SNOMED International

Delivering SNOMED CT

Observables for Clinical Group Leads

18 March 2021

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Presentation Outline

1. Introduction to observables
2. Implementation of observables
3. How to get involved with observables
4. Requirements

Introduction to observables

SNOMED CT

The global language of healthcare

Introduction to observables

- What is an observable entity
- Describe four types of observables
- Attributes for observable entities
- Relationship between observable entities and evaluation procedures
- Challenges in modeling observables

What is an observable entity?

An observable entity concept represents information about a feature (e.g., quality or property) that is to be observed and how it is observed

Can be thought of as a question that will produce an answer, result, or value

Examples:

What is the blood pressure of this person while sitting? -> 163035008 |Sitting blood pressure (observable entity)|

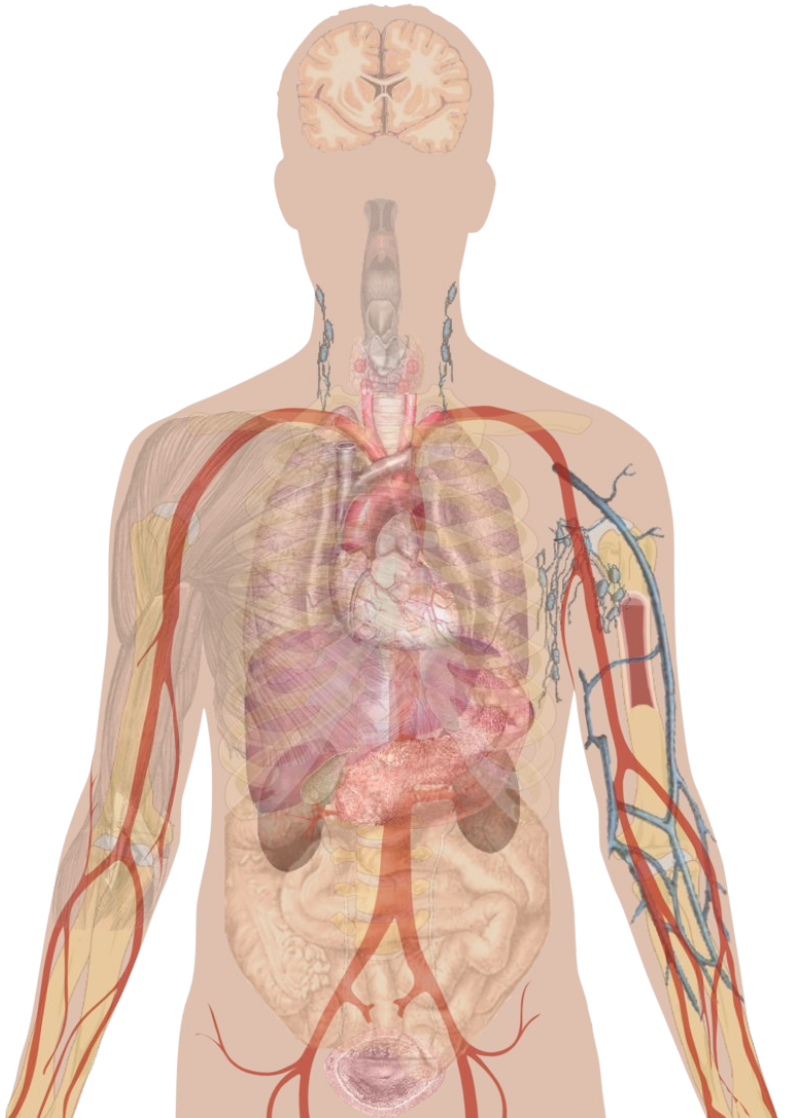
What is the level of pain being experienced? -> 405161002 |Pain level (observable entity)|

What is the estimated protein intake in one day? -> 792882006 |Estimated quantity of intake of protein and protein derivative in 24 hours (observable entity)|

Observables model principles

WHAT

HOW

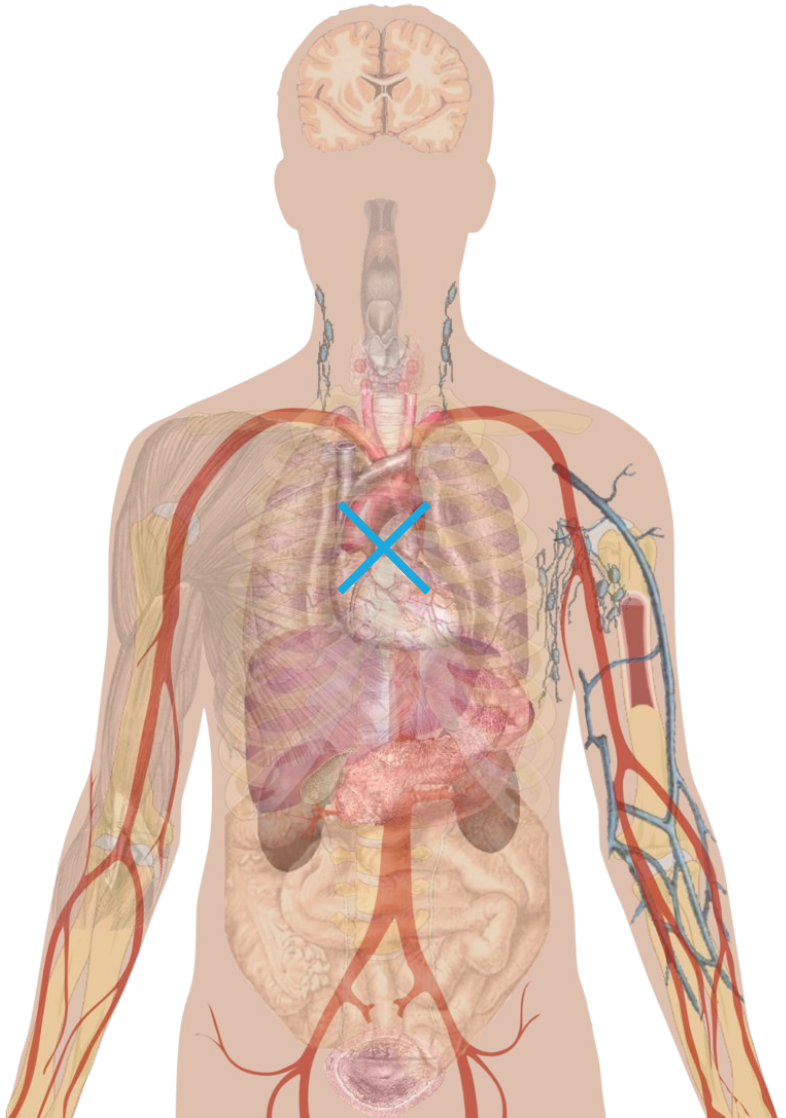


Following illustrative set of slides from Daniel Karlsson

Observables model principles

WHAT

Core temperature, also called core body temperature, is the operating **temperature** of an organism, specifically in **deep structures of the body** such as the liver, in comparison to temperatures of peripheral tissues.



HOW

Observables model principles

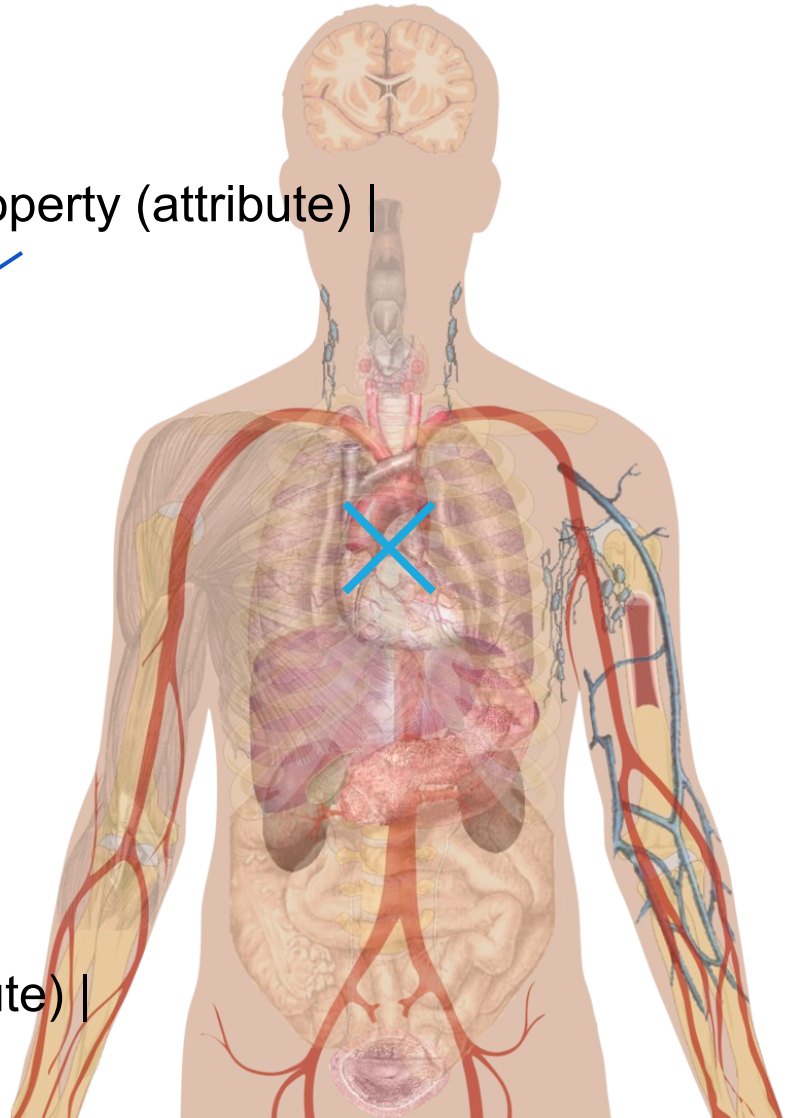
WHAT

370130000 | Property (attribute) |

HOW

Core temperature, also called core body temperature, is the operating **temperature** of an organism, specifically in **deep structures of the body** such as the liver, in comparison to temperatures of peripheral tissues.

704319004 | Inheres in (attribute) |



Observables model principles

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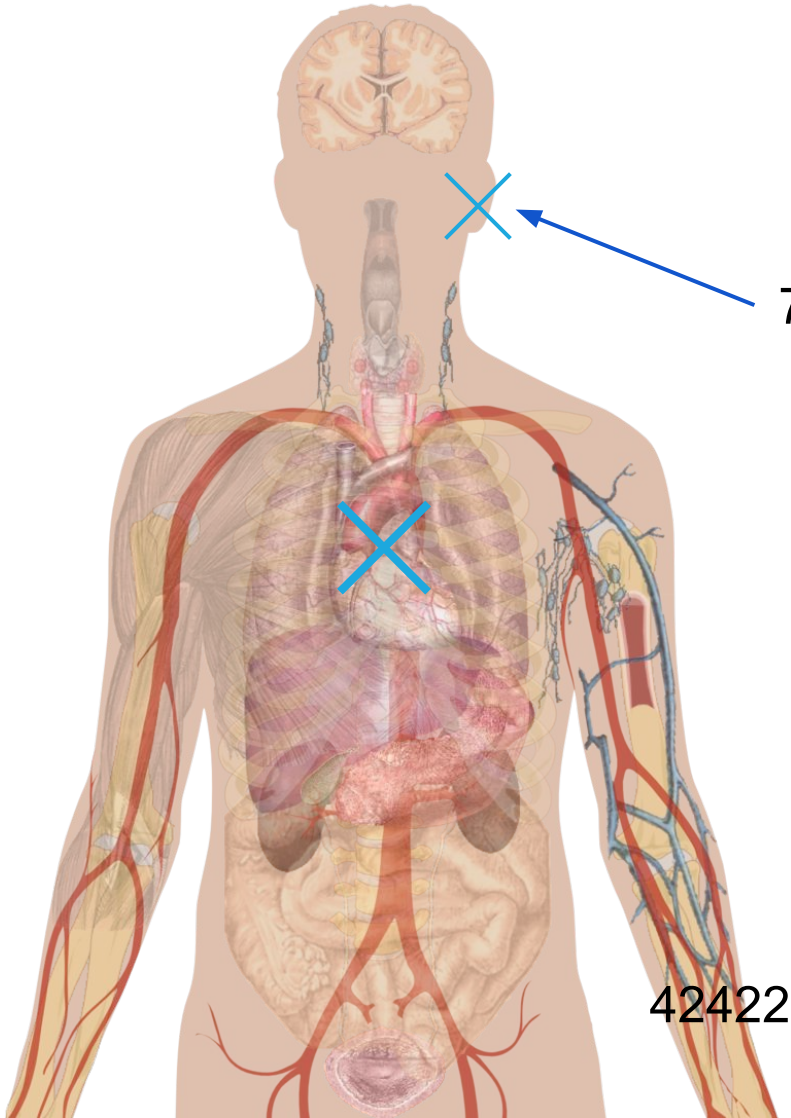


HOW

704327008 | Direct site (attribute) |

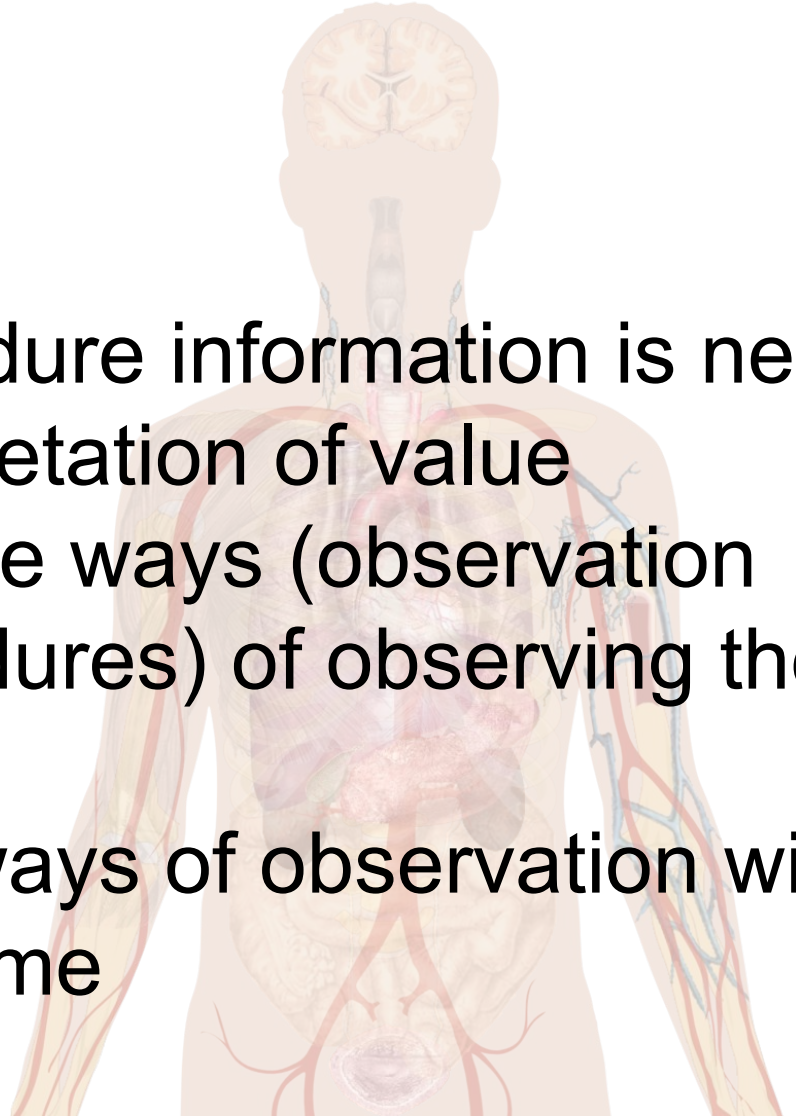
370132008 | Scale type (attribu

424226004 | Using device (attribute) |

Observables model principles

WHAT

HOW



- Procedure information is needed for interpretation of value
- Multiple ways (observation procedures) of observing the same “thing”
- New ways of observation will evolve over time

Types of observables
To date, four types described

1. Quality observable
    a. observation about a characteristic that is inherent in a person or thing such as body weight or blood glucose concentration
2. Process observable
    a. observation about a process or outcome of a process such as heart rate or tumor invasion
3. Disposition observable
    a. observation about a feature that is not always realized in full such as antimicrobial susceptibility or genetic predisposition to a disease
4. Function observable
    a. observation about the ability of a person or part of a person or thing to perform an activity or realize a process such as ability to walk

Types of observables
To date, four types described

Most of our experience is with quality and process observable

Limited experience with disposition observable: Antimicrobial susceptibility template created but not implemented yet

Function observables have been discussed

More types of observables may be required depending on use cases

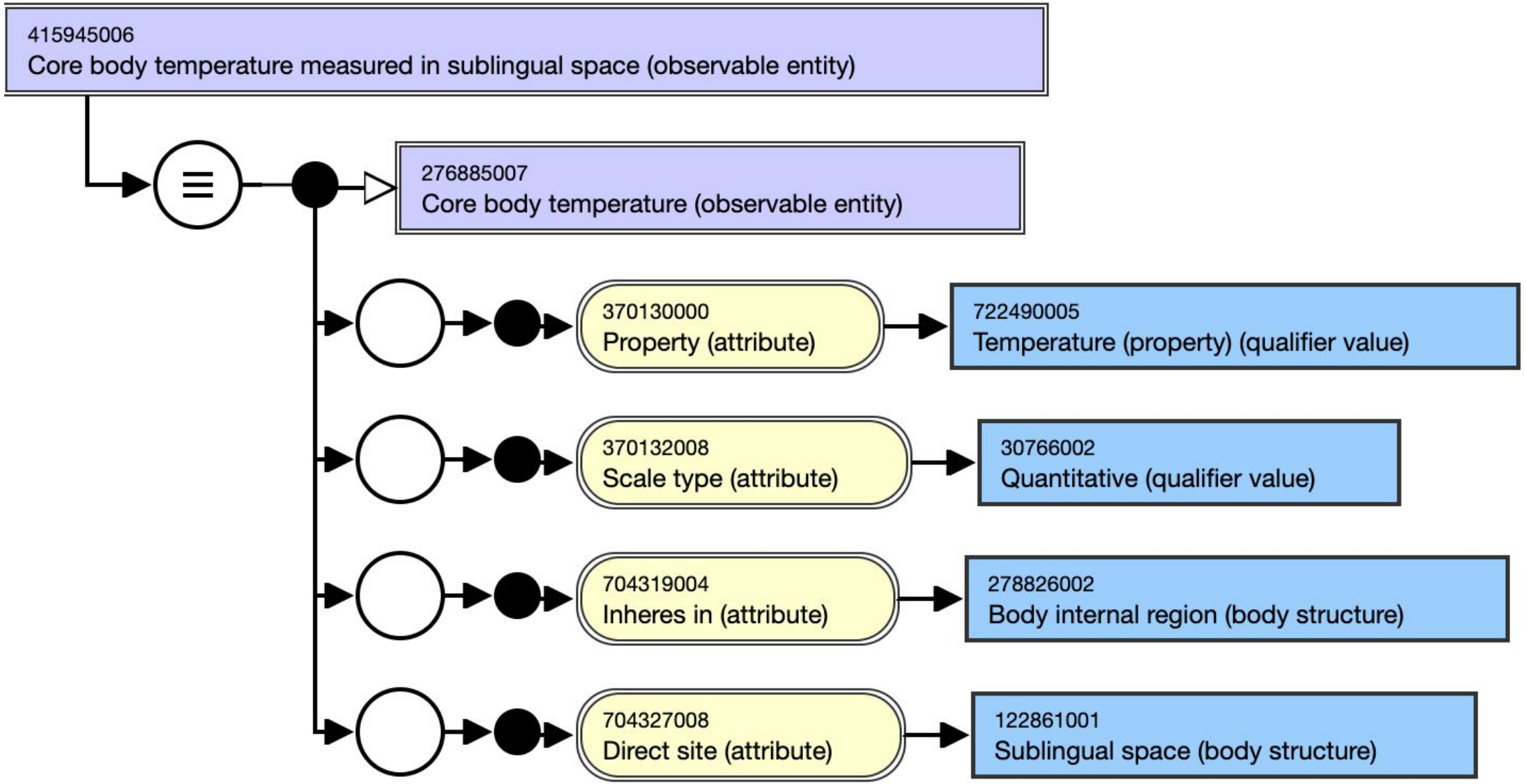
Attributes for observables

- Component
- Property
- Direct site
- Inheres in
- Inherent location
- Precondition
- Technique
- Time aspect
- Process duration
- Relative to
- Relative to part of
- Characterizes
- Process agent
- Process output
- Process extends to **July 2021
- Process acts on **July 2021
- Towards
- Direct substance
- Has realization
- Scale type **for extensions
- Using device
- Procedure device
- Units

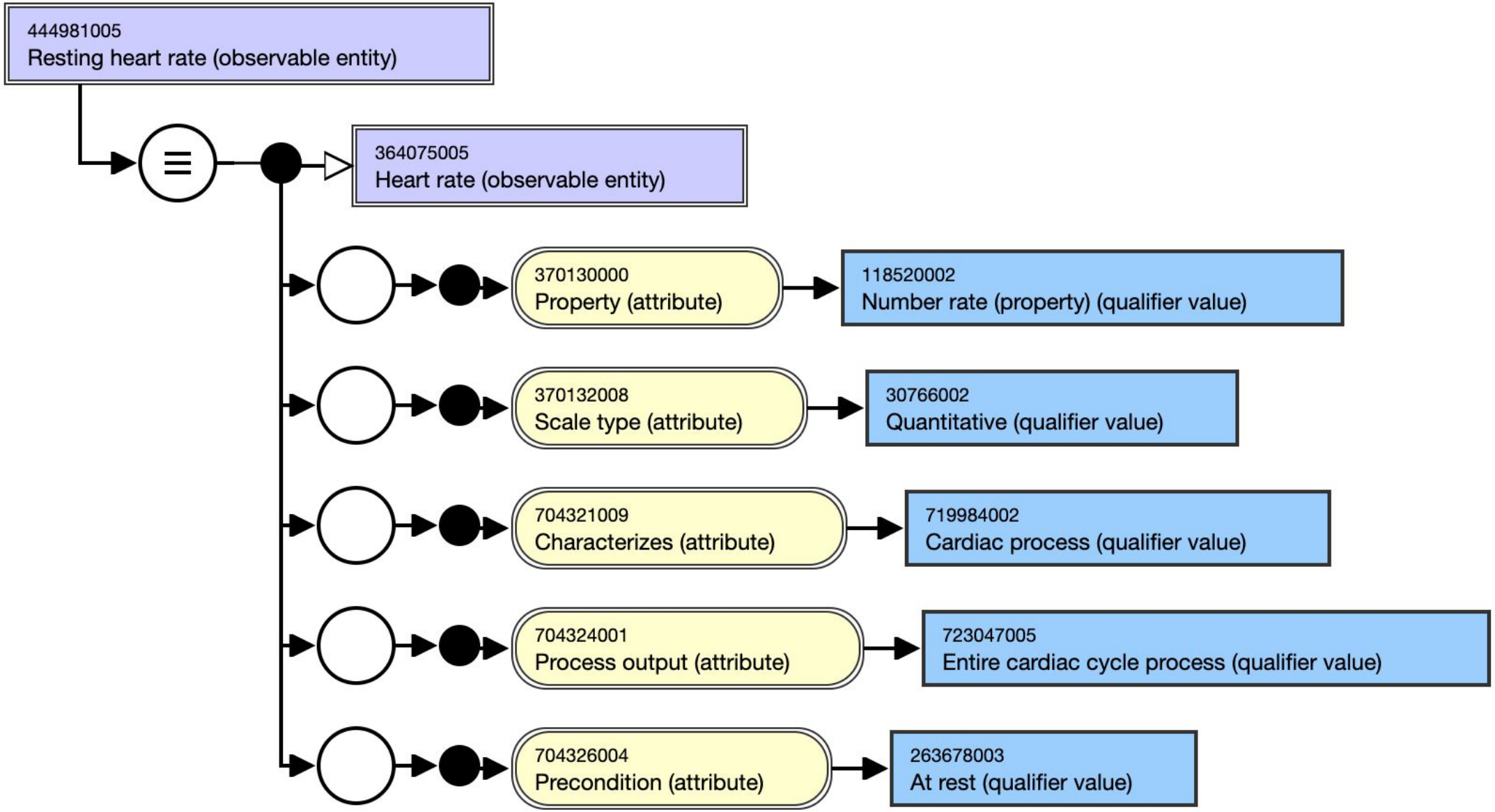
Attributes for observables

- Some are general; some are specific to a particular type of observable, e.g.:
  - 704323007 |Process duration (attribute)| used to model process observables
  - 719722006 |Has realization (attribute)| for function observables
- New attributes added and ranges adjusted as use cases arise, e.g.:
  - Created Process extends to (attribute) to model metastatic invasions
  - Extended the range of 246501002 |Technique (attribute)| to include staging and scales for modeling scale observables

Example: attributes in quality observable



Example: attributes in process observable



Relationship between observable entities and evaluation procedures

Observable entity hierarchy and evaluation procedure share some attributes, e.g., 246093002 |Component (attribute)|

SNOMED CT Editorial Guide notes:

- Legacy issue: SNOMED CT contains evaluation procedure concepts which should logically be included in the observable entity hierarchy
- Content inconsistency and duplication will be addressed in future
- New content should be added as observable entity rather than evaluation procedure

"Evaluation procedures to Observables (E2O) transfer evaluation" subgroup of EAG and OIMP analyzing the legacy issues for eventual resolution

Challenges in modeling observables

- Hierarchy contains ambiguous and outdated content and possible duplication
  - Encountered challenges when attempting to remodel or inactivate older content
  - Clarification and remodeling of upper level concepts needed, e.g., Process (observable entity)|, Function (observable entity), Clinical history/examination observable (observable entity)|
- Much of hierarchy is primitive (modeling hasn't been added yet)
- Newer and limited implementation of model
  - Some new values for attributes needed, e.g., new content under Process (qualifier value), Technique (qualifier value)
- Limited resources and large hierarchy (>9000 concepts in o.e. and >10000 in e.p.)
- SNOMED CT - LOINC Cooperative Agreement restricts addition of new content in certain areas (laboratory, vital signs, anthropomorphic measurements)
  - Content can be added upon request of two member countries

Implementation of observables

SNOMED CT

The global language of healthcare

Implementation of observables

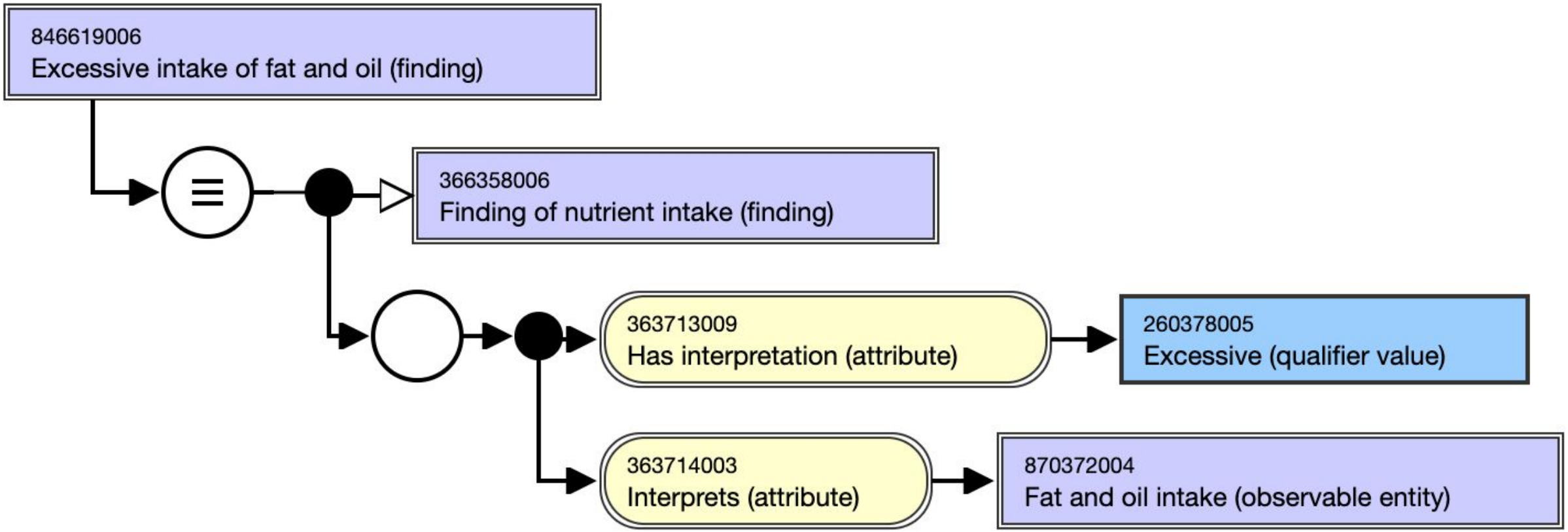
- Within SNOMED CT
- In information models
- Other applications

Implementation within SNOMED CT

- Observable entity concepts are used to define concepts in other hierarchies, namely Clinical findings and disorders:
  - Observable entity concepts are used as value of 363714003 |Interprets (attribute)|
- Observable entity model applied to portion of content including vital signs, nutrition intake, measurements

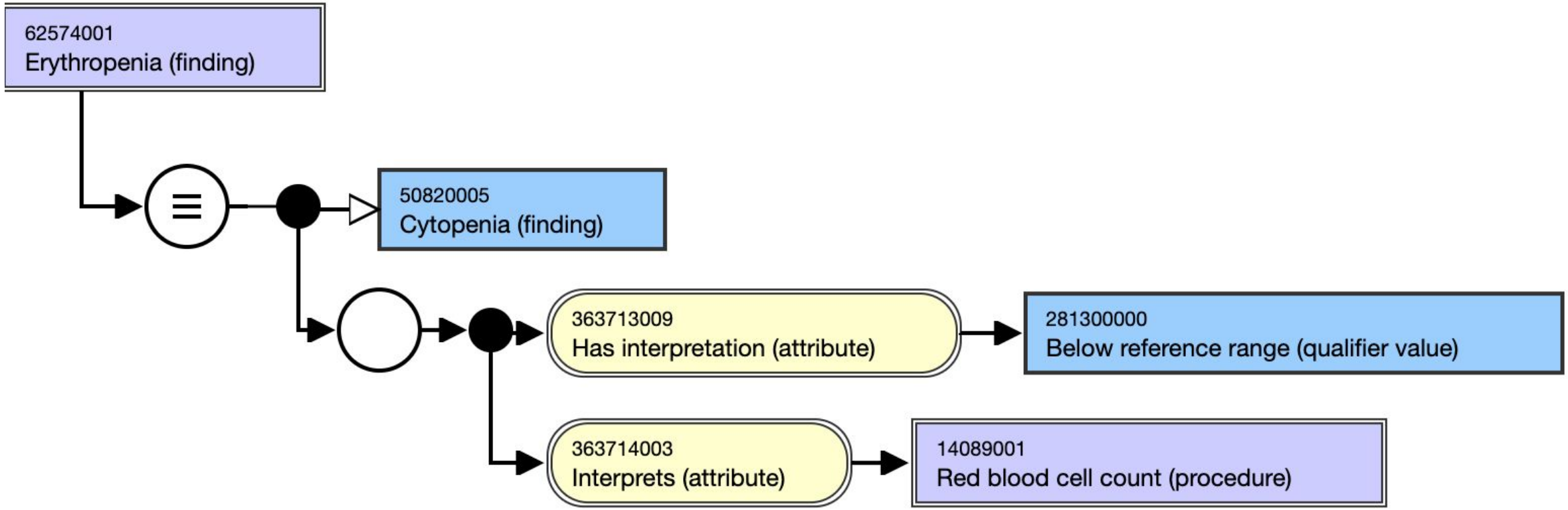
Implementation within SNOMED CT

- Define concepts in other hierarchies

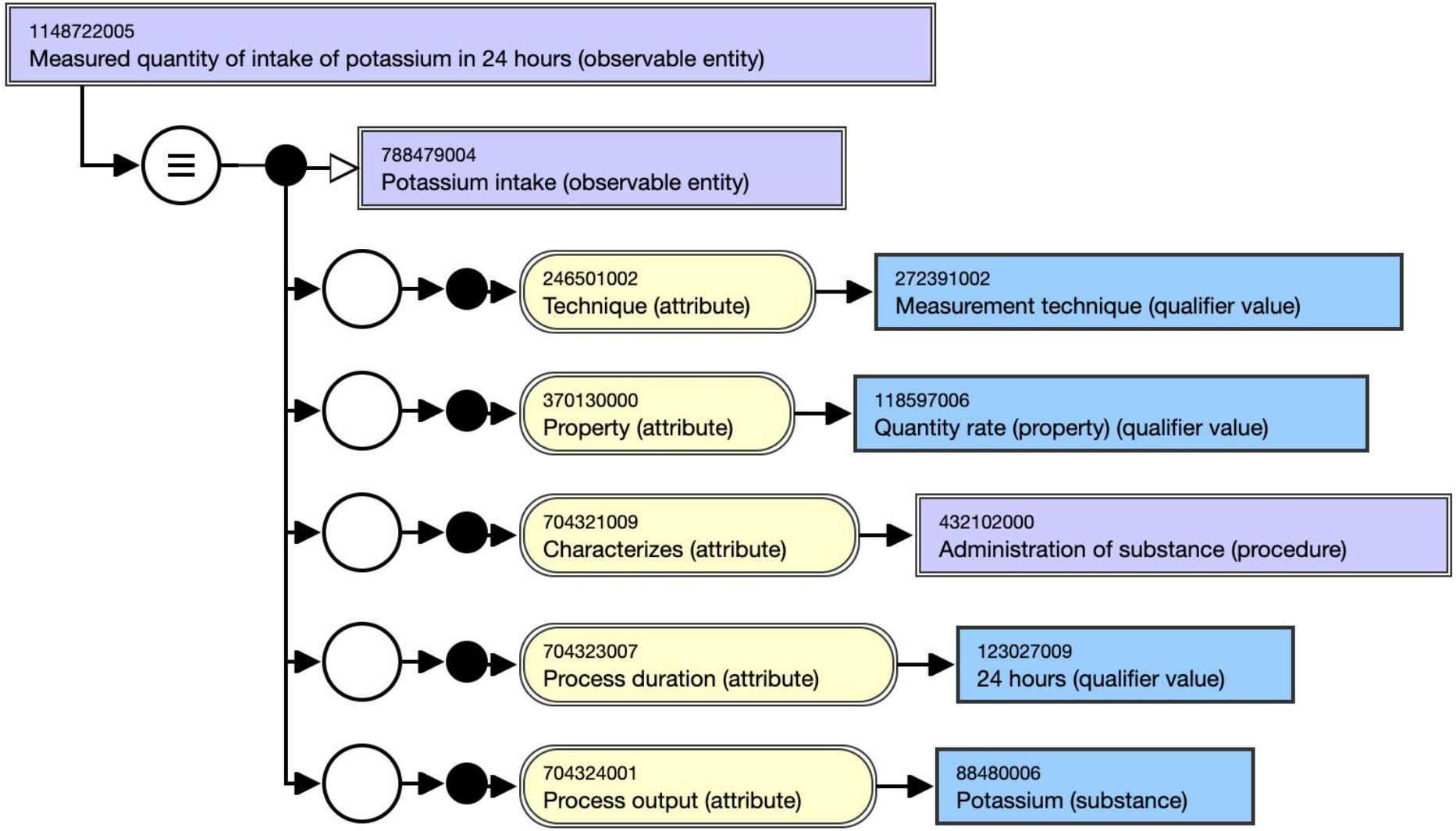


Implementation within SNOMED CT

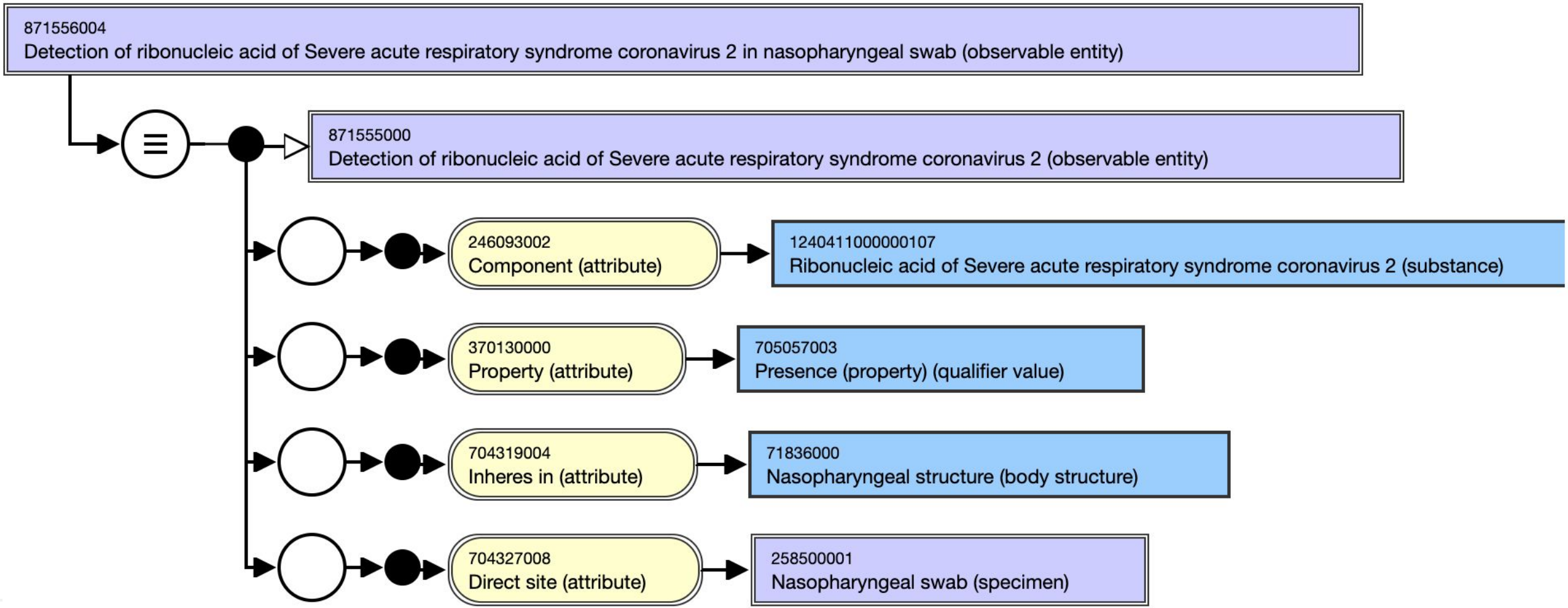
- Define concepts in other hierarchies



Implementation within SNOMED CT



Implementation within SNOMED CT

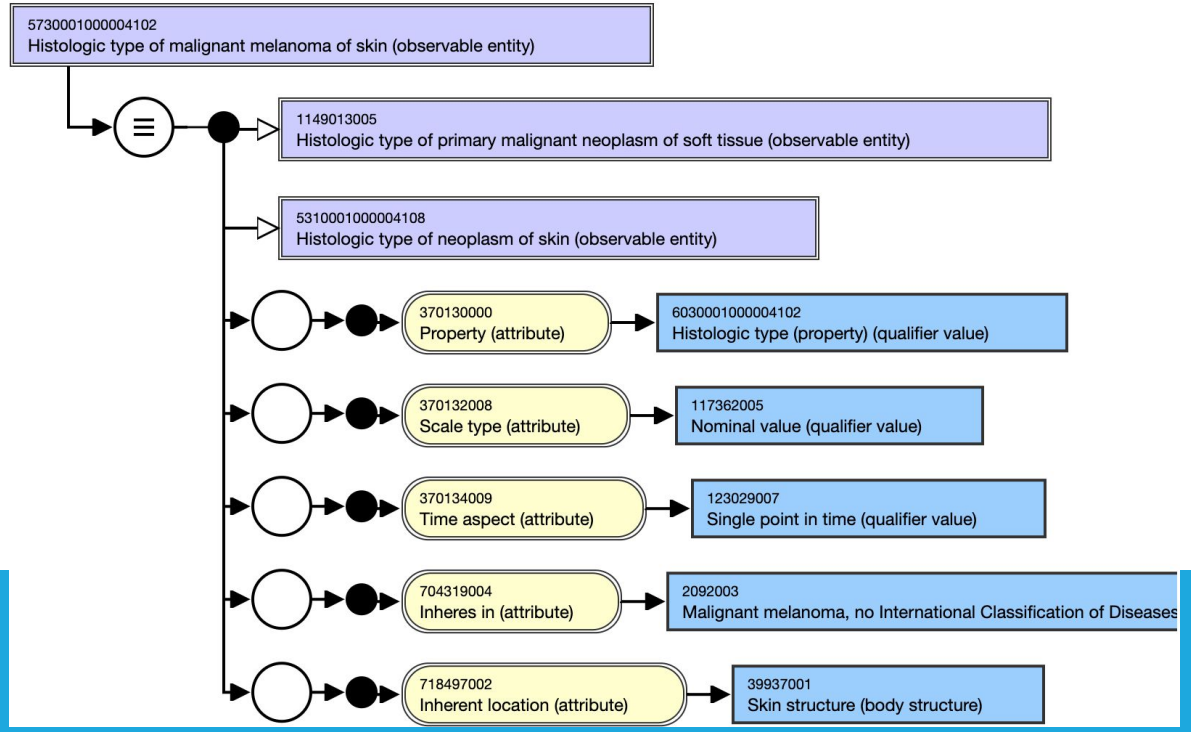


Implementation in information models

- Clinical content in health record/EHR, e.g., “body temperature”
- Laboratory information system, e.g., “organism identified”
- Checklists, e.g., “site of metastatic invasion” in cancer synoptic report
- Surveys/interviews, e.g., “age when started smoking”
- SNOMED on FHIR Observation profiles

Other applications

- Cancer Synoptic Reporting
  - ~500 observable entity concepts
  - currently viewable in community content browser and being reviewed for addition to international release starting in July 2021



Other applications

- Antimicrobial susceptibility observable (disposition observable)
  - Template drafted but not implemented yet
- SNOMED CT - LOINC Cooperation Project
  - Modeled >22K lab LOINC Terms using observable entity model (via post-coordinated expressions)

How to get involved with observables

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SNOMED International: Delivering SNOMED CT

How to get involved with observables

- Observable and Investigation Model Project Group
- Templates
- SNOMED CT Editorial Guide

Observable and Investigation Model Project Group (OIMPG)

Daniel Karlsson is the chair of the OIMPG

Group meets monthly (third Monday at 20 UTC)

Confluence area for discussions

CRGs bring questions to the group for discussion, e.g., MABH PG, CSRPG, Anesthesia CRG

More information: https://confluence.ihtsdotools.org/x/Wo4eAQ

Observable templates

Two “Simple” templates available as starting point and can be modified for purpose:

- Simple template for quality observable: https://confluence.ihtsdotools.org/display/SCTEMPLATES/Simple+template+for+Quality+Observable
- Simple template for process observable: https://confluence.ihtsdotools.org/display/SCTEMPLATES/Simple+template+for+Process+Observable?src=contextnavpagetreemode

See subtype templates of above for more examples, e.g. A nutritional intake template

Future refinements based on testing and feedback

“Simple” template for quality observable

Simple template for Quality Observable

Created by Suzanne Santamaria, last modified on 2021-Mar-03

Status	Ready for implementation
Version	1.0

Descriptions:

Term	description type	Language/acceptability	Langauge/acceptability	Case significance
[property] of [component] to [relative to] in [inheres in] measured in [time aspect] at [direct site] by [technique] using [using device] [precondition] (observable entity)	FSN	US:PT	GB:PT	ci
[property] of [component] to [relative to] in [inheres in] measured in [time aspect] at [direct site] by [technique] using [using device] [precondition]	PT	US:PT	GB:PT	ci

Concept model:

Attribute cardinality	Attribute	Value	Role group cardinality
1.. 1	116680003 |Is a (attribute)|	363787002 |Observable entity (observable entity)|	N/A
0.. *	246093002 |Component (attribute)|	<< 105590001 |Substance (substance)| OR << 123037004 |Body structure (body structure)| OR << 123038009 |Specimen (specimen)| OR << 260787004 |Physical object (physical object)| OR << 373873005 |Pharmaceutical / biologic product (product)| OR << 410607006 |Organism (organism)| OR << 419891008 |Record artifact (record artifact)|	0..*
0..1	370130000 |Property (attribute)|	<< 118598001 |Property (qualifier value)|	0..1

SNOMED CT Editorial Guide

Observable entity section of the SNOMED CT Editorial Guide

https://confluence.ihtsdotools.org/display/DOCEG/Observable+Entity

Editorial guide being updated for July 2021 release

Requirements

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Requirements

- **Current topics at OIMPG**
  - “Settable” or “Parameter” or “Target” observables
  - Modeling scale observables
  - ...plus backlog of topics such as risks, likelihood, probability
- **Discussion by group**

THANK YOU

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