Truveta Events Data Model

Overview

Truveta aggregates health system data from multiple sources, including clinical and administrative "events" following the OHDSI OMOP Common Data Model (CDM) (at the OHDSI Domain level but not the data format), demographics and firmographics, with reference data.

Tables

Truveta "event" tables are grouped into five "domains": conditions (diagnoses), measurements ([vitals], labs), [observations(https://learn.truveta.com/studio/docs/observations)], drug exposure, (meds, immunizations), procedures and device exposure, "Standardized Health System" tables, and "Standardized Vocabulary" tables.

Dates

Truveta "event" tables have multiple possible date columns depending on source. Truveta Studio methods to select the first non-null date by table. The **condition* table contains two date columns, 'OnsetDateTime' and 'RecordedDateTime', with guidance to use 'OnsetDateTime' unless blank, then use 'RecordedDateTime'. This is consistent with collecting *diagnoses* across operational systems, where one may have a clinical finding of 'OnsetDateTime' and another may infer the *diagnosis* from a lab result or other observation, in which case

Truveta data are de-identified using a date shifting algorithm from -30 to +30 days within a patient record which preserves the date intervals , but across patients a given event is within a 60 day sliding window.

Concept Codes

Truveta event tables map to codeconceptmap tables, and often a one-to-many relationship. Truveta Studio provides methods called **load_filtered_table()** and **codeset()** which manage the complex relationship from an event table to the concept table.

Vocabularies

Truveta "Standardized Vocabulary" includes not only "concepts" in common clinical vocabularies (SNOMED, ICD%, LOINC, etc) but also "concepts" for other system uses and includes custom "TRUVETA" concepts. These concepts are in the Truveta **concept** table keyed by **conceptid**, and mapped to any *event* table through an intermediate table *event*codeconceptmap.

Duplicative Records in Event Tables

As is typical with mapping data from operational systems to the OHDSI domains, a single health system record can map to more than one domain, e.g. a positive lab result results in a diagnosis and may generate TWO **condition** events, one from the positive lab, the other from a providers actual **condition** diagnosis. This is by design, and in the Truveta Data Model accomodates these by differentining a **patientid** from the record of source from the **personid**, which links actual patients across "event" tables.

Within the set of **condition** records for one **personid** and discounting the **encounterid** and **patientid** duplicate diagnosis records will appear for a given **patientid**/{date} combination if the diagnosis was from

two different operational systems with differing concept codes e.g. a positive lab results in LOINC or SNOMED and a diagnosis in ICD% system.

The "events" data model, from Truveta Data Dictionary (look for Download Data Dictionary), is:

```
graph LR
        subgraph persons
        person
        end
    %%  subgraph bodysite
    %%          bodysitemap
    %%  end
    subgraph conditions
        condition
        conditioncodeconceptmap
    end
%% another subgraph for medicationstatement, list of known medications??
    subgraph drug_exposure
%%        medicationstatement
        medicationrequest
        medicationdispense
        medicationadministration
        immunization
        medicationcodeconceptmap
%%        medicationstatementcodeconceptmap
        medicationadherencereasonconceptmap
        medicationrequestcodeconceptmap
        medicationdispensecodeconceptmap
        medicationadministrationcodeconceptmap
        immunizationcodeconceptmap
    end
    subgraph servicerequests
            servicerequest
    end
    subgraph observations
            observation
            observationcomponent
            observationcodeconceptmap
            labresult
            labresultcodeconceptmap
    end
    subgraph procedures
        procedure
        deviceuse
        procedurecodeconceptmap
        deviceusecodeconceptmap
    end
    subgraph vocabularies
        concept
    end
person-->condition
person-->immunization
```

```
%%person-->medicationstatement
person-->medicationrequest
person-->medicationdispense
person-->medicationadministration
person-->observation
person-->servicerequest
%%person-->labresult
%%person-->procedure
condition-->|codeconceptmapid| conditioncodeconceptmap
%%condition-->|bodysitemapid| bodysitemap
procedure-->|procedureid| deviceuse
deviceuse-->|codeconceptmapid| deviceusecodeconceptmap
%%deviceuse-->|bodysitemapid| bodysitemap
immunization-->|codeconceptmapid| immunizationcodeconceptmap
servicerequest-->|servicerequestid| labresult
labresult-->|codeconceptmapid| labresultcodeconceptmap
observation-->|codeconceptmapid| observationcodeconceptmap
%%observation-->|bodysitemapid| bodysitemap
observationcomponent-->|observationid| observation
medicationrequest-->|requestid| medicationadministration
medicationdispense-->|codeconceptmapid|medicationcodeconceptmap
medicationadministration-->|codeconceptmapid| medicationcodeconceptmap
%%medicationadministration-->|bodysitemapid| bodysitemap
medicationrequest-->|codeconceptmapid| medicationcodeconceptmap
%%medicationstatement-->|adherencereasonconceptmapid|
medicationadherencereasonconceptmap
%%medicationstatement-->|Id| medicationstatementcodeconceptmap
%%medicationstatement-->|codeconceptmapid| medicationcodeconceptmap
%%medicationstatement-->|bodysitemapid| bodysitemap
procedure-->|codeconceptmapid| procedurecodeconceptmap
%%procedure-->|bodysitemapid| bodysitemap
servicerequest-->|servicerequestid| procedure
conditioncodeconceptmap-->concept
observationcodeconceptmap-->concept
labresultcodeconceptmap-->concept
immunizationcodeconceptmap-->concept
medicationcodeconceptmap-->concept
medicationrequest-->medicationrequestcodeconceptmap
medicationrequestcodeconceptmap-->concept
medicationdispense-->medicationdispensecodeconceptmap
medicationdispensecodeconceptmap-->concept
medicationadministration-->medicationadministrationcodeconceptmap
medicationadministrationcodeconceptmap-->concept
%%medicationstatementcodeconceptmap-->concept
procedurecodeconceptmap-->concept
deviceusecodeconceptmap-->concept
```

Dates by event table

```
dates = list(
        Account= c('ServiceStartDateTime', 'RecordedDateTime'), # note: not in
```

```
Prose
        CareSiteRequestHistory= 'EffectiveDateTime', # note: not in Prose
        Claim= 'ServiceBeginDate', # note: not in Prose
        ChargeItem = c('ServiceDateTime', 'RecordedDateTime'), # note: not in
Prose
        Condition= c('OnsetDateTime', 'RecordedDateTime'),
        DeviceUse= c('ActionDateTime', 'RecordedDateTime'),
        Encounter= 'StartDateTime',
        EncounterHistory= c('StartDateTime', 'RecordedDateTime'), # note: not in
Prose
        Enrollment = 'StartDate',
        EventLog = c('EffectiveDateTime', 'RecordedDateTime'), # note: not in
Prose
        Extract= c('EffectiveDateTime', 'RecordedDateTime'), # note: not in Prose
        FamilyMemberHistory= 'RecordedDateTime',
        ImagingInstance= 'AcquisitionDateTime',
        ImagingSeries= 'SeriesDateTime',
        ImagingStudy= 'StudyDateTime',
        Immunization= c('AdministeredDateTime', 'RecordedDateTime'),
        LabResult= c('EffectiveDateTime', 'SpecimenCollectionDateTime',
'RecordedDateTime'),
        MedicalClaim = 'ServiceStartDate',
        MedicationAdministration= c('StartDateTime', 'RecordedDateTime'),
        MedicationDispense= 'DispenseDateTime',
        MedicationRequest= c('StartDateTime', 'AuthoredOnDateTime'),
        MedicationStatement= c('EffectiveDateTime', 'RecordedDateTime'),
        Note= 'EffectiveDateTime',
        Observation= c('EffectiveDateTime', 'RecordedDateTime'),
        PersonDeathFact= 'DeathDateTime',
        PersonLocation= 'EffectiveStartDateTime', # note: in Prose it is
EffectiveDateTime
        Person= 'BirthDateTime',
        PharmacyClaim= 'ServiceDate',
        Procedure= c('StartDateTime', 'RecordedDateTime'),
        ServiceRequest= c('OccurrenceStartDateTime', 'AuthoredOnDateTime',
'RecordedDateTime')
    )
```