

# **Database Background and General Data Limitations Documentation**

## **National Ambulatory Care Reporting System (NACRS)**

**2007–2008**

### **Executive Summary**

**October 2008**



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**Database Background and General Data Limitations Documentation,  
National Ambulatory Care Reporting System (NACRS),  
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## Abbreviations

ACCS	Ambulatory Care Classification System
AHP	allied health professional
B.C.	British Columbia
CACS	Comprehensive Ambulatory Classification System
CC	cardiac catheterization clinic
CCI	Canadian Classification of Health Interventions
CCO	Cancer Care Ontario
CCP	Canadian Classification of Diagnostic, Therapeutic, and Surgical Procedures
CIHI	Canadian Institute for Health Information
CL	clinic
CSRs	client services representatives
CTAS	Canadian Triage Acuity Scale
DAD	Discharge Abstract Database
DPG	day procedure groups
ED	emergency department
eNACRS	NACRS Electronic Comparative Reports
FY	fiscal year
ICD-10-CA	International Statistical Classification of Diseases and Related Health Problems, 10th Revision, Canada
ICD-9	International Statistical Classification of Diseases and Related Health Problems, 9th Revision
ICD-9-CM	International Statistical Classification of Diseases and Related Health Problems, 9th Revision, Clinical Modification
LOS	length of stay
MED D/N	medical day/night care
MCR	multiple contact record
MIS FC	Management Information System Functional Centre Account Code
MOHLTC	Ministry of Health and Long-Term Care (Ontario)
NACRS	National Ambulatory Care Reporting System
NCAD	National Clinical Administrative Databases Steering Committee
N.S.	Nova Scotia
OC	oncology clinic
Ont.	Ontario
PCCF	Postal Code Conversion File (Statistics Canada)
PCTAS	Pediatric Canadian Triage Acuity Scale
PDF	printable document format
P.E.I.	Prince Edward Island
RD	renal dialysis clinic
SARS	severe acute respiratory syndrome
SURG D/N	surgical day/night care
TADB	Therapeutic Abortions Database
Y.T.	Yukon Territory



# 1 An Overview of the National Ambulatory Care Reporting System (NACRS)

As in many other developed countries, ambulatory care comprises a significant portion of the health care delivered in Canada. It has expanded significantly in recent years and is now one of the largest-volume patient activities in Canadian health care. As such, the need for high-quality, reliable and timely data about this sector is paramount. For this reason, the Canadian Institute for Health Information (CIHI) developed the National Ambulatory Care Reporting System (NACRS). This system is designed to provide valuable information that can help evaluate the management of ambulatory care services in Canadian health care facilities.

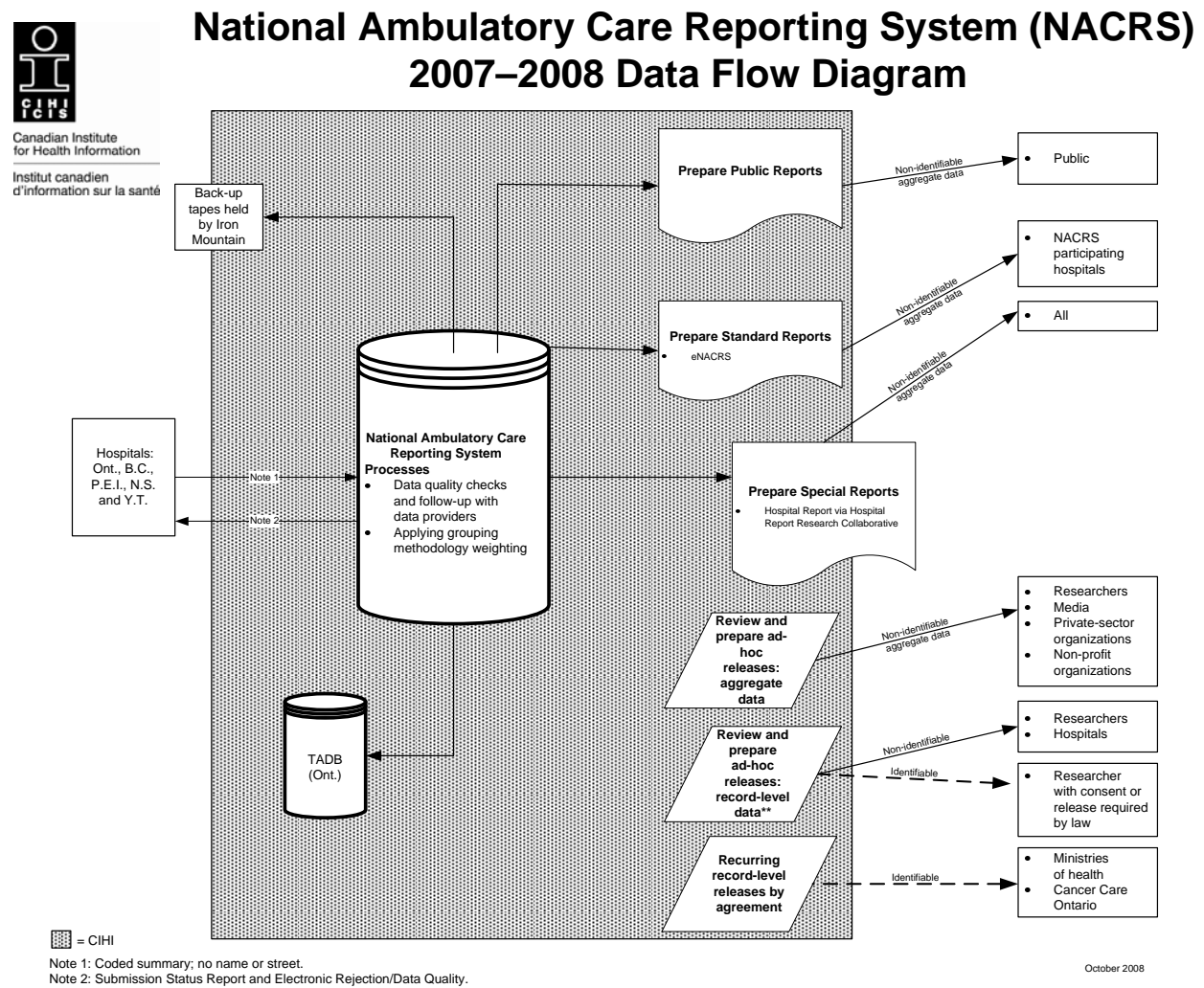
After identifying a need for the collection of information on ambulatory care, CIHI used Alberta’s Ambulatory Care Classification System (ACCS) product as a model and released NACRS in 1997. In 2002–2003, the product was re-engineered to respond to the Canadian implementation of the International Classification of Diseases, 10th Revision, and the Canadian Classification of Health Interventions (ICD-10-CA/CCI). The table below illustrates the evolution of NACRS:

<b>NACRS Evolution</b>	
April 1997	<ul style="list-style-type: none"> <li>• NACRS launched</li> <li>• First British Columbia (B.C.) facility adopts emergency department (ED) reporting</li> </ul>
July 2000	<ul style="list-style-type: none"> <li>• Ontario (Ont.) adopts ED reporting</li> </ul>
April 2001	<ul style="list-style-type: none"> <li>• Launch of the Comprehensive Ambulatory Classification System (CACS) and Ambulatory Cost Weights (ACW)</li> </ul>
April 2002	<ul style="list-style-type: none"> <li>• Second B.C. facility adopts ED reporting</li> <li>• Implementation of ICD-10-CA/CCI; NACRS re-engineered</li> </ul>
April 2003	<ul style="list-style-type: none"> <li>• Ontario adopts surgical day/night care (SURG D/N) reporting</li> <li>• Third B.C. facility adopts ED reporting</li> <li>• First Nova Scotia (N.S.) facility adopts ED reporting</li> </ul>
July 2003	<ul style="list-style-type: none"> <li>• First Prince Edward Island (P.E.I.) facility adopts ED reporting</li> </ul>
October 2003	<ul style="list-style-type: none"> <li>• Ontario adopts clinic reporting, specifically renal dialysis (RD), cardiac catheterization (CC) and oncology (OC) clinics</li> <li>• Two Nova Scotia facilities adopt SURG D/N reporting</li> <li>• Three Nova Scotia facilities adopt ED reporting</li> </ul>
April 2004	<ul style="list-style-type: none"> <li>• First Yukon facility adopts ED reporting</li> </ul>
April 2005	<ul style="list-style-type: none"> <li>• One Nova Scotia facility adopts ED and SURG D/N reporting</li> </ul>
April 2006	<ul style="list-style-type: none"> <li>• Comprehensive Ambulatory Classification System/Day Procedure Group (CACS/DPG) Redevelopment</li> <li>• First reabstraction study of the NACRS data sets</li> <li>• Elimination of multiple contact records captured within the NACRS database</li> </ul>
April 2007	<ul style="list-style-type: none"> <li>• Fourth B.C. facility adopts ED reporting</li> </ul>

## 2 Purpose and Uses of NACRS

NACRS is a data collection tool designed to capture information on client visits to facility- and community-based ambulatory care. Data about visits are collected at the time of service in participating facilities. The data elements in the database are demographic, clinical, administrative, financial and service-specific. NACRS information is used by a variety of agencies and facilities for planning and evaluation. Facilities use the data to support facility-specific utilization management decisions, administrative research and costing and clinical outcomes research. Governments use the data for policy development, system planning and evaluation. Universities and other academic institutions use the data for research purposes. NACRS data are also used for quality and risk management, report cards and status reports. NACRS, one of the core clinical administrative databases at CIHI, is one of the sources for records that go into the Therapeutic Abortions Database (TADB).

The data flow diagram below represents the uses of NACRS information:





This document includes background information on NACRS and describes general data limitations that may influence analyses that use the system. The background and general data limitations chapters are organized into sections based on criteria outlined in CIHI's Data Quality Framework.

To create an operational definition of data quality, CIHI defined five dimensions of data quality to divide fitness for use into distinct components. They are accuracy, timeliness, comparability, usability and relevance. This document examines accuracy and comparability, the most important dimensions for analytical purposes. Accuracy refers to how well information in or derived from the database reflects the reality it was designed to measure. Comparability refers to the extent to which the database is consistent over time and uses standard conventions.

## **3 Background Information**

### **3.1 Accuracy**

#### **3.1.1 Coverage**

##### *Population*

The population of reference (the population for which statements can be made) for NACRS for 2007–2008 includes ambulatory care activity with a date of registration/visit between April 1, 2007, and March 31, 2008, from all participating facilities in Canada. These include visits to the following facilities:

- *Ontario*: all ED, SURG D/N, RD, OC and CC clinic visits.
- *B.C.*: ED visits to four facilities.
- *P.E.I.*: ED visits to one facility.
- *Nova Scotia*: ED visits to four facilities and SURG D/N visits to three of four facilities.
- *Yukon*: ED visits to one facility.

Appendix A outlines Visit Management Information System Functional Centre Account Codes (MIS FC) by ambulatory care types (that is, ED, SURG D/N, RD, OC and CC).

As of the published year-end deadline of July 31, 2008, 9,994,920 abstracts had been submitted to NACRS for 2007–2008. A detailed breakdown of all visits by province/territory and ambulatory care type is summarized in Table 1.

**Table 1 Summary of All Visits for NACRS 2007–2008, by Province and Ambulatory Care Type**

Prov.	ED	SURG D/N	CC	RD	OC	Other*	Total
P.E.I.	29,933	0	0	0	0	28	29,961
N.S.	77,577	10,913	0	0	0	28,488	116,978
Ont.	5,367,323	1,212,867	42,973	1,131,822	1,911,508	65,855	9,732,348
B.C.	89,105	0	0	0	0	1,017	90,122
Y.T.	25,511	0	0	0	0	0	25,511
<b>Total</b>	<b>5,589,449</b>	<b>1,223,780</b>	<b>42,973</b>	<b>1,131,822</b>	<b>1,911,508</b>	<b>95,388</b>	<b>9,994,920</b>

**Note**

\* Other includes all visits with an MIS FC other than those listed in Appendix A.

**Source**

National Ambulatory Care Reporting System, 2007–2008, as of July 31, 2008, Canadian Institute for Health Information.

In the previous fiscal year, 9,692,460 abstracts were submitted to NACRS before the published year-end deadline. Table 2 summarizes the percentage change in the volume of NACRS abstracts between the two fiscal years.

**Table 2 Percentage Change in Volume of NACRS Between 2006–2007 and 2007–2008, by Province and Ambulatory Care Type**

Prov.	ED	SURG D/N	CC	RD	OC	Other*	Total
P.E.I.	-0.6%	0.0%	0.0%	0.0%	0.0%	-17.6%	-0.7%
N.S.	-3.0%	-1.4%	0.0%	0.0%	0.0%	1.1%	-1.9%
Ont.	1.2%	2.9%	2.3%	4.0%	7.0%	-4.4%	2.8%
B.C.	74.6%	0.0%	0.0%	0.0%	0.0%	30.6%	74.0%
Y.T.	1.8%	0.0%	0.0%	0.0%	0.0%	0.0%	1.8%
<b>Total</b>	<b>1.9%</b>	<b>2.8%</b>	<b>2.3%</b>	<b>4.0%</b>	<b>7.0%</b>	<b>-2.5%</b>	<b>3.1%</b>

**Note**

\* Other includes all visits with an MIS FC other than those listed in Appendix A.

**Source**

National Ambulatory Care Reporting System, 2006–2007 and 2007–2008, Canadian Institute for Health Information.

There were 3.1% more abstracts submitted in 2007–2008 than in 2006–2007. A comparative analysis for the two fiscal years shows a reduction in the current fiscal year for four Ontario facilities with submissions in all 12 periods in 2006–2007. These resulted either from staffing issues, the transfer of services to another facility or the discontinuation of ambulatory care. One Ontario facility that started submitting abstracts in October 2007 reported in only six periods. Funding and staffing issues kept one new facility in British Columbia from submitting in more than seven periods, but this facility still contributed to the large percentage change in the total B.C. volume.

### *The NACRS Frame*

The frame for NACRS is an inventory of institutions that is used to ensure the collection of all units in the population of reference. Since the provinces and territories determine which institutions will be included in NACRS and all institution numbers are identified in advance, the NACRS frame is validated by individual provinces and territories. If data are not received from a particular institution, that institution is contacted by the provincial/territorial ministry of health or CIHI, if necessary.

The 2007–2008 NACRS population of reference includes 194 facilities in Canada.

**Table 3      The Number of Institutions Submitting to Each Ambulatory Care Type  
in the 2007–2008 NACRS**

<b>Prov.</b>	<b>ED</b>	<b>SURG D/N</b>	<b>CC</b>	<b>RD</b>	<b>OC</b>	<b>Other*</b>	<b>Total</b>
<b>P.E.I.</b>	1	0	0	0	0	1	1
<b>N.S.</b>	4	3	0	0	0	3	4
<b>Ont.</b>	176	155	23	57	90	54	184
<b>B.C.</b>	4	0	0	0	0	2	4
<b>Y.T.</b>	1	0	0	0	0	0	1
<b>Total</b>	<b>186</b>	<b>158</b>	<b>23</b>	<b>57</b>	<b>90</b>	<b>60</b>	<b>194</b>

**Note**

\* Other includes all visits with an MIS FC other than those listed in Appendix A.

**Source**

National Ambulatory Care Reporting System, 2007–2008, as of July 31, 2008, Canadian Institute for Health Information.

The 2006–2007 NACRS population of reference also included 194 facilities in Canada.

**Table 4 The Number of Institutions Submitting to Each Ambulatory Care Type in the 2006–2007 NACRS**

<b>Prov.</b>	<b>ED</b>	<b>SURG D/N</b>	<b>CC</b>	<b>RD</b>	<b>OC</b>	<b>Other*</b>	<b>Total</b>
<b>P.E.I.</b>	1	0	0	0	0	1	1
<b>N.S.</b>	5	3	0	0	0	4	5
<b>Ont.</b>	176	153	21	53	88	59	184
<b>B.C.</b>	3	0	0	0	0	2	3
<b>Y.T.</b>	1	0	0	0	0	1	1
<b>Total</b>	<b>186</b>	<b>156</b>	<b>21</b>	<b>53</b>	<b>88</b>	<b>66</b>	<b>194</b>

**Note**

\* Other includes all visits with an MIS FC other than those listed in Appendix A.

**Source**

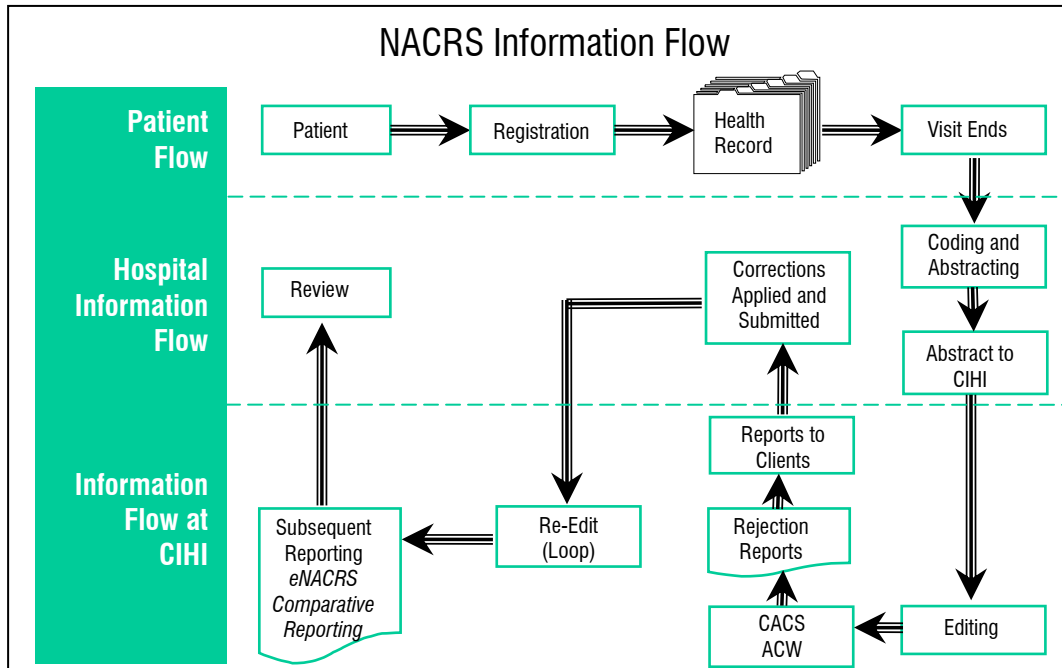
National Ambulatory Care Reporting System, 2006–2007, as of July 31, 2007, Canadian Institute for Health Information.

Changes in these figures are a result of the addition of new facilities in Ontario and British Columbia and a series of transfers of services and closures of facilities in Ontario. The transfer of services from one large facility that discontinued ambulatory care and therefore retired its ambulatory care number may have changed the ambulatory care numbers for Ontario facilities.

### 3.1.2 Capture and Collection

#### Data Collection

The NACRS data capture and collection process and information flow is summarized below:



#### Abstracting and Data Submission

The *NACRS Abstract* is a tool designed to capture ambulatory care visit activity; it contains relevant data elements to be submitted to CIHI’s NACRS database. The *NACRS Abstract* completed for each client visit uses a variety of sources, including admission/discharge/transfer (ADT) systems, patient records, physician notes and laboratory and diagnostic imaging results, to create a complete picture of a client’s visit, as depicted by the “Health Record” section in the diagram above. In other words, each abstract is associated with a client visit and is submitted to the NACRS database from the facility. If a client visits an ambulatory care setting on multiple occasions within the fiscal year, multiple abstracts are submitted.

All abstracts sent to NACRS contain an MIS FC account code to represent the statistical and financial reporting related to the service provided (see Appendix A). Prior to 2006–2007, a multiple contact record (MCR) was created when an allied health professional (AHP) provided care or treatment outside of the mandated MIS FC in which the visit occurred. MCRs were discontinued in the 2006–2007 reporting year. Clients were instructed to record information on AHP care on the main visit abstract, using an additional data element, MIS FC account code. This allows for multiple MIS FCs to be identified, as well as the service provider data element. In other words, there is one abstract submitted per visit, even if during that visit a client is seen by several physicians, clinicians and AHPs in different MIS FCs.

The *NACRS Manual*, the abstracting reference tool provided to clients, may be purchased by submitting facilities in PDF through CIHI's website under CIHI service packages called Core Plans. The manual is designed to guide clients through the abstracting process of demographic, administrative and clinical data elements collected in each episode of care. Whether a data element is optional or mandatory could depend on any of a number of factors:

- Province of submission;
- Specific ICD-10-CA/CCI codes; and/or
- Ambulatory care type (Visit MIS FC groupings, such as ED, SURG D/N, clinics).

For each data element, the manual contains a data element definition, valid data examples and corresponding edits. The manual is used by clients, researchers and abstracting software vendors.

Adherence to the data submission and abstracting standards described in the manual helps to ensure that CIHI's reports accurately reflect the facility's ambulatory care client activity. Adherence is enforced through the application of edits, education sessions and ongoing client support.

*Data submission* to CIHI's data holdings, including NACRS, is facilitated through the electronic Data Submission Services (eDSS) and service packages called Core Plans. Through Core Plans, facilities gain access to CIHI's national data holdings, including services related to data quality and processing, client support, access to data, national health information standards, selected publications and reports and basic education. Subscribers to Core Plans also have access to NACRS electronic comparative reports (eNACRS). Provincial and territorial ministries of health purchase these packages on behalf of their facilities and mandate submission to various CIHI databases.

### *Completeness of Data Submissions*

NACRS Submission Status Reports are used to monitor the number of abstracts submitted by period and by ambulatory care type (Visit MIS FC groupings, such as ED, SURG D/N) for each institution. These reports are used to identify deficiencies in data submissions during the submission year.

### *Data Submission Timeline*

All data must be submitted to NACRS before the year-end deadline. For 2007–2008, this was July 31, 2008.

## *Data Quality Control*

Quality control for NACRS occurs via several different channels:

- **Abstracting Software and Role of External Software Developers (Vendors)**

In order to standardize and ensure accurate data collection, CIHI's data suppliers hire external software vendors to install whatever software is required for data submission. CIHI publishes data submission and edit specifications for vendors annually. To be licensed, vendors must submit successful test files to CIHI. Facilities are also required to submit test files before data are moved into production. CIHI provides ongoing support to both vendors and facilities in identifying and solving issues. The vendor products add value by providing data capture quality control measures, such as edit checks, visual verification pop-ups by data field and cross-logic checks based on CIHI specifications.

The Information Technology and Operations Department at CIHI offers support to vendors and assists with the annual release of vendor specifications and vendor testing. Abstracting system vendors receive detailed specifications describing valid fields and proper formatting. The first period of data submission from clients is accepted as a test submission to ensure adherence to CIHI data submission requirements. A vendors-only section on CIHI's website ensures consistent communication between CIHI and vendors.

Although vendors must meet CIHI submission specifications, differences do exist in vendor software, which could introduce errors in the data. For example, a vendor may customize a client's software to include data variables that are not part of the NACRS data set. CIHI works with vendors to ensure compliance with NACRS terminology while respecting their proprietary freedom of software design.

- **CIHI Education Program**

Clients in jurisdictions considering NACRS are provided with education sessions on data collection and submission, CACS/RIW methodology and planning and implementation. These sessions are a way of standardizing coding practices and adherence to CIHI's data submission and collection requirements. The CIHI eQuery tool gives users a mechanism for obtaining answers to common questions about such matters as ICD-10-CA/CCI, case mix and data elements. Bulletins via the web or email also inform clients about NACRS issues.

- **CIHI Production System Edits and Correction Process**

The comprehensive NACRS edit structure is designed to identify or flag inconsistencies. More than 500 data element edits and warnings were applied to NACRS in 2007–2008. Since NACRS accepts only error-free abstracts, an error detected by the edit system results in the rejection of the entire abstract, and the client is asked to correct and re-submit it. Abstracts receiving only a warning message are not rejected and are accepted in NACRS. The correction and editing steps must be repeated for a rejected record until it is successfully corrected or the database closes at the year-end deadline. Before the end of the fiscal year, clients can submit previously missing abstracts or delete duplicate abstracts. 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.

- **Client Services Representatives (CSRs)**

CIHI has assigned CSRs to provide direct client support related to NACRS products, assist in the development and delivery of education programs, provide data quality expertise and build relationships with provincial/territorial data consultants, health organizations and data users.

- **Special Studies**

CIHI completed a reabstraction and data quality assessment study that evaluated the accuracy of coding in NACRS and identifies best practices (such as facility policies and processes) that may be associated with high data quality. The study involved returning to the original source of information (that is, client charts) and comparing this source with information in the NACRS database for 2004–2005. An additional component to the study included a data quality survey of the study facilities that obtained information on coding and abstracting processes and policies and data collection methods thought to be associated with “poor” data quality indicators. The final report was released in January 2008.

- **Data Element Changes**

Refinements and suggested enhancements to data elements in NACRS are communicated to CIHI in several ways. These include:

- Routine communication from clients (both internal and external) to NACRS CSRs;
- Input from advisory committees; and
- Formal submissions for data element additions or deletions from key stakeholders.

The NACRS National Advisory Committee was disbanded in October 2003 and folded into the National Clinical Administrative Databases Steering Committee (NCAD), with an enhanced mandate to advise on NACRS. NCAD discusses suggestions and considers whether proposed data elements are appropriate for inclusion and whether their collection ought to be mandatory (to ensure national comparability), optional or specific to selected provinces and territories. This committee has national representation from ministries of health, Statistics Canada and Health Canada/Public Health Agency of Canada (PHAC). It was through this committee that changes to the data elements appeared in the 2007–2008 NACRS database.

Appendix B outlines the mandatory and optional data elements in the 2007–2008 NACRS. Appendix C outlines the evolution of data elements over time, from 2001–2002 to 2008–2009.



## 3.2 Comparability

### 3.2.1 Standardization

Classification systems in health care provide a standard mechanism for the capture and coding of diagnoses and interventions. Different provinces and territories used different classification systems: 2001–2002 NACRS diagnosis and intervention coding was classified using the ICD-9/CCP (9th Revision of the International Statistical Classification of Diseases [ICD9] and the Canadian Classification of Diagnostic, Therapeutic, and Surgical Procedures [CCP] or the ICD-9-CM (ICD-9-Clinical Modification) for diagnoses and interventions.

In 2001–2002, the initial version of the ICD-10-CA (International Statistical Classification of Diseases and Related Health Problems, 10th Revision, Canada) and CCI coding standards (Canadian Classification of Health Interventions) was released. The enhanced ICD-10-CA replaces the earlier ICD-9 and ICD-9-CM coding of diagnoses, and the CCI contains a comprehensive list of diagnostic, therapeutic and support interventions that replace the earlier CCP and ICD-9-CM procedural sections. The ICD-10-CA and CCI guidelines are reviewed, amended and enhanced annually by a pan-Canadian committee representing the provinces and territories. The Canadian coding standards for ICD-10-CA and CCI are available by year as PDF documents on the CIHI website. They may be downloaded free of charge.

In 2002–2003, NACRS was re-engineered to collect diagnosis- and intervention-related information solely in the ICD-10-CA/CCI coding system. Since then, all clinical data submitted to NACRS have been coded in ICD-10-CA/CCI (Appendix C). In an effort to produce comparable data, CIHI created conversion tables that standardize ICD-10-CA diagnoses and CCI interventions back to ICD-9/CCP for users. ***Users are strongly advised to analyze data using the original classification scheme.***

### 3.2.2 Linkage

- The 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 the information in databases can be compared to each other. The forward sortation area (FSA)—that is, the first three digits of a postal code—is typically the lowest level of aggregation normally available to external users under CIHI’s Privacy and Confidentiality Policy. The release of information for small geographical areas may also be restricted to ensure confidentiality. Special requests must be approved by the CIHI Privacy, Confidentiality and Security Committee. Note that for rural areas that use post office box numbers, postal code data do not necessarily provide an accurate picture of patient residence. This is because box numbers can point to a region different from the place of residence. In addition, when rural postal codes include more than one enumeration area, it becomes more difficult to determine a specific place of residence.

- The standard time frame for NACRS is the fiscal year (April 1 to March 31). Within NACRS, a number of variables—the FY, registration date/time and date/time visit complete—give the flexibility of specifying records that belong to a specific time period, such as the calendar year. This flexibility is especially useful in comparison with registries, which tend to be cumulative rather than separate databases for discrete years.
- The facility-unique identifier is the ambulatory care number assigned by provincial ministries of health and territorial governments. Each province/territory has the autonomy to determine how the facility ambulatory care number is assigned. As some facilities close and others merge, a single facility can have different numbers. A frame of ambulatory care number changes is required to perform linkages by ambulatory care number over time. Requests for institution-identifying information require approval by the CIHI Privacy, Confidentiality and Security Committee.
- Health care numbers (HCNs) are assigned to individuals by provincial ministries of health and territorial governments. NACRS also captures a variable representing the province/territory that issued a health care number, as the numbers are unique only within the province/territory. Combining the two variables with other relevant personal fields (such as birthdate, gender and postal code) allows individuals to be uniquely identified within NACRS. Since NACRS is event-based, a unique visit for a particular individual can be determined by using the institution and admit/intervention date fields. The HCNs facilitate linkage to other databases with the same fields.
- Some health care numbers in Ontario may include a version code. Where present (in HCNs of more than 10 bytes), it 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 NACRS abstracts. When new Ontario health cards are issued or a replacement card is issued, the 10-digit numeric portion of the health care number remains the same but the version code changes. Linkage over time therefore can only be accomplished by using the first 10-digits of either the HCN or encrypted HCN. Health care number, birthdate and full postal code are not normally made available to external users. Access to these restricted data elements and the use of NACRS data for data linkage studies requires prior approval by the CIHI Privacy, Confidentiality and Security Committee. Users should note that client names and street addresses are *not* part of NACRS.

### 3.2.3 Equivalency

Before April 1, 2003, Ontario day surgery cases were reported in the Discharge Abstract Database (DAD). On that date, the Ministry of Health and Long-Term Care (MOHLTC) changed Ontario's definition of day surgery. Since then, these cases have been reported in NACRS. These changes make it difficult to compare Ontario's day surgery cases in NACRS with those in DAD. See Appendix A of this document and the *Fiscal 2002/2003 DAD Abstracting Manual* for more information on day surgery definitions.

### **3.2.4 Historical Comparability**

#### *NACRS Re-Engineering*

The re-engineering of the NACRS database in 2002–2003 resulted in a database-wide move to ICD-10-CA/CCI coding. Other changes in the re-engineering consisted of a new record layout, electronic rejection reports and additional data fields.

Additional data elements and changes to data elements as a result of the re-engineering are listed in Appendix C.

#### *NACRS Grouper*

With the release of each year of data, the most recent version of the CACS grouping methodology is used. For the 2007–2008 NACRS data year, the CACS 2007 methodology is applied.

#### *Historical References*

The following NACRS-related products are updated annually. Users should consider both the fiscal year and classification scheme when referring to NACRS documentation.

- *NACRS Manual, 2007–2008*
- *NACRS Manual, 2006–2007*
- *NACRS Manual, 2005–2006*
- *NACRS Manual, 2004–2005*
- *NACRS Manual, 2003–2004*
- *NACRS Manual, 2002–2003*
- *NACRS Manual, 2001–2002*
- *CACS 2007 Directory*
- *CACS 2006 Directory*
- *CACS 2003 version 3 Directory*
- *CIHI NACRS Bulletins*

The Canadian Coding Standards for ICD-10-CA and CCI are available by year as PDF documents on the CIHI website.

#### *Future Changes*

Future changes to the NACRS database are outlined in Appendix C.

## 4 General Data Limitations

This section describes general data limitations that may affect analyses using NACRS, including variation in abstracting and coding practices, changes over time in submissions from various facilities and facility-specific data collection methods. When working with record-level data in particular, users should plan to conduct basic descriptive analyses of the data to aid in their understanding of the underlying patterns present in the sample they are working with.

### 4.1 Accuracy

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

#### 4.1.1 Coverage

Under- or over-coverage occurs when there is a difference between the population of reference and the frame. Under-coverage occurs when part of the population of reference is not included in the frame that is used. Over-coverage occurs when units that are not part of the population of reference (that is, that are out of scope) are included in the frame, or when duplicate records appear in the database.

##### *Under-Coverage*

There is no under-coverage in NACRS for 2007–2008. CIHI and provincial or territorial ministries of health monitor participation by examining monthly reports of submission status received from each facility. The MOHLTC mandates facilities in the province to submit all abstracts. Since all facilities outside Ontario in the population of reference are in the frame, they do not contribute to under-coverage.

##### *Over-Coverage*

###### **Duplicates**

A source of over-coverage in NACRS is duplicate records, which cannot be verified as such without confirmation from the facilities. However, CIHI can use combinations of data elements to identify abstracts that look like duplicates. Data users should take this into consideration when deciding whether or not to include these abstracts in their analyses.

- For 2007–2008, true duplicate records were identified by matching records for all but three data elements (see Appendix D). The same method was used for 2006–2007. There are 5,135 true duplicate records for 2007–2008. They are enumerated in Table 5, according to the proportion of these records that are ED, DS, OC and other clinics, and the proportion they represent in the entire NACRS.

**Table 5 NACRS True Duplicates**

Fiscal Year	True Duplicates (N)	Emergency N (%)	Day Surgery N (%)	Oncology N (%)	Other Clinics N (%)	Proportion of NACRS
2007–2008	5,135	68 (1.32)	7 (0.14)	5,054 (98.42)	6 (0.12)	0.05%

**Source**

National Ambulatory Care Reporting System, 2007–2008, Canadian Institute for Health Information.

- For 2007–2008, as for 2006–2007, potential duplicates were identified by matching records for four data elements: chart number, encrypted HCN, registration date and registration time. Table 6 shows the number of potential duplicates observed in NACRS in 2007–2008, with the proportion of these records that are ED, DS, OC and other clinics, and the proportion they represent in the entire NACRS.

**Table 6 NACRS Potential Duplicates**

Fiscal Year	Potential Duplicates (N)	Emergency N (%)	Day Surgery N (%)	Oncology N (%)	Other Clinics N (%)	Proportion of NACRS
2007–2008	63,773	105 (0.16)	74 (0.12)	62,396 (97.84)	1,198 (1.88)	0.6%

**Source**

National Ambulatory Care Reporting System, 2007–2008, Canadian Institute for Health Information.

### 4.1.2 Capture and Collection

Data capture quality control measures are defined as the use of consistent data capture and collection methods across all data suppliers. Data submission and abstracting standards are documented in the *NACRS Manual*. Adherence to these standards is enforced through the application of edits during data processing, delivery of educational sessions and ongoing client support. CIHI also provides the NACRS edit standards and data submission specifications to all vendors.

- Although data capture quality control measures exist for NACRS, it is important to note that abstracting standards and guidelines included in the manual may be open to interpretation. Consequently, the data supplied to CIHI by all data suppliers may not be consistent.
- All vendors incorporate NACRS submission specifications into their proprietary software systems. However, no standard protocol is used to ensure that CIHI’s edits are incorporated in a standard manner across all vendor systems. It cannot be determined if all clients utilize suitable data capture control measures. Please refer to the *Data Quality Control* section on page 9 for details.

As part of the ongoing data quality assessment of NACRS data, analyses are conducted to identify facility-specific variations in data collection practices. Those identified as having a significant impact on the quality of NACRS data are reported within this document.

### 4.1.3 Non-Response

#### *Unit Non-Response*

Unit non-response refers to data from facilities in the frame that are not submitted. These incomplete submissions should not be confused with under-coverage, where a facility in the population of reference is not in the frame. Additional unit non-response may occur with any outstanding rejected records that are not re-submitted during the data collection period. The following summarizes unit non-response:

- Due to staff shortage and funding issues, there are incomplete period submissions from one facility in B.C., one in Nova Scotia and three in Ontario. This contributes to the unit non-response rate of 1.6%.
- The unit non-response rate due to outstanding rejected records for NACRS-mandated reporting (that is, for ED, DS, OC, RD and CC clinic visits) was found to be 0.01%.

#### *Item Non-Response*

- Item non-response or partial non-response refers to missing or unknown information within data elements at the record level. Data elements in NACRS can be either mandatory or optional. Abstracts that have missing data for NACRS-mandated data elements are rejected from the database.

Table 7 summarizes the level of unknown information reported for several mandated data elements.

**Table 7 Proportion of Unknown Data Reported for Certain NACRS Mandatory Data Elements**

Element Number	Element	Unknown Value	Proportion NACRS When Applicable (%)	Definition
02	Encrypted HCN	All zeros	1.21	Health care number not available
05	Postal code	2-digit alpha code or invalid code	1.2	Client is a resident of Canada and the postal code is unknown or postal code is invalid
09	Birthdate estimated	Y	0.02	Birthdate unknown or partial
10	Family physician flag	U	2.16	Unknown
25	Triage time	9999	1.37	Unknown
30	Time of physician initial assessment	9999	19.85	Unknown
45	Other problem	U98.9	58.96	Unknown codes for place of occurrence with injuries

**Table 7 Proportion of Unknown Data Reported for Certain NACRS Mandatory Data Elements (cont'd)**

<b>Element Number</b>	<b>Element</b>	<b>Unknown Value</b>	<b>Proportion NACRS When Applicable (%)</b>	<b>Definition</b>
100	Glasgow Coma Scale	99	55.75	Not available
101	Seatbelt indicator	99	14.84	Unknown
102	Helmet indicator	99	43.39	Unknown
114	Disposition time	9999	6.07	Unknown
117	Time patient left ED	9999	10.31	Unknown

**Source**

National Ambulatory Care Reporting System, 2007–2008, Canadian Institute for Health Information.

It is important to note that the proportion of unknown data may vary considerably by facility. For example, the proportion of unknown time for the initial assessment by a physician has been found to range from 0% to more than 95% of a facility's emergency department data. Facilities with high proportions of unknown data may be excluded from analyses using this information. Analyses including any of the above data elements should consider facility variation in the completeness of the information submitted to CIHI.

Item non-response or partial non-response cannot be calculated for all NACRS data elements. For example, several mandated data elements do not allow for the coding of an unknown value, which makes it impossible to calculate item non-response accurately. This may also affect the reporting of these data (see next section).

#### **4.1.4 Measurement Error**

CIHI's data quality framework indicates that data measurement error, bias and consistency combine to give a measure of how well the data were reported. Measurement error occurs when the values reported do not match the values that should have been reported; it may be measured by the number of times a data element is coded incorrectly. Bias is the systematic occurrence of measurement error, and consistency is the variation of responses over repeated measurements (that is, reliability). Consistency may result from differing opinions of data collectors/coders, particularly with subjective data elements such as triage level (measured on a scale of one to five), as there is no correct answer. Consistency applies to more than subjective variables; it can also be a factor for data elements where there is an element of measurement error (for example, reporting times).

- CIHI's *NACRS Reabstraction and Data Quality Assessment Study* report provides quantitative evidence of measurement error with data elements, such as main/other problem, main/other intervention, date/time fields, health care number, date of birth, postal code and gender. As part of this study, a data quality survey links facility-specific information to the reabstracted data to identify best practices (such as facility policies and processes) that may be associated with quality data collection.

The final study report was released in January 2008.

- A number of measurement error issues associated with NACRS time elements have been identified. They include:
  - *Triage time.* Overall, 17% of ED records have a triage time that is exactly the same as registration time, including those from 14 facilities that report triage and registration as the same time in more than 95% of their data. Of these, six are large (recording more than 30,000 ED visits), one is medium (between 15,000 and 30,000 ED visits) and seven are small (with fewer than 15,000 ED visits). The time between triage and registration is one minute in more than 35% of the records from four facilities, and the time is either two or three minutes in more than 20% of the data from 15% of ED facilities. As these results indicate default coding for triage time, the data should be used with caution.
  - *Registration/visit time and disposition time.* These time elements can provide an insight into lengths of stay for visits to emergency and day surgery units. Among the ED and SURG D/N NACRS abstracts, 0.03% show that registration time is the same as disposition time, with 35% of those being discharged home and 34% being registered and then leaving the ED before further assessment. These results indicate some default coding for registration time and disposition time.
  - *All time elements.* The most accurately reported NACRS time element is the registration time, most likely because these data are collected electronically. Manual data collection methods can lead to some measurement error in other time elements. Measurement error in time elements is indicated by the clumping of data around certain minutes of the day. For example, disproportionate numbers of visits are coded with times that are on the hour, half-hour or quarter-hour (which may indicate the time of the physician's initial assessment).
- According to guidelines in the *NACRS Manual*, when a patient is transferred or discharged to another acute care institution or an institutional place of residence, the data element "institution to" is expected to be consistent with the data element "visit disposition." However, when "visit disposition" was cross-checked against "institution to" (mandatory in Ontario and Nova Scotia), only 91% met this criterion.
- Some measurement error has been identified in the data element "duration of ambulatory intervention." This optional data element is reported in 29.1% of SURG D/N interventions (though one record may account for several interventions). Of the reported durations, 99.6% are shorter than 200 minutes, and 0.04% are longer than 600 minutes (or 10 hours), a dubious length of time. Therefore, caution should be used when using this data element.



- Invalid postal codes occurred in the NACRS for 2007–2008. A number of records included correctly formatted six-digit postal codes that did not match a postal code provided by Canada Post, whether current or retired (see Table 8). They represent 0.62% of all the records in NACRS.

**Table 8 Examples of Invalid Postal Codes in the 2007–2008 NACRS**

Postal Code	Number of Records
X9X9X9	580
A0A0A0	462
X0X0X0	414
M8V4S7	191
L3B6W3	175
K9A4J6	172
M5K4H8	171
N5Z5V4	169
K1V1O6	165
M4Z3S1	161
M9M3P1	160
<b>Total</b>	<b>62,517</b>

**Source**

National Ambulatory Care Reporting System, 2007–2008, Canadian Institute for Health Information.

- Measurement error may occur with data that are reported in mandatory data elements that do not allow for the coding of an unknown value. NACRS requires completion of mandatory data elements upon submission and excludes records when mandatory data elements are left blank. Therefore, if information is not included on the original health record, coders and abstractors may be instructed to code a valid value as a proxy or default for an unknown so that the abstract can be included in the NACRS database. This is known to occur for triage time, family physician flag and time of physician initial assessment. Database samples or subsets should be analyzed at the facility level for incidences of larger-than-expected proportions of data occurring in specific data element codes.
- Cancer Care Ontario (CCO) data constitute a large proportion (52.8%) of OC data in NACRS. CCO visits can be identified within a host facility’s data by abstract ID numbers that begin in the 9,000,000 range and an oncology clinic MIS FC (see Appendix A for the list of oncology clinic MIS FC). Measurement error occurred in these data for elements including the following:
  - *Visit disposition.* CCO does not capture NACRS visit disposition and codes all CCO abstracts with a visit disposition of “discharged home” or “01.”



## 4.2 Comparability

The comparability dimension tells us how well databases meet a common standard. It consists of standard data definitions, derived common groupings, common data elements for linkage, correct conversions of data values and data that are comparable over time.

### 4.2.1 Standardization

- Data element completion may be mandatory, optional or region-specific. NACRS collects more types of data than are mandated by provinces and territories. Response rates for optional data elements vary and are typically low. For an overview of data element mandatory/optional status, consult Appendix B, as well the *NACRS Manual 2007–2008*.
- In performing analyses over time or across provinces and territories, users should note that data element specifications could change between fiscal years. For example, some data elements that were optional in 2001–2002 might have been mandatory in 2002–2003. For an overview of the data element evolution over time, please consult Appendix C, as well the *NACRS Manual 2007–2008*.

### 4.2.2 Linkage

- In NACRS, postal codes may not accurately reflect a client residence.
  - Through use of the PCCF from Statistics Canada, rural postal codes mapping to more than one enumeration area can be found.
  - The use of PO box number for rural residences may make it difficult to accurately determine a client’s residence.
- Users should be aware that the facility identifier numbers for the reporting of SURG D/N visits are not the same in NACRS as they were in DAD. When conducting trend analyses, mappings must be performed between DAD day surgery institution numbers and the NACRS ambulatory care facility numbers.

### 4.2.3 Historical Comparability

- Four data elements, 33 to 37, (decision to admit date/time and date/time visit completed) were deleted from NACRS because it was not possible to calculate key indicators.
- Four new data elements, 114 to 117, (disposition date/time and date/time patient left ED) were introduced in NACRS 2007–2008, so that key indicators, such as time waiting for an inpatient bed, could be calculated.
- Valid code 9999 for unknown value was added to the triage time.
- Valid code U for unknown was added to the family physician flag.
- Valid code 7 for allied health provider was added to the provider type. This is a service provider associated with a different MIS FC than the Visit MIS FC.
- Service provider code = 00052 (uro-gynecology) was changed to 00053 to achieve consistency with the Discharge Abstract Database code.

## 5 General Data Query Guidelines

In general, a well-defined research question and analytical plan will help to make the process of working with NACRS less complex. As such, the extensive nature of NACRS requires a number of general data considerations before the data can be used in analyses. Included below are several considerations that may be useful in an analysis of NACRS data:

- NACRS includes several types of ambulatory care visit types. Each type, including ED, SURG D/N and clinics (that is, RD, CC and OC), can be identified by multiple MIS FC (see Appendix A).
- Surgical day/night care or clinic type visits can occur in the ED MIS FC. These may be identified for exclusion in analyses pertaining to true emergency type visits with the data element “scheduled emergency department visit indicator.”
- A main diagnosis and intervention is coded in NACRS along with up to nine additional diagnoses and interventions. Therefore, analyses may consider only the main diagnosis and intervention or other diagnoses and interventions as well.
- There is known measurement error in NACRS. Therefore, it is suggested that record-level database samples or subsets be analyzed at the facility level for larger-than-expected proportions of data occurring in data element codes.
- Understanding variation in NACRS data by facility size or a rural/urban designation, for example, may indicate groupings to help analyze the data. The known variation by these groupings in ambulatory care services provided is reflected in data. It includes, but is not limited to, scheduled ED visit indicator, types of service providers and visit dispositions (such as transfers).

Other data exclusions and inclusions may need to be considered for specific analyses. A review of the *NACRS Manual* is recommended so that the data elements and the information collected can be understood. The information provided by the *NACRS Manual* is like that provided by a formal data dictionary.

## 6 Contacts

For more information, please contact CIHI by writing to [NACRS@cihi.ca](mailto:NACRS@cihi.ca).

## Bibliography

- Canadian Institute for Health Information. *Coding Variations in the Discharge Abstract Database (DAD) Data*. Ottawa, Ont.: CIHI, 2003. (May be downloaded from <http://www.cihi.ca>.)
- Canadian Institute for Health Information. *Comprehensive Ambulatory Classification System Directory 2003 (CACS)—Version 3*. Ottawa, Ont.: CIHI, 2005. (May be ordered at <http://www.cihi.ca>.)
- 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, Ont.: CIHI, 2003. (May be ordered at <http://www.cihi.ca>.)
- Canadian Institute for Health Information. *Data Quality of the Discharge Abstract Database Following the First-Year Implementation of ICD-10-CA/CCI—Executive Summary*. Ottawa, Ont.: CIHI, 2004. (May be downloaded from <http://www.cihi.ca>.)
- Canadian Institute for Health Information. *Improving Timeliness of Discharge Abstract Database Data*. Ottawa, Ont.: CIHI, 1999. (May be downloaded from <http://www.cihi.ca>.)
- Canadian Institute for Health Information. *MIS Standards, 2006*. Ottawa, Ont.: CIHI, 2005. (May be ordered at <http://www.cihi.ca>.)
- Canadian Institute for Health Information. *National Ambulatory Care Reporting System Manual, 2008–2009*. Ottawa, Ont.: CIHI, 2007. (May be ordered at <http://www.cihi.ca>.)
- Canadian Institute for Health Information. *Privacy and Confidentiality of Health Information at CIHI, Principles and Policies for the Protection of Personal Health Information, Updated November 2007, 3rd Edition*. Ottawa, Ont.: CIHI, 2007. (May be downloaded from <http://www.cihi.ca>.)
- Canadian Institute for Health Information. *Quality Assurance Processes in the Discharge Abstract and Hospital Morbidity Databases*. Ottawa, Ont.: CIHI, 2002. (May be downloaded from <http://www.cihi.ca>.)
- Canadian Institute for Health Information. *The CIHI Data Quality Framework—June 2005 Revision*. Ottawa, Ont.: CIHI, 2005.
- Ontario Ministry of Health and Long-Term Care. *Ministry of Health and Long-Term Care Master Numbering System*. Ottawa, Ont.: MOHLTC, 2003. [Online], from [http://www.health.gov.on.ca/english/public/pub/ministry\\_reports/master\\_nums/mns\\_book.pdf](http://www.health.gov.on.ca/english/public/pub/ministry_reports/master_nums/mns_book.pdf) > .



## Appendix A—Visit MIS Functional Centre Codes

Ambulatory Care Type	Province	MIS Functional Centre Account Codes
<b>ED</b>		
ED	ON	7*310 series (* = 1, 2 or 3)
ED	BC	71310 series
ED	PE	71310 series
ED	NS	7*310 series (* = 1, 2 or 3)
ED	YT	71310 series
<b>SURG D/N</b>		
DS	ON	7*260**, 7*262, 7*265**, 7*34020, 7*34025**, 7*34055 (* = 1, 2 or 3; ** = series)
DS	NS	712600000, 722600000, 712602000, 712602500, 712603000, 712604000, 712604500, 712606000, 712606500, 712607000, 712609900, 713402000, 713402500, 713402520, 713403500, 713403700, 713405500
<b>Clinics</b>		
RD	ON	7*34086**, 7*53086 (* = 1, 2 or 3; ** = series)
OC	ON	7*34066**, 7*35066**, 7*466**, 7*53066, 7*51066** (* = 1, 2 or 3; ** = series)
CC	ON	7*41544** (* = 1, 2 or 3; ** = series)
<b>Other</b>		
All non-mandatory	All provinces	All valid codes not included above.

### Notes

\*\* Series. The province of Nova Scotia zero fills Visit MIS Functional Centre Account Codes to the ninth digit.

### Sources

Canadian Institute for Health Information, *MIS Standards, 2006* (Ottawa, Ont.: CIHI, 2005) and Ontario Healthcare Reporting System (OHRIS), Ontario Ministry of Health and Long-Term Care.





## Appendix B—2007–2008 Mandatory NACRS Data Elements

This document is intended for use in conjunction with the *NACRS Abstracting Manual*. Refer to the *NACRS Manual 2007–2008* for details.

Legend	
M	Mandatory
M*	Mandatory if applicable
O	Optional

Data Element ID Number	Data Element Description	Ontario			Nova Scotia			British Columbia			Prince Edward Island		
		ED	SURG D/N	CL	ED	SURG D/N	CL	ED	SURG D/N	CL	ED	SURG D/N	CL
00A	Reporting Facility's Province/Territory	M	M	M	M	M	M	M	M	M	M	M	M
00B	Reporting Facility's Ambulatory Care Number	M	M	M	M	M	M	M	M	M	M	M	M
00C	Submission Fiscal Year	M	M	M	M	M	M	M	M	M	M	M	M
00D	Submission Period	M	M	M	M	M	M	M	M	M	M	M	M
00E	Abstract Identification Number	M	M	M	M	M	M	M	M	M	M	M	M
00F	Coder Number	M	M	M	M	M	M	M	M	M	M	M	M
01	Chart Number	M	M	M	M	M	M	M	M	M	M	M	M
02	Health Care Number	M	M	M	M	M	M	M	M	M	M	M	M
03	Province/Territory Issuing Health Care Number	M	M	M	M	M	M	M	M	M	M	M	M
04	Responsibility for Payment	M	M	M	M	M	M	M	M	M	M	M	M
05	Postal Code	M	M	M	M	M	M	M	M	M	M	M	M
06	Residence Code	M	M	M	M	M	M	O	O	O	O	O	O
07	Gender	M	M	M	M	M	M	M	M	M	M	M	M
08	Birth Date	M	M	M	M	M	M	M	M	M	M	M	M
09	Birth Date is Estimated	M	M	M	M	M	M	M	M	M	M	M	M
10	Family Physician Flag	M	O	O	M	O	O	O	M	O	O	M	O
11	Ambulatory Registration Number	O	O	O	O	O	O	O	O	O	O	O	O
12	Ambulatory Registration/Encounter Sequence Number	O	O	O	O	O	O	O	O	O	O	O	O
13	Visit MIS FC Acct Code	M	M	M	M	M	M	M	M	M	M	M	M
14	Admit Via Ambulance	M	M	M	M	M	M	M	M	M	M	M	M
15	Ambulance Call Number	O	O	O	O	O	O	O	O	O	O	O	O
16	Living Arrangement	O	O	O	O	O	O	O	O	O	O	O	O

Data Element ID Number	Data Element Description	Ontario			Nova Scotia			British Columbia			Prince Edward Island		
		ED	SURG D/N	CL	ED	SURG D/N	CL	ED	SURG D/N	CL	ED	SURG D/N	CL
17	Residence Type	O	O	O	O	O	O	O	O	O	O	O	O
18	Visit Type	M	O	O	O	O	O	O	O	O	M	O	O
19	Ambulatory Visit Status	O	O	O	O	O	O	O	O	O	O	O	O
20	Mode of Visit/Contact	M	M	M	M	M	M	M	M	M	M	M	M
21	Highest Level of Education	O	O	O	O	O	O	O	O	O	O	O	O
22	Arrival Date	O	O	O	O	O	O	O	O	O	O	O	O
23	Arrival Time	O	O	O	O	O	O	O	O	O	O	O	O
24	Triage Date	M	O	O	M	O	O	M	O	O	M	O	O
25	Triage Time	M	O	O	M	O	O	M	O	O	M	O	O
26	Triage Level	M	O	O	M	O	O	M	O	O	M	O	O
27	Date of Registration/Visit	M	M	M	M	M	M	M	M	M	M	M	M
28	Registration/Visit Time	M	M	O	M	M	O	M	M	O	M	M	O
29	Date of Physician Initial Assessment	M*	O	O	M*	O	O	M*	O	O	M*	O	O
30	Time of Physician Initial Assessment	M*	O	O	M*	O	O	M*	O	O	M*	O	O
31	Referral Source Prior to Ambulatory Care Visit	O	O	O	O	O	O	O	O	O	O	O	O
32	Institution From	M*	M*	M*	M*	M*	M*	O	O	O	O	O	O
35	Visit Disposition	M	M	M	M	M	M	M	M	M	M	M	M
38	Referred To—After Completion of Am. Care Visit	O	O	O	O	O	O	O	O	O	O	O	O
39	Institution To	M*	M*	M*	M*	M*	M*	O	O	O	O	O	O
40	Provider Type	M*	M*	M*	M*	M*	M*	M*	M*	M*	M*	M*	M*
41	Service Provider	M*	M*	M*	M*	M*	M*	M*	M*	M*	M*	M*	M*
42	Service Provider ID Number	M*	M*	M*	M*	M*	M*	M*	M*	M*	M*	M*	M*
43, 43 (a-i)	Main and Other Problem Prefix	O	O	O	O	O	O	O	O	O	O	O	O
44	Main Problem	M	M	M	M	M	M	M	M	M	M	M	M
45 (a-i)	Other Problem(s)	M*	M*	M*	M*	M*	M*	M*	M*	M*	M*	M*	M*
46	Main Intervention	M*	M*	M*	M*	M*	M*	M*	M*	M*	M*	M*	M*
47 (a-i)	Other Intervention(s)	M*	M*	M*	M*	M*	M*	M*	M*	M*	M*	M*	M*
48, 48 (a-i)	Status Attribute (Main and Other)	M*	M*	M*	M*	M*	M*	M*	M*	M*	M*	M*	M*
49, 49 (a-i)	Location Attribute (Main and Other)	M*	M*	M*	M*	M*	M*	M*	M*	M*	M*	M*	M*
50, 50 (a-i)	Extent Attribute (Main and Other)	M*	M*	M*	M*	M*	M*	M*	M*	M*	M*	M*	M*

Data Element ID Number	Data Element Description	Ontario			Nova Scotia			British Columbia			Prince Edward Island		
		ED	SURG D/N	CL	ED	SURG D/N	CL	ED	SURG D/N	CL	ED	SURG D/N	CL
51 (a-i)	Duration of Am. Care Intervention For Main and Other Interventions	O	O	O	O	O	O	O	O	O	O	O	O
52, 52 (a-i)	Intervention Location Code For Main and Other Interventions	O	M	O	O	M	O	O	O	O	O	O	O
53	Anaesthetic Technique	M*	M*	M*	M*	M*	M*	M*	M*	M*	M*	M*	M*
54	Died During Intervention Flag	M*	M*	M*	M*	M*	M*	M*	M*	M*	M*	M*	M*
55	Out-of-Hospital Indicator	M*	M*	M*	M*	M*	M*	M*	M*	M*	M*	M*	M*
56	Out-of-Hospital Institution Number	M*	M*	M*	M*	M*	M*	M*	M*	M*	M*	M*	M*
57	Blood Transfusion Indicator	M	M	M	M	M	M	O	O	O	M	M	M
58	Blood Components/ Products—Red Blood Cells	M	M	M	M	M	M	O	O	O	M	M	M
59	Platelets	M	M	M	M	M	M	O	O	O	M	M	M
60	Plasma	M	M	M	M	M	M	O	O	O	M	M	M
61	Albumin	M	M	M	M	M	M	O	O	O	M	M	M
62	Other	M	M	M	M	M	M	O	O	O	M	M	M
63	Autologous	M	M	M	M	M	M	O	O	O	M	M	M
64	Units of Blood Transfused—Red Blood Cells	O	O	O	O	O	O	O	O	O	O	O	O
65	Platelets	O	O	O	O	O	O	O	O	O	O	O	O
66	Plasma	O	O	O	O	O	O	O	O	O	O	O	O
67	Albumin	O	O	O	O	O	O	O	O	O	O	O	O
68	Other	O	O	O	O	O	O	O	O	O	O	O	O
69	Therapeutic Abortion Info—Number of Previous Term Deliveries	M	M	M	M	M	M	O	O	O	O	O	O
70	Number of Previous Pre-Term Deliveries	M	M	M	M	M	M	O	O	O	O	O	O
71	Number of Previous Spontaneous Abortions	M	M	M	M	M	M	O	O	O	O	O	O
72	Number of Previous Therapeutic Abortions	M	M	M	M	M	M	O	O	O	O	O	O
73	Gestational Age—Therapeutic Abortion	M	M	M	M	M	M	O	O	O	O	O	O
74	Date of Last Menses	M	M	M	M	M	M	O	O	O	O	O	O
75 (a-j)	MIS FC Acct. Code	O	O	O	O	O	O	O	O	O	O	O	O
79	Project Number	O	O	O	O	O	O	O	O	O	O	O	O

Data Element ID Number	Data Element Description	Ontario			Nova Scotia			British Columbia			Prince Edward Island		
		ED	SURGD/N	CL	ED	SURGD/N	CL	ED	SURGD/N	CL	ED	SURGD/N	CL
80–96	Facility/Jurisdiction Specific	O	O	O	O	O	O	O	O	O	O	O	O
97	PCTAS Indicator	M	O	O	M	O	O	M	O	O	M	O	O
98	Program Area	M*	M*	M*	M*	M*	M*	M*	M*	M*	M*	M*	M*
99	Scheduled ED Visit Indicator	M	O	O	O	O	O	O	O	O	M	O	O
100	Glasgow Coma Scale	M*	O	O	M*	O	O	M*	O	O	M*	O	O
101	Seatbelt Indicator	M*	O	O	M*	O	O	M*	O	O	M*	O	O
102	Helmet Indicator	M*	O	O	M*	O	O	M*	O	O	M*	O	O
103	Level of Care/ Service Recipient	O	O	O	O	O	O	O	O	O	O	O	O
104	Referral Date	O	O	O	O	O	O	O	O	O	O	O	O
105	Vendor MAC	O	O	O	O	O	O	O	O	O	O	O	O
106	Vendor CACS	O	O	O	O	O	O	O	O	O	O	O	O
107	Vendor ACW	O	O	O	O	O	O	O	O	O	O	O	O
108	Complete Record Flag	O	O	O	O	O	O	O	O	O	O	O	O
109	Main Intervention Date	O	O	O	O	O	O	O	O	O	O	O	O
110	Main Intervention Start Time	O	O	O	O	O	O	O	O	O	O	O	O
111 (a–i)	Other Intervention Date	O	O	O	O	O	O	O	O	O	O	O	O
112 (a–i)	Other Intervention Start Time	O	O	O	O	O	O	O	O	O	O	O	O
113	Reason for Visit/ Chief Complaint	M	O	O	O	O	O	O	O	O	O	O	O
114	Disposition Date	M	M	O	M	M	O	M	M	O	M	M	O
115	Disposition Time	M	M	O	M	M	O	M	M	O	M	M	O
116	Date Patient Left Emergency Department (ED)	M*	O	O	M*	O	O	M*	O	O	M*	O	O
117	Time Patient Left Emergency Department (ED)	M*	O	O	M*	O	O	M*	O	O	M*	O	O

## Appendix C – NACRS Field Evolution by Fiscal Year

This document is intended for use in conjunction with the *NACRS Abstracting Manual 2007–2008*; please refer to it for details.

<b>Legend</b>	
* = No change to existing data element	D = Deleted data element
C = Change in data element definition (including legend/code change/collection of new data)	N = New data element
F = Change in data element format	O = Data element did not exist that year
	R = Retired data element

<b>Current</b>		<b>ICD-10-CA</b>							<b>ICD-9</b>	
Data Element ID Number	Data Element Description	2008–2009	2007–2008	2006–2007	2005–2006	2004–2005	2003–2004	2002–2003 <sup>^</sup>	2001–2002	Data Element ID Number
00A	Reporting Facility's Province/Territory	*	*	*	*	*	*	N	O	-
00B	Reporting Facility's Ambulatory Care Number	*	*	*	*	*	*	*	*	N/A
00C	Submission Fiscal Year	*	*	*	*	*	*	*	*	N/A
00D	Submission Period	*	*	*	*	*	*	*	*	N/A
00E	Abstract Identification Number	*	*	*	*	*	*	N	O	-
00F	Coder Number	*	*	*	*	*	*	N	O	-
00G	Primary Abstract ID Number	R	R	R	N	O	O	O	O	-
01	Chart Number	*	*	*	*	*	*	*	*	01
02	Health Care Number	*	*	*	*	*	*	*	*	02
03	Province/Territory Issuing Health Care Number	*	*	*	*	*	C	F	*	03
04	Responsibility for Payment	*	*	*	*	*	*	C	*	35
05	Postal Code	*	*	*	*	*	C	F	*	04
06	Residence Code/ Geographic Code (2001)	*	*	*	*	*	*	F	*	34
07	Gender	*	*	*	*	*	*	F	*	05
08	Birth Date	*	*	*	*	*	*	*	*	06
09	Birth Date is Estimated	*	*	*	*	*	*	F	*	07
10	Family Physician Flag	*	C	*	*	*	*	N	O	-

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Current		ICD-10-CA							ICD-9	
Data Element ID Number	Data Element Description	2008–2009	2007–2008	2006–2007	2005–2006	2004–2005	2003–2004	2002–2003^	2001–2002	Data Element ID Number
11	Ambulatory Registration Number/Encounter Number (2001)	*	*	*	*	*	*	*	*	08
12	Ambulatory Registration/Encounter Sequence Number	*	*	*	*	*	*	*	*	08b
13	Visit MIS FC Acct Code	*	*	*	*	*	*	*	*	09
14	Admit Via Ambulance	*	*	C	*	*	C	*	*	48
15	Ambulance Call Number	*	*	*	*	*	*	*	*	49
-	Marital Status (2001)	D	D	D	D	D	D	D	*	46
16	Living Arrangement	*	*	*	*	*	*	C	*	28
17	Residence Type	*	*	*	*	*	*	C	*	29
18	Visit Type	C	*	*	*	*	*	N	O	-
19	Ambulatory Visit Status/Type of Visit (2001)	*	*	*	*	*	*	*	*	24
20	Mode of Visit/Contact	*	*	*	*	*	*	*	*	25
21	Highest Level of Education	*	*	*	*	*	*	C	*	30
22	Arrival Date	*	*	*	*	*	*	N	O	-
23	Arrival Time	*	*	*	*	*	*	N	O	-
24	Triage Date	*	*	*	*	*	*	N	O	-
25	Triage Time	*	C	*	*	*	*	N	O	-
26	Triage Level	*	*	C	*	*	*	*	*	20
27	Date of Registration/Visit	*	*	*	*	*	*	*	*	10
28	Registration/Visit Time	*	*	*	*	*	*	*	*	22
29	Date of Physician Initial Assessment	*	*	*	*	*	*	N	O	-
30	Time of Physician Initial Assessment	*	*	*	*	*	C	N	O	-
31	Referral Source Prior to Ambulatory Care Visit	C	*	*	*	C	*	C	*	26
32	Institution From	C	*	*	*	*	*	N	O	-
33	Decision to Admit Date	R	R	*	*	*	*	N	O	-
34	Decision to Admit Time	R	R	*	*	*	C	*	*	47
35	Visit Disposition	*	*	*	C	*	C	C	*	14
36	Date Visit Completed	R	R	*	*	*	*	*	*	21

Current		ICD-10-CA							ICD-9	
Data Element ID Number	Data Element Description	2008–2009	2007–2008	2006–2007	2005–2006	2004–2005	2003–2004	2002–2003^	2001–2002	Data Element ID Number
37	Time Visit Completed/Disposition Time (2001)	R	R	C	*	*	*	*	*	23
38	Referred To—After Completion of Am. Care Visit	*	*	*	*	C	*	C	*	27
39	Institution To	C	*	*	*	*	*	N	O	-
40	Provider Type/Primary Provider Type (2001)	*	C	*	*	*	*	C	*	12
41	Service Provider/Provider Type (2001)	C	C	C	C	*	C	C	*	11
42	Service Provider ID Number	*	*	*	*	*	*	F	*	13
43, 43 (a–i)	Main and Other Problem Prefix	C	*	C	*	*	C	N	O	-
44	Main Problem	*	*	*	*	*	*	F	*	15
45 (a–i)	Other Problem(s)	*	*	*	*	*	*	F	*	16
45 (a–i)	External Cause of Injury/Poisoning (2001 – Separate data element)	*	*	*	*	*	*	C	*	17
45 (a–i)	Place of Occurrence/Activity When Injured (2001 – Separate data element)	*	*	*	*	*	*	C	*	33
46	Main Intervention	*	*	*	*	*	*	F	*	18
47 (a–i)	Other Intervention(s)	*	*	*	*	*	*	F	*	19
48, 48 (a–i)	Status Attribute (Main and Other)	*	*	*	*	*	*	N	O	-
49, 49 (a–i)	Location Attribute (Main and Other)	*	*	*	*	*	*	N	O	-
50, 50 (a–i)	Extent Attribute (Main and Other)	*	*	*	*	*	*	N	O	-
51 (a–i)	Duration of Am. Care Intervention for Main and Other Interventions	*	*	*	*	*	*	N	O	-
52, 52 (a–i)	Intervention Location Code for Main and Other Interventions	*	*	*	*	*	C	N	O	-
53	Anaesthetic Technique	*	*	*	C	*	*	C	*	36
54	Died During Intervention Flag	*	*	*	*	*	*	N	O	-

Current		ICD-10-CA							ICD-9	
Data Element ID Number	Data Element Description	2008–2009	2007–2008	2006–2007	2005–2006	2004–2005	2003–2004	2002–2003^	2001–2002	Data Element ID Number
55	Out-of-Hospital Indicator	*	*	*	*	*	*	N	O	-
56	Out-of-Hospital Institution Number	*	*	*	*	*	*	N	O	-
57	Blood Transfusion Indicator	*	*	*	*	*	*	*	*	31
58	Blood Components/Products—Red Blood Cells	*	*	*	*	*	*	C	*	32
59	Platelets	*	*	*	*	*	*	C	*	32
60	Plasma	*	*	*	*	*	*	C	*	32
61	Albumin	*	*	*	*	*	*	C	*	32
62	Other	*	*	*	*	*	*	C	*	32
63	Autologous	*	*	*	*	C	*	N	O	-
64	Units of Blood Transfused—Red Blood Cells	*	*	*	*	*	*	*	*	50
65	Platelets	*	*	*	*	*	*	*	*	50
66	Plasma	*	*	*	*	*	*	*	*	50
67	Albumin	*	*	*	*	*	*	*	*	50
68	Other	*	*	*	*	*	*	*	*	50
69	Therapeutic Abortion Info—Number of Previous Term Deliveries	*	*	*	*	*	*	C/F	*	41
70	Number of Previous Pre-Term Deliveries	*	*	*	*	*	*	N	O	-
71	Number of Previous Spontaneous Abortions	*	*	*	*	*	*	C/F	*	42
72	Number of Previous Therapeutic Abortions	*	*	*	*	*	*	C/F	*	43
73	Gestational Age—Therapeutic Abortion	*	*	*	*	*	*	C	*	44
74	Date of Last Menses	*	*	*	*	*	*	*	*	45
75 (a–j)	MIS FC Acct Code	*	*	*	*	F	*	*	*	37
76	Service Recipient—Specific Direct Cost	R	R	R	R	R	*	*	*	38
77	Service Recipient—Specific Indirect Cost	R	R	R	R	R	*	*	*	39
78	Traceable Supplies/Patient-Specific Supplies (2001)	R	R	R	R	R	*	*	*	40
79	Project Number	*	*	*	*	*	*	N	O	-



Current		ICD-10-CA							ICD-9	
Data Element ID Number	Data Element Description	2008–2009	2007–2008	2006–2007	2005–2006	2004–2005	2003–2004	2002–2003 <sup>^</sup>	2001–2002	Data Element ID Number
80–96	Facility/Jurisdiction Specific	*	*	*	*	*	*	N	O	-
97	PCTAS Indicator	*	*	*	*	*	N	O	O	-
98	Program Area	*	*	*	*	*	N	O	O	-
99	Scheduled ED Visit Indicator	C	*	*	*	*	N	O	O	-
100	Glasgow Coma Scale	C	*	*	*	*	N	O	O	-
101	Seatbelt Indicator	*	*	*	*	*	N	O	O	-
102	Helmet Indicator	C	*	*	*	N	O	O	O	-
103	Level of Care/Service Recipient	*	*	*	*	N	O	O	O	-
104	Referral Date	*	*	*	*	N	O	O	O	-
105	Vendor MAC	*	*	*	*	N	O	O	O	-
106	Vendor CACS	*	*	*	*	N	O	O	O	-
107	Vendor RIW/ACW (2004 to 2005)	*	*	C	*	N	O	O	O	-
108	Complete Record	*	*	*	*	N	O	O	O	-
109	Main Intervention Date	*	*	*	*	N	O	O	O	-
110	Main Intervention Start Time	*	*	*	*	N	O	O	O	-
111 (a–i)	Other Intervention Date	*	*	*	*	N	O	O	O	-
112 (a–i)	Other Intervention Start Time	*	*	*	*	N	O	O	O	-
113 (#43 “R” Code—2003 to 2005)	Reason for Visit/Chief Complaint	*	*	N	O	O	O	O	O	-
114	Disposition Date	*	N	O	O	O	O	O	O	-
115	Disposition Time	*	N	O	O	O	O	O	O	-
116	Date Patient Left Emergency Department	*	N	O	O	O	O	O	O	-
117	Time Patient Left Emergency Department	*	N	O	O	O	O	O	O	-

**Note**

<sup>^</sup> In 2002–2003, NACRS was re-engineered and ICD-10 was implemented. The data element numbering convention substantially changed.



## Appendix D—Identifying Duplicates in NACRS

- For 2006–2007 and 2007–2008, true duplicate records were identified using all data elements except these three:
  - am\_care\_key
  - abstract\_id\_number
  - date\_recorded
- For 2006–2007 and 2007–2008, abstracts were matched on four data elements:
  - chart\_number
  - HCN\_encrypted (2007–2008)/health\_care\_number (2006–2007)
  - date\_of\_registration
  - registration\_time
- For 2003–2004, 2004–2005 and 2005–2006, abstracts were matched on 26 data elements:
  - facility\_am\_care\_num
  - submission\_fiscal\_year
  - submission\_period
  - coder\_number
  - chart\_number
  - health\_care\_number
  - postal\_code
  - gender
  - birth\_date
  - MIS\_functional\_centre
  - triage\_date
  - triage\_time
  - triage\_level
  - date\_of\_registration
  - registration\_time
  - date\_physician\_init\_assessment
  - time\_physician\_init\_assessment
  - decision\_to\_admit\_date
  - decision\_to\_admit\_time
  - visit\_disposition
  - date\_visit\_completed
  - time\_visit\_completed
  - main\_problem
  - main\_intervention
  - service\_provider
  - service\_provider\_id
- The matching process used was the SAS PROC SORT procedure with the nodupkey option.

