

SNOMED Clinical Terms


SNOMED International

- **Most comprehensive multilingual clinical terminology**
 - Designed on experience
 - Logic based design
 - Quality assured clinically relevant content
 - Customisable
 - Extensions, reference sets including subsets and mapping, language preferences
 - Enables analysis, decision support and knowledge linkage


SNOMED CT

A blue globe with a blue arrow pointing upwards and to the right, with the text 'SNOMED CT' written across it.


SNOMED Clinical Terms



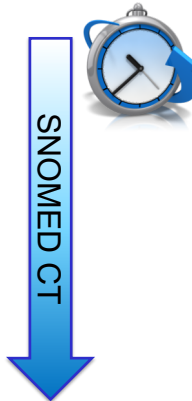
- Most comprehensive multilingual clinical terminology
 - **Designed on experience**
 - Logic based design
 - Quality assured clinically relevant content
 - Customisable
 - Extensions, reference sets including subsets and mapping, language preferences
 - Enables analysis, decision support and knowledge linkage



SNOMED CT History



- First released in 2002
 - By the College of American Pathologists (CAP)
 - Original Content from
 - Earlier versions of SNOMED (CAP)
 - Read Codes (UK NHS)
- Design based on
 - Identified user requirements
 - Practical experience
 - Scientific principles established in peer reviewed publications
- Acquired by IHTSDO (SNOMED International) for the public good in 2007



A Purpose Built Terminology



- The requirements for effective representation of clinical ideas are described in Dr James Cimino's widely referenced, peer acclaimed 1998 paper
- "Desiderata for controlled clinical vocabularies in the twenty-first century"

SNOMED CT was designed to address these requirements

- 1 Content, Content, and Content
- 2 Concept Orientation
- 3 Concept Permanence
- 4 Non-semantic Concept Identifier
- 5 Polyhierarchy
- 6 Formal Definitions
- 7 Reject "Not Elsewhere Classified"
- 8 Multiple Granularities
- 9 Multiple Consistent Views
- 10 Representing Context
- 11 Evolve Gracefully
- 12 Recognize Redundancy

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3415631/>


SNOMED Clinical Terms



- Most comprehensive multilingual clinical terminology
 - Designed on experience
 - **Logic based design**
 - Quality assured clinically relevant content
 - Customisable
 - Extensions, reference sets including subsets and mapping, language preferences
 - Enables analysis, decision support and knowledge linkage




SNOMED CT - Not Just a Code System




- Logical relationships between concepts supports meaning-based processing




SNOMED Clinical Terms



- Most comprehensive multilingual clinical terminology
 - Designed on experience
 - Logic based design
 - **Quality assured clinically relevant content**
 - Customisable
 - Extensions, reference sets including subsets and mapping, language preferences
 - Enables analysis, decision support and knowledge linkage




Broad Scope of Content




Updated to changes in medical knowledge


SNOMED Clinical Terms




- Various levels of detail
 - ▲ Myocardial infarction (disorder)
 - ▲ Acute ischemic heart disease (disorder)
 - ▼ Acute myocardial infarction (disorder)
 - ▼ Acute myocardial infarction due to right coronary artery occlusion (disorder)
 - Acute ST segment elevation myocardial infarction due to right coronary artery occlusion (disorder)
- Quality approach to content
 - Expert SNOMED International personnel
 - Transparency through guidance
 - Automated rules validation, pattern evaluation
 - Collaboration




SNOMED Clinical Terms




- Most comprehensive multilingual clinical terminology
 - Designed on experience
 - Logic based design
 - Quality assured clinically relevant content
 - **Customisable**
 - Extensions, reference sets including subsets and mapping, language preferences
 - Enables analysis, decision support and knowledge linkage



SNOMED Clinical Terms



- Most comprehensive multilingual clinical terminology
 - Designed on experience
 - Logic based design
 - Quality assured clinically relevant content
 - Customisable
 - Extensions, reference sets including subsets and mapping, language preferences
 - **Enables analysis, decision support and knowledge linkage**





SNOMED International

- An international not-for-profit organisation
 - Owned by Members
 - Governed by General Assembly of its Members
 - Funded by members based on national wealth
- Maintains and delivers SNOMED CT
 - Free use in Member territories
 - Low cost licenses for institutions in other countries





Global Patient Set (GPS) released

- Managed collection of existing SNOMED CT subsets
- Free for all users to support cross-border interoperability
- Includes
 - Unique identifiers
 - Fully specified names
 - Preferred terms in international English
 - Active/inactive status flags



SNOMED International Support

- Website, communications and document library
- Business meetings and Expo
- Collaboration environment
- Advisory and project groups
- SNOMED CT education
- Content request service (CRS)
- Customer support management
- Vendor and clinical engagement
- Standards collaboration



SNOMED International Tooling Support



- SNOMED CT tooling
 - SNOMED CT browser, mapping tool, refset management and translation tool, authoring platform, CRS
- Open source software development
 - e.g. Snowstorm - scalable SNOMED CT terminology server
- SNOMED International managed service



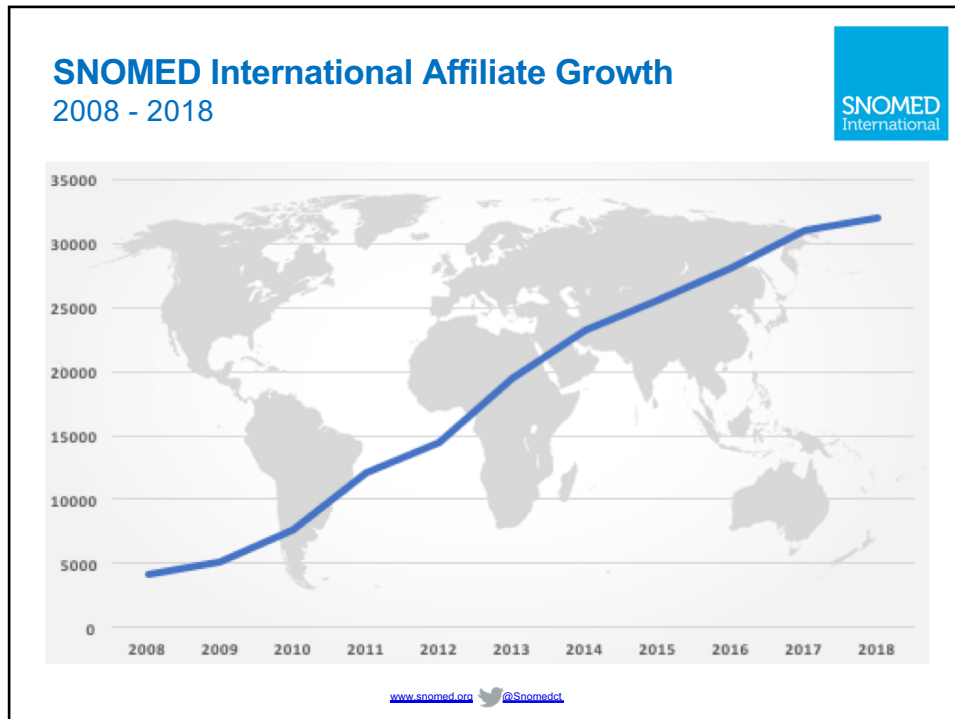
GitHub

<https://github.com/IHTSDO>

SNOMED International Membership Growth 2007 - 2019




www.snomed.org @Snomedict




SNOMED International Members (April 2019)

Argentina	Denmark	Lithuania	Singapore
Austria	Estonia	Luxembourg	Slovak Republic
Australia	Finland	Malaysia	Slovenia
Belgium	Hong Kong	Malta	Spain
Brazil	Iceland	The Netherlands	Sweden
Brunei	India	New Zealand	Switzerland
Canada	Ireland	Norway	United Kingdom
Chile	Israel	Poland	USA
Cyprus	Jordan	Portugal	Uruguay
Czech Republic	Kazakhstan	Saudi Arabia	

SNOMED International Membership Benefits



- Free use of SNOMED CT and related products
- Membership of General Assembly
- Ability to create national extension and translation
- Access to global community of member countries
- Free new member induction
- Member education benefits
 - FREE Foundation Course for all students
 - Membership discount (50%) for all education courses
 - NRC access to 1 FREE enrolment in each course per year
 - NRC access to 1 FREE enrolment in each certification per year

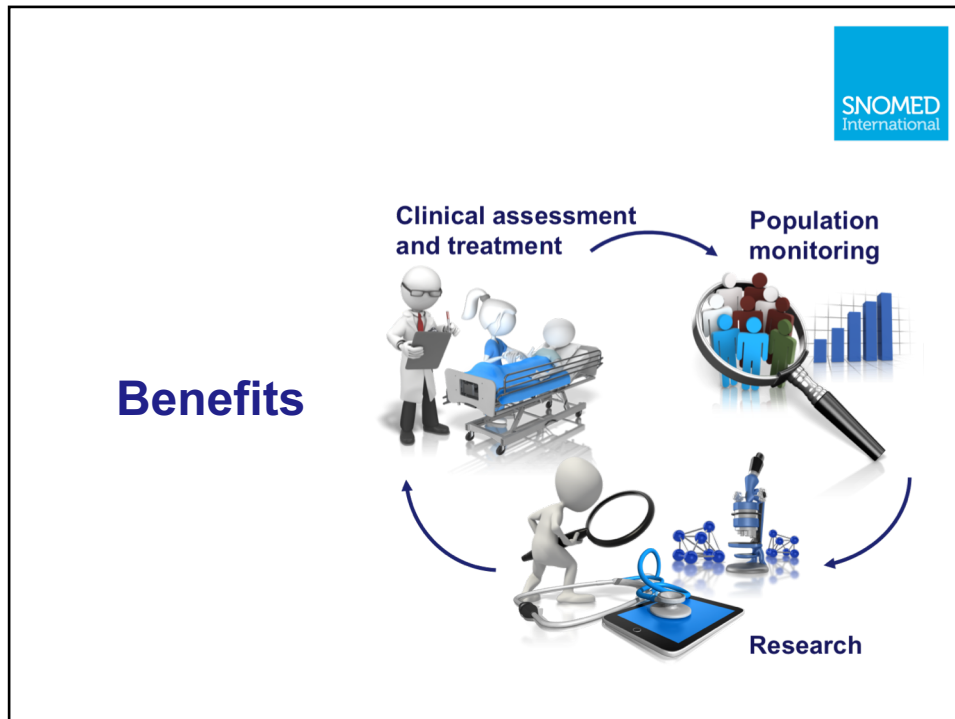


Our Vision



By 2025 clinical terminologies will be used globally, which will result in better health and patient outcomes, supported by one language of health





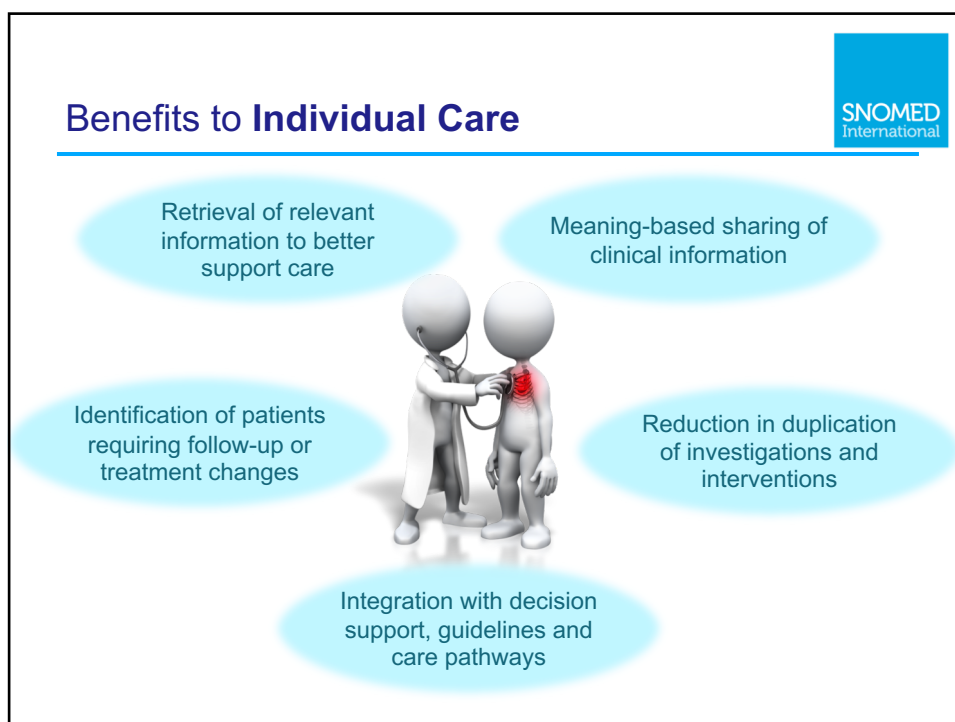
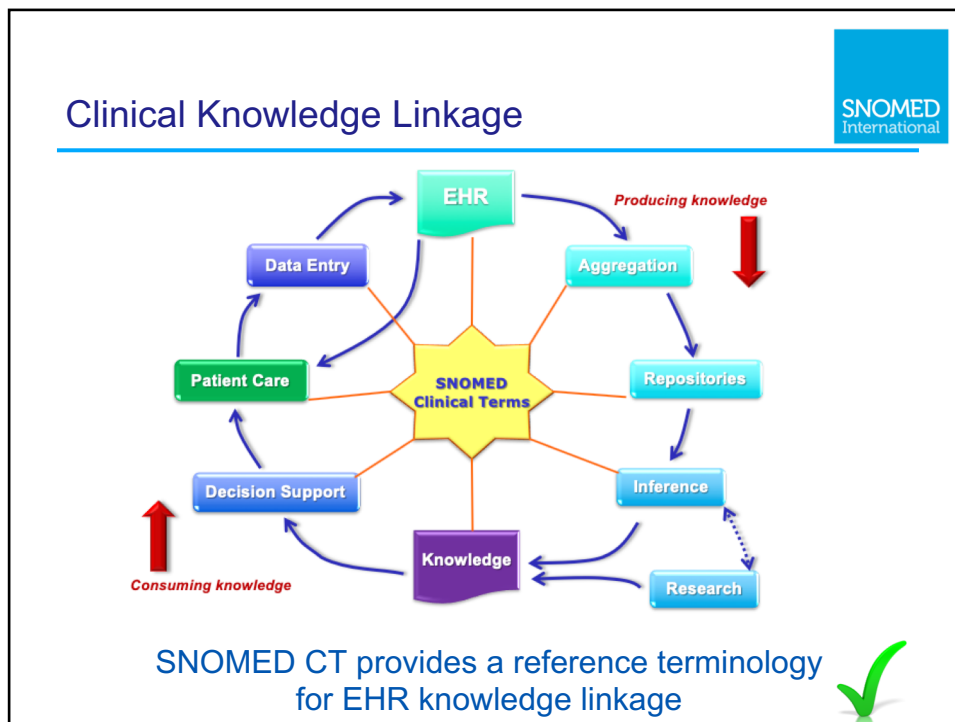
Meaning View of Health Records

SNOMED International


- SNOMED CT provides information about
 - Significant facts in oceans of data
 - The immediate problems and risks for a patient
 - Outcomes of different types of clinical treatment
 - Enhances decision making
- Computation of the current situation requires
 - Consistent processable representation of clinical information

SNOMED CT is designed to support meaning-based processing of clinical information in health records

The complex block features a 3D character of a doctor in a white coat and blue tie, standing with one hand on their chin in a thoughtful pose. A large green checkmark is positioned at the bottom right of the text area.




Benefits to Population Care




Epidemiological monitoring and reporting

Audit of clinical care and service delivery




Systems that measure and maximize the delivery of cost-effective treatments and minimize the risk of costly errors

Benefits to Clinical Research



Identification of clinical trial candidates




Clinical care delivery planning


Planning for future service delivery provision

Research into the effectiveness of different approaches to disease management

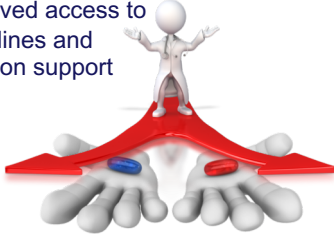
Benefits of SNOMED CT Implementation




A solid foundation for clinical records




Improved access to guidelines and decision support



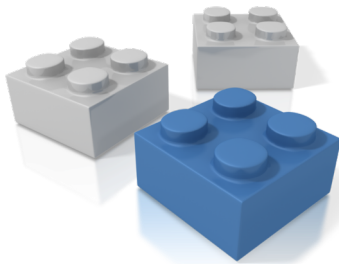

Interoperable information and knowledge resources



Improved Clinical and Business Intelligence



SNOMED CT Features



Concept

A clinical idea with a unique identifier

SNOMED International

22298006

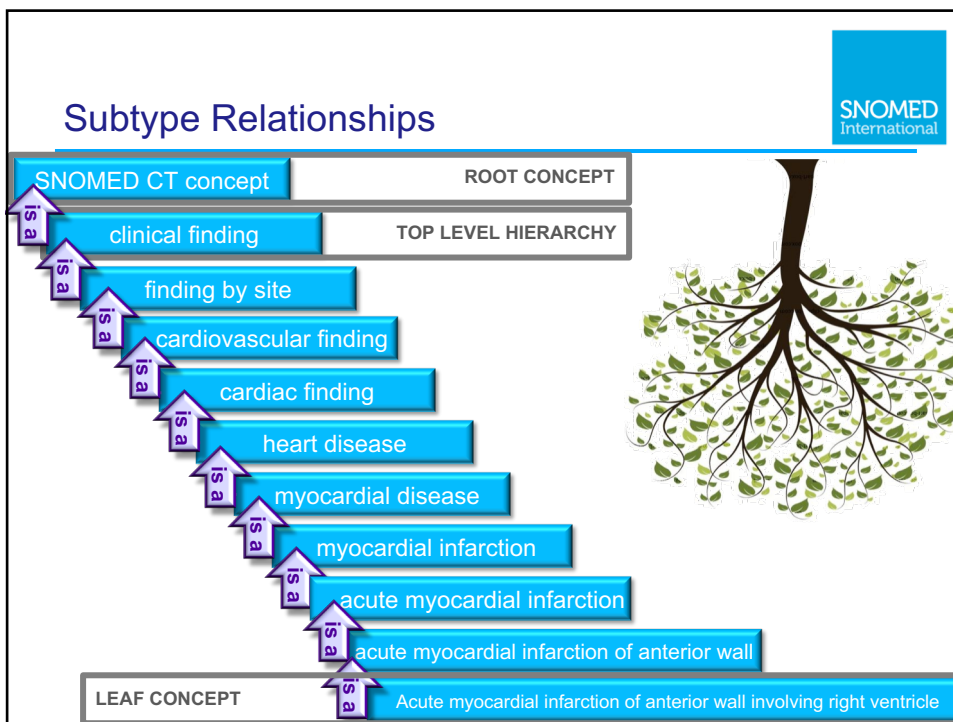
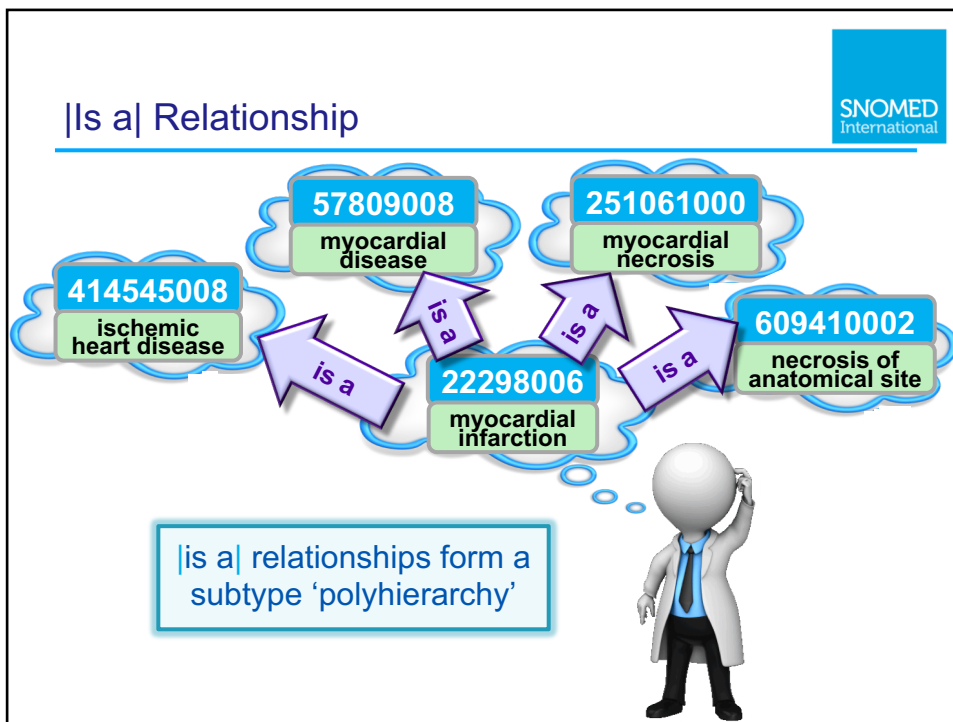
Description

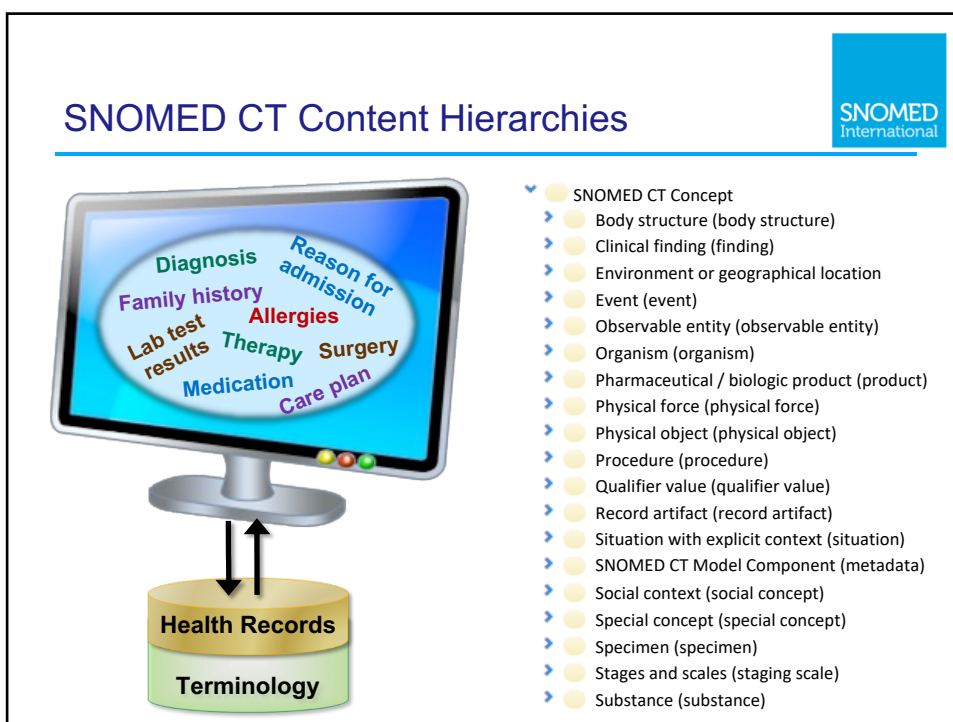
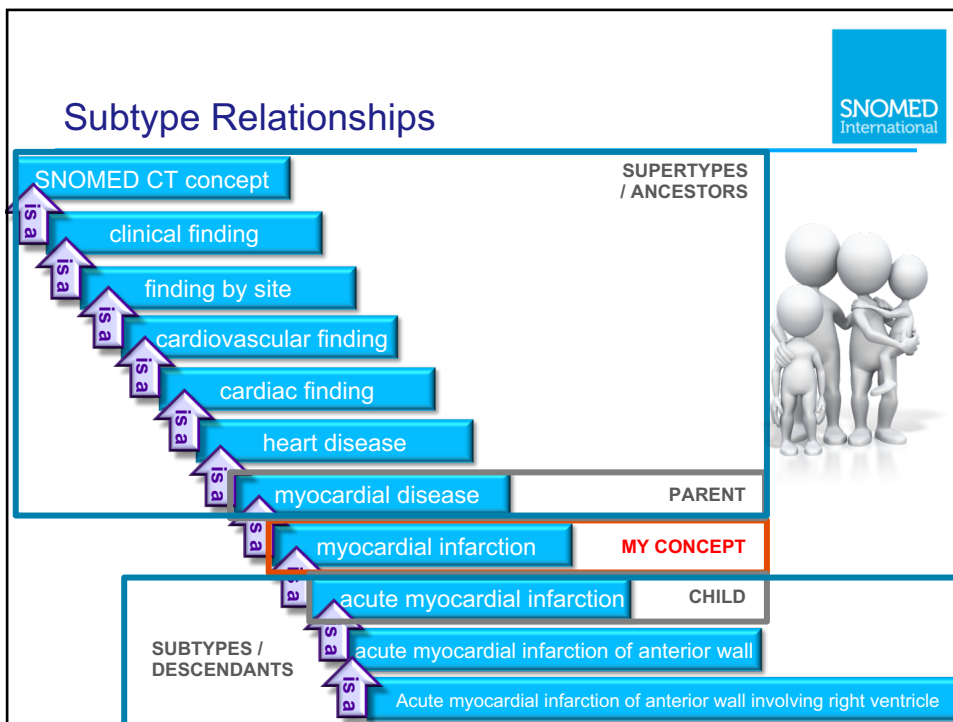
FSN	myocardial infarction (disorder)	751689013
SYN	myocardial infarction	37436014
SYN	cardiac infarction	37442013
SYN	heart attack	37333015
SYN	MI – Myocardial infarction	17848
SYN	myocardial infarct	17849

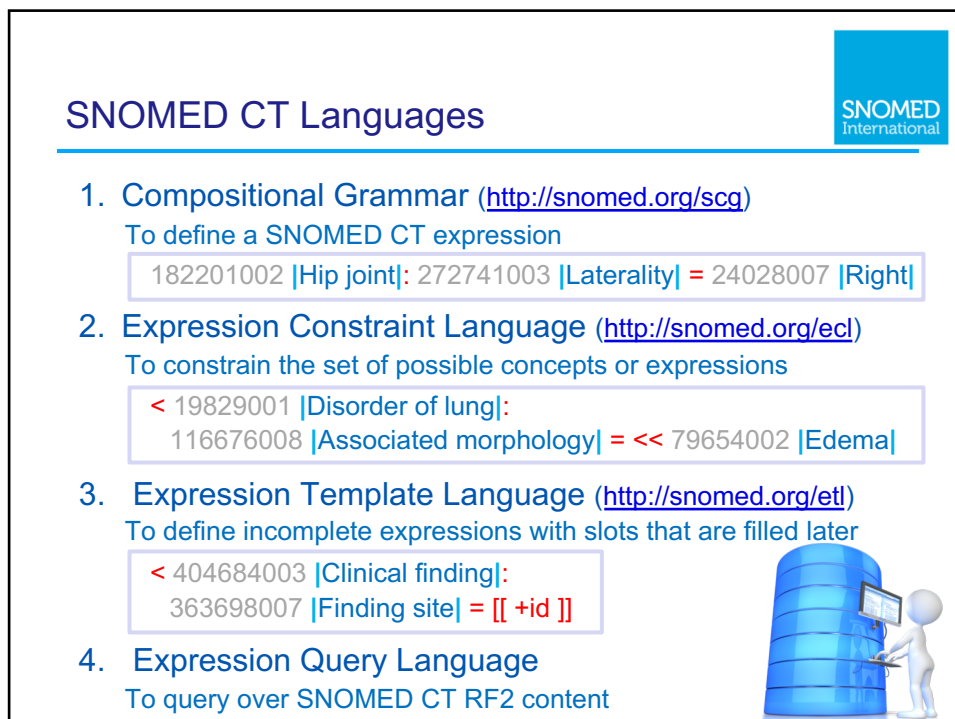
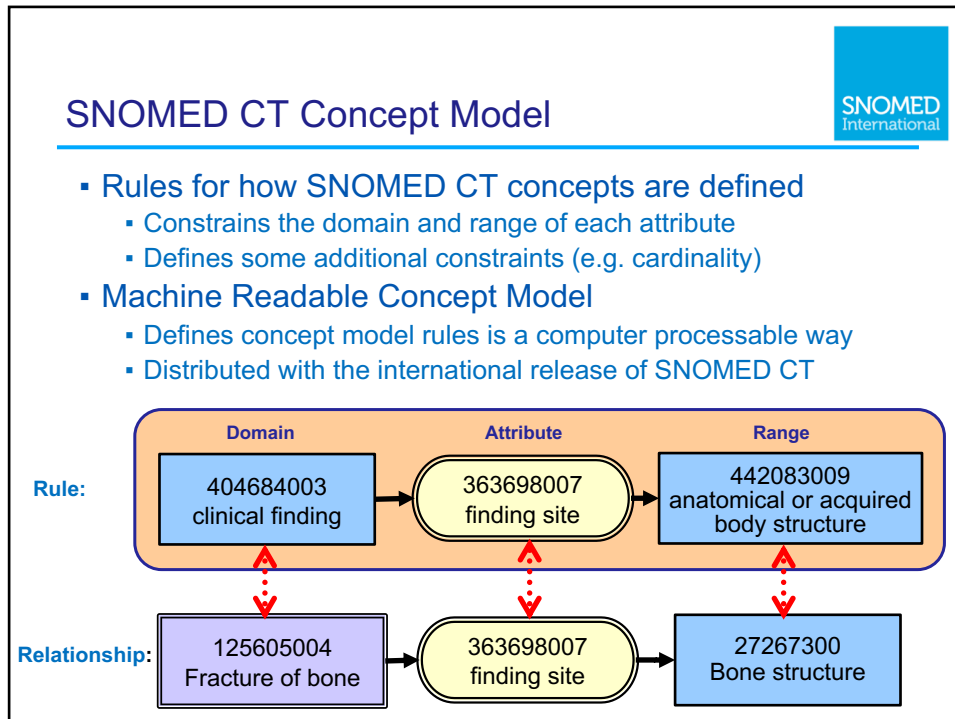
SNOMED International


22298006

Human-readable term linked to a concept

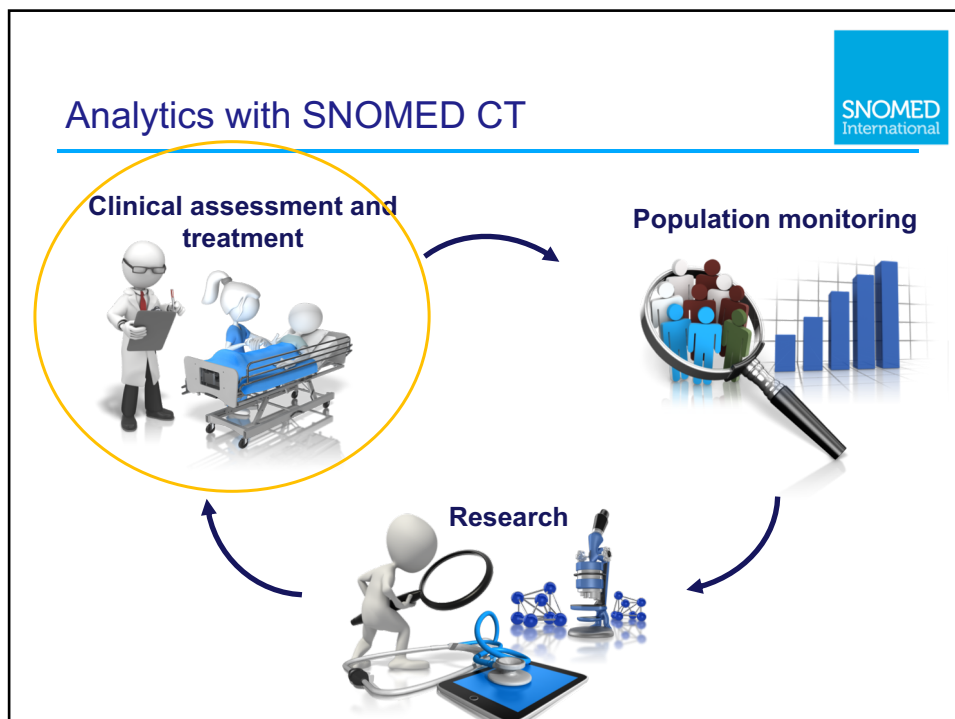



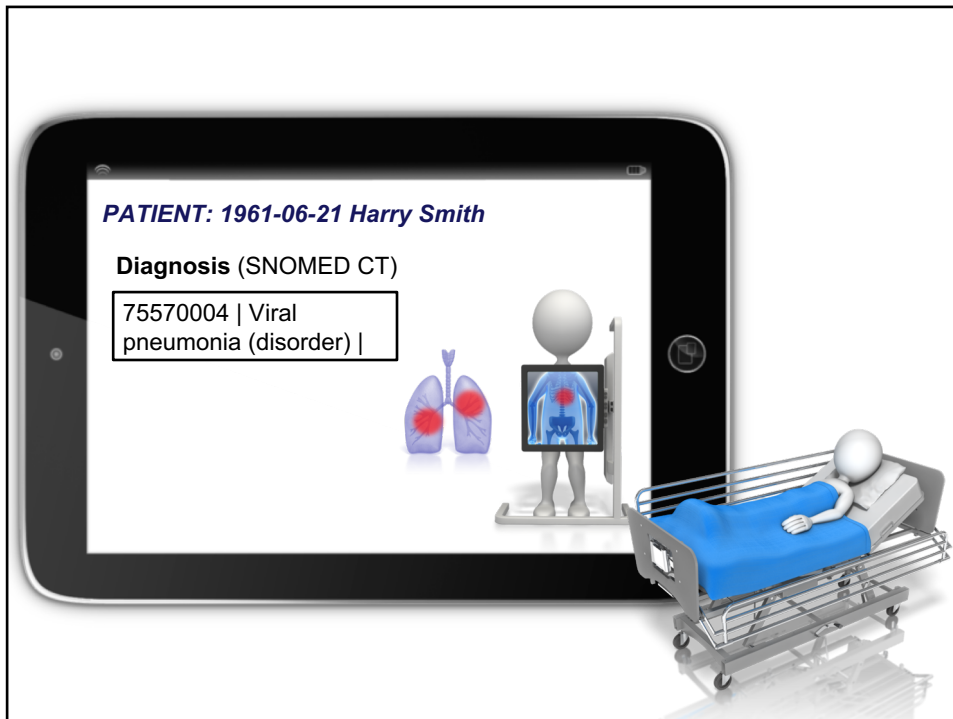






Using SNOMED CT for Analytics





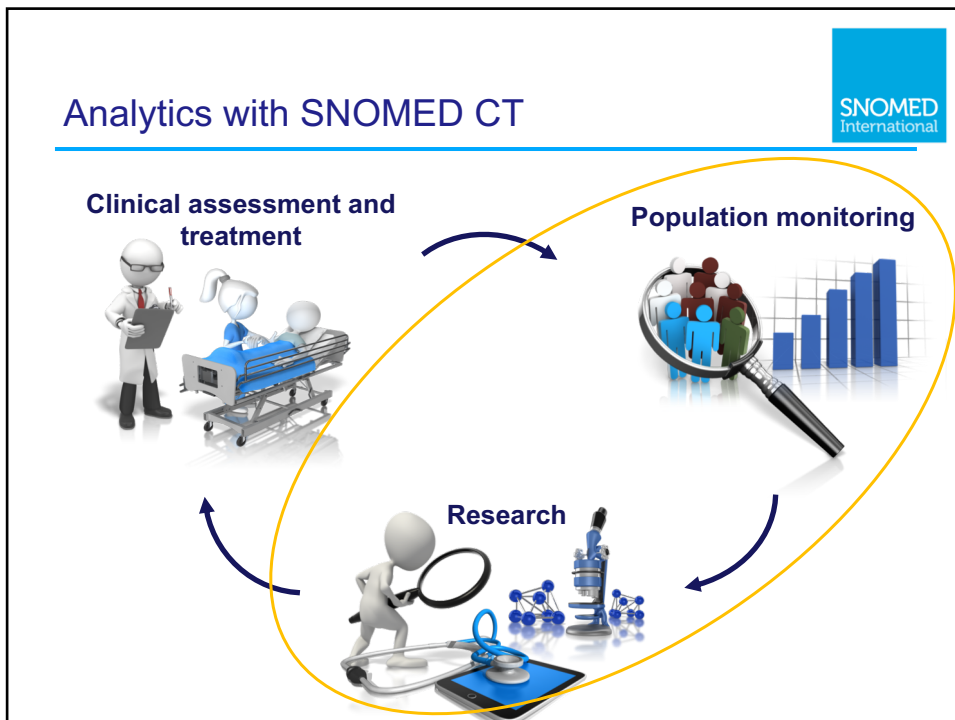
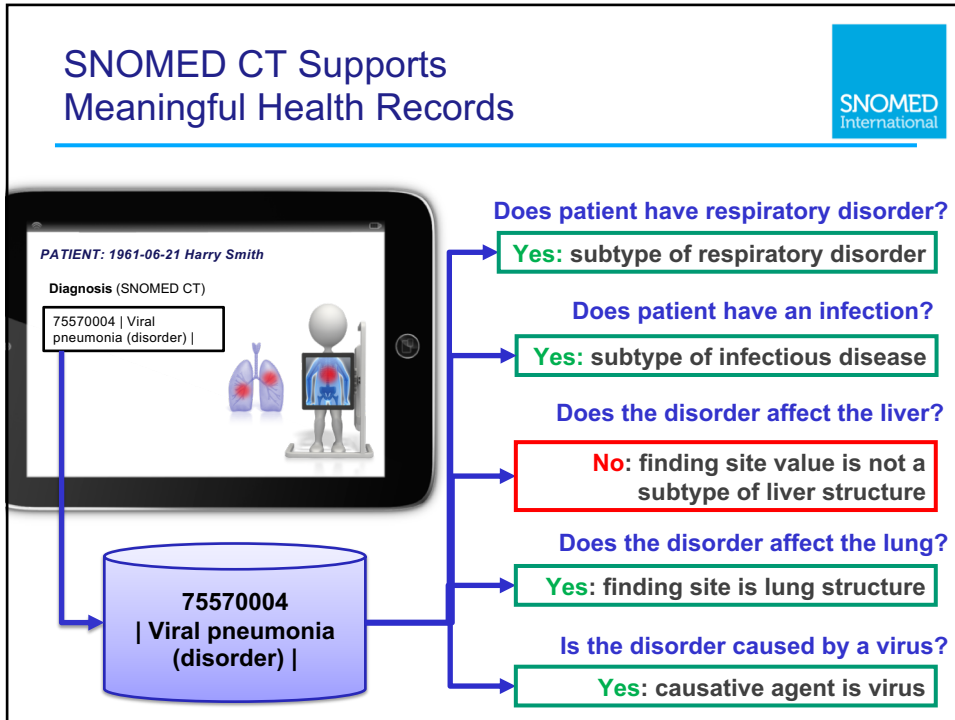
Parents

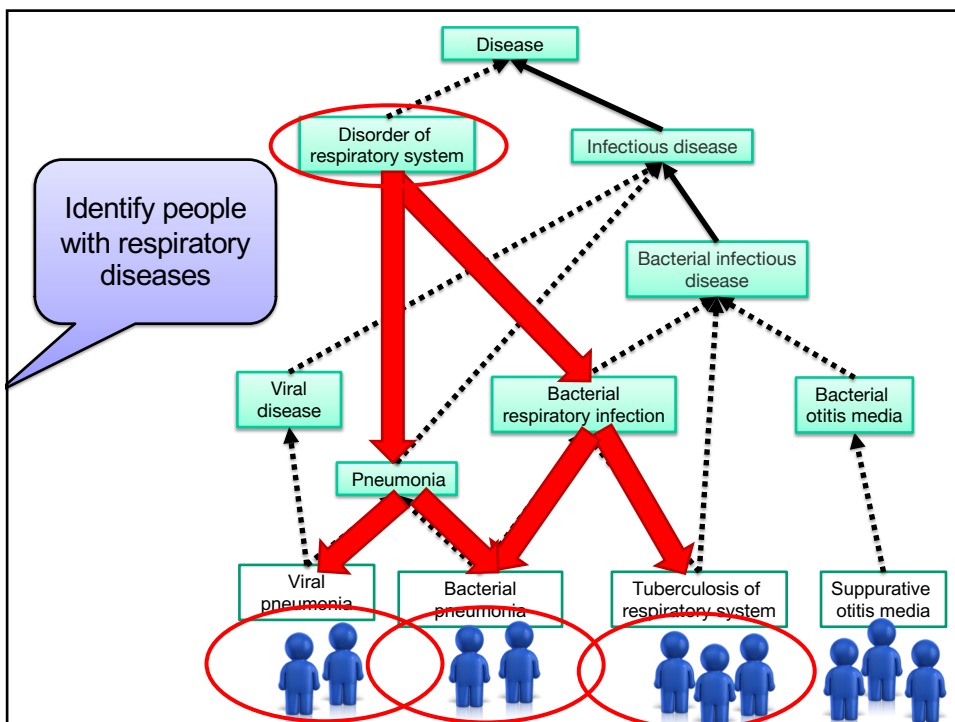
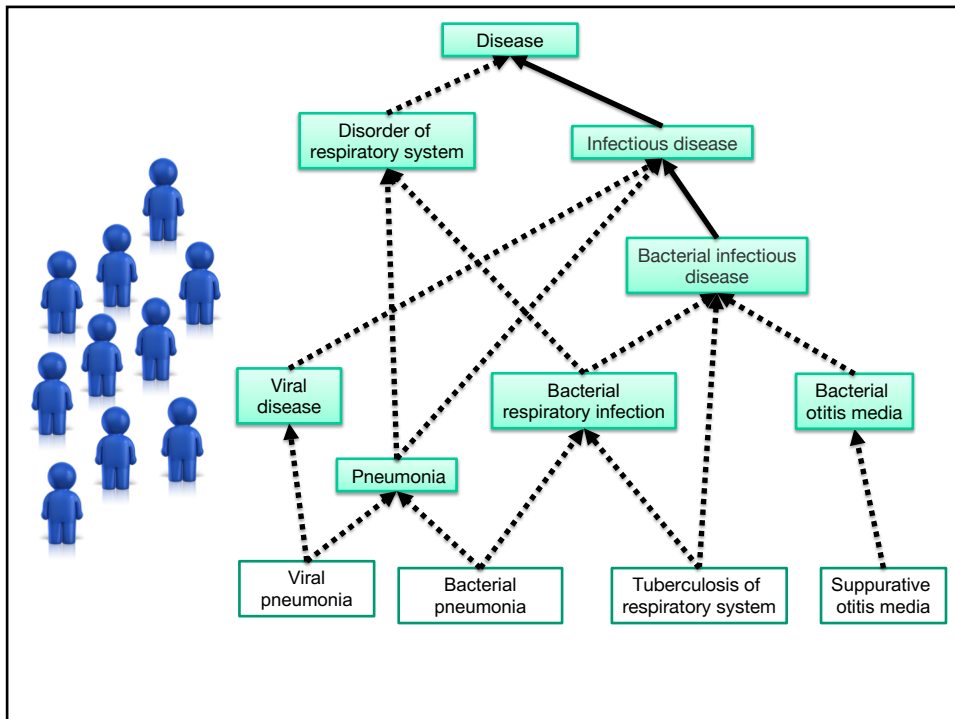
- Infective pneumonia (disorder)
- Viral lower respiratory infection (disorder)

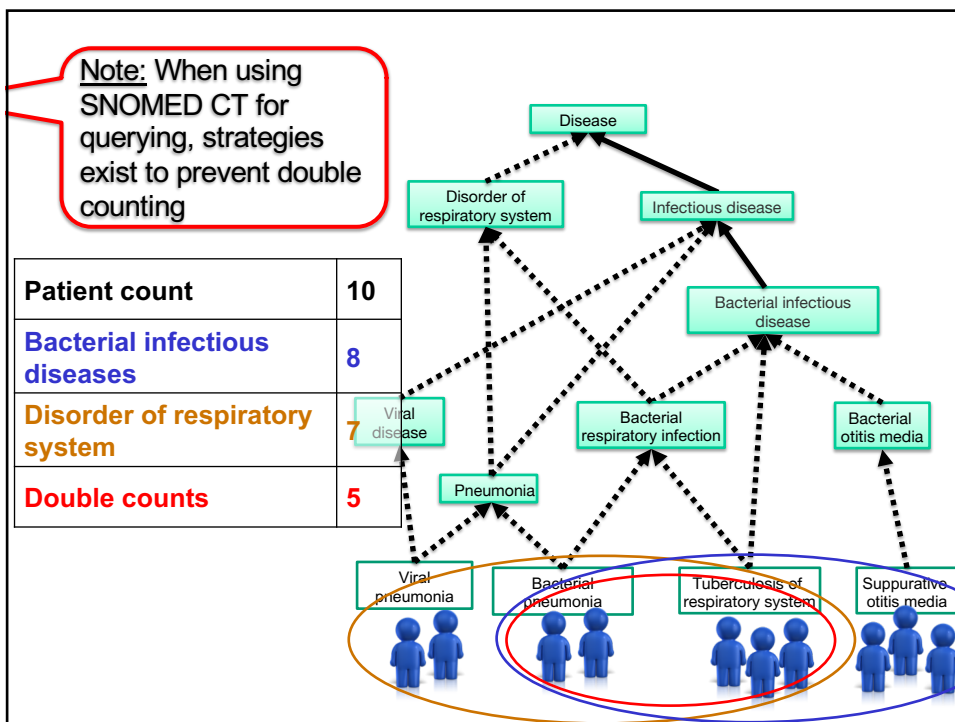
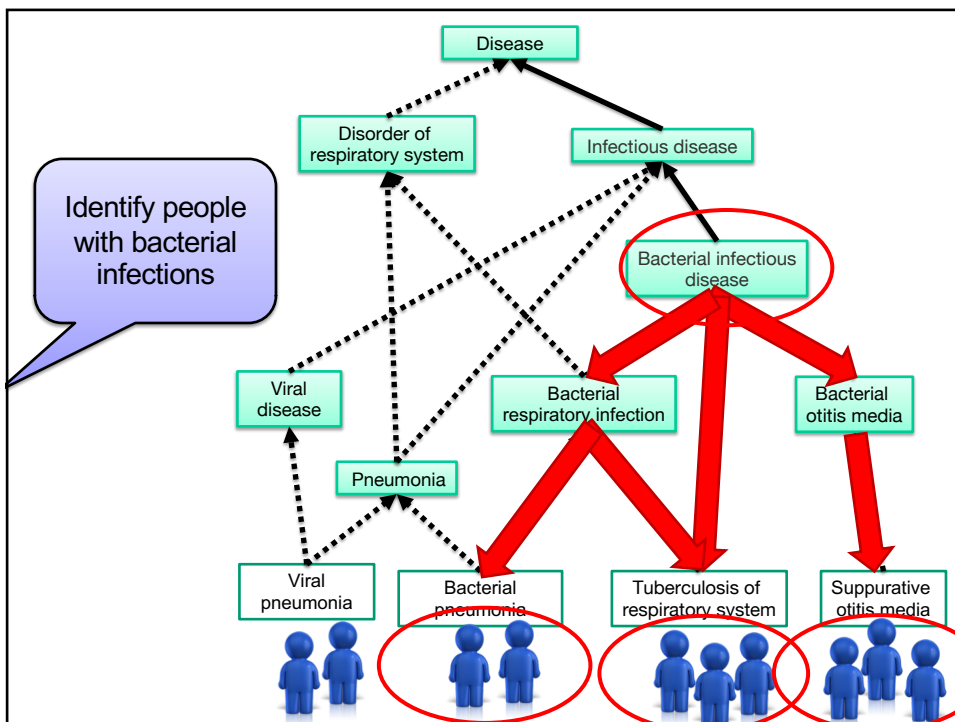
Viral pneumonia (disorder)
SCTID: 75570004
75570004 | Viral pneumonia (disorder) |

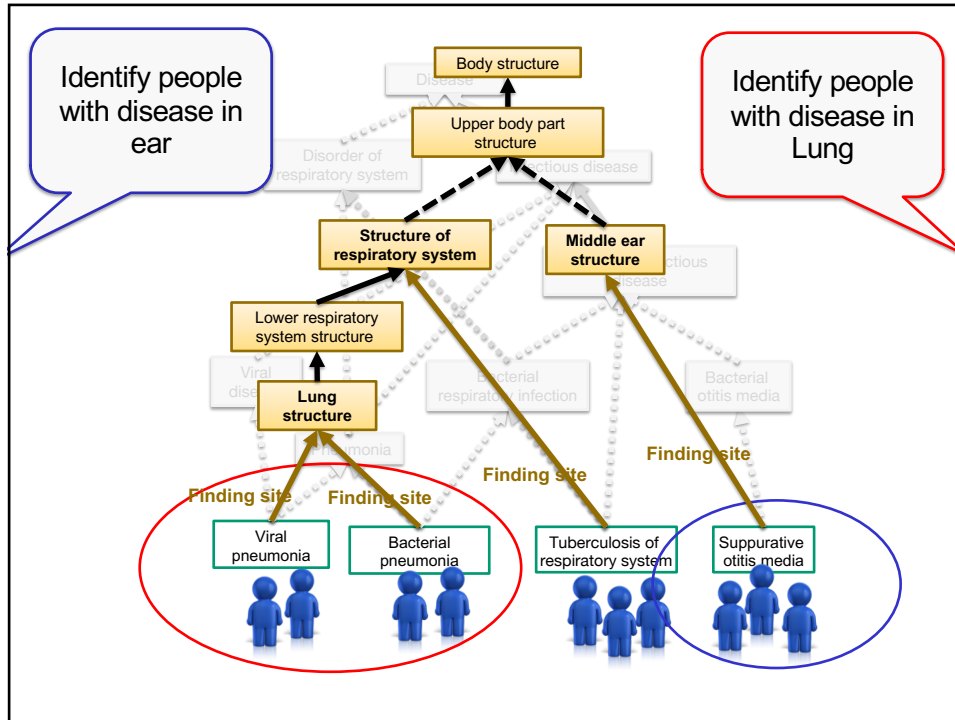
Pathological process → Infectious process
Associated morphology → Inflammation and consolidation
Finding site → Lung structure
Causative agent → Virus

Pathological process → Infectious process
Associated morphology → Inflammation and consolidation
Finding site → Lung structure
Causative agent → Virus









Extensions

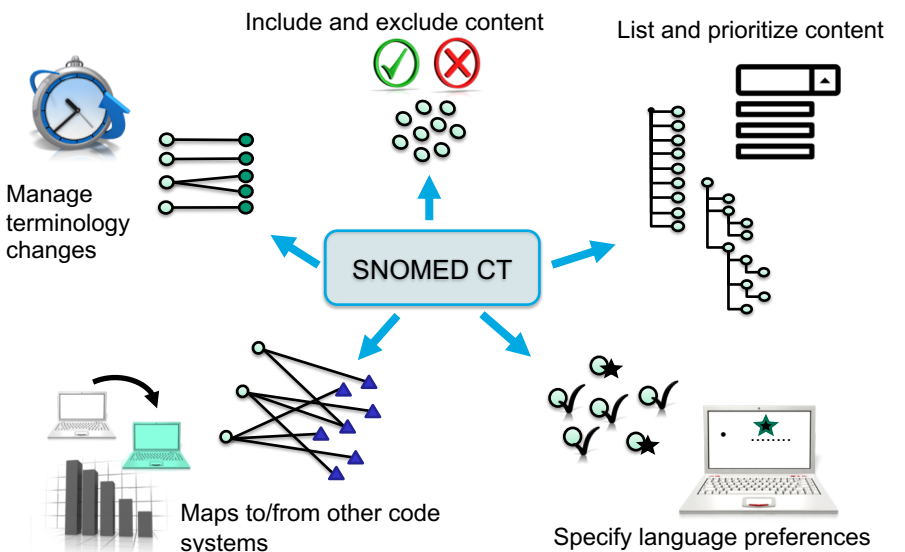



- Additional content for local use
 - To meet the needs of countries, specialties and realms
 - To meet vendor needs
 - To meet local business needs
- May include local
 - Concepts, relationships, descriptions
 - Subsets, Language, Maps
- Must have one or more authorized namespaces
 - Ensures global uniqueness of identifiers



21782 1000132 10 5

Reference Sets




Manage terminology changes

Include and exclude content

List and prioritize content

Maps to/from other code systems

Specify language preferences




Subset

A collection of components for a particular purpose


Id	Term
82272006	Common cold
6142004	Influenza
55604004	Avian influenza


id	effective Time	active	moduleId	refsetId	referenced ComponentId
0000d6608041-005b-5108-b608-07891b210365	20140731	1	19999999103	49999999102	82272006
00008774f374-5f54-5234-8af1-8aca6e73b5c2	20140731	1	19999999103	49999999102	6142004
00006ac9-2f97-5ed4-b37e-84cb158c388d	20140731	1	19999999103	49999999102	55604004



Subset Development

- **Membership is defined by enumeration**
 - Identifying each of the members individually






- ▲ General finding of observation of patient (finding)
- ▼ Finding of general observation of appearance (finding)
 - Beautiful appearance (finding)
 - Bizarre personal appearance (finding)
 - Blue bloater (finding)
 - Comfortable appearance (finding)
 - ▶ Finding of appearance relating to age (finding)
 - ▶ Finding of general form of body (finding)
 - General appearance of patient (finding)
 - ▼ Generally clean appearance (finding)
 - On examination - clean and tidy (finding)
 - ▼ Neglected appearance (finding)
 - On examination - care poor (finding)
 - No injuries apparent (finding)
 - Normal appearance (finding)
 - Normal extension (finding)
 - Normal flexion (finding)
 - ▶ On examination - appearance (finding)
 - Parkinsonian features (finding)
 - ▶ Personal appearance about reported age (finding)
 - ▼ Personal appearance dirty (finding)
 - Clothing dirty (finding)
 - Hands dirty (finding)
 - On examination - unclean (finding)
 - Pink puffer (finding)
 - ▼ State of dress finding (finding)
 - Clothing dirty (finding)
 - ▶ Dressed - appearance (finding)
 - Undressed (finding)
 - ▼ Well cared for appearance (finding)
 - Adequately dressed (finding)
 - On examination - care good (finding)
 - Smartly dressed (finding)

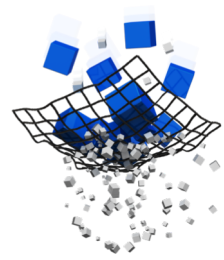
Example:

- 80670004 | Bizarre personal appearance (finding) |
- 398168006 | Generally clean appearance (finding) |
- 102892007 | Neglected appearance (finding) |
- 386549008 | Normal appearance (finding) |
- 78158007 | Personal appearance dirty (finding) |
- 397749000 | Well cared for appearance (finding) |

Subset Development



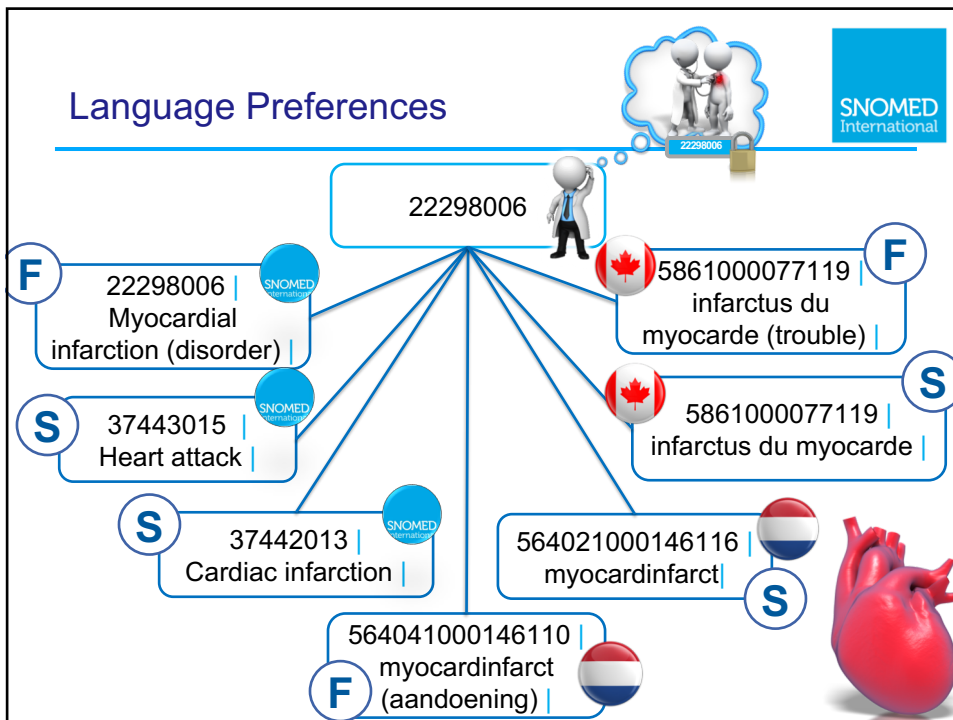
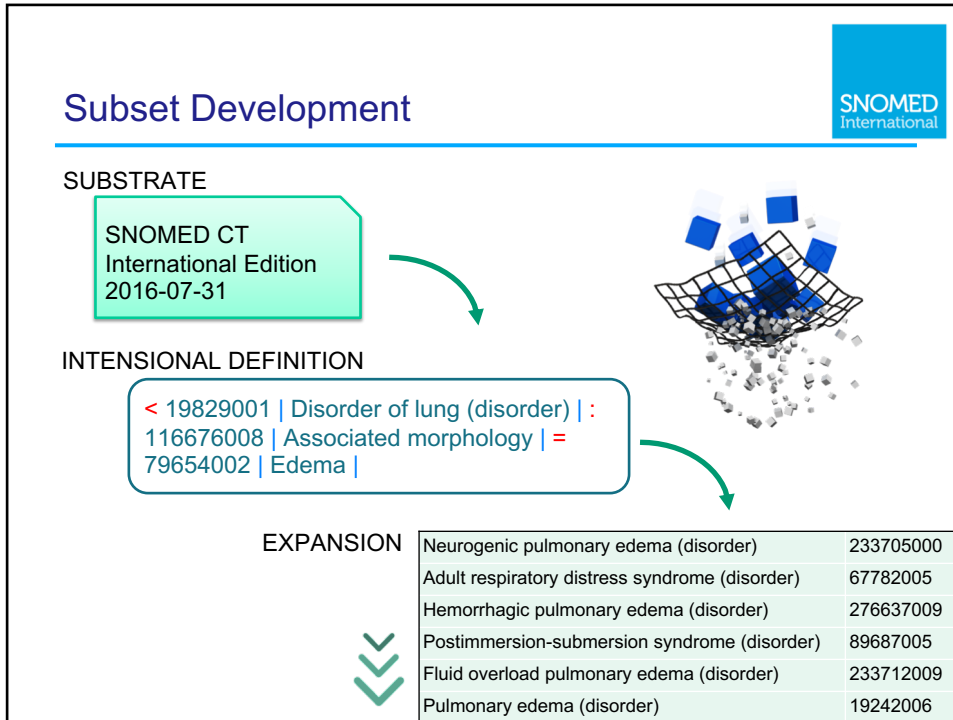
- **Membership is defined by a set of rules**
 - The rules are expressed as a query that computes the reference set members
- **SNOMED CT Expression Constraint**
 - A computable rule that can be used to define a bounded set of clinical meanings
 - <http://snomed.org/ecl>

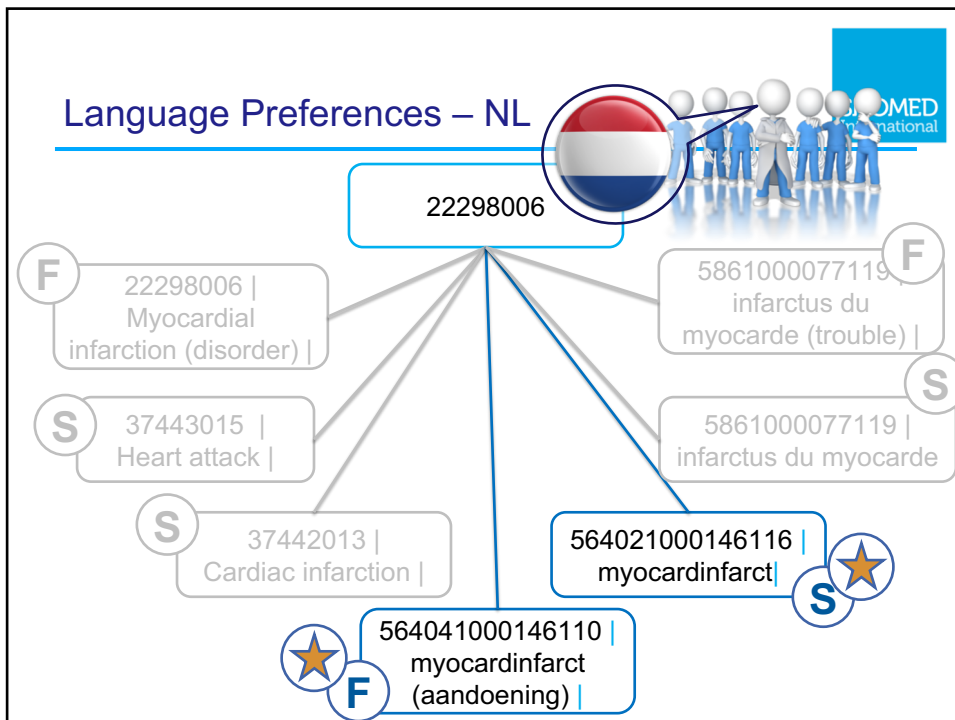
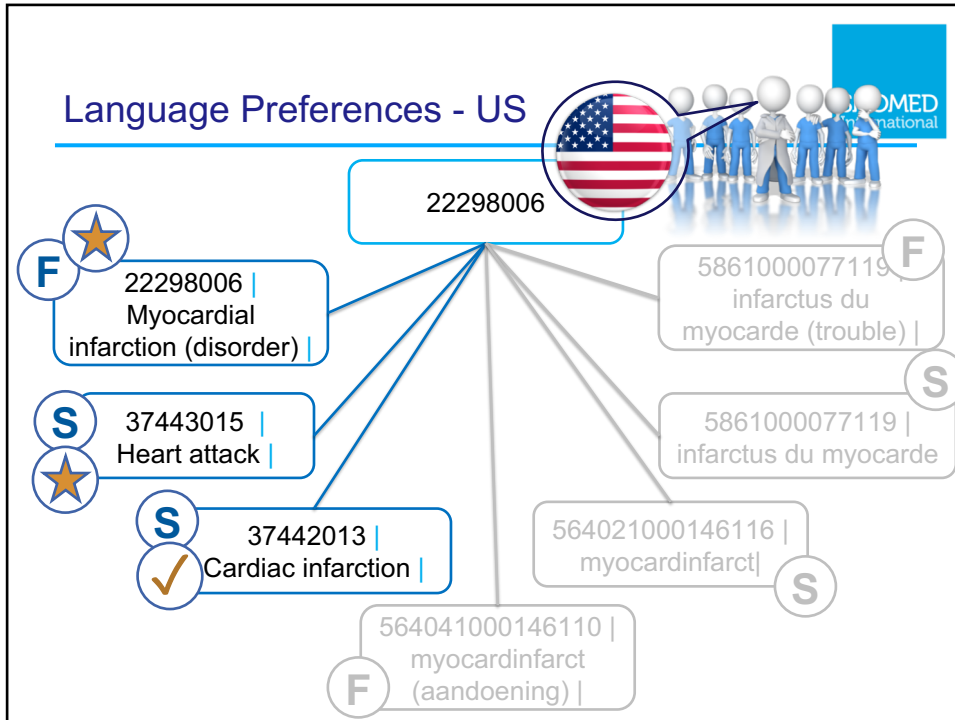


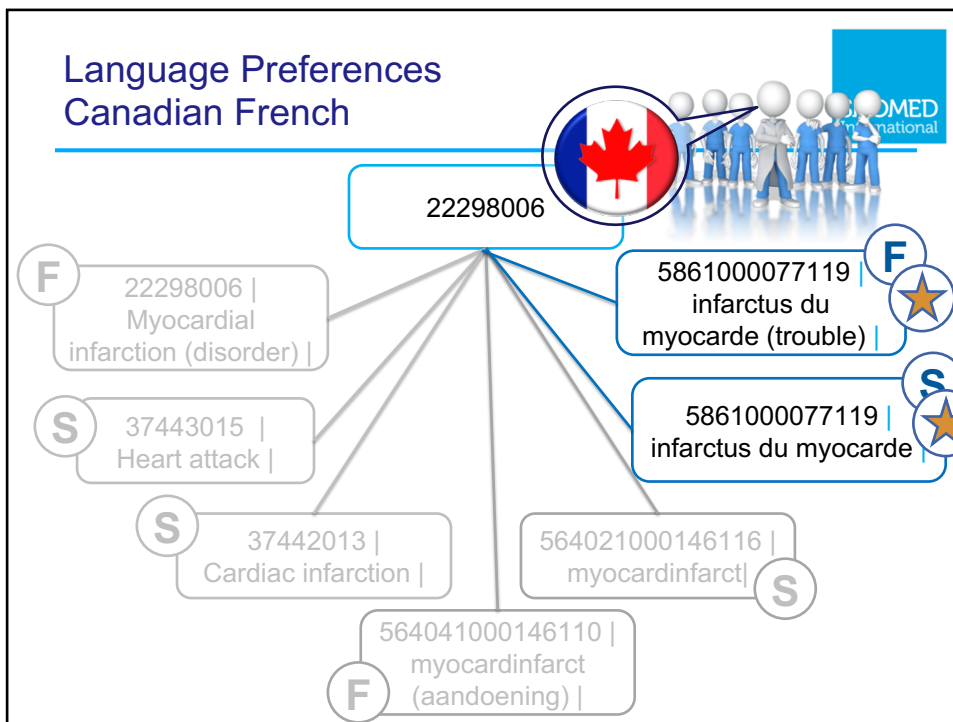
Examples:

<< 387714009 |Operation on lung (procedure)|

< 19829001 |Disorder of lung (disorder)| :
116676008 |associated morphology| = 79654002 |edema|







Canadian French Language Reference Set

FR-CA language reference set			
SNOMED CT description		Acceptability	
680211000077116	infarctus du myocarde (trouble)	900000000000548007	Preferred
5861000077119	infarctus du myocarde	900000000000548007	Preferred

Canadian French Language Reference Set

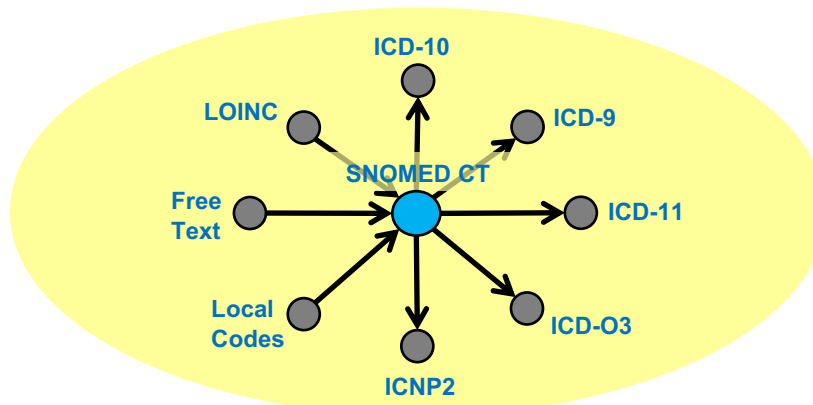


EN-CA language reference set			
SNOMED CT description		Acceptability	
751689013	myocardial infarction (disorder)	900000000000548007	preferred
37436014	myocardial infarction	900000000000548007	preferred
37442013	cardiac infarction	900000000000549004	acceptable
37443015	heart attack	900000000000549004	acceptable
37441018	infarction of heart	900000000000549004	acceptable
1784872019	MI - Myocardial infarction	900000000000549004	acceptable
1784873012	myocardial infarct	900000000000549004	acceptable

SNOMED CT and Other Coding Systems



SNOMED CT acts as bridge between other code systems



Enables cross-domain queries and analysis

Map Example




Between SNOMED CT and an external code system

ICD-O simple map reference set			
SNOMED CT concept		ICD-O code	
243930007	entire spine	C41.2	Vertebral column
372177002	entire nail plate	C44.9	Skin, NOS
61685007	lower limb structure	C76.5	lower limb, NOS
447643008	vipoma	8155/1	vipoma, NOS
127573000	neuroendocrine carcinoma, grade 2	8249/3	Neuroendocrine tumor, grade 2
447644002	benign stromal tumour	8935/0	stromal tumor, benign


**Learn More
 About
 SNOMED CT**




SNOMED CT Implementation



- Continuous increase in the number and maturity of implementations around the world
- SNOMED CT implementation experiences
 - SNOMED in Action <http://snomedinaction.org/>




SNOMED CT Course Catalogue



<https://courses.ihtsdotools.org>

Foundation Course*	Curso de Fundamentos*	
SNOMED for Developers	SNOMED for Data Analysts	
Implementation Course**	Authoring L1 Course**	Authoring L1 Certification**



**Free to residents of Member territories*
***Discounts for residents of Member territories*



WIN A FREE COURSE !


Visit the SNOMED CT course catalogue
courses.ihtsdotools.org






Discover the answer to this simple question:
"How many products are available on the SNOMED CT Course Catalogue?"

Submit your answer at snomed.org/win

*Two free SNOMED CT course enrolments to be won
All entrants will receive a 20% discount voucher - first 50 enrolments only
All vouchers must be used before December 2019*


SNOMED CT Document Library




Overviews	Guides	Specifications	SNOMED CT Expo	Glossary
				

<http://snomed.org/doc>

- Introductory Guides
 - Starter Guide <http://snomed.org/sq>
 - Vendor Introduction <http://snomed.org/vendorintro>
 - Member (NRC) Guide <http://snomed.org/nrcguide>
- Specifications and Technical Guidance
 - Release file specifications
 - Computable language specifications
 - Terminology and record services
- Practical Guides
 - Search, Data entry, Decision support, Analytics, Reference sets, Extensions





Learning More About SNOMED CT

Expo 2019 tutorials

Thursday


13:30	Intelligent search and data entry	(90 min)
15:30	Data analytics and clinical decision support	(90 min)
15:30	An introduction to authoring	(90 min)

Friday

11:00	Developing subsets and reference sets	(90 min)
13:30	Understanding SNOMED CT's description logic enhancements	(90 min)


Presentation streams

- A – Demonstrating implementation excellence
- B – Enhancing clinical practice
- C – Terminology leading practices



Additional Information

- SNOMED International website
<http://snomed.org>
- SNOMED CT Browser
<http://snomed.org/browser>
- SNOMED CT Document Library
<http://snomed.org/doc>
- SNOMED CT Starter Guide
<http://snomed.org/sg>
- SNOMED CT E-Learning server
<http://snomed.org/elearning>
- SNOMED CT Tools
<http://snomed.org/tools>



Questions and Discussion



Contact: info@snomed.org
Website: www.snomed.org