



Oncology Diagnoses

- Trying to converge on a standard way to represent oncology diagnoses.
- Adopted ICDO (<https://codes.iarc.fr/>) as the standard way to represent oncology diagnoses.
- ICDO is a dual axis vocabulary of site and histology.
 - ICDO 'Site' or 'Topography' describes the anatomic location of the tumor.
 - ICDO 'Histology' or 'Morphology' describes the cellular character of the tumor.
- Pre-coordinated the most common ICDO site/histology combinations and mapped to or subsumed under SNOMED concepts.
- The extension recommends these pre-coordinated, ICDO site/histology combinations land in:
 - `CONDITION_OCCURRENCE.condition_concept_id` field
 - `EPISODE.episode_object_concept_id` field
- ICDO is in Athena.

ICDO: Site/Histology Mapping to Itself

- Example: oncology diagnosis of
 - ICDO site 'C18.2 Ascending colon'
 - ICDO histology '8140/3 Adenocarcinoma, NOS'.

ICDO: Site/Histology Mapping to Itself SQL

```
SELECT c1.concept_id
      , c1.concept_name
      , c1.vocabulary_id
      , c1.concept_code
      , c1.standard_concept
      , cr.relationship_id
      , c2.concept_id
      , c2.concept_name
      , c2.vocabulary_id
      , c2.concept_code
      , c2.standard_concept
FROM concept c1 JOIN concept_relationship cr on c1.concept_id = cr.concept_id_1 AND cr.relationship_id = 'Maps to'
              JOIN concept c2 on cr.concept_id_2 = c2.concept_id AND c2.standard_concept = 'S'
WHERE c1.concept_class_id = 'ICDO Condition'
AND c1.concept_code = '8140/3-C18.2'
```

ICDO: Site/Histology Mapping to SNOMED

- Example: oncology diagnosis of
 - ICDO site 'C42.1 Bone marrow'
 - ICDO histology '9930/3 Myeloid sarcoma'

ICDO: Site/Histology Mapping to SNOMED SQL

```
SELECT c1.concept_id
      , c1.concept_name
      , c1.vocabulary_id
      , c1.concept_code
      , c1.standard_concept
      , cr.relationship_id
      , c2.concept_id
      , c2.concept_name
      , c2.vocabulary_id
      , c2.concept_code
      , c2.standard_concept
FROM concept c1 JOIN concept_relationship cr on c1.concept_id = cr.concept_id_1 AND cr.relationship_id = 'Maps to'
              JOIN concept c2 on cr.concept_id_2 = c2.concept_id AND c2.standard_concept = 'S'
WHERE c1.concept_class_id = 'ICDO Condition'
AND c1.concept_code = '9930/3-C42.1'
```

ICDO:

Find all ICDO Site/Histology Conditions
that Have a Histology

- Example: find all Site/Histology combinations that have ICDO histology '9440/3 Glioblastoma, NOS'

ICDO

Find all ICDO Site/Histology Conditions that Have a Histology SQL

```
SELECT c1.concept_id
      , c1.concept_name
      , c1.vocabulary_id
      , c1.concept_code
      , c1.standard_concept
      , cr1.relationship_id
      , c2.concept_id
      , c2.concept_name
      , c2.vocabulary_id
      , c2.concept_code
      , c2.standard_concept

FROM concept c1 JOIN concept_relationship cr1 ON c1.concept_id = cr1.concept_id_1 AND cr1.relationship_id = 'Maps to'
              JOIN concept c2              ON cr1.concept_id_2 = c2.concept_id AND c2.standard_concept = 'S'
              JOIN concept_relationship cr2 ON cr2.concept_id_1 = c1.concept_id-- AND cr2.relationship_id = 'Has asso morph'
              JOIN concept c3              ON cr2.concept_id_2 = c3.concept_id

WHERE c1.concept_class_id = 'ICDO Condition'

AND c3.concept_code = '9440/3'
```


ICDO: Source Systems

- NAACCR
 - NAACCR item 400 'Primary Site':
 - <http://datadictionary.naacccr.org/default.aspx?c=10#400>
 - NAACCR item 522 'HISTOLOGIC TYPE ICD-O-3'
 - <http://datadictionary.naacccr.org/default.aspx?c=10#522>
- Discrete within your Oncology EMR or Pathology LIMS
 - CAP eCC: <https://www.cap.org/laboratory-improvement/proficiency-testing/cap-ecc>
- Obtained via NLP or chart abstraction from pathology reports.

Oncology Diagnosis Modifiers

- Want to be able to further refine these oncology diagnoses with oncology diagnosis modifiers (like staging, grading, biomarkers etc.). Unfortunately, unlike with ICDO base oncology diagnoses, there is no standardized vocabulary of oncology diagnosis modifiers.
- OMOP currently contains vocabularies with duplicative, overlapping options for representing many oncology diagnosis modifiers.
- Thus, currently, an OMOP ETL developer is forced to choose whatever "seems" right.
- The oncology extension recommends placing oncology diagnosis modifiers within the MEASUREMENT table. These MEASUREMENT entries should point to a parent CONDITION_OCCURRENCE or EPISODE entry by populating the new polymorphic foreign key: MEASUREMENT.modifier_of_field_concept_id and MEASUREMENT.modifier_of_event_id.

Necessary Evil: NAACCR

- In the US, the most widely available source system containing "discrete" oncology diagnosis modifiers is NAACCR formatted tumor registry data.
- NAACCR is a data dictionary format for the tracking of oncology diagnoses, oncology diagnosis modifiers and oncology treatments. All US facilities diagnosing and treating cancer patients are mandated to report their data in the NAACCR format to federal and state agencies. Most NAACCR data is manually abstracted from patient charts by certified tumor registrars.
- The oncology extension wants to be able to support the ingestion of oncology diagnosis modifiers from NAACCR tumor registry data. To enable this use case, the oncology extension recommends adopting the NAACCR tumor registry vocabulary as the standard OMOP oncology diagnosis modifier vocabulary.
- The ingestion of the NAACCR data format is currently under construction by the OMOP vocabulary team.
- The hope is that NAACCR vocabulary could be transitioned from the standard OMOP oncology diagnosis modifier vocabulary to a source vocabulary.
- The future vision is that the Nebraska Lexicon will be adopted as OMOP's standard oncology diagnosis modifier vocabulary
 - <https://www.unmc.edu/pathology/informatics/tdc>
- The Nebraska lexicon is an effort to map the CAP Cancer Protocols to standardized vocabularies like SNOMED and/or LOINC.
 - <https://www.cap.org/protocols-and-guidelines/cancer-reporting-tools/cancer-protocol-templates>
- The CAP Cancer Protocols is a comprehensive, frequently updated vocabulary of oncology diagnosis modifiers that is tightly bound to actual clinical pathology practice.
- A mapping from NAACCR to the Nebraska lexicon will need to be completed.

Oncology Treatments: hemonc.org

- Oncology drug regimen ontology.
- Now: oncology drug regimens and constituent components and oncology drug classification:
- Later: dosing, cycle timing and indications.
- Released in Athena
- List all Chemotherapy drug regimens
 - <http://athena.ohdsi.org/search-terms/terms/35803401>
- List a specific chemotherapy drug regimen
 - <http://athena.ohdsi.org/search-terms/terms/35806122>
- Use this oncology drug compendium with algorithms to identify/detect drug oncology treatment episodes.
 - Algorithm to Identify Systemic Cancer Therapy Treatment Using Structured Electronic Data
 - <https://ascopubs.org/doi/pdf/10.1200/CCI.17.00002>