Data Quality Documentation
Hospital Morbidity Database, 2010–2011

Executive Summary

Types of Care

Canadian Institute for Health Information
Institut canadien d'information sur la santé

Who We Are

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

Our Vision

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

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1 Introduction

An ongoing challenge for any organization that produces statistical information is to ensure that a) the quality of the information it produces is suited for its intended uses and b) data users are provided with good information about data quality. To this end, the Canadian Institute for Health Information (CIHI) has established a comprehensive and systematic data quality program that includes the implementation and ongoing monitoring of a corporate Data Quality Framework, as well as conducting special studies that focus on data quality issues.

CIHI's Data Quality Framework was introduced to provide a common, objective approach to assessing the data quality of all CIHI databases and registries. It also standardizes information on data quality for users and helps to identify priority issues, which in turn lead to continuous improvements. The Data Quality Framework draws on Statistics Canada guidelines and methods, literature about information quality, CIHI's mandate, and the principle of continuous quality improvement.

The 2009 framework is structured along five general dimensions of quality: accuracy, timeliness, comparability, usability and relevance. These five dimensions are based on 19 characteristics, which in turn are based on 61 criteria. The framework is part of the larger quality cycle in which problems are identified, addressed, documented and reviewed on a regular basis. A description of the data quality characteristics contained in *CIHI's Data Quality Framework* [14] is available on CIHI's website.

This report, *Data Quality Documentation, Hospital Morbidity Database, 2010–2011—Executive Summary*, is an important output of CIHI's Data Quality Framework. It is intended to provide information about the quality of the data contained in the Hospital Morbidity Database (HMDB) to help users decide whether the information fits their needs. Data quality documentation is published annually with each release of the HMDB, beginning with the 2001–2002 fiscal year. Updated documentation is also released as required. Users who require information beyond what is contained in this report are encouraged to consult the References section in this document or to contact the HMDB program area at CIHI at morbidity@cihi.ca.

1.1 An Overview of the Hospital Morbidity Database

The HMDB is a national data holding that captures administrative, clinical and demographic information on inpatient separations from acute care hospitals. Discharge data is received from all acute care facilities across Canada. Management and responsibility for the HMDB was assumed by CIHI from Statistics Canada in 1995 during a transfer of several databases.

For 2010–2011, all provinces and territories (with the exception of Quebec) submitted discharge data to CIHI's Discharge Abstract Database (DAD). Quebec's Ministère de la Santé et des Services sociaux (MSSS) submitted a data file to CIHI at the end of the year. This data file was then mapped, processed and finally merged with the DAD acute care data to create the national HMDB.

Data from the DAD and the HMDB is housed in the same physical database. The MSSS submits a data file to CIHI on an annual basis. This data file is then merged with the DAD to create the national DAD–HMDB data file. Although there is an overlap between the DAD and the HMDB, there are distinct differences between their populations of reference and data elements. For example, the HMDB includes data from Quebec, whereas the DAD does not contain any separations from this province. For a detailed description of the DAD and to see how it resembles and differs from the HMDB, please refer to the data quality documentation for the DAD on the CIHI website.

1.2 Mandate/Purpose

The mandate of the HMDB is to collect, process and analyze national discharge data from Canadian acute care hospitals. The purposes of the HMDB are to

- Facilitate hospital, regional, provincial/territorial and national comparative reporting;
- Support management decision-making at the hospital, regional and provincial/territorial levels;
- Provide data to federal departments such as the Public Health Agency of Canada/Health Canada; and
- Support related approved analysis and research.

A number of CIHI databases and registries obtain extracts from the HMDB to create their annual files, including the Hospital Mental Health Database (HMHDB) and the National Trauma Registry (NTR). HMDB data is used in the production of several CIHI reports, such as *Health Care in Canada* and *Health Indicators*. Annual updates of Canadian discharge statistics are submitted to the Organisation for Economic Co-operation and Development (OECD) for international comparisons of hospital discharge statistics.

Ad hoc reports are frequently produced for the news media, government organizations, research groups, hospitals and private industry.

2 Coverage

2.1 The HMDB Frame

Table 1 lists the number of valid submitting Institution Numbers for the HMDB. A valid submitting Institution Number is one that has been designated by a ministry or department of health in a province or territory for an institution that is required and expected to report separations.

The Analytical Institution Type Code was a new data element introduced to the DAD in 2004–2005 to minimize the impact of the differences between level-of-care definitions across provinces/territories and to facilitate comparative reporting across Canada. It is a CIHI-defined data element that is assigned when the Institution Type assigned to an Institution Number is known to differ from the type of care provided. CIHI consults and confirms the level of care with the institutions and the provincial/territorial ministries or departments of health before assigning this value. Table 2 lists the number of Institution Numbers that were assigned an Analytical Institution Type that is different from the Institution Type in 2010–2011 by province.

Table 1: Number of Acute Care Institution Numbers in the 2010–2011 HMDB as Defined by Analytical Institution Type Code, by Province/Territory

Province/Territory	Number of Acute Care Institution Numbers
Newfoundland and Labrador	34
Prince Edward Island	7
Nova Scotia	33
New Brunswick	21
Quebec	105
Ontario	168
Manitoba	73
Saskatchewan	69
Alberta	96
British Columbia	80
Yukon	1
Northwest Territories	4
Nunavut	1
Total	**692**

Table 2: Number of Institution Numbers Assigned an Analytical Institution Type That Differs From the Institution Type in the HMDB, 2010–2011

Province	Number of Affected Institutions	Submitted Institution Type	Analytical Institution Type
Nova Scotia	1	Acute	Psychiatric
Quebec	14	Acute	Chronic Care
	10	Acute	General Rehabilitation
	11	Acute	Psychiatric
Ontario	2	Acute	Chronic Care
	4	Acute	Psychiatric
Manitoba	2	Acute	Chronic Care
	22	Acute	Nursing Station
Alberta	13	Acute	Sub-Acute
British Columbia	1	Acute	Psychiatric
	1	Chronic Care	Psychiatric

2.2 Population of Reference for the HMDB

The population of reference for the 2010–2011 HMDB includes all separations from acute care institutions in Canada (excluding stillbirths and cadaveric donors), as defined by the Analytical Institution Type Code, between April 1, 2010, and March 31, 2011.

Table 3 shows the total number of abstracts included in the HMDB for 2010–2011.

Abstracts (including newborns but excluding stillbirths and cadaveric donors) are categorized by Analytical Institution Type Code. Of these, approximately 77% were originally submitted to the DAD. The remaining records (approximately 23%) were provided by the MSSS.

Table 3: Number of Acute Care Abstracts in the 2010–2011 HMDB as Defined by Analytical Institution Type Code, by Province/Territory

Province/Territory	Number of Acute Care Abstracts
Newfoundland and Labrador	55,405
Prince Edward Island	15,497
Nova Scotia	94,008
New Brunswick	90,809
Quebec	734,158
Ontario	1,095,037
Manitoba	134,729
Saskatchewan	138,742
Alberta	364,041
British Columbia	414,529
Yukon	3,263
Northwest Territories	5,658
Nunavut	1,968
Total	**3,147,844**

3 Collection and Response

3.1 Data Collection

DAD data collection and capture procedures apply to DAD-submitting facilities in the HMDB. The DAD discharge abstract is completed by health records professionals and submitted to CIHI on a monthly basis throughout the year. If errors are found during processing, the facility receives a detailed report describing all errors found, and the facility is requested to submit a correction. In the case of Quebec, the MSSS submits a single annual file of its hospital separations following the closure of its provincial database. This data has also been edited, validated and corrected prior to submission to CIHI for inclusion in the HMDB.

3.1.1 Abstracting and Data Submission

DAD Data Submission

The DAD abstract is a record of hospital activity that is completed for each instance of a hospital separation (discharge, death, sign-out or transfer of the patient to another facility). The data collected on each abstract includes coded diagnostic, intervention and patient demographic and administrative information. Diagnostic and intervention information is captured according to ICD-10-CA/CCI. ICD-10-CA is the enhanced Canadian version of the 10th revision of the International Statistical Classification of Diseases and Related Health Problems.

CCI is the Canadian Classification of Health Interventions, developed and maintained by CIHI. Sections 4.1 and 4.2 provide additional detail on the implementation of ICD-10-CA and CCI across the country.

For DAD-submitting facilities, the *DAD Abstracting Manual*[1] provides data element definitions, data collection guidelines, data validation rules, error message descriptions and valid code values. It is made available to clients prior to the beginning of each fiscal year. The Core section of the manual provides the data collection requirements that are applicable at a national level. A section on provincial variations identifies province-/territory-specific guidelines for abstracting certain data elements. Adherence to the data submission and coding standards described in the manual ensures that CIHI reports accurately reflect the hospital's patient activity. Adherence is enforced through the application of edits and through educational sessions offered by CIHI.

All hospitals that submit data to the DAD must use abstracting software that meets CIHI's specifications. CIHI outsources the development of abstracting software to vendors in the private sector. These vendors incorporate CIHI submission specifications into proprietary software systems, which also provide data quality control measures, such as data capture edit checks, cross–data element logic checks and interactive warning messages, to be presented to clients as data is collected.

Quebec Data Submission

Demographic, clinical and administrative information for inpatient acute care, day surgery, as well as data from some rehab, chronic and psychiatric facilities, is captured in the Quebec database MED-ÉCHO. The MSSS in Quebec submits an annual file to CIHI on a voluntary basis. The file format is not the same as the DAD file format; however, many of the data elements are the same. Although Quebec adopted the ICD-10-CA/CCI for coding clinical information as of 2006–2007, full adoption of the Canadian Coding Standards for diagnoses and interventions did not occur. The MSSS issued the Quebec Coding Directives, which are comparable to the Canadian Coding Standards with few exceptions related to the different concepts of Diagnosis Type in the DAD and Diagnosis Characteristic in MED-ÉCHO. To enable national reporting and provincial comparisons, CIHI, with the input of the ministry, maps the available Quebec data elements to the DAD data elements where applicable.

3.2 Data Quality Control

Extensive quality control measures support the collection of high-quality data in the HMDB. Highlights are provided below. For more detail, users are encouraged to refer to the document *Quality Assurance Processes Applied to the Discharge Abstract and Hospital Morbidity Databases*,[2] available on the CIHI website.

DAD Data Submission

Abstracting Software Development and Testing

CIHI maintains data capture quality control measures through the Vendor Relations and Production Systems sections of its Information Technology department. These areas offer vendor support, coordinate the annual release of vendor system specifications and assist with vendor system testing. CIHI requires vendors to test their software annually. They must submit a specified number and type of test abstracts, which are then processed in a testing environment to ensure that the format and content of the files meet the submission requirements for the fiscal year. Facilities are also required to submit test submissions after their vendors have passed an annual test.

CIHI Education Program

Through the CIHI education program, instructional sessions are provided to clients on coding and abstracting, managing submission errors and corrections, Case Mix Group methodology and other related topics. These sessions serve as one mechanism to ensure standardized data collection coding practices and adherence to CIHI's data submission and collection requirements.

CIHI's eQuery application provides clients with a central place to submit questions to a variety of program areas. With this shared knowledge base, clients can view answers to questions that have previously been asked about DAD abstracting, data quality, report interpretation and other topics. Clients can also submit new questions that are not already resolved in the knowledge base.

CIHI Production System Edits and Correction Process

More than 800 data element edits are applied to each abstract as it is processed at CIHI to ensure that the data in each field is in the expected format, falls within a specific range of values and has a logical relationship to other data elements. For most data elements, when errors are detected, a standard default value of Z is substituted into the data field (for hard errors), or the field is flagged with a warning message. For some data elements, blanks or numeric values are used to represent missing or invalid data. The client receives an electronic report and is asked to submit corrections for abstracts and fields that have been defaulted to Z or flagged as errors. The correction and editing steps are repeated until either the client successfully corrects the abstracts or the database closes at the year-end deadline. Prior to the closure of the fiscal year, clients can submit abstracts that were missing from a previous admission or delete duplicate abstracts. Any uncorrected hard errors that remain in the database can be identified by the standard default value of Z.

In addition to verifying individual data elements, the editing process checks a number of interrelationships. Clients may receive an error message in a field when the reported value is valid but violates certain logical relationships with the data in other fields. To ensure relevance and consistency, edits are reviewed and updated each year as new data elements are added and changes are made to the database. Test cases and specifications are created according to internal guidelines so that new edits will function correctly.

Client Services Representatives

CIHI assigns specific client services representatives to provide support for data collectors in each of the DAD-submitting provinces and territories. The client services representatives answer questions related to DAD products, help develop and deliver education programs, provide data quality expertise and build relationships with provincial/territorial data consultants, health organizations and data users.

Special Studies

CIHI's Data Quality department evaluates coding and abstracting accuracy in the DAD via reabstraction studies. Reabstraction involves returning to the original source of information (a patient chart) and comparing it with information in the DAD. The studies focus on data used to calculate specific health indicators, select administrative clinical data and diagnosis and intervention coding.

Eight reabstraction studies have been completed and released to date; they are available on CIHI's website. The first study is *Discharge Abstract Database Data Quality Re-Abstraction Study—Combined Findings for Fiscal Years 1999/2000 and 2000/2001*.[3] Building upon this two-year study, CIHI also produced the *Discharge Abstract Database (DAD) CMG/Plx Data Quality Re-Abstraction Study*,[4] which measured the accuracy of data elements used in the CMG assignment methodology and complexity overlay process. The third study is *Data Quality of the Discharge Abstract Database Following the First-Year Implementation of ICD-10-CA/CCI—Final Report*.[5] The fourth, *Reabstraction Study of the Ontario Case Costing Facilities for Fiscal Years 2002/2003 and 2003/2004*,[6] includes the double reabstraction of approximately 800 separations to specifically measure the inter-rater reliability of the health information professionals who participated in the study.

The Data Quality department at CIHI has implemented a five-year plan for ongoing reabstraction studies, starting with a study of the 2005–2006 DAD. The first part (year 1) of the study, *CIHI Data Quality Study of the 2005–2006 Discharge Abstract Database*,[7] evaluated the quality of clinical and non-clinical information in the 2005–2006 DAD for all of the provinces and territories across

Canada; it also identified issues associated with coding variations. Results for the 2005–2006 study were released in winter 2008 to all institutions and provinces that participated in the study. A summary report has been available on CIHI's website since August 2009.

The second part (year 2) of the study, *CIHI Data Quality Study of the 2006–2007 Discharge Abstract Database*,[8] focused on interventions used by the case mix methodology and included the provinces of British Columbia, Alberta and Ontario. Results were distributed to those institutions and provinces that participated in the study in summer and fall 2009; in November 2009, a summary report was made available on CIHI's website.

A third study, *CIHI Data Quality Study of the 2007–2008 Discharge Abstract Database*,[9] focused on specific health conditions in the 2007–2008 DAD. Results were distributed to participating institutions in February 2010 and to participating provinces in April 2010. The summary report was made available on CIHI's website in May 2010.

A fourth study, *CIHI Data Quality Study of the 2008–2009 Discharge Abstract Database*,[15] focused on stroke and thrombolytic therapy in the 2008–2009 DAD. Institution and province reports were disseminated in summer 2010, while the summary report was made available on CIHI's website in January 2011.

Quebec Data Submission

Many data quality control measures are applied to the Quebec data.

MSSS Control Measures

Data capture quality control measures exist at the source of data collection, as required by the MSSS. The MED-ÉCHO data file is subjected to Quebec-specific validity and edit checks prior to database closure. The ministry also performs data quality checks prior to sending the data files to CIHI.

CIHI

Quebec data is further edited once at CIHI. Staging tables are produced in preparation for processing, and the counts in these staging tables are checked against counts obtained from the source file. There are also checks performed to confirm the number of records and diagnosis and procedure counts between stages. Applicable DAD edits are applied and any invalid data is flagged.

3.3 Data Element Changes

Refinements and suggested enhancements to data elements in the DAD–HMDB are communicated to CIHI in several ways. These include

- Regular communication from clients to DAD client services representatives;
- Input from advisory committees; and
- Formal submissions for data element additions or deletions from stakeholders.

Requests for data element additions, deletions and enhancements are discussed at the semi-annual meetings of the National Steering Committee for Clinical Administrative Databases. The mandate of this committee is to make recommendations to CIHI on operational and strategic issues related to the clinical administrative databases, including the DAD and HMDB. Each province and territory appoints a member to the committee, with a requirement that the member possess decision-making authority on matters related to the DAD and HMDB in his or her province or territory. The committee considers whether a proposed data element is appropriate for inclusion in the database and whether its collection ought to be mandatory (to ensure national comparability), optional or a provincial variation (specific to only selected provinces/territories).

4 Major Changes

4.1 Historical Changes

Classification Systems

Classification systems in health care provide a standard mechanism for the capture and coding of diagnoses and interventions. ICD-10-CA is the enhanced Canadian version of the 10th revision of the International Statistical Classification of Diseases and Related Health Problems and replaces the earlier ICD-9 and ICD-9-CM classifications. CCI is the Canadian Classification of Health Interventions, developed and maintained by CIHI. It contains a comprehensive list of diagnostic, therapeutic and support interventions and replaces the CCP and ICD-9-CM intervention codes.

The ICD-10-CA and CCI classification systems were first implemented in 2001–2002 in Newfoundland and Labrador, Prince Edward Island, Nova Scotia, British Columbia, the Yukon and parts of Saskatchewan. Full implementation of ICD-10-CA and CCI was achieved in 2006–2007, when Quebec made the transition from ICD-9 and CCP. See Table 4 for details on the timing of the implementation of ICD-10-CA and CCI in each jurisdiction.

Table 4: Year of ICD-10-CA/CCI Implementation, by Province/Territory

Province/ Territory	2001–2002	2002–2003	2003–2004	2004–2005	2006–2007
Newfoundland and Labrador	**ICD-10-CA/CCI**	ICD-10-CA/CCI	ICD-10-CA/CCI	ICD-10-CA/CCI	ICD-10-CA/CCI
Prince Edward Island	**ICD-10-CA/CCI**	ICD-10-CA/CCI	ICD-10-CA/CCI	ICD-10-CA/CCI	ICD-10-CA/CCI
Nova Scotia	**ICD-10-CA/CCI**	ICD-10-CA/CCI	ICD-10-CA/CCI	ICD-10-CA/CCI	ICD-10-CA/CCI
British Columbia	**ICD-10-CA/CCI**	ICD-10-CA/CCI	ICD-10-CA/CCI	ICD-10-CA/CCI	ICD-10-CA/CCI
Yukon	**ICD-10-CA/CCI**	ICD-10-CA/CCI	ICD-10-CA/CCI	ICD-10-CA/CCI	ICD-10-CA/CCI
Saskatchewan	**ICD-10-CA/CCI (partial)**	**ICD-10-CA/CCI (full)**	ICD-10-CA/CCI	ICD-10-CA/CCI	ICD-10-CA/CCI
Ontario	ICD-9/CCP and ICD-9-CM	**ICD-10-CA/CCI**	ICD-10-CA/CCI	ICD-10-CA/CCI	ICD-10-CA/CCI
Alberta	ICD-9-CM	**ICD-10-CA/CCI**	ICD-10-CA/CCI	ICD-10-CA/CCI	ICD-10-CA/CCI
Northwest Territories	ICD-9-CM	**ICD-10-CA/CCI**	ICD-10-CA/CCI	ICD-10-CA/CCI	ICD-10-CA/CCI
Nunavut	ICD-9-CM	**ICD-10-CA/CCI**	ICD-10-CA/CCI	ICD-10-CA/CCI	ICD-10-CA/CCI
New Brunswick	ICD-9-CM	ICD-9-CM	**ICD-10-CA/CCI**	ICD-10-CA/CCI	ICD-10-CA/CCI
Manitoba	ICD-9-CM	ICD-9-CM	ICD-9-CM	**ICD-10-CA/CCI**	ICD-10-CA/CCI
Quebec	ICD-9/CCP	ICD-9/CCP	ICD-9/CCP	ICD-9/CCP	**ICD-10-CA/CCI**

ICD-10-CA and CCI codes are reviewed regularly, and codes may be added or deactivated as required. In April 2006, a new version of the ICD-10-CA/CCI was introduced, which included a large number of new diagnosis and intervention codes. Further information on the changes can be found in the CIHI publication *ICD-10-CA and CCI Evolution Tables, 2006*,[10] which is available on CIHI's website.

The ICD-10-CA and CCI coding standards are also reviewed, amended and enhanced annually by a pan-Canadian committee representing the provinces and territories. *Canadian Coding Standards for ICD-10-CA and CCI, 2006*[11] is available on the CIHI website and can be downloaded free of charge.

To initially assess the quality of coded diagnostic and intervention data from the first-year implementation of the new ICD-10-CA and CCI classification systems, *Data Quality of the Discharge Abstract Database Following the First-Year Implementation of ICD-10-CA/CCI—Final Report*[5] was published to provide data users with accurate and timely information on the implementation of the system and the accuracy of the data. The complete document is available on the CIHI website.

In an effort to produce nationally comparable data until such time as all jurisdictions were reporting in ICD-10-CA and CCI, CIHI created conversion tables to map ICD-10-CA and CCI codes back to ICD-9 and CCP codes, respectively. The data was converted up to and including 2006–2007. As of 2007–2008, only ICD-10-CA and CCI codes are included in the HMDB. In some cases, where a direct one-to-one conversion was not possible,

the conversion tables used a best force fit of codes, and comparability was inevitably compromised. Time series analyses have revealed that there are important limitations when using converted data. Therefore, CIHI strongly recommends that data analysis be conducted in the original classification system (that is, in the classification system in which the data was coded) and that converted data be used with caution, if at all. This is consistent with recommendations from the World Health Organization and underscores the importance of understanding how a specific disease entity or intervention is coded in ICD-10-CA and CCI versus ICD-9/CCP to conduct meaningful time series analyses, perform provincial/territorial comparisons and report national counts.

In April 2006, Quebec facilities began coding diagnosis and intervention data using the ICD-10-CA and CCI classification systems. The DAD ICD-10-CA abstract allows for the capture of up to 25 diagnoses for DAD provinces/territories. The MED-ÉCHO ICD-10-CA abstract for Quebec allows for the capture of diagnoses in up to four service blocks and up to 25 other diagnoses in the “Autres diagnostics” fields. Two accident codes can also be captured in the “Code de cause extérieure d’accident” and “Code de lieu d’accident” fields on the MED-ÉCHO abstract, for a total of up to 31 diagnoses on one abstract. This is an increase from a maximum of 16 diagnoses with the MED-ÉCHO ICD-9 abstract. Mapping rules applied to MED-ÉCHO data result in up to 35 diagnoses on each Quebec abstract in HMDB. Diagnosis codes from each of the four service blocks are moved into the HMDB twice: once to capture the diagnosis type C, 2, 3, 9 or 0 in the diagnosis type field and a second time to capture the diagnosis type M, W, X or Y for the same diagnosis code. Efforts were made within CIHI to verify the comparability of the 2006–2007 Quebec data to that of the previous years, which had been coded in ICD-9 and CCP.

Health Care Number

The collection and provision of provincial/territorial Health Care Numbers in the HMDB has been an evolving process. The Health Care Number is a mandatory data element in Quebec and is verified within the province before the data is sent to CIHI.

The Health Care Number is also a mandatory data element for all DAD-submitting provinces and territories. CIHI validates this field against files or algorithms provided by each provincial/territorial ministry of health. Beginning with the 1999–2000 data year, allowance was made to capture instances in which the patient was insured by another province’s health plan. In such cases, CIHI can validate only the length of the data field, not the actual number. In the past, Ontario, Saskatchewan, Alberta, British Columbia and the Northwest Territories have revised their health care numbering systems (for example, from family- to individual-based) and have issued new Health Care Numbers.

However, CIHI does not have the linking information between the old and the new numbering systems. Therefore, users must exercise caution when using Health Care Numbers for linkage purposes.

Note that CIHI, under its Privacy and Confidentiality Policy,[12] releases only encrypted Health Care Numbers to external users, if they are released at all.

Coding Variations

Concern over the potential impact of variation in abstracting and coding practices across DAD hospitals on the comparability of DAD data resulted in the production of *Coding Variations in the Discharge Abstract Database (DAD) Data, FY 1996–1997 to 2000–2001*,[13] available on the CIHI website. Please refer to this document for detailed analysis.

Manitoba Submissions to the DAD

All hospitals in Manitoba began submitting their discharge abstracts directly to the DAD in April 2004. Until the end of 2003–2004 (March 31, 2004), only the Winnipeg region of Manitoba submitted discharge abstracts to the DAD, and Manitoba Health submitted annual data files to the HMDB.

In the HMDB prior to 2004–2005, four Manitoba Institution Numbers were used as pseudo Institution Numbers to track Manitoba residents treated outside of the province. When Manitoba began fully submitting to the DAD in April 2004, these four Institution Numbers were recycled and assigned to DAD-submitting facilities. This issue impacts trending analyses for all fiscal years that include data from these four institutions.

Changes to CIHI Data Processing of Quebec Data as of 2006–2007

Quebec's adoption of ICD-10-CA and CCI for coding clinical data as of April 1, 2006, provided a unique opportunity for CIHI to enhance the process for integrating MED-ÉCHO data into the HMDB. The revision of the mapping rules, a joint effort between CIHI and the MSSS, resulted in the ability to populate more data elements in the HMDB than was historically possible for Quebec data. A good example is the ability to populate additional values of the DAD Diagnosis Type data element for MED-ÉCHO data, albeit with important limitations regarding comorbidities present at admission and secondary diagnoses. While Quebec adopted ICD-10-CA and CCI for coding clinical information, full adoption of the Canadian Coding Standards did not occur. The MSSS issued the Quebec Coding Directives, which, with few exceptions (mostly related to the different concepts of Diagnosis Type in the DAD and "Caractéristique du diagnostic" in MED-ÉCHO), are comparable to the Canadian Coding Standards.

Following the integration of the 2006–2007 MED-ÉCHO data into the HMDB, which involved applying the DAD edits to MED-ÉCHO data, a high volume of diagnostic and intervention codes were found to have failed the edits in MED-ÉCHO data, rendering the data unusable for certain analyses. Therefore, to ensure the integrity and fitness for use of Quebec data, a solution was put in place that allowed MED-ÉCHO data to be edited such that a data element that failed an edit was not systematically given a value of Z. Instead, the record that failed the edit was flagged and linked to a look-up table that provides the details of the edit failure. Analysts are required to review Quebec data carefully and make decisions on an analysis-by-analysis basis to include or exclude Quebec records from the analysis.

CIHI's Assignment of Diagnosis Type to Quebec Data

While Diagnosis Types are assigned by the submitting institutions for DAD-submitting provinces and territories, Diagnosis Type is not a concept within the MED-ÉCHO data. However, there is a data element in MED-ÉCHO that corresponds to Diagnosis Type called "Caractéristique du diagnostic." A new methodology to derive Diagnosis Types was implemented for 2006–2007 and onwards. All assigned Diagnosis Types are consistent with the DAD definitions.

In the DAD, the pre-admission comorbidity definition is consistently applied across all DAD-submitting provinces and territories, and these diagnoses are assigned Diagnosis Type 1 by the submitting institutions. CIHI initially assigned Diagnosis Type 1 to the Quebec data but found that the number of Type 1 diagnoses greatly exceeded the estimated expectations based on comparisons with other provinces and territories. This large volume of pre-admission comorbidities is likely due to a default within the MED-ÉCHO system by which some secondary diagnoses were incorrectly defaulted as pre-admission comorbidities. To account for the fact that Diagnosis Type 1s for Quebec also include some secondary diagnoses that were miscategorized in MED-ÉCHO, a new value for Diagnosis Type has been assigned for Quebec records only. Diagnosis Type C has been created because CIHI cannot distinguish the Diagnosis Type 1s from Diagnosis Type 3s that were incorrectly defaulted in the MED-ÉCHO system.

Quebec Geographic Data

With the exception of Quebec, all provinces and territories submit postal codes at the full six-digit level to CIHI. Prior to 2006–2007, Quebec submitted only the first three digits of the postal code, also known as the forward sortation area (FSA), which is the lowest level of aggregation. As of 2006–2007, patient geographic information submitted by Quebec consists of a mini–postal code (a two-letter code identifying a Canadian province or territory of residence) and a ministry-assigned administrative region code for Quebec residents.

While this data can be used to group Quebec residents by region and Canadian residents by province or territory of residence, there is no longer a sufficient level of granularity available to distinguish an FSA.

Diagnosis Type 0

In the DAD, Diagnosis Type 0 is restricted to newborn codes only when Admission Category is N (Newborn). The concept of Diagnosis Type does not exist in MED-ÉCHO. Through internal consultation, no need for this diagnosis type could be identified. Thus, as of 2009–2010, Quebec records will not have a Diagnosis Type 0 associated with any diagnosis codes.

4.2 Major Changes in 2010–2011

There are no major changes to report in 2010–2011.

4.3 Future Changes

No major future changes are anticipated at this time.

5 Comparability

Comparability refers to the extent to which databases are consistent over time and use standard conventions (such as data elements or reporting periods) that make them similar to other databases.

In performing analyses over time or across provinces/territories, users should note that in any given fiscal year, the collection of a data element within a province or territory can be mandatory, optional or vary in definition, depending on the decisions made by the provincial/territorial ministries of health. Changes over time can be tracked by examining the yearly documentation (such as the *DAD Abstracting Manual*[1]). HMDB staff members are also available to answer questions about year-to-year data element changes.

5.1 Geography

Postal Code is a common variable in almost all CIHI databases. If it is used along with the Postal Code Conversion File (PCCF) from Statistics Canada, any standard geographical classification can be located and information can be compared across databases.

With the exception of Quebec, all provinces and territories submit postal codes at the full six-digit level to CIHI. The first three characters, also known as the FSA, is the lowest level of aggregation typically available to external users under

CIHI's Privacy and Confidentiality Policy.[12] The release of data for small geographical areas may also be restricted to ensure confidentiality. Special requests must be approved by the CIHI Privacy, Confidentiality and Security team.

For some rural areas, postal code data does not necessarily provide an accurate picture of patient residence because of the use of post office box numbers, which may be located in a region different than the place of residence. Rural postal codes may also map to more than one enumeration area, thus reducing the ability to determine the specific place of residence.

Since 2006–2007, patient geographic information submitted by Quebec consists of a mini–postal code (a two-letter code identifying a Canadian province or territory of residence) and a ministry-assigned administrative region code for Quebec residents. While this data can be used to group Quebec residents by region and Canadian residents by province or territory of residence, there is no longer a sufficient level of granularity available to distinguish an FSA.

5.2 Institution

There are two numbers by which an institution may be identified in the HMDB. The first is the Institution Number, which is assigned by the provincial/territorial ministries of health. In the HMDB, a province/territory prefix is added to the Institution Number to make each Institution Number unique. This is the case for all provinces/territories except Quebec. Institution Numbers submitted by Quebec are originally eight digits long and are truncated to five digits once submitted to the HMDB. When attempting to identify an institution in the HMDB, the Institution Number should be combined with the data element Submitting Province Code to ensure that the correct institution is identified.

The second method is the Institutional Care Facility Master Inventory (ICFMI) number. This number is unique at the provincial or territorial level. Historically assigned by Statistics Canada, the ICFMI number is now assigned to new facilities by CIHI.

Information that can identify an institution is not released externally without approval from the CIHI Privacy, Confidentiality and Security team. For limitations related to Institution Number, refer to Section 4.1.

5.3 Time

HMDB data is grouped by fiscal year (April 1 to March 31), based on the discharge date on the abstract. Admission dates collected on each abstract enable data users to group data within and across fiscal years, depending on the need of the study.

5.4 Person

Patient names and street addresses are *not* part of the HMDB. Health Care Numbers (HCNs) are assigned to individuals by provincial/territorial ministries of health. CIHI receives a complete HCN (which may be encrypted prior to submission to CIHI) and applies a standard algorithm to scramble this number. Because the numbers are unique only within each province or territory, the HMDB captures a variable representing the province or territory that issued the HCN. Combining the HCN and the Province/Territory Issuing Health Care Number with other fields, such as Birthdate, Gender and Postal Code, means that unique individuals can be identified within the database without identifying the actual individual.

A person's HCN, Birthdate and full Postal Code are not normally made available to external users. Access to these and other restricted data elements, as well as the use of HMDB data for linkage studies, requires prior approval by the CIHI Privacy, Confidentiality and Security team.

5.5 External Source Validation

DAD Data Submission

Volumes of cases submitted to the DAD can be compared with hospital census reports and the hospitals' own internal systems. Facilities receive reports notifying them of the number of records received and processed at CIHI for each period and compare these with the number of records they submitted and the number of patients registered as admitted and discharged.

Quebec Data Submission

For Quebec institutions, frame maintenance and validation are completed by the Quebec MSSS prior to the closure of its inpatient discharge database and prior to data file submission to the HMDB.

6 General Data Limitations

Data limitations are detected and investigated through data processing and editing and through data quality activities within the HMDB program area. The CIHI Data Quality Framework, which was implemented in 2000–2001, provides a common strategy for assessing data quality across CIHI databases and registries. The framework is built upon five dimensions of quality:

- Accuracy
- Comparability
- Timeliness

- Usability
- Relevance

The data limitations presented below focus on the accuracy (coverage, non-response, response bias, and edits and imputations), comparability (equivalency, linkage, standardization and historical comparability) and timeliness dimensions. For further information on the *CIHI Data Quality Framework* [14] please refer to the CIHI website.

6.1 Accuracy

Accuracy refers to how well information in, or derived from, the database or registry reflects the reality it was designed to measure.

Coverage

The HMDB frame is effectively validated by the provinces and territories, since they determine in advance which institutions must submit data to the DAD or to MED-ÉCHO.

Over-Coverage

Over-coverage occurs when units that are not part of the population of reference are included in the frame, potentially skewing the result of analyses performed on the population of reference. The population of reference in the HMDB is acute inpatient abstracts. In addition, however, institutions have occasionally used the HMDB to abstract data from other levels of care, including chronic care and rehabilitation. Any such non-acute data that appears in the HMDB does not constitute over-coverage, since the reference population can still be studied if these records are excluded by using the Analytical Institution Type Code. Users are advised to use Analytical Institution Type Codes to identify acute inpatient abstracts.

Under-Coverage

Under-coverage occurs when part of the population of reference is not included in the frame. This, too, can affect analyses of the population of reference. There were no known sources of under-coverage in the HMDB in 2010–2011, since acute care institutions are mandated by their provincial/territorial ministry of health to submit to the DAD or MED-ÉCHO. Note that under-coverage is different from non-response, which occurs when facilities are on the frame but have not submitted all abstracts for a specified time period (see Unit Non-Response and Item Non-Response for further information).

There are a number of coverage issues to be aware of when using 2010–2011data:

- **Changes in institutions:** Throughout the fiscal year, there are openings, closures and mergers of institutions. Some facilities closed, some submitted data under a different level of care and others were no longer part of the frame at some point during the year. Of the Institution Numbers reported in 2010–2011, four acute care institutions were valid in 2009–2010 but not valid in 2010–2011. One was from New Brunswick, one was from Ontario, one was from Saskatchewan and one was from British Columbia. There were no new institutions in 2010–2011 that did not exist in 2009–2010. In 2010–2011, effective October 1, 2010, three Ontario acute care institutions changed their institution numbers.

  Each of these institutions used two valid institution numbers to submit their data in 2010–2011.
- **Potential extra abstracts:** To identify potential extra abstracts in the HMDB, CIHI looks for abstracts with identical values in a combination of select data elements, including Province Code, Institution Code, Health Care Number, Birthdate, Gender, Postal Code, Admission Date/Time, Discharge Date/Time, Most Responsible Diagnosis, Principal Intervention Code and Weight. CIHI is unable to identify true extra abstracts definitively without confirmation by agencies of the provincial and territorial governments. In 2010–2011, there were 220 potential extra abstracts (of which 3 are from Quebec) in the HMDB population of reference. These include 180 duplicates and 20 triplicates. The high number of extra abstracts in 2010–2011 is due to an Ontario institution which had 148 duplicate records and 20 triplicate records.
- **Analytical Institution Type assignment:** No sources of over-coverage or under-coverage were identified after the closure of the 2010–2011 DAD.

Unit Non-Response

Unit non-response can occur at either the institution level (the frame unit) or the record level (the unit of analysis).

Record-level unit non-response occurs when an entire record is missing. Although it is not possible to determine whether an abstract was submitted for every episode of care, provincial/territorial mandates and legislation make it very unlikely that significant numbers of abstracts would not be submitted. Hospitals are mandated by their provincial/territorial ministry of health to submit all abstracts in a fiscal year to the DAD, or to the MED-ÉCHO database in Quebec. In addition, hospitals are bound by provincial/territorial legislation to maintain a health record for all individuals seen in hospital, and in many provinces, hospital funding depends upon the comprehensive submission of data for each patient by that hospital.

Institution-level unit non-response occurs when an entire fiscal period of data or an entire facility is missing. Two valid institutions from Ontario did not submit any data to CIHI in 2010–2011 due to staff shortages. A total of 236 abstracts were not reported to CIHI. The missing data from these two institutions constitutes institution-level unit non-response as no data files were submitted for the entire fiscal year. The unit non-response rate at the institution level in the DAD for 2010–2011 was 0.23%.

Item Non-Response

Item non-response is defined as the magnitude with which received abstracts have blank data elements that should not be blank.

For DAD-submitting provinces/territories, the item response rate depends largely on whether submission of the data element to CIHI is mandatory or optional. No missing data is allowed for mandatory variables. Uncorrected missing values and invalid data for mandatory variables are converted to Z. Examples of mandatory data elements for all DAD provinces/territories include Postal Code, Birthdate, Admission Date and Discharge Date (less than 0.01% had missing values or hard errors).

For Quebec facilities, the item response rate depends largely on whether submission of the data element was historically mandated by Statistics Canada and/or the provincial government. As of 2006–2007, CIHI changed its practice for handling missing or invalid values in the Quebec data. In the DAD, missing or invalid mandatory data is defaulted to Z. However, as described previously, the editing process for the Quebec data was modified such that a data element that failed a DAD edit is not systematically replaced by a Z. Instead, the record that failed the edit is flagged and linked to a look-up table that provides the details of the failure. Analysts are required to review Quebec data carefully and make decisions on an analysis-by-analysis basis to include or exclude Quebec records from the analysis.

For 2010–2011, approximately 37.2% of abstracts received via the MED-ÉCHO data file had missing values or invalid data and were therefore assigned a Discrepancy Flag and logged into the QC Discrepancy Log. For the core data elements, item non-response is typically less than 0.1%. For Health Care Number, it was 2.2%. It is noted that Quebec submits Age rather than Birthdate and a mini–postal code rather than full Postal Code.

Response Bias

Response bias occurs when a data element is coded incorrectly and the errors occur in a systematic way. The CIHI report *Coding Variations in the Discharge Abstract Database (DAD) Data, FY 1996–1997 to 2000–2001*[13] found that coding variations result from differences in the interpretation of coding/reporting guidelines and varying documentation practices in institutions. While reabstraction of 2001–2002 and 2002–2003 DAD data showed that problems with diagnosis typing had not been eliminated, preliminary analysis of the 2003–2004 and 2004–2005 DAD data suggested a reduction in coding variations.

The Data Quality department at CIHI has implemented a five-year plan for ongoing reabstraction studies, starting with a study of the 2005–2006 DAD. The first part (year 1) of the study, *CIHI Data Quality Study of the 2005–2006 Discharge Abstract Database*,[7] evaluated the quality of clinical and non-clinical information in the 2005–2006 DAD for all of the provinces and territories across Canada; it also identified issues associated with coding variations. Results for the 2005–2006 study were released in winter 2008 to all institutions and provinces that participated in the study. As of August 2009, a summary report is available on CIHI's website.

The second part (year 2) of the study, *CIHI Data Quality Study of the 2006–2007 Discharge Abstract Database*,[8] focused on interventions used by the case mix methodology and included the provinces of British Columbia, Alberta and Ontario. Results were distributed to those institutions and provinces that participated in the study in summer and fall 2009; in November 2009, a summary report was made available on CIHI's website.

A third study, *CIHI Data Quality Study of the 2007–2008 Discharge Abstract Database*,[9] focused on specific health conditions in the 2007–2008 DAD. Results were distributed to participating institutions in February 2010 and to participating provinces in April 2010. The summary report was made available on CIHI's website in May 2010.

A fourth study, *CIHI Data Quality Study of the 2008–2009 Discharge Abstract Database*,[15] focused on stroke and thrombolytic therapy in the 2008–2009 DAD. Institution and province reports were disseminated in summer 2010, while the summary report was made available on CIHI's website in January 2011.

Data from Quebec constitutes 23% of all data in the HMDB, with the remainder originating in the DAD. A reabstraction study has not been completed for the HMDB, but there is no reason to suspect that the level of bias is significant. Inter-provincial comparisons for a variety of indicators (such as in-hospital mortality rates) reveal no differences between Quebec and the DAD-submitting provinces.

Edits and Imputations

DAD-Submitting Institutions

The DAD's edit structure is comprehensive and is designed to identify inconsistencies. More than 800 data edits are applied to the DAD; errors are reported in the form of either the standard default value Z or a warning message, and the client is asked to submit a corrected abstract. The correction and editing steps repeat until the client successfully corrects the abstracts or the database closes at its year-end deadline. Prior to the closure of the fiscal year, clients can also submit abstracts that were missing from a previous submission period or delete duplicate abstracts that have been detected by subsequent analyses. Any remaining errors that are identified are defaulted to the value of Z by CIHI into the corresponding data element field.

Apart from data values, the editing process also checks the relationship between data elements. Clients may receive an error message when the reported value is in fact valid but violates a logical relationship with another data element. Edits are reviewed and updated each year as new elements are added and changes to the database are made to ensure relevance and consistency. Test cases and specifications are created according to internal guidelines for all new edits to ensure that they function correctly.

Quebec Institutions

The MED-ÉCHO data files are subject to Quebec-specific edit checks prior to database closure. The Quebec ministry then submits a yearly MED-ÉCHO file to CIHI. After the data is mapped and formatted into the DAD–HMDB schema, relevant DAD edits are applied.

Following the integration of the 2006–2007 MED-ÉCHO data into the HMDB, which involved applying the DAD edits to MED-ÉCHO data, a high volume of diagnostic and intervention codes were found to have failed the edits in MED-ÉCHO data, rendering the data unusable for certain analyses. Therefore, to ensure the integrity and fitness for use of Quebec data, a solution was put in place that allowed MED-ÉCHO data to be edited in a way that a data element that failed an edit was not systematically replaced by a Z. Instead, the record that failed the edit was flagged and linked to a look-up table that provides the details of the edit failure. Analysts are required to review Quebec data carefully and make decisions on an analysis-by-analysis basis to include or exclude Quebec records from the analysis.

6.2 Comparability

Comparability is defined as the extent to which databases are consistent over time and use standard conventions (such as data elements or reporting periods) that make them similar to other databases.

Equivalency

The 2010–2011 data year marks the tenth year of processing Quebec data in the merged DAD–HMDB. There were fundamental differences in the way data was processed in the DAD versus the HMDB prior to the merger, that is, when the DAD and HMDB were two distinct databases. In particular, edit rules, manipulation of the data and the way errors were handled differed between the two databases. The merger with the DAD resulted in streamlining HMDB data processing rules and edits with those of the DAD, thereby eliminating these differences.

Quebec facilities do not submit to the DAD. As such, these facilities do not follow CIHI standards in general and DAD abstracting guidelines in particular. With the input of the Quebec ministry, CIHI maps Quebec data to DAD values to enable comparative analysis, including national reporting and meaningful provincial comparisons. The HMDB team at CIHI, in partnership with Quebec representatives, developed and continues to update the mapping rules and documents for Quebec data. Mapping rules for the 2010–2011 data were rigorously tested to assess their robustness. Once the data was mapped, the mapped values were compared with the original data to confirm the accuracy of the mapping. No significant issues were encountered with Quebec data as a result of this mapping.

The data year 2006–2007 was the first year of full adoption of the ICD-10-CA and CCI classification systems in all provinces and territories. The classification change resulted in a number of challenges for users wishing to trend data over time. Data users are strongly advised to analyze the data using the classification system in which the data was collected. Table 4 in Section 4.1 contains details regarding when each province and territory began using the new classification systems.

Linkage

- **Health Care Number systems are evolving:** Provincial standards, edits and procedures regarding HCNs have changed over the years. Ontario, Saskatchewan, Alberta, British Columbia and the Northwest Territories have revised their health care numbering systems (for example, from family- to individual-based) and have issued new HCNs. Because CIHI information does not link the old and the new numbering systems, users must exercise caution when using HCNs for linkage purposes. Note that CIHI, under its Privacy and Confidentiality Policy,[12] releases only encrypted Health Care Numbers to external users, if they are released at all.
- **Version codes on Ontario HCNs:** Some HCNs in Ontario may include a version code. Where present (in HCNs of more than 10 characters), the version code appears after the 10-digit HCN. Version codes were introduced to uniquely identify a health card and to verify the status of the health card. Some cards do not have a version code, and version codes are not always recorded on DAD–HMDB abstracts. When new Ontario health cards are issued or a replacement card is issued, the 10-digit numeric portion of the HCN remains the same but the version code changes. Linkage over time, therefore, can be accomplished only by using the first 10 digits of either the HCN or the encrypted HCN.
- **Encrypted Health Care Number:** CIHI's use of consistently encrypted HCNs makes it possible to link data within and across years. One caveat is that invalid and missing HCNs are converted to 000000000000 and so should be excluded before data is linked.
- **Patient postal codes do not necessarily provide an accurate picture of patient residence:** The post office box numbers used by some rural residents may point to a region different from the place of residence. In addition, when rural postal codes map to more than one enumeration area, it becomes difficult to determine a specific place of residence. The FSA (first three digits of the postal code) is typically the lowest level of aggregation available to external users under CIHI's Privacy and Confidentiality Policy.[12] The release of information for small geographical areas may also be restricted to ensure patient privacy and confidentiality of patient information.

- **Incomplete linkage between mothers and babies:** The DAD ICD-10-CA abstract allows for the capture of information for linking mothers and babies. For DAD-submitting jurisdictions, the Maternal/Newborn Chart Number on the abstract captures the baby's Chart Number on the mother's abstract and the mother's Chart Number on the baby's abstract. However, for Quebec, only one linking number exists: the mother's Chart Number is on the baby's abstract. Users should be aware of these differences and that mother-and-baby linkages in DAD-submitting jurisdictions may be incomplete because some institutions have not adhered to CIHI's guidelines for coding these fields.
- **Incomplete HCNs for newborns:** The provinces and territories have different guidelines for coding HCNs for newborns. Some systematically code 0, 1 or the mother's HCN on the newborn abstract. In other jurisdictions, newborns receive a valid HCN before leaving the institution. When a newborn has not been assigned a valid HCN before leaving the institution, the HCN is defaulted to 000000000000. This prevents future linkages to the newborn's record. Although it is not mandatory for newborns to have an HCN within Quebec, only a few newborn records have missing HCNs. Missing HCNs on Quebec records are also defaulted to 000000000000.

Standardization

- **Provincial/territorial variation in data collection:** The collection of a data element within a province or territory can be mandatory, optional or vary in definition, depending on the decisions made by the provincial/territorial ministries of health. Response rates are typically low for non-mandatory fields. Users should be aware of these variations when conducting data analyses.
- **Lack of standardized definitions for levels of care across Canada:** Currently there are no standardized definitions for levels of care. To minimize the differences between definitions for levels of care across all jurisdictions and to facilitate national comparison, the Analytical Institution Type Code is used in the HMDB. It is a CIHI-defined data element that is assigned when the Institution Type assigned to an Institution Number is known to differ from the type of care that is provided. Before assigning this value, CIHI consults the institutions and provincial/territorial health agencies and confirms the level of care. The provincially/territorially assigned Institution Type remains in the database under the Institution Type Code field. Users are advised to use the Analytical Institution Type Code when performing analysis on acute care data.

Historical Comparability

- **Health Care Number systems are evolving:** Provincial standards, edits and procedures regarding HCNs have changed over the years. Ontario,

Saskatchewan, Alberta, British Columbia and the Northwest Territories have revised their health care numbering systems (for example, from family- to individual-based) and have issued new HCNs. Because CIHI information does not link the old and the new numbering systems, users must exercise caution when using HCNs for linkage purposes. Note that CIHI, under its Privacy and Confidentiality Policy,[12] releases only encrypted Health Care Numbers to external users, if they are released at all.

- **Version codes on Ontario HCNs:** Some HCNs in Ontario may include a version code. Where present (in HCNs of more than 10 characters), the version code appears after the 10-digit HCN. Version codes were introduced to uniquely identify a health card and to verify the status of the health card. Some cards do not have a version code, and version codes are not always recorded on DAD–HMDB abstracts. When new Ontario health cards are issued or a replacement card is issued, the 10-digit numeric portion of the HCN remains the same but the version code changes. Linkage over time, therefore, can be accomplished by using only the first 10 digits of either the HCN or the encrypted HCN.
- **Encrypted Health Care Number:** CIHI's use of consistently encrypted HCNs makes it possible to link data within and across years. One caveat is that invalid and missing HCNs are converted to 000000000000 and should therefore be excluded before data is linked.
- **Institution Number is not standardized over time:** Institution Numbers are assigned by provincial and territorial ministries or departments of health. One facility can be assigned different numbers as facilities merge or close or as the type of care provided in the facility changes.

6.3 Timeliness

Data Currency at the Time of Release

Ideally, the time period between the end of the reference period and the date of release of HMDB data should be reasonably brief (within 12 months). Whereas DAD data is received monthly, MED-ÉCHO data is received in one yearly file, generally several months after the end of the reference period. The MED-ÉCHO data file was received at CIHI at the end of November 2011. The processing of the 2010–2011 HMDB data was completed within two and a half months, during which the data file changes described in Section 4.1 were implemented. The release of the 2010–2011 HMDB data was 12 months after the end of the reference period.

6.4 Usability

No issues found.

6.5 Relevance

No issues found.

7 Contacts

For more information, please contact CIHI at morbidity@cihi.ca.

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Canadian Institute for Health Information
495 Richmond Road, Suite 600
Ottawa, Ontario K2A 4H6

Phone: 613-241-7860
Fax: 613-241-8120
www.cihi.ca
copyright@cihi.ca

Talk to Us

CIHI Ottawa
495 Richmond Road, Suite 600
Ottawa, Ontario K2A 4H6
Phone: 613-241-7860

CIHI Toronto
4110 Yonge Street, Suite 300
Toronto, Ontario M2P 2B7
Phone: 416-481-2002

CIHI Victoria
880 Douglas Street, Suite 600
Victoria, British Columbia V8W 2B7
Phone: 250-220-4100

CIHI Montréal
1010 Sherbrooke Street West, Suite 300
Montréal, Quebec H3A 2R7
Phone: 514-842-2226

CIHI St. John's
140 Water Street, Suite 701
St. John's, Newfoundland and Labrador A1C 6H6
Phone: 709-576-7006

www.cihi.ca

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