

# ICD-O-3 and SNOMED

# Problem?

- Want to fit dual axis ICD-O-3 site/histology codes into the OMOP/OHDSI CDM.
- Only valid combinations of ICD-O-3 site/histology.
- SEER site/histology validation list provides set of valid combinations for all malignant tumors and benign primary CNS tumors.
- Need single OMOP/OHDSI concept\_id to fit into condition\_occurrence.condition\_concept\_id
- SNOMED clinical findings are the standard concepts for condition\_occurrence.
- Need to map ICD-O-3 site/histology combinations to precoordinated SNOMED clinical finding codes

# SEER Site/Histology Validation List

- 49,831 site/histology valid combinations. Only covers SEER reportable combinations. Benign non-primary CNS neoplasms are not covered.

# SNOMED

- SNOMED is a multi axis vocabulary. Perfectly organized for what we want to accomplish. Three axes of interest.
- Body Structure axis: Morphologically abnormal structure (morphologic abnormality) sub-axis. Which is mapped via a SNOMED refset to ICD-O-3 morphology codes.
- Body Structure axis: Anatomical structure (body structure) sub-axis. Which is mapped via a SNOMED refset to a ICD-O-3 site code.
- Clinical Finding axis: Disease(disorder) sub-axis (which can be a pre-coordinated combination of a 'Finding Site' attribute relationship and an 'Associated Morphology' attribute relationship).

# SNOMED Browser

- <http://browser.ihtsdotools.org/?perspective=full&conceptId1=707455001&edition=us-edition&release=v20170301&server=https://prod-browser-exten.ihtsdotools.org/api/snomed&langRefset=9000000000000509007>
- <http://browser.ihtsdotools.org/?perspective=full&conceptId1=39607008&edition=us-edition&release=v20170301&server=https://prod-browser-exten.ihtsdotools.org/api/snomed&langRefset=9000000000000509007>
- <http://browser.ihtsdotools.org/?perspective=full&conceptId1=39056008&edition=us-edition&release=v20170301&server=https://prod-browser-exten.ihtsdotools.org/api/snomed&langRefset=9000000000000509007>

# Axis to Axis Mapping

- Mappings in SNOMED are accomplished via 'refsets'.
- ICD-O simple map reference set (foundation metadata concept)  
446608001
  - Histologies: 13 unmapped, 854 mapped to one, 198 mapped to more than one
  - Sites: 43 unmapped, 4 mapped to one, 283 mapped to more than one.
- CTV3 simple map reference set (foundation metadata concept)  
9000000000000498005
  - Histologies: 5 unmapped, 1060 mapped to one, 0 mapped to more than one.

# Combination to Precoordinated Code Mappings

- 69,824 SNOMED Disease (disorders) have a pre-coordinated relationship via the 'Finding Site' attribute relationship and an 'Associated Morphology' attribute relationship.
- Found all the matching combination SEER site/histology pairings mapped to SNOMED codes to pre-coordinated SNOMED disorder codes
  - 1,924 mappings from a ICD-O-3 site/histology pairings mapped to SNOMED codes
  - 46 mapped to one, 927 mapped to more than one
  - 973 out of the 49,831 SEER site/histology pairings. 2%

# SNOMED Response

- Axis to axis mapping
  - All ICD-O-3 histologies have been included: one-to-one, many-to-one. Different granularity. Some synonyms in ICD-O-3 are distinct in SNOMED. Some histologies in SNOMED not in ICD-O-3.
  - Not all ICD-O-3 sites are mapped to to SNOMED. 22,826 body structure concepts are mapped to 287 ICD-O codes. The topographical codes from ICD-O are not sufficient for SNOMED CT concept modeling for disorders
- Precoordinating disorders: Not taken approach to precoordinate every combination. Can be fully supported by post-coordination. Disorders are added when we receive customer requests.