CJRR

Data Quality Documentation for Users

Canadian Joint Replacement Registry

2018–2019 Data

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

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

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Purpose of this document

This document provides high-level data quality information about the Canadian Joint Replacement Registry (CJRR) 2018–2019 data set. This information will help users determine whether the data is fit for the intended use. Specifically, this document contains information on CJRR's coverage, collection processes, data quality control, methodology changes and revision history.

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 to improve the quality of care for joint replacement recipients; and
- Conduct analyses pertaining to orthopedic devices and surgical techniques.

Effective April 1, 2018, CJRR data can be submitted to CIHI in 1 of 2 ways:

1. Directly to the CJRR database via standardized electronic files (legacy submission); or
2. Via the Discharge Abstract Database (DAD) (Group 20: Hip and Knee Prosthesis Information).

In 2018–2019, a total of 103,673 hip and knee prosthesis records were submitted:

- 62.9% of records came through the CJRR legacy electronic file submission system; and
- 37.1% of records came through the DAD.

In 2018–2019, CJRR data submission was mandatory in Nova Scotia, Ontario, Manitoba and British Columbia. In the other provinces and the territories, CJRR data was submitted on a voluntary basis by participating regional health authorities or facilities.

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 a minimum data set (MDS) that is aligned with the standards established by the International Society of Arthroplasty Registries (ISAR).

CJRR collects 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 prosthesis and cement identifiers (manufacturers/names and product/lot numbers).

Coverage

CJRR population and frame

The population of interest for CJRR is all hip and knee replacements performed or all hospitalizations for hip and/or knee replacements that took place in Canada between April 1, 2018, and March 31, 2019.

CJRR collection is procedure-based, while DAD collection is hospitalization-based. Users can select their population of interest using the data elements Surgery Date or Discharge Date, respectively.

The Discharge Abstract Database–Hospital Morbidity Database (DAD-HMDB) and National Ambulatory Care Reporting System (NACRS) collectively capture administrative, clinical and demographic information on hip and knee replacements performed in all acute inpatient and day surgery facilities in Canada.

Procedure-based coverage

Procedure-based coverage can be assessed by comparing what is collected in the DAD-HMDB and NACRS with what is collected in CJRR via the CJRR database and via the DAD Group 20. Compared with the reference population of interest, CJRR captured 74.3% of all hip and knee replacements in 2018–2019 (Table 1).

Table 1 CJRR prosthesis information coverage, by jurisdiction, 2018–2019

Jurisdiction	Submitted through	Number of procedures submitted with CJRR prosthesis information	Number of procedures expected with CJRR prosthesis information*	Percentage coverage
Newfoundland and Labrador	DAD Group 20	2,260	2,357	95.9%
Prince Edward Island	n/a	0	670	0.0%
Nova Scotia†	CJRR legacy submission	4,186	4,635	90.3%
New Brunswick	DAD Group 20	19	3,576	0.5%
Quebec	CJRR legacy submission	943	25,509	3.7%
Ontario†	CJRR legacy submission and DAD Group 20	56,155	57,903	97.0%
Manitoba†	DAD Group 20	5,032	5,071	99.2%
Saskatchewan	DAD Group 20	4,399	4,916	89.5%
Alberta	CJRR legacy submission	10,264	13,239	77.5%
British Columbia†	CJRR legacy submission	20,341	21,524	94.5%
Yukon	n/a	0	45	0.0%
Northwest Territories	DAD Group 20	74	75	98.7%
Total	**n/a**	**103,673**	**139,520**	**74.3%**

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.

† Nova Scotia, Ontario, Manitoba and British Columbia have mandatory CJRR data submission.

n/a: Not applicable.

No hip and knee replacements were performed in Nunavut.

Sources

Canadian Joint Replacement Registry, Discharge Abstract Database, Hospital Morbidity Database and National Ambulatory Care Reporting System, 2018–2019, Canadian Institute for Health Information.

Among the 103,673 CJRR records, less than 1% were identified as same-day procedures. CJRR coverage for hip and knee replacements performed as day surgeries is 17%. This low coverage occurs because Ontario facilities submit day surgery data to NACRS, which does not accept CJRR prosthesis data. Ontario facilities that submit prosthesis data via the DAD and that also perform day surgeries will not have their day surgery prosthesis information included in the CJRR database.

Given that CJRR submission is mandatory in a few provinces and voluntary in others, under-coverage is the primary data quality issue. CIHI continues to collaborate with voluntary jurisdictions to further encourage mandated CJRR reporting to achieve the goal of capturing prosthesis data for more than 90% of all procedures.

Facility-based coverage

In 2018–2019, overall facility coverage — defined as the number of facilities submitting hip and/or knee prosthesis information over the total number of facilities performing hip and/or knee procedures — was approximately 68.8%. In mandatory provinces, overall facility coverage was 93.1% (Table 2).

Table 2 Facility-level CJRR prosthesis information coverage, by jurisdiction, 2018–2019

Jurisdiction	Number of facilities that submitted CJRR prosthesis information	Number of facilities that performed hip and knee replacements*	Percentage coverage at facility level
Newfoundland and Labrador	5	5	100.0%
Prince Edward Island	0	1	0.0%
Nova Scotia†	5	5	100.0%
New Brunswick	1	8	12.5%
Quebec‡	10	54	18.5%
Ontario†	68	74	91.9%
Manitoba†	6	6	100.0%
Saskatchewan	5	7	71.4%
Alberta	13	15	86.7%
British Columbia†	29	31	93.5%
Yukon	0	1	0.0%
Northwest Territories	1	1	100.0%
Total	**143**	**208**	**68.8%**

Notes

* Represented by the number of facilities submitting to the DAD-HMDB and/or NACRS; to be consistent with CJRR legacy submission, each facility was counted as a single entity.

† Nova Scotia, Ontario, Manitoba and British Columbia have mandatory CJRR data submission.

‡ In Quebec, not all surgeons from each participating facility submitted CJRR prosthesis data.

No hip and knee replacements were performed in Nunavut.

Sources

Canadian Joint Replacement Registry, Discharge Abstract Database, Hospital Morbidity Database and National Ambulatory Care Reporting System, 2018–2019, Canadian Institute for Health Information.

Issues of bias and reliability

Procedure and facility 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 it is recommended that users include only data from mandated provinces in their analyses that involve estimates and adjustments with population covariates.

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 their health care number (HCN) and the jurisdiction that issued the HCN.

In 2018–2019, almost all CJRR records (>99%) could be linked to the DAD-HMDB or NACRS. 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.

Availability of product numbers for linkage

CJRR product numbers can be linked to product libraries to obtain characteristics about the prostheses used and their components. In 2018–2019, CJRR collected 371,883 product numbers in 2 different formats: 95.2% were catalogue numbers and 4.8% were global trade item numbers (GTINs).

Almost 90% of the CJRR catalogue numbers could be linked to an international arthroplasty product library,[i] enabling identification of the prosthesis characteristics such as component type, fixation, bearing surface and size. At this time, CIHI does not have access to a GTIN product library, so we are unable to determine prosthesis characteristics for those parts. CJRR will continue to look for supplementary sources of product information.

Data quality control processes

All submitted hip and knee prosthesis data is subject to systematic checks for validity, logic, allowable ranges and consistency. The following specific quality control measures are built into CIHI's applications and tools:

- **Submission to CJRR database:** Validation checks are applied to the data, as outlined in *CJRR Electronic Data Submission Requirements*. Errors in electronic submission 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.
- **Submission to the DAD:** Edits are applied to the submitted data, as outlined in *Vendor Specifications for Submitting Data to DAD*. For hard errors, a default value of Z is substituted into the data field. An error message in a field can occur when the reported value is valid but violates certain logical relationships with the data in other fields. All errors are recorded in the detailed submission error report that is sent to data suppliers. Any uncorrected hard errors that remain after the submission deadline can be identified with a Z.

Methodology changes and revision history

Mandatory submission timeline

Jurisdictions with mandatory CJRR coverage have a complete picture of prostheses used for hip and knee replacements in their province.

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i. This standardized hip and knee replacement prosthesis library, developed by the International Consortium of Orthopaedic Registries and ISAR, is maintained through the collaboration of more than 30 international orthopedic registries.

Table 3 Implementation of mandatory CJRR submission among provinces

Province	Fiscal year
Nova Scotia	2018–2019
Ontario	2012–2013
Manitoba	2011–2012 (paper); 2012–2013 (electronic)
British Columbia	2012–2013

Data collection changes

- In May 2001, CJRR was launched as a collaborative effort between CIHI and the Canadian Orthopaedic Association. Data was collected via paper forms or electronic files.
- In 2007, the CJRR web-based data submission and reports tool was launched. Data was collected via paper forms, electronic files or web tool entries.
- Starting with 2012–2013 data, the MDS standard for submission was adopted.
- In 2013, the CJRR system was updated to accept data from scanned barcodes of prosthesis stickers, which reduced errors resulting from manual entry as well as the effort needed to input product information.
- In April 2013, paper data submission was retired.
- In April 2018, the web-based data submission and reports tool was decommissioned; electronic file submission is the unique mode of data collection for CJRR.
- Starting with 2018–2019 data, CJRR prosthesis data is also accepted through the DAD, leveraging an existing national platform.

Data revisions

The CJRR database can accept data beyond the reporting period deadline; thus there may be slight variations in published data over time due to data revisions. CJRR data submitted via the DAD will not be accepted beyond the reporting period deadline.

Contact information

For more information, please visit CJRR's web page 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

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