# Conversion of Saudi Arabia Electronic Health Record using the OMOP Common Data Model, Challenges and Solutions

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## Background

❑ The **SFDA is a legislative and regulatory body tasked with safety profiling of medication** and protecting the health of the population of **Saudi Arabia**.

❑ As such, the ability to quickly identify, evaluate, assess and report any health-related drug outcomes among the population is of utmost importance.

❑ The pharmacoepidemiology database was established as a **centralized database containing electronic health records (EHR) of both public and private hospitals** in the Kingdom of Saudi Arabia.

❑ It was determined that the Observational Medical Outcomes Partnership (OMOP) Common Data Model (CDM)[1] would be the best data model to use given the open-source nature of the community and readily available tools and proven research methods (Figure 1).
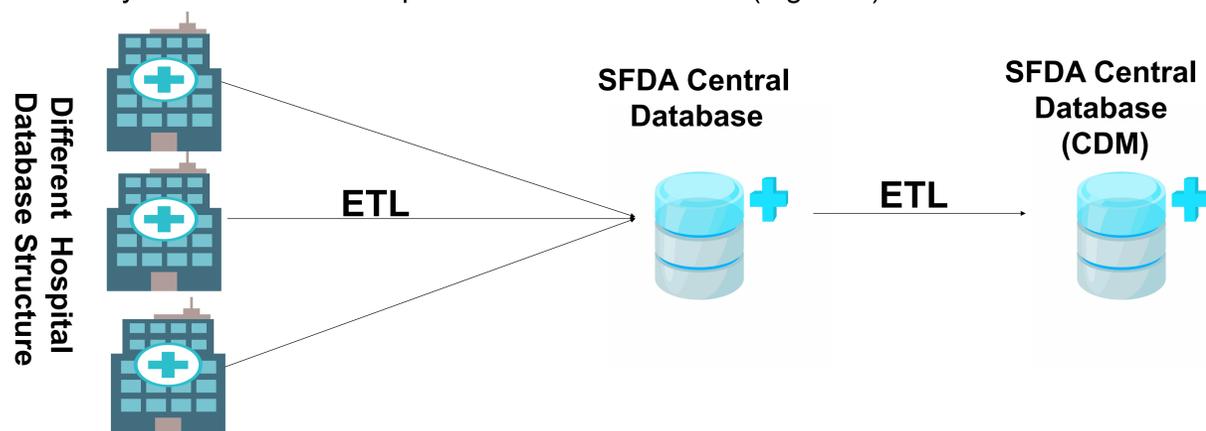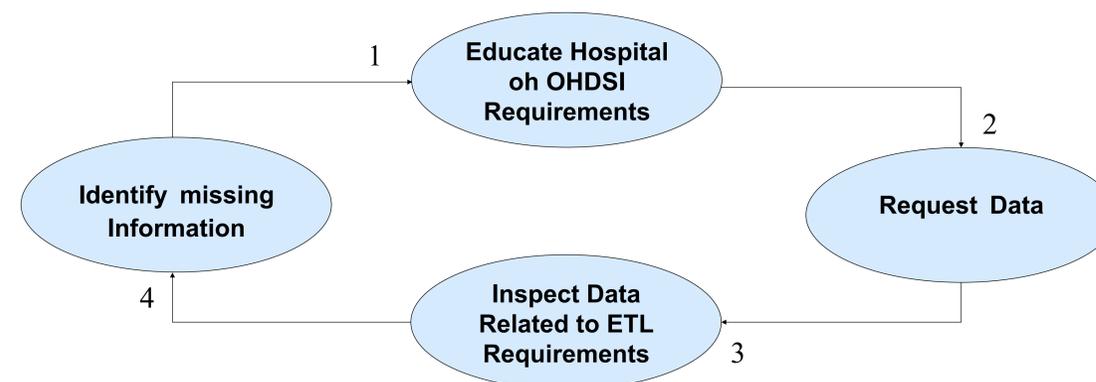


## Methods

### Mapping to the OMOP CDM:

❑The pharmacoepidemiology database is being piloted with data from one hospital which contains **~85K unique patients**.

❑Certain challenges were faced that **required a deeper understanding of the OHDSI mission**, not only on the part of the research team but the hospital data partner as well. This learning curve resulted in a refined process consisting of two phases:

### First Phase:

Initially, CDM table information and fields as well as a brief overview about the OHDSI collaborative was provided to the hospital as a guide to understand our framework and to start extracting the required data. Upon receiving the first data extraction, it became obvious that the brief overview was not enough and thus the following cycle was born (Figure 2):

### References
1.OMOP Common Data Model [Webpage]. 2015 [cited 20 Jul 2015]. Available from:
http://www.ohdsi.org/data-standardization/the-common-data-model/.
2.Schuemie M. Usagi. 2018; http://www.ohdsi.org/web/wiki/doku.php?id=documentation:software:whiterabbit. Accessed 01 Nov 2018.

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## Challenges:

❑Hospitals were not aware of OHDSI so we had to fully educate hospital staff on the OHDSI mission and goals. Educating the hospital was via OHDSI website and discussing the OHDSI concept.

❑Data was received in different batches. We had to continually request information as the process went on due to hospital's lack of awareness of the OMOP framework. For example, the first data extraction lacked source codes and only provided an English description of the clinical visit, conditions, and procedures.

❑The medical terminology used the tables were an amalgamation of up to date Current Procedural Terminology 4th edition (CPT4) codes, outdated CPT4 codes, as well as internal hospital codes in one column. This required further investigation and contact with the hospital staff to explain. This eventually resulted in their sending the internal codes and associated descriptions, which allowed us to use USAGI to map them to standard concepts.

### Second Phase:

While in the process of requesting and re-requesting information from the hospital data partner, we leveraged the suite of OHDSI tools to initiate the extract-transfer-load (ETL) process. This included the use of **White Rabbit[2]** and **Rabbit-in-a-hat[2]** as well as the **USAGI[3]** vocabulary mapping tool. USAGI proved very important in this case as the pilot hospital utilized a mix of existing vocabularies as well as some proprietary coding schemas in the same source code fields, both of which the tool was able to detect and map. Using Rabbit-in-a-hat an ETL blue print has been generated as a guide to converting the initial data extract to the OMOP CDM and upon successful conversion, we will test our ETL mapping and validate our converted data.

## Conclusions

While attempting to fulfill the directive of the SFDA to create a pharmacoepidemiology database designed to facilitate research, interactions with the pilot data partner showed the necessity of education and instruction. With the next hospital to come board we are expecting a smoother process as we have overcome the learning curve faced and prepared proper material for hospitals to understand the OMOP CDM framework. In future studies we will be presenting results and outcomes of the conversion process and research made.

### References, cont.
3. Schuemie M. Usagi. 2015; http://www.ohdsi.org/web/wiki/doku.php?id=documentation:software:usagi. Accessed 24 Aug 2015, 2015.