Change request

Diagnosis / FOPH Diagnosis / Nursing Diagnosis

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Project	General interest	**Contact**	DCC
Dataset release	2024.1	**Consulted expert**	

1 Change request input / rationale

The introduction of the Provenance-concept expands dat by additional metainformation. In this context, the concept 'Semantic Mapping' ("process of transforming data elements to a code") is introduced in release 2024.1. It is designed and intended to cover mapping and coding events and makes the 'coding datetime' composedOfs of Diagnosis and Procedure as well as of inheriting concepts obsolete.

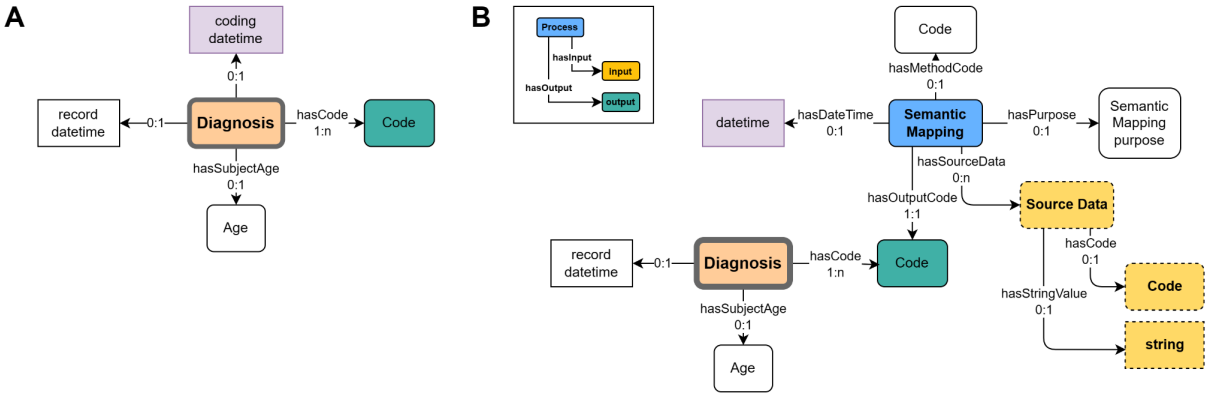

Figure 1: Representation of 'coding datetime' in the 'Diagnosis'-concept

(A) Explicit 'coding datetime' (purple) of Diagnosis (release 2023.2) (B) Implicit 'coding datetime' of 'Diagnosis' using the 'datetime'-composedOf of 'Semantic Mapping' (release 2024.1). The dashed borders of 'Source Data' (yellow) emphasize the optional character of 'Source Data' in the context of 'Semantic Mapping' (cardinality 0:n). Inset: Process-oriented design: Processes feature input and output.
Note: 'coding datetime' and 'record datetime' (A) as well as 'method code' and 'output code' (B) are shown separately for better accessibility.

2 Comparison to other standards/data models

The rationale for this particular change request roots in a general change in the SPHN schema, an extensive comparison to other standards is therefore not indicated.

2.1 FHIR

FHIR features diagnosis-related information under 'Condition', defined as "A clinical condition, problem, diagnosis, or other event, situation, issue, or clinical concept that has risen to a level of concern.". 'Condition' has a 'code'-attribute which, however, does not feature information on the time of code assignment.
Further time information is provided by Condition.recordedDate ("Date condition was first recorded", "The recordedDate represents when this particular Condition record was created in the system, which is often a system-generated date."), directly linked to 'Condition' akin to the record datetime' of SPHN Diagnosis.

2.2 OMOP

The 'CONDITION_OCCURRENCE' table of the OMOP data model features several fields relevant in the context of code assignment and data provenance, including:

- 'condition_source_concept_id' ("A foreign key to a Condition Concept that refers to the code used in the source")
- 'condition_source_value' ("The source code for the condition as it appears in the source data. This code is mapped to a standard condition concept in the Standardized Vocabularies and the original code is stored here for reference.")

The field 'condition_start_datetime' refers to "The date and time when the instance of the Condition is recorded.", i.e., it corresponds to SPHN 'record datetime'.
There is no explicit time information on code assignment.

3 Change content

3.1 Diagnosis

3.1.1 Currently released concept

Concept or concept compositions or inherited	General concept name	General description	Contextualized concept name	Contextualized description	Type	Standard	Value set or subset	Meaning binding	Cardinality for composedOf
concept	Diagnosis	determination of the presence of a disease, condition, or injury from expressed signs and symptoms and assessments such as physical examination, laboratory test, or the like	Diagnosis	determination of the presence of a disease, condition, or injury from expressed signs and symptoms and assessments such as physical examination, laboratory test, or the like				SNOMED CT: 439401001 |Diagnosis (observable entity)|	
composedOf	code	code, name, coding system and version describing the concept	code	code, name, coding system and version used to describe the diagnosis	Code	SNOMED CT, ICD-10, ICD-O-3 Topography, ICD-O-3 Morphology, NANDA, ORPHA or other			1:n
composedOf	record datetime	datetime the concept was recorded	record datetime	datetime the diagnosis was recorded	temporal				0:1

composedOf	coding datetime	datetime the concept was coded	coding datetime	datetime the diagnosis was coded	temporal				0:1
composedOf	subject age	age of the individual at the time of the event	subject age	age of the individual at the time of diagnosis	Age				0:1

General concept name	Cardinality for concept to Administrative Case	Cardinality for concept to Data Provider Institute	Cardinality for concept to Subject Pseudo Identifier
Diagnosis	0:1	1:1	1:1

3.1.2 Proposed new concept

Concept or concept compositions or inherited	General concept name	General description	Contextualized concept name	Contextualized description	Type	Standard	Value set or subset	Meaning binding	Cardinality for composedOf
concept	Diagnosis	determination of the presence of a disease, condition, or injury from expressed signs and symptoms and assessments such as physical examination, laboratory test, or the like	Diagnosis	determination of the presence of a disease, condition, or injury from expressed signs and symptoms and assessments such as physical examination, laboratory test, or the like				SNOMED CT: 439401001 |Diagnosis (observable entity)|	

composedOf	code	coded information specifying the concept	code	coded diagnosis information	Code	SNOMED CT; ICD-10; ICD-O-3 Topography; ICD-O-3 Morphology; NANDA; ORPHA or other			1:n
composedOf	record datetime	datetime the concept was recorded	record datetime	datetime the diagnosis was recorded	temporal				0:1
composedOf	subject age	age of the individual at the time of the event	subject age	age of the individual at the time of diagnosis	Age	SNOMED CT; ICD-10; ICD-O-3 Topography; ICD-O-3 Morphology; NANDA; ORPHA or other			0:1

General concept name	Cardinality for concept to Administrative Case	Cardinality for concept to Data Provider Institute	Cardinality for concept to Subject Pseudo Identifier	Cardinality for concept to Source System
Diagnosis	0:1	1:1	1:1	1:1

3.2 FOPH Diagnosis

3.2.1 Currently released concept

Concept or concept compositions or inherited	General concept name	General description	Contextualized concept name	Contextualized description	Type	Standard	Value set or subset	Meaning binding	Cardinality for composedOf
concept	FOPH Diagnosis	discharge diagnosis given respecting the rules of FOPH and used for building the DRGs, e.g. K35 acute appendicitis	FOPH Diagnosis	discharge diagnosis given respecting the rules of FOPH and used for building the DRGs, e.g. K35 acute appendicitis	Diagnosis	-		SNOMED CT: 89100005 |Final diagnosis (discharge) (contextual qualifier) (qualifier value)|; LOINC: 38999-9 Hospital discharge DRG [Interpretation]	
inherited	code	code, name, coding system and version describing the concept	code	code, name, coding system and version of the FOPH diagnosis	Code	ICD-10			1:1
inherited	record datetime	datetime the concept was recorded	record datetime	datetime the diagnosis was recorded	temporal				0:1
inherited	coding datetime	datetime the concept was coded	coding datetime	datetime the diagnosis was coded	temporal				0:1
composedOf	rank	specifies the level of the concept	diagnosis rank	specifies the level of diagnosis	qualitative		principal; secondary; complementary		0:1

inherited	subject age	age of the individual at the time of the event	subject age	age of the individual at the time of diagnosis	Age				0:1

General concept name	Cardinality for concept to Administrative Case	Cardinality for concept to Data Provider Institute	Cardinality for concept to Subject Pseudo Identifier
FOPH Diagnosis	0:1	1:1	1:1

3.2.2 Proposed new concept

Concept or concept compositions or inherited	General concept name	General description	Contextualized concept name	Contextualized description	Type	Standard	Value set or subset	Meaning binding	Cardinality for composedOf
concept	FOPH Diagnosis	discharge diagnosis given respecting the rules of FOPH and used for building the DRGs, e.g. K35 acute appendicitis	FOPH Diagnosis	discharge diagnosis given respecting the rules of FOPH and used for building the DRGs, e.g. K35 acute appendicitis	Diagnosis	-		SNOMED CT: 89100005 |Final diagnosis (discharge) (contextual qualifier) (qualifier value)|; LOINC: 38999-9 |Hospital discharge DRG [Interpretation]|	
inherited	code	coded information specifying the concept	code	coded FOPH diagnosis information	Code	ICD-10			1:1

inherited	record datetime	datetime the concept was recorded	record datetime	datetime the diagnosis was recorded	temporal				0:1
composedOf	rank	specifies the level of the concept	diagnosis rank	specifies the level of diagnosis	qualitative		Principal; Secondary; Complementary		0:1
inherited	subject age	age of the individual at the time of the event	subject age	age of the individual at the time of diagnosis	Age				0:1

General concept name	Cardinality for concept to Administrative Case	Cardinality for concept to Data Provider Institute	Cardinality for concept to Subject Pseudo Identifier	Cardinality for concept to Source System
FOPH Diagnosis	0:1	1:1	1:1	1:1

3.3 Nursing Diagnosis

3.3.1 Currently released concept

Concept or concept compositions or inherited	General concept name	General description	Contextualized concept name	Contextualized description	Type	Standard	Value set or subset	Meaning binding	Cardinality for composedOf
concept	Nursing Diagnosis	clinical judgment concerning a human response to health conditions/life processes, or a vulnerability for that response, by an individual, family, group or community; a nursing diagnosis provides the basis for selection of nursing interventions to achieve outcomes for which the nurse has accountability	Nursing Diagnosis	clinical judgment concerning a human response to health conditions/life processes, or a vulnerability for that response, by an individual, family, group or community; a nursing diagnosis provides the basis for selection of nursing interventions to achieve outcomes for which the nurse has accountability	Diagnosis				
composedOf	code	code, name, coding system and version describing the concept	code	code, name, coding system and version used to describe the nursing diagnosis	Code	NANDA			1:1
composedOf	record datetime	datetime the concept was recorded	record datetime	datetime the diagnosis was recorded	temporal				0:1
composedOf	coding datetime	datetime the concept was coded	coding datetime	datetime the diagnosis was coded	temporal				0:1

composedOf	subject age	age of the individual at the time of the event	subject age	age of the individual at the time of diagnosis	Age				0:1

General concept name	Cardinality for concept to Administrative Case	Cardinality for concept to Data Provider Institute	Cardinality for concept to Subject Pseudo Identifier
Nursing Diagnosis	0:1	1:1	1:1

3.3.2 Proposed new concept

Concept or concept compositions or inherited	General concept name	General description	Contextualized concept name	Contextualized description	Type	Standard	Value set or subset	Meaning binding	Cardinality for composedOf
concept	Nursing Diagnosis	clinical judgment concerning a human response to health conditions/life processes, or a vulnerability for that response, by an individual, family, group or community; a nursing diagnosis provides the basis for selection of nursing interventions to achieve outcomes for	Nursing Diagnosis	clinical judgment concerning a human response to health conditions/life processes, or a vulnerability for that response, by an individual, family, group or community; a nursing diagnosis provides the basis for selection of nursing interventions to achieve outcomes for	Diagnosis				

		which the nurse has accountability		which the nurse has accountability					
composedOf	code	coded information specifying the concept	code	coded nursing diagnosis information	Code	NANDA			1:1
composedOf	record datetime	datetime the concept was recorded	record datetime	datetime the diagnosis was recorded	temporal				0:1
composedOf	subject age	age of the individual at the time of the event	subject age	age of the individual at the time of diagnosis	Age				0:1

General concept name	Cardinality for concept to Administrative Case	Cardinality for concept to Data Provider Institute	Cardinality for concept to Subject Pseudo Identifier	Cardinality for concept to Source System
Nursing Diagnosis	0:1	1:1	1:1	1:1

4 Pros and cons

4.1 Advantages

Providing the 'coding datetime' via the concept 'Semantic Mapping' instead of directly linking it to 'Diagnosis' and subconcepts enables the provision of a datetime for code assignment and potentially additional information in the future (see 6. Discussion).
In general, the introduction of the Provenance concepts allows to represent information on the data provenance, i.e., metadata that explains how the data were generated and where they came from, gives an indication about data quality and allows the researcher to assess whether the data are suitable for his or her type of data science (fit for purpose).

4.2 Disadvantages

The proposal does not feature conceptual disadvantages. The new concept design, however, needs to be communicated thoroughly to data providers to avoid the impression that the information on 'coding datetime' has gotten lost by the redesign of the concept (compare Figure 1). Data pipelines and SPARQL-queries will need to be adjusted accordingly. In part, this will be taken care of by the new release of Schema Forge (2024.1).

5 Impact on SPHN Dataset

Diagnosis and its child-concepts FOPH Diagnosis and Nursing Diagnosis are covered by this change request, to be in force with release 2024.1.
ICD-O Diagnosis has been deprecated as of release 2024.1 and is therefore not included in this change request.

6 Discussion

The introduction of the Provenance-concept 'Semantic Mapping' has made the 'coding datetime' composedOfs of Diagnosis and Procedure as well as of inheriting concepts obsolete. The 'datetime'-composedOf of 'Semantic Mapping' will replace the respective 'coding datetime'-composedOfs (compare Figure 1).

This new concept design (release 2024.1) is at first glance less intuitive than the current one (release 2023.2) where a composedOf 'coding datetime' is directly linked to 'Diagnosis' or 'Procedure'. The change, however, comes at the benefit of being able to better represent information on data origin.
The design changes need to be communicated thoroughly to data providers to avoid the impression that it is no longer possible to represent the 'coding datetime' of diagnoses and procedures (compare Figure 1).

While other standards feature 'record datetime' and diagnosis codes (see 2. Comparison to other standards/data models), the Provenance concept 'Semantic Mapping' goes beyond this and allows to

provide information when a code was actually assigned. In future releases, this metainformation could be expanded further, for example, by information on the performer of the code assignment or the confidence level.

7 Example

Diagnosis

code: SNOMED CT:44054006 |Diabetes mellitus type 2 (disorder)|
record datetime: 2023-10-18T16:32:15+01:00
subject age:
  age:
    quantity:
      value: 75
      unit: a
    determination datetime: 2023-10-17T11:31:52+01:00

FOPH Diagnosis

code: ICD-10-GM:E11.80 |Diabetes mellitus, Typ 2: Mit nicht näher bezeichneten Komplikationen: Nicht als entgleist bezeichnet|
record datetime: 2022-05-27T09:30:10+01:00
rank: Principal
subject age:
  age:
    quantity:
      value: 82
      unit: a
    determination datetime: 2022-05-26T21:30:42+01:00