Data Quality Documentation for Users

Canadian Joint Replacement Registry

2016–2017 Data

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

Production of this document is made possible by financial contributions from Health Canada and provincial and territorial governments. The views expressed herein do not necessarily represent the views of Health Canada or any provincial or territorial government.

Canadian Institute for Health Information
495 Richmond Road, Suite 600
Ottawa, Ontario K2A 4H6
Phone: 613-241-7860
Fax: 613-241-8120
www.cihi.ca
copyright@cihi.ca

Cette publication est aussi disponible en français sous le titre *Documentation sur la qualité des données à l'intention des utilisateurs : Registre canadien des remplacements articulaires, données de 2016-2017*.

Table of contents

Purpose of the report

This report provides high-level data quality information about the Canadian Joint Replacement Registry (CJRR) 2016–2017 data set. This information will help users determine whether the data is fit for the intended use. Specifically, this document contains information on coverage, collection processes, data quality control, methodological changes and revision history for CJRR, with a focus on 2016–2017.

Canadian Joint Replacement Registry

Overview

CJRR collects administrative, clinical and prosthesis information on hip and knee replacements performed across Canada.

This medical device registry was formed as a collaborative effort between the Canadian Institute for Health Information (CIHI) and the Canadian Orthopaedic Association. The goals of the registry are to

- Collect, process and analyze data on hip and knee replacements performed in Canada;
- Support evidence-based decision-making in order to improve the quality of care for joint replacement recipients; and
- Conduct analyses pertaining to orthopedic devices and surgical techniques.

Information about CJRR, including the minimum data set (MDS), can be downloaded from CIHI's website at www.cihi.ca/cjrr.

For 2016–2017 CJRR data, submission was mandatory in Ontario, Manitoba and British Columbia and in 2 regions in Saskatchewan (Regina Qu'Appelle Health Region and Saskatoon Health Region). In the other provinces and the territories, CJRR data is submitted on a voluntary basis by participating regional health authorities, facilities or orthopedic surgeons.

In 2016–2017, a total of 88,960 records were submitted to CJRR through either

- Electronic file submission (75.7% of records); or
- Web submission through the CJRR Web-Based Data Submission and Reports Tool (24.3% of records).

Users

Primary users of CJRR data include orthopedic surgeons, health policy-makers and health care administrators. Other users include allied health care clinicians, researchers and the general public.

Core data elements and concepts

Effective April 1, 2012, CJRR streamlined its list of data elements by implementing an MDS that is aligned with the standards established by the International Society of Arthroplasty Registries (ISAR).

For 2016–2017, CJRR collected the following information on hip and knee replacements:

- Patient demographics;
- Surgeon and facility information; and
- Surgery details, such as type of replacement (primary or revision procedure), type of primary procedure, joint side, diagnosis grouping or reason for revision, and implant and cement identifiers (manufacturers/names, product/lot numbers).

Coverage

CJRR population and frame

The population of interest is all hip and knee replacements performed in Canada between April 1, 2016, and March 31, 2017. All hip and knee replacements performed in acute inpatient and day surgery settings in Canada are collected in CIHI's Discharge Abstract Database (DAD), Hospital Morbidity Database (HMDB) or National Ambulatory Care Reporting System (NACRS); therefore, these combined data sources are used as the population of reference. The DAD/HMDB captures administrative, clinical and demographic information on hospital inpatient and day surgery events, including hip and knee replacements. NACRS captures demographic, administrative and clinical data for hospital- and community-based ambulatory care for participating jurisdictions, including hip and knee replacements.

Procedure-based coverage

Procedure-based coverage can be assessed by comparing what is collected in the DAD/HMDB and NACRS with what is in CJRR. Compared with the DAD/HMDB and NACRS, CJRR captured approximately 71% of all hip and knee replacements in 2016–2017 (Table 1). Nearly all procedures were performed in an inpatient setting. Only 333 procedures (0.3%) were performed as day surgeries.[i]

Given that CJRR is mandatory in only a few provinces, under-coverage is the primary data quality issue. Over-coverage is very rare.

CJRR continues to work in collaboration with key policy-makers and orthopedic surgeons in voluntary jurisdictions to further encourage mandated reporting to achieve the goal of capturing more than 90% of all procedures. As of April 1, 2018, CIHI has expanded CJRR data capture through the DAD in order to leverage a pan-Canadian system to link the implant data with the patient's hospitalization record.

Facility-based coverage

In 2016–2017, overall facility coverage was approximately 72.5% (Table 2). In mandatory provinces, facility coverage was 100.0%. In voluntary provinces, it is possible that not all surgeons in each facility are reporting to CJRR.

i. Among the 333 day surgery procedures, 267 were performed in NACRS-submitting facilities and 67 were performed in facilities that submit day surgery data to the DAD/HMDB.

Table 1 Hip and knee replacements in CJRR as a percentage of replacements in the DAD/HMDB and NACRS, by jurisdiction, 2016–2017

Jurisdiction	Number of procedures submitted to CJRR	Number of procedures expected in CJRR*	Percentage coverage of CJRR
British Columbia†	15,910	16,914	94.1%
Alberta	4,206	12,962	32.4%
Saskatchewan	3,745	4,435	84.4%
Manitoba‡	4,235	4,363	97.1%
Ontario†	49,235	52,077	94.5%
Quebec	5,693	23,832	23.9%
New Brunswick	2,971	3,556	83.5%
Nova Scotia	2,569	4,040	63.6%
Prince Edward Island	0	576	0.0%
Newfoundland and Labrador	396	2,137	18.5%
Territories§	0	86	0.0%
Total	**88,960**	**124,978**	**71.2%**

Notes

* Bilateral procedures collected in the DAD/HMDB and NACRS were counted as 2 separate procedures to be consistent with the submission process for CJRR.

† In 2012–2013, Ontario and British Columbia mandated CJRR data submission.

‡ Manitoba mandated CJRR submission as of 2011–2012 for paper submissions. As of 2013–2014, the province mandated submissions on an electronic basis.

§ Territories include Yukon and the Northwest Territories, which are combined due to small values. No hip and knee replacements are performed in Nunavut.

Numbers reflect the province/territory in which the joint replacement was performed.

Sources

Canadian Joint Replacement Registry, Discharge Abstract Database, Hospital Morbidity Database and National Ambulatory Care Reporting System, 2016–2017, Canadian Institute for Health Information.

Table 2 Participating facility response rate in CJRR (compared with the DAD/HMDB and NACRS), by jurisdiction, 2016–2017

Jurisdiction	Number of facilities represented in CJRR	Number of facilities that submitted to the DAD/HMDB and NACRS*	Unit response rate
British Columbia†	30	30	100.0
Alberta	9	15	60.0
Saskatchewan	6	7	85.7
Manitoba‡	6	6	100.0
Ontario†	71	71	100.0
Quebec	17	56	30.4
New Brunswick	7	8	87.5
Nova Scotia	3	5	60.0
Prince Edward Island	0	1	0.0
Newfoundland and Labrador	1	5	20.0
Territories§	0	2	0.0
Total	**150**	**207**	**72.5**

Notes

* Facilities submitting to the DAD/HMDB and NACRS were counted as a single entity to be consistent with CJRR.

† In 2012–2013, Ontario and British Columbia mandated CJRR data submission.

‡ Manitoba mandated CJRR submission as of 2011–2012 for paper submissions. As of 2013–2014, the province mandated submissions on an electronic basis.

§ Territories include Yukon and the Northwest Territories, which are combined due to small values. No hip and knee replacements are performed in Nunavut.

In voluntary provinces/territories where submission is done directly by the surgeons (and/or their staff), rather than at the facility level, a facility can be represented in CJRR even if not all surgeons participate in the registry.

Sources

Canadian Joint Replacement Registry, Discharge Abstract Database, Hospital Morbidity Database and National Ambulatory Care Reporting System, 2016–2017, Canadian Institute for Health Information.

Issues of bias and reliability

Procedure, facility and surgeon under-coverage, where they exist in voluntary CJRR reporting provinces and territories, are major potential sources of bias in CJRR. Given the nature of voluntary response, the facilities and populations with low coverage can be under-represented in the analyses conducted involving this data. Thus for CJRR analyses involving estimates and adjustments with population covariates, it is recommended that users include only data from mandated provinces in their analyses. With the expansion of mandated participation and increased CJRR coverage over time, it is expected that biases due to under-coverage will be reduced. In terms of other sources of bias, there may also be some degree of inconsistency due to coding variation, such as varying clinical interpretations and definitions (e.g., data elements such as Diagnosis Grouping or Reason for Revision).

Comparability

Availability of Health Care Numbers for linkage

CJRR data can be linked to other CIHI databases such as the DAD, HMDB or NACRS to pull together more comprehensive information about an individual's joint replacement surgeries. For this linkage, individuals are identified by the Health Care Number (HCN) and the jurisdiction that issued the HCN. Records without valid HCNs or issuing jurisdictions and records with jurisdiction/HCN combinations that are believed to be used by more than one person are excluded.

In 2016–2017, there were 1,042 records (1.2%) without a valid HCN and/or issuing jurisdiction. Furthermore, a small number of CJRR records (6.1%) could not be linked due to jurisdictional differences in HCN reporting to CIHI (5,386 records from Quebec and 24 records of Manitoba residents who had joint replacements done out of province).

Availability of product numbers for linkage

Joint replacement implant parts in CJRR are identified through product numbers: catalogue numbers or global trade item numbers (GTINs). In 2016–2017, 325,760 product numbers were submitted to CJRR: 95.7% were catalogue numbers and 4.3% were GTINs.

Implant characteristics (such as type, fixation, bearing surface, size, etc.) can be obtained by linking CJRR catalogue numbers to the Global Product Library maintained by the International Consortium of Orthopaedic Registries (ICOR) and ISAR. This is a standardized implant library that is developed and maintained via collaboration among more than 30 international orthopedic registries for hip and knee replacement. Currently, this library stores information for implants using catalogue numbers only; it does not include information on implant parts that use GTIN as product identification.

In 2016–2017, 89.9% of catalogue numbers collected in CJRR could be linked to the ICOR/ISAR library. We acknowledge that the library may not contain all possible catalogue numbers for implant parts used in Canada. At this time, CIHI does not have access to a product library for GTINs, so we are unable to determine implant characteristics for those parts.

Implant characteristics can be used for analysis and future reporting. CJRR will continue to work on improving linkage by looking for opportunities to identify and access other product libraries that contain component characteristics and manufacturer-related information of implants used in Canadian patients.

Data quality control processes

All captured data is subject to CJRR database checks for validity, logic, allowable ranges and consistency. The following specific quality control measures are built into CIHI's applications and tools:

- **Electronic submission files:** Validation checks are applied to the data, as outlined in the CJRR Electronic Data Submission Requirements. Errors in electronic submission data fall into 2 categories: severe and non-severe (warning) errors. Both types of errors are flagged in error reports that are sent to the data suppliers. Records with severe errors are rejected and not saved in the CJRR database.
- **Web-Based Data Submission and Reports Tool:** The data entered is subject to automated logic edits to ensure that mandatory fields are complete and that logic conditions are met prior to being saved in the database.

Methodological changes and revision history

As previously noted, CJRR underwent major changes as of 2012–2013, when it adopted the new MDS standard that significantly streamlined the data elements. CJRR had become mandatory to report to in Ontario, Manitoba (electronically) and British Columbia by 2013–2014. Also as of April 2013, CJRR retired paper data submissions, which was a long-standing mode of submission by individual surgeons to the registry. Finally, as of 2013, the CJRR system was modified to accept data from scanned barcodes of implant stickers, which reduced errors resulting from manual entry and the effort needed to input product information. Of note, the CJRR system can accept data beyond the reporting period deadline; thus there may be slight variations in published data over time due to data revisions.

Collectively, these initiatives have substantially improved the data quality of CJRR from a timeliness, accuracy and coverage perspective, supporting its goal of providing data to improve outcomes for Canadians receiving hip and knee replacements.

Contact information

For more information, please visit CJRR's web page at www.cihi.ca/cjrr or contact us at cjrr@cihi.ca.

help@cihi.ca

CIHI Ottawa
495 Richmond Road
Suite 600
Ottawa, Ont.
K2A 4H6
613-241-7860

CIHI Toronto
4110 Yonge Street
Suite 300
Toronto, Ont.
M2P 2B7
416-481-2002

CIHI Victoria
880 Douglas Street
Suite 600
Victoria, B.C.
V8W 2B7
250-220-4100

CIHI Montréal
1010 Sherbrooke Street West
Suite 602
Montréal, Que.
H3A 2R7
514-842-2226

cihi.ca

17775-0518