



Data Quality Documentation for Users

Canadian Joint Replacement Registry

2017–2018 Data



Canadian Institute
for Health Information

Institut canadien
d'information sur la santé

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Purpose of the report

This report provides high-level data quality information about the Canadian Joint Replacement Registry (CJRR) 2017–2018 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 2017–2018.

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 2017–2018 CJRR data, submission was mandatory in Ontario, Manitoba and British Columbia. 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 2017–2018, a total of 94,439 records were submitted to CJRR through either

- Electronic file submission (76.3% of records); or
- Web submission through the CJRR Web-Based Data Submission and Reports Tool (23.7% of records). Note that as of April 1, 2018, data submission through the web tool is no longer available.

As of 2018–2019, CJRR data is also accepted through the Discharge Abstract Database (DAD).

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 2017–2018, 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, 2017, and March 31, 2018. All hip and knee replacements performed in acute inpatient and day surgery settings in Canada are collected in CIHI's 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 72% of all hip and knee replacements in 2017–2018 (Table 1). Nearly all procedures were performed in an inpatient setting. Only 485 procedures (0.4%) 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 voluntary jurisdictions to further encourage mandated reporting to achieve the goal of capturing more than 90% of all procedures. As mentioned previously, as of April 1, 2018, CIHI has expanded the DAD to enable the capture of CJRR data, which will support increased coverage in the future.

Facility-based coverage

In 2017–2018, overall facility coverage was approximately 70.3% (Table 2). In mandatory provinces, facility coverage was close to 100.0%. In voluntary provinces, not all facilities are reporting to CJRR.

i. Among the 485 day surgery procedures, 352 were performed in NACRS-submitting facilities and 133 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, 2017–2018

Jurisdiction	Submission mode	Number of procedures submitted to CJRR	Number of procedures expected in CJRR*	Percentage coverage of CJRR
British Columbia [†]	Electronic file	17,239	18,267	94.4%
Alberta	Electronic file/web	6,284	12,971	48.4%
Saskatchewan	Web	4,047	4,773	84.8%
Manitoba [‡]	Electronic file	4,511	4,633	97.4%
Ontario [†]	Electronic file/web	50,431	55,318	91.2%
Quebec	Electronic file/web	5,674	24,378	23.3%
New Brunswick	Web	2,954	3,379	87.4%
Nova Scotia	Electronic file/web	2,944	4,400	66.9%
Prince Edward Island	n/a	0	620	0.0%
Newfoundland and Labrador	Web	355	2,187	16.2%
Territories [§]	n/a	0	79	0.0%
Total	n/a	94,439	131,005	72.1%

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.

n/a: Not applicable.

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, 2017–2018, Canadian Institute for Health Information.

Table 2 Participating facility response rate in CJRR (compared with the DAD-HMDB and NACRS), by jurisdiction, 2017–2018

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	12	16	75.0
Saskatchewan	6	7	85.7
Manitoba [‡]	6	6	100.0
Ontario [†]	68	73	93.2
Quebec	16	58	27.6
New Brunswick	7	8	87.5
Nova Scotia	3	6	50.0
Prince Edward Island	0	1	0.0
Newfoundland and Labrador	1	5	20.0
Territories [§]	0	2	0.0
Total	149	212	70.3

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, 2017–2018, 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 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 2017–2018, there were 476 records (0.5%) without a valid HCN and/or issuing jurisdiction. Furthermore, a small number of CJRR records (5.9%) could not be linked due to jurisdictional differences in HCN reporting to CIHI (41 records from Quebec and 15 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 2017–2018, 344,298 product numbers were submitted to CJRR: 96.2% were catalogue numbers and 3.8% 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 2017–2018, 90.6% 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. Note that effective April 1, 2018, the CJRR web-based tool was retired as a method of CJRR data submission.

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. 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. As of April 1, 2018, the web-based data submission and reports tool was decommissioned, leaving electronic file submission as the unique mode of data collection starting in 2018–2019. Also as of 2018–2019, CJRR data is accepted through the DAD.

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.

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