



SNOMED CT | ICD-10-CA

# CIHI SNOMED CT to ICD-10-CA Map Refset Implementation Guide

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# Table of contents

Acknowledgements .....	4
1 Introduction .....	4
2 About ICD-10-CA .....	5
3 About the maps .....	5
4 SNOMED CT CA Edition .....	6
5 Benefits to vendors and their clients.....	7
6 Practical use cases .....	7
7 Map implementation expectations .....	8
8 Licensing .....	8
9 Release files (RF2 files).....	9

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## 1 Introduction

SNOMED CT (Systematized Nomenclature of Medicine — Clinical Terms) is a widely used health care terminology designed to be used within an electronic health record (EHR) or electronic medical record (EMR) system to capture diagnostic, procedural and related information. SNOMED CT's standardized vocabulary supports direct care and management of the patient and can enable the sharing of patient information within and across all health care settings.

There is increasing demand from stakeholders in Canada, at the local and provincial levels, to supply a consistent and accurate SNOMED CT to ICD-10-CA mapping solution so that clinical coders can leverage the diagnostic information captured by clinicians using SNOMED CT in the EHR for semi-automated generation of ICD-coded data. CIHI has developed a set of maps for this purpose. The maps have been produced as a refset that can be used at all levels of care in a health care facility.

This guide has been developed to inform vendors and interested parties of the availability of the CIHI SNOMED CT Refset, to describe use cases, and to provide guidance on key considerations for implementation in an EHR system.

To be able to use the CIHI refset, SNOMED CT must be already implemented in the EHR system. It is recommended that readers of this guide first familiarize themselves with SNOMED CT guides and introductions to understand what is important from a user perspective. Information about SNOMED CT and its implementation can be found at [SNOMED.org](https://www.snomed.org).

## 2 About ICD-10-CA

The Canadian Institute for Health Information (CIHI) is an independent, not-for-profit organization that provides essential information on Canada's health systems and the health of Canadians. The *International Classification of Diseases* (ICD) is the base classification developed and published by the World Health Organization and is used for statistical reporting of diseases and health conditions. ICD-10 is the 10th revision of the classification and ICD-10-CA (*International Statistical Classification of Diseases and Related Health Problems, 10th Revision, Canada*) is the enhanced Canadian version of ICD-10. ICD-10-CA is the national standard for morbidity data reporting in Canada and is released on a 3-year cycle.

For more information, email [help@cihi.ca](mailto:help@cihi.ca).

## 3 About the maps

The CIHI refset is a mapping reference set between a subset of SNOMED CT and ICD-10-CA. This refset provides a solution for semi-automated data collection to support submission of data to CIHI databases. They can be incorporated in software to present to the coding expert the ICD-10-CA code or codes which have been attached to a SNOMED CT concept.

An original refset (maps) from SNOMED CT International Edition to the international version of ICD-10 was created to support the epidemiological, statistical and administrative needs of the SNOMED International member countries and WHO-Family of International Classifications (WHO-FIC) Collaborating Centres. Refset updates are released twice annually, on January 31 and July 31, as a derivative of the SNOMED CT International and SNOMED CT CA release schedule. The maps in this refset are a directed set of associations from SNOMED CT source concepts to ICD-10 target classification terms. They are rule-based semi-automated maps that include concepts from the following SNOMED CT domains:

- Clinical findings (disorders and findings) SCTID404684003 and descendants.
- Events SCTID 272379006 and descendants; and
- Situations with explicit context SCTID 243796009 and descendants.

We have leveraged the base SNOMED CT to ICD-10 map refset, applied the SNOMED International mapping methodology and mapped data to create a SNOMED CT to ICD-10-CA map refset.

Since the original maps are SNOMED CT to ICD-10, CIHI mapping specialists reviewed and validated each map to ensure the accurate assignment of a target ICD-10-CA code(s), in accordance with the most current version of the *Canadian Coding Standards for ICD-10-CA and CCI* and to meet national data collection requirements to support CIHI's health indicator reporting. The maps act as a link between the SNOMED CT concept and the most accurate ICD-10-CA target code(s).

Although the maps apply the rules, conventions and *Canadian Coding Standards*, manual intervention by a clinical coder with knowledge of the classifications and coding standards is still required.

The maps between SNOMED CT and ICD-10-CA can yield a 1:1 lexical match of a single SNOMED CT concept to a single ICD-10-CA target code. In some cases, a single SNOMED CT concept is mapped to 2 or more ICD-10-CA target codes (a one-to-many map). When there is an alternative ICD-10-CA target code that is context-dependent (i.e., gender or age), a map rule is employed. More information on map rules is found below.

The maps between SNOMED CT and ICD-10-CA are not a completely automated data source and do not account for all ICD-10-CA codes.

## 4 SNOMED CT CA Edition

Canada Health Infoway maintains and makes available a Canadian (CA) edition of SNOMED CT, which is published quarterly, in February, May, August and November each year. The SNOMED CT CA Edition is a comprehensive clinical reference terminology that includes English and French descriptions, the most recent SNOMED International Edition and Canadian-specific content developed with stakeholders to support digital health implementations across the country. This includes communicable disease tracking, sharing of diagnostic imaging content, immunization recording, public health surveillance and primary care content standards. It is highly recommended to use the SNOMED CT CA Edition when utilizing the CIHI refset.

For more information, email [standards@infoway-inforoute.ca](mailto:standards@infoway-inforoute.ca).

## 5 Benefits to vendors and their clients

SNOMED CT supports the consistent representation of comprehensive high-quality clinical content in EHRs. The value of SNOMED CT is strengthened by its solid clinical validation and a design that facilitates evolutionary growth to meet emerging requirements such as data analytics. The use of an EHR improves communication and increases the availability of relevant information. If clinical information is stored in ways that allow meaning-based retrieval, the benefits are greatly increased. The added benefits range from increased opportunities for real-time decision support and more accurate retrospective reporting for research and management to enhanced data quality and consistency at the point of data collection.

There are many benefits to incorporating SNOMED CT to ICD-10-CA maps in an EHR system, including the following:

- Reuse of data captured at the point of care by a clinician will
  - Enable real-time data analysis for statistical purposes.
  - Reduce coder burden.
    - The maps will positively alter the clinical coder's role by reducing the time spent going through the clinical record and coding; the clinical coder role is evolving (e.g., performing more reviews to ensure data quality, allowing more time to focus on decision-support activities).
  - Improve data submission timelines to CIHI.
- There will be a reduced need for coders to seek clarification from a clinician during the coding process.
- The cost of data collection for administrative purposes is reduced when a mapping reference set supplies possible ICD-10-CA codes that can be quickly validated for submission to CIHI and other data registries. Hospitals, health authorities and provincial ministries of health are seeking this benefit from the EHR.

## 6 Practical use cases

These maps can be employed in an EHR solution where clinicians are using SNOMED CT CA to record diagnoses and develop problem lists for patient care. Once the refset maps are implemented in the EHR system, it is intended that the clinicians will be selecting the appropriate concepts. Before the concepts are submitted to CIHI, the clinical coder — informed by clinical details and applying their classification expertise — will validate the concepts and make the final selection by following rules and advices. The concept selection process and the review process are dependent on the implementation type.

SNOMED CT to ICD-10-CA maps can be used to support the creation of specialty driven value sets for targeted data capture (e.g., rehab clinics, colonoscopy clinics, cataract clinics), reducing cost and coder burden.

Some form of quality and consistency auditing (e.g., software-based) will be necessary for a period of time to assess the work.

## 7 Map implementation expectations

The vendor employs the map in the EHR and, following the sequential computable mapping rules, uses available administrative data to help identify an accurate ICD-10-CA code. Mapping rules are identified within the maps and provide an opportunity to utilize an algorithm to use administrative data (e.g., patient's age and/or gender) or clinician input to support automated code selection.

Map advices, which are human-readable text, have been employed in the maps when an accurate ICD-10-CA code cannot be selected by a mapping specialist due to the lack of details in a SNOMED CT concept. The map advices are attached to a specific ICD-10-CA target code and provide guidance for the clinical coder about what to pay attention to and/or instructions to follow during the coding process. The map advices will need to be readily available to the clinical coder when they are presented with the ICD-10-CA target codes for validation. More information on specific map advices is found below.

## 8 Licensing

The use of CIHI refset maps requires licensing agreements for both ICD-10-CA (from CIHI) and SNOMED CT (from Canada Health Infoway).

ICD-10-CA is available at no charge to Core Plan subscribers or for purchase by non-Core Plan clients. To request a licence for ICD-10-CA, contact [help@cihi.ca](mailto:help@cihi.ca).

For questions related to the use of the ICD-10-CA classification or about its application, please visit CIHI's [Codes and classifications web page](#).

To access the SNOMED CT Canadian Edition, an implementer must [create a Canada Health Infoway account](#) and confirm acceptance, annually, of the Terms of Use and Licence Agreements. Once a licence agreement is in place, release package files are made available for download by Canada Health Infoway to Canadian organizations at no cost via the Terminology Gateway.



## 9 Release files (RF2 files)

The following link to the SNOMED International Confluence page describes the data contained in the map files and provides examples of data in a table format (see Table 5.2.10-5): <https://confluence.ihtsdotools.org/display/DOCRELFMT/5.2.10+Complex+and+Extended+Map+Reference+Sets>

The following are descriptions associated with a map file:

**Map member:** A single Refset MAP data record, which assembles knowledge-based data required to validate the link between a single SNOMED CT concept and at most one ICD-10-CA classification code. The Map member includes a link to the source SNOMED CT concept identifier, a mapGroup integer, a mapPriority integer, a mapCategoryId status concept reference, a mapRule, mapAdvice and link to at most one mapTarget ICD-10-CA classification code.

**mapGroup:** An integer assigned to each set of Map members, which are coordinated to specify 1 target ICD-10-CA code for the map, or the null map if the source concept does not require an additional ICD-10-CA code for proper classification. Each mapGroup collates and orders the rules, which are sequentially evaluated to yield at most a single target code. The first mapGroup designates the set of records used to specify the first (primary) target code. The second mapGroup identifies the set of data records for the second target code. These are repeated as required to specify a complete set of mapping target codes.

**mapPriority:** An integer that designates the sequence of run-time Map member processing within each mapGroup. Each data record may include a rule that is designed to be processed to provide knowledge-based mapping. Only the first Map member meeting the run-time criteria is taken for the target code within the mapGroup data records.

**mapCategoryId:** A SNOMED CT foundation metadata concept identifier that indicates the process state for run-time use, including the editorial status of the Map member:

- The map source concept is properly classified (447637006 |Map source concept is properly classified|) within the target ICD 10-CA classification for this Map member, so no additional data is necessary for selection of this target code of the map (Exemplar: One to one: #1-10).
- The map source concept cannot be classified (447638001 |Map source concept cannot be classified with available data|) and cannot be assigned a target. This may be chosen when the source concept is not appropriate for assignment of an ICD-10-CA classification (Exemplar: NotClassifiable: #1-19), when the source concept cannot be assigned a granular classification specified by ICD-10-CA, as a default map when context must be employed for an accurate map or when the source concept must specify gender or age for assignment of an ICD-10-CA classification and context is not specified.

**mapRule:** A machine-processable truth statement created to evaluate to *true* or *false* at run-time, which determines whether the Map member should be validated as the correct link to the associated map target for the mapGroup being evaluated.

Formatting of the mapRule is generally 1 of 3 forms:

1. IFA Concept.id [= VALUE] — A mapRule that evaluates for the existence of one or more SNOMED CT concept instances including their descendant concepts, or an observable and value found in the patient record. The concept is designated by the SNOMED CT Identifier for a clinical finding or observable entity and the SNOMED CT fully specified name. In the case of rules for age at onset of clinical finding or current chronological age, it may include a range of allowable VALUES. If such an instance is found in the patient record at the time of rule evaluation, the rule is evaluated as *true*, and the associated map target is selected for that mapGroup. Otherwise, the rule evaluates as *false*, and the run-time evaluation proceeds to the next Map member within the mapGroup. The mapAdvice for the record will include a readable statement relating the rule and map target.
2. TRUE — Applied when a mapRule is not relevant for evaluation of the Map member and the Map member should always be accepted as valid.
3. OTHERWISE TRUE — Employed as the rule in the final mapPriority record when a series of rules must be evaluated to determine the valid map target. This is the case when none of the rules are satisfied or when there is no additional patient context information available. A default target code may or may not be specified with this value for mapRule, depending on whether the mapCategoryId is properly classified (447637006 |Map source concept is properly classified (foundation metadata concept) |) or non-classifiable ().

**mapAdvice:** Human-readable textual advice that a software vendor may employ to inform the clinician user or the classification expert during a semi-automated mapping session. The mapAdvice has 3 components separated by a vertical bar (|):

- A summary statement of the mapRule logic in readable terms for the clinical user
- Supplementary metadata guidance intended to clarify the map for the coding professional. Metadata advice supported in the MAP includes the following:
  - POSSIBLE REQUIREMENT FOR AN EXTERNAL CAUSE CODE
  - POSSIBLE REQUIREMENT FOR INFECTIOUS AGENT WHEN DOCUMENTED
  - POSSIBLE REQUIREMENT FOR ADDITIONAL CODE TO FULLY DESCRIBE DISEASE OR CONDITION
  - CONSIDER AVAILABILITY OF A MORE SPECIFIC CODE
  - CONSIDER USE ADDITIONAL CODE INSTRUCTION
  - REQUIRES VALIDATION OF THE OBSTETRICS 5<sup>TH</sup> AND/OR 6<sup>TH</sup> CHARACTERS
  - THIS MAP REQUIRES A DAGGER CODE AS WELL AS AN ASTERISK CODE

- USE ADDITIONAL CODE TO IDENTIFY ANY ASSOCIATED TYPE OF SEPSIS/SEPTIC SHOCK
- USE ADDITIONAL CODE WITH FOURTH AND FIFTH CHARACTERS .28 TO IDENTIFY ANY ASSOCIATED DIABETES MELLITUS
- USE ADDITIONAL CODE WITH FOURTH AND FIFTH CHARACTERS .33 TO IDENTIFY ANY ASSOCIATED DIABETES MELLITUS
- USE ADDITIONAL CODE WITH FOURTH AND FIFTH CHARACTERS .38 TO IDENTIFY ANY ASSOCIATED DIABETES MELLITUS
- USE ADDITIONAL CODE WITH FOURTH AND FIFTH CHARACTERS .51 TO IDENTIFY ANY ASSOCIATED DIABETES MELLITUS
- USE ADDITIONAL CODE WITH FOURTH AND FIFTH CHARACTERS .52 TO IDENTIFY ANY ASSOCIATED DIABETES MELLITUS
- USE ADDITIONAL CODE WITH FOURTH AND FIFTH CHARACTERS .68 TO IDENTIFY ANY ASSOCIATED DIABETES MELLITUS
- A summary statement reporting the mapCategoryId for readability of Map members that do not have a mapTarget:
  - 447638001: “Map source concept cannot be classified with available data”

More information related to the use of RF2 files and implementation of SNOMED CT can be found at <https://confluence.ihtsdotools.org/display/DOCICD10/ICD-10+Mapping+Technical+Guide>.



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