

Developer Training Terminology Services

Belgium - Online

Friday, 24th March 2023

<https://confluence.ihtsdotools.org/display/DEV/Belgium>



Welcome & Introductions

The SNOMED International Team

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Workshop Introduction

To better understand SNOMED CT,
how to deploy it easily in your local environments,
how to keep the terminology updated and
how to integrate it with your applications



Agenda - Monday

Setting up a production-ready SNOMED CT enabled terminology server

- SNOMED CT in Belgium
- Introduction to SNOMED CT
- Introduction to terminology services and Snowstorm

Exercise: Snowstorm Setup and SNOMED Import

- Examples of use (browser, UI demo)

Exercise: Validate import

- Learn more



Agenda - Friday

Using a SNOMED-enabled terminology server

- Refresh
- Catch-up and questions
- Accessing component and derivatives
- Analytics demo
- Using SNOMED CT expression constraints and FHIR
- Wrap-up



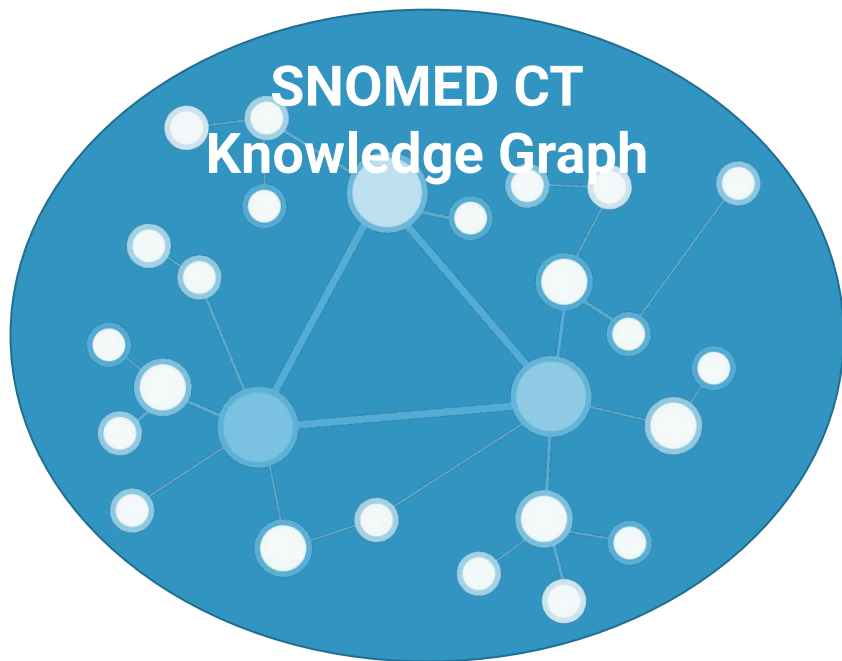
Guidelines for the (online) day

- Ask questions - put your (virtual) hand up, ask anything using the link above ... there are no bad questions!
 - Shout if you need help and a Zoom breakout room will be created where someone will help
 - Write code to do more than the simple examples
 - Use your own applications to work on the examples and exercises
- Don't feel the need to keep your webcam on all day!

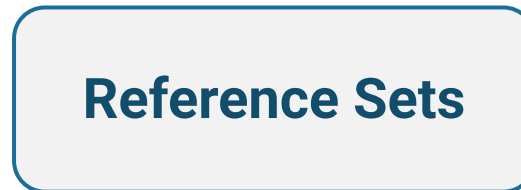
Refresh



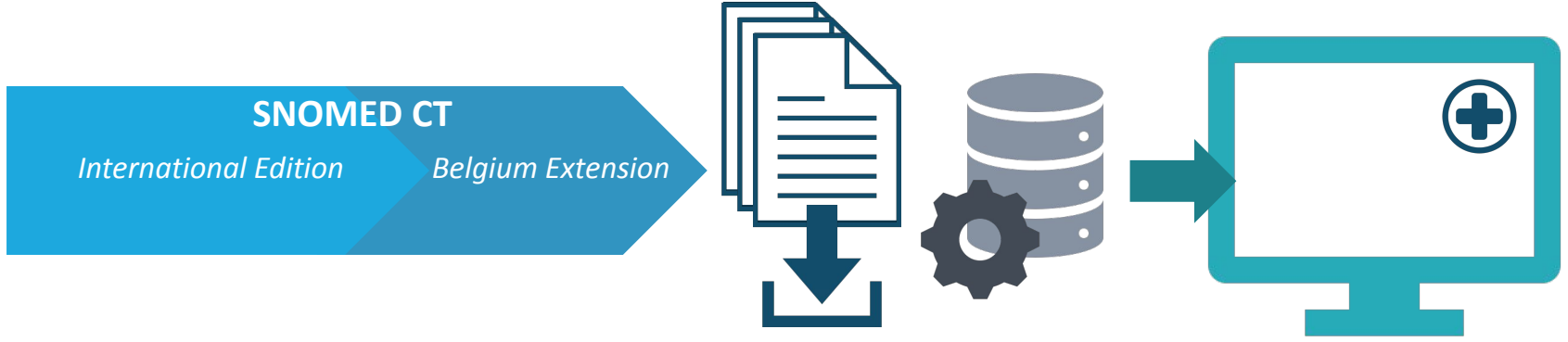
Components

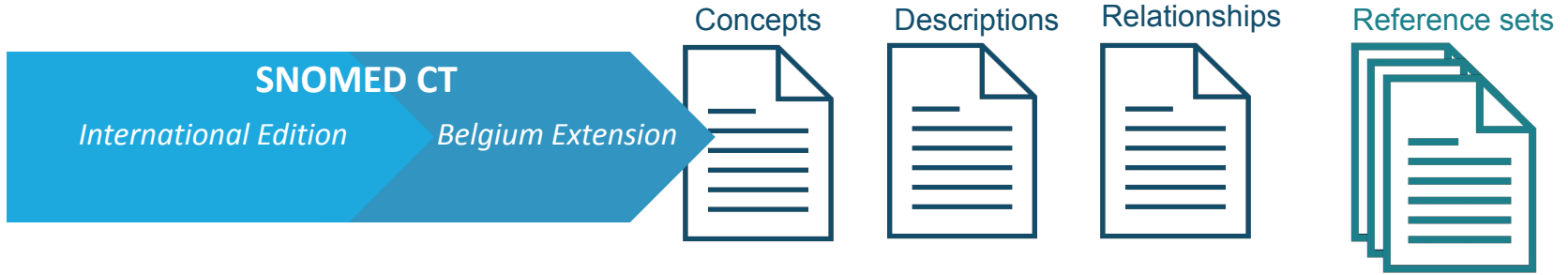


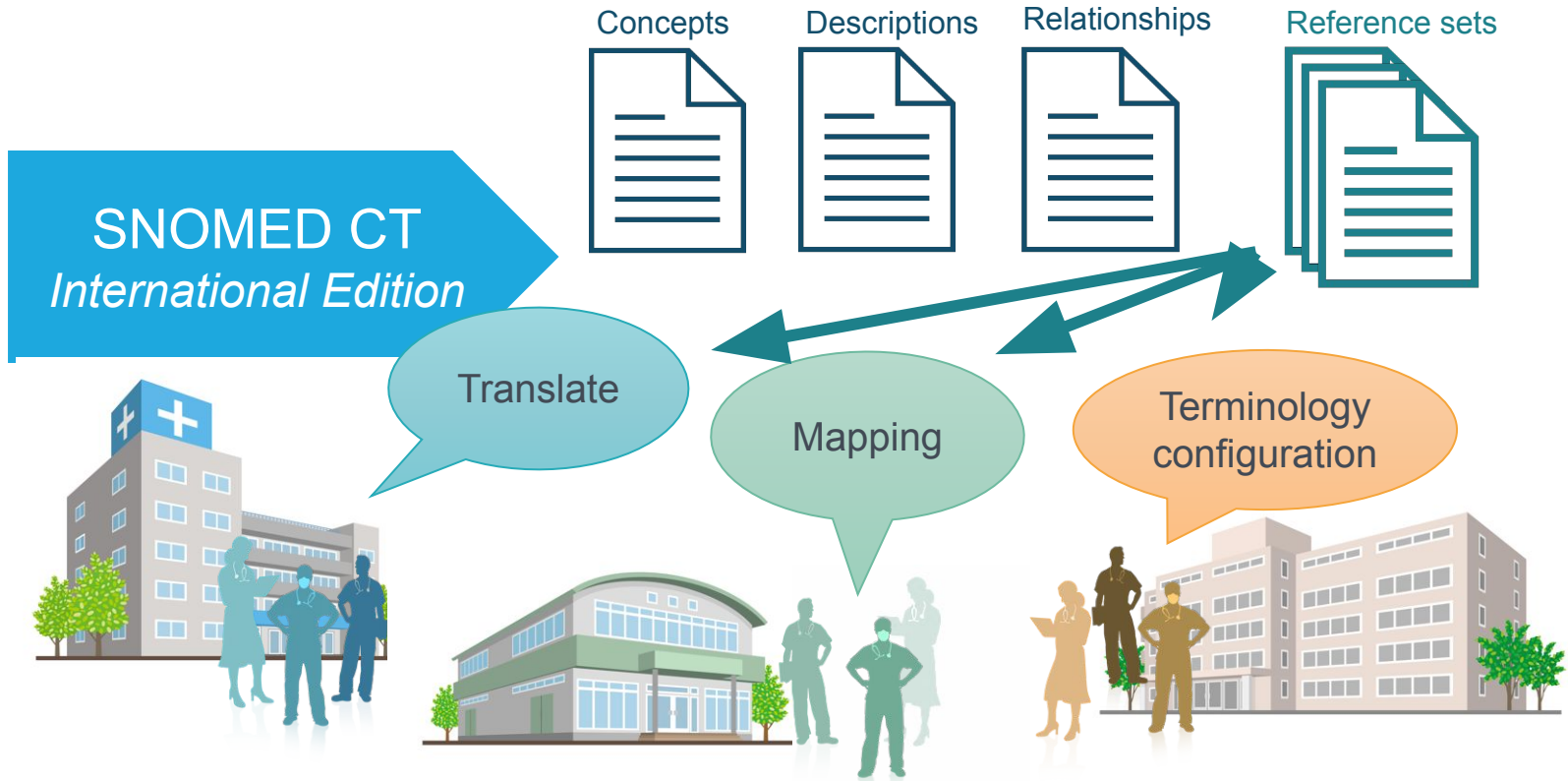
Components



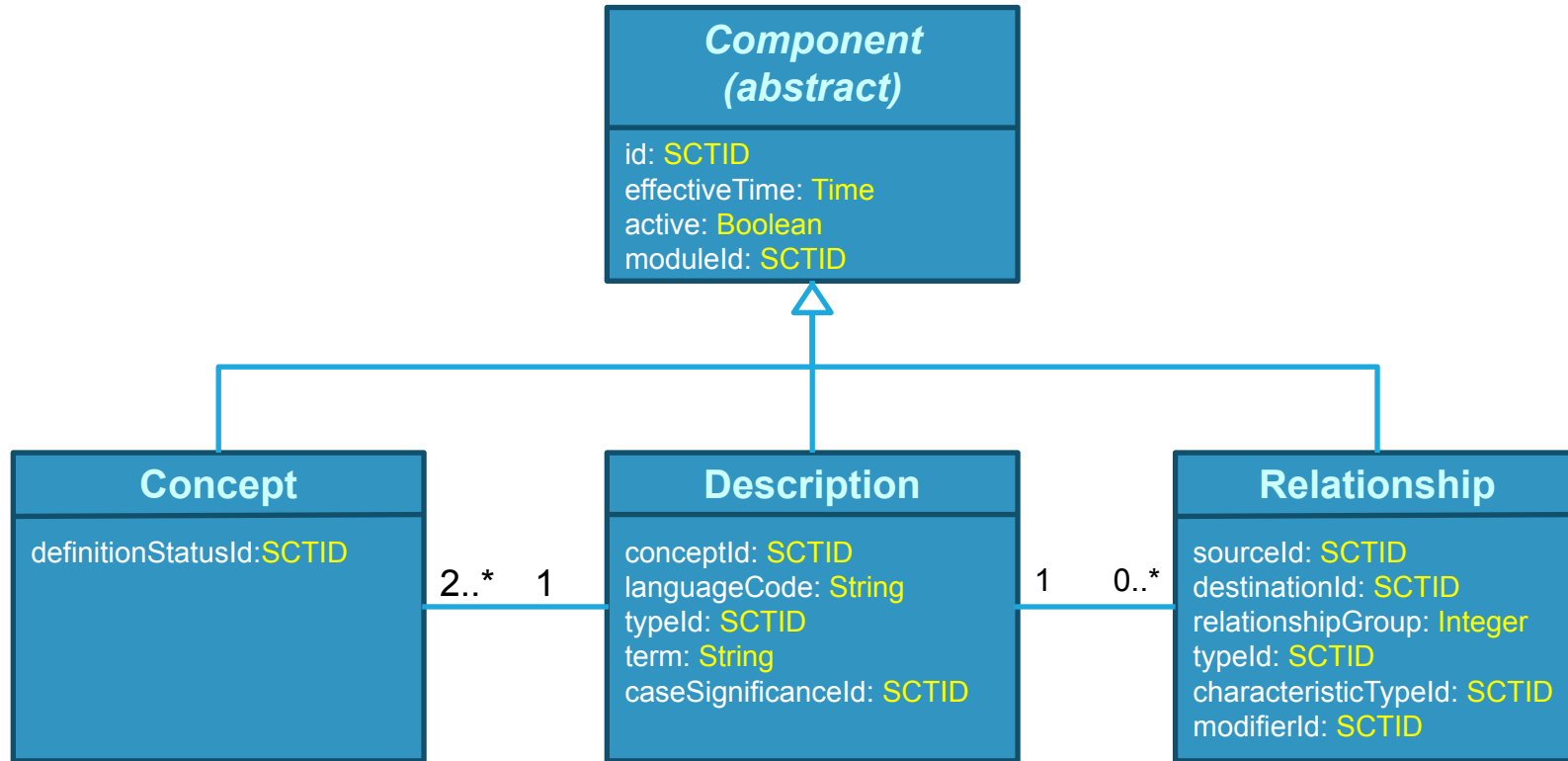
Derivatives



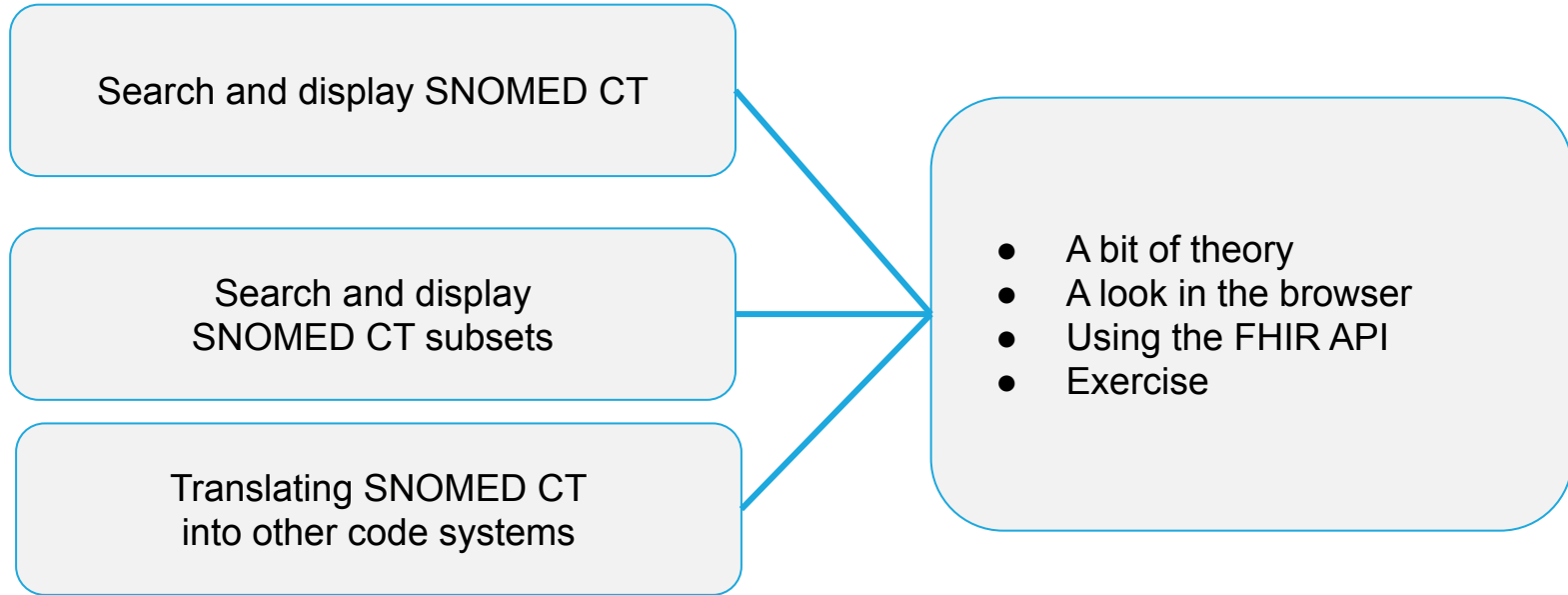




Logical Model of SNOMED CT Components



Accessing SNOMED CT Components and Derivatives



A medical professional in blue scrubs is shown from the chest down, holding a tablet. A digital overlay of glowing blue hexagons and icons (like a cross, a pill, and a stethoscope) is superimposed over the scene. The word "MEDICAL" is repeated in several hexagons. A semi-transparent dark blue rectangle is centered over the image, containing the text "Search and Display".

Search and Display

Concept

A clinical idea with a
unique identifier



id	effective Time	active	moduleId	definitionStatusId
22298006	20020131	1	900000000000207008	900000000000073002

Description

id	term	typeld	conceptId
751689013	Myocardial infarction disorder)	Fully specified name	22298006
37436014	Myocardial infarction	Synonym	22298006
37442013	Cardiac infarction	Synonym	22298006
37333015	Heart attack	Synonym	22298006
1784872019	MI - Myocardial infarction	Synonym	22298006
1784873012	Myocardial infarct	Synonym	22298006

22298006

adable term linked
to a concept

Exploring Concepts and Descriptions in the Browser

The screenshot displays the SNOMED CT Browser interface. The top navigation bar includes 'Release: International Edition', 'Version: 2023-02-28', 'Perspective: Full', and 'Feedback'. The main interface is divided into several sections:

- Search:** A search bar with the text 'breast cancer' and a dropdown menu showing '44 matches found in 0.619 seconds.' Below the search bar is a table of search results.
- Options:** A sidebar on the left with filters for 'Search: Prefix any order', 'Status: Active concepts only', 'Description type: All', 'Language Refsets', 'Group by concept', 'Filter results by Language' (set to 'english' with 44 results), and 'Filter results by Semantic'.
- Concept Details:** The main content area shows details for the concept 'Malignant neoplasm of breast (disorder)' (SCTID: 254837009). It includes a list of 'Parents' (Malignant neoplasm of thorax (disorder), Neoplasm of breast (disorder)), a list of 'Children' (Carcinoma of breast (disorder), Familial cancer of breast (disorder), Hormone receptor positive malignant neoplasm of breast (disorder)), and a list of 'Inferred' concepts (Malignant neoplasm of breast (disorder), Malignant tumor of breast, Breast cancer, CA - Breast cancer, Malignant neoplasm of breast, Malignant tumour of breast).

Search Results	
Breast cancer	Malignant neoplasm of breast (disorder)
Female breast cancer	Malignant neoplasm of female breast (disorder)
Fear of breast cancer	Fear of breast cancer (finding)
Breast cancer screening	Screening for malignant neoplasm of breast (procedure)
Suspected breast cancer	Suspected breast cancer (situation)
Familial	Familial cancer

Concept Details: Malignant neoplasm of breast (disorder)
SCTID: 254837009 | Malignant neoplasm of breast (disorder) |
en Malignant neoplasm of breast (disorder)
en Malignant tumor of breast
en Breast cancer
en CA - Breast cancer
en Malignant neoplasm of breast
en Malignant tumour of breast

Parents

- Malignant neoplasm of thorax (disorder)
- Neoplasm of breast (disorder)

Children (22)

- Carcinoma of breast (disorder)
- Familial cancer of breast (disorder)
- Hormone receptor positive malignant neoplasm of breast (disorder)

Inferred

- Malignant neoplasm of breast (disorder)
- Malignant tumor of breast
- Breast cancer
- CA - Breast cancer
- Malignant neoplasm of breast
- Malignant tumour of breast

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Introduction to HL7 FHIR *Terminology Module*



The FHIR **Terminology Module** is the part of the HL7 FHIR API specification for interacting with terminologies and classifications.

The main Terminology Resources are:

- **CodeSystem**
 - e.g. “SNOMED CT International Edition”, “LOINC” or “ICD-10”
- **ValueSet**
 - e.g. “Nursing Activities Subset” or “Clinical Procedures”
- **ConceptMap**
 - e.g. “SNOMED CT to ICD-10 Map” or “SNOMED CT to MedDRA Map”

Introduction to HL7 FHIR

Terminology Operations



A brief summary of the Operations that can be performed on the main Resources:

- **CodeSystem**
 - **\$lookup** - view the details of a single code / concept
 - **\$validate-code** - check that a code (and term) is within a specific CodeSystem
 - **\$subsumes** - test if there is an ancestor / descendant relationship between a pair of codes
- **ValueSet**
 - **\$expand** - list all, or search within, the codes in a ValueSet
 - **\$validate-code** - check that a code (and term) is within a specific ValueSet
- **ConceptMap**
 - **\$translate** - translate a code from one CodeSystem to a code within another CodeSystem

Technical Terms in SNOMED CT and FHIR

Relevant to search & display



SNOMED CT technical terms and their equivalents in FHIR:

SNOMED CT Term	HL7 FHIR Term
SNOMED CT Version	CodeSystem
Concept / Concept ID	Code
Description	Designation

SNOMED Concept Lookup with FHIR



Using CodeSystem \$lookup operation

<https://www.hl7.org/fhir/codesystem-operation-lookup.html>

```
HTTP GET [base]/CodeSystem/$lookup
      ?system=http://snomed.info/sct
      &code=22298006
```

- Here the **system** parameter uses the URI for SNOMED CT
- The **code** parameter is a SNOMED CT concept id
- When no **version** parameter is set a terminology server should use the International Edition

Caution: *Snowstorm goes beyond the FHIR specification for this operation and will automatically select the edition that contains the requested code.*

SNOMED Concept Lookup with FHIR



Using **CodeSystem \$lookup** with a specific Edition

```
HTTP GET [base]/CodeSystem/$lookup
      ?system=http://snomed.info/sct
      &version=http://snomed.info/sct/11000172109
      &code=22298006
```

- This example adds the **version** parameter with URI for the **SNOMED CT Belgian Edition**
 - 11000172109 is the belgian module identifier
- In the response we can see many descriptions from the International and Belgian Editions (see *valueString*)

SNOMED Concept Search with FHIR



Using ValueSet \$expand operation

<https://www.hl7.org/fhir/valueset-operation-expand.html>

```
HTTP GET [base]/ValueSet/$expand
      ?url=http://snomed.info/sct/11000172109?fhir_vs
      &displayLanguage=nl
      &filter=astma
```

- Here the *url* parameter is the implicit value set of all SNOMED CT concepts in the Belgian Edition
 - <https://www.hl7.org/fhir/snomedct.html#implicit>
- The *displayLanguage* parameter switches both the search and display language
- The *filter* parameter is the user search term

SNOMED Concept Search with FHIR



Using ValueSet \$expand operation ... continued

Additional Options

- **displayLanguage** parameter can be an ordered list of languages or language-dialects
 - Example: nl-be,fr-be,de,en-gb

Snowstorm Search Behaviour

- All descriptions within the requested language/dialect are used to find concepts
- Concepts are sorted by the shortest term that matched the user search
- The “display” term in the response is the preferred term in the requested language/dialect
- *The available dialect aliases are in Snowstorm configuration under “search.dialect.config”*

Exercise

Use the FHIR API to:

- Lookup the code “80146002”
 - How many designations / descriptions does it have?
- Filter the set of all concepts to find the code for “Myocardial infarction”
 - What other terms / languages can be used to find this concept using FHIR?
 - Why does the “display” term in the response sometimes not match the search term?



Lookup Content in SNOMED subsets with the FHIR API

SNOMED CT (Versioned Edition)

- ^ Clinical finding (finding)
- ▼ General finding of observation of patient (finding)
- ▼ General body state finding (finding)
- ▼ Vital signs finding (finding)
- ▼ ≡ Body temperature finding (finding)
 - Able to manage body temperature (finding)
 - ▼ Abnormal body temperature (finding)
 - > ≡ Body temperature above reference range (finding)
 - > ≡ Body temperature below reference range (finding)
 - > Finding of measures of body temperature (finding)
 - > Finding of temperature of skin (finding)
 - Hysterical fever (finding)
 - Normothermic at conclusion of immediate postoperative period (finding)
 - State of cold preservation (finding)
 - > Temperature change at anatomical site (finding)
 - Temperature normal (finding)

Subset

50177009

846676008

87273009

All surgical
procedures

All disorders
with a
morphology of
inflammation



Subset

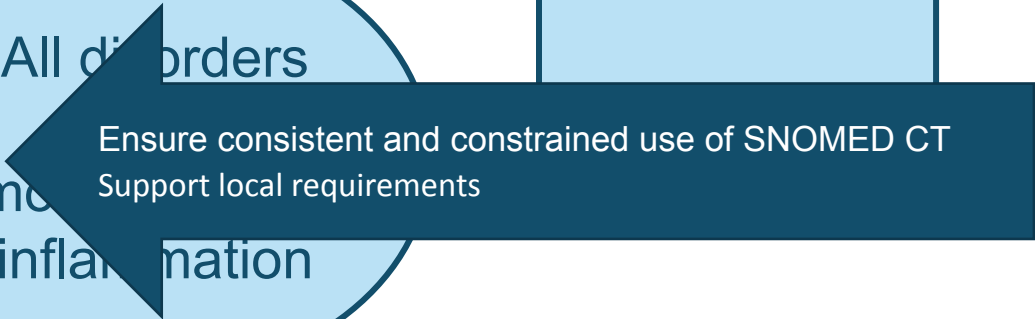
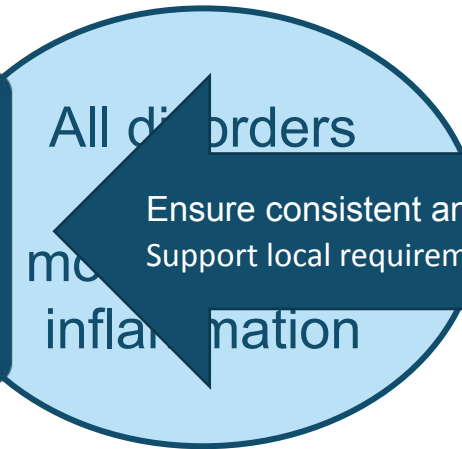
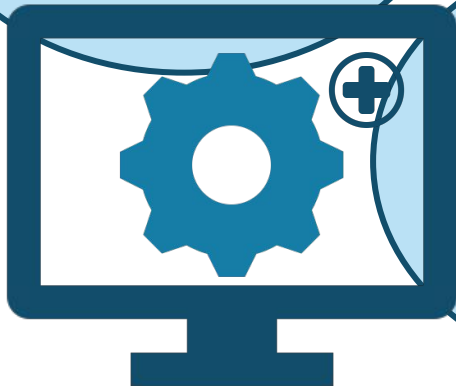
50177009

846676008

87273009



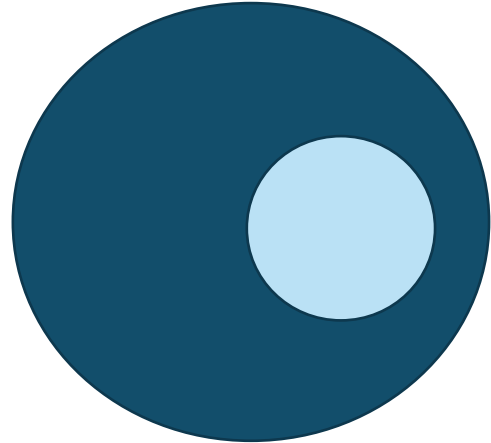
SNOMED CT Subsets



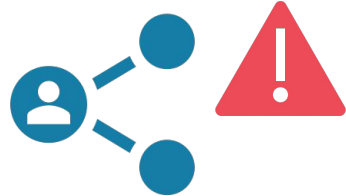
Subset Use Cases



Constrain search and data entry



Specify value sets used for communication, reporting and decision support



Specify groups used for retrieval and analytics

Subsets in SNOMED CT



A simple list of identifiers can represent a subset

A subset needs to be identified and named

Subsets may be represented as a reference set

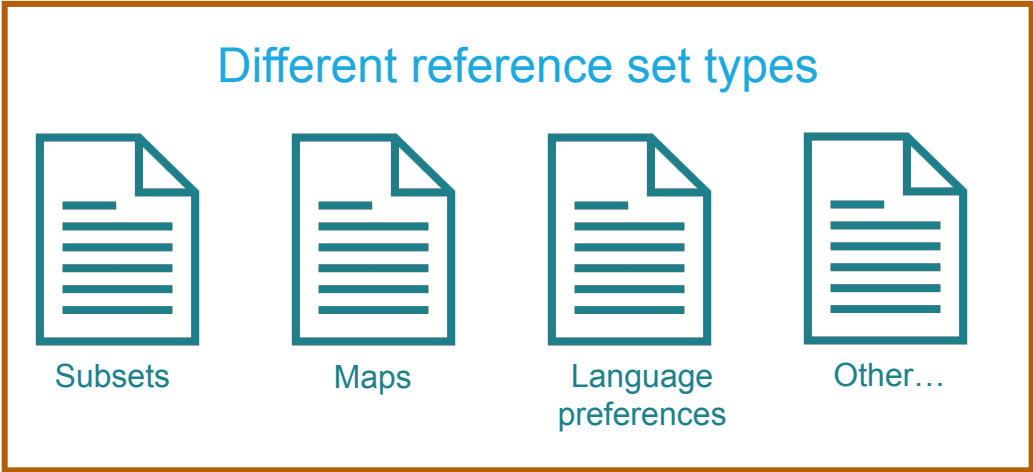
- The subset is identified by the refsetId
- The refsetId refers to a concept
- Descriptions of that concept name the reference set
- A supertype of that concept refers to the reference set type
(|simple type reference set|)



Distribution Format - Reference Sets

Standard file format for distributing sets of references to SNOMED CT components

Reference sets



Refset Use Cases

SNOMED CT *International Edition*

Concepts Descriptions Relationships **Reference sets**



Examples

- Term preferences (UK and US language)
- Replacements for inactive concepts
- Lateralizable body structures
- Maps between SNOMED CT and other standard code systems

Concepts Descriptions Relationships Reference sets



Simple Type Refset Example

|Simple type reference set|

Identification, versioning and modularization information	id	UUID
	effectiveTime	Time
	active	Boolean
	moduleId	SCTID
An identifier of the reference set	refsetId	SCTID
References a subset member	referencedComponentId	SCTID

The **refsetId** refers to a concept which is a descendant of the concept 446609009

|Simple type reference set|

The **referencedComponentId** refers to a component which is a member of the subset

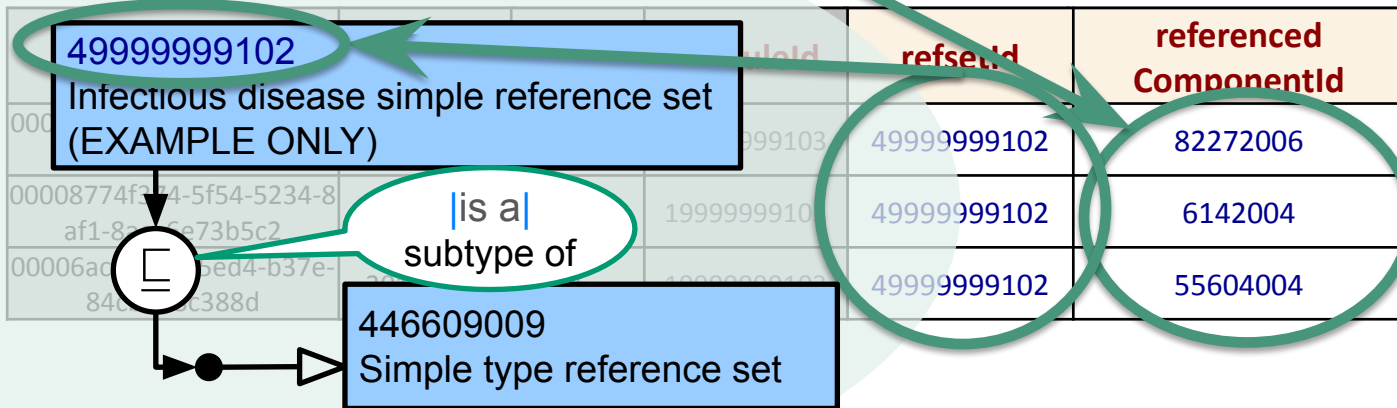
Simple Type Refset Example

Subset



Concept Id	Preferred Term
82272006	Common cold
6142004	Influenza
55604004	Avian influenza

Reference Set



Browser

The screenshot displays the SNOMED CT Browser interface. The top navigation bar includes the title 'SNOMED CT Browser', release information ('Release: International Edition'), version ('Version: 2023-02-28'), and perspective ('Perspective: Full'). Below this, there are tabs for 'Taxonomy' and 'Concept Details'. The 'Taxonomy' tab is active, showing a tree view of reference sets. The 'Simple type reference set' is selected, and its details are shown in the 'Concept Details' tab. The 'Concept Details' tab includes a 'Summary' section with 'Stated' and 'Inferred' buttons, a 'Parents' section showing the 'Reference set (foundation metadata concept)', a 'Children (13)' section listing various reference sets, and a 'No attributes' section. The footer contains copyright information and version 'v3.31.0'.

Technical Terms in SNOMED CT and FHIR

Relevant to subsets

Subset is the generic term, simply meaning a smaller set of things.

SNOMED CT technical terms and their equivalents in FHIR:

SNOMED CT Term	HL7 FHIR Term
Simple Reference set / Refset	ValueSet



Search within Refsets with FHIR



Using ValueSet \$expand operation

<https://www.hl7.org/fhir/valueset-operation-expand.html>

```
HTTP GET [base]/ValueSet/$expand
?url=http://snomed.info/sct/11000172109?fhir_vs=refset/50831000172102
&displayLanguage=nl,fr,en
&filter=virus
```

- The **url** is an implicit value set containing the “Belgian subset for Vaccination” refset from the SNOMED CT Belgian Edition
- **displayLanguage** includes the user’s preferred language and fallback options
- **filter** is a search term

Search within Subsets with FHIR



Using ValueSet \$expand operation

Snowstorm Search Behaviour Continued

- Search terms may use multiple word prefixes, in any order
 - For example to find the drug “**vaccin met enkel antigeen van hepatitis A-virus**”
A good search term could be: “**vac hep a-**”
 - Users who learn this type less and find faster
 - This is also a great way to avoid spelling mismatch issues

Exercise

Use the FHIR API to

1. Count the total number of codes in the **Belgian subset for Vaccination**
2. Filter the **Belgian subset for Vaccination** to find a vaccination for Measles, Mumps and Rubella
3. Filter the “Belgian GP subset” to find “Family history of stroke”
 - What would be a good short prefix search for this in English
 - How about a prefix search in French?
 - Are character accents required to get a match?

Use Maps with the FHIR API



Background

Link SNOMED CT to other code systems

Integrating local codes and SNOMED CT

- Using a library of clinical phrases as an interface terminology
- Communication of clinical data between organizations
- Migration to SNOMED CT

Integrating statistical classification systems and SNOMED CT

- Statistical analysis of SNOMED CT encoded data
- Meaning-based analysis of statistical data



Map Reference Sets

- Simple Map from SNOMED CT Reference Set
- Simple Map to SNOMED CT Reference Set
- Complex and Extended Map from SNOMED CT Reference Sets
- Map to SNOMED CT with Correlation and Origin Reference Set
- Code to Expression Reference Set
- Simple map with correlation from SNOMED CT type reference set
- Simple map with correlation to SNOMED CT type reference set
- Simple map with correlation from SNOMED CT to SNOMED CT type reference set





Simple Map Type - Purpose

Represent one-to-one maps between SNOMED CT concepts and values in another code system

Reference Set types

- 1187636009
|Simple map to SNOMED CT type reference set|
- 9000000000000496009
|Simple map from SNOMED CT type reference set|

Data Structure

Identification, versioning and modularization information	id effectiveTime active moduleId	UUID Time Boolean SCTID
An identifier for the reference set < Simple map from SNOMED CT type reference set	refsetId	SCTID
SNOMED CT concept being mapped from	referencedComponentId	SCTID
The equivalent code in the other code system	mapTarget	String
An identifier for the reference set < Simple map to SNOMED CT type reference set	refsetId	SCTID
SNOMED CT concept being mapped from	referencedComponentId	SCTID
The equivalent code in the other code system	mapSource	String

Simple map to SNOMED CT type reference set (foundation metadata concept)

- Reference set (foundation metadata concept)
 - Simple map to SNOMED CT type reference set (foundation metadata concept)
 - CTV3 to SNOMED CT simple map reference set (foundation metadata concept)
 - European Directorate for the Quality of Medicines & HealthCare to SNOMED CT simple map reference set (foundation metadata concept)
 - International Classification for Nursing Practice diagnoses to SNOMED CT simple map reference set (foundation metadata concept)
 - International Classification for Nursing Practice interventions to SNOMED CT simple map reference set (foundation metadata concept)
 - MedDRA to SNOMED CT simple map reference set (foundation metadata concept)
 - SNOMED RT to SNOMED CT simple map (foundation metadata concept)

Simple map from SNOMED CT type reference set (foundation metadata concept)

- Reference set (foundation metadata concept)
 - Simple map from SNOMED CT type reference set (foundation metadata concept)
 - SNOMED CT to European Directorate for the Quality of Medicines & HealthCare simple map reference set (foundation metadata concept)
 - SNOMED CT to GMDN simple map reference set (foundation metadata concept)
 - SNOMED CT to ICD-O simple map reference set (foundation metadata concept)
 - SNOMED CT to MedDRA simple map reference set (foundation metadata concept)
 - SNOMED CT to Orphanet simple map reference set (foundation metadata concept)
 - SNOMED CT to Unified Code for Units of Measure simple map reference set (foundation metadata concept)

| SNOMED CT to ICD-O simple map reference set |

...	refsetId	referencedComponentId	mapTarget
...	446608001	2142002	8721/3
...	446608001	2227007	8370/3
...	446608001	21326004	8045/3
...	446608001	27313007	8857/0
...	446608001	32913002	8510/3
...	446608001	41607009	8312/3

| SNOMED CT to ICD-O simple map reference set |

...	refsetId	referencedComponentId	mapTarget
...	SNOMED CT to ICD-O simple map reference set	Nodular melanoma (morphologic abnormality)	Nodular melanoma
...	SNOMED CT to ICD-O simple map reference set	Adrenal cortical carcinoma (morphologic abnormality)	Adrenal cortical carcinoma
...	SNOMED CT to ICD-O simple map reference set	Combined small cell carcinoma (morphologic abnormality)	Combined small cell carcinoma
...	SNOMED CT to ICD-O simple map reference set	Spindle cell lipoma (morphologic abnormality)	Spindle cell lipoma
...	SNOMED CT to ICD-O simple map reference set	Medullary carcinoma (morphologic abnormality)	Medullary carcinoma, NOS
...	SNOMED CT to ICD-O simple map reference set	Renal cell carcinoma (morphologic abnormality)	Renal cell carcinoma, NOS



Complex and Extended Map from SNOMED CT - Purpose

Represents maps where each SNOMED CT concept may map to one or more codes in the target scheme, e.g.

- One to many maps
- Many to one maps
- Many to many maps

Resolution of the choices may involve

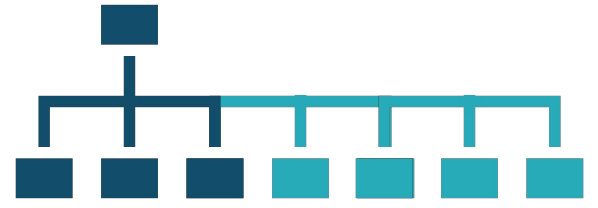
- Manual selection supported by human readable advice
- Automated selection based on machine readable rules
- A combination of automated processing with manual confirmation



Complex and Extended Map from SNOMED CT – Data Structure

|Complex map from SNOMED CT
type reference set|

|Simple map from SNOMED CT
type reference set|



Enables representation of
map rules, map advice,
different map types, etc.

Complex map from SNOMED CT

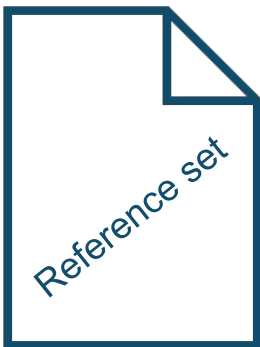
- ^ ● Reference set
 - v ● Complex map from SNOMED CT
 - ● SNOMED CT to ICD-9-CM equivalence complex map
 - ● SNOMED CT to ICD-9-CM reimbursement complex map
 - ● SNOMED CT to ICPC-2 complex map

Extended map from SNOMED CT

- ^ ● Reference set
 - v ● Extended map from SNOMED CT
 - ● SNOMED CT to ICD-10 extended map



[SNOMED CT to ICD-10 extended map]



SNOMED CT

- 14189004 | Measles |
- 111873003 | Measles without complication |
- 240483006 | Atypical measles |

ICD-10

B05.9
Measles without complication

|SNOMED CT to ICD-10 extended map|



SNOMED CT

10674911000119108
|Otitis media caused by Influenza A virus|

ICD-10

J10.8
Influenza with other
manifestations, seasonal influenza
virus identified

H67.1 Otitis media in viral diseases
classified elsewhere

Map advice:
THIS CODE MAY BE USED IN THE
PRIMARY POSITION WHEN THE
MANIFESTATION IS THE PRIMARY FOCUS
OF CARE

|SNOMED CT to ICD-10 extended map|



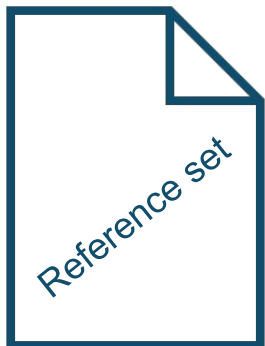
SNOMED CT
8619003 |Infertile|



ICD-10

N97.9 Female infertility, unspecified

N46 Male infertility



SNOMED CT

10674911000119108
|Otitis media caused by Influenza A virus|

10674911000119108
|Otitis media caused by Influenza A virus|

Map advice:
THIS CODE....

8619003 |Infertile|

ICD-10

J10.8
Influenza with other manifestations,
seasonal influenza virus identified

H67.1 Otitis media in viral diseases
classified elsewhere

J10.8
Influenza with other manifestations,
seasonal influenza virus identified

H67.1 Otitis media in viral diseases
classified elsewhere

N97.9 Female infertility, unspecified

N46 Male infertility



dev-browser.ihtsdotools.org/?perspective=full&conceptid=90000000000455006&edition=MAIN:2023-01-31&release=&languages=en

SNOMED CT Browser Release: International Edition Version: 2023-01-31 Perspective: Full Feedback About US

Taxonomy Search Favorites Refset

Search Options

Search: Prefix any order
 Status: Active concepts only
 Description type: All
 Language Refsets
 Group by concept

Type at least 3 characters Example: shou fra
 map reference set
 25 matches found in 0.585 seconds.

<input type="radio"/> ICPC-2 map category reference set	ICPC-2 map category reference set (foundation metadata concept)
<input type="radio"/> LOINC part to SNOMED CT map reference set	LOINC part to SNOMED CT map reference set (foundation metadata concept)
<input type="radio"/> Simple map to SNOMED CT type reference set	Simple map to SNOMED CT type reference set (foundation metadata concept)
<input type="radio"/> SNOMED CT to GMDN simple map reference set	SNOMED CT to GMDN simple map reference set (foundation metadata concept)
<input type="radio"/> CTV3 to SNOMED CT simple map reference set	CTV3 to SNOMED CT simple map reference set (foundation metadata concept)
<input type="radio"/> SNOMED CT to ICD-O simple map reference set	SNOMED CT to ICD-O simple map reference set (foundation metadata concept)
<input type="radio"/> Simple map from	Simple map from SNOMED

Filter results by Language: english (25)

Filter results by Semantic Tag: core metadata concept (1) foundation metadata concept (24)

Filter results by Module: SNOMED CT model component (25)

Concept Details Expression Constraint Queries

Summary Details Diagram Expression Refsets Members History References Stated Inferred

Parents

- Foundation metadata concept (foundation metadata concept)

Reference set (foundation metadata concept) ☆ 🔍
 SCTID: 90000000000455006
 90000000000455006 | Reference set (foundation metadata concept) |
 en Reference set (foundation metadata concept)
 en Reference set

No attributes

Children (27)

- Annotation type reference set (foundation metadata concept)
- Association type reference set (foundation metadata concept)
- Attribute value type reference set (foundation metadata concept)
- Code to expression type reference set (foundation metadata concept)
- Complex map from SNOMED CT type reference set (foundation metadata concept)
- Concept model reference set (foundation metadata concept)
- Description format reference set (foundation metadata concept)
- Expansion history reference set (foundation metadata concept)
- Extended map from SNOMED CT type reference set (foundation metadata concept)
- Intensional definition reference set (foundation metadata concept)
- Language type reference set (foundation metadata concept)

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Map to other CodeSystems with FHIR



Using **ConceptMap \$translate** operation

<https://www.hl7.org/fhir/conceptmap-operation-translate.html>

```
HTTP GET [base]/ConceptMap/$translate
      ?code=254153009
      &system=http://snomed.info/sct
      &version=http://snomed.info/sct/11000172109
      &targetsystem=http://hl7.org/fhir/sid/icd-10
```

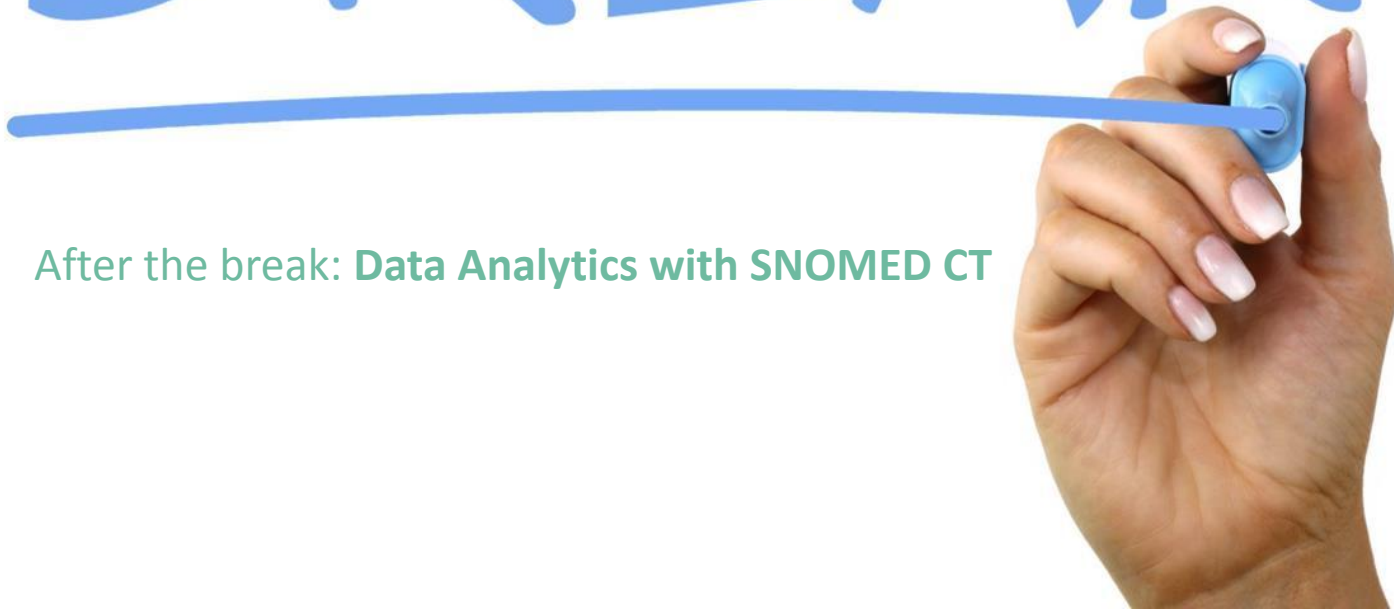
- **code** is the concept to translate
- **system** is the source CodeSystem, in this case SNOMED CT
- **version** selects the latest available version of the SNOMED CT Belgian Edition
- **targetsystem** is the uri of the CodeSystem to translate the code to, ICD-10

Exercise


Use the FHIR API to

1. Translate the SNOMED CT concept 74400008 |Appendicitis| to ICD-10
2. Translate 8619003 |Infertile| to ICD-10
 - How many possible ICD-10 codes are there?

BREAK



After the break: **Data Analytics with SNOMED CT**

A medical professional in blue scrubs is shown from the chest down, holding a tablet. The image is overlaid with a complex digital graphic in shades of blue and white. The graphic includes a globe, a padlock with a cross, hexagonal shapes with the word "MEDICAL", and various data points and lines. The overall theme is medical data analytics.

Data Analytics with SNOMED CT

Query SNOMED CT with the FHIR API

Search using ECL with FHIR



Using ValueSet \$expand operation

<https://www.hl7.org/fhir/valueset-operation-expand.html>

```
HTTP GET [base]/ValueSet/$expand
?url=http://snomed.info/sct/11000172109?fhir_vs=ecl/<71388002
&displayLanguage=nl,fr,en
&filter=virus
```

- This *url* is another type of “implicit ValueSet”, using the ECL query language
- It selects all concepts of type “71388002 |Procedure|” in the SNOMED CT Belgian Edition

Search using ECL with FHIR



\$expand combining a Refset and ECL constraint

```
HTTP GET [base]/ValueSet/$expand
?url=http://snomed.info/sct/11000172109?fhir_vs=ecl/^721000172106 AND
<71388002
```

- This example uses ECL to combine a **refset** and a **hierarchical** constraint
- It filters the “721000172106 |Belgian GP subset|” by concepts of type “71388002 |Procedure|” in the SNOMED CT Belgian Edition
- **Note: URLs containing ECL may require URL encoding, particularly the ^ char (%5E)**

Search using ECL with FHIR



\$expand with a more complex ECL example

This is the ECL to select any **surgical procedure** with a **procedure site** of some **heart structure**

```
< 387713003 |Surgical procedure (procedure)| :
```

```
<< 363704007 |Procedure site (attribute)| = << 80891009 |Heart structure (body structure)|
```

```
HTTP GET [base]/ValueSet/$expand
?url=http://snomed.info/sct/11000172109?fhir_vs=ecl/< 387713003 |Surgical
procedure (procedure)| : << 363704007 |Procedure site (attribute)| = <<
80891009 |Heart structure (body structure)|
&filter=transplant
```

The FHIR example is filtered by the term “transplant”.

.. there are many options for flexible or context based search!

Exercise

Use FHIR to:

1. Search for all Disorders within the **Belgian GP subset**
2. Search for Disorders within the **Belgian GP subset** that have “brain” in the name
3. List the concepts within the **Belgian subset for Vaccination** that have an active ingredient of **Antigen of Measles morbillivirus** without using a term filter
 - This one is harder, use an ECL refinement, see <http://snomed.org/ecl>

A healthcare professional in blue scrubs is holding a tablet. The background features a futuristic digital overlay with a globe, hexagonal patterns, and various medical icons such as a cross, a pill bottle, and a stethoscope. The word "MEDICAL" is repeated in several places within the overlay. A semi-transparent dark blue rectangle is centered over the image, containing the text "Wrap-up".

Wrap-up

SNOMED International Tools and Resources

- Mapping - <https://mapping.ihtsdotools.org> & <https://snap.snomedtools.org/>
- SNOMED CT Browser - <https://browser.ihtsdotools.org>
- MRCM Browser (relevant to writing ECL) - <https://browser.ihtsdotools.org/mrcm>
- Health Data Analytics Demonstrator - https://youtu.be/hmB3VMu_74w
- Reference set & translation tool - <https://refset.ihtsdotools.org>
- Release service
- MLDS - <https://mlds.ihtsdotools.org/de>

Links to Further Information

SNOMED International Training & Terminology Services Certification Course

- <https://courses.ihtsdotools.org/>

SNOMED International Implementation Support

- <http://snomed.org/support>

Open Source Repositories

- <https://github.com/IHTSDO>

Getting in touch

- Technical
 - techsupport@snomed.org
- General
 - info@snomed.org



Questions?

The logo consists of a solid blue square with the text "SNOMED International" in white, sans-serif font. "SNOMED" is on the top line and "International" is on the bottom line.

SNOMED
International



THANK YOU

The logo consists of a solid blue square. Inside the square, the word "SNOMED" is written in a bold, white, sans-serif font. Below "SNOMED", the word "International" is written in a smaller, white, sans-serif font.

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