New concept proposal

Tumor Stage Assessment Event, Tumor Stage Assessment

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Dataset Release	2024.1	Consulted expert	-

1   Change request input / rationale

Multiple specifications exist for tumor staging, and the current version of the Tumor Stage concept cannot hold any information about which system is used. Therefore, it is suggested to deprecate the present Tumor Stage concept and replace it by the newly proposed concepts Tumor Stage Assessment Event and Tumor Stage Assessment.

2   Comparison to other standards/data models

2.1   NCI thesaurus
NCI thesaurus has codes representing numerous staging systems.

- Ann Arbor Lymphoma Staging System
- Atypical Teratoid/Rhabdoid Tumor Staging System
- Binet Staging System
- Children's Oncology Group Staging System
- Collaborative Staging
- Derkay Staging System
- Dukes' Classification
- Embryonal Tumor with Multilayered Rosettes Staging System
- Enneking Staging System
- Evans Staging System
- French-American-British Classification

- Intergroup Rhabdomyosarcoma Study Group Clinical Staging and Grouping System
- International Neuroblastoma Risk Group Staging System
- International Neuroblastoma Staging System
- International Society of Pediatric Oncology Staging System
- International Staging System for Myeloma
- Medulloblastoma Staging System
- Modified Chang Staging System for Medulloblastoma
- Pediatric Oncology Group Neuroblastoma Staging System
- Pineoblastoma Staging System
- PRETEXT Staging System
- Rai Staging System
- Reese-Ellsworth Staging System
- SIOP/COG/NWTSG Staging System
- TNM Staging System
- Whitmore-Jewett Staging System

NCI thesaurus has stages that are specific to the system used (and sometimes diagnosis); Stage II Childhood Ovarian Germ Cell Tumor by Toronto Guidelines v2 (Code C198447) and Stage II Ovarian Germ Cell Tumor AJCC v6 and v7 (Code C8084). Codes for TNM values are also in NCI thesaurus, but these are represented in the SPHN Dataset via another concept (TNM Classification).

2.2 SNOMED CT
Similar to NCI thesaurus, SNOMED CT has codes representing numerous staging systems.

- American Joint Commission on Cancer, Cancer Staging Manual, 6th edition neoplasm staging system
- American Joint Commission on Cancer, Cancer Staging Manual, 7th edition neoplasm staging system
- American Joint Commission on Cancer, Cancer Staging Manual, 8th edition neoplasm staging system
- American Urological Association staging system for prostate cancer
- Ann Arbor lymphoma staging system
- Astler-Coller staging system
- Breslow system for melanoma staging
- Clark system for melanoma staging
- Cotswolds Hodgkin's disease tumor staging system
- Dukes staging system
- International Federation of Gynecology and Obstetrics staging system of gynecological malignancy
- International neuroblastoma staging system
- Malignant tumor staging

- Marshall Modification of Jewett-Strong staging system for urinary bladder tumor
- Modified Astler-Coller staging system
- National Wilms' tumor study staging system
- Siopel liver staging system
- St Jude's malignant histiocytosis tumor staging system
- St Jude's non-Hodgkin's lymphoma staging system
- Stannard staging system for retinoblastoma
- Testicular tumor staging systems
- Trophoblastic malignancy staging system
- United Kingdom children's cancer study group central nervous system tumor staging system
- Walter Reed staging of prostatic cancer

SNOMED CT represents the stage value Clinical stages that are findings and Stages that are qualifier values.

2.3 LOINC

LOINC has the concept Stage group.clinical Cancer (21908-9) and its normative answer list LL240-3 contains codes for stage I, II, III, IV among other modificators (for instance IVA, IVB, IIS), from AJCC.

3 Change content

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
concept	Tumor Stage	growth extent of the tumor and how far the tumor has spread	Tumor Stage	growth extent of the tumor and how far the tumor has spread				SNOMED CT: 254292007 |Tumor staging (tumor staging)|; LOINC: 21908-9 Stage group.clinical Cancer
composedOf	code	code, name, coding system and version describing the concept	code	code, name, coding system and version used to assess the tumor stage with TNM or other staging system	Code			
composedOf	assessment datetime	datetime at which the concept was assessed	assessment datetime	datetime at which the staging was assessed	temporal			

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3.2 Proposed new concept Tumor Stage Assessment

Concept or concept compositions or inherited	General concept name	General description	Contextualized concept name	Contextualized description	Type	Standard & Value set or subset	Meaning binding	Cardinalities
Concept	Tumor Stage Assessment	staging system used to assess the spread of the oncology disease	Tumor Stage Assessment	staging system used to assess the spread of the oncology disease	Assessment		SNOMED CT: 254292007 |Tumor staging (tumor staging)|	
inherited	code	coded information specifying the concept	staging system	coded information specifying the tumor stage assessment	Code	SNOMED CT descendant of: 254292007 | Tumor staging (tumor staging) |		0:1
inherited	name	name associated to the concept	name	name associated to the tumor stage assessment	string			0:1
inherited	component	part of the concept	component	part of the tumor stage assessment	AssessmentComponent			0:n

Concept or concept compositions or inherited	General concept name	General description	Contextualized concept name	Contextualized description	Type	Standard & Value set or subset	Meaning binding	Cardinalities
inherited	result	evaluation outcome associated to the concept	result	evaluation outcome associated to the tumor stage assessment	Result	code restricted to: 138875005 |SNOMED CT Concept (SNOMED RT+CTV3)|		0:1[1]

3.3 Proposed new concept Tumor Stage Assessment Event

Concept or concept compositions or inherited	General concept name	General description	Contextualized concept name	Contextualized description	Type	Standard and Value set or subset	Meaning binding	Cardinalities
Concept	Tumor Stage Assessment Event	evaluation of the tumor stage at a given time, which takes into account a predefined staging system	Tumor Stage Assessment Event	evaluation of the tumor stage at a given time, which takes into account a predefined staging system	Assessment Event			
composedOf	assessment	evaluation tool associated to the concept	assessment	evaluation tool associated to the tumor stage assessment event	Tumor Stage Assessment			1:1
composedOf	datetime	datetime of the concept	datetime	datetime when the tumor stage assessment event was performed	temporal			1:1

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[1] The assessment (not the component) should link to maximum one result, which represents the "total" result. If more than one result is available, assessment components should be instantiated.

Concept or concept compositions or inherited	General concept name	General description	Contextualized concept name	Contextualized description	Type	Standard and Value set or subset	Meaning binding	Cardinalities
composedOf	performer	type of person who performs or reports the concept	performer	type of person who performs or reports the tumor stage assessment event	Performer			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
Tumor Stage Assessment	0:1	1:1	1:1	1:1
Tumor Stage Assessment Event	0:1	1:1	1:1	1:1

4   Impact on SPHN Dataset

The concept of Tumor Stage will be deprecated and replaced by the concepts Tumor Stage Assessment Event and the Tumor Stage Assessment.

5 Discussion

5.1 Value set of result code

A value set restriction is not possible because it depends on the grading system to use. If SNOMED CT provides codes, use them instead of general qualifiers. Otherwise, SNOMED CT provides generic stages in the descendants of 261612004 | Stages (qualifier value) |. For instance, if you use the American Joint Commission on Cancer (AJCC) staging system, use 1222801008 | American Joint Committee on Cancer stage III (qualifier value) |; if you use another system that has no specific codes made available in SNOMED CT, use 258224005 | Stage 3 (qualifier value) |. The situation is similar in the case of Tumor Grade.

5.2 Meaning bindings

There were two candidates for meaning binding: SNOMED CT: 371508000 | Tumor stage (observable entity) | and SNOMED CT: 254292007 |Tumor staging (tumor staging)|, but neither are the descendants of 273249006 | Assessment scales (assessment scale) | nor 386053000 | Evaluation procedure (procedure) |, which are the respective meaning bindings of Assessment and Assessment Event.

6 Example

The first example is an instantiation of a staging using the commonly used roman-letter system (I to IV).

Tumor Stage Assessment Event

```
assessment:
        code (grading system):
                identifier: 897275008
                name: American Joint Commission on Cancer, Cancer Staging Manual, 8th edition
                        neoplasm staging system (tumor staging)
                system name and version : SNOMED-CT-2023-03-10
        name: -
        component: -
        result:
                code:
                        identifier: 1222801008
                        name: American Joint Committee on Cancer stage III (qualifier value)
                        system name and version: SNOMED-CT-2023-03-10
datetime: 2018-07-01
```

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performer:
      code:
            identifier: 309295000
            name: Clinical oncologist (occupation)
            system name and version: SNOMED-CT-2023-10-01

The second example is an instantiation of an alternative system that is specific to melanoma.

Tumor Stage Assessment Event

assessment:
      code (staging system):
            identifier: 385345007
            name: Clark system for melanoma staging (tumor staging)
            system name and version : SNOMED-CT-2023-03-10
      name: -
      component: -
      result:
            code:
                  identifier: 277734003
                  name: Level 2 (qualifier value)
                  system name and version: SNOMED-CT-2023-03-10
datetime: 2018-07-01
performer:
      code:
            identifier: 309295000
            name: Clinical oncologist (occupation)
            system name and version: SNOMED-CT-2023-10-01