Health Data in Practice lecture series

Controlled Clinical Terminologies: SNOMED CT

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Learning Objectives

At the end of this lecture you will be able to

- Define controlled clinical terminologies and their purpose

- Understand the main controlled clinical terminologies in use in electronic health records

- Describe the elements of SNOMED CT codes

- Understand the content of the NHS Data Dictionary

You will be required to complete a marked assignment based on SNOMED READ and NHS Data Dictionary codesets as part of the assessment of this compulsory module.

What are Controlled Clinical Terminologies?

- Developed to enable systematic capture, curation, and description of health care-related concepts encountered during clinical care, including diagnoses, symptoms, prescribed medications, tests, procedures, lab measurements

- conceptual core of clinical electronic health record systems

- essential tool to support integration of different datasets and their reuse

- Examples include:
  - DSM5 Diagnostic and Statistical Manual of Mental Disorders – 5th edition
  - **ICD10**: International Statistical Classification of Diseases and Related Health Problems—10th revision
  - LOINC: Logical Object Identifiers and Codes (laboratory measurements)
  - OPCS Classification of Interventions and Procedures (procedures)
  - **Read** Codes, Clinical Terms
  - **SNOMED-CT** Systematized Nomenclature of Medicine-Clinical Terms

ICD 10

- Used to abstract electronic health record data

- Assigns unique codes to diagnoses and procedures, referred to as clinical coding

- Clinical coding is manual or algorithmic by trained/ specialist staff using prespecified protocols

- Sub-classifications enable cause, manifestation, location, severity, and type of injury or disease to be specified

- ICD 10 Coded data are used for research, commissioning, national statistics, and billing purposes rather than direct care

- ICD11 due January 2022

Read Clinical Terms

- Developed by Dr James Read in the 1980s originally for GP computing; founded Read Codes

- 1990 DH bought Read Codes and established NHS Centre for Coding & Classification with James Read as first director

- Comprehensive computerised coded thesaurus for use by clinicians in primary care record

- two main formats: Version 2 and Clinical Terms Version 3 (CTV3).

- Used by almost all UK GPs since 1990s: essential prerequisite for Quality and Outcomes Framework

- Can be mapped and used to generate ICD -10 and OPCS-4 codes

- Replaced by SNOMED CT (April 2020): no updates since 2018 eg no COVID codes

- However found in legacy primary care EHR records so important to be aware although most systems now are mapping Read to SNOMED, these are not always complete

More info
- https://datadictionary.nhs.uk/supporting_information/read_coded_clinical_terms.html
- History: Benson Informatics in Primary Care 2011;19:173–82
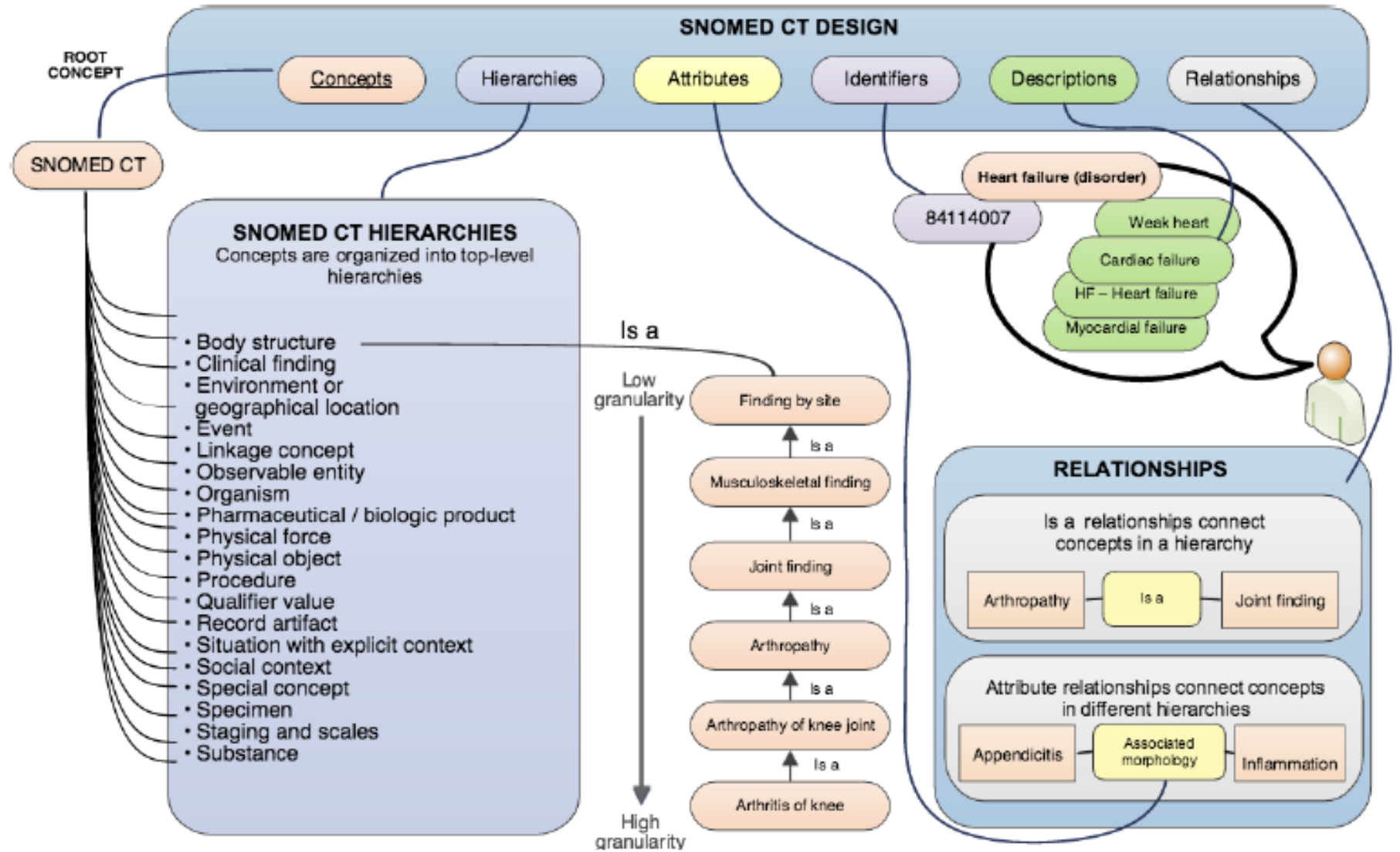
SNOMED CT

- SNOMED CT stand for Systematized Nomenclature For Medicine – Clinical Terms

- It is a merger of the Read Codes with SNOMED RT – the original SNOMED Reference Terminology developed by the American College of Pathologists

- contains representations of >300,000 health care-related concepts designed to represent clinical care

- Comprises 4 primary components : concepts, descriptions, relationships and reference sets

- contains terms for clinical findings, symptoms, diagnoses, procedures, medication, devices and anatomical body structures.

- allows multiple terms to be combined into terms that represent complex medical concepts, referred to as **post-coordination**.

SNOMED CT

- Contains concepts with unique meanings and formal logic-based definitions organized into hierarchies

- These are represented using three types of components:

  - **Concepts** representing clinical meanings that are organized into **hierarchies**

  - **Descriptions** which link appropriate human readable terms to **concepts**

  - **Relationships** which link each concept to other related concepts

- Supplemented by **reference sets**, which enable configuration for different purposes
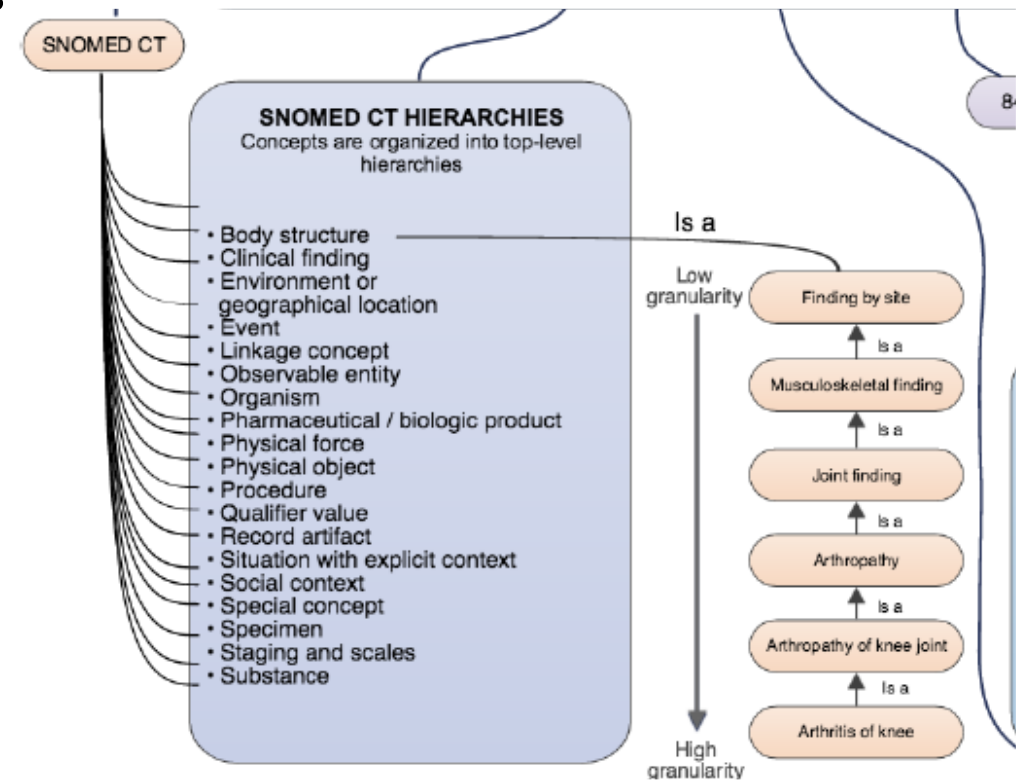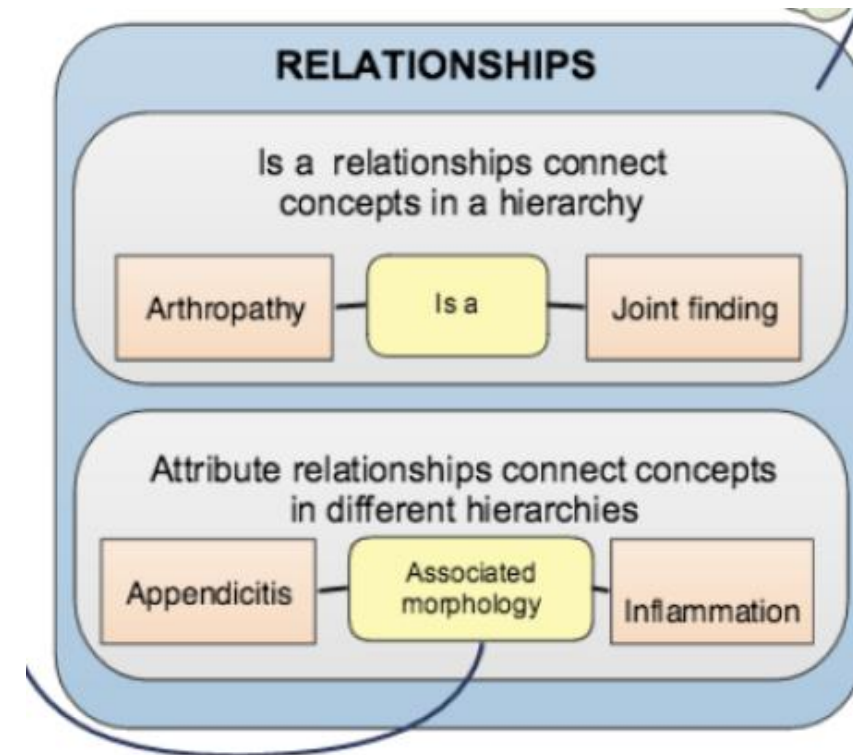
SNOMED CT

SNOMED CT

- SNOMED CT **concepts** represent clinical thoughts, and every concept has a **unique** numeric **concept identifier.**

- Within each **hierarchy**, concepts are organized from the general to the more detailed

- SNOMED CT relationships link concepts to other concepts

SNOMED CT

- The |is a| relationship relates a specific concept to more general concepts

- These |is a| relationships define the hierarchy of SNOMED CT concepts eg arthropathy and joint finding

- Every relationship has a unique numeric relationship identifier

- **Attribute** relationships **join concepts** from hierarchies

- These include the **representation** of subsets for use of particular terms and mapping

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SNOMED CT Concepts and Attributes

- All concepts descend from a root SNOMED concept

- The direct subtypes are called '**Top Level Concepts' (TLCs)**

- These are connected through **|as is |** relationships

- They include TLCs such as

  - **Clinical finding**: observation, judgement, inc concepts that represent diagnosis

  - **Procedure** – eg giving medicine, imaging as well as obvious procedures

  - **Observable entity** eg blood pressure

  - **Body structure** eg a type of tumour, a named heart valve

- The set of concepts to which an attribute can be applied is called a **domain**

SNOMED CT Concepts
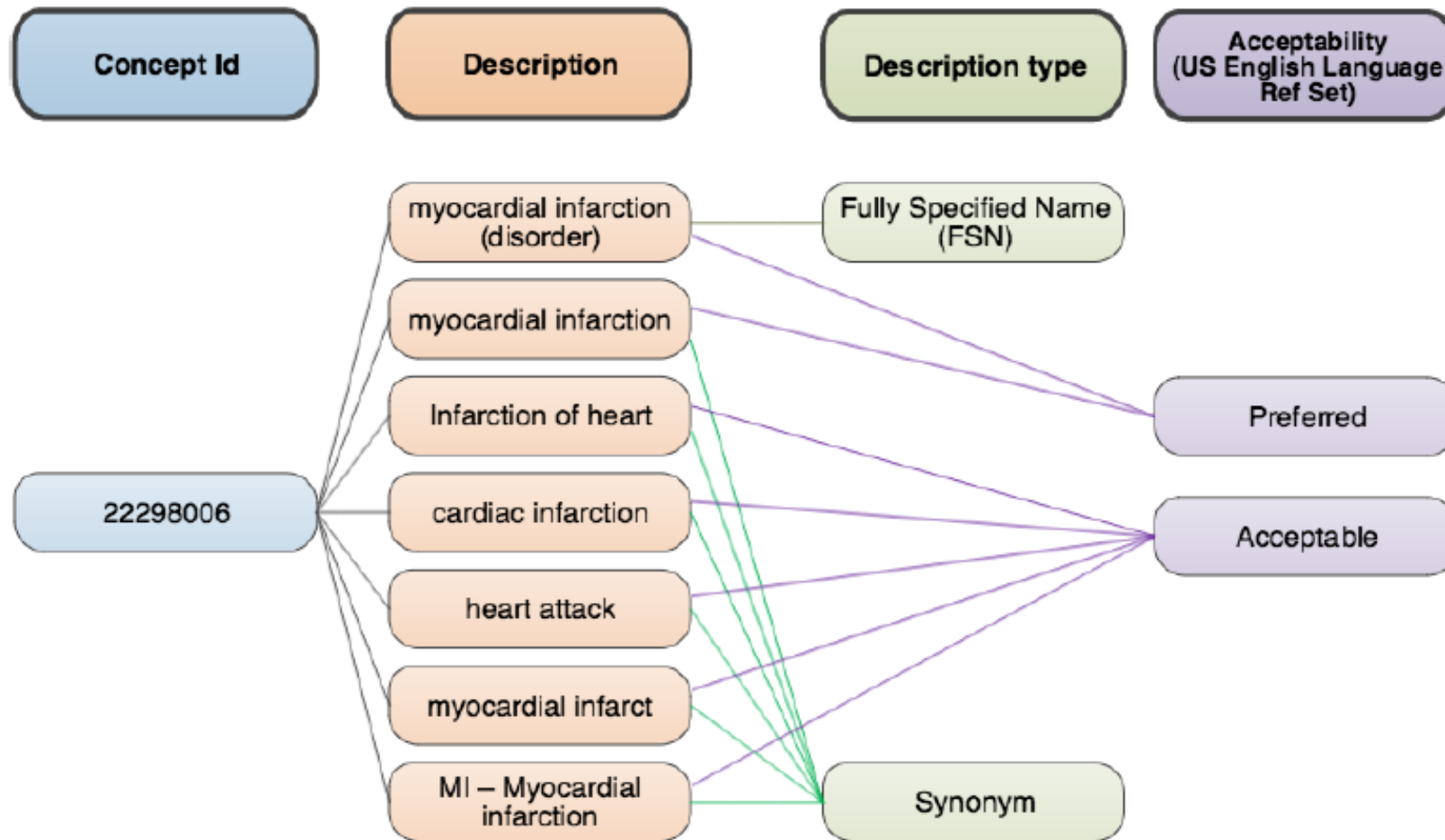
SNOMED CT Reference Sets

- **Reference Sets** are a standard way to represent information about members of a set of components.

- Can be used in SNOMED CT enabled applications to constrain, configure and enhance functionality for different use cases.

- **Uses include**

    - **Language and dialect preferences**
    - **Subsets of components that are included in or excluded** for a specific country, specialty, context.
    - **Value sets of concepts** limiting the permitted content of a field in line with requirements of standard message or communication interface.
    - **Frequently used descriptions or concepts** prioritised for searches
    - **Structure and order lists and hierarchies** to display concepts in convenient structured lists
    - **Maps to or from other code systems**

- SNOMED terms and reference sets can be found using **SNOMED NHS Browser** https://termbrowser.nhs.uk

SNOMED CT Training resources

https://elearning.ihtsdotools.org/

Register for free

Foundation course, also Analytics course

Not required as part of this module but if your MRes or PhD involves data specification using SNOMED CT terms then very worthwhile

Questions???

NHS Data Model & Dictionary

- provides the development, maintenance and support of NHS Information Standards.

- is modelled using the following convention and naming:

- **Data Sets** are built from a series of **Data Elements** and, optionally, groups of data elements.

- **Data Elements** are a specialised use of Attributes for use within the context of the data set.

- **Attributes** describe the properties of **Classes** and provide common data definitions for classes

- **Classes** describe aspects of the health and care business with their significant characteristics through their **Attributes** and their relationships to other **Classes**

See https://datadictionary.nhs.uk/index.html

NHS Data Model & Dictionary: Data Sets

Data Sets bring together a collection of **Data Elements** into a specification for collection or analysis for a specific transaction, use case for data exchange or a specific outcome.

Types of data set include:

- Administrative Data Sets e.g. work force

- Commissioning Data Sets (CDS)

- Central Return Data Sets e.g. COVER Immunisations dataset

- Clinical Content e.g. National Joint Registry Data Set

- Clinical Data Sets e.g. Diagnostic Imaging Data Set

- Supporting Data Sets e.g. Critical Care Minimum Data Set

Examples of Data Sets include:

- An **interaction for delivery of care**: Maternity Services Data Set .

- A **data collection**: NHS Continuing Healthcare Data Set

- A **reference Data Set**: National Workforce Data Set

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NHS Data Model & Dictionary: eg content of COVER @ 12 months

Permitted Codes 🔗

Code	Description
011	D3 - Diphtheria
012	D4 - Diphtheria booster
021	aP3 - Pertussis
022	aP4 - Pertussis booster
031	T3 - Tetanus
032	T4 - Tetanus booster
041	Po3 - Polio
042	Po4 - Polio booster
051	Hib3 - Haemophilus influenzae type b
061	MMR1 - Measles, Mumps, Rubella 1
062	MMR2 - Measles, Mumps, Rubella 2
080	Haemophilus influenzae type b and Meningococcal C (booster) (Hib/MenC (booster))
091	PCV2 - Pneumococcal
092	PCV (booster) - Pneumococcal (booster)
093	PCV1 - Pneumococcal
120	Rotavirus
131	Hepatitis B (Hep B3) - Routine
132	Hepatitis B (Hep B) - Selective
140	Tuberculosis (BCG)
151	MenB2 - Meningococcal serogroup B
152	MenB (booster) - Meningococcal serogroup B (booster)

Assessed assignment

2500 word marked assignment (c 10 pages double spaced)

Title: A critical assessment of coding terminologies and reference sets used to identify ethnic background

1) Using relevant browsers search for and identify all available codesets used to identify a person's ethnic background from information held in the electronic health record, including

- SNOMED CT reference sets

- ONS Census codes (READ)

- NHS data dictionary codesets including ONS and PDS codes

2) Consider, compare and summarise their differences

3) Prepare a 2500 word report of your approach, methods, and findings including discussion of implications for studies based on primary care electronic health records that require reporting or analysis of ethnic background citing relevant publications retrieved from the literature

To be handed in by 15th January 2020

Questions???