DECEMBER 2003

Discharge Abstract Database (DAD)/ CMG/PIx Data Quality

Re-abstraction Study

Canadian Institute
for Health Information

Institut canadien
d'information sur la santé

CMG™/PIx™
Data Quality
Re-abstraction Study

December 2003

377 Dalhousie Street
Suite 200
Ottawa, Ontario
K1N 9N8

Telephone: (613) 241-7860
Fax: (613) 241-8120
www.cihi.ca

ISBN: 1-55392-351-0 (PDF)

CMG/PIx Data Quality Re-abstraction Study
December 2003

Table of Contents

Introduction

An ongoing challenge for any statistical organization is to ensure that the quality of the information it produces is suited for its intended uses and that that information is accompanied by good information about its quality. To this end, the Canadian Institute for Health Information (CIHI) has established a data quality program that includes the implementation of a corporate data quality framework and special data quality studies.

This report provides a summary of the national findings from CIHI's special data quality study: CMG™/Plx™ Data Quality Re-abstraction Study. This national study examined the data within CIHI's Discharge Abstract Database (DAD) to measure the accuracy of data elements used in the Case Mix Group (or CMG) assignment methodology and Complexity (or Plx) overlay process. This study built upon the results of a related two-year study—the DAD Data Quality Re-abstraction Study—which measured the accuracy of diagnoses and procedures related to selected health indicators and administrative data at the national level.

Contact DAD@cihi.ca for further information.

The Discharge Abstract Database

The DAD is a national database containing information related to hospital inpatient and day surgery events. Currently, over four million records are submitted to the DAD annually. Inpatient records submitted to the DAD represent 75%[1] of all patient discharges in Canada. Each record in the DAD contains standard clinical, demographic and administrative data for the health services provided for each inpatient stay. Health records staff at hospitals code the abstract data from the discharge summary and other information contained in the patient chart. On a monthly basis, the abstracted data are forwarded to CIHI, where the information is processed and edited. Reports (default reports) are provided to hospitals for analysis and correction of erroneous data. In addition to the abstracted data submitted by hospitals, the DAD contains value-added outputs, such as the CMG and related resource consumption indicators developed by applying CIHI's case mix grouping methodologies and costing algorithms.

A revised DAD abstract was implemented in fiscal year 2001–2002 to accommodate the ICD-10-CA/CCI national classification system and to adapt to the evolving health information needs of stakeholders. The re-development of CIHI's Case Mix Groups and Resource Intensity Weights began in 2003 in order to accommodate logic changes in the classification of diagnoses and procedures resulting from ICD-10-CA and CCI, as well as to take advantage of the rich specificity of codes now available.

[1] Facilities in Quebec do not currently submit to the DAD. Manitoba will begin submitting in 2004.

Situating Re-abstraction in the Context of Quality Assurance

Re-abstraction studies form an integral part of the quality assurance strategy at CIHI. For the DAD, the production of **accurate** and valid data begins with the timely submission of data according to pre-defined codes and data elements outlined in CIHI's *DAD Abstracting Manual* and using the International Statistical Classification of Diseases and Health Problems, Tenth Revision (ICD-10), as endorsed by the World Health Assembly of WHO. Historically, a systematic quality assurance process for the DAD has begun *after* data are submitted to CIHI. Once data are submitted, CIHI begins a process designed to ensure **comparability** and **usability** of the data. The **relevance** of the data is achieved through consultation with advisory committees and the dissemination of comparative and special topic reports.

CIHI undertakes a number of initiatives to assure the quality of the DAD data. These activities support the production of quality data at each step in the data supply chain.

These activities include:

- **Client Support and Education.** CIHI provides direct client support through a number of activities related to the DAD products. CIHI's Support Services Representatives (SSR) and Classification Specialists liaise with data suppliers to provide support for consistent coding and abstracting. Other activities include assisting in the development and delivery of educational programs, providing coding and other expertise and building relationships with provincial/territorial data consultants, health organizations and data users.

- **Input Documentation.** CIHI provides significant documentation to DAD stakeholders to support systems development, data abstraction and coding. These include the *DAD Abstracting Manual* and DAD systems specifications, as well as the documentation related to standards outlined below.

- **Standards.** CIHI publishes the classification standards that are used to code diagnoses and interventions within the DAD abstract (currently, these are ICD-10-CA and CCI). These classification standards are further supplemented through the regular publication of coding standards. CIHI also offers a coding query service to health records coders to assist coders in appropriate code selection.

- **Data Editing.** CIHI verifies DAD data upon receipt using over 800 submission edits. CIHI supplies data providers with error reports outlining the nature of the error and provides an opportunity for data suppliers to resubmit data.

- **Analysis of Within Year Data.** As data is received by CIHI, analysis is performed to further verify the quality of the data. As issues are found, they are communicated to stakeholders requesting validation or re-submission.

- **Application of CIHI Data Quality Framework.** For each year of data received by CIHI, CIHI conducts an overall assessment of the DAD database and the data to identify data issues, limitations and opportunities for improvement.

- **Data User Documentation.** To support the annual release of data, CIHI produces user documentation. This documentation is a means to make users aware of the limitations and issues associated with the data.

- **Advisory Committees.** The DAD has a number of advisory committees composed of stakeholders from across Canada who guide the evolution of the DAD and address issues related to the DAD, including data quality.

In addition to the above activities, CIHI has instituted a re-abstraction program to further supplement its quality assurance activities. Re-abstraction studies return to the original sources of information (i.e. patient charts) and compare this information with what exists in the CIHI database. Re-abstraction studies use a statistical sampling methodology (described later in this document) to reliably measure the accuracy of the coding of selected non-medical and clinical administrative data contained in the DAD. To date, three national re-abstraction studies have been conducted (including the study being reported on in this document). The previous two studies identified levels of inter-rater reliability in coding practices for the data elements in the DAD that were examined. A handful of elements were identified for improvement, and action is already underway to improve the consistency of coding practices for these elements.

The study described in this report focuses on the data elements contained in the DAD used to derive value-added products, commonly known as *Case Mix Group*, or *CMG*, and *complexity overlay*, or *Plx* (see Glossary/Additional Information).

A fourth study is currently in progress, and a continuing series of annual studies are being designed.

Goal/Objectives

The goal of this study is to evaluate, at a national level, the quality of selected clinical and administrative data from the DAD. The study looked at data submitted using the ICD-9 classification system.

The specific objectives of the study are

1. to measure to the extent possible through re-abstraction, the overall quality of the DAD CMG grouper variables;
2. to measure the coding quality of diagnoses and procedures relevant to CMG/Plx assignment;
3. to facilitate the development of the ICD-10-CA and CCI CMG grouper; and
4. to facilitate the ongoing development of coding standards for the ICD-10-CA and CCI classification system.

Methods

The study is based on a nationally representative sample. It consists of three component samples from the DAD with multi-stage random sampling. The first stage randomly selected acute care facilities across Canada stratified by geographical region and size. The second stage randomly selected charts from each selected facility, based either on complexity level or on conditions and procedures representing certain health indicators. A total of 5,327 charts were re-abstracted from 44 facilities[2].

Clinical data was blindly re-abstracted on-site by CIHI specialists[3] and compared with the data elements contained in the original submission to the DAD. Re-abstraction occurred for a one-week period per facility for the components shown below:

- First year sample: DAD fiscal year 1999–2000
- Second year sample: DAD fiscal year 2000–2001
- CMG/Plx sample: DAD fiscal year 2000–2001

The classification systems in use over the course of the study were I) ICD-9 and ICD-9-CM for clinical diagnoses and II) CCP and Volume 3 of ICD-9-CM for procedures. The data elements, shown below, were included in the study and are those required for CMG assignment and complexity overlay.

Non-Medical Data Elements	Diagnosis Data Elements	Procedure Data Elements
Chart number (for linking) Gender Birthdate Estimated birthdate Institution from Discharge date Institution to Exit alive Weight (0–29 days)	Diagnosis prefix Diagnosis code Diagnosis suffix (ICD-9) Diagnosis type	Procedure date Procedure code Procedure suffix

[2] The target population includes all acute care facilities submitting data to the DAD for fiscal years 1999–2000 and 2000–2001. Facilities from Quebec and Manitoba were excluded, as there is no provincial mandate for them to submit abstracts. Facilities from the three territories were excluded for travel/cost reasons. The overall facility participation rate was 80%.

[3] CIHI Classification Specialists are certified with the Canadian College of Health Record Administrators and have expert knowledge of medical terminology and diagnosis and intervention classification standards. They are responsible for developing, interpreting and teaching classification systems and are well experienced in various hospital settings.

The national rates estimated by the study are based on the discrepancies and the reasons for those discrepancies found in the sample of re-abstracted charts and are weighted to represent the study population.[4] As with all studies of this nature, it should be noted that results are subject to sampling error.

CIHI policies on privacy, confidentiality and security, which respect personal privacy and safeguard the confidentiality of individual records and facilities, were adhered to throughout the study.

Summary of Study Findings

Case Mix Group, or CMG, is the foundation of CIHI's acute inpatient grouping, length of stay (LOS) and resource intensity weight methodologies. The patient's Most Responsible Diagnosis (MRDx) is used to assign the case to one of the 25 Major Clinical Categories (MCCs). Within each MCC, based on the presence or absence of an operative procedure, the case is directed towards a surgical or medical hierarchy flowchart.

In 1997, CIHI introduced a complexity overlay called Plx to its inpatient case-mix methodology for most CMG assignments. The complexity overlay identifies diagnoses, over and above the MRDx used for CMG assignment, for which prolonged LOS and more costly treatment might reasonably be expected.

The study findings are summarised below as they relate to the study objectives. A glossary of terms is appended.

Study Objective 1: To measure to the extent possible through re-abstraction, the overall data quality of the DAD CMG grouper variables

The DAD CMG grouper variables are those that are used in the CMG and Plx methodologies discussed above. These variables include non-medical data elements, such as gender and birthdate; diagnoses that describe the MRDx or a comorbid condition; and procedures.

For the *non-medical data elements* re-abstracted in this study, the agreement rate between the original values submitted to the DAD and the values collected on re-abstraction is greater than 96.0%. A more detailed breakdown of this figure is available in Table 3 (see Appendix A—Detailed Results).

The remaining data elements used by the grouper are discussed in Objective 2.

[4] Due to the increased sampling error of small samples, the findings are only included for a CMG assignment only if the number of re-abstracted charts is more than 30.

Study Objective 2: To measure the coding quality of diagnoses and procedures relevant to CMG/Plx assignment

For the *diagnoses* relevant to CMG/Plx assignment, the agreement rates between the original values submitted to the DAD and the re-abstracted elements are presented by category below:

87.0% Most Responsible Diagnosis (MRDx)

75.5% Presence or absence of comorbid conditions

82.9% Typing of comorbid conditions

The MRDx is considered to be the one diagnosis that describes the most significant condition of a patient that causes his or her stay in hospital. This may not always be the condition for which the patient is admitted. A comorbidity is a diagnosis of a significant nature that affects the resource consumption or LOS of the patient. A comorbid condition may co-exist at the time of admission, or may develop during the patient's stay.

In this study, the *procedures* provided to the patients were not found to have an impact of any significance on CMG/Plx assignment.

After re-abstraction, the assignment of the MRDx and the identification of the types of diagnoses (i.e. comorbid conditions) differed from what was originally submitted to the DAD. This produced a change in CMG assignment for 14.8% of charts and a change in Plx level for 10.8% of charts. The combined effect was a net reduction of the average RIW™ value of 0.9%.

More information on CMG assignment, Plx overlay and diagnoses is available in Appendix A—Detailed Results.

Study Objective 3: To facilitate the development of the ICD-10-CA and CCI CMG grouper

ICD-10-CA is a Canadian enhanced classification based on the World Health Organization (WHO) publication of the *International Statistical Classification of Diseases and Related Health Problems*. CIHI is currently facilitating the implementation of this new standard. Provinces and territories began implementation on April 1, 2001.

CCI, or the *Canadian Classification of Health Interventions,* was developed by CIHI to accompany ICD-10-CA. CCI classifies a broader range of interventions than its predecessor, CCP.

With the advent of these new classification systems, CIHI must re-develop its CMG grouper methodology. Results from this study were used to facilitate the identification of comorbid conditions where there existed a low agreement rate between the original values submitted to the DAD and the values that were re-abstracted. For those diagnoses where coding and classification standards could not be clarified, changes to the list of diagnoses contained within the grade list (an important element of the CMG/Plx methodology), were recommended.

In addition, this study allowed the establishment of benchmarks for the evaluation of the source data elements and outputs from the grouper methodology, such as LOS or resource intensity weights. These benchmarks were set in this study with the ICD-9 and ICD-9-CM classification system. With the subsequent coding in ICD10-CA/CCI, this will create a baseline against which to measure the quality of the source data elements and outputs of the CMG/Plx methodology.

More information on coding within CMG assignment is available in Appendix A—Detailed Results.

Study Objective 4: To facilitate the ongoing development of coding standards for the ICD-10-CA and CCI classification system

As noted above, this study was a rich source of information for the identification of coding standards for certain diagnoses that were not well understood and that required clarification: for example, knowing when a diagnosis has a significant impact on treatment or what is mandatory information that must be included in the DAD abstract. The information gleaned from this study will be used in the development and enhancement of coding standards for ICD-10-CA/CCI.

Action Plan

CIHI is continuing to undertake many initiatives towards continued improvements in the quality of the data in the DAD as outlined earlier in this document. These activities include introducing a new classification system, ICD-10-CA/CCI, and developing and tightening coding standards for this new classification system, all the while addressing the issues identified in the study with respect to diagnosis typing. In addition, CIHI will be providing extensive education workshops across the country to health records professionals on the new classification system and associated coding standards. The existing edit checks on the DAD are being reviewed and, where necessary, will be enhanced. In addition, new edit checks will be developed where the need is demonstrated. CIHI is also undertaking the redevelopment of its CMG grouping methodology—findings of this study will be incorporated into the redevelopment plan.

CIHI is also committed to increasing communication to its stakeholders as data quality issues arise.

Next Steps

In 2003–2004, CIHI is undertaking another special study on the DAD that will examine selected data elements using the new DAD abstract and the new ICD-10-CA/CCI classification system. The ICD-10-CA/CCI DAD Data Quality Re-abstraction Study will build upon the results of the previous DAD re-abstraction studies.

Appendix A—Detailed Results

CMG and PIx Overlay Findings

The PIx overlay and CMG assignment were derived by applying the grouper methodology to the non-medical and clinical data of each abstract. These findings involve comparison of the original value to the re-abstracted value. The findings do not involve discrepancy or reason codes, as these are associated with the source data elements only. Changes in overall RIW value depend not only on the number of cases that change CMG assignment but also on the cases that change PIx level. The combination of these changes is shown below.

Table 1. Changes in CMG Assignment and PIx Level

% of Charts		PIx Level		
		Matched	Changed	**Total**
CMG Assignment	Matched	77.1	8.1	**85.2**
	Changed	12.1	2.7	**14.8**
	Total	**89.2**	**10.8**	**100.0**

For 77.1% of charts, CMG assignment and PIx level did not change through re-abstraction. After re-abstraction, changes in diagnoses and typing produced a change in CMG assignment for 14.8% of charts and a change in PIx level for 10.8% of charts. The combined effect was a net reduction of the average RIW value of 0.9%.

PIx Overlay Findings

Presented below is a comparison of the proportion of charts in each PIx level before and after re-abstraction.

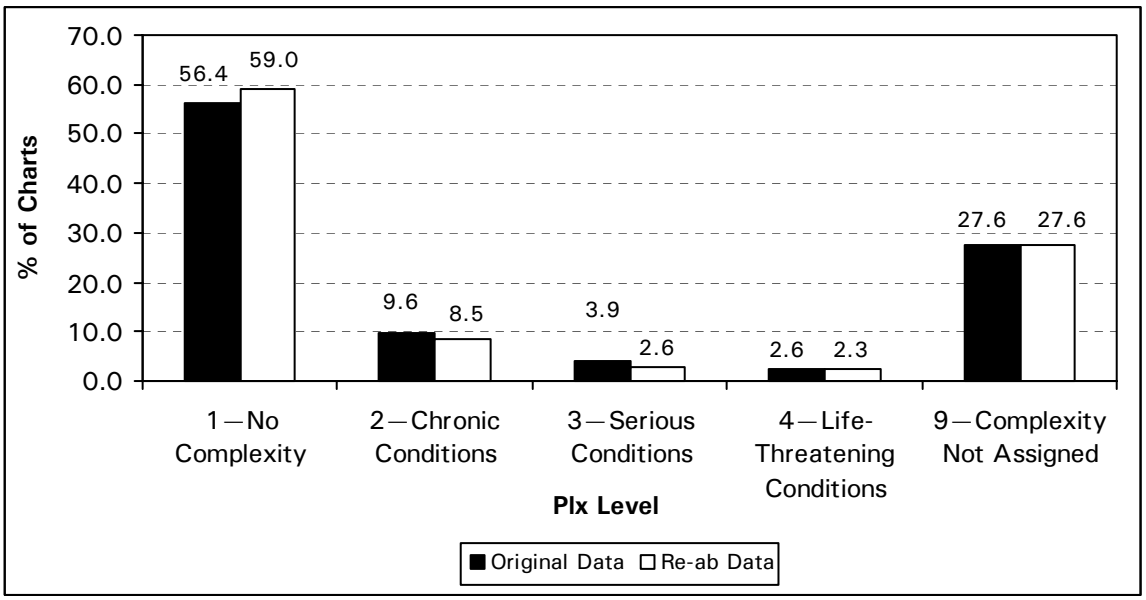

Figure 1. Complexity Level Distribution Before and After Re-abstraction

At the national level, after re-abstraction, an estimated 10.8% of charts changed Plx level. The following table gives the breakdown, by original complexity level, of the percentage of charts that were re-abstracted to either a higher or a lower Plx level.

Table 2. Increases and Decreases in Complexity Level

Complexity Level	% of Original Charts				
	Matched	Changed	Decreased Plx	Increased Plx	Net Movement
1—No complexity	53.7	2.7	0.1	2.6	2.5
2—Chronic conditions	5.0	4.5	3.9	0.6	-3.2
3—Serious conditions	1.4	2.5	2.1	0.4	-1.8
4—Life-threatening conditions	1.7	1.0	1.0	0.0	-1.0
9—Complexity not assigned	27.4	0.1	0.0	0.1	0.1
Total	**89.2**	**10.8**	**7.0**	**3.7**	**-3.3**

Note: a complexity of 9 (not assigned) means that the complexity is inherent in the CMG assignment and the chart does not inherit additional complexity from the Plx overlay. For this table, level 9 is considered a decrease in Plx overlay levels from level 1 (no complexity).

These findings indicate:

- Very low disagreement between the original and re-abstracted Plx levels for charts with no complexity (level 1), and virtually none where the Plx level was not assigned (level 9).
- A drop in the number of charts with Plx levels 2, 3 and 4 and an overall increase in the Plx level 1. This accounts for the decrease in RIW reported in the previous section.
- While there were charts that were re-abstracted to a higher Plx level (for example, for 2.6% of the charts with an original complexity of level 1), there was an overall reduction of Plx level (-3.3%).

Figure 2 shows the proportion of charts that changed Plx level.

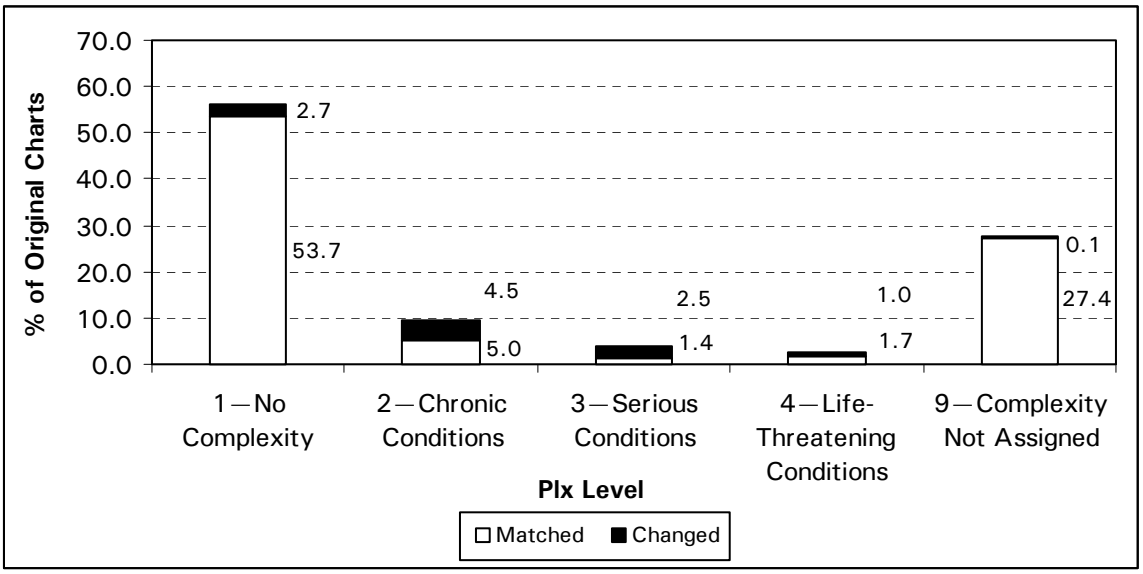

Figure 2. Volume of Plx Level Changes

CMG Findings

Some case mix groups had a large change in average RIW values. Specific coding difficulties for these CMG assignments may have contributed to these changes. For example,

CMG 140—Chronic Obstructive Pulmonary Disease (COPD)

CMG 140 (COPD) is the chronic end stage of other lung diseases and patients may be hospitalized due to an exacerbation of the condition. Sometimes the acute cause for the specific hospital stay is specified. In ICD-9, a COPD patient admitted with pneumonia could be coded to either pneumonia or to COPD as the MRDx, depending on the course of treatment. In ICD-10-CA, all cases of COPD with an acute exacerbation are to be coded to COPD.

CMG 351—Joint Replacement for Trauma

The CMG changes are most likely due to lack of complete documentation at the time of original coding, as the procedure codes used to drive this CMG assignment are very straightforward. The Plx level changes for joint replacement for trauma are due to misunderstanding the definition of comorbid condition.

A majority of joint fractures are found in elderly patients who often have other chronic or underlying medical conditions. If these underlying conditions do not increase the LOS, or the resources used to treat the patient during their stay, they should be considered as type (3), or secondary, conditions. Underlying conditions should be considered as comorbid only if, for example, they require additional medication, treatment or consultation, or they delay surgery or discharge.

CMG 644—Neonates Weight > 2500 gm with Major Problem Diagnosis
The changes are due to the very specific diagnosis codes for each CMG assignment.

For example, respiratory distress syndrome (RDS) is considered a major problem and is grouped to CMG 644 if the infant is under 2,500 g. While some neonates are suspected of having RDS, CIHI has a standard that this condition should only be coded if the chart contains clear documentation that the neonate received surfactant. Facilities that are not aware of this guideline may be coding incorrectly.

Non-Medical Findings

The Plx overlay and CMG assignment are both derived from the non-medical and clinical data; the quality of these constituent elements is examined below.

At a national level, over 96% of all re-abstracted non-medical data elements match the original data. The percentage of elements that did not match is shown below.

Table 3. Discrepancy Rates of Non-Medical Data Elements

Non-Medical Data Element	Discrepancy Rate
Institution from which the patient was transferred	3.8%
Institution to which the patient was transferred	2.7%
Birthdate (or, if not provided, estimated birthdate)	<1%
Discharge date	<1%
Exit from facility	<1%
Gender	<1%
Weight—0 to 28 days on admission	<1%

Diagnosis Findings—Discrepancies and Reasons

Findings for the discrepancies and their reasons relate either to the MRDx, comorbid condition, service transfer diagnosis or mandatory secondary diagnosis. Discrepancies are mutually exclusive, except for prefix/suffix and different code discrepancies (those in Table 5).

In the tables below, where discrepancies occur as a result of a change in the typing of a condition, the combination of these typing conditions in the original and re-abstracted data that create the discrepancy are included in the last two columns to illustrate the change. It should be noted that throughout the section totals might not add up due to rounding.

Most Responsible Diagnosis (MRDx)

Of all original and re-abstracted Most Responsible Diagnosis codes, 87.0% matched. The 13.0% of MRDx with discrepancies breaks down as follows:

Table 4. Discrepancy and Reason Rates—MRDx

%	Discrepancy Description	Original Type	Re-abstracted Type
6.3	MRDx coded as different type	Any type other than MRDx	MRDx
3.1	Diagnosis not coded, typed as MRDx	MRDx	Not coded
2.3	MRDx missing	Not coded	MRDx
1.1	Secondary diagnosis coded as the MRDx	MRDx	Type 3
0.1	Post-admit comorbidity typed as MRDx	MRDx	Type 2

%	Reasons for Discrepancy (that caused more than 10% of the discrepancies)
50.6	**Different interpretation:** discrepancies were caused by a different interpretation of documentation. Cases where a misinterpretation of the documentation in the original abstract has resulted in a different code.
13.8	**Coding contrary to CIHI guidelines:** information in the database contravenes CIHI guidelines. Cases where clear guidelines are not being followed.

Comorbid Condition (CC) Diagnosis

Comorbid conditions matched 75.5% of the time. The 24.5% of discrepancies in comorbid conditions breaks down below.

Table 5. Discrepancy and Reason Rates—CC Dx

%	Discrepancy Description	Original Type	Re-abstracted Type
14.9	Diagnosis not coded, typed as CC diagnosis	Type 1 or 2	Not coded
9.4	CC diagnosis missing	Not coded	Type 1 or 2
0.1	Transfer Dx missing	Not coded	Type W, X or Y
0.1	Diagnosis not coded, typed as transfer Dx	Type W, X or Y	Not coded

%	Reasons for Discrepancy (that caused more than 10% of the discrepancies)
31.0	**Information missed:** cases where a code or data was not entered despite clear documentation on the chart.
26.2	**Dx had no significant impact:** diagnoses were coded that did not have significant impact on treatment and/or LOS. These are cases where a diagnosis is typed as significant (1 or 2) and the re-abstractor does not agree that the documented treatment warranted this typing.
16.6	**Different interpretation:** discrepancies were caused by a different interpretation of documentation. Cases where a misinterpretation of the documentation in the original abstract has resulted in a different code.

Comorbid Condition Typing

Of comorbid conditions, 82.9% were typed at the same level as the re-abstracted data; 17.1% were typed differently, as shown below.

Table 6. Discrepancy and Reason Rates—CC Typing

%	Discrepancy Description	Original Type	Re-abstracted Type
14.8	Secondary diagnosis typed as CC diagnosis	Type 1 or 2	Type 3
1.5	CC diagnosis coded as type 3	Type 3	Type 1 or 2
0.5	Pre-admit comorbidity typed as post-admit	Type 2	Type 1
0.4	Post-admit comorbidity typed as pre-admit	Type 1	Type 2

%	Reasons for Discrepancy (that caused more than 10% of the discrepancies)
63.8	**Dx had no significant impact:** diagnoses were coded that did not have significant impact on treatment and/or LOS. These are cases where a diagnosis is typed as significant (1 or 2) and the re-abstractor does not agree the documented treatment warranted this typing.
11.1	**Coding contrary to CIHI guidelines:** information in the database contravenes CIHI guidelines. Cases where clear guidelines are not being followed.
10.3	**Different interpretation:** discrepancies were caused by a different interpretation of documentation. Cases where a misinterpretation of the documentation in the original abstract has resulted in a different code.

Different Diagnosis Code

For 7.6% of diagnoses, the same condition was coded—but differences in the code itself created a discrepancy.

Table 7. Discrepancy and Reason Rates—Different Dx Code

%	Discrepancy Description
7.5	Different diagnosis code used to identify the same condition
0.1	Diagnosis prefix/suffix different

%	Reasons for Discrepancy (that caused more than 10% of the discrepancies)
28.3	**Coding error:** cases where the discrepancy is clearly the result of incorrect or incomplete code look-ups. This includes dagger/asterisk errors.
26.5	**Different interpretation:** discrepancies were caused by a different interpretation of documentation. Cases where a misinterpretation of the documentation in the original abstract has resulted in a different code.
15.7	**Specificity:** a case where a non-specific or "other/unspecified" code was used when a more specific code is supported by the chart documentation.

Glossary/Additional Information

Discharge Abstract Database (DAD)

The DAD is a national database containing standard clinical, demographic and administrative data pertaining to each hospital patient discharge and day surgery event. DAD data is used to produce various CIHI reports and publications, such as its annual health care system performance report; to conduct analyses of health conditions and injuries; and, increasingly, to track patient outcomes.

Inpatient records submitted to the DAD represent 75% of all patient discharges in Canada. For fiscal year 2000–2001, this resulted in approximately 2.5 million abstracts for inpatient stays.

Classification Standards

During fiscal year 1999–2000 and 2000–2001, the following systems were in use:

- for the coding of clinical condition diagnoses:
  - ICD-9: the International Statistical Classification of Diseases, Injuries and Causes of Death, Ninth Revision
  - ICD-9-CM: the ICD-9-Clinical Modification
- for the coding of procedures:
  - CCP: Canadian Classification of Diagnostic, Therapeutic, and Surgical Procedures
  - Volume 3 of ICD-9-CM

Starting in fiscal year 2001–2002, Canada phased in, by province, new classifications for diagnoses and interventions:

- ICD-10-CA: the International Statistical Classification of Diseases and Related Health Problems, Tenth Revision—Canadian Modification
- CCI: the Canadian Classification of Health Interventions

CMG

DAD data is used to derive value-added outputs such as the Case Mix Group assignment. The CMG assignment is a grouping of patient stays with similar clinical and resource utilization for comparison of hospital resource use. The CMG assignment is based on the patient's Most Responsible Diagnosis (MRDx), the diagnosis that, at discharge, is determined to have been responsible for the greatest portion of the patient's length of stay (LOS) in hospital or resource use.

Plx Overlay, MCCs and the Grade List

The Plx, or complexity, methodology was developed in the mid-1990s to address differences in resource consumption due to burden of illness, patient age or severity of illness. The Plx overlay is a refinement to the CMG methodology applied to certain Major Clinical Categories (MCCs). The MCC system was developed by CIHI based on the ICD diagnostic categories and the MRDx. By restricting the overlay to those MCCs involving major body systems, conditions that are considered inherently complex, such as pregnancy and childbirth, do not gain additional complexity. Each CMG assignment, within the permitted MCC, is subdivided into complexity levels. A list (the grade list) has been created that grades diagnoses of pre-admission comorbidity (type 1), post-admission comorbidity (type 2), or service transfer (type W, X or Y), that are deemed to prolong LOS or increase hospital resource use, into levels of severity.

Grade	Definition
A	Life-threatening conditions
B	Conditions having important LOS impact
C	Chronic disease
D	Debilitating conditions
P	Psychiatric conditions associated with increased LOS

The Plx overlay methodology uses the complicating conditions on the grade list, and the patient's age, to account for the variation in LOS and resource use.
The Plx levels are defined as follows:

Plx Level	Definition
1	No complexity
2	Complexity related to chronic conditions
3	Complexity related to serious/important conditions
4	Complexity related to potentially life-threatening conditions
9	Complexity not applied

RIW

Resource consumption indicators such as resource intensity weights (i.e. RIW values) are used to monitor utilization of acute health care services. The RIW costing algorithm measures the relative cost of acute care resources by patient types. By applying RIW values, volumes can be expressed in terms of weighted cases.

Diagnosis Typing

Closely related to the clinical condition is the typing of the clinical condition. Mandatory typing codes identify the diagnoses for which health service resources were utilized during the patient stay: either the Most Responsible Diagnosis (MRDx), a comorbid condition, or, if the patient is transferred, the diagnosis relating to the service transfer. Comorbid conditions are conditions that either co-exist at the time of admission or develop subsequently, and that affect the treatment received or the LOS. These conditions may require clinical evaluation, therapeutic treatment, diagnostic procedures, or increased nursing care and monitoring. Optional typing codes are for secondary diagnoses which may not affect LOS or resource use but which may be of interest to the hospital.

Type	Diagnosis	Inclusion
M	MRDx	Mandatory
1	Pre-admission comorbidity	Mandatory if applicable
2	Post-admission comorbidity	Mandatory if applicable
3	Secondary	Some mandatory
W, X, Y	Service transfer diagnosis	Mandatory if applicable

Identification of Discrepancies and Reasons

Discrepancies between the original and re-abstracted data are identified in one of two ways depending on the data element. Objective non-medical information, such as birthdate, is immediately compared to the original data to identify a match. All clinical information, such as diagnosis, is re-abstracted blindly (without viewing the original abstracted data) and then compared to the original values. Each difference in clinical or non-medical data was assigned a standardised discrepancy and reason code by the re-abstractor.

The findings contained in this report are for type A discrepancies—discrepancies that reflect a material difference between the original and re-abstracted information. In some cases (type B discrepancies) the reason for the discrepancy may be of a less critical nature, but is captured due to its potential benefit in coding guideline development.

Table A. Type A Discrepancy Example

A 68-year-old male patient was admitted to hospital for a transurethral prostatectomy (TURP) to treat benign prostatic hypertrophy (BPH). His LOS was two days.

Original Abstract		Re-abstract		Re-abstract Comment
ICD-9-CM Code	*Type*	*ICD-9-CM Code*	*Type*	
600—BPH	M	600–BPH	M	One lab value outside normal range on one occurrence only, no other documentation.
276.1—Hyponatremia	1			

- Discrepancy 16—Diagnosis not coded, typed as comorbid condition diagnosis in DAD.
- Reason code F—Different interpretation of documentation.

The discrepancy occurs in the above example because the re-abstractor could not find physician documentation substantiating that the single laboratory value was indicative of a clinical diagnosis. Comorbid conditions are all conditions that either co-exist at the time of admission or develop subsequently, and that affect the treatment received and/or the LOS. Comorbid conditions are those conditions that have an effect on the patient care in terms of requiring at least one of the following: clinical evaluation, therapeutic treatment, diagnostic procedures, extended length of hospital stay or increased nursing care and/or monitoring.

Type B Discrepancy Example

A woman arrives at the hospital in labour. Her labour is augmented with Syntocin; however, her cervix fails to open more than 3 cm. In addition, it is noticed that the baby is having decelerations. She is therefore taken to the O.R. where a C-section is performed for dystocia, obstructed labour due to CPD and fetal distress.

Original Abstract		Re-abstract		Re-abstract Comment
ICD-9-CM Code	*Type*	*ICD-9-CM Code*	*Type*	
661.01—Dystocia	M	660.11—Obstructed labour due to CPD	M	Since there are multiple reasons for the C-section, any of those could be chosen as the MRDx, and none could be considered an “incorrect” choice.
660.11—Obstructed labour due to CPD	1	661.01—Dystocia	1	
659.71—Fetal distress	1	659.71—Fetal distress	1	

- Discrepancy 6—MRDx coded as different type in DAD.
- Reason code H—Order of codes different—either order is correct.

Discrepancy Codes

Non-Medical (Clinical) Data

1. **Entry missing.**
   Re-abstractor captured data not in database.
2. **Entry not coded by re-abstractor**. Re-abstractor did not capture data that was in database.
3. **Entry different.**
   Re-abstractor captured data that is different than the data in the database.

Diagnosis Codes

4. **Diagnosis prefix/suffix different.**
   Either the data originally submitted to the database or the re-abstractor's data contains a prefix/suffix that the other has not.
5. **Different diagnosis code.**
   Different codes used to identify same condition.
6. **MRDx coded as different type.**
   Re-abstractor coded as MRDx, but coded in database as another diagnosis type.
7. **MRDx missing.**
   Re-abstractor coded as MRDx, but does not appear in database at all.
8. **CC diagnosis coded as type 3.**
   Re-abstractor coded and typed as 1 or 2, but coded in database as a type 3.
9. **CC diagnosis missing.**
   Re-abstractor coded and typed as 1 or 2, but does not appear in database at all.
10. **Pre-admit comorbidity typed as post-admit.**
    Re-abstractor coded and typed as 1, but coded in database as a type 2.
11. **Post-admit comorbidity typed as MRDx.**
    Re-abstractor coded and typed as 2, but coded in database as MRDx.
12. **Post-admit comorbidity typed as pre-admit.**
    Re-abstractor coded and typed as 2, but coded in database as a type 1.
13. **Secondary diagnosis coded as the MRDx.**
    Re-abstractor coded as type 3, but coded in database as MRDx.
14. **Secondary diagnosis typed as CC diagnosis.**
    Re-abstractor coded as type 3, but coded in database as a type 1 or 2.
15. **Diagnosis not coded, typed as MRDx.**
    Re-abstractor did not code, but coded in database as MRDx.
16. **Diagnosis not coded, typed as CC diagnosis.**
    Re-abstractor did not code, but coded in database as a type 1 or 2.

17. **(Plx only) Mandatory type 3 missing**
    Re-abstractor coded a mandatory type 3 diagnosis (e.g. for a dagger asterisk scenario or to reflect an infectious organism), but it was not coded in database.
18. **Transfer Dx missing.**
    Re-abstractor coded transfer Dx, but does not appear in database.
19. **Diagnosis not coded, typed as transfer diagnosis.**
    Re-abstractor did not code, but coded in database as a transfer diagnosis.
20. **(Year 2 only) E-code different.**
    Different e-code used to identify same cause.

Reasons for Discrepancies

Type A Discrepancies

A. Transcription error. Errors in transcription of numbers and/or letters. Includes abstracting errors.

B. Incomplete documentation available at time of original abstraction—only when clearly identifiable.

D. Lack of code specificity. A case where a non-specific or "other/unspecified" code was used, when a more specific code is supported by the chart documentation.

E. Code specificity not supported by record. Cases where a very specific code is used which is not supported by chart documentation.

F. Different interpretation of documentation. Cases where error in interpretation of documentation in original abstract has resulted in incorrect code.

I. Diagnosis coded did not have significant impact on treatment and/or LOS. Cases where code is typed as significant (1 or 2) and re-abstractor does not agree the documented treatment warranted it.

K. Other grey area coding. Other cases where different interpretation of the documentation and guidelines may lead to discrepancies.

L. Inconsistent or conflicting documentation on paper chart.

M. Coding contrary to CIHI guidelines—where clearly identifiable.

N. Hospital policy. Cases where, after discussion with hospital staff, it is identified that a hospital-specific rule or policy has affected the original codes chosen and caused the discrepancy.

O. Coding error—not following code book properly. Cases where discrepancy is clearly the result of incorrect or incomplete code look-ups. This includes dagger/asterisk errors.

P. Information on chart missed. Cases where a code or data was not entered in spite of clear documentation on the chart.

R. Downloaded incorrectly. ADT download inconsistent with the rest of the chart.

T. Mandatory type 3 missing. Situations where the re-abstractor coded a type 3 diagnosis to complete a dagger asterisk scenario or to reflect an infectious organism. (CMG/Plx study only)

V. Other. Any identifiable reason that cannot be categorized into the other reason codes.

W. No apparent reason. When the discrepancy cannot be categorized or explained by any of the above codes.

Z. Diagnosis had a significant impact on treatment and/or LOS.

Type B Discrepancies

C. Re-abstractor unable to access required information.

G. Different interpretation of documentation—either code correct. Documentation may be interpreted more than one way and it is difficult to determine which way is more correct—but neither can be said to be wrong.

H. Order of codes different—either order is correct. Cases where two or more diagnoses were of equal importance and either could have been MRDx.

S. Database data amended by CIHI edit. Data amended in database and different on chart.

U. Re-abstractor missed data and believes original submission was correct.

X. Not re-abstracted—not wrong to code.

Y. Not coded in DAD—not necessary to code.

References

Brown, A., and J. Richards. "The Data Quality Study of the Canadian Discharge Abstract Database," Proceedings of Statistics Canada Symposium 2001, Achieving Data Quality in a Statistical Agency: A Methodological Perspective, Ottawa, Canada, October 17–19, 2001. Ottawa: Statistics Canada, 2001.

Canadian Institute for Health *Information. Coping with the Introduction of ICD-10-CA and CCI: Impact of New Classification Systems on the Assignment of Case Mix Groups/Day Procedure Groups Using Fiscal 2001–2002 Data*. Ottawa: CIHI, July 2003. <http://secure.cihi.ca/cihiweb/en/downloads/casemix_ICDimpact_e.pdf>

Canadian Institute for Health Information. *DAD Resource Intensity Weights and Expected Length of Stay 2002*. Ottawa: CIHI, 2002.

Canadian Institute for Health Information. *Data Quality Documentation: Discharge Abstract Database 2001–2002.* Ottawa: CIHI, February 2003. <http://www.cihi.ca/cihiweb/en/downloads/DAD_DQ_Doc_01_02.pdf>

Canadian Institute for Health Information. *Discharge Abstract Database Data Quality Re-abstraction Study – Combined Findings for Fiscal Years 1999–2000 and 2000–2001.* Ottawa: CIHI, December 2002. <http://www.cihi.ca/cihiweb/dispPage.jsp?cw_page=reports_dad2002reabstudy_e>

Canadian Institute for Health Information. *Improving Timeliness of the Discharge Abstract Database Data.* Ottawa: CIHI, 2000. <http://secure.cihi.ca/cihiweb/dispPage.jsp?cw_page=GR_3_E>

Canadian Institute for Health Information. *Health Care in Canada, 2001 ed.* Ottawa: CIHI, 2001.

Canadian Institute for Health Information. *Products and Services Catalogue, 2001 ed.* Ottawa: CIHI, 2001.

Canadian Institute for Health Information. Redevelopment of CIHI's Acute Care Inpatient Grouping Methodology Project Plan. CIHI, unpublished.

Canadian Institute for Health Information. *Case Mix Tools.* Ottawa: CIHI, September 2003. <http://www.cihi.ca/cihiweb/dispPage.jsp?cw_page=casemix_e>

Canadian Institute for Health Information. *Complexity Overlay* (bulletin). Ottawa: CIHI, November 26, 2002. <http://www.cihi.ca/cihiweb/dispPage.jsp?cw_page=bl_plx26nov2002_e>

Canadian Institute for Health Information. *DAD Data Quality Study* (bulletin). Ottawa: CIHI, June 2000. <http://www.cihi.ca>

Newfoundland and Labrador Centre for Health Information (NLCHI). "Reabstracting Results," *The E-Backbone Newsletter*, Vol. 3, No. 1 (Jan. 2003): 2–3.

Ontario Hospital Association, Ontario Ministry of Health and Hospital Medical Records Institute. *Report of the Ontario Data Quality Re-abstracting Study.* Ontario. April 1991.

Ontario Clinical Data Quality Task Force. *Understanding and Improving the Quality of Health Care in Ontario—A Report and Recommendations by the Ontario Clinical Data Quality Task Force*. Ontario. August 2002.


ten
years
dix
ans
taking health information further
à l'avant-garde de l'information sur la santé