Quality assessment of vaccine concepts in OMOP common data model

Yupeng Li, PhD[1], Adam Black, MS[2], Gretchen A. Baltus[1], Carolyn Cho, PhD[1],

Vasu Chandrasekaran, PhD[1], Erik Dasbach, PhD[1], Lixia Yao, PhD[1,3]

[1]MRL, Merck & Co., Inc., Kenilworth, NJ 07033, USA
[2]Odysseus Data Services, Cambridge, MA 02142, USA
[3]Corresponding author

Abstract

Vaccination against communicable diseases is one of the pillars of a modern healthcare system and has contributed to longer, healthier lives for people around the world. Given their widespread use and broad efficacy, there is significant interest in conducting vaccine-related health outcomes research. Moreover, vaccine development has unique challenges compared to other therapeutic modalities that can be addressed using observational studies.

In most electronic health records (EHR) and claims databases in the United States, vaccine administration is recorded as a "procedure" but is treated as a "drug" in the Observational Medical Outcomes Partnership Common Data Model (OMOP CDM). Given this difference in coding, studying vaccines using data converted to the OMOP CDM can increase the chance of errors during analysis. In order to ensure reliable and reproducible analyses from observational clinical data, we performed a careful examination and evaluation of vaccine-related concepts in the OMOP vocabularies and their associated mappings from source concepts to standard concepts using three different vaccines.

We identified several issues that could impact the quality of vaccine-related health outcomes study using OMOP CDM. These include (1) vaccine codes are assigned to the procedure, drug, or observation domain, (2) changes in the "standard concept" status of some concepts over time, and (3) common issues in many medical ontologies, such as the lack of hierarchy, one-to-one exact mapping, and clear naming conventions. We believe that it is impactful to document and communicate such findings with the OHDSI community in the hopes of identifying opportunities for future improvement.