OHDSI Europe 2019 Software Demonstrations

1. The Extract, Transform, Tools: Usagi, Rabbit-in-a-Hat, and WhiteRabbit
This demo will showcase the ETL tools Usagi, Rabbit-in-a-Hat, and WhiteRabbit. This comprehensive suite of tools offers a concise, systematic way to design and develop an OMOP CDM instance from source data. White Rabbit performs a scan of the source data, providing detailed information on the tables, fields, and values that appear in a field. This scan will generate a report that can be used as a reference when designing the ETL. Rabbit-In-a-Hat comes with WhiteRabbit and is designed to read and display a WhiteRabbit scan document. WhiteRabbit generates information about the source data while Rabbit-In-a-Hat uses that information and through a graphical user interface to allow a user to connect source data to tables and columns within the CDM. Usagi is a software tool created by the Observational Health Data Sciences and Informatics (OHDSI) team and is used to help in the process of mapping codes from a source system into the standard terminologies stored in the OMOP Vocabulary.
Presenter: Clair Blacketer, Janssen Research & Development, US

2. The European Health Data & Evidence Network portal – unveiling the EHDEN ecosystem in a nutshell
The European Health Data & Evidence Network aspires to be the trusted observational research ecosystem to enable better health decisions, outcomes and care. Its mission is to provide a new paradigm for the discovery and analysis of health data in Europe, by building a large-scale, sustainable federated network of data sources standardized to a common data model. Central to EHDEN is the standardization of health data to the OMOP common data model and the adoption of analytical tools developed by OHDSI. In this demo we will showcase the initial version of the EHDEN portal, that links tools and services currently under development within EHDEN such as a Database Catalogue, and the EHDEN Academy.
Presenter: João Almeida, Alina Trifan, Unversidade de Aveiro, Portugal

3. Arachne – Distributed OHDSI Research Network
ARACHNE Research Network platform enables a consistent, transparent, secure and compliant observational research process. It brings participating organizations, e.g. data providers, investigators, sponsors and data scientists, into a single, collaborative study team and facilitates an end-to-end observational study. ARACHNE can be used internally within an organizational network and firewall boundaries (ARACHNE Workflow Suite), or across firewalls accessing databases in other organizations (ARACHNE Research Collaboration Network) deployed as a cloud-based SaaS platform. The software demo will demonstrate the execution of an end to end study utilizing ARACHNE.
Presenter: Gregory Klebanov, Pavel Grafkin, Odysseus Data Services, US

4. ATLAS – A Unified interface for the OHDSI Tools
ATLAS is a web-based integrated platform for database exploration, standardized vocabulary browsing, cohort definition and population-level analysis. ATLAS recently incorporated a new enhancement to cohort generation which uses OHDSI Feature Extraction to calculate the prevalence of binary covariates within a population within different time windows. This allows a researcher to understand the characteristics of the population they have defined. The purpose of this demonstration is to demonstrate the population-level characteristics of several cohort definitions.
Presenter: Anthony Sena, Janssen Research & Development, US

5. Patient-Level Prediction Package

The Patient Level Prediction R package is a novel large-scale analytics platform for developing personalized risk prediction models in observational data. The standardized framework addresses problems of the form "Amongst <target population>, which patients will develop <an outcome> during <a time-at-risk period>?" and enables predictive model fitting using an array of machine learning approaches- including regularized regression, gradient boosting machines, random forest, K-nearest neighbors, and neural networks- and applies a systematic evaluation to determine model validity based on measures of calibration, discrimination, and generalizability.

Presenter: Luis H. John, Health Data Science Group, Erasmus MC, The Netherlands

6. Increasing Atlas performance using a nested OMOP model with Apache Spark

The standard physical storage model for OMOP data is based on a set of relational tables. When using this model for large volumes of data, the query performance can be poor, even on Hadoop based systems. In this software demonstration we will show that a physical model that co-locates person related data, using nested data, leads to superior performance. This approach efficiently integrates the nested OMOP data with Atlas using Apache Spark as a distributed processing engine for the analysis generation. The performance of this approach is also going to be assessed in this demonstration by comparing the obtained results with the existing Impala Hadoop integration.

Presenter: Michael Davies, IQVIA, UK

7. Interpretable ML software to support discharge decisions at the ICU

Together with intensivists from the VUmc ICU, Pacmed developed an intepretable machine-learning-driven tool to predict and prevent unexpected readmissions of ICU patients. Apart from being more accurate than reference readmission models, the tool employs advanced methods to explain the model's predictions based on clinically-relevant patient features. The software is validated through user studies performed in three hospitals in the Netherlands, assessing the ability of the software to provide clinicians with actionable information for the discharge decision process. Currently being evaluated for CE certification, the model has been validated on a different storage system (EPIC) and on data from another hospital after being trained on Metavision data from the VUmc. Crucial for this process is Pacmed's ETL pipeline that transforms data from different source systems into a single standardized format. Joining forces with OHDSI MIMIC OMOP, initiatives for further standardization will be of utter importance towards creating interpretable decision support tools for all ICU's in- and outside the Netherlands.

Presenter: Daan de Bruin, Pacmed, The Netherlands

8. An OMOP-based tool for surveying and visualising concurrent drug exposure and renal function.

Clinical guidelines aim to help clinicians provide appropriate treatment, and dosing algorithms exist to guide treatment of patients with impaired renal function. Continuous monitoring of genuine medicine use in real patients is key to surveying guideline adherence and discerning problematic patterns, if such exist. Combining our pilot-study data from mostly surgical patients with colorectal cancer, mapped to the OMOP common data model, and Rstudio's Shiny web app framework, we developed a functional tool allowing users without technical expertise in programming or database management to interactively query and survey real-life use of select medicines requiring particular attention when used while renal function is impaired, e.g., morphine and metformin. Inappropriate dosing of the studied medicines did not seem a problem in this patient population. We found no substantial differences between females and males, nor between patients simultaneously using few and many medicines. More sophisticated functions and querying operations will be added as new and more diverse data become available.

Presenter: Kaas-Hansen BS, Clinical Pharmacology Unit, Zealand University Hospital, Denmark, NNF Center for Protein Research, University of Copenhagen, Denmark