Data Quality Documentation, National Ambulatory Care Reporting System, 2009–2010

Executive Summary
October 2010

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

Who We Are

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

Our Vision

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

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Abbreviations

ACCS	Ambulatory Care Classification System
ADT	admission/discharge/transfer
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
CSR	client services representative
CTAS	Canadian Triage Acuity Scale
DAA	death after arrival
DAD	Discharge Abstract Database
DOA	death on arrival
DPG	Day Procedure Group
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
RD	renal dialysis clinic
SARS	severe acute respiratory syndrome
SURG D/N	surgical day/night care
TADB	Therapeutic Abortions Database
Y.T.	Yukon

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 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 using the June 2009 revision of the CIHI Data Quality Framework. 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.

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). Table 1 illustrates the evolution of NACRS.

Table 1: Cases Discharged From Hospital, Atlantic Canada, 2009–2010

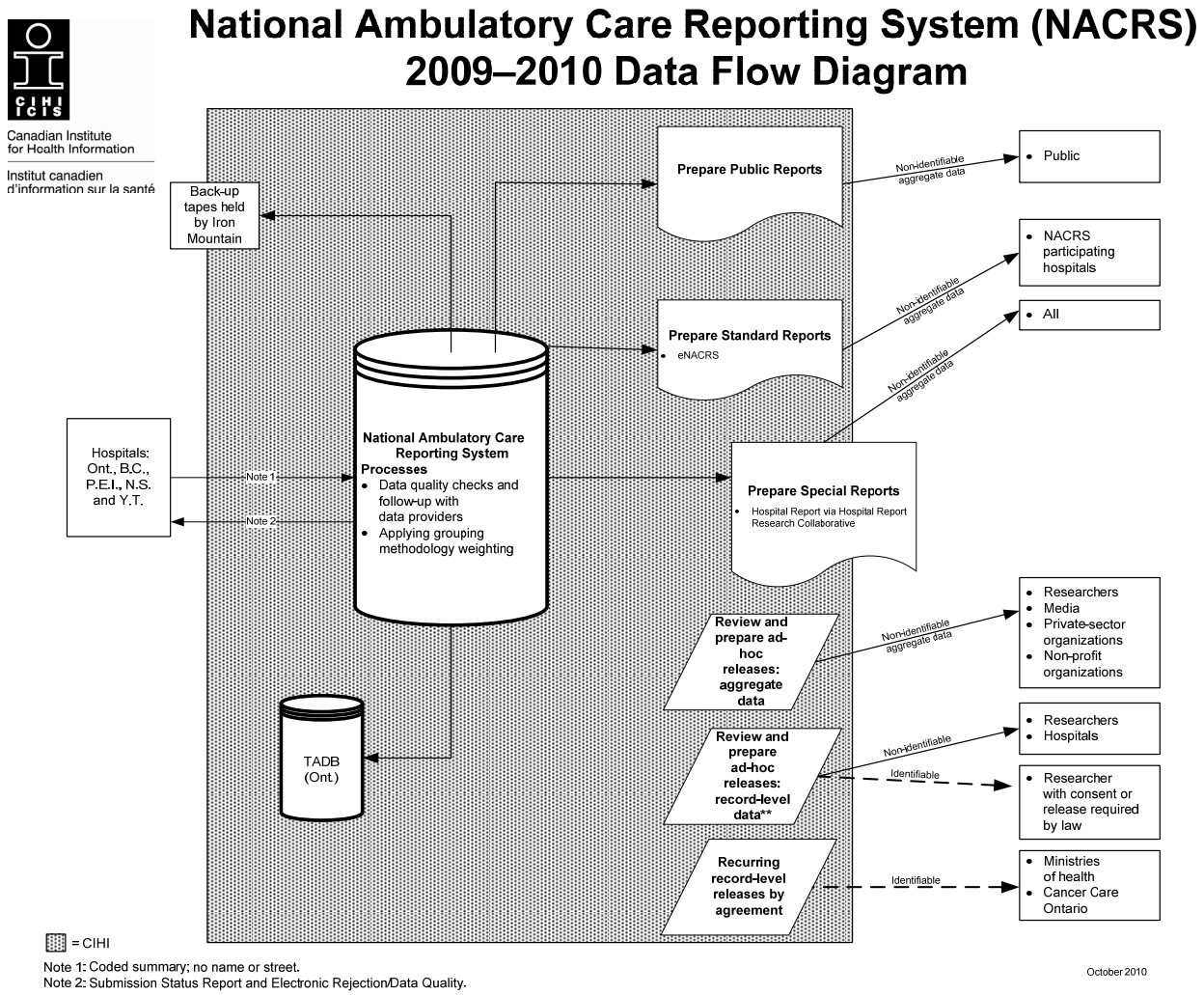
NACRS Evolution	
April 1997	• NACRS launched • First British Columbia facility adopts emergency department (ED) reporting
July 2000	• Ontario adopts ED reporting
April 2001	• Launch of the Comprehensive Ambulatory Classification System (CACS) and Ambulatory Cost Weights (ACWs)
April 2002	• Second B.C. facility adopts ED reporting • Implementation of ICD-10-CA/CCI; NACRS re-engineered
April 2003	• Ontario adopts surgical day/night care (SURG D/N) reporting • Third B.C. facility adopts ED reporting • First Nova Scotia facility adopts ED reporting
July 2003	• First Prince Edward Island facility adopts ED reporting
October 2003	• Ontario adopts clinic reporting, specifically renal dialysis (RD), cardiac catheterization (CC) and oncology (OC) clinics • Two Nova Scotia facilities adopt SURG D/N reporting • Three Nova Scotia facilities adopt ED reporting
April 2004	• First Yukon facility adopts ED reporting
April 2005	• One Nova Scotia facility adopts ED and SURG D/N reporting
April 2006	• Comprehensive Ambulatory Classification System/Day Procedure Group (CACS/DPG) Redevelopment • First reabstraction study of the NACRS data sets • Elimination of multiple contact records captured within the NACRS database
April 2007	• B.C. NACRS pilot project (two sites)
April 2009	• NACRS is modified to accept different reporting levels • Six Manitoba facilities adopt Level 1 ED reporting • One Manitoba facility adopts Level 3 ED reporting

1.3 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 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.

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 is 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:



2 Background Information

2.1 Accuracy

2.1.1 Coverage

Population

The population of reference (the population for which statements can be made) for NACRS 2009–2010 includes ambulatory care activity with a date of registration or visit between April 1, 2009, and March 31, 2010, from all submitting facilities in Canada. This includes the following:

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

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

A total of **9,349,225** abstracts were submitted to NACRS for 2009–2010. One Ontario facility did not submit any 2009–2010 data prior to the July 31, 2010, database closure. One Ontario and two British Columbia facilities did not submit all periods of 2009–2010 data prior to the July 31, 2010, database closure deadline. In addition, all Manitoba facilities submitted only several periods of data in 2009–2010, according to the effective date of their adoption of NACRS reporting. A detailed breakdown of all visits by province or territory and ambulatory care type is summarized in Table 2.

Table 2: Summary of All Visits for NACRS 2009–2010, by Province or Territory and Ambulatory Care Type

Prov./ Terr.	ED		SURG D/N	CC	RD	OC	Other*	Total
	Level 1	Level 3						
P.E.I.	0	28,689	0	0	0	0	0	**28,689**
N.S.	0	80,595	10,838	0	0	0	10,747	**102,180**
Ont.	0	5,537,495	1,206,962	50,238	1,156,040	1,047,281	59,687	**9,057,703**
Man.	89,100	22,850	0	0	0	0	0	**111,950**
B.C.	0	21,332	0	0	0	0	7	**21,339**
Y.T.	0	27,364	0	0	0	0	0	**27,364**
Total	**89,100**	**5,718,325**	**1,217,800**	**50,238**	**1,156,040**	**1,047,281**	**70,441**	**9,349,225**

Note

* Other includes all visits with an MIS FC that is not listed in Appendix A.

Source

National Ambulatory Care Reporting System, 2009–2010, as of July 31, 2010, Canadian Institute for Health Information.

In 2008–2009, there were 9,161,723 abstracts submitted to NACRS, as compared to 9,349,225 in 2009–2010. Table 3 summarizes the percentage change in the volume of NACRS abstracts between the two fiscal years.

Table 3: Percentage Change in Volume of NACRS Abstracts Between 2008–2009 and 2009–2010, by Province or Territory and Ambulatory Care Type

Prov./Terr.	ED	SURG D/N	CC	RD	OC	Other*	Total
P.E.I.	4.8	0.0	0.0	0.0	0.0	0.0	**4.8**
N.S.	2.2	-0.1	0.0	0.0	0.0	-61.6	**-13.2**
Ont.	2.4	-2.9	9.4	2.6	0.6	5.2	**1.5**
Man.	N/A	N/A	N/A	N/A	N/A	N/A	**N/A**
B.C.	-68.3	0.0	0.0	0.0	0.0	-99.7	**-69.9**
Y.T.	5.6	0.0	0.0	0.0	0.0	0.0	**5.6**
Total	**2.9**	**-2.9**	**9.4**	**2.6**	**0.6**	**-19.3**	**2.1**

Note

* Other includes all visits with an MIS FC that is not listed in Appendix A.

Sources

National Ambulatory Care Reporting System, 2008–2009 and 2009–2010, Canadian Institute for Health Information.

Changes in Abstract Volumes From 2008–2009 to 2009–2010

One of the three British Columbia facilities that used to submit data to NACRS in 2008–2009 withdrew from voluntary submission to NACRS in 2009–2010. The other two reporting facilities did not submit all 13 periods of 2009–2010 data prior to the July 31, 2010, database closure. This resulted in a 70% reduction in the volume of British Columbia abstracts.

In NACRS 2009–2010, three Nova Scotia facilities halted submission of ambulatory care clinic visits occurring in the non-mandated MIS FCs. This resulted in a 13% volume reduction in abstracts from this province.

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.

The 2009–2010 NACRS population of reference included 202 facilities in Canada. Out of the 202 facilities, one Ontario facility did not submit any data in 2009–2010, as reflected in Table 4.

Table 4: Number of Institutions Submitting to Each Ambulatory Care Type in the 2009–2010 NACRS

Prov./Terr.	Total No. of Submitting Institutions	ED		SURG D/N	CC	RD	OC	Other*
		Level 1	Level 3					
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
Total	**201**†	**7**	**186**	**154**	**22**	**56**	**84**	**48**

Notes

* Other includes all visits with an MIS FC that is not listed in Appendix A.

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

Source

National Ambulatory Care Reporting System, 2009–2010, as of July 31, 2010, Canadian Institute for Health Information.

The 2008–2009 NACRS population of reference included 196 facilities in Canada.

Table 5: Number of Institutions Submitting to Each Ambulatory Care Type in the 2008–2009 NACRS

Prov./Terr.	Total No. of Submitting Institutions	ED		SURG D/N	CC	RD	OC	Other*
		Level 1	Level 3					
P.E.I.	1	0	1	0	0	0	0	0
N.S.	4	0	4	3	0	0	0	3
Ont.	187	0	178	151	22	56	85	43
Man.	0	0	0	0	0	0	0	0
B.C.	3	0	3	0	0	0	0	3
Y.T.	1	0	1	0	0	0	0	0
Total	**196**	**0**	**187**	**154**	**22**	**56**	**85**	**49**

Note

* Other includes all visits with an MIS FC that is not listed in Appendix A.

Source

National Ambulatory Care Reporting System, 2008–2009, as of July 31, 2009, Canadian Institute for Health Information.

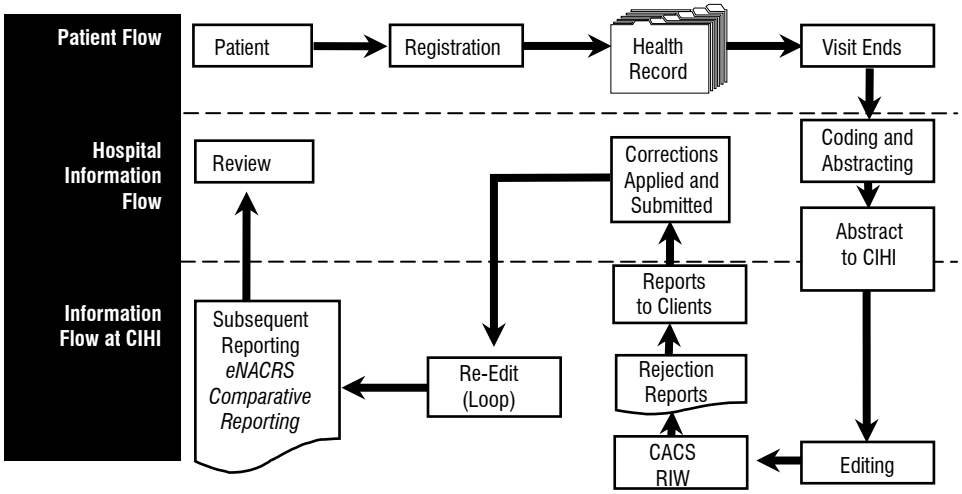
Changes in these figures are a result of one Ontario facility being unable to submit NACRS data due to staffing issues and a merger between two Ontario facilities in 2008–2009. In addition, one British Columbia facility withdrew from voluntary submission to NACRS prior to the start of 2009–2010.

2.1.2 Capture and Collection

Data Collection

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

NACRS Information Flow, 2009–2010



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.

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 patient is seen by several physicians, clinicians and AHPs in different MIS FCs.

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;
- Specific ICD-10-CA/CCI codes; and/or
- Ambulatory care type (visit MIS FC groupings, such as ED, SURG D/N 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.

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 2009–2010. 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.

Data Submission Timeline

There were 12 reporting periods in NACRS 2009–2010, with the exception of B.C., which had 13 periods. A submission file can contain ambulatory care data for one period only. For all ambulatory care types (for example, surgical day/night care, emergency, clinics) the registration date determines the reporting period. All facilities should submit their NACRS data to CIHI within 30 days of the end of the reporting period. Facilities will then have an additional 30 days to resubmit rejected abstracts prior to the generation of comparative reports. All abstracts for NACRS 2009–2010 (from April 1, 2009, to March 31, 2010) must have been submitted by the date of database closure on July 31, 2010.

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 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 for all provinces and territories where the vendor has client site installations. 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 first full period of data submission from clients is accepted as a test submission 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 terminology while respecting their proprietary freedom of software design.

- **CIHI Education Program**

Existing clients and clients in jurisdictions considering NACRS are provided with education sessions on data collection and submission, the CACS/RIW (Resource Intensity Weight) 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. In 2009–2010, 730 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.

Period closure is important in the edit and correction process as it determines completeness of data submission. 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.

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.

- **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.

- **Special Studies**

CIHI completed a reabstraction and data-quality assessment study that evaluated the quality of ED data submitted to NACRS in terms of measurement error, bias and consistency, and also identified 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 (client charts) and comparing this source with information in the NACRS database for 2004–2005. An additional component of 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, including

  - 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 the Public Health Agency of Canada (PHAC). It was through this committee that changes to the data elements appeared in the 2009–2010 NACRS database.

Appendix B outlines the mandatory and optional data elements in the 2009–2010 NACRS. Appendix C outlines the evolution of data elements over time, from 2001–2002 to 2009–2010.

2.2 Comparability

2.2.1 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 9th Revision of the International Statistical Classification of Diseases (ICD-9) and the Canadian Classification of Diagnostic, Therapeutic, and Surgical Procedures (CCP) or the ICD-9-Clinical Modification (ICD-9-CM) for diagnoses and interventions.

In 2001–2002, the initial version of 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 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 has 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.**

2.2.2 Linkage

- **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.

- **Time Frame**

The standard time frame for NACRS is the fiscal year (April 1 to March 31). 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.

- **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.

- **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 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. Linkage over time therefore can only be accomplished by using the first 10 digits of either the HCN or 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.

2.2.3 Equivalency

Before April 1, 2003, Ontario surgical day/night care 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 surgical day/night care. Since then, these cases have been reported in NACRS. These changes make it difficult to compare Ontario's surgical day/night care cases in NACRS with those in the DAD. See Appendix A of this document and the *2009–2010 DAD Abstracting Manual* for more information on surgical day/night care definitions.

2.2.4 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.

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. 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 and 3, available in NACRS 2009–2010, are as follows:

Level 1:

- 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).
- No diagnostic or intervention information is coded or available at this level.

Level 2:

- Option available in 2010–2011.

Level 3:

- Applicable to all ambulatory care, such as emergency department, surgical day/night care, outpatient clinics, etc.
- The full NACRS data set which includes all mandatory and optional data elements as well as the coded diagnostic and intervention information.

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

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 same surgical day/night care. 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. Variables that assign clients to groups are Diagnosis, Client Age, Gender, Intervention and Anaesthetic Technique.

With the release of each year of data, the most recent version of the CACS grouping methodology is used. For the 2009–2010 NACRS data year, the CACS 2010 methodology was applied.

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 2009–2010
- CACS 2003 version 3, 2006, 2007, 2008 and 2009 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

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 2009–2010 are outlined in Appendix C.

The *Standards for Management Information Systems in Canadian Health Service Organizations* (MIS Standards) are a set of national standards which 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. Currently and 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.

Beginning in 2010–2011, NACRS will no longer accept provincial/territorial MIS FC variations; it will only accept abstracts submitted with the national MIS FC Account Codes for NACRS.

Also in 2010–2011, NACRS will introduce Level 2 reporting and multiple-level submissions. Level 2 will be similar to Level 1, with the addition of the Presenting Complaint and Discharge Diagnosis data elements. This reporting level will be applicable to emergency department records only. Facilities submitting multiple levels can submit Level 1 and Level 3 or Level 2 and Level 3. When a period of Level 3 emergency department 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.

3 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.

3.1 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.

3.1.1 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. Under-coverage at a facility level was observed in NACRS for 2009–2010, as one Ontario and one British Columbia facility did not submit any 2009–2010 data. CIHI and provincial or territorial ministries of health monitor participation by examining monthly reports of submission status received from each facility. The Ontario MOHLTC mandates facilities in the province to submit all ED, SURG D/N, RD, OC and CC clinic visit abstracts.

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 2009–2010, true duplicate records were identified by matching records on all but three data elements (see Appendix D). The same method was used for 2008–2009. 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, SURG D/N, OC and other clinics, and the proportion of the entire NACRS database they represent.

Table 6: NACRS True Duplicates

Fiscal Year	True Duplicates — N	Emergency Level 1— N (%)	Emergency Level 3— N (%)	SURG D/N— N (%)	Oncology — N (%)	Other Clinics— N (%)	Proportion of NACRS
2008–2009	57	0 (0)	13 (22.81)	39 (68.42)	3 (5.26)	2 (3.51)	~0.00%
2009–2010	301	0 (0)	12 (3.99)	1 (0.33)	273 (90.70)	15 (4.98)	~0.00%

Sources
National Ambulatory Care Reporting System, 2008–2009 and 2009–2010, Canadian Institute for Health Information.

- For 2009–2010, as for 2008–2009, potential duplicates were identified by matching records on four data elements: Chart Number, Encrypted HCN, Registration Date and Registration Time. Table 7 shows the number of potential duplicates observed in NACRS in 2009–2010 and historically for 2008–2009, with the numbers of these records that are ED, SURG D/N, OC and other clinics, and the proportion they represent in the entire NACRS database.

Table 7: NACRS Potential Duplicates

Fiscal Year	Potential Duplicates —N	Emergency Level 1— N (%)	Emergency Level 3— N (%)	SURG D/N— N (%)	Oncology— N (%)	Other Clinics— N (%)	Proportion of NACRS
2008–2009	61,769	0 (0)	386 (0.62)	424 (0.69)	60,513 (97.97)	446 (0.72)	0.67%
2009–2010	63,516	0 (0)	357 (0.56)	116 (0.18)	62,623 (98.59)	420 (0.66)	0.68%

Sources
National Ambulatory Care Reporting System, 2008–2009 and 2009–2010, Canadian Institute for Health Information.

3.1.2 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 when viewed as a whole.
- All vendors incorporate NACRS submission specifications into their proprietary software systems. 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.

3.1.3 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:

- Due to staff shortages and technical issues, there are incomplete period submissions from three facilities in Ontario. Two British Columbia facilities did not submit all periods of 2009–2010 data prior to the July 31, 2010, database closure. This contributes to the unit non-response rate of 0.37%. The unit non-response rate due to outstanding rejected records for NACRS-mandated reporting (that is, for ED, SURG D/N, OC, RD and CC clinic visits) was found to be less than 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 mandatory, optional or mandatory if applicable. Abstracts that have missing data for NACRS-mandated data elements are rejected from the database.

Table 8 summarizes the level of unknown information reported for several mandated data elements. Unknown values for the data elements Time of Physician Initial Assessment, Disposition Time and Time Patient Left ED were reduced by approximately 5%, 2% and 3%, respectively. This can likely be attributed to the open-year data-quality efforts.

Table 8: Proportion of Unknown Data Reported for Certain NACRS Mandatory Data Elements

Data Element Number	Data Element	Definition	Unknown Value	2008–2009 NACRS Proportion When Applicable (%)	2009–2010 NACRS Proportion When Applicable (%)	% Change Between 2008–2009 and 2009–2010
02	Encrypted HCN	Health Care Number data is not available	All zeros	1.22	1.16	-0.06
05	Postal Code	Client is a resident of Canada and the postal code is unknown or postal code is invalid	2-digit alpha code	0.62	0.63	0.01
09	Birth Date is Estimated	Birth Date is unknown or partial	Y	0.02	0.02	0.00
25	Triage Time	Unknown	9999	1.41	1.31	-0.10
30	Time of Physician Initial Assessment	Unknown	9999	16.90	12.35	-4.55
45	Other Problem	Unknown codes for place of occurrence with injuries	U98.9	59.45	60.37	0.92
100	Glasgow Coma Scale	Not available	99	53.35	54.86	1.51
101	Seatbelt Indicator	Unknown	99	15.40	15.47	0.07
102	Helmet Indicator	Unknown	99	61.17	61.64	0.47
114	Disposition Time	Unknown	9999	3.99	2.23	-1.76
117	Time Patient Left ED	Unknown	9999	4.22	1.59	-2.63

Sources

National Ambulatory Care Reporting System, 2008–2009 and 2009–2010, Canadian Institute for Health Information.

It is important to note that the proportion of unknown data varies 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 85% 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 accurately calculate item non-response. This may also affect the reporting of this data (see next section).

3.1.4 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 ED records have a triage time that is identical to the registration time, including those from 12 facilities that report triage and registration as the same time in more than 95% of their data. Of these, three are large (recording more than 30,000 ED visits) and five 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 seven facilities, and the time difference is either two or three minutes in more than 20% of the data from nine ED 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 SURG D/N units. Among the ED and SURG D/N NACRS abstracts, 0.04% show that registration time is the same as disposition time, with 44% of those being registered and leaving the ED before treatment and 26% being discharged home. 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, 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 2009–2010:** A number of records included correctly formatted six-digit postal codes that did not match any postal code provided by Canada Post (see Table 9).

Table 9: Examples of Invalid Postal Codes in the 2009–2010 NACRS

Postal Code	Number of Records
A0A 0A0	422
L7S 2S9	170
M5K 4H8	168
X0X 0X0	164
L3M 4G9	164
L9P 6P5	161
L0L 0L0	160
X9X 9X9	137

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

- **Coding issue with the auto-coding processing of left-heart catheterizations:** One facility in Ontario reported its cardiac catheterization abstracts with 3.IP.10.VX and 3.IP.10.VY switched for both 2008–2009 and 2009–2010. It incorrectly coded the CCI code 3.IP.10.VY instead of 3.IP.10.VX for left-heart catheterization and vice versa.
- **Time of Physician Initial Assessment auto-picked:** Two facilities in Ontario populated the Time of Physician Initial Assessment with 9999 (unknown) for all of their records in 2009–2010, and 99.7% of their records in 2008–2009.
- **Multiple deaths recorded for the same HCN:** Four patients (eight records) were identified as dead more than once by three difference facilities in 2009–2010. 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 2009–2010, there were 108,007 (1%) records with the encrypted HCN set to 000000000000.
- **Age_code and age_number inconsistencies:** The age derived fields in NACRS 2009–2010 (age_code and age_number) were incorrectly calculated for the following cases:
  - In case of an estimated Birth Date (birth_date_estimated = Y) the age_code field must be set to E. In 2009–2010, there were 1,547 records where the Birth Date was estimated but the age_code was not set to E.
  - When the age is less than two years, the age_code must be set to either D (days) if the age is less than or equal to 31 days or M (months) if the age is less than 24 months but greater than 31 days. There were miscalculations of the derived fields when the actual age was between one and two years but the year part of the Registration Date and the Birth Date was two years apart. In such cases the age_code and the

age_number fields were derived as Y and 1, respectively. In 2009–2010, there were 70,723 records with such cases.

- **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 in not enforced by edits, hence the following data quality issues were discovered in the 2009–2010 data:

  - There are abstracts where a Diagnosis Cluster was assigned with one Diagnosis Code.
  - 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).

- **Duplicate interventions:** In 2009–2010, 0.4% 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 2009–2010, the NACRS database contained 0.07% of records where the LOS in the ED was greater than 72 hours and 0.03% of records where the LOS was equal to 0.
- Measurement error may occur with data that is 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 rejects 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 constitutes a large proportion (44.4%) 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 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."
  - **Service provider codes:** Physician specialty codes captured by CCO are not necessarily the same as CIHI service provider codes. All the CCO abstracts are coded with the main service provider; of those, 94% are coded as either medical oncologist (19%) or radiation oncologist (75%). Procedural intervention service provider codes appear on 97% of CCO abstracts; of those, 73% code a radiotherapist, 24% a registered nurse and 3% a laboratory or X-ray technician. About a third of CCO abstracts that had another responsible service provider coded a registered nurse.
  - **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 (9%). 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 65% of all the CCO abstracts having a Disposition Time of 18:00. This percentage represents 74% of all visits with a recorded visit Disposition Time of 18:00. Of all CCO abstracts, 35% have a Disposition Time of 23:30; this represents 75% of all visits with a Disposition Time of 23:30.

- Response bias due to coding variations created through the implementation of the ICD-10-CA and CCI classification systems has been observed in other CIHI databases (see Coping *With the Introduction of ICD-10-CA* and *CCI: Impact of New Classifications Systems on the Assignment of Case Mix Groups/Day Procedure Groups Using Fiscal 2002–2003 Data*). A study, *Coding Variations in the Discharge Abstract Database (DAD) Data*, was carried out to address these variations. As noted previously, a NACRS reabstraction study was released in January 2008.
- NACRS has a provincial response bias. In 2009–2010, 96.9% of the data was from Ontario.

3.2 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.

3.2.1 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 B, as well the *NACRS Manual, 2009–2010*.
- 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 C, as well the *NACRS Manual, 2009–2010*.

3.2.2 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 SURG D/N visits are not the same in NACRS as they are in the DAD. When conducting trend analyses, mappings must be performed between the DAD SURG D/N Institution Numbers and the NACRS ambulatory care facility numbers.

3.2.3 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.

- **Pneumonia and stroke:** The number of pneumonia and stroke cases presented in EDs as the Main Problem increased from 2007–2008 to 2009–2010. Pneumonia increased by 28% and stroke increased by 34%. 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.

The table below describes the changes to the data elements for NACRS during the 2009–2010 fiscal year.

Table 10: Summary of NACRS Data Element Changes in 2009–2010

Data Element Number	Data Element Name	Description of Change
10	Family Physician Flag	• Data element retired • See DE 129 Access to Primary Health Care Code
18	Visit Type	• Valid data changed to 1–3, 5 and blank (value 4 removed) • Legend descriptions amended
26	Triage Level	• Valid value of 9 added for unknown
31	Referral Source Prior to Ambulatory Care Visit	• Field status changed to mandatory for Level 3 ED reporting
32	Institution From	• New collection guidelines to address – The scenario where the sending facility is known but the level of care is not – The scenario where the sending facility has no (known) Institution Number
35	Visit Disposition	• Amended legend descriptions for Visit Dispositions 10 (death after arrival) and 11 (death on arrival)
38	Referred To—After Completion of Ambulatory Care Visit	• 99 (unknown/unavailable) added as valid data
39	Institution To	• New collection guidelines to address – The scenario where the receiving facility is known but the level of care is not – The scenario where the receiving facility has no (known) Institution Number
41	Provider Service	• Name change (was Service Provider) • New legend – Deleted 00006 (Resident) and 00052 (Retired) – Added 00120 (Pediatric Development) and 00121 (Palliative Medicine)
42	Provider Number	• Name change (was Service Provider Identification Number) • Must be zero-filled if less than 15 digits

Table 10: Summary of NACRS Data Element Changes in 2009–2010

Data Element Number	Data Element Name	Description of Change
45(a–i)	Other Problem	• Definition amended to harmonize with *Canadian Coding Standards for ICD-10-CA and CCI 2009*
3	Anaesthetic Technique	• Definition clarified • Legend amended • Additional notes by technique added
58–63	Blood Components/ Products	• Pentaspan added to Other in the listing of components
75	MIS Functional Centre Account Code (a–j)	• New edit to enforce that the first occurrence of DE 75 equals the Visit MIS Functional Centre Account Code (DE 13)
79	Special Projects—Project 100—Ontario MOHLTC Data Quality Indicator Project	• New data element Pathology Report Available Date of Subsequent Review to be captured in DDMMYYYY order
118 **119** **120** **121**	Ambulance Arrival Date Ambulance Arrival Time Ambulance Transfer of Care Date Ambulance Transfer of Care Time	• New data elements
122 **123** **124** **125** **126**	Clinical Decision Unit Flag Clinical Decision Unit Date InClinical Decision Unit Time InClinical Decision Unit Date Out Clinical Decision Unit Time Out	• New data elements
127 **127(a–i)**	Main and Other Problem Cluster	• New data elements
128	Submission Level Code	• New data element
129	Access to Primary Health Care Code	• New data element
FIY	Reporting Level Code	• New data element on facility information file
Data Submission Control Record	Submission Level Code	• New data element on the submission control record

4 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 FCs (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.

5 Contacts

For more information, please contact CIHI by writing to nacrs@cihi.ca.

Appendix A—Visit MIS Functional Centre Codes for 2009–2010

Ambulatory Care Type	Province	MIS Functional Centre Account Codes
ED		
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
ED	MB	71310 series
SURG D/N		
DS	ON	7*260**, 7*262, 7*265**, 7*34055, 7*360, 7*362, 7*365, 7*369 (* = 1, 2 or 3; ** = series)
DS	NS	712600000, 722600000, 712602000, 712602500, 712603000, 712604000, 712604500, 712606000, 712606500, 712607000, 712609900, 712650000, 712652000, 712654000, 712656000, 713403500, 713403700, 713405500, 713600000, 713620000, 713650000, 713670000, 713671000, 713672000, 713690000
Clinics		
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)
Other		
All non-mandatory	All provinces	All valid codes not included above.

Note

The province of Nova Scotia zero-fills visit MIS FC Account Codes to the ninth digit.

Sources

Canadian Institute for Health Information, *Standards for Management Information Systems in Canadian Health Service Organizations, 2009* (Ottawa, Ont.: CIHI, 2005) and Ontario Healthcare Reporting System (OHRS), Ontario Ministry of Health and Long-Term Care. Appendix B—2009–2010 NACRS Data Elements.

Appendix B—2009–2010 NACRS Data Elements

This document is intended for use in conjunction with the NACRS abstraction manual. Refer to the NACRS Manual, 2009–2010 for details.

Legend	
M	Mandatory
M*	Mandatory if applicable
O	Optional
N/A	Not applicable
L1	Level 1
L3	Level 3

		Ontario				Nova Scotia				British Columbia				Prince Edward Island				Yukon				Manitoba			
		ED		SURG D/N	CL	ED		SURG D/N	CL	ED		SURG D/N	CL	ED		SURG D/N	CL	ED		SURG D/N	CL	ED		SURG D/N	CL
Data Element ID Number	**Data Element Description**	L1	L3			L1	L3			L1	L3			L1	L3			L1	L3			L1	L3		
00A	**Reporting Facility's Province/ Territory**	M	M	M	M	M	M	M	M	M	M	M	M	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	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	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	M	M	M	M	M	M	M	M	M	M	M	M
OOE	**Abstract Identification Number**	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
OOF	**Coder Number**	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
1	**Chart Number**	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
2	**Health Care Number**	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
3	**Province/Territory Issuing Health Care Number**	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
4	**Responsibility for Payment**	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
5	**Postal Code**	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
6	**Residence Code**	M	M	M	M	M	M	M	M	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
7	**Gender**	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
8	**Birth Date**	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
9	**Birth Date Is Estimated**	M*	M*	M*	M*	M*	M*	M*	M*	M*	M*	M*	M*	M*	M*	M*	M*	M*	M*	M*	M*	M*	M*	M*	M*

		Ontario				Nova Scotia				British Columbia				Prince Edward Island				Yukon				Manitoba			
Data Element ID Number	Data Element Description	ED		SURG D/N	CL	ED		SURG D/N	CL	ED		SURG D/N	CL	ED		SURG D/N	CL	ED		SURG D/N	CL	ED		SURG D/N	CL
		L1	L3			L1	L3			L1	L3			L1	L3			L1	L3			L1	L3		
11	Ambulatory Registration Number	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
12	Ambulatory Registration/ Encounter Sequence Number	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
13	Visit MIS FC Account Code	M	M	M	M	M	M	M	M	M	M	M	M	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	M	M	M	M	M	M	M	M	M	M	M	M
15	Ambulance Call Number	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O
16	Living Arrangement	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O
17	Residence Type	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O
18	Visit Type	O	M	N/A	N/A	O	M	N/A	N/A	O	M	N/A	N/A	O	M	N/A	N/A	O	O	N/A	N/A	O	O	N/A	N/A
9	Ambulatory Visit Status	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O
20	Mode of Visit/Contact	O	M	M	M	O	M	M	M	O	M	M	M	O	M	M	M	O	M	M	M	O	M	M	M
21	Highest Level of Education	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O
22	Arrival Date	O	O	N/A	N/A	O	O	N/A	N/A	O	O	N/A	N/A	O	O	N/A	N/A	O	O	N/A	N/A	O	O	N/A	N/A
23	Arrival Time	O	O	N/A	N/A	O	O	N/A	N/A	O	O	N/A	N/A	O	O	N/A	N/A	O	O	N/A	N/A	O	O	N/A	N/A
24	Triage Date	M	M	N/A	N/A	M	M	N/A	N/A	M	M	N/A	N/A	M	M	N/A	N/A	M	M	N/A	N/A	M	M	N/A	N/A
25	Triage Time	M	M	N/A	N/A	M	M	N/A	N/A	M	M	N/A	N/A	M	M	N/A	N/A	M	M	N/A	N/A	M	M	N/A	N/A
26	Triage Level	M	M	N/A	N/A	M	M	N/A	N/A	M	M	N/A	N/A	M	M	N/A	N/A	M	M	N/A	N/A	M	M	N/A	N/A
27	Date of Registration/ Visit	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
28	Registration/ Visit Time	M	M	M	O	M	M	M	O	M	M	M	O	M	M	M	O	M	M	M	O	M	M	M	O
29	Date of Physician Initial Assessment	M	M	N/A	N/A	M	M	N/A	N/A	M	M	N/A	N/A	M	M	N/A	N/A	M	M	N/A	N/A	M	M	N/A	N/A
30	Time of Physician Initial Assessment	M	M	N/A	N/A	M	M	N/A	N/A	M	M	N/A	N/A	M	M	N/A	N/A	M	M	N/A	N/A	M	M	N/A	N/A
31	Referral Source Prior to Ambulatory Care Visit	O	M	O	O	O	M	O	O	O	M	O	O	O	M	O	O	O	M	O	O	O	M	O	O
32	Institution From	N/A	N/A	M*	M*	N/A	N/A	M*	M*	N/A	N/A	M*	M*	N/A	N/A	M*	M*	N/A	N/A	M*	M*	N/A	N/A	M*	M*
35	Visit Disposition	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M

		Ontario				Nova Scotia				British Columbia				Prince Edward Island				Yukon				Manitoba			
Data Element ID Number	Data Element Description	ED		SURG D/N	CL	ED		SURG D/N	CL	ED		SURG D/N	CL	ED		SURG D/N	CL	ED		SURG D/N	CL	ED		SURG D/N	CL
		L1	L3			L1	L3			L1	L3			L1	L3			L1	L3			L1	L3		
38	Referred To—After Completion of Ambulatory Care Visit	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O
39	Institution To	N/A	M*	M*	M*	N/A	M*	M*	M*	N/A	M*	M*	M*	N/A	M*	M*	M*	N/A	M*	M*	M*	N/A	M*	M*	M*
40	Provider Type	N/A	M	M	M	N/A	M	M	M	N/A	M	M	M	N/A	M	M	M	N/A	M	M	M	N/A	M	M	M
41	Service Provider	N/A	M	M	M	N/A	M	M	M	N/A	M	M	M	N/A	M	M	M	N/A	M	M	M	N/A	M	M	M
42	Service Provider ID Number	N/A	M*	M*	M*	N/A	M*	M*	M*	N/A	M*	M*	M*	N/A	M*	M*	M*	N/A	M*	M*	M*	N/A	M*	M*	M*
43, 43 (a–i)	Main and Other Problem Prefix	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O
44	Main Problem	N/A	M	M	M	N/A	M	M	M	N/A	M	M	M	N/A	M	M	M	N/A	M	M	M	N/A	M	M	M
45 (a–i)	Other Problem(s)	N/A	M*	M*	M*	N/A	M*	M*	M*	N/A	M*	M*	M*	N/A	M*	M*	M*	N/A	M*	M*	M*	N/A	M*	M*	M*
46	Main Intervention	N/A	M*	M*	M*	N/A	M*	M*	M*	N/A	M*	M*	M*	N/A	M*	M*	M*	N/A	M*	M*	M*	N/A	M*	M*	M*
47 (a–i)	Other Intervention(s)	N/A	M*	M*	M*	N/A	M*	M*	M*	N/A	M*	M*	M*	N/A	M*	M*	M*	N/A	M*	M*	M*	N/A	M*	M*	M*
48, 48 (a–i)	Status Attribute (Main and Other)	N/A	M*	M*	M*	N/A	M*	M*	M*	N/A	M*	M*	M*	N/A	M*	M*	M*	N/A	M*	M*	M*	N/A	M*	M*	M*
49, 49 (a–i)	Location Attribute (Main and Other)	N/A	M*	M*	M*	N/A	M*	M*	M*	N/A	M*	M*	M*	N/A	M*	M*	M*	N/A	M*	M*	M*	N/A	M*	M*	M*
50, 50 (a–i)	Extent Attribute (Main and Other)	N/A	M*	M*	M*	N/A	M*	M*	M*	N/A	M*	M*	M*	N/A	M*	M*	M*	N/A	M*	M*	M*	N/A	M*	M*	M*
51 (a–i)	Duration of Ambulatory Care Intervention for Main and Other Interventions	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O
52, 52 (a–i)	Intervention Location Code for Main and Other Interventions	N/A	O	M	O	N/A	O	M	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O
53	Anaesthetic Technique	N/A	M*	M*	M*	N/A	M*	M*	M*	N/A	M*	M*	M*	N/A	M*	M*	M*	N/A	M*	M*	M*	N/A	M*	M*	M*
54	Died During Intervention Flag	N/A	M*	M*	M*	N/A	M*	M*	M*	N/A	M*	M*	M*	N/A	M*	M*	M*	N/A	M*	M*	M*	N/A	M*	M*	M*
55	Out-of-Hospital Indicator	N/A	M*	M*	M*	N/A	M*	M*	M*	N/A	M*	M*	M*	N/A	M*	M*	M*	N/A	M*	M*	M*	N/A	M*	M*	M*

Data Element ID Number	Data Element Description	Ontario				Nova Scotia				British Columbia				Prince Edward Island				Yukon				Manitoba			
		ED		SURG D/N	CL	ED		SURG D/N	CL	ED		SURG D/N	CL	ED		SURG D/N	CL	ED		SURG D/N	CL	ED		SURG D/N	CL
		L1	L3			L1	L3			L1	L3			L1	L3			L1	L3			L1	L3		
56	**Out-of-Hospital Institution Number**	N/A	M*	M*	M*	N/A	M*	M*	M*	N/A	M*	M*	M*	N/A	M*	M*	M*	N/A	M*	M*	M*	N/A	M*	M*	M*
57	**Blood Transfusion Indicator**	N/A	M	M	M	N/A	M	M	M	N/A	O	O	O	N/A	M	M	M	N/A	M	M	M	N/A	M	M	M
58	**Blood Components/ Products—Red Blood Cells**	N/A	M	M	M	N/A	M	M	M	N/A	O	O	O	N/A	M	M	M	N/A	M	M	M	N/A	M	M	M
59	**Platelets**	N/A	M	M	M	N/A	M	M	M	N/A	O	O	O	N/A	M	M	M	N/A	M	M	M	N/A	M	M	M
60	**Plasma**	N/A	M	M	M	N/A	M	M	M	N/A	O	O	O	N/A	M	M	M	N/A	M	M	M	N/A	M	M	M
61	**Albumin**	N/A	M	M	M	N/A	M	M	M	N/A	O	O	O	N/A	M	M	M	N/A	M	M	M	N/A	M	M	M
62	**Other**	N/A	M	M	M	N/A	M	M	M	N/A	O	O	O	N/A	M	M	M	N/A	M	M	M	N/A	M	M	M
63	**Autologous**	N/A	M	M	M	N/A	M	M	M	N/A	O	O	O	N/A	M	M	M	N/A	M	M	M	N/A	M	M	M
64	**Units of Blood Transfused—Red Blood Cells**	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O
65	**Platelets**	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O
66	**Plasma**	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O
67	**Albumin**	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O
68	**Other**	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O
69	**Therapeutic Abortion Info—Number of Previous Term Deliveries**	N/A	M	M	M	N/A	M	M	M	N/A	O	O	O	N/A	O	O	O	N/A	M	M	M	N/A	M	M	M
70	**Number of Previous Pre-Term Deliveries**	N/A	M	M	M	N/A	M	M	M	N/A	O	O	O	N/A	O	O	O	N/A	M	M	M	N/A	M	M	M
71	**Number of Previous Spontaneous Abortions**	N/A	M	M	M	N/A	M	M	M	N/A	O	O	O	N/A	O	O	O	N/A	M	M	M	N/A	M	M	M
72	**Number of Previous Therapeutic Abortions**	N/A	M	M	M	N/A	M	M	M	N/A	O	O	O	N/A	O	O	O	N/A	M	M	M	N/A	M	M	M
73	**Gestational Age—Therapeutic Abortion**	N/A	M	M	M	N/A	M	M	M	N/A	O	O	O	N/A	O	O	O	N/A	M	M	M	N/A	M	M	M
74	**Date of Last Menses**	N/A	M	M	M	N/A	M	M	M	N/A	O	O	O	N/A	O	O	O	N/A	M	M	M	N/A	M	M	M
75 (a–j)	**MIS FC Account Code**	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O
79	**Project Number**	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O
80–96	**Facility/ Jurisdiction Specific**	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O

Data Element ID Number	Data Element Description	Ontario					Nova Scotia				British Columbia				Prince Edward Island				Yukon				Manitoba			
		ED		SURG D/N		CL	ED		SURG D/N		ED		SURG D/N		ED		SURG D/N		ED		SURG D/N		ED		SURG D/N	
		L1	L3				L1	L3			L1	L3			L1	L3			L1	L3			L1	L3		
97	PCTAS Indicator	N/A	M	N/A	N/A	N/A	M	N/A	N/A	N/A	N/A	M	N/A	N/A	M	N/A	N/A	N/A	M	N/A	N/A	N/A	M	N/A	N/A	N/A
98	Program Area	N/A	M*	M*	M*	N/A	M*	M*	M*	N/A	M*	M*	M*	N/A	M*	M*	M*	N/A	M*	M*	M*	N/A	M*	M*	M*	M*
99	Scheduled ED Visit Indicator	O	M	N/A	N/A	O	M	N/A	N/A	O	M	N/A	N/A	O	M	N/A	N/A	O	M	N/A	N/A	O	O	N/A	N/A
100	Glasgow Coma Scale	N/A	M*	N/A	N/A	N/A	M*	N/A	N/A	N/A	M*	N/A	N/A	N/A	M*	N/A	N/A	N/A	M*	N/A	N/A	N/A	M*	N/A	N/A
101	Seatbelt Indicator	N/A	M*	N/A	N/A	N/A	M*	N/A	N/A	N/A	M*	N/A	N/A	N/A	M*	N/A	N/A	N/A	M*	N/A	N/A	N/A	M*	N/A	N/A
102	Helmet Indicator	N/A	M*	N/A	N/A	N/A	M*	N/A	N/A	N/A	M*	N/A	N/A	N/A	M*	N/A	N/A	N/A	M*	N/A	N/A	N/A	M*	N/A	N/A
103	Level of Care/Service Recipient	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
104	Referral Date	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O
105	Vendor MAC	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O
106	Vendor CACS	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O
107	Vendor RIW	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O
108	Complete Record Flag	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O
109	Main Intervention Date	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O
110	Main Intervention Start Time	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O
111 (a–i)	Other Intervention Date	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O
112 (a–i)	Other Intervention Start Time	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O	N/A	O	O	O
113	Reason for Visit/ Chief Complaint	N/A	M	N/A	N/A	N/A	O	N/A	N/A	N/A	O	N/A	N/A	N/A	O	N/A	N/A	N/A	O	N/A	N/A	N/A	O	N/A	N/A
114	Disposition Date	M	M	M	O	M	M	M	O	M	M	M	O	M	M	M	O	M	M	M	O	M	M	M	O
115	Disposition Time	M	M	M	O	M	M	M	O	M	M	M	O	M	M	M	O	M	M	M	O	M	M	M	O
116	Date Patient Left Emergency Department (ED)	M*	M*	N/A	N/A	M*	M*	N/A	N/A	M*	M*	N/A	N/A	M*	M*	N/A	N/A	M*	M*	N/A	N/A	M*	M*	N/A	N/A
117	Time Patient Left Emergency Department (ED)	M*	M*	N/A	N/A	M*	M*	N/A	N/A	M*	M*	N/A	N/A	M*	M*	N/A	N/A	M*	M*	N/A	N/A	M*	M*	N/A	N/A
118	Ambulance Arrival Date	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
119	Ambulance Arrival Time	O	O	O	O	O	O	O	O	O	O	O	O	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				Yukon				Manitoba			
		ED		SURG D/N	CL		ED		SURG D/N	CL	ED		SURG D/N	CL	ED		SURG D/N	CL	ED		SURG D/N	CL	ED		SURG D/N	CL
		L1	L3				L1	L3			L1	L3			L1	L3			L1	L3			L1	L3		
120	**Ambulance Transfer of Care Date**	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
121	**Ambulance Transfer of CareTime**	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
122	**Clinical Decision Unit Flag**	O	O	N/A	N/A	O	O	N/A	N/A	O	O	N/A	N/A	O	O	N/A	N/A	O	O	N/A	N/A	O	O	N/A	N/A	O
123	**Clinical Decision Unit Date In**	O	O	N/A	N/A	O	O	N/A	N/A	O	O	N/A	N/A	O	O	N/A	N/A	O	O	N/A	N/A	O	O	N/A	N/A	O
124	**Clinical Decision Unit Time In**	O	O	N/A	N/A	O	O	N/A	N/A	O	O	N/A	N/A	O	O	N/A	N/A	O	O	N/A	N/A	O	O	N/A	N/A	O
125	**Clinical Decision Unit Date Out**	O	O	N/A	N/A	O	O	N/A	N/A	O	O	N/A	N/A	O	O	N/A	N/A	O	O	N/A	N/A	O	O	N/A	N/A	O
126	**Clinical Decision Unit Time Out**	O	O	N/A	N/A	O	O	N/A	N/A	O	O	N/A	N/A	O	O	N/A	N/A	O	O	N/A	N/A	O	O	N/A	N/A	O
127 (a–i)	**Other Problem Cluster**	N/A	M*	M*	M*	N/A	M*	M*	M*	N/A	M*	M*	M*	N/A	M*	M*	M*	N/A	M*	M*	M*	N/A	M*	M*	M*	M*
128	**Submission Level Code**	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
129	**Access to Primary Health Care Code**	O	M	O	O	O	M	O	O	O	M	O	O	O	M	O	O	O	M	O	O	O	M	O	O	O

Appendix C—NACRS Field Evolution by Fiscal Year

This document is intended for use in conjunction with the *NACRS Manual, 2009–2010*; 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	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
OOE	**Abstract Identification Number**	*	*	*	*	*	*	*	N	O	—
OOF	**Coder Number**	*	*	*	*	*	*	*	N	O	—
OOG	**Primary Abstract ID Number**	R	R	R	R	N	O	O	O	O	—
1	**Chart Number**	*	*	*	*	*	*	*	*	*	1
2	**Health Care Number**	*	*	*	*	*	*	*	*	*	2
3	**Province/Territory Issuing Health Care Number**	*	*	*	*	*	*	C	F	*	3
4	**Responsibility for Payment**	*	*	*	*	*	*	*	C	*	35
5	**Postal Code**	*	*	*	*	*	*	C	F	*	4
6	**Residence Code/Geographic Code (2001)**	C	*	*	*	*	*	*	F	*	34
7	**Gender**	*	*	*	*	*	*	*	F	*	5
8	**Birth Date**	*	*	*	*	*	*	*	*	*	6

Current NACRS Schema		ICD-10-CA								ICD-9 NACRS Schema	
Data Element ID Number	Data Element Description	2009–2010	2008–2009	2007–2008	2006–2007	2005–2006	2004–2005	2003–2004	2002–2003†	2001–2002	Data Element ID Number
9	**Birth Date Is Estimated**	*	*	*	*	*	*	*	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**	*	*	*	*	*	*	*	*	*	9
14	**Admit via Ambulance**	*	*	*	C	*	*	C	*	*	48
15	**Ambulance Call Number**	*	*	*	*	*	*	*	*	*	49
—	**Marital Status (2001)**	D	D	D	D	D	D	D	D	*	46
16	**Living Arrangement**	*	*	*	*	*	*	*	C	*	28
17	**Residence Type**	*	*	*	*	*	*	*	C	*	29
18	**Visit Type**	C	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**	C	*	*	*	*	*	*	N	O	—
23	**Arrival Time**	C	*	*	*	*	*	*	N	O	—
24	**Triage Date**	*	*	*	*	*	*	*	N	O	—
25	**Triage Time**	*	*	C	*	*	*	*	N	O	—
26	**Triage Level**	C	*	*	C	*	*	*	*	*	20
27	**Date of Registration/Visit**	*	*	*	*	*	*	*	*	*	10
28	**Registration/ Visit Time**	*	*	*	*	*	*	*	*	*	22
29	**Date of Physician Initial Assessment**	C	*	*	*	*	*	*	N	O	—
30	**Time of Physician Initial Assessment**	C	*	*	*	*	*	C	N	O	—
31	**Referral Source Prior to Ambulatory Care Visit**	C	C	*	*	*	C	*	C	*	26
32	**Institution From**	C	C	*	*	*	*	*	N	O	—
33	**Decision to Admit Date**	R	R	R	*	*	*	*	N	O	—

Current NACRS Schema		ICD-10-CA								ICD-9 NACRS Schema	
Data Element ID Number	Data Element Description	2009–2010	2008–2009	2007–2008	2006–2007	2005–2006	2004–2005	2003–2004	2002–2003[†]	2001–2002	Data Element ID Number
34	**Decision to Admit Time**	R	R	R	*	*	*	C	*	*	47
35	**Visit Disposition**	C	*	*	*	C	*	C	C	*	14
36	**Date Visit Completed**	R	R	R	*	*	*	*	*	*	21
37	**Time Visit Completed/ Disposition Time (2001)**	R	R	R	C	*	*	*	*	*	23
38	**Referred To— After Completion of Ambulatory Care Visit**	C	*	*	*	*	C	*	C	*	27
39	**Institution To**	C	C	*	*	*	*	*	N	O	—
40	**Provider Type/ Primary Provider Type (2001)**	C	*	C	*	*	*	*	C	*	12
41	**Service Provider/ Provider Type (2001)**	C	C	C	C	C	*	C	C	*	11
42	**Service Provider ID Number**	C	*	*	*	*	*	*	F	*	13
43, 43 (a–i)	**Main and Other Problem Prefix**	C	C	*	C	*	*	C	N	O	—
44	**Main Problem**	*	*	*	*	*	*	*	F	*	15
45 (a–i)	**Other Problem(s)**	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)**	*	*	*	*	*	*	*	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 Ambulatory 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	*	*	C	*	36

Current NACRS Schema		ICD-10-CA								ICD-9 NACRS Schema	
Data Element ID Number	Data Element Description	2009–2010	2008–2009	2007–2008	2006–2007	2005–2006	2004–2005	2003–2004	2002–2003†	2001–2002	Data Element ID Number
54	**Died During Intervention Flag**	*	*	*	*	*	*	*	N	O	—
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	*	*	*	*	*	*	C	*	32
59	**Platelets**	C	*	*	*	*	*	*	C	*	32
60	**Plasma**	C	*	*	*	*	*	*	C	*	32
61	**Albumin**	C	*	*	*	*	*	*	C	*	32
62	**Other**	C	*	*	*	*	*	*	C	*	32
63	**Autologous**	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/F	*	41
70	**Number of Previous Pre-Term Deliveries**	C	*	*	*	*	*	*	N	O	—
71	**Number of Previous Spontaneous Abortions**	C	*	*	*	*	*	*	C/F	*	42
72	**Number of Previous Therapeutic Abortions**	C	*	*	*	*	*	*	C/F	*	43
73	**Gestational Age— Therapeutic Abortion**	C	*	*	*	*	*	*	C	*	44
74	**Date of Last Menses**	C	*	*	*	*	*	*	*	*	45
75 (a–j)	**MIS FC Account Code**	*	*	*	*	*	F	*	*	*	37
76	**Service Recipient— Specific Direct Cost**	R	R	R	R	R	R	*	*	*	38
77	**Service Recipient— Specific Indirect Cost**	R	R	R	R	R	R	*	*	*	39
78	**Traceable Supplies/ Patient-Specific Supplies (2001)**	R	R	R	R	R	R	*	*	*	40

Current NACRS Schema		ICD-10-CA								ICD-9 NACRS Schema	
Data Element ID Number	Data Element Description	2009–2010	2008–2009	2007–2008	2006–2007	2005–2006	2004–2005	2003–2004	2002–2003[†]	2001–2002	Data Element ID Number
79	**Project Number**	*	*	*	*	*	*	*	N	O	—
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	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)	**OtherIntervention Start Time**	*	*	*	*	*	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**	*	*	N	O	O	O	O	O	O	—
117	**Time Patient Left Emergency Department**	*	*	N	O	O	O	O	O	O	—
118	**Ambulance Arrival Date**	N	O	O	O	O	O	O	O	O	—
119	**Ambulance Arrival Time**	N	O	O	O	O	O	O	O	O	—
120	**Ambulance Transfer of Care Date**	N	O	O	O	O	O	O	O	O	—
121	**Ambulance Transfer of Care Time**	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	2009–2010	2008–2009	2007–2008	2006–2007	2005–2006	2004–2005	2003–2004	2002–2003†	2001–2002	Data Element ID Number
122	**Clinical Decision Unit/Observation Unit Flag**	N	O	O	O	O	O	O	O	O	—
123	**Clinical Decision Unit Date In**	N	O	O	O	O	O	O	O	O	—
124	**Clinical Decision Unit Time In**	N	O	O	O	O	O	O	O	O	—
125	**Clinical Decision Unit Date Out**	N	O	O	O	O	O	O	O	O	—
126	**Clinical Decision Unit Time Out**	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**	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	—

Note

† 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, 2007–2008, 2008–2009 and 2009–2010, 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, potential duplicates were identified by matching on four data elements:
  chart_number
  health_card_encrypt_num (2009–2010)/HCN_encrypted (2007–2008)/health_care_number (2006–2007)
  date_of_registration
  registration_time
- For 2003–2004, 2004–2005 and 2005–2006, potential duplicates were identified by matching 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_physican_init_assessment
  time_physican_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.

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