OMOP CDM compared to ContSys (ISO13940) to make data FAIR

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Background

With the increasing need to improve the infrastructure supporting the reuse of data, more attention is given to make data **FAIR** (Findable, Accessible, Interoperable, Reusable)[1].

Information models clearly define the data items in the database and the relationships between them[2]. Therefore, information models are **useful for interoperability (the 'I' of FAIR)** between databases.

Two generally used information models are **OMOP CDM and ContSys (ISO13940).** It is not clear whether both models are applicable to observational data.

The aim of this study was to **compare OMOP CDM and ContSys (ISO13940)** by applying both models to a dataset from an observational ICU quality registry **and determining the interoperability** between the two models.

Methods

Case study: The Severe Acute Respiratory Infections (SARI) set, part of a national ICU quality registry was used to compare the models. The set contains eighteen variables for physiological information, lab results and diagnoses in the first 24 hours after ICU admission. Below are the three steps that were taken to represent the dataset in both information models (i.e. 1: OMOP ; 2: Contsys) and check the interopability (i.e. 3).

1 The OMOP ETL process was completed as is described in the book of OHDSI[3] with the help of White Rabbit, Rabbit-in-a-Hat and Usagi[4].

2

5 ContSys.org reference

3
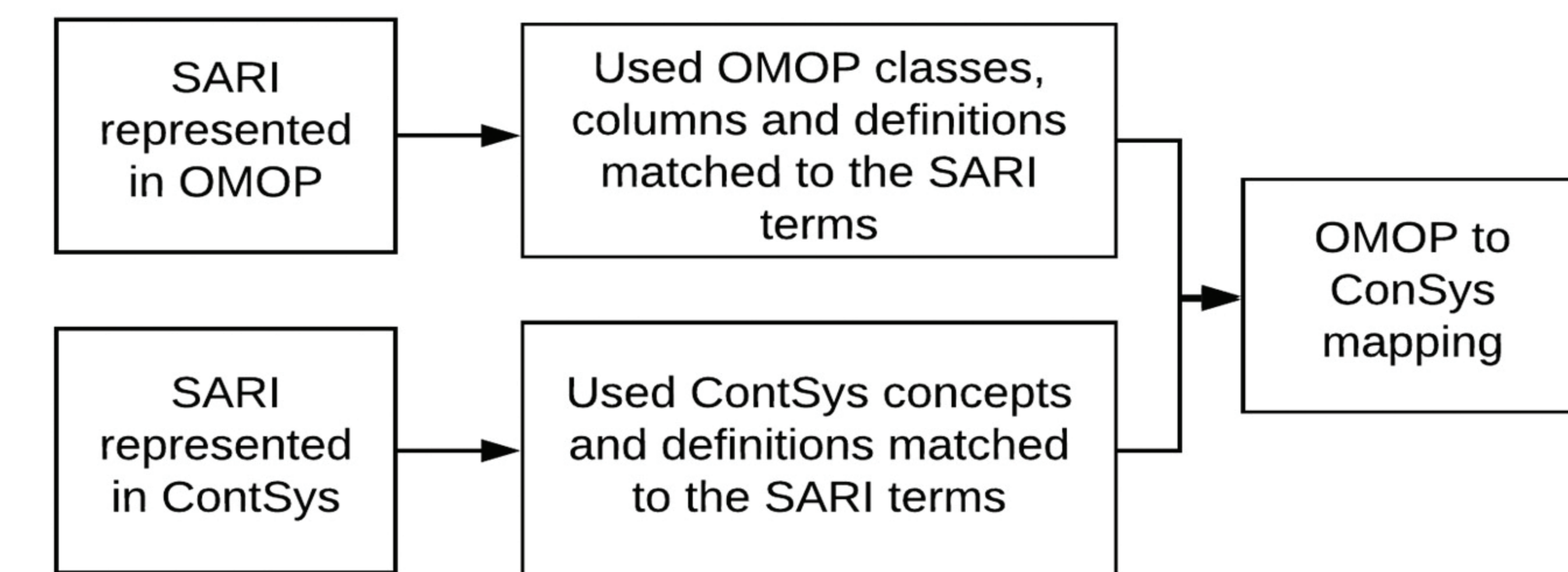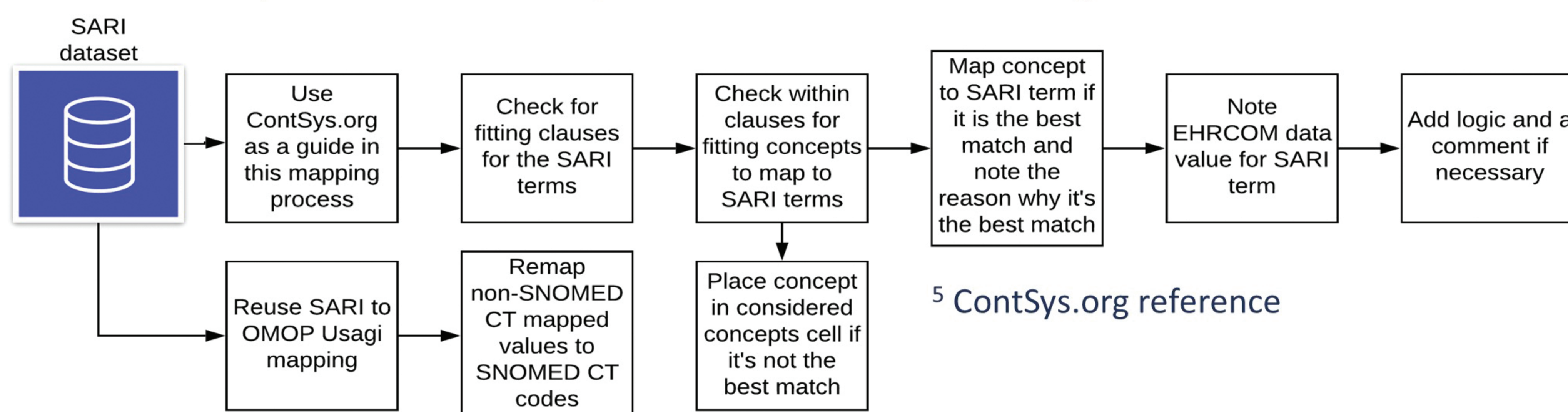
Models were compared on the amount of data items and data values that could be mapped and ease of use. The models were also cross-mapped to evaluate the interoperability of the two models, see Figure.

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Results

1. OMOP
- All necessary fields mapped
- 94.6% of source data values mapped

2. ContSys
- All fields mapped to a concept
- 93.5% of source data values mapped

3. Interoperability
- All used OMOP tables and columns were successfully mapped to a ContSys concept
- All of the concept ids in OMOP were interoperable with ContSys if they have a concept code from SNOMED CT

Conclusions

OMOP and ContSys are highly interoperable. Although a similar amount of source items and values could be represented in both models, the usability of the models differed.

OMOP:
- ✓ Was easier to map to
- ✓ Tools, guides and a forum are available for help
- ✓ Clear tables and columns with a helpful description
- ✗ Not that suitable to represent negative findings

ContSys:
- ✗ Difficult to map to
- ✗ Has no tools, guides or forum
- ✗ Extremely broad description of concepts
- ✓ Has concepts for negative findings

Both models could be used to represent observational data from an ICU quality registry. However, different users that map the same dataset could represent it differently in ContSys due to the lack of guidance and the general concepts in ContSys. This is far more unlikely to happen in OMOP CDM. **OMOP CDM is therefore far more viable to use for realizing FAIR data.**

References

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