

- The completeness of physician claims data is becoming increasingly fragmented and eroded.
- Physician services at some Community Health Centres, Health Service Organizations and academic institutions are excluded.
- Because of these various sources and structures of physician services data in Ontario, it is very difficult to create a comprehensive picture of physician care in the province.
- Shadow billing is resulting in duplicate claims and an overall reduction in the number of claims.
- The increased numbers of alternate payment plans (AFPs) with the associated reduced financial incentives for submitting service delivery information is a factor in the erosion of data quality (because of incompleteness). Incomplete data are problematic for all physicians on AFPs in which appropriate incentives to shadow bill have not been created.
- AFPs tend to be concentrated in certain specialties or geographic areas and can therefore distort analyses. Attention should be directed towards:
 - The South East Academic Medical Organization (SEAMO) in Kingston
 - The Hospital for Sick Children in Toronto
 - The Sault Ste Marie Group Health Centre
 - Physician sponsored Health Services Organizations (HSOs) (half of these are located in the Central West part of the province)

Accuracy: ¹⁻³

- Accuracy is an issue for both patient and physician addresses.
- Patient residence information: is an issue regarding patients who do not update their OHIP cards if their address changes. This is not mandated.
- The information about where the physician service was provided and the information that is available is of questionable quality – physicians may work from one office and bill for services from another location or use their home address rather than their practice location.
- RPDB is not regularly updated. In urban areas for some age groups, the RPDB has 30% more people identified than Statistics Canada population estimates.
- The type of practice setting is not included, making it not possible to evaluate or describe the performance of these new groups.
- There is no mechanism in place to ensure that the recorded information related to the reason or diagnosis for the patient visit is accurate.
- ‘Diagnosis not required/not stated’ is the most common diagnosis and accounts for 30% of non-laboratory physician services in OHIP.

Coding: ¹⁻⁴

- There are hundreds of physician services diagnostic codes, yet there are few codes for mental health or preventive care services (immunizations).
- Diagnostic coding system is not as accurate as other systems. It is similar to ICD-9 but not as accurate in that codes are grouped together.
- Some diagnosis codes are unique to claims but use the same codes as bona-fide ICD-9 codes. This can lead to misunderstandings.
- Symptoms rather than the actual diagnoses are often recorded.
- Real diagnoses can be masked (e.g. the code for anxiety may be used instead of diagnoses of schizophrenia).
- Approximately 25% of claims do not have a diagnosis, especially with diagnostic testing.
- There are multiple diagnoses for the same condition.
- Fee Suffix Codes – A, B and C are valid fee suffix codes. For surgical procedures, ‘A’ indicates the primary surgeon, ‘B’ indicates an assistant and ‘C’ indicates the anaesthesiologist. Attention should be paid to suffixes to avoid double (or triple) counting procedures.

Anaesthesiologists are paid based on time units as opposed to procedure units and therefore receive the same amount for different procedures. Consequently, this may impact the accuracy of procedure coding as they may select fee codes which will provide the appropriate time code, rather than the most accurate procedure code.

Suggested Citation: Medical Services [years], Ontario Ministry of Health and Long-Term Care, Provincial Health Planning Database Ver [xx.xx], Extracted [month/year].

1 Ontario Ministry of Health and Long-Term Care. PHPDB – medical services, user guide. [Online]. 2005 May 2 [cited 2005 Aug]; Available from: URL: <http://portal.healthdss.moh.gov.on.ca/>

2 Ontario Ministry of Health and Long-Term Care. Ontario health insurance plan (OHIP) databases. Presentation by the Transformation Project Team; 2004 Sept 13; Toronto, Ontario.

3 Institute for Clinical Evaluative Sciences. Improving health care data in Ontario. [Online]. 2005 Jan [cited 2005 Oct]; Available from: URL: <http://www.ices.on.ca/file/HealthData.pdf>

4 Brochu P. Personal communication. Health Data and Decision Support Unit, Knowledge Management and Reporting Branch, Ontario Ministry of Health and Long-Term Care. 2005 Aug 24; Toronto, Ontario.

2.6 Vital Statistics – Live Births

Keywords: Administrative/Vital Statistics/General Population/Births

Name of Data Holding: Vital Statistics – Live Births

Description: The Live Birth Table is one of three tables contained in the Vital Statistics Data Tables in the Provincial Health Planning Database (PHPDB). Data on the number of live births are based on the official registration files of the Office of the Registrar General of Ontario (ORG). Data are based on birth registration and physician notice of birth or stillbirth forms.

Agency Collecting the Data: The ORG receives data from Statistics Canada after editing.

Distributor/Source of Data: The Health Data and Decision Support Unit (HDDSU) of the Ontario Ministry of Health and Long-Term Care (MOHLTC) maintains the PHPDB which includes live birth data.

Live birth data are also available from the Health Planning System (HELPS), Public Health Division, Ontario MOHLTC; however the inclusions/exclusions differ from those in the PHPDB.

**Years Available/
Frequency of Collection:** Currently covers calendar years, 1986 to 2001.

Population Described: Live births occurring in Ontario. Stillbirths are included with live births in the PHPDB. In order to distinguish between stillbirths and live births in the PHPDB, use the live birth/stillbirth indicator.

Data Collection Methods: The Provincial Vital Statistics Act requires registration of all births, deaths and marriages. ^{1,2}

The ORG obtains birth data from the birth registration form that is completed by parents and from the physician notice of birth or stillbirth form. The PHPDB live birth database includes births to out-of-province mothers if the birth occurs in Ontario and excludes births to Ontario mothers that occur outside the province. ¹

The Registrar General submits microfilm/optical images of birth registration forms and machine-readable abstracts of registrations to Statistics Canada, where edit routines are applied to ensure data quality and completeness.

Name of Data Holding: Vital Statistics – Live Births

Geographic (or other)
Level of Data Collection:

Location of birth:

- Province
- Region
- County
- Municipality
- Local Health Integration Network (LHIN)
- Public Health Unit (PHU)
- District Health Council (DHC)

Residence of mother:

- Province
- Region
- County
- Municipality
- LHIN
- Postal Code
- Forward Sortation Area (FSA)
- PHU
- DHC

Content:

The PHPDB Live Birth File includes:

- Date and Place of Birth
- Child's Sex, Birth Weight (in grams) and Gestational Age (in weeks)
- Parents' Age, Marital Status and Birthplace
- Mother's Place of Residence
- Type of Birth (single or multiple)
- Parity (number of live born the mother has, including this birth)
- Setting (where the birth occurred)
- Birth Order
- Attendant Type
- Stillbirth Information

Potential Indicators & Uses:

Live birth data are used to calculate crude and age-specific birth rates, low birth weight rates and teenage live birth rates.

Birth data can be used with stillbirth and therapeutic abortion data to calculate pregnancy rates, age-specific pregnancy rates and teenage pregnancy rates.

Data Quality Issues: Statistics Canada completes a series of data quality checks (checks for outliers, internal consistency and comparisons to previous years) on the national death database and verifies the data with the provinces. Due to legal reporting requirements registration of births is virtually complete. Late registration may occur since registration of birth is required for school registration. Out of country births are incompletely reported. The ORG has noted a rise in the number of physician notices of birth without a corresponding registration from the parents, representing 4000 births or 3% of all births in 2000.² This has been attributed to service fees for birth registration. Deaths among infants that occur shortly after birth may also contribute to under-registration by parents.

According to Statistics Canada, the response rates in 1997 – 2000 were 98 – 100% for most variables on the birth database, with the exception of mother’s marital status, father’s age and father’s birthplace where response rates were 90 – 95%. Information on parents’ date of birth will be available for the 2003 birth data.²

The duration of pregnancy field has been problematic. Until 1990 the physician notification of birth was used as the standard for assignment of gestational age. From 1990 to May 1998, the ORG used the parent’s registration; however as of June 1998 the physician notification has been the source of information for gestational age. The use of the parent registration forms was associated with over-estimates of pre-term births (9% for parent registration versus 5 – 6% using the physician notification). Over-estimation of prematurity may be due to parents reporting a full-term pregnancy as 36 weeks (9 months x 4 weeks) rather than closer to 40 weeks.

There have been issues with truncation of birth weight and gestational age within the Ontario data; however Statistics Canada notes that these issues have been resolved. It is recommended that the analysis of live births should exclude those with birth weights less than 500g, due to inconsistencies in the registration (live births and stillbirths) of these infants.

The introduction of LHINs to Ontario affects the comparison of data from previous time periods and geographic groupings.

Suggested Citation: [Ontario Birth Data, years], Ontario Ministry of Health and Long-Term Care, Provincial Health Planning Database Ver [xx.xx], Extracted [month/year].

1 Provincial Health Indicators Work Group. Core indicators for public health: live birth data. [Online]. 2003 [cited 2005 Aug]; Available from: URL: <http://www.apheo.ca/indicators/index.html>

2 Statistics Canada. Births 2003 – data quality, concepts and methodology. [Online]. 2004. [cited 2005 Aug]; Available from: URL: <http://www.statcan.ca/english/freepub/84F0210XIE/2003000/technote2.htm>

2.7 Vital Statistics – Mortality

Keywords: Administrative/Vital Statistics/General Population/Mortality

Name of Data Holding: Vital Statistics – Mortality

Description: Mortality is one of three tables contained in the Vital Statistics Data Tables in the Provincial Health Planning Database (PHPDB). Data on the number of deaths are based on death certificate information and provides data regarding the most significant health conditions affecting the population.

Agency Collecting the Data: Office of the Registrar General (ORG) of Ontario after editing by Statistics Canada.

Distributor/Source of Data: The Health Data and Decision Support Unit (HDDSU) of the Ontario Ministry of Health and Long-Term Care (MOHLTC) maintains the PHPDB which includes mortality data.

Mortality Data are also available through the Health Planning System (HELPS), Public Health Division, Ontario MOHLTC.

**Years Available/
Frequency of Collection:** Currently covers calendar years, 1986 to 2001.

Population Described: Deaths among Ontario residents.

Data Collection Methods: The Provincial Vital Statistics Act requires registration of all births, deaths and marriages. ¹

The ORG obtains information about mortality from death certificates which are completed by physicians. All deaths within Ontario are registered in the Office of the Division Registrar within which the death occurs.

A Statement of Death (Form 15) and a Medical Certificate of Death (Form 16) must be filed with a division registrar before a Burial Permit can be issued. ^{1,2}

The Registrar General submits microfilm/optical images of death registration forms and machine-readable abstracts of registrations to Statistics Canada, where edit routines are applied to ensure data quality and completeness.

Geographic (or other)
Level of Data Collection:

Location of death:

- Province
- Region
- County
- Municipality
- Local Health Integration Network (LHIN)
- Public Health Unit (PHU)
- District Health Council (DHC)

Residence of deceased:

- Province
- Region
- County
- Municipality
- LHIN
- Postal Code
- Forward Sortation Area (FSA)
- PHU
- DHC

Note – LHINs are only assigned when the municipality is completely within one LHIN

Content:

The death certificate includes personal and medical information about the deceased. The funeral director supplies the personal information which includes information on the age, sex, marital status, place of residence, birthplace of the deceased and date of death and information on the disposition of the body (e.g. burial).

The medical information is supplied by the medical practitioner last in attendance or by the coroner and includes the immediate cause of death; antecedent causes, if any, giving rise to the immediate cause, the underlying cause and other significant conditions contributing to the death but not causally related to the immediate cause. ^{1,2} However, the mortality files include only the underlying cause of death. The underlying cause of death is (a) the disease or injury which initiated the train of events leading directly to death, or (b) the circumstances of the accident or violence which produced the fatal injury. ²

Causes of death are coded in ICD-9 through the end of calendar year 1999 and in ICD-10 beginning calendar year 2000.

The PHPDB Mortality File includes:

- Date of Death
 - Sex of Deceased
 - Geographic Information
 - Age
 - Marital Status
 - Cause of Death
 - Autopsy Findings
-

Potential Indicators & Uses:

Age Standardized and Crude Mortality Rates
Cause-specific Mortality Rates
Leading Causes of Death
Infant Mortality
Potential Years of Life Lost (PYLL)
Premature Mortality Rates
Age-specific Mortality Rates

Data Quality Issues: Statistics Canada completes a series of data quality checks (checks for outliers, internal consistency and comparisons to previous years) on the national death database and verifies the data with the provinces. Due to legal reporting requirements registration of death is virtually complete; however deaths among Canadian residents occurring outside of Canada and the US may be missing.^{1,3,4} Under-coverage may occur because of late registration, deaths of unidentified persons and deaths among serving members of the Canadian military (not registered by the provincial registrars).^{1,4}

Demographic variables including age, date of birth, sex, and county of residence are complete for 99 – 100% of records in the national death database. Recording of postal codes of the deceased has improved recently from 69% of deaths in 1997 to 89% of deaths in 2000; however this missing information may lead to errors associated with the municipality of residence and results in larger numbers of deaths with an unclassified or unknown residence.^{3,4} Co-morbidity contributes uncertainty to classifying the underlying cause of death. Determining true cause of death may be influenced by the social or legal conditions surrounding the death and by the level of medical investigation, e.g. AIDS, suicide.^{2,3} The underlying cause of death was available for 99.3% of deaths in the national database in 2000.⁴

Out-of-province residents who died in Ontario are excluded in HELPS but are included in the PHPDB total counts. Exclude these deaths from analysis if using the PHPDB. Ontario residents who die outside of the province are excluded in the PHPDB.²

Coding of cause of death changed from ICD-9 to ICD-10 in 2000. Due to the increased specificity of ICD-10, comparisons and trends across the two coding systems are not recommended. Other variations in data collection procedures over time and/or geography may reduce the validity of time and place-specific comparisons. Quality studies of the national database suggest that approximately one-third of death certificates contain errors and 85% of these errors involved the use of non-specific conditions as the cause of death.⁴

The introduction of LHINs to Ontario affects the comparison of data from previous time periods and geographic groupings.

Suggested Citation: [Ontario Mortality Data, years], Ontario Ministry of Health and Long-Term Care, Provincial Health Planning Database Ver [xx.xx], Extracted [month/year].

1 Statistics Canada. Vital statistics – death database. [Online]. 2004 [cited 2005 Jun]; Available from: URL: <http://www.statcan.ca/cgi-bin/imdb/p2SV.pl?Function=getSurvey&SDDS=3233&lang=en&db=IMDB&dbg=f&adm=8&dis=2>

2 Provincial Health Indicators Work Group. Core indicators for public health: mortality data. [Online]. 2003 [cited 2005 Jun]; Available from: URL: <http://www.apheo.ca/indicators/index.html>

3 Central East Health Information Partnership. Ontario mortality database. [Online]. 2005 [cited 2005 Jun]; Available from: URL: <http://www.healthinformation.on.ca/DataInfo/mortality.htm>

4 Statistics Canada. Quality measures vital statistics – death database. [Online]. 2004 [Cited 2005 Jun]; Available from: URL: http://www.statcan.ca/english/sdds/document/3233_D2_T9_V1_E.pdf

2.8 The Canadian Census

Keywords: General Population/Demography

Name of Data Holding: The Canadian Census

Description: The Canadian Census is a statistical portrait of the Canadian population. It provides population and dwelling counts and information on demographic, social and economic characteristics.

Agency Collecting the Data: Statistics Canada

Distributor/Source of Data: Statistics Canada and Ontario Ministry of Health and Long-Term Care (MOHLTC).

**Years Available/
Frequency of Collection:** Since 1971 a nationwide census has been conducted every five years. The most recent census took place in 2001.

Population Described: The Canadian population.

Data Collection Methods: The Canadian Census takes place every five years. The census enumerates Canadian citizens, landed immigrants, and non-permanent residents residing in Canada on the census day and gathers social and economic information.¹⁻³ However, prior to 1991, the census only included permanent residents. The census also counts Canadian citizens and landed immigrants who are temporarily out of the country on census day including federal and provincial employees working outside Canada, Canadian embassy staff, members of the Canadian Armed Forces and Canadian crew of merchant vessels.¹

Since 1971, census data has been collected by self-enumeration. In 2001, 98% of households completed the census through self-enumeration while 2% of households were enumerated by canvassers who visited the households and completed the questionnaires by interview. This latter method is used in remote areas, on most First Nations Reservations and in urban areas where residents are unlikely to respond to the questionnaire.¹ One member of the household (Person 1) is asked to complete the questionnaire for all members of that household and then return it in the provided, pre-addressed envelope. The relationship between the persons residing in each household and Person 1 must be established on the questionnaire. All persons residing in the household are counted including; children, co-tenants, roomers, children who live elsewhere when in school, children under joint custody who live in the dwelling most of the time, and persons who usually live in the dwelling but have been living in an institution for less than six months. Births and deaths that occur after 12:00 am on census day are not counted.³

In the 2001 Census, 80% of private dwellings received a short questionnaire (Form 2A) containing 7 questions and 20% of private dwellings received the long questionnaire (Form 2B) containing 59 questions.^{1,2} In northern and remote areas, and First Nations Reservations, all households received a long questionnaire (Form 2D) as it was unlikely that sampling would produce accurate estimates for such small areas. Form 2C was used to enumerate people posted outside Canada. The 3A and 3B questionnaires were used for usual residents in private dwellings who wished to be enumerated separately, as well as for people in collective dwellings.¹ Census questionnaires were produced in both English and French and individual questions were translated into 60 additional languages.¹

Census responses were sent to the regional processing sites for data entry and processing. Statistics Canada field staff reviewed the returned questionnaires for missing or unacceptable responses. If necessary, they contacted the respondents to obtain required information. Final clean up of the data was completed in an automated edit and imputation process. Missing or inconsistent responses were corrected through imputation. Data collected from the long questionnaire are weighted to adjust the sample to represent the entire population. For more information, refer to the 2001 Census Handbook. ¹

Geographic (or other)
Level of Data Collection:

Population level:

The dissemination area (DA) was introduced in 2001. DAs are the smallest standard area for dissemination of census data with populations of 400 to 700. DAs cover all of Canada and have replaced enumeration area (EAs), which are still used for census collection. DAs respect the boundaries of census subdivisions (CSDs) and census tracts (CTs) and can be aggregated to create any of the other standard geographic areas above CSDs and CTs in hierarchy. ¹

Census data are available from Statistics Canada at many geographic levels including DA, CT, CSD and census division (CD). User-defined geographic area data may also be requested from Statistics Canada. For more information, refer to the 2001 Census Handbook. ¹

Census profiles for Ontario provided by the MOHLTC are available at the:

- Provincial
- CD
- CSD
- Census Metropolitan Area (CMA)/Census Agglomeration (CA)
- CT
- DA
- Forward Sortation Area (FSA)
- Census profiles of urban areas, designated places and dissolved 1996 CSDs are also available.
- Statistics Canada has recently released the 2001 Census by LHIN (Version 10 boundaries). Profiles at the LHIN level have been derived using CD, CSD and DA data.

Content:

Some of the principal data elements in the 2001 Census are: ¹

- Sex
- Age
- Marital/Common-law Status
- Relationship to Other Members of Household
- First Language Learned in Childhood
- Place of Birth (self and parents)
- Citizenship/Immigration Status/Year of Immigration
- Knowledge of Official and Other Languages
- Languages Spoken at Home and First Language Learned
- Ethnic Origin
- Aboriginal Identity
- Religion
- Mobility (place of residence one and five years ago)
- Levels of Education and School Attendance
- Unpaid Work
- Employment Status and Occupational Characteristics
- Mode of Transportation to Work
- Housing Characteristics (own or rent, number of rooms, period of construction, shelter costs)

Questions related to activity limitations and difficulties with daily activities were used in 2001 to identify respondents for the post-censal Participation and Activity Limitation Survey (PALS). The 2001 Census included new questions on the language(s) used at work, language spoken at home, birthplace of parents, religion and common-law couples. ²

Copies of the 2001 short and long census questionnaires are available online on the Statistics Canada 2001 Census website. ⁵

Potential Indicators & Uses:

Age/Sex of the Population
Education
Socio-economic Status
Ethnic Origin
Mother Tongue

Statistics Canada uses many census variables in its calculations of health indicators for the Canadian Institute for Health Information (CIHI)/Statistics Canada Health Indicators Project. ⁶

Data Quality Issues: There are a number of sources of error in the Census. Coverage errors occur when dwellings or members of dwellings are not included in the census counts. Undercoverage is more common than overcoverage or double-counting and occurs more frequently for certain population groups.

In 2001, the net undercoverage rate was 2.99% for Canada and 3.68% for Ontario. The net undercoverage rate was the highest for young adults (age 20 to 34) and was associated with higher residence mobility among this age group. In 2001, the net undercoverage rate for those aged 20 to 24 was 7.19% and only slightly lower for those between the ages of 25 and 34 (7.15%). For all age groups combined, net undercoverage was higher for men (3.98%) than for women (2.02%). The undercoverage rate was also substantially higher for those who reported a non-official language as their mother tongue (7.7%).⁴ In 2001, enumeration was not permitted in 30 First Nations Reservations including 17 Ontario Reservations for a net undercoverage rate of 10% for Ontario.⁴

Non-response errors occur when members of the household are away during the census period or refuse to complete the form. Census representatives follow up to encourage response; however some non-response occurs. Respondents may also misinterpret or may not be able to answer questions accurately for absent household members, which results in response errors. Occasionally, there are mistakes in data entry and coding when written information is ambiguous, incomplete or difficult to read.¹

There were a number of changes (amalgamations) to Ontario CSDs following the 1996 Census making historical comparisons difficult.¹

Non-permanent residents were included for the first time in the 1991 Census.

Various changes in census questions have occurred over the years to meet new requirements or reflect societal changes. In addition, some questions (e.g. religion) are not asked at every census but only in decennial censuses (i.e. those that occur at the beginning of each decade).¹

Rounding and suppression of counts associated with small geographic areas are done by Statistics Canada to maintain the confidentiality of respondents. Further details on the dissemination rules for statistics are provided in the 2001 Census Handbook.¹

Suggested Citation: [year] Census, Statistics Canada.

-
- 1 Statistics Canada. 2001 Census handbook. [Online]. Ottawa: Minister of Industry; 2003 [cited 2005 Jul]; Available from: URL: <http://www12.statcan.ca/english/Census01/Products/Reference/2001handbook/pdf/92-379-XIE02001.pdf>
 - 2 Statistics Canada. Content of the 2001 census questionnaires. [Online]. 2001 [cited 2005 Jul]; Available from: URL: <http://www12.statcan.ca/english/Census01/Info/content.cfm>
 - 3 Central East Health Information Partnership. Canadian Census. [Online]. 2005 [cited 2005 Jun]; Available from: URL: <http://www.healthinformation.on.ca/DataInfo/Census.htm>
 - 4 Statistics Canada. 2001 Census technical report – coverage. [Online]. 2005 Jan 13 [cited 2005 Jul]; Available from: URL: http://www12.statcan.ca/english/Census01/Products/Reference/tech_rep/coverage/index.cfm
 - 5 Statistics Canada. Census questionnaires. [Online]. 2004 Jun 24 [cited 2005 Jun]; Available from: URL: <http://www12.statcan.ca/english/Census01/home/questionnaire.cfm>
 - 6 Statistics Canada. Health indicators. [Online]. 2005 [cited 2005 Jun]; Available from: URL: <http://www.statcan.ca/english/freepub/82-221-XIE/82-221-XIE2004002.htm>

2.9 Population Estimates

Keywords: Population Estimates/Demography

Name of Data Holding: Population Estimates

Description: Estimates of the population of Ontario.

Agency Collecting the Data: Population estimates are produced by the Demography Division of Statistics Canada. The Health Data and Decision Support Unit (HDDSU) of the Ontario Ministry of Health and Long-Term Care (MOHLTC) receives population estimate data from Statistics Canada.

Distributor/Source of Data: The HDDSU maintains the Provincial Health Planning Database (PHPDB) which includes the estimates produced by the Statistics Canada. Population estimates can be obtained through the PHPDB.

**Years Available/
Frequency of Collection:** Estimates are available from 1986 – 2004. They are based on the population as of July 1st of each year.

Population Described: Population of Ontario by year, sex and single year of age, up to 90+.

Data Collection Methods: The population estimates are based on the 1986, 1991, 1996 and 2001 census counts and are adjusted for net undercoverage. The methods used to calculate estimates are described below.

**Geographic (or other)
Level of Data Collection:** Estimates are calculated at the census subdivision (CSD) level. Estimates are available at the:

- Region
- Municipality
- County
- District Health Council (DHC)
- Public Health Unit (PHU)
- Local Health Integration Network (LHIN)

Content: Statistics Canada calculates estimates based on population counts in the census years, adjusted for net undercoverage. Three stages are used to calculate population estimates. The first involves adjusting census counts for net undercoverage. Age and sex specific results from provincial/territorial coverage studies are applied to CSD populations. The second stage consists of interpolating the population by age and sex between census years (inter-censal estimates) or extrapolating the population by age and sex following the census year based on adjusted counts (post-censal estimates). The last step involves ensuring that results are consistent with annual population counts by age and sex for census divisions (CDs). This involves adjusting the annual interpolated and extrapolated CSD estimates to the annual CD population estimates available by single year of age and sex. ¹

Potential Indicators & Uses: Estimates are used as the denominators for various rate calculations.

Name of Data Holding: Population Estimates

Data Quality Issues:

CSD population estimates are calculated differently than CD and provincial estimates. CSD estimates are only based on census counts whereas CD and provincial estimates take population growth (births, deaths and migration) into account. ¹

As part of the population estimation process, it is assumed that the annual population growth rate at the CSD level is equal to the average annual growth between the last two census years which may not be accurate. ¹

In addition, in the last stage of the estimation process, it is assumed that the difference between the sum of the CSD estimates and the CD population in which the CSDs are located are distributed proportionately across the CSDs which may not be the actual case. ¹

There may not be a one-to-one match between CSDs and the municipalities used in the MOHLTC coding system, in particular for areas in Northern Ontario. ²

Estimates by single year of age and sex should not be used on their own but only to produce aggregate age groupings. ¹

Population estimates by LHIN can be obtained from Statistics Canada by special request.

Suggested Citation:

Population Estimates [years], Ontario Ministry of Health and Long-Term Care, Provincial Health Planning Database Ver [xx.xx], Extracted [month/year].

1 Statistics Canada. Estimates of population for census subdivisions (CSD): methodology. [Online]. 2004 Nov [cited 2005 Aug]; Available from: URL: <http://www.apheo.ca/indicators/pages/MethodologyMethodologie%20%20-CSDSDR%20nov.%202004.doc>

2 Ontario Ministry of Health and Long-Term Care. Provincial health planning database: population data. [Online]. 2005 Aug [cited 2005 Aug]; Available from: URL: <http://portal.healthdss.moh.gov.on.ca/>

2.10 Population Projections

Keyword: Population/Demographics

Name of Data Holding: Population Projections

Description: Detailed population projections are produced for the 30 year period following every census.

Agency Collecting the Data: Population projections are produced by the Ontario Ministry of Finance. The Health Data and Decision Support Unit (HDDSU) of the Ontario Ministry of Health and Long-Term Care (MOHLTC) receives population projection data from the Ministry of Finance.

Distributor/Source of Data: The HDDSU maintains the Provincial Health Planning Database (PHPDB) which includes the population projections produced by the Ministry of Finance. Projections can be obtained through the PHPDB or the Ministry of Finance website.

**Years Available/
Frequency of Collection:** Projections are available for Ontario and its 49 census divisions (CDs) for 2004 to 2031.

Population Described: The Ontario population by age and sex projected for the years 2004 to 2031 (as of July 1st of each year). The PHPDB has projections by single year, while the Ministry of Finance website has projections in five year age groupings.

Data Collection Methods: The Ministry of Finance used the base populations from the preliminary July 1st, 2004 post-censal estimates that were released by Statistics Canada in November, 2004. ¹ Modeling, as described below, is used to calculate the projections.

**Geographic (or other)
Level of Data Collection:** In the PHPDB, projections are available at:

- County
- Region
- District Health Council (DHC)

The Ministry of Finance has data at the county level.

Content: The Ministry of Finance uses a cohort-component modeling technique to calculate population projections. It starts with population estimates in a base year by age and sex, namely 2004. The population is ‘aged’ one year at a time, with assumed fertility and mortality rates generating births and deaths in each year. Further assumptions generate the annual level and the age-sex composition of each of five migration components (immigration, net emigration, net change in non-permanent residents, interprovincial in-and-out-migration and intraprovincial in-and-out-migration). This methodology is applied and the population is projected for each of the 49 CDs. These populations are then summed to a projected Ontario total. ¹

Low, medium and high growth scenarios are used to generate three different sets of projections with the medium growth scenario considered to be the most likely to occur. It is based on a slightly increasing fertility level to 2011, a moderate decline in mortality and a slowly declining net migration level. ¹ The medium scenarios are contained in the PHPDB.

For more details on the methods used to calculate population projections, see Reference 1.

Potential Indicators & Uses: Population projections provide information on expected changes in future population size and structure. They can be used to predict future health care requirements and needs.

Data Quality Issues: Projections are based on many assumptions (past and future) which are subject to change and uncertainty and as a result, projections may not accurately reflect true population counts. The discrepancy between projections and actual population figures may become more pronounced for projections which are further removed from the base year. Fertility and mortality are considered to be more predictable components of the projection model than migration, as the latter is subject to government policy changes and is affected by social and economic conditions. ²

Greater variation is expected with smaller geographic areas as changes to the assumptions in these areas may have more of an effect on population size and structure. More stability is obtained by using larger population areas and broad age categories. ²

Suggested Citation: Population Projections [years], Ontario Ministry of Health and Long-Term Care, Provincial Health Planning Database Ver [xx.xx], Extracted [month/year].

¹ Ministry of Finance. Ontario population projections 2004 – 2031. [Online]. 2005 Mar 4 [cited 2005 Aug]; Available from: URL: <http://www.fin.gov.on.ca/english/demographics/demog05.html>

² Health Information Partnership-Eastern Ontario region. A comparison of population estimates and population projections for Eastern Ontario. [Online]. 2001 May [cited 2005 Aug]; Available from: URL: <http://www.healthinformation.on.ca/reports/Eastern%20HIU/2001/Comparing-%20Population%20Projections%20and%20Estimates.pdf>

2.11 Canadian Community Health Survey (CCHS)

Keywords: Survey/Community Health/Population Health/Health Status/
Mental Health/Nutrition

Name of Data Holding: Canadian Community Health Survey (CCHS)

Description: The Canadian Community Health Survey (CCHS) is a health survey conducted by Statistics Canada that provides regular, timely, cross-sectional estimates of health determinants, health status and health system utilization across Canada.

The survey is conducted in two year cycles with each cycle comprising two distinct surveys:

- Cycle x.1 – a large sample survey in the first year designed to provide estimates at the sub-provincial level (Health Regions or combinations of Health Regions).
- Cycle x.2 – a smaller in-depth survey focused on a particular topic in the second year that provides estimates at the provincial and national levels.

The large sample surveys consist of two components: common modules that are used in all Health Regions with topics identified as a high priority and optional modules chosen by each individual health region.^{1,2} A sub-sample of the main sample is surveyed for some modules, yielding results at the provincial and national levels only.

Agency Collecting the Data: Statistics Canada

Distributor/Source of Data: Statistics Canada (Master File/ Public Use Microdata File)
Ministry of Health and Long-Term Care (MOHLTC) (Ontario Share File).

Note – The ‘Master File’ is confidential, remains at Statistics Canada and is only used by Statistics Canada employees or by some researchers if special permission is granted. The ‘Share File’ contains the same information as the master file but all identifiable information is removed and respondents who do not wish to share information are excluded. Ministries of Health and their partners have access to the ‘Share File’. The ‘Public Use Microdata File’ or ‘PUMF’ is public domain and data are aggregated.³ Each file will provide slightly different estimates.

**Years Available/
Frequency of Collection:** The survey is biennial, as described above:¹

- Cycle 1.1 – conducted from September 2000 to November 2001. The 2001 Health Services Access Survey (HSAS) was a supplement to Cycle 1.1 and was conducted from November to December, 2001.
- Cycle 1.2 (Mental Health and Well Being) – conducted in 2002.
- Cycle 2.1 – conducted in 2003. Also included the 2003 HSAS, which was released as a separate file.
- Cycle 2.2 (Nutrition) – conducted in 2004.
- Cycle 3.1 – conducted from January to December 2005. The HSAS is fully integrated into Cycle 3.1.

Name of Data Holding: Canadian Community Health Survey (CCHS)

Population Described: The CCHS includes residents 12 years of age and older living in private households. Excluded from the sample are those living in institutions, on Aboriginal Reserves and Crown Lands, full-time members of the Canadian Armed Forces and residents of certain remote regions. For the smaller focused surveys (Cycles x.2), the population surveyed may differ (the sample for Cycle 1.2 included residents 15 years of age and older while the sample for Cycle 2.2 included residents of all ages).¹

Data Collection Methods: The CCHS is a sample survey with a cross-sectional design. Questionnaires are designed for computer-assisted interviewing (CAI). Three sampling frames are used to select the sample of households for the Cycle x.1 surveys. The area frame designed for the Canadian Labour Force Survey (LFS) is used as the primary frame. The sampling plan of the LFS is a multistage stratified cluster design in which the dwelling is the final sampling unit. In some Health Regions, a Random Digit Dialling (RDD) sampling frame or a list frame of telephone numbers is also used. Details on the sampling methods for the various CCHS cycles are available from the Statistics Canada website.¹

Geographic (or other) Level of Data Collection: Population level:
Data are available at the health region, provincial and national levels for Cycles x.1. In Ontario, the Health Region level is the Public Health Unit (PHU).¹ Data for Cycles x.1 can also be converted to the Local Health Integration Network (LHIN) level.
For Cycles x.2, data are available at the provincial and national levels. For Cycles 1.2 and 2.2, Ontario provided extra funds so that a larger sample of dwellings could be selected. Therefore, analysis at the sub-provincial level (7 health planning regions) is possible for these surveys.¹

Content: A list of variables and questionnaires for the various cycles of the CCHS are available from the Statistics Canada website.¹

Potential Indicators & Uses: Statistics Canada uses many CCHS variables in its calculations of health indicators for the Canadian Institute for Health Information (CIHI)/Statistics Canada Health Indicators Project.²
The Provincial Health Indicators Work Group (PHIWG) has compiled the Core Indicators for Public Health, an extensive resource that provides definitions, methods and calculations for more than 120 health indicators. Many of the CCHS variables are included in the indicators listed on the Association of Public Health Epidemiologists in Ontario (APHEO) website.⁴⁻⁶
Many of the CCHS indicators form the basis for How Healthy Are Canadians? Supplements to Statistics Canada Health Reports.⁷
Data from the HSAS are included in Ontario's 2004 Health System Performance Report, 2004.⁸

Data Quality Issues:

For Cycle 1.1, in cases where the selected respondent was not present for an extended period of time or was unable to complete the CCHS interview, another knowledgeable member of the household completed the survey questions on his/her behalf. This is known as a proxy interview. Due to the sensitive nature of many of the questions, proxy respondents were not asked all questions. Some questions were therefore skipped and missing responses were imputed using the nearest neighbour approach.

The optional modules selected for Cycles x.1 vary by Health Region and are not necessarily consistent across Ontario. The APHEO website contains a table outlined by the PHIWG that shows the different modules chosen by Ontario PHUs for the various cycles. Refer to 'Resources' then 'Optional Content in the CCHS: Who Chose What?'. ⁹

From Cycle 1.1 to 2.1, some modules moved from the common content to the optional content. Not all modules can be analyzed in detail for all PHUs, particularly those with smaller populations. In addition, responses for a few smaller PHUs have been collapsed in the Public Use Microdata File.

Variable DUIA_3 from the CCHS 1.1 which relates to the number of times the respondent drove when perhaps he/she had too much to drink, was unusable due to coding errors. For more information, refer to the 'Drinking and Driving Prevalence Indicator' on the Core Indicators for Public Health in Ontario website. ¹⁰

Sampling and non-sampling errors are two of the types of errors related to the CCHS. Because the CCHS is a sample survey, rather than a census of the population under similar conditions, estimates are subject to sampling error. Sampling errors for CCHS estimates are calculated using the bootstrap re-sampling technique. ¹¹

Errors not related to sampling are called non-sampling errors (e.g. a respondent may misunderstand a question or a response may be recorded incorrectly). These types of errors may be present in any survey although much effort is expended to minimize these types of errors in the CCHS. ¹¹

Non-response (either item non-response or total non-response) is another potential source of non-sampling error. Total non-response occurs when a respondent either refused to participate in the survey or because the interviewer cannot contact the selected respondent. ¹¹ Social desirability and recall bias are potential sources of bias in the CCHS.

Comparisons between the 2001 and the 2003 HSAS should be made with caution because of differences in data collection methods. ¹²

Name of Data Holding: Canadian Community Health Survey (CCHS)

Suggested Citation: Canadian Community Health Survey, cycle x.x [year], Statistics Canada, Public Use Microdata File.
Canadian Community Health Survey, cycle x.x [year], Statistics Canada, Ontario Share File, Ontario MOHLTC.

- 1 Statistics Canada. Population health surveys. [Online]. 2005 Mar 8 [cited 2005 Jun]; Available from: URL: <http://www.statcan.ca/english/concepts/hs/index.htm>
- 2 Statistics Canada. Health indicators. [Online]. 2005 Mar 6 [cited 2005 Jun]; Available from: URL: <http://www.statcan.ca/english/freepub/82-221-XIE/82-221-XIE2004002.htm>
- 3 Statistics Canada. Access to NPHS and CCHS products. Workshop by the Data Access Unit, NPHS/CCHS Statistics Canada; 2005 Jun 8, Ottawa ON.
- 4 Provincial Health Indicators Work Group. Core indicators for public health in Ontario. [Online]. 2004 Nov [cited 2005 Aug]; Available from: URL: <http://www.apheo.ca/indicators/index.html>
- 5 Provincial Health Indicators Work Group. Core indicators for public health in Ontario: the Canadian Community Health Survey (CCHS). [Online]. 2003 Jan 7 [cited 2005 Jun]; Available from: URL: <http://www.apheo.ca/indicators/index.html>
- 6 Provincial Health Indicators Work Group. Core indicators for public health in Ontario: the 2002 Canadian Community Health Survey (CCHS) cycle 1.2 mental health and well-being. [Online]. 2003 Jan 7 [cited 2005 Jun]; Available from: URL: <http://www.apheo.ca/indicators/index.html>
- 7 Statistics Canada. How healthy are Canadians? Health Reports [serial online] 2004 Dec [cited 2005 Jun]; 15 Suppl: Available from: URL: <http://www.statcan.ca/english/freepub/82-003-SIE/2004000/pdf/82-003-SIE2004000.pdf>
- 8 Ministry of Health and Long-Term Care. Ontario's health system performance report. [Online]. 2004 Nov [cited 2005 Jul]; Available from: URL: http://www.health.gov.on.ca/english/public/pub/ministry_reports/pirc_04/pirc_04.pdf
- 9 Provincial Health Indicators Work Group. Core indicators for public health in Ontario: optional content in the CCHS: who chose what? [Online]. 2004 [2005 Jul]. Available from: URL: <http://www.apheo.ca/indicators/index.html>
- 10 Provincial Health Indicators Work Group. Core indicators for public health in Ontario: drinking and driving prevalence. [Online]. 2005 May 30 [2005 Jul]; Available from: URL: <http://www.apheo.ca/indicators/index.html>
- 11 Beland Y. Canadian community health survey – methodological overview. Health Reports. 2002 Mar;13(3).
- 12 Statistics Canada. The Daily, Wednesday, June 30, 2004. [Online]. 2004 Jun 30 [cited 2005 Jun]; Available from: URL: <http://www.statcan.ca/Daily/English/040630/d040630b.htm>

Additional References:

Central East Health Information Partnership. Canadian Community Health Survey. [Online]. 2002 [cited 2005 Jun]; Available from: URL: <http://www.healthinformation.on.ca/DataInfo/cchs.htm>

2.12 Ontario Cancer Registry (OCR)

Keywords: Administrative/General Population/Cancer/Registry

Name of Data Holding: Ontario Cancer Registry (OCR)

Description: The Ontario Cancer Registry (OCR) is an electronic registry of all newly diagnosed cases of cancer and cancer deaths in Ontario. It includes all malignant neoplasms, except non-melanoma skin cancer. Data are from the following sources: ¹

From the Canadian Institute for Health Information (CIHI):

- Discharge Abstract Database (DAD) – from 1978
- Same day procedure (now part of the National Ambulatory Care Reporting System [NACRS]) – from 1990
- Emergency department visits (NACRS) – from 2003
- Clinic visits (NACRS)– from 2003

From Hospital and Private Labs:

- Pathology reports that mention cancer (paper or through the Pathology Information Management System [PIMS])

From the Ontario Registrar General (ORG):

- Collects mortality data for all causes. For non-cancer deaths, only broad groups are shown.

From Integrated Cancer Programs (ICPs) (formerly referred to as regional Cancer Centres).

From Princess Margaret Hospital (PMH).

From out-of-province data for Ontario residents.

Agency Collecting the Data: Cancer Care Ontario (CCO). Primary data collection is completed by agencies that are external to CCO (see above) and data are subsequently forwarded to CCO. CCO works in conjunction with its external stakeholders to facilitate the data collection process. Once CCO receives the data, various record linkages and case resolution processes are completed before the final dataset is generated.

Distributor/Source of Data: CCO (available through SEER*Stat and CanQuery). ^{2,3}

Note – SEER*Stat is a desktop system that provides statistics on frequency counts; crude and age standardized incidence and mortality rates; survival rates; and prevalence rates. CanQuery is a web based system that uses the output from SEER*Stat to create tables. It only contains age standardized incidence and mortality rates, and projected incidence and mortality counts.

Health Planning System (HELPS), Public Health Division, Ontario MOHLTC.

Name of Data Holding: Ontario Cancer Registry (OCR)

**Years Available/
Frequency of Collection:** Incidence data are available in SEER*Stat from 1964 – 2002 for Ontario and from 1979 onwards for Public Health Units (PHUs) and census divisions (CDs). Cancer mortality data are available in SEER*Stat from 1950 onwards for Ontario and from 1979 onwards for PHUs and CDs. ⁴ In CanQuery, counts and age-standardized rates for both incidence v over 1998 – 2002 at the county/health region level. Projected incidence and mortality counts are available annually from 1982 – 2016 for Ontario and the Health regions.

Note – In this instance, ‘Health Regions’ refer to the Cancer Planning Regions.

Population Described: Ontario residents newly diagnosed with cancer.

Deceased Ontario residents with cancer as the underlying cause of death.

Data Collection Methods: Data are obtained from the aforementioned sources and linked through computerized probabilistic record linkage, in which identifying variables are compared across all records.

Records whose identifiers are sufficiently similar likely pertain to the same person and are brought together. ⁵

More details are available in the CCO report ‘Cancer Incidence and Mortality in Ontario, 1964 – 1996’. ⁵

**Geographic (or other)
Level of Data Collection:** Person level:

In SEER*Stat, data are available at:

- County
- Public Health Unit (PHU)
- Provincial level
- Data at the Local Health Integration Network (LHIN) level will be available soon. ⁴

In HELPS, data are available at the municipality level, although the suggested level of analysis is at the county level. ⁶

Content: Registry includes the following identifying/demographic elements: ¹

- Sex
- Date of Birth (mm/dd/yyyy)
- Age in Complete Years
- Area of Residence
- Primary Site by ICDO (International Classification of Diseases for Oncology) or ICD (Note – Cancer incidence is usually reported by ICD. Seer*Stat allows mapping of ICD and ICDO morphology to produce ICDO topography, which is reported separately. The ability to combine ICDO topography and morphology is another means of examining cancer by site, which can sometimes lead to different results when compared to OCD.)
- Morphology/Histology
- Date of Diagnosis (mm/yyyy)
- Residence at Time of Diagnosis
- Method of Confirmation

SEER*Stat includes the following variables: ⁴

- Sex
- Year of Diagnosis and Death
- ICD-9 Codes
- County
- PHU

Crude and age-standardized rates can also be calculated in SEER*Stat. ⁴

Potential Indicators & Uses: Counts
Crude and Age-standardized Rates for Incidence and Mortality
Potential Years of Life Lost (PYLLs) due to Cancer
Cancer Prevalence
Cancer Survival

Age-standardized incidence and mortality rates are also available on the Cancer Care Ontario website. ¹

Indicators appear in Canadian Cancer Statistics Reports, produced by the Canadian Cancer Society, the National Cancer Institute of Canada (NCIC), Statistics Canada, Provincial/Territorial Cancer Registries and the Public Health Agency of Canada. ⁷

Data Quality Issues: There are several issues related to the classification, coding, completeness and validity of the data: ^{4,5}

Data at the PHU level are based on CD level geographies.

There is inconsistency in assigning colon and rectum cancer. Inconsistent reports are automatically assigned to colon cancer. Therefore, rates of colon cancer in the OCR are likely inflated, while rates of rectal cancer rates are correspondingly low.

With the introduction of newer classifications for non-Hodgkin's Lymphoma, ICD-9 Codes 200 and 202 are best combined into one category to ensure consistency in comparisons.

The classification of non-invasive papillary transitional carcinomas of the bladder has changed over time. Consequently, from 1989 onwards, a decline in incidence of approximately 25% has been observed.

Coding for borderline epithelial neoplasms of the ovary changed in 1988 and 2003, resulting in an apparent adjustment in the trend of types of neoplasms.

With respect to leukemia, trends and patterns according to subtype cannot be reliably interpreted due to the number of cases with an unspecified cell type.

Liver cancer rates need to be interpreted with care as the liver is a common secondary site. Many of the diagnoses listed as primary liver cancer might actually represent cancers that have metastasized to the liver.

Some changes in the coding of malignant neoplasms may have occurred with the introduction of ICD-10. ⁸

For more details on data quality issues, see disease specific sites on the CCO website. ^{2,3,9}

Suggested Citation: Ontario Cancer Incidence Database [years], HELPS (Health Planning System) Release: [date], Public Health Branch, Ontario MOHLTC.
Ontario Cancer Registry Incidence data [years], Cancer Care Ontario, Release: [number, date].
Ontario Cancer Registry Mortality Data [years], Cancer Care Ontario, Release: [number, date].

- 1 Dale D. Generation of Ontario incidence data. Presentation by Cancer Care Ontario at the Central East Health Information Partnership (CEHIP) Meeting; 2000 Apr 27; Toronto Ontario.
- 2 Cancer Care Ontario. [Online]. 2005 [cited 2005 Sept]; Available from: URL: <http://www.cancercare.on.ca>
- 3 Cancer Care Ontario. CanQuery. [Online]. 2005 [cited 2005 Sept]; Available from: URL: <http://canques.seer.cancer.gov/ontario/>
- 4 Ontario Cancer Registry Incidence data documentation [1964 – 2002], Cancer Care Ontario, Release: [4, 2004].
- 5 Cancer Care Ontario. Cancer Incidence and Mortality in Ontario, 1964 – 1996. [Online]. 1998 [cited 2005 Jun]; Available from: URL: <http://www.cancercare.on.ca/pdf/methods.pdf>
- 6 Central East Health Information Partnership. Cancer incidence. [Online]. 1998 [cited 2005 Jun]; Available from: URL: <http://www.healthinformation.on.ca/DataInfo/cancer.htm>
- 7 Canadian Cancer Society, National Cancer Institute of Canada, Statistics Canada, Provincial/Territorial Cancer Registries, Public Health Agency of Canada. Canadian Cancer Statistics. [Online]. 2005 April [cited 2005 Sept]; Available from: URL: http://www.ncic.cancer.ca/ncic/internet/standard/0,3621,84658243_85787780__langId-en,00.html
- 8 Anderson R, Minino A, Hoyert D, Rosenberg H. Comparability of cause of death between ICD-9 and ICD-10: preliminary estimates. National Vital Statistics Reports. 2001 May 18;49(2).
- 9 Cancer Care Ontario. Statistics: cancer statistics by disease site. [Online]. 2005 [cited 2005 Sept]; Available from: URL: http://www.cancercare.on.ca/index_statistics.htm

Additional References:

Provincial Health Indicators Work Group. Core indicators for public health in Ontario: Ontario cancer incidence data. [Online]. 2003 Jan 7 [cited 2005 Jun]; Available from: URL: <http://www.apheo.ca/indicators/index.html>

2.13 Guidelines for Management Information Systems in Canadian Health Service Organizations (MIS Guidelines)

Keywords: Administrative/Financial/Resource Usage

Name of Data Holding: **Guidelines for Management Information Systems in Canadian Health Service Organizations (MIS Guidelines)**
(Also referred to as the Ontario Healthcare Reporting System (OHRS) or the Ontario HealthCare Financial and Statistical (OHFS) MIS Data Warehouse)

Description:

National:

The Guidelines for Management Information Systems in Canadian Health Service Organizations (MIS Guidelines) are the national standards for reporting financial and statistical data. Provinces send these data to the Canadian Institute for Health Information (CIHI) for inclusion in the Canadian MIS Database (CMDB).¹

Ontario:

The Ontario Healthcare Reporting System (OHRS) are the standards for Ontario-specific MIS information.²

The Ontario HealthCare Financial and Statistical (OHFS) MIS Data Warehouse is a tool containing a subset of Ontario MIS data in cube format to facilitate data queries.³

Agency Collecting the Data:

Individual health service organizations submit quarterly and year-end data to the Ontario Ministry of Health and Long-Term Care (MOHLTC). The MOHLTC sends provincial data to CIHI for inclusion in the CMDB.

Distributor/Source of Data:

Finance and Information Management Branch (FIM) of the MOHLTC. The MIS Data Warehouse allows the user to query the data cubes created by FIM. Data that are not available through the cubes can be requested from FIM. Canada-level data can be obtained through CIHI.

Years Available/

Frequency of Collection:

Current Fiscal Year: 2004/05

Previous 5 Fiscal Years: 1999/00 to 2003/04

Data are available for quarters and year-end.³

Population Described:

The health service organizations in Ontario required to submit data include:

- Public Hospitals – Acute Care, Rehabilitation and Chronic Care
- Long-Term Mental Health Hospitals
- Cancer Care Ontario

Beginning in 2003/04, the following will also be required to submit data:

- Community Care Access Centres (CCACs)
- Children's Treatment Centres (CTCs)
- Community Mental Health and Addictions Organizations (CMH&A)²

Name of Data Holding: **Guidelines for Management Information Systems in Canadian Health Service Organizations (MIS Guidelines)**
(Also referred to as the Ontario Healthcare Reporting System (OHRS) or the Ontario HealthCare Financial and Statistical (OHFS) MIS Data Warehouse)

Data Collection Methods: Data are submitted to each organization's finance department by each department or program. The finance department, in turn, sends quarterly and year-end data to FIM. The MIS Data Warehouse cubes are created by FIM. FIM submits data to CIHI for inclusion in the CMDB.

Geographic (or other) Level of Data Collection: Institution Level: Functional Centre, Facility, Facility Type, District Health Council (DHC), Region, Local Health Integration Network (LHIN)

Content: The OHFS MIS Data Warehouse cubes have the following data elements:

- Primary Account Groupings with drill-down capabilities to Primary Account Submission Level (as per the MIS Chart of Accounts).
- Secondary Account Groupings with drill-down capabilities to Secondary Account Submission Level.
- MOHLTC regional aggregates with the drill-down capability through DHCs, LHINs, counties and municipalities, to the Health Care Facility Level.
- Data may be accessed through Pre-defined Views of the Cube or the Default View, and further analysis can be done using any of these views as a starting-point. Standard Cognos® functions are used, such as replacing columns and rows, drilling down to greater detail, or filtering on Accounting Period, Facility Type, Service Recipient, etc.

Details of the MIS Guidelines are available through CIHI. ¹ Details of the OHRS can be found in the manuals accessible through the FIM website. ²

Using these data requires a thorough understanding of the MIS structure. The following is a brief description of some key terms and the MIS structure (from the OHRS Manual). ⁴

Key Terms:

Primary Accounts: Balance Sheet, Functional Centre and Accounting Centre accounts

Balance Sheet accounts provide the information required to generate a formal statement of financial position of the health service organization. These accounts show assets, liabilities and net assets at a particular point in time. Balance Sheet accounts are 5 digits in length and are not reported with associated secondary accounts.

Functional Centres are subdivisions of an organization for the purpose of recording budgeted and actual revenues, expenses, and statistics pertaining to the function or activity being carried out. They are used to capture the costs of labour, supplies, and equipment required to perform specific functions. Functional centres accounts are up to 9 digits in length (for level 5 detail) and only 5 digits for level 3 (minimum level of reporting). Accounting Centres are used to collect or aggregate revenues, expenses, or statistical data that cannot reasonably be identified with specific functions or activities of an organization.

Accounting centre accounts are up to 9 digits in length (for level 5 detail) and only 5 digits for level 3 (minimum level of reporting).

Functional Centre and Accounting Centre financial information provide the information required to generate the Income Statement.

Secondary Accounts: Financial and Statistical accounts are Secondary accounts. Financial accounts are limited to 5 digits and statistical accounts are 7 digits in length. These accounts are always linked to a functional or accounting centre account when reported.

Hierarchy of Accounts: Both primary and secondary accounts are built on a hierarchy that allows different levels of detail to be collected by different sized organizations. The Chart of Accounts provides a completely defined Roll-Up or method of aggregation of accounts from the level of individual general ledger accounts to a broad group of accounts. The coding structure is hierarchical in nature so that the roll-up definition is embedded in the numbering system, which has been employed in the chart.

Fund Types: The second position in all primary accounts indicates the fund type. Only Operating Fund Types can be used in Functional Centre account codes. In Ontario there are three Operating funds.

Fund Type 1 is reserved for the Public Hospital Vote activities for hospital and Cancer Care Ontario services:

- Acute Care Hospitals
- Rehabilitation Hospitals
- Chronic Care Hospitals
- Mental Health Hospitals
- Pediatric Hospitals
- Specialty Hospitals

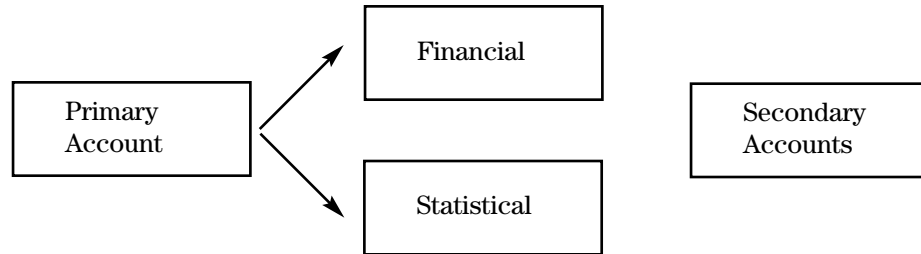
Fund Type 2 is used for programs funded by the MOHLTC other than Fund Type 1 programs:

- Community Care Access Centres
- Children's Treatment Centres
- Community Mental Health
- Medical Formal Education
- French Language Services
- Interim Long-Term Care
- Municipal Taxes – Bed Levy
- Midwives
- Nurse Practitioners
- And MOHLTC Other vote programs not listed above

Fund Type 3 is used for services funded by:

- Federal Government (e.g. DVA)
- Municipal Governments (e.g. Long-Term Care, Ambulance)
- Other Ministries (e.g. MCYS)
- Non-government Agencies (e.g. Diabetic Network)

MIS Account Structure:



Primary Accounts Structure:

Functional Centres and Accounting Centres Structure

Level1			Level2		Level3			Level4			Level5	
7	1		2		2	0						

Example: 7 functional centre; 1 fund type; 2 nursing inpatient services; 20 surgical inpatient

Level 1 (not a reporting level)

The first digit indicates whether the primary account is 7 (a functional centre) or 8 (an accounting centre). The second digit indicates the fund type. Only fund types 1, 2, and 3 are used in functional centre accounts. All valid fund types may be used in accounting centres.

Level 2 (not a reporting level)

Functional Centres are grouped in Level 2 framework sections as follows:

- 7* 1 Administration and Support Services – All Health Service Organizations
- 7* 2 Nursing Inpatient Services – Hospitals only
- 7* 3 Ambulatory Care Services – Hospitals only
- 7* 4 Diagnostic and Therapeutic Services – Hospitals and dedicated Community Diagnostic Services
- 7* 5 Community and Social Services – All Health Service Organizations
- 7* 7 Research – All Health Service Organizations
- 7* 8 Education – All Health Service Organizations
- 7* 9 Undistributed Functional Centres – All Health Service Organizations

Level 3

Level 3 is the most aggregate level of reporting allowed in MOHLTC submissions. Level 3 accounts roll-up to Level 2.

Example: Level 2

71 2 Nursing Inpatient Services is the sum of the following Level 3 accounts

- 71 2 10 IP Medical Inpatient
- 71 2 20 IP Surgical Inpatient
- 71 2 30 IP Combined Medical/Surgical
- 71 2 40 IP Intensive Care Unit
- 71 2 50 IP Obstetrics
- 71 2 60 IP Operating Room
- 71 2 65 IP Recovery Room
- 71 2 70 IP Pediatrics
- 71 2 76 IP Mental Health/Addictions
- 71 2 80 IP Rehabilitation
- 71 2 95 IP Long-Term Care

Levels 4 and 5

These levels provide additional levels of detail and will be used more extensively in large organizations where service volumes allow for segregation of activities in unique functional centres. If these accounts are utilized internally by a hospital to monitor activities and expenses, it is recommended that the health service organization reports this level of detail. This will increase the value of benchmarking information and explain variances across organizations.

Balance Sheet Structure

Level1				Level2		Level3	
1		1		1		4	0

Example: 1 Current Asset, 1 Operating Fund, 1 Cash, 40 Payroll Balance sheet accounts do not have secondary accounts, e.g. revenues and expenses are not linked to balance sheet accounts. For internal purposes, additional information can be incorporated into the numbering system of the balance sheet accounts.

Secondary Accounts*Financial Account Structure*

Level1		Level2			Level3	
4		6	0		4	0

Example: 4 Supplies; 60 Medical Surgical; 40 Instruments

Secondary Financial Accounts provide information on the nature of revenues and expenses in an organization. Financial Accounts are limited to 5 digits in the provincial database.

Level 1 identifies the secondary financial broad group.

Level 2 (2nd and 3rd digit) defines the nature of the revenue or expense within the broad group.

Level 3 (4th and 5th digit) is used to capture further details.

Level 3 accounts roll-up to level 2 accounts and level 2 accounts roll up to Level 1. The overall secondary account description and content is made up of a combination of the three individual levels.

Statistical Accounts Structure

Level1		Level2	Activity		Level3	Detail		Level4	MoreDetail
1		0	7		2	1			

Example: 1 Workload; 07 Diagnostic Imaging; 21 Emergency

The statistical codes are used to record the volume of resource use or activity and in some cases, to describe more details on the nature of the service. The statistical accounts do not roll-up in the same way as financial accounts. Statistical codes vary depending on the type of statistical accounts.

Level 1 accounts:

1. Workload
2. Staff Activity
3. Earned Hours
4. Service Recipient Activity
5. Service Recipient Profile
7. Functional Centre Profile
8. Organization Profile
9. Priority Programs

Level 1 (1st digit) indicates the broad statistical group as shown above.

Level 2 (2nd and 3rd digits) indicates the type of measure within the broad group. These are unique for each broad group.

Level 3 (4th and 5th digits) provides additional information and these are unique for each Level 2 account. The 4th and 5th digits of the earned hour accounts describe the type of earned hour.

Level 4 (6th and 7th digits) provides greater details. The activity section is unique for each individual account. The last two numbers of diagnostic workload and exams/procedures match.

Potential Indicators & Uses: Any indicators requiring financial and/or aggregate statistical information for all Ontario health services organizations will use this data source. In addition, indicators requiring statistical information such as earned hours and workload measurement is also available.

Data Quality Issues: The data are electronically and visually edited but not audited by FIM.

The current OHRS version is 5.3 (fiscal 2005/06); comparisons with previous versions require conversion.

Statistical data are for services, not people (i.e. hours of services rather than number of employees).

Extra caution should be taken with the CCAC, CTC and CMH&A data as they have only recently begun to report data.

All organizations in the same sector are not required to report at the same level of detail but each sector has determined the minimum level of reporting for overall comparative purposes.

Lower levels can be reported in order to facilitate our understanding of variation in performance indicators of large organizations with complex services.

Suggested Citation: [data table, years], Ontario Ministry of Health and Long-Term Care, Ontario HealthCare Financial and Statistical MIS Data Warehouse, Extracted [month/year]

1 Canadian Institute for Health Information. Canadian MIS database. [Online]. 2005 Mar 10 [cited 2005 Oct]; Available from: URL: http://secure.cihi.ca/cihiweb/dispPage.jsp?cw_page=spend_canmis_e

2 Ontario Ministry of Health and Long-Term Care. Ontario health care reporting system. [Online]. 2005 [cited 2005 Oct]; Available from: URL: http://www.mohltcfm.com/cms/client_webmaster/sec.jsp?ids=ac0a80704000000f74ee2fd568005&parent_id=0

3 Ontario Ministry of Health and Long-Term Care. MIS data warehouse cube 1. [Online]. 2005 [cited 2005 Oct]; Available from: URL: <http://ohfs.moh.gov.on.ca>

4 Ontario Ministry of Health and Long-Term Care. Ontario health care reporting system 5.3. [Online]. 2005 [cited 2005 Oct]; Available from: URL: http://www.mohltcfm.com/cms/client_webmaster/pages.jsp?page_id=a_8273

Appendix 1:

Acronyms used in The Health Analyst's Toolkit

Acronym	Description
AFP	Alternate Payment Plan
ALC	Alternate Level of Care
ALOS	Acute Length of Stay
APHEO	Association of Public Health Epidemiologists in Ontario
CA	Census Agglomeration
CCAC	Community Care Access Centre
CCHS	Canadian Community Health Survey
CCI	Canadian Classification of Health Interventions
CCO	Cancer Care Ontario
CCP	Canadian Classification of Diagnostic, Therapeutic, and Surgical Procedures
CCRS	Continuing Care Reporting System
CD	Census Division
CHDB	Claims History Database
CIHI	Canadian Institute for Health Information
CMA	Census Metropolitan Area
CMG	Case Mix Group
CMH&A	Community Mental Health and Addictions Organization
CPC	Canada Post Corporation
CPDB	Corporate Provider Database
CSD	Census Subdivision
CT	Census Tract
CTC	Children's Treatment Centre
CV	Coefficient of Variation
DA	Dissemination Area
DAD	Discharge Abstract Database
DHC	Diagnostic Health Condition
DHC	District Health Council
EA	Enumeration Area
FIM	Finance and Information Branch
FSA	Forward Sortation Area
HDDSU	Health Data and Decision Support Unit
HIPSU	Health Information Product Services Unit
HIU	Health Intelligence Unit
HRR	Hospital Referral Region
HRT	Health Results Team
HRT-IM	Health Results Team for Information Management
HSA	Hospital Service Area
HSIP	Health System Intelligence Project

Acronym	Description
HSO	Health Services Organizations
HV	High Volume
ICD	International Classification of Diseases
ICES	Institute for Clinical Evaluative Sciences
LHIN	Local Health Integration Network
LOS	Length of Stay
MIS	Guidelines for Management Information Systems
MOHLTC	Ministry of Health and Long-Term Care
NACRS	National Ambulatory Care Reporting System
NRS	National Rehabilitation Reporting System
OCCPS	Ontario Chronic Care Patient System
OCR	Ontario Cancer Registry
OHFS	Ontario Healthcare Financial and Statistical (MIS Data Warehouse)
OHIP	Ontario Health Insurance Plan
OHRS	Ontario Healthcare Reporting System
ORG	Office of the Registrar General
PAC	Prospective Complexity Adjustment
PALS	Participation and Activity Limitation Survey
PCCF	Postal Code Conversion File
PHPDB	Provincial Health Planning Database
PHRED	Public Health Resources Education and Development Program
PHU	Public Health Unit
PHIWG	Provincial Health Indicators Work Group
PUMF	Public Use Microdata File
RCG	Rehabilitation Client Group
RDD	Random Digit Dialling
RIW	Resource Intensity Weight
RPDB	Registered Persons Database
RUG	Resource Utilization Groups
SGC	Standard Geographical Classification
WHO	World Health Organization

