The VISIT_DETAIL: A Vehicle for Standard Visits

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Background

The VISIT_DETAIL table was introduced into the Observed Medical Outcomes Partnership Common Data Model (OMOP CDM) in January 2018 as part of version 5.3.(1) The original intention of the table was to record the movement of a patient between different floors or units of a hospital while the VISIT_OCCURRENCE table remained the way that overall visits were represented. For example, a patient may have a record in VISIT_DETAIL of a two-day stay in an intensive care unit followed immediately by a VISIT_DETAIL record of a four-day stay in a step down unit in the same hospital. These two VISIT_DETAIL records then roll-up into one six-day inpatient visit in the VISIT_OCCURRENCE table.

Since the advent of the VISIT_DETAIL table it has proven to be more useful during the extract, transform, and load (ETL) process than as a research artifact. The ETL benefits are two-fold: 1) it allows for 1:1 referential integrity with the source data and 2) it provides a base on which a standardized visit logic can be applied to produce the VISIT_OCCURRENCE table. Using the Optum® Clinformatics Extended Data Mart (Optum) as an example, we describe how to populate the VISIT_DETAIL table and how to apply the standard visit algorithm to build the VISIT_OCCURRENCE table. It is our assertion that all data partners within the OHDSI network should use this method to define standard visits.

Methods

Optum's de-identifed Clinformatics® Data Mart Database is a US administrative claims database covering inpatient, outpatient, and pharmacy records. The main tables containing visit information are the MEDICAL_CLAIMS, RX_CLAIMS, and INPATIENT_CONFINEMENT tables. Both MEDICAL_CLAIMS and RX_CLAIMS tables contain line-level details of patient encounters, including diagnoses, procedures, and the CMS place of service code for where the encounter occurred. INPATIENT_CONFINEMENT contains a summarized record for each inpatient episode occurring in an acute care hospitalization or skilled nursing facility setting where all claim detail records are bundled and reported in a single row.

The VISIT_DETAIL table is populated by creating a single record that corresponds to each record in the native MEDICAL_CLAIMS, RX_CLAIMS, and INPATIENT_CONFINEMENT. The CMS place of service field is used as the VISIT_DETAIL_SOURCE_VALUE which is then mapped to a standard concept. This standard concept is used as the VISIT_DETAIL_CONCEPT_ID.

To generate the standard VISIT_OCCURRENCE records, the VISIT_DETAIL_CONCEPT_IDs are mapped to their highest-level ancestor in the Visit domain using the terminal ancestor query[1]. Once the terminal ancestor is determined, an algorithm is then applied to the data to identify unique inpatient visits, outpatient visits, emergency room visits, etc. The full logic is detailed on github[2] and is based on previous work described by Voss, et al.(2) Briefly, inpatient visits are identified first and any other records that occur at the same time are considered part of the inpatient stay. Then, the algorithm looks for emergency room visits and either associates them with an inpatient visit or treats them as separate visits, depending on the dates of service. Non-hospital institution visits are evaluated third and then all other visits are rolled-up by VISIT_DETAIL_START_DATE, VISIT_DETAIL_END_DATE, and CARE_SITE_ID. Essentially any VISIT_DETAIL records that are not inpatient, emergency, or non-hospital institution that occur on the same day at the same care site are considered part of the same VISIT_OCCURRENCE.

Results

There are 43 unique VISIT_DETAIL_CONCEPT_IDs present in the Optum VISIT_DETAIL table. The most common is 581477, corresponding to 'Office Visit'. After applying the standard visit logic, these 43 concepts map to 10 VISIT_CONCEPT_IDs in the VISIT_OCCURRENCE table. This relationship between VISIT_CONCEPT_ID and VISIT_DETAIL_CONCEPT_ID can be seen in Figure 1. Each bar represents a VISIT_CONCEPT_ID and each color within the bar represents a VISIT_DETAIL_CONCEPT_ID.
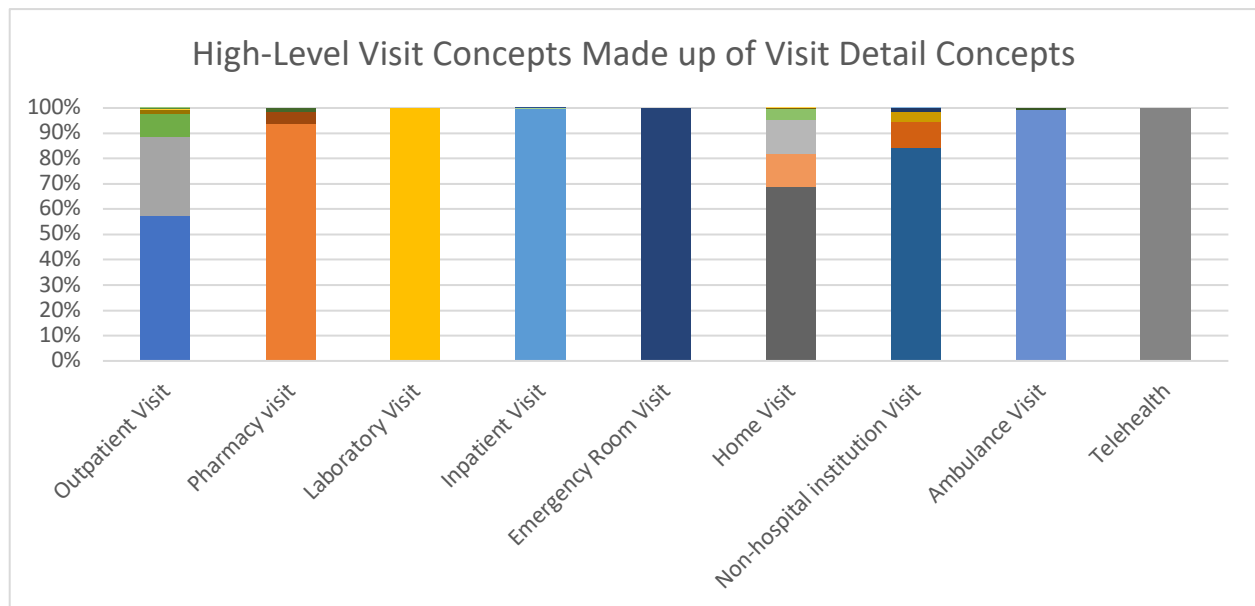

Figure 1: The representation of Visit Detail Concepts by Visit Occurrence Concept after application of standard visit logic.

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[1] https://github.com/OHDSI/ETL-LambdaBuilder/blob/master/docs/Optum%20Clinformatics/Queries/CMS_PlaceOfService_OMOP_Vocab.sql
[2] https://ohdsi.github.io/ETL-LambdaBuilder/Optum%20Clinformatics/Optum_visit_occurrence.html

Conclusion

We present a standard way that the VISIT_DETAIL table can be used to identify healthcare visits from line-level detail information. It is our assertion that data partners standardized to the OMOP CDM should use this method to further align the open-source OHDSI community on data standard and ETL best practices.

References

1. OMOP Common Data Model [Internet]. [cited 2021 Jan 14]. Available from: http://ohdsi.github.io/CommonDataModel/

2. Voss EA, Ma Q, Ryan PB. The impact of standardizing the definition of visits on the consistency of multi-database observational health research. BMC Med Res Methodol. 2015 Mar 8;15:13.