

New concept proposal

Procedure

Author	Kristin Gnodtke	Date last updated	18.05.2022
Project	All	Contact person	-
Dataset release	2022.1	Consulted expert	-

1. Rationale

In the current version of the SPHN Dataset there are several concepts defined that are procedures, e.g. *FOPH Procedure*, *Radiotherapy Procedure*, *Diagnostic Radiologic Examination* and further procedure concepts are in development, e.g. imaging procedure and ECG procedure. Those procedures cannot be of type *FOPH Procedure*, as not all of them hold a CHOP code. A more general concept *Procedure* is needed to capture different “types” of procedures for inpatients as well as for outpatients. This general *Procedure* concept is meant to serve as parent concept for all more granular procedure concepts and needs to contain the composedOfs that all procedures have in common.

2. Comparison to other standards/data models

2.1. SNOMED CT

In SNOMED CT there is a hierarchy of procedures and the top level concept of this hierarchy is: 71388002 [Procedure (procedure)].

2.2. LOINC

There are single LOINC codes for procedures such as 29306-8 Surgery Procedure but LOINC does not cover a comprehensive number of different types of procedures.

2.3. ICHI

The international Classification of Health Interventions (ICHI) by the World Health Organization (WHO) is being developed to provide a common tool for reporting and analysing health interventions for statistical purposes. ICHI describes a healthcare procedure as follows: “A health intervention is an act performed for, with or on behalf of a person or population whose purpose is to assess, improve, maintain, promote or modify health, functioning or health conditions.”

Example of an ICHI code (contains 3 pieces of information (axes): target, action, means):

Foundation URI: <http://id.who.int/icd/entity/189282853>

ICHI code	EAA.AD.AA
Target	EAA - Pituitary gland
Action	AD - Biopsy
Means	AA - Open approach
ICHI descriptor	Biopsy of pituitary gland

Source: <https://icd.who.int/dev11/l-ichi/en>

The Beta-2 version of ICHI was released in October 2018. Further testing will be undertaken during 2019 and once finalized, ICHI will be freely available for adoption by Member States.

2.4. HL7 FHIR

HL7 FHIR provides a resource called Procedure and describes the concept as follows “An action that is or was performed on or for a patient. This can be a physical intervention like an operation, or less invasive like long term services, counseling, or hypnotherapy.”

2.5. UMLS

Procedure (CUI: C2700391): There are two different definitions of procedure present in UMLS (status of 15.09.2021):

Definitions (2)

Any stepwise set of actions. (NCI)

Observations generated by other procedures. This category includes observations resulting from interventional and non-interventional procedures excluding lab and imaging (e.g. cardiology catheterization, endoscopy, electrodiagnostics, etc.). Procedure results are typically generated by a clinician to provide more granular information about component observations made during a procedure, such as where a gastroenterologist reports the size of a polyp observed during a colonoscopy.

(HL7V3.0)

3. Concept information

Concept name	Description	Type	Standard	Value set	Meaning binding SNOMED CT	Meaning binding LOINC
Procedure	invasive or non-invasive intervention performed for, with or on behalf of an individual whose purpose is to assess, improve, maintain, promote or modify health, functioning or health conditions				71388002 [Procedure (procedure)]	
code	code, name, coding system and version of the procedure	Code	SNOMED CT, CHOP, or other			
body site	body site where procedure was performed	Body Site				
start datetime	datetime the procedure started	temporal			442371002 [Start time of procedure (observable entity)]	80989-7 Date of procedure
end datetime	datetime the procedure ended	temporal				
coding datetime	datetime the procedure was coded	temporal				
intent	intention for the procedure	Intent				

4. Impact on the SPHN Dataset

For the existing procedure concepts *FOPH Procedure*, *Radiotherapy Procedure*, *Diagnostic Radiologic Examination*, the type would change to *Procedure* (instead of empty or *FOPH Procedure*), and the properties *code*, *body site*, *start datetime*, *end datetime* and *intent* would need to be added if not existing yet or change to inherited (instead of composedOf).

4.1. FOPH Procedure

Currently released version of concept *FOPH Procedure*

SPHN Dataset version: 2021.1

Unique concept ID: 0000000323

Concept or concept compositions or inherited	Concept name	Description	Type	Standard	Value set	Meaning binding SNOMED CT	Meaning binding LOINC
concept	FOPH Procedure	procedure, coded respecting the rules of FOPH and used for building the DRGs, e.g. Z57.34 open biopsy of the urinary bladder				71388002 Procedure (procedure)	
composedOf	code	code, name, coding system and version of the procedure	Code	CHOP			
composedOf	datetime	datetime at which the procedure took place	temporal			439272007 Date of procedure (observable entity)	80989-7 Date of procedure
composedOf	procedure rank	specifies the rank if applicable	qualitative		principal; supplementary	277367001 Nature of procedure values (qualifier value)	
composedOf	intent	intention for the procedure	Intent				

Proposed adaptation of concept *FOPH Procedure*

Concept or concept compositions or inherited	Concept name	Description	Type	Standard	Value set	Meaning binding SNOMED CT	Meaning binding LOINC
concept	FOPH Procedure	procedure, coded respecting the rules of FOPH and used for building the DRGs, e.g. Z57.34 open biopsy of the urinary bladder	Procedure				
inherited	code	code, name, coding system and version of the procedure	Code	CHOP			
inherited	coding datetime	datetime the procedure was coded	temporal				
inherited	start datetime	datetime the procedure started	temporal				
inherited	end datetime	datetime the procedure ended	temporal				
composedOf	procedure rank	specifies the rank if applicable	qualitative		principal; supplementary	277367001 Nature of procedure values (qualifier value)	
inherited	body site	body site where procedure was performed	Body Site				
inherited	intent	intention for the procedure	Intent				

4.2. Radiotherapy Procedure

Currently released version of concept *Radiotherapy Procedure*

SPHN Dataset version: 2021.1

Unique concept ID: 0000000420

Concept or concept compositions or inherited	Concept name	Description	Type	Standard	Value set	Meaning binding SNOMED CT	Meaning binding LOINC
concept	Radiotherapy Procedure	given radiotherapy procedure during oncological treatment				108290001 Radiation oncology AND/OR radiotherapy (procedure)	
composedOf	code	code of the given radiotherapy procedure	Code	SNOMED CT 2021-01-31	33195004 Teleradiotherapy procedure (procedure); 115959002 Stereotactic radiosurgery (procedure); 395096001 Stereotactic radiotherapy (procedure); 152198000 Brachytherapy (procedure); 399315003 Radionuclide therapy (procedure); 168524008 Radiotherapy - intraoperative control (procedure); 78080008 Hyperthermia treatment of cancer (procedure); 74964007 Other (qualifier value)		
composedOf	start time	datetime at which the radiotherapy session started	temporal				

composedOf	end time	datetime at which the radiotherapy session ended	temporal		
composedOf	target body site	body site where radiotherapy is performed	Body Site		
composedOf	fractions number	number of fractions applied during radiotherapy	quantitative		228862004 Number of fractions (observable entity)
composedOf	radiation amount	amount of radiation delivered according to the value displayed by the machine	quantitative		371892002 Delivered radiation dose (observable entity)
composedOf	unit	unit of the amount of radiation delivered	Unit	Gy; cGy; mCi; MBq	
composedOf	intent	the intent of the radiotherapy procedure, e.g. if curative or palliative	Intent		

Proposed adaptation of concept *Radiotherapy Procedure*

Concept or concept compositions or inherited	Concept name	Description	Type	Standard	Value set	Meaning binding SNOMED CT	Meaning binding LOINC
concept	Radiotherapy Procedure	given radiotherapy procedure during oncological treatment	Procedure			108290001 Radiation oncology AND/OR radiotherapy (procedure)	
inherited	code	code of the given radiotherapy procedure	Code	SNOMED CT 2021-01-31	33195004 Teleradiotherapy procedure (procedure); 115959002 Stereotactic radiosurgery (procedure); 395096001 Stereotactic radiotherapy (procedure); 152198000 Brachytherapy (procedure); 399315003 Radionuclide therapy (procedure); 168524008 Radiotherapy - intraoperative control (procedure); 78080008 Hyperthermia treatment of cancer (procedure); 74964007 Other (qualifier value)		
inherited	start datetime	datetime at which the radiotherapy session started	temporal				
inherited	end datetime	datetime at which the radiotherapy session ended	temporal				
inherited	coding datetime	datetime the procedure was coded	temporal				

inherited	body site	target body site where radiotherapy is performed	Body Site		
composedOf	fractions number	number of fractions applied during radiotherapy	quantitative		228862004 Number of fractions (observable entity)
composedOf	radiation amount	amount of radiation delivered according to the value displayed by the machine	Quantity	Unit: Gy; cGy; mCi; MBq	371892002 Delivered radiation dose (observable entity)
inherited	intent	the intent of the radiotherapy procedure, e.g. if curative or palliative	Intent		

4.3. Diagnostic Radiologic Examination

Currently released version of concept *Diagnostic Radiologic Examination*

SPHN Dataset version: 2021.1

Unique concept ID: 0000000443

Concept or concept compositions or inherited	Concept name	Description	Type	Standard	Value set	Meaning binding SNOMED CT	Meaning binding LOINC
concept	Diagnostic Radiologic Examination	radiographic procedure using the emission of x-rays to form an image of the structure penetrated by the radiation	FOPH Procedure			363680008 [Radiographic imaging procedure (procedure)]	
inherited	code	code, name, coding system and version of the procedure type for the diagnostic radiologic examination	Code	CHOP	Value set defined in SPHN Dataset tab DiagnRadExam		
composedOf	method	method used for the diagnostic radiological examination	qualitative		CT; PET; PET CT; SPECT;MRI; X-ray	278395004 [Imaging technique (qualifier value)]	

composedOf	radiation amount	amount of radiation applied for the diagnostic radiological examination	quantitative		
composedOf	unit	unit of the amount of radiation applied	Unit	Gy; cGy; mCi; MBq	
composedOf	body site	body site where diagnostic radiological examination was performed	Body Site		

Proposed adaptation of concept *Diagnostic Radiologic Examination*

Concept or concept compositions or inherited	Concept name	Description	Type	Standard	Value set	Meaning binding SNOMED CT	Meaning binding LOINC
concept	Diagnostic Radiologic Examination	radiographic procedure using the emission of x-rays to form an image of the structure penetrated by the radiation	Procedure			363680008 [Radiographic imaging procedure (procedure)]	

inherited	code	code, name, coding system and version of the procedure type for the diagnostic radiologic examination	Code	CHOP	Value set defined in SPHN Dataset tab DiagnRadExam	
composedOf	method	method used for the diagnostic radiological examination	qualitative		CT; PET; PET CT; SPECT;MRI; X-ray	278395004 [Imaging technique (qualifier value)]
composedOf	radiation amount	amount of radiation applied for the diagnostic radiological examination	Quantity		Unit: Gy; cGy; mCi; MBq	
inherited	body site	body site where diagnostic radiological examination was performed	Body Site			
inherited	start datetime	datetime at which the diagnostic radiologic examination started	temporal			
inherited	end datetime	datetime at which the diagnostic radiologic	temporal			

		examination ended	
inherited	coding datetime	datetime the procedure was coded	temporal
inherited	intent	the intent of the diagnostic radiologic examination	Intent

5. Discussion

The newly created general *Procedure* concept can be instantiated and allows to capture procedure data without specifying the type of procedure explicitly through separate SPHN concepts. This is attractive especially for capturing procedure data encoded in semantic standards that come with knowledge structures allowing to retrieve the type of procedure from the semantic standard itself, such as SNOMED CT. Furthermore, the *Procedure* concept serves as template (blue print) for more granular procedure concepts such as ECG Procedure, Radiotherapy Procedure, and common properties of a procedure are defined only once.