

Mapping OMOP Observation to PCORnet Vital Smoking

Version	Date	Author	Comments
1.0	05 January 2017	Don Torok	Initial version

This solution meets the goal that it can be implemented as a single (though somewhat complex) SQL statement. This solution assumes that tobacco values are stored in accordance with [Conventions for Populating OMOP CDM v5 for PCORnet v3](#).

The first part the solution is to define a set of qualifying values that can be filled from the various tobacco concept id's and then be used to assign values to the PCORnet smoking variables.

Qualifying values

Smoke	Smoke Status	Smoke Degree	Chew	Chew Status
Yes	Current	Heavy	Yes	Current
No	EX	Medium	No	EX
Unknown	Never	Light	Unknown	Never
	Unknown	Trivial		Unknown
		Second Hand		
		Unknown		

Smoke – Indicates if the person smoked some tobacco product

Smoke Status – Indicates current status of the smoking use

Smoke Degree – Indicate the how much a person smoked

Chew – Indicates if a person uses/used non-smoked tobacco

Chew Status – Indicates current status of non-smoked tobacco

Starting with the various concept ids, it is possible to fill in the various qualifier values. For example, the SNOMED code **266924008**, concept id **4141783** (Ex-heavy cigarette smoker (20-39/day)) can be qualified as:

Smoke	Smoke Status	Smoke Degree	Chew	Chew Status
Yes	EX	Heavy	Unknown	Unknown

And if this were all the information that we had we could fill in the PCORnet Vital table

SMOKING	TOBACCO	TOBACCO_TYPE
03=Former smoker	03=Quit/former user	05=Use of smoked tobacco but no information about non-smoked tobacco use

The problem is a bit more complex, because there may be more than one tobacco related concept in OMOP. So continuing with this example, the person may also have the following codes.

59978006 (Cigar smoker) concept id 4246415

228512004 (Never chewed tobacco) concept id 4036090

Now filling out the qualifier values would look more like

Concept Id	Smoke	Smoke Status	Smoke Degree	Chew	Chew Status
4141783	Yes	EX	Heavy	Unknown	Unknown
4246415	Yes	Current	Unknown	Unknown	Unknown
4036090	Unknown	Unknown	Unknown	No	Never
Result	Yes	Current	Heavy	No	Never

And the values for PCORnet would now be

SMOKING	TOBACCO	TOBACCO_TYPE
07=Heavy tobacco smoker	01=Current user	01=Smoked tobacco only

Note: This may not be the best fit. The person might be better represented by saying the smoke degree is *Unknown* for concept **4141783** (Ex-heavy cigarette smoker (20-39/day)) since the *Heavy* from the ex-smoking record is being applied to their current Cigar habit. With that change the result would be *05=Smoker, current status unknown*, for **SMOKING**.

When combining the qualifier values to get a single result it will be necessary to provide a ranking of values. For example, in the **Chew** column the end result should be *No* therefore *No* should have a higher priority than *Unknown*.

So the basics of this solution are:

- 1) Qualify OMOP concepts into a set of values that provide sufficient information to populate PCORnet
- 2) Have a ranking for these values so that any number of rows can be reduced to a single row that best represents the answers for the possible qualifier values.
- 3) Provide a mapping for that single row of qualifier values to the three PCORnet tobacco related values.

Included is a Excel work book with the following tabs:

- PCORnet Vital Tobacco – List PCORnet columns from Vital table we are trying to fill.
- Qualifying values – Repeat of above, lists the possible values for **Smoke, Smoke Status, Smoke Degree, Chew and Chew Status** and gives each value an assigned rank.
- OMOP Concepts for Tobacco – List the concepts that we agreed upon for tobacco
- concept_qualifier_map– Application of breaking the concepts into the qualifier values given above and then mapping that single concept to PCORnet (this is simplistic view because as shown above we need to assume multiple tobacco related concepts)
- Complete map – which is a mapping of all the possible combination of qualifiers mapped to PCORnet. The complete set is 3 possible values for **SMOKE** times 4 possible values for **SMOKE STATUS** times 5 possible values for **SMOKE Degree** and so forth for 3x4x6x3x4 equal 864 possible states

Tables needed to Support ETL of Tobacco Related Data into PCORnet v3

The values to populate these table are in the Excel workbook [tobacco_qualifier_to_pcornet.xlsx](#) tabs 'concept_qualifier_map' and 'tobacco_qualified_to_pcornet' respectively.

```
CREATE TABLE concept_qualifier_map
( concept_id bigint NOT NULL
, concept_name varchar(80) NOT NULL
, smoke varchar(20) NOT NULL
, smoke_rank smallint NOT NULL
, smoke_status varchar(20) NOT NULL
, smoke_status_rank smallint NOT NULL
, degree varchar(20) NOT NULL
, degree_rank smallint NOT NULL
, chew varchar(20) NOT NULL
, chew_rank smallint NOT NULL
, chew_status varchar(20) NOT NULL
, chew_status_rank smallint NOT NULL
);
```

COMMENT ON table concept_qualifier_map

IS

'Map from smoking related concepts into qualifiers necessary to map concept to pcornet vital tobacco fields.'

```
CREATE table dtorok.tobacco_qualified_to_pcornet
( smoke varchar(12) NOT NULL
, smoke_rank smallint NOT NULL
, smoke_status varchar(12) NOT NULL
, smoke_status_rank smallint NOT NULL
, degree varchar(12) NOT NULL
, degree_rank smallint NOT NULL
```

```
, chew varchar(12) NOT NULL
, chew_rank smallInt NOT NULL
, chew_status varchar(12) NOT NULL
, chew_status_rank smallInt NOT NULL
, smoking varchar( 60 ) NOT NULL
, smoking_code varchar(2) NOT NULL
, tobacco varchar( 60 ) NOT NULL
, tobacco_code varchar(2) NOT NULL
, tobacco_type varchar( 80 ) NOT NULL
, tobacco_type_code varchar(2) NOT NULL
, comment varchar(80)
);
```

COMMENT ON table concept_qualifier_map

IS

'Map from smoking qualifiers to PCORnet smoking conditions.'

Steps to get PCORnet Vital Values for Smoking

1. Select all the smoking related values stored in the OMOP OBSERVATION table for a person for a given visit or day.
2. Join the results of the tobacco related concepts to the CONCEPT_QUALIFIER_MAP table to get the ranked qualifier values (note priority of is 1 the highest). Take the highest priority for each qualifier and the result will be a single set of values for each combination of person/date.
3. Join the results of the above to TOBACCO_QUALIFIED_TO_PCORNET to get the value for the PCORnet Vital table columns, *smoking*, *tobacco* and *tobacco_type*.

```
SELECT person_id, observation_date
      , COALESCE( smoking_code, 'OT' ) AS smoking
      , COALESCE(tobacco_code, 'OT' ) AS tobacco
      , COALESCE(tobacco_type_code, 'OT') AS tobacco_type
FROM – person/date rankings
(
  SELECT person_id, observation_date
        , min(smoke_rank) as smoke_rank
        , min(smoke_status_rank) AS smoke_status_rank
        , min(degree_rank) AS degree_rank
        , min(chew_rank) AS chew_rank
        , min(chew_status_rank ) AS chew_status_rank
  FROM observation
 WHERE observation_concept_id = 4041306    --Tobacco use and exposure
 JOIN concept_qualifier_map map
   ON map.concept_id = observation.value_as_concept_id
 GROUP BY person_id, observation_date
```

```
) tobacco
JOIN tobacco_qualified_to_pcornet map
  ON map.smoke_rank          = tobacco.smoke_rank
 AND map.smoke_status_rank   = tobacco.smoke_status_rank
 AND map.degree_rank        = tobacco.degree_rank
 AND map.chew_rank           = tobacco.chew_rank
 AND map.chew_status_rank    = tobacco.chew_status_rank;
```