



Data Quality Documentation for External Users:  
National Ambulatory Care Reporting System,  
2010–2011



## Who We Are

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

## Our Vision

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

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# Abbreviations

ACCS	Ambulatory Care Classification System
ADT	admission/discharge/transfer
AHP	allied health professional
Alta.	Alberta
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
CSR	client services representative
CTAS	Canadian Triage Acuity Scale
DAA	death after arrival
DAD	Discharge Abstract Database
DI	diagnostic imaging
DOA	death on arrival
DPG	Day Procedure Group
DS	day surgery
ED	emergency department
EDIS	emergency department information system
eDSS	electronic Data Submission Services
eNACRS	NACRS Electronic Comparative Reports
HCN	Health Care Number
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
Man.	Manitoba
MED D/N	medical day/night care
MCR	multiple contact record
MIS FC	Management Information System Functional Centre
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
OMHRS	Ontario Mental Health Reporting System
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
PHAC	Public Health Agency of Canada
PIA	Physician Initial Assessment
Que.	Quebec
RD	renal dialysis clinic
SARS	severe acute respiratory syndrome
Sask.	Saskatchewan
TADB	Therapeutic Abortions Database
UCC	urgent care centre
Y.T.	Yukon Territory

# 1 Introduction

## 1.1 Purpose and Scope

This document provides background information on the National Ambulatory Care Reporting System (NACRS) and describes general data limitations that may influence analyses. 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 using the June 2009 revision of the CIHI Data Quality Framework. This document focuses on accuracy and comparability. 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, making it comparable to other databases.

## 1.2 An Overview of the National Ambulatory Care Reporting System

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.

NACRS is a national database designed to capture information on client visits to facility- and community-based ambulatory care. Data about visits is collected at the time of service in participating facilities. Data elements in NACRS can be grouped according to five categories—demographic, clinical, administrative, financial and service-specific—with information on discharges, deaths and transfers within a fiscal year (April 1 to March 31). Over time, NACRS has been used to capture not only emergency department (ED) visits but also day surgery (DS) procedures, diagnostic imaging (DI) visits and numerous clinic visits, including renal dialysis (RD), cardiac catheterization (CC), oncology (OC) and mental health (MH).

More than 16.9 million abstracts were submitted to NACRS in 2010–2011. Of these, more than 8.2 million related to ED visits, representing approximately 51.8% of all ED visits in Canada. About 2.4 million day surgery abstracts were submitted to CIHI in 2010–2011, with 36.4% sent to the DAD and 63.6% sent to NACRS.

Following NACRS' inception in 1997, when it was developed based on Alberta's Ambulatory Care Classification System (ACCS) to collect information on ambulatory care, the product was re-engineered in 2002–2003 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). In 2009–2010, the NACRS database was further modified to allow for different levels of data submission to reduce the burden of data collection and improve timelines for reporting purposes (see Section 4 for more details). In 2010–2011, NACRS implemented standard National Management Information System Functional Centre (MIS FC) Account Codes for use in NACRS and developed standard ambulatory care groups based on this national list (see sections 3.3 and 4 for more details). Furthermore, with additional jurisdictions adopting NACRS for ED reporting, it is anticipated that by 2012–2013, at least 80% of all ED visits in Canada will be reported to NACRS. Table 1 illustrates the evolution of NACRS.

**Table 1: Timeline of NACRS Evolution, 2010–2011**

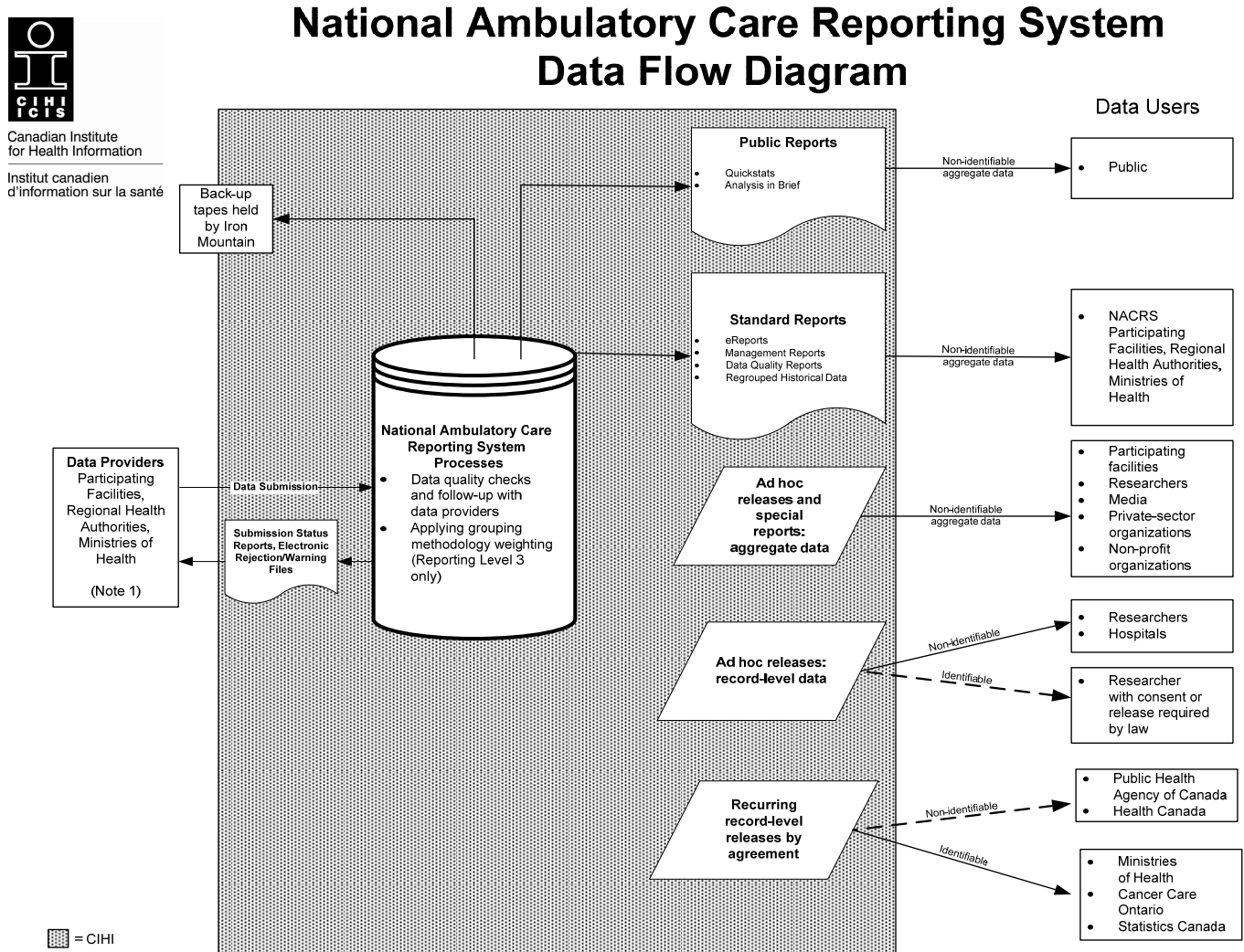
<b>NACRS Evolution</b>	
<b>April 1997</b>	<ul style="list-style-type: none"> <li>• NACRS launched</li> <li>• First British Columbia facility adopts emergency department (ED) reporting</li> </ul>
<b>July 2000</b>	<ul style="list-style-type: none"> <li>• Ontario adopts ED reporting</li> </ul>
<b>April 2001</b>	<ul style="list-style-type: none"> <li>• Launch of the Comprehensive Ambulatory Classification System (CACS) and Ambulatory Cost Weights (ACWs)</li> </ul>
<b>April 2002</b>	<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>
<b>April 2003</b>	<ul style="list-style-type: none"> <li>• Ontario adopts surgical day/night care (DS) reporting</li> <li>• Third B.C. facility adopts ED reporting</li> <li>• First Nova Scotia facility adopts ED reporting</li> </ul>
<b>July 2003</b>	<ul style="list-style-type: none"> <li>• First Prince Edward Island facility adopts ED reporting</li> </ul>
<b>October 2003</b>	<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 DS reporting</li> <li>• Three Nova Scotia facilities adopt ED reporting</li> </ul>
<b>April 2004</b>	<ul style="list-style-type: none"> <li>• First Yukon facility adopts ED reporting</li> </ul>
<b>April 2005</b>	<ul style="list-style-type: none"> <li>• One Nova Scotia facility adopts ED and DS reporting</li> </ul>
<b>April 2006</b>	<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>
<b>April 2007</b>	<ul style="list-style-type: none"> <li>• B.C. NACRS pilot project (two sites)</li> </ul>
<b>April 2009</b>	<ul style="list-style-type: none"> <li>• NACRS is modified to accept different reporting levels</li> <li>• Seven Manitoba facilities adopt Level 1 ED reporting</li> <li>• One Manitoba facility adopts Level 3 ED reporting</li> </ul>
<b>April 2010</b>	<ul style="list-style-type: none"> <li>• Alberta mandates Level 3 reporting for all ambulatory care visits</li> <li>• One Saskatchewan facility adopts Level 1 ED reporting</li> <li>• One additional Nova Scotia facility switches submission of DS data from DAD to NACRS</li> <li>• Implementation of National MIS Functional Centres</li> </ul>



In addition to the collection and processing of ambulatory data, CIHI also provides value-added information (calculated Case Mix Groups, expected length of stay and Resource Intensity Weights) and national comparative reporting based on peer groups (eNACRS) to data suppliers. These facilitate management decision-making at the facility, regional and provincial/territorial levels.

Information from NACRS is used by institutions, governments and academic institutions. Facilities use NACRS data to support utilization management decisions and for administrative research. Governments use NACRS data for funding, system planning and evaluation. Academic and other institutions use NACRS for a wide variety of research purposes.

Figure 1 illustrates the flow of data in NACRS and the uses of NACRS information.



Note 1: Data may be submitted at Reporting Level 3 (full NACRS abstract) or at levels 1/2 (subset of NACRS abstract: no intervention, diagnosis, or CACS information).

July 2011

## 2 Coverage

### 2.1 Population of Reference for NACRS

The population of reference (the population for which statements can be made) for NACRS 2010–2011 includes ambulatory care visit activity with a date of registration between April 1, 2010, and March 31, 2011, from all submitting facilities in Canada.

#### 2.1.1 The NACRS Frame

The frame for NACRS is an inventory of facilities that is used to ensure the collection of all units in the population of reference. Since the provinces and territories determine which facilities will be included in NACRS and all facility numbers are identified in advance, the NACRS frame is validated by individual provinces and territories. If data is not received from a particular facility, that facility is contacted by CIHI if necessary. For a listing of provincial/territorial participation in NACRS, please refer to the following table below.

The 2010–2011 NACRS population of reference included 367 facilities in Canada.

**Table 2: Number of Institutions Submitting to Each Ambulatory Care Group in the 2010–2011 NACRS**

Prov./Terr.	Total No. of Submitting Institutions	ED		DS	Clinic					DI	Other Ambulatory Care
		Level 1	Level 3		CC	RD	OC	MH	Other		
<b>P.E.I.</b>	1	0	1		0	0	0	0	0	0	0
<b>N.S.</b>	5	0	4	4	0	0	0	0	3	0	0
<b>Ont.</b>	188	0	179	150	22	56	84	0	36	14	3
<b>Man.</b>	8	7	1		0	0	0	0	0	0	0
<b>Y.T.</b>	1	0	1		0	0	0	0	0	0	0
<b>Alta.</b>	163	0	108	95	4	4	4	30	101	118	117
<b>Sask.</b>	1	0	1		0	0	0	0	1	0	0
<b>Total</b>	<b>367</b>	<b>7</b>	<b>295</b>	<b>249</b>	<b>24</b>	<b>60</b>	<b>88</b>	<b>30</b>	<b>141</b>	<b>132</b>	<b>120</b>

**Note**

For a listing of how the ambulatory care groups are defined using the National Management Information System Functional Centre (MIS FC) Account Codes, please refer to Appendix D of the *NACRS Manual, 2010–2011*.

**Source**

National Ambulatory Care Reporting System, 2010–2011, Canadian Institute for Health Information.

The 2009–2010 NACRS population of reference included 202 facilities in Canada.

**Table 3: Number of Institutions Submitting to Each Ambulatory Care Group in the 2009–2010 NACRS**

Prov./ Terr.	Total No. of Submitting Institutions	ED		DS	Clinic					DI	Other Ambulatory Care
		Level 1	Level 3		CC	RD	OC	MH	Other		
P.E.I.	1	0	1	0	0	0	0				0
N.S.	4	0	4	3	0	0	0				4
Ont.	185	0	177	151	22	56	84				41
Man.	8	7	1	0	0	0	0				0
B.C.	2	0	2	0	0	0	0				1
Y.T.	1	0	1	0	0	0	0				0
<b>Total</b>	<b>201*</b>	<b>7</b>	<b>186</b>	<b>154</b>	<b>22</b>	<b>56</b>	<b>84</b>				<b>48</b>

**Note**

\* One facility in the population of reference did not submit any data in 2009–2010.

**Source**

National Ambulatory Care Reporting System, 2009–2010, Canadian Institute for Health Information.

In 2010–2011, a total of **16,922,003** abstracts were submitted to NACRS (see Table 4 below); in 2009–2010, there were 9,349,225 abstracts submitted. This 81% increase in volume of records between 2009–2010 and 2010–2011 is due to the full adoption of NACRS in Alberta (all ambulatory care data) as well as in one Saskatchewan facility (Level 1 ED data) and one Nova Scotia facility (DS data). Table 5 summarizes the percentage change in the volume of NACRS abstracts between the two fiscal years.

The two British Columbia facilities that used to submit data to NACRS in 2009–2010 withdrew from voluntary submission to NACRS in 2010–2011.

Three Ontario facilities and one Saskatchewan facility did not submit all periods of 2010–2011 data prior to the July 31, 2011, database closure deadline. There were also 15 Alberta facilities that had no records submitted for some periods as a result of no ambulatory care activity at the facilities during these periods.

**Table 4: Summary of All Visits for NACRS 2010–2011, by Province or Territory and Ambulatory Care Group**

Prov./Terr.	ED		DS	Clinic					DI	Other Ambulatory Care	Total
	Level 1	Level 3		CC	RD	OC	MH	Other			
<b>P.E.I.</b>	—	26,793	—	—	—	—	—	—	—	—	—
<b>N.S.</b>	0	76,625	15,237	0	0	0	0	2,383	0	0	<b>94,245</b>
<b>Ont.</b>	0	5,620,918	1,187,365	51,438	1,151,155	990,640	0	36,989	9,085	540	<b>9,048,130</b>
<b>Man.</b>	283,328	40,915	0	0	0	0	0	0	0	0	<b>324,244</b>
<b>Sask.</b>	0	7,889						512			<b>8,401</b>
<b>Alta.</b>	0	2,131,026	303,441	12,058	271,664	3,155	246,580	2,163,323	690,662	1,570,111	<b>7,392,020</b>
<b>Y.T.</b>	0	28,170	0	0	0	0	0	0	0	0	<b>28,170</b>
<b>Total</b>	<b>283,328</b>	<b>7,932,337</b>	<b>1,506,043</b>	<b>63,496</b>	<b>1,422,819</b>	<b>993,795</b>	<b>246,580</b>	<b>2,203,207</b>	<b>699,747</b>	<b>1,570,651</b>	<b>16,922,003</b>

**Note**

With the implementation of the National MIS FC Account Codes in 2010–2011, some records may have shifted from one ambulatory care group to another, as the groups have now been nationally defined. Please refer to the *NACRS Manual, 2010–2011*, Appendix D—National MIS Standards Functional Centre Account Codes to Ambulatory Care Group Mapping Table.

**Source**

National Ambulatory Care Reporting System, 2010–2011, Canadian Institute for Health Information.

**Table 5: Percentage Change in Volume of NACRS Abstracts Between 2009–2010 and 2010–2011, by Province or Territory and Ambulatory Care Type**

Prov./Terr.	ED		DS	Clinic					DI	Other Ambulatory Care	Total
	Level 1	Level 3		CC	RD	OC	MH	Other			
<b>P.E.I.</b>	0	-6.6	0.0	0.0	0.0	0.0	N/A	N/A	N/A	0.0	<b>-6.6</b>
<b>N.S.</b>	0	-4.9	40.6	0.0	0.0	0.0	N/A	N/A	N/A	N/A	<b>-7.8</b>
<b>Ont.</b>	0	1.5	-1.6	2.4	-0.4	-5.4	N/A	N/A	N/A	-99.1	<b>-0.1</b>
<b>Man.</b>	218	79.1	0.0	0.0	0.0	0.0	N/A	N/A	N/A	0.0	<b>189.6</b>
<b>Sask.</b>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<b>N/A</b>
<b>Alta.</b>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<b>N/A</b>
<b>B.C.</b>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<b>N/A</b>
<b>Y.T.</b>	0	2.9	0.0	0.0	0.0	0.0	N/A	N/A	N/A	0.0	<b>2.9</b>
<b>Total</b>	<b>218</b>	<b>38.7</b>	<b>0.0</b>	<b>26.4</b>	<b>23.1</b>	<b>-5.1</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>2,129.7</b>	<b>81.0</b>

**Note**

With the implementation of the National MIS FC Account Codes in 2010–2011, some records may have shifted from one ambulatory care group to another, as the groups have now been nationally defined. Please refer to the *NACRS Manual, 2010–2011*, Appendix D—National MIS Standards Functional Centre Account Codes to Ambulatory Care Group Mapping Table.

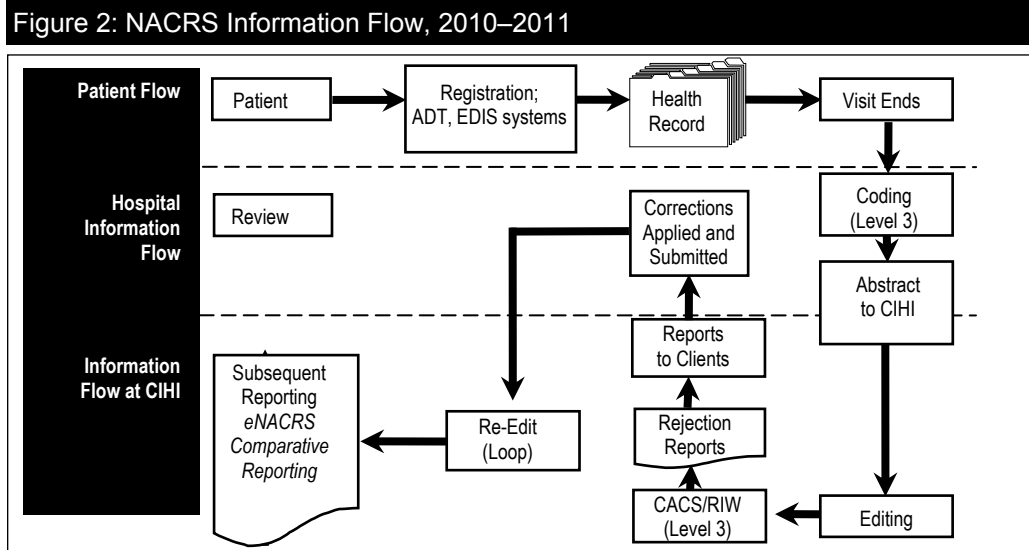
**Sources**

National Ambulatory Care Reporting System, 2009–2010 and 2010–2011, Canadian Institute for Health Information.

## 3 Data Collection and Standards

### 3.1 Data Collection

The NACRS data capture and collection process and information flow is summarized below, in Figure 2.



#### 3.1.1 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 patient visit uses a variety of sources, including admission/discharge/transfer (ADT) systems, emergency department information systems (EDIS), patient records, physician notes and laboratory and diagnostic imaging results, to create a complete picture of a patient’s visit, as depicted by the “Health Record” section in the diagram above. In other words, each abstract is associated with a patient visit and is submitted to the NACRS database from the facility. If a patient visits an ambulatory care setting on multiple occasions within the fiscal year, multiple abstracts are submitted.

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 patient is seen by several physicians, clinicians and AHPs in different MIS FCs. As of 2010–2011, the province

of Alberta started submitting all ambulatory care visits to NACRS. Alberta's emergency and day surgery abstracts are to conform to CIHI's NACRS abstract creation submission requirements; no multiple contact abstracts are to be created. Alberta's ambulatory care clinic visits will also, whenever possible, follow the NACRS abstract creation process. Some facilities submitted MCRs for Alberta mental health and other clinic visits.

The NACRS manual, the abstracting reference tool provided to clients, is available as a PDF through CIHI's website under the 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, including:

- Province of submission;
- Use of specific ICD-10-CA/CCI codes resulting in required coding of other data elements; and/or
- Ambulatory care type (visit MIS FC groupings, such as ED, DS and clinics).

For each data element, the manual contains a data element definition, collection guidelines where applicable, 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 obtained through the application of hard and soft 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)—a single method for file transmission via the internet which provides security that meets corporate and industry standards through the use of encrypted protocols and satisfies national and provincial privacy legislation. Transmission of data can occur 24 hours a day, 7 days a week. Once the eDSS has been set up, facilities can submit data to CIHI at their convenience.

### **3.1.2 Data Submission Timeline**

There were 12 reporting periods in NACRS 2010–2011. A submission file can contain ambulatory care data for one period only. For all ambulatory care types (for example, DS, ED, clinics) the registration date determines the reporting period. All abstracts for NACRS 2010–2011 (from April 1, 2010, to March 31, 2011) must have been submitted by the date of database closure on July 31, 2011.

### **3.1.3 Completeness of Data Submissions**

Data Submission Status Reports are used to monitor the number of abstracts submitted by period for each institution. These reports are used to identify data-submission issues during the submission year. There were two data submission reports generated for submitted abstracts, including the facility information file, in 2010–2011. Given that the file was successfully processed, the Submission Status Report was generated. Second, an Electronic Rejection/Data Quality Warning File accompanied the Submission Status Report when records were found to have errors and/or warnings.

In 2010–2011, NACRS introduced a set of cumulative Data Quality Reports at the facility and provincial levels. These reports provide information on the number of records with unknown/missing value for specific time-related data elements. Using these reports, facilities and provinces can identify where data collection practices could be improved

Period closure is important in communicating the completeness of data submission to CIHI. Period closure is indicated by a data element called Ready for Reports Flag in a data submission. When this data element is set to 1 (yes) it communicates to NACRS that all records for that period have been submitted. Once the period closure is submitted and accepted, NACRS assumes that facilities have sent in all their data for that period. Each period within a fiscal year must be closed regardless of whether or not NACRS data was submitted for that period. The presence of a period closure in the absence of data will convey that the facility had no activity for that period (for example, unit closes in July) or the facility closed within that fiscal year.

## **3.2 Data Quality Control**

In addition to the above, quality control for NACRS also occurs through the following channels:

### **3.2.1 CIHI Production System Edits and Correction Process**

The comprehensive NACRS edit structure is designed to identify or flag inconsistencies. In 2010–2011, more than 750 data element edits and warnings were applied to NACRS. 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 resubmit 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.



All submission, deletion, correction and editing of abstracts for the fiscal year must be completed prior to the closure of the NACRS database on July 31. After that time, no additional abstracts or changes are accepted. Edits are reviewed and updated each year as new data 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.

### **3.2.2 Abstracting Software and Role of External Software Developers (Vendors)**

In order to standardize and ensure accurate data collection, CIHI's clients hire external software vendors to install any software 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 is 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 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 values and proper formatting. CIHI requires vendors to submit at least one test file annually. The primary purpose for vendor testing is to ensure that vendors have adjusted data-submission requirements for any new fiscal year changes prior to facility testing. Problem areas are identified and communicated to the vendors with possible solutions. Vendors are also expected to test the resubmission process. A vendors-only section on CIHI's website ensures consistent communication between CIHI and vendors. A list of vendors who have successfully submitted test data to NACRS is posted on the NACRS webpage.

Each ambulatory care facility is also required to submit test files to CIHI annually. Client testing begins once its NACRS abstracting vendor has successfully tested. The primary purpose for facility testing is to ensure that the updated vendor software has been applied in the facility and to ensure adherence to CIHI data submission requirements.

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 data submission specifications while respecting their proprietary freedom of software design.

### **3.2.3 Annual Database Change Cycle**

Every year, enhancements are made to the database to address emerging health care issues, address client needs and improve data quality. Refinements and suggested enhancements to data elements and edits in NACRS are communicated to CIHI in several ways, including

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

Appendix A outlines the mandatory and optional data elements in the 2010–2011 NACRS. Appendix B outlines the evolution of data elements over time, from 2001–2002 to 2010–2011.

### **3.2.4 Advisory Groups**

The National Clinical Administrative Databases (NCAD) Steering Committee has national representation from ministries of health, Statistics Canada and the Public Health Agency of Canada (PHAC). This committee assists in the annual database change cycle by providing feedback on requested changes, such as proposals for new data elements and edits, as well as revisions to current data elements and edits. The feedback helps to ensure national comparability.

NACRS also has an ED Ad Hoc Advisory Committee that has representation from the Canadian Association of Emergency Physicians (CAEP). This advisory group meets when required to discuss ED-specific issues as they relate to data collection and reporting for NACRS.

### **3.2.5 Client Services Representatives**

CIHI has assigned client services representatives (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 and territorial data consultants, health organizations and data users.

### **3.2.6 CIHI Education Program**

Existing clients and clients in jurisdictions considering NACRS are provided with education sessions on NACRS implementation, data collection and submission, as well as on the use of NACRS products and reports including the CACS/RIW (Resource Intensity Weight) methodology and eNACRS reports. 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 data collection, data submission, data elements and edits. eQuery can also assist in such matters as ICD-10-CA and CCI coding standards and case mix methodologies. Bulletins via the web or email also inform clients about NACRS issues and/or new NACRS products.

### 3.2.7 Special Studies

CIHI occasionally completes reabstraction and data-quality assessment studies. The last reabstraction study on NACRS data was released in January 2008, and was completed for 2004–2005 data. The study involved returning to the original source of information (client charts), reabstracting the data and comparing results to the data originally submitted to NACRS. Results of these studies can help focus data quality efforts.

## 3.3 Standardization

### 3.3.1 Classification System

Classification systems in health care provide a standard mechanism for the capture and coding of diagnoses and interventions. As of 2002–2003, all facilities submitting to NACRS use the International Statistical Classification of Diseases and Related Health Problems, 10th Revision, Canada (ICD-10-CA) and Canadian Classification of Health Interventions (CCI) coding standards. **For years prior to this, users are strongly advised to analyze data using the original classification scheme.**

### 3.3.2 NACRS Pick-Lists

Pick-lists are standardized lists from which predefined words or phrases can be selected. The use of these lists allows structured input to be received and variation in data collection to be minimized, which facilitates comparative reporting. The NACRS pick-lists are designed to be completed by ED clinical staff (physician or nurse) at the time of service.

The Presenting Complaint List (PCL) consists of approximately 165 common initial complaints received from patients entering the ED.

The Canadian Emergency Department Diagnoses Shortlist (CED-DxS) consists of a subset of more than 800 diagnoses derived from a complete list of more than 17,000 ICD-10-CA codes used to capture diagnostic information on acute and ambulatory care patients in Canada.

### **3.3.3 National Management Information System Functional Centre (MIS FC) Account Codes**

Prior to 2009–2010, all abstracts sent to NACRS contained a provincial/territorial Management Information System Functional Centre (MIS FC) Account Code. As of 2010–2011, a National MIS FC Account Codes list was introduced. NACRS no longer accepts provincial/territorial MIS Functional Centre variations, and will accept only abstracts submitted with the National MIS Standards Functional Centre Account Codes. As such, all abstracts sent to NACRS must contain a National MIS FC Account Code to represent the statistical and financial reporting related to the services provided (see *NACRS Manual, 2010–2011*, Appendix D–National MIS Standards Functional Centre Account Codes to Ambulatory Care Group Mapping Table).

## **3.4 Linkage**

### **3.4.1 Postal Code**

The Postal Code is a common variable in 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. 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 does 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.

### **3.4.2 Time Frame**

The standard time frame for NACRS is the fiscal year (the period from April 1 of one year to March 31 of the following year). Within NACRS, a number of variables—the fiscal year, registration date/time and disposition date/time—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.

### 3.4.3 Facility-Unique Identifier

The facility-unique identifier is the ambulatory care number assigned by provincial ministries of health and territorial governments. Each province or 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. In order to prevent potential identification, any requests for facility-identifying information require approval by the CIHI Privacy, Confidentiality and Security Committee.

### 3.4.4 Health Care Numbers

Health Care Numbers (HCNs) are assigned to individuals by provincial ministries of health and territorial governments. NACRS also captures a variable representing the province or territory that issued a Health Care Number, as the numbers are unique only within the province or territory. Combining the two variables with other relevant personal information data fields (such as Birth Date, 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 Reporting Facility's Ambulatory Care Number, the HCN and Registration/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. CIHI applies standardized algorithms to encrypt all HCNs to maintain patients' privacy and, at the same time, for linkage purposes. Linkage over time, therefore, can be accomplished only by using the encrypted HCN. Health Care Number, Birth Date 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 patient names and street addresses are *not* part of NACRS.

## 3.5 Equivalency

### 3.5.1 Day Surgery

Day surgery visits are submitted to either the Discharge Abstract Database (DAD) or NACRS. Over the years, more facilities/jurisdictions are making the switch from reporting day surgery visits to DAD to reporting them to NACRS. For example, since 2003–2004, Ontario has submitted information on day surgery cases to NACRS. In 2010–2011, an additional facility in Nova Scotia also made the switch. There are differences between DAD and NACRS for day surgery reporting with respect to day surgery definition, data elements and valid values, which can make it difficult to compare information between DAD and NACRS and across different fiscal years. Current work is under way to align these databases for day surgery reporting. **Users are strongly advised to be aware of these differences when doing historical analysis and provincial comparisons.**

## 4 Major Changes to NACRS

### 4.1 Historical Comparability

#### 4.1.1 NACRS Re-Engineering (2002–2003)

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.

#### 4.1.2 NACRS Multiple Submission Level Implementation (2009–2010 and 2010–2011)

During 2008–2009, CIHI undertook a special project to enhance the NACRS database to address the burden of data collection, to improve timeliness and functionality of reporting and to increase coverage across the country. As of April 1, 2009, the NACRS database was modified to allow for different levels of data submission for ED visits. These are referred to as data submission levels 1, 2 and 3. As a result, facilities submitting to the NACRS database under submission levels 1 and 2 will report a subset of the full NACRS data set. Facilities that have been reporting the full NACRS data set will be categorized as submission Level 3. **Users are strongly advised to take into consideration the data submission level information when performing their analysis.**

General details regarding submission levels 1, 2 and 3, available in NACRS as of 2010–2011, are as follows:

Level 1 (ED Only):

- Introduced in 2009–2010.
- Applicable to emergency department records only.
- Is a subset of the full NACRS data set, with approximately 30 mandatory data elements.
- Includes data elements required for ED wait times indicators such as Time of Registration, Time of Triage, Time of Discharge, Triage Level, etc.
- Data is readily available via ADT/EDIS interface to the NACRS abstract (real time or within a few days of month end).
- Fully coded diagnosis (ICD-10-CA) and intervention (CCI) information is not available.
- Completion of the NACRS pick-lists (Presenting Complaint and Discharge Diagnosis ) data elements is optional. These pick-lists provide some diagnostic information without a facility being required to submit the fully coded ICD-10-CA diagnoses. (See Section 3.3.2 above.)
- Comprehensive Ambulatory Classification System (CACS) grouped data is not available.

Level 2 (ED Only):

- Option became available in 2010–2011.
- Level 2 data submission contains the same data elements as Level 1, except completion of at least one of the NACRS pick-lists is mandatory.
- CACS grouped data is not available.

Level 3:

- Applicable to all ambulatory care, such as ED, DS and outpatient clinics.
- The full NACRS data set, which includes all mandatory and optional data elements, as well as the fully coded diagnosis (ICD-10-CA) and intervention (CCI) information.
- CACS grouped data is available.

#### Multi-Level Submission (ED Only):

- Introduced in 2010–2011.
- Facilities submitting multiple levels can submit a preliminary Level 1 or Level 2 file for a reporting period to gain access to more timely reports and then submit a final Level 3 file for access to the CACS grouped data. When a period of Level 3 ED data is accepted into the NACRS database, the previously submitted Level 1 or Level 2 data for that period is archived and the Level 3 data then populates the database.

### **4.1.3 NACRS National Management Information System Functional Centre (MIS FC) Account Code (2010–2011)**

The *Standards for Management Information Systems in Canadian Health Service Organizations* (MIS Standards) are a set of national standards that provide a framework for collecting and reporting financial and statistical data on the day-to-day operations of health service organizations. Each jurisdiction (province/territory) has the ability to develop a subset of the MIS reporting standards, which might differ marginally from the national MIS reporting system. In the past, NACRS received yearly updates of jurisdictional MIS charts of accounts and incorporated each province-/territory-specific MIS FC in NACRS error and warning edits and eNACRS reports.

As of 2010–2011, NACRS no longer accepts provincial/territorial MIS FC variations; it accepts only abstracts submitted with the national MIS FC Account Codes for NACRS. (See *NACRS Manual, 2010–2011*, Appendix D—National MIS Standards Functional Centre Account Codes to Ambulatory Care Group Mapping Table.)

### **4.1.4 Comprehensive Ambulatory Classification System Grouper**

The Comprehensive Ambulatory Classification System (CACS) is a national grouping methodology for ambulatory care patients that includes emergency departments, clinics and -day surgery. Patients are grouped according to principal procedure, main diagnosis and visit disposition data collected via NACRS. CACS places patient visits into groups that are clinically and resource homogenous. Some of the variables that assign clients to groups are Diagnosis, Intervention, Anaesthetic Technique, Visit Disposition, Mode of Visit, Client Age, and Gender.

With the release of each year of data, the most recent version of the CACS grouping methodology is used. For the 2010–2011 NACRS data year, the CACS 2010 methodology was applied.



### 4.1.5 Other Changes to NACRS

The NACRS database is evaluated annually for future changes through a process called the annual change cycle. This process involves discussing changes to the database with clients and stakeholders, with the intent of improving the content and functionality of NACRS. Proposed changes are evaluated according to priority and feasibility. Changes to the full NACRS data set up to and including 2010–2011 are outlined in Appendix B.

### 4.1.6 Historical References

The NACRS manual and CACS directory are updated annually. Users should consider both the fiscal year and classification scheme when referring to NACRS documentation.

- NACRS abstracting manual, 2001–2002 through to 2010–2011
- CACS 2003 version 3, 2006, 2007, 2008, 2009 and 2010 directory
- CIHI NACRS bulletins

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

## 5 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.

### 5.1 Accuracy

Accuracy is what most people think of when they think of data quality. Accuracy refers to how well information in or derived from the data holding reflects the reality it was designed to measure.

#### 5.1.1 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

A source of under-coverage in NACRS is non-submission of data. No under-coverage at a facility level was observed in NACRS for 2010–2011. CIHI and provincial or territorial ministries of health monitor participation by examining monthly reports of submission status received from each facility.

The Ontario Ministry of Health and Long-Term Care mandates facilities in the province to submit all ED, DS, RD, OC and CC clinic visit abstracts; Alberta Health and Wellness mandates all ambulatory care activity, including all clinic visits, to be submitted to NACRS.

## Over-Coverage

### Duplicates

A source of over-coverage in NACRS is duplication of records. CIHI uses a combination of data elements to identify abstracts that could be duplicates, which cannot be verified without confirmation from the facilities. Data users should take these criteria into consideration when deciding whether to include abstracts in their analyses.

- For 2010–2011, true duplicate records were identified by matching records on all but three data elements. A slightly different method was used for 2009–2010 (see Appendix C). Through the open-year data-quality process, the NACRS program area continues to work with the facilities to identify duplicates, thus enabling the facilities to submit corrections before the database was closed.

The numbers of true duplicate records for the last two years are presented in Table 6, categorized by ED, DS, CC, RD, OC, MH, DI and other clinics, and the proportion of the entire NACRS database they represent.

**Table 6: NACRS True Duplicates\***

Fiscal Year		2009–2010 N (%)	2010–2011 N (%)
<b>ED</b>	Level 1	0 (0)	0 (0)
	Level 3	12 (3.99)	15 (0.01)
<b>DS</b>		1 (0.33)	1,012 (0.81)
<b>Clinic</b>	CC	N/A	1 (0)
	RD	N/A	2,883 (2.31)
	OC	273 (90.7)	114 (0.09)
	MH	N/A	29,920 (23.99)
	Other	N/A	83,867 (67.25)
<b>DI</b>		N/A	251 (0.20)
<b>Other Ambulatory Care</b>		15 (4.98)	6,647 (5.33)
<b>Total</b>		301	124,710
<b>Proportion of NACRS</b>		~0.00%	~0.74%

**Note**

\* Changes in these figures are the result of Alberta submitting to NACRS in 2010–2011. The changes could also be due to variations in visit type definitions as the National MIS FCs were used in 2010–2011. The majority (99.9%) of the 2010–2011 duplicates are from Alberta.

**Sources**

National Ambulatory Care Reporting System, 2009–2010 and 2010–2011, Canadian Institute for Health Information.

Many abstracting systems offer a cloning function. Using this feature, a facility can copy an abstract from a previous visit and reuse the data that is applicable to a subsequent visit. Information that is unique to each visit, like registration date, should be updated. If updating does not occur, multiple records may appear as duplicates.

**Example:**

A patient attends the chemotherapy clinic on November 1, 2 and 3. The first visit is abstracted and cloned for the two subsequent visits. Data is not updated on the abstracts representing the November 2 and 3 visits. As a result, NACRS will have three chemotherapy clinic records for one patient, all with a visit date of November 1.

**Multiple Contact Records**

A NACRS record should represent a single ambulatory care visit. Alberta facilities may submit multiple records for a single visit when the patient receives care or treatment from service providers who are not routinely involved in patient care delivery within the service area. These additional records are referred to as multiple contact records. This practice is primarily observed in Alberta clinic records.

Example:

A patient attends the renal dialysis clinic and is assessed by a physician. Patient care is also provided by a clinical nutritionist and social worker who are not members of the renal dialysis team.

In NACRS, one clinic record should be reported. Providers may include the physician, clinical nutritionist and social worker.

In Alberta, this scenario may result in the submission of three records, as follows:

- A renal dialysis clinic record with the physician provider;
- A second record with the clinical nutritionist; and
- A third record with the social worker.

### **5.1.2 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 and is supported by the 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 when viewed as a whole.
- All vendors incorporate NACRS submission specifications into their proprietary software systems. Please refer to the Data Quality Control section above 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.

### 5.1.3 Non-Response

#### Unit Non-Response

Unit non-response refers to data from facilities in the frame that is 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 resubmitted during the data-collection period. The following summarizes unit non-response:

- Three Ontario facilities and one in Saskatchewan did not submit all periods of 2010–2011 data prior to the July 31, 2011, database closure. This contributes to the unit non-response rate of 0.09%. The unit non-response rate due to outstanding rejected records for NACRS-mandated reporting was found to be less than 0.13%.

#### 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 mandatory, optional or mandatory if applicable. 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 data elements.

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

Data Element Number	Data Element	Definition	Unknown Value	2009–2010 NACRS Proportion When Applicable (%)	2010–2011 NACRS Proportion When Applicable (%)	% Change Between 2009–2010 and 2010–2011
02	Encrypted HCN	Health Care Number data is not available	All zeros	1.16	1.21	0.05
05	Postal Code	Client is a resident of Canada and the postal code is unknown or postal code is invalid	2-digit alpha code	0.63	0.02	-0.61
09	Birth Date is Estimated	Birth Date is unknown or partial	Y	0.02	0.01	-0.01

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

Data Element Number	Data Element	Definition	Unknown Value	2009–2010 NACRS Proportion When Applicable (%)	2010–2011 NACRS Proportion When Applicable (%)	% Change Between 2009–2010 and 2010–2011
25	Triage Time	Unknown	9999	1.31	1.50	0.19
26	Triage Level	Unknown	99	0.63	1.98	1.35
30	Time of Physician Initial Assessment	Unknown	9999	12.35	15.14	2.79
45	Other Problem	Unknown codes for place of occurrence with injuries	U98.9	60.37	60.9	0.53
100	Glasgow Coma Scale	Not available	99	54.86	50.31	-4.55
101	Seatbelt Indicator	Unknown	99	15.47	33.06	17.59
102	Helmet Indicator	Unknown	99	61.64	71.25	9.61
114	Disposition Time	Unknown	9999	2.23	2.26	0.03
117	Time Patient Left ED	Unknown	9999	1.59	0.85	-0.74

**Sources**

National Ambulatory Care Reporting System, 2009–2010 and 2010–2011, Canadian Institute for Health Information.

It is important to note that the proportion of unknown data varies considerably by facility. 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 accurately calculate item non-response. This may also affect the reporting of this data (see next section).

### 5.1.4 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 was reported. Measurement error occurs when the values reported do not match the values that should have been reported; it can be measured by the frequency with which a data element is incorrectly coded. 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 also applies to more than subjective variables; it can 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, Birth Date, 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:
  - **Registration Time and Triage Time:** Overall, 14% of unscheduled ED records have a triage time that is identical to the registration time, including those from 23 facilities that report triage and registration as the same time in more than 95% of their data. Of these, 4 are large (recording more than 30,000 ED visits) and 15 are small (with fewer than 15,000 ED visits). The time between triage and registration is one minute in more than 25% of the records from nine facilities. As these results may indicate default coding for triage time, the data might be used with caution.
  - **Registration Time and Disposition Time:** These time elements can provide an insight into lengths of stay for visits to emergency and DS units. Among the ED and DS NACRS abstracts, 1% show that registration time is the same as disposition time, with 17 facilities reporting Registration and Disposition time as the same for 100% of their data. These results suggest some default coding for Registration Time and Disposition Time.
  - **All time elements:** The most consistently reported NACRS time element is the Registration Time, most likely because this is the place of initial patient contact. Manual data collection methods can lead to some measurement errors 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).

- **Main intervention location:** There has been an inconsistent use of Main Intervention Location and MIS FC by some facilities. These facilities reported Main Intervention Location as Ambulatory Operating Room/Surgical Day while using the Main Operating Room MIS FC (71260 and 71262).
- **J09 code used to identify H1N1 influenza:** After the H1N1 influenza outbreak in early 2009, CIHI, the World Health Organization (WHO) and the International Update and Revision Committee of the ICD-10 (URC) decided to use the code J09 *Influenza due to identified avian influenza virus* to identify H1N1 influenza until a unique code could be developed, as there had been no confirmed cases of avian flu in Canada. The J09 code was a new ICD-10-CA code for 2006–2007, and was to be used in subsequent years. In 2009–2010 and 2010–2011, the J09 code was used to identify the H1N1 influenza, as the new, unique H1N1 code has not yet been implemented.
- **Invalid postal codes appear in NACRS for 2010–2011:** A number of records included correctly formatted six-digit postal codes that did not match any postal code provided by Canada Post (see Table 8).

**Table 8: Examples of Invalid Postal Codes in the 2010–2011 NACRS**

Postal Code	Number of Records
X0X0X0	545
A0A0A0	542
T1T1T1	350
P1P1P1	250
T2T2T2	239
X1X1X1	189
T5T5T5	155
M1M1M1	140

**Source**

National Ambulatory Care Reporting System, 2010–2011, Canadian Institute for Health Information.

- **Multiple deaths recorded for the same HCN:** 40 patients (80 records) were identified as dead more than once by eight different facilities in 2010–2011. These are instances where there are multiple records for the same HCN and the visit disposition is either 10 (DAA) or 11 (DOA).
- **Encrypted Health Care Number and linkage:** When the HCN is coded as either 0 or 1, the encrypted HCN is defaulted to 000000000000. Such an assignment prevents data linkage using encrypted HCNs. In 2010–2011, there were 205,478 (1.2%) records with the encrypted HCN set to 000000000000.



- **Diagnosis Cluster, Post-Intervention Condition and Drug-Resistant Microorganism Issues:** The Diagnosis Cluster is a new NACRS data element introduced in 2009–2010, and is mandatory for post-intervention conditions and drug-resistant microorganisms. The Diagnosis Cluster is used when more than one ICD-10-CA code is used to describe a condition, illness and/or diagnosis.

The mandatory status of this data element is not enforced by edits, hence the following data quality issues were discovered in the 2010–2011 data:

- There are abstracts where a post-intervention condition code (T80 to T88), external cause code (Y60 to Y84) or drug-resistant microorganism code (U82 to U85) was assigned without a Diagnosis Cluster.
- There are abstracts where a post-intervention condition code (T80 to T88) was assigned without a corresponding external cause code (Y60 to Y84).
- In 2012–2013, new edits will be implemented to ensure the proper use of Problem Cluster.
- **Duplicate interventions:** In 2010–2011, 0.3% of the records had a duplicate intervention.
- **Unusual length of stay (LOS) in the emergency department:** LOS is a derived field calculated as the time between the Registration or Triage Date/Time and the Date/Time Patient Left the ED or Disposition Date/Time. A wait time in the ED that is greater than 72 hours is considered excessive. In 2010–2011, the NACRS database contained 0.06% of records where the LOS in the ED was greater than 72 hours and 0.02% of records where the LOS was equal to 0.
- Cancer Care Ontario (CCO) data constitutes a large proportion (48.5%) 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 D of the *NACRS Manual, 2010–2011* for the list of oncology clinic MIS FCs). Measurement error occurred in this data for the following elements:
  - **Visit Disposition:** CCO does not capture NACRS visit disposition and codes all CCO abstracts with a visit disposition of discharged home or 01.
  - **Main Intervention:** Multiple CCI intervention codes on a single abstract are not necessarily prioritized so that the most significant intervention code is the main intervention. This is contrary to the definition of Main Intervention, which is “the procedure/intervention performed and considered by the provider(s) as being the most clinically significant.”
  - **Registration Time:** The reporting of this data element is optional for clinic visits, but CCO abstracts include this information. Measurement error is suggested by the disproportionate number of abstracts coded with a registration time of 00:00 (14%). CCO has indicated to CIHI that

Registration Time is not captured for chemotherapy visits or for unscheduled radiation or minor-procedure visits and that an arbitrary registration time of 00:00 is assigned for these abstracts.

- **Disposition Time:** The reporting of this data element is optional for clinic visits. Measurement error is observed, with 66% of all the CCO abstracts having a Disposition Time of 18:00 and 34% of CCO abstracts having a Disposition Time of 23:30.
- NACRS has a provincial response bias. In 2010–2011, 53% of the data was from Ontario and 44% was from Alberta.

## 5.2 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 is comparable over time.

### 5.2.1 Standardization

- Submission of a data element may be mandatory, optional or mandatory if applicable. As a national database, a large number of NACRS data elements are mandatory, regardless of the geographical location of submitting facilities, even though a particular data element may not have been mandated for reporting by a province or territory. All other data collected in NACRS may be either optional or mandatory if applicable, depending upon decisions of individual provinces or territories to mandate the reporting of a particular data element. Response rates for optional data elements vary and are typically low. For an overview of data element mandatory/optional status, consult Appendix A, as well the *NACRS Manual, 2010–2011*.
- 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 data element evolution over time, please consult Appendix B, as well as the *NACRS Manual, 2010–2011*.

### 5.2.2 Linkage

- **Postal codes:** In NACRS, postal codes may not accurately reflect a client's 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 numbers for rural residences may make it difficult to accurately determine a client's residence.

- **Facility number:** Users should be aware that the facility-identifier numbers for the reporting of DS visits are not the same in NACRS as they are in the DAD. When conducting trend analyses, mappings must be performed between the DAD DS Institution Numbers and the NACRS ambulatory care facility numbers.

### 5.2.3 Historical Comparability

- **ECT volumes:** There was an increase in electroconvulsive therapy (ECT) treatment volumes from 2005–2006 to 2006–2007 (from 3,467 to 5,299 cases). The main reason for this is that, prior to 2006, ECTs were collected in inpatient abstracts and were reflected in the DAD. Only outpatient ECTs were registered in NACRS. However, since the introduction of the Ontario Mental Health Reporting System (OMHRS) in 2006, one NACRS abstract was created for the ambulatory component (ECT treatment) of the visit, as OMHRS does not have a component to capture the ECT intervention.
- **MIS FCs:** Prior to 2010–2011, Provincial MIS FCs were used in NACRS. With the implementation of the National MIS FC, some records may have shifted from one visit type to another, as the provinces and territories may have been defining the visit types differently based on their provincial MIS FCs.
- **Pneumonia and stroke:** The number of pneumonia and stroke cases presented in EDs as the Main Problem increased from 2007–2008 to 2008–2009. Pneumonia increased by 16% and stroke increased by 26%. The main reason that accounts for this increase is the introduction of new valid CIHI code Q (Suspected Conditions/Query/Uncertain Diagnosis) in the Main Problem prefix in 2008–2009. Prior to 2008, only the symptoms of the actual condition were coded and not the diagnosis.
- **Data element changes:** Every year, enhancements are made to NACRS by adding new pertinent data elements, deleting those that are no longer required or are poorly defined, or adding additional valid values. For a summary of the changes, please refer to Appendix B—NACRS Field Evolution in this document or the *NACRS Manual, 2010–2011*, pages vii–xi.

## 6 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, DS, DI and clinics (for example, RD, CC, OC and MH), can be identified by multiple MIS FCs (see Appendix D of the *NACRS Manual, 2010–2011*).
- Day surgery 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.

## Appendix A—2010–2011 NACRS Data Elements Mandatory/Optional Status

This document is intended for use in conjunction with the NACRS abstraction manual. Refer to the *NACRS Manual, 2010–2011* for details.

Legend	
<b>M</b>	Mandatory
<b>M*</b>	Mandatory if applicable
<b>O</b>	Optional
<b>N/A</b>	Not applicable
<b>L1</b>	Level 1
<b>L2</b>	Level 2
<b>L3</b>	Level 3

Data Element ID Number	Data Element Description	Mandatory/Optional Status NACRS Standard			
		ED		DS	Other Amb. Care
		L1/L2	L3		
<b>00A</b>	Reporting Facility's Province/Territory	M	M	M	M
<b>00B</b>	Reporting Facility's Ambulatory Care Number	M	M	M	M
<b>00C</b>	Submission Fiscal Year	M	M	M	M
<b>00D</b>	Submission Period	M	M	M	M
<b>OOE</b>	Abstract Identification Number	M	M	M	M
<b>OOF</b>	Coder Number	M	M	M	M
<b>01</b>	Chart Number	M	M	M	M
<b>02</b>	Health Care Number	M	M	M	M
<b>03</b>	Province/Territory Issuing Health Care Number	M	M	M	M
<b>04</b>	Responsibility for Payment	M	M	M	M
<b>05</b>	Postal Code	M	M	M	M
<b>06</b>	Residence Code (Geographic Code)	O (M in N.S., Ont.)	O (M in N.S., Ont.)	O (M in N.S., Ont.)	O (M in N.S., Ont.)
<b>07</b>	Gender	M	M	M	M
<b>08</b>	Birth Date	M	M	M	M
<b>09</b>	Birth Date Is Estimated	M	M	M	M
<b>11</b>	Ambulatory Registration Number	O	O	O	O
<b>12</b>	Ambulatory Registration/Encounter Sequence Number	M*	M*	M*	M*
<b>13</b>	Visit MIS FC Account Code	M	M	M	M
<b>14</b>	Admit via Ambulance	M	M	M	M

Data Element ID Number	Data Element Description	Mandatory/Optional Status NACRS Standard			
		ED		DS	Other Amb. Care
		L1/L2	L3		
15	Ambulance Call Number	N/A	O	O	O
16	Living Arrangement	N/A	O	O	O
17	Residence Type	N/A	O	O	O
18	Visit Type	O	O (M* in P.E.I., N.S., Ont., Man., B.C.)	N/A	N/A
19	Ambulatory Visit Status	N/A	O	O	O
20	Mode of Visit/Contact	O	M	M	M
21	Highest Level of Education	N/A	O	O	O
22	Arrival Date	O	O	N/A	N/A
23	Arrival Time	O	O	N/A	N/A
24	Triage Date	M	M	N/A	N/A
25	Triage Time	M	M	N/A	N/A
26	Triage Level (CTAS)	M	M	N/A	N/A
27	Date of Registration/Visit	M	M	M	M
28	Registration/Visit Time	M	M	M	O
29	Date of Physician Initial Assessment	M	M	N/A	N/A
30	Time of Physician Initial Assessment	M	M	N/A	N/A
31	Referral Source Prior to Ambulatory Care Visit	O	M	O	O
32	Institution From	N/A	M*	M*	M*
35	Visit Disposition	M	M	M	M
38	Referred To—After Completion of Ambulatory Care Visit	N/A	O	O	O
39	Institution To	N/A	M*	M*	M*
40	Provider Type	N/A	M	M	M (O in Alta.)
41	Provider Service	N/A	M	M	M (O in Alta.)
42	Provider Number	N/A	M	M	M* (O in Alta.)
43/43a-i	Problem Prefix (Main and Other)	O	O	O (M* for Ont.)	O
44	Main Problem	O	M	M	M
45 (a-i)	Other Problem(s)	N/A	M*	M*	M*
46	Main Intervention	N/A	M*	M*	M*
47 (a-i)	Other Intervention(s)	N/A	M*	M*	M*
48, 48 (a-i)	Status Attribute (Main and Other Interventions)	N/A	M*	M*	M*
49, 49 (a-i)	Location Attribute (Main and Other Interventions)	N/A	M*	M*	M*

Data Element ID Number	Data Element Description	Mandatory/Optional Status NACRS Standard			
		ED		DS	Other Amb. Care
		L1/L2	L3		
50, 50 (a-i)	Extent Attribute (Main and Other Interventions)	N/A	M*	M*	M*
51 (a-i)	Duration of Ambulatory Care Intervention (Main and Other Interventions)	N/A	O	O (M* in Ont.)	O
52 (a-i)	Intervention Location Code (Main and Other Interventions)	N/A	O	O (M* in Ont.)	O (M* in Ont.)
53	Anaesthetic Technique	N/A	M*	M*	M*
55	Out-of-Hospital Indicator	N/A	M*	M*	M*
56	Out-of-Hospital Institution Number	N/A	M*	M*	M*
57	Blood Transfusion Indicator	N/A	M* (O in Alta., B.C.)	M* (O in Alta., B.C.)	M* (O in Alta., B.C.)
58-63	Blood Components/Products	N/A	M* (O in Alta., B.C.)	M* (O in Alta., B.C.)	M* (O in Alta., B.C.)
64-68	Units of Blood Transfused	N/A	O	O	O
69-74	Therapeutic Abortion Information	N/A	M* (O in P.E.I., Alta., B.C.)	M* (O in P.E.I., Alta., B.C.)	M* (O in P.E.I., Alta., B.C.)
75 (a-j)	MIS FC Account Code	N/A	O	O	O
79	Project Number	O	O	O	O
80-96	Special Project Fields	O	O	O	O
98	Program Area	N/A	M*	M*	M*
99	Scheduled ED Visit Indicator	O (M in Ont.)	M (O in Alta.)	N/A	N/A
100	Glasgow Coma Scale	N/A	M*	N/A	N/A
101	Seatbelt Indicator	N/A	M*	N/A	N/A
102	Helmet Indicator	N/A	M*	N/A	N/A
103	Level of Care/Service Recipient	N/A	N/A	N/A	N/A
104	Referral Date	N/A	O	O	O
105	Vendor MAC	N/A	O	O	O
106	Vendor CACS	N/A	O	O	O
107	Vendor RIW	N/A	O	O	O
108	Complete Record	N/A	O	O	O
109	Main Intervention Date	N/A	O	O (M* in Ont.)	O
110	Main Intervention Start Time	N/A	O	O (M* in Ont.)	O
111	Other Intervention Date (a-i)	N/A	O	O (M* in Ont.)	O
112	Other Intervention Start Time (a-i)	N/A	O	O (M* in Ont.)	O

Data Element ID Number	Data Element Description	Mandatory/Optional Status NACRS Standard			
		ED		DS	Other Amb. Care
		L1/L2	L3		
113	Reason for Visit/ Chief Complaint	N/A	O (M in Ont.)	N/A	N/A
114	Disposition Date	M	M	M	O
115	Disposition Time	M	M	M	O
116	Date Patient Left Emergency Department (ED)	M*	M*	N/A	N/A
117	Time Patient Left Emergency Department (ED)	M*	M*	N/A	N/A
118	Ambulance Arrival Date	O (M* in Ont.)	O (M* in Ont.)	O	O
119	Ambulance Arrival Time	O (M* in Ont.)	O (M* in Ont.)	O	O
120	Ambulance Transfer of Care Date	O (M* in Ont.)	O (M* in Ont.)	O	O
121	Ambulance Transfer of Care Time	O (M* in Ont.)	O (M* in Ont.)	O	O
122	Clinical Decision Unit Flag	O (M* in Ont.)	O (M* in Ont.)	N/A	N/A
123	Clinical Decision Unit Date In	O (M* in Ont.)	O (M* in Ont.)	N/A	N/A
124	Clinical Decision Unit Time In	O (M* in Ont.)	O (M* in Ont.)	N/A	N/A
125	Clinical Decision Unit Date Out	O (M* in Ont.)	O (M* in Ont.)	N/A	N/A
126	Clinical Decision Unit Time Out	O (M* in Ont.)	O (M* in Ont.)	N/A	N/A
127/;127 (a–i)	Problem Cluster (Main and Other)	N/A	M*	M*	M*
128	Submission Level Code	M	M	M	M
129	Access to Primary Health Care Code	O	M	O	O
130	Specialist Consult Request Date	O (M* in Ont.)	O (M* in Ont.)	O	O
131	Specialist Consult Request Time	O (M* in Ont.)	O (M* in Ont.)	O	O
132	Specialist Consult Request Service	O (M* in Ont.)	O (M* in Ont.)	O	O
133	Date of Non-Physician Initial Assessment	O (M* in Ont.)	O (M* in Ont.)	N/A	N/A
134	Time of Non-Physician Initial Assessment	O (M* in Ont.)	O (M* in ON)		
135	Non-Physician Initial Assessment Provider Service	O (M* in Ont.)	O (M* in ON)		



Data Element ID Number	Data Element Description	Mandatory/Optional Status NACRS Standard			
		ED		DS	Other Amb. Care
		L1/L2	L3		
<b>136 (a–c)</b>	Presenting Complaint List	O (M* for Level 2)	O	N/A	
<b>137 (a–c)</b>	ED Discharge Diagnosis	O (M* for Level 2)			



## Appendix B—NACRS Field Evolution by Fiscal Year

This document is intended for use in conjunction with the *NACRS Manual, 2010–2011*; please refer to it for details.

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

Current NACRS Schema		ICD-10-CA									ICD-9 NACRS Schema	
Data Element ID Number	Data Element Description	2010–2011	2009–2010	2008–2009	2007–2008	2006–2007	2005–2006	2004–2005	2003–2004	2002–2003*	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	C	*	*	*	*	*	*	*	N	O	—
00G	Primary Abstract ID Number	*	R	R	R	R	N	O	O	O	O	—
1	Chart Number	*	*	*	*	*	*	*	*	*	*	1
2	Health Care Number	C	*	*	*	*	*	*	*	*	*	2
3	Province/Territory Issuing Health Care Number	C	*	*	*	*	*	*	C	F	*	3

Current NACRS Schema		ICD-10-CA										ICD-9 NACRS Schema	
Data Element ID Number	Data Element Description	2010–2011	2009–2010	2008–2009	2007–2008	2006–2007	2005–2006	2004–2005	2003–2004	2002–2003*	2001–2002	Data Element ID Number	
4	Responsibility for Payment	C	*	*	*	*	*	*	*	C	*	35	
5	Postal Code	C	*	*	*	*	*	*	C	F	*	4	
6	Residence Code/ Geographic Code (2001)	C	C	*	*	*	*	*	*	F	*	34	
7	Gender	C	*	*	*	*	*	*	*	F	*	5	
8	Birth Date	*	*	*	*	*	*	*	*	*	*	6	
9	Birth Date Is Estimated	C	*	*	*	*	*	*	*	F	*	7	
10	Family Physician Flag	*	R	*	C	*	*	*	*	N	O	—	
11	Ambulatory Registration Number/ Encounter Number (2001)	*	*	*	*	*	*	*	*	*	*	8	
12	Ambulatory Registration/ Encounter Sequence Number	*	*	*	*	*	*	*	*	*	*	08b	
13	Visit MIS FC Account Code	C	*	*	*	*	*	*	*	*	*	9	
14	Admit via Ambulance	C	*	*	*	C	*	*	C	*	*	48	
15	Ambulance Call Number	C	*	*	*	*	*	*	*	*	*	49	
—	Marital Status (2001)	D	D	D	D	D	D	D	D	D	*	46	
16	Living Arrangement	*	*	*	*	*	*	*	*	C	*	28	
17	Residence Type	*	*	*	*	*	*	*	*	C	*	29	
18	Visit Type	C	C	C	*	*	*	*	*	N	O	—	
19	Ambulatory Visit Status/Type of Visit (2001)	*	*	*	*	*	*	*	*	*	*	24	
20	Mode of Visit/Contact	C	*	*	*	*	*	*	*	*	*	25	
21	Highest Level of Education	*	*	*	*	*	*	*	*	C	*	30	
22	Arrival Date	*	C	*	*	*	*	*	*	N	O	—	
23	Arrival Time	*	C	*	*	*	*	*	*	N	O	—	

Current NACRS Schema		ICD-10-CA									ICD-9 NACRS Schema	
Data Element ID Number	Data Element Description	2010–2011	2009–2010	2008–2009	2007–2008	2006–2007	2005–2006	2004–2005	2003–2004	2002–2003*	2001–2002	Data Element ID Number
24	Triage Date	*	*	*	*	*	*	*	*	N	O	—
25	Triage Time	*	*	*	C	*	*	*	*	N	O	—
26	Triage Level	C	C	*	*	C	*	*	*	*	*	20
27	Date of Registration/ Visit	*	*	*	*	*	*	*	*	*	*	10
28	Registration/ Visit Time	*	*	*	*	*	*	*	*	*	*	22
29	Date of Physician Initial Assessment	C	C	*	*	*	*	*	*	N	O	—
30	Time of Physician Initial Assessment	C	C	*	*	*	*	*	C	N	O	—
31	Referral Source Prior to Ambulatory Care Visit	C	C	C	*	*	*	C	*	C	*	26
32	Institution From	C	C	C	*	*	*	*	*	N	O	—
33	Decision to Admit Date	R	R	R	R	*	*	*	*	N	O	—
34	Decision to Admit Time	R	R	R	R	*	*	*	C	*	*	47
35	Visit Disposition	C	C	*	*	*	C	*	C	C	*	14
36	Date Visit Completed	R	R	R	R	*	*	*	*	*	*	21
37	Time Visit Completed/ Disposition Time (2001)	R	R	R	R	C	*	*	*	*	*	23
38	Referred To—After Completion of Ambulatory Care Visit	*	C	*	*	*	*	C	*	C	*	27
39	Institution To	C	C	C	*	*	*	*	*	N	O	—
40	Provider Type/ Primary Provider Type (2001)	C	C	*	C	*	*	*	*	C	*	12
41	Service Provider/ Provider Type (2001)	C	C	C	C	C	C	*	C	C	*	11

Current NACRS Schema		ICD-10-CA									ICD-9 NACRS Schema	
Data Element ID Number	Data Element Description	2010–2011	2009–2010	2008–2009	2007–2008	2006–2007	2005–2006	2004–2005	2003–2004	2002–2003*	2001–2002	Data Element ID Number
42	Service Provider ID Number	C	C	*	*	*	*	*	*	F	*	13
43, 43 (a-i)	Main and Other Problem Prefix	C	C	C	*	C	*	*	C	N	O	—
44	Main Problem	C	*	*	*	*	*	*	*	F	*	15
45 (a-i)	Other Problem(s)	C	C	*	*	*	*	*	*	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)	C	*	*	*	*	*	*	*	N	O	—
49, 49 (a-i)	Location Attribute (Main and Other)	C	*	*	*	*	*	*	*	N	O	—
50, 50 (a-i)	Extent Attribute (Main and Other)	C	*	*	*	*	*	*	*	N	O	—
51 (a-i)	Duration of Ambulatory Care Intervention for Main and Other Interventions	C	*	*	*	*	*	*	*	N	O	—
52, 52 (a-i)	Intervention Location Code for Main and Other Interventions	*	*	*	*	*	*	*	C	N	O	—

Current NACRS Schema		ICD-10-CA									ICD-9 NACRS Schema	
Data Element ID Number	Data Element Description	2010–2011	2009–2010	2008–2009	2007–2008	2006–2007	2005–2006	2004–2005	2003–2004	2002–2003*	2001–2002	Data Element ID Number
53	Anaesthetic Technique	*	C	*	*	*	C	*	*	C	*	36
54	Died During Intervention Flag	R	*	*	*	*	*	*	*	N	O	—
55	Out-of-Hospital Indicator	C	*	*	*	*	*	*	*	N	O	—
56	Out-of-Hospital Institution Number	*	*	*	*	*	*	*	*	N	O	—
57	Blood Transfusion Indicator	C	*	*	*	*	*	*	*	*	*	31
58	Blood Components/ Products—Red Blood Cells	C	C	*	*	*	*	*	*	C	*	32
59	Platelets	C	C	*	*	*	*	*	*	C	*	32
60	Plasma	C	C	*	*	*	*	*	*	C	*	32
61	Albumin	C	C	*	*	*	*	*	*	C	*	32
62	Other	C	C	*	*	*	*	*	*	C	*	32
63	Autologous	C	C	*	*	*	*	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 Information—Number of Previous Term Deliveries	C	C	*	*	*	*	*	*	C/F	*	41
70	Number of Previous Pre-Term Deliveries	C	C	*	*	*	*	*	*	N	O	—
71	Number of Previous Spontaneous Abortions	C	C	*	*	*	*	*	*	C/F	*	42

Current NACRS Schema		ICD-10-CA									ICD-9 NACRS Schema	
Data Element ID Number	Data Element Description	2010–2011	2009–2010	2008–2009	2007–2008	2006–2007	2005–2006	2004–2005	2003–2004	2002–2003*	2001–2002	Data Element ID Number
72	Number of Previous Therapeutic Abortions	C	C	*	*	*	*	*	*	C/F	*	43
73	Gestational Age—Therapeutic Abortion	C	C	*	*	*	*	*	*	C	*	44
74	Date of Last Menses	C	C	*	*	*	*	*	*	*	*	45
75 (a–j)	MIS FC Account Code	C	*	*	*	*	*	F	*	*	*	37
76	Service Recipient—Specific Direct Cost	R	R	R	R	R	R	R	*	*	*	38
77	Service Recipient—Specific Indirect Cost	R	R	R	R	R	R	R	*	*	*	39
78	Traceable Supplies/Patient-Specific Supplies (2001)	R	R	R	R	R	R	R	*	*	*	40
79	Project Number	C	*	*	*	*	*	*	*	N	O	—
80–96	Special Project Fields	C	*	*	*	*	*	*	*	N	O	—
97	PCTAS Indicator	R	*	*	*	*	*	*	N	O	O	—
98	Program Area	C	*	*	*	*	*	*	N	O	O	—
99	Scheduled ED Visit Indicator	C	*	C	*	*	*	*	N	O	O	—
100	Glasgow Coma Scale	C	C	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	—



Current NACRS Schema		ICD-10-CA									ICD-9 NACRS Schema	
Data Element ID Number	Data Element Description	2010–2011	2009–2010	2008–2009	2007–2008	2006–2007	2005–2006	2004–2005	2003–2004	2002–2003*	2001–2002	Data Element ID Number
107	Vendor RIW/ACW (2004 to 2005)	*	*	*	*	C	*	N	O	O	O	—
108	Complete Record	*	*	*	*	*	*	N	O	O	O	—
109	Main Intervention Date	C	*	*	*	*	*	N	O	O	O	—
110	Main Intervention Start Time	C	*	*	*	*	*	N	O	O	O	—
111 (a–i)	Other Intervention Date	C	*	*	*	*	*	N	O	O	O	—
112 (a–i)	Other Intervention Start Time	C	*	*	*	*	*	N	O	O	O	—
113 (#43 R Code—2003 to 2005)	Reason for Visit/Chief Complaint	*	C	*	*	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	C	*	*	N	O	O	O	O	O	O	—
117	Time Patient Left Emergency Department	C	*	*	N	O	O	O	O	O	O	—
118	Ambulance Arrival Date	C	N	O	O	O	O	O	O	O	O	—
119	Ambulance Arrival Time	C	N	O	O	O	O	O	O	O	O	—
120	Ambulance Transfer of Care Date	C	N	O	O	O	O	O	O	O	O	—
121	Ambulance Transfer of Care Time	C	N	O	O	O	O	O	O	O	O	—
122	Clinical Decision Unit/ Observation Unit Flag	C	N	O	O	O	O	O	O	O	O	—
123	Clinical Decision Unit Date In	C	N	O	O	O	O	O	O	O	O	—

Current NACRS Schema		ICD-10-CA									ICD-9 NACRS Schema	
Data Element ID Number	Data Element Description	2010–2011	2009–2010	2008–2009	2007–2008	2006–2007	2005–2006	2004–2005	2003–2004	2002–2003*	2001–2002	Data Element ID Number
124	Clinical Decision Unit Time In	C	N	O	O	O	O	O	O	O	O	—
125	Clinical Decision Unit Date Out	C	N	O	O	O	O	O	O	O	O	—
126	Clinical Decision Unit Time Out	C	N	O	O	O	O	O	O	O	O	—
127, 127 (a–i)	Problem Cluster for Main Problem (Main and Other)	*	N	O	O	O	O	O	O	O	O	—
128	Submission Level Code	C	N	O	O	O	O	O	O	O	O	—
129	Access to Primary Health Care Code	*	N	O	O	O	O	O	O	O	O	—
130	Specialist Consult Request Date	N	O	O	O	O	O	O	O	O	O	—
131	Specialist Consult Request Time	N	O	O	O	O	O	O	O	O	O	—
132	Specialist Consult Request Service	N	O	O	O	O	O	O	O	O	O	—
133	Date of Non-Physician Initial Assessment (DNPIA)	N	O	O	O	O	O	O	O	O	O	—
134	Time of Non-Physician Initial Assessment (TNPIA)	N	O	O	O	O	O	O	O	O	O	—
135	Non-Physician Initial Assessment Provider Service (NPIAPS)	N	O	O	O	O	O	O	O	O	O	—
136 (a–c)	Presenting Complaint List	N	O	O	O	O	O	O	O	O	O	—

Current NACRS Schema		ICD-10-CA									ICD-9 NACRS Schema	
Data Element ID Number	Data Element Description	2010–2011	2009–2010	2008–2009	2007–2008	2006–2007	2005–2006	2004–2005	2003–2004	2002–2003*	2001–2002	Data Element ID Number
137 (a–c)	Emergency Department (ED) Discharge Diagnosis	N	O	O	O	O	O	O	O	O	O	—

**Note**

\* In 2002–2003, NACRS was re-engineered and ICD-10 was implemented. The data element numbering convention substantially changed.



## Appendix C—Identifying Duplicates in NACRS

- For 2010–2011, the true duplicate records were identified using all data elements except these three:  
am\_care\_key  
abstract\_id\_number  
date\_recorded
- For 2006–2007, 2007–2008, 2008–2009 and 2009–2010, the true duplicate records were identified using all data elements from the main ambulatory care table except these three:  
am\_care\_key  
abstract\_id\_number  
date\_recorded



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