



Semantic Data Integration for Public Health in Brazil

Debora Ciriaco, Alexandre Pessoa, Renata Wassermann, Lais Salvador

► **To cite this version:**

Debora Ciriaco, Alexandre Pessoa, Renata Wassermann, Lais Salvador. Semantic Data Integration for Public Health in Brazil. LatinX in AI Research at ICML 2019, Jun 2019, Long Beach, United States. hal-02266923

HAL Id: hal-02266923

<https://hal.archives-ouvertes.fr/hal-02266923>

Submitted on 16 Aug 2019

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Semantic Data Integration for Public Health in Brazil

Debora Lina Ciriaco^a, Alexandre Pessoa^a, Renata Wassermann^a, Lais Salvador^b

^a Department of Computer Science, Institute of Mathematics and Statistics, University of São Paulo – São Paulo – Brazil

^b Department of Computer Science, Federal University of Bahia – Bahia – Brazil
 {dciriaco, alexcpp, renata}@ime.usp.br, laisns@dcc.ufba.br

1. Introduction

- The Brazilian Ministry of Health requires more than 45 information systems for reporting the national health situation [1];
- Independent, redundant and non-interoperable information systems [1];
- Integration projects ignores semantic meaning [1];

2. Proposal

This project aims to develop an ontology layer to integrate distinct health-care databases (Natality - SINASC, Mortality - SIM, Hospitalization - SIH) and to do complex analysis, such as to track the patient care pathway, allowing better resource management and to answer questions like:

- What was the level of education of the mother when the child was born?
- Did the mother have any records of hospitalization during pregnancy? Was hospitalization related to the pregnancy?
- Did the mother have any records of ICU admission?

3. Semantic Data Integration Method

Different approaches can be used for integrating data, such as schema mapping and matching, model management, record linkage and data fusion. Ontology Based Data Integration - OBDI, is a useful approach for solving the absence of interoperability between the databases and identifying semantic correspondence in concepts. The OBDI method followed in the project is based on the works of [2, 3], Figure 1.

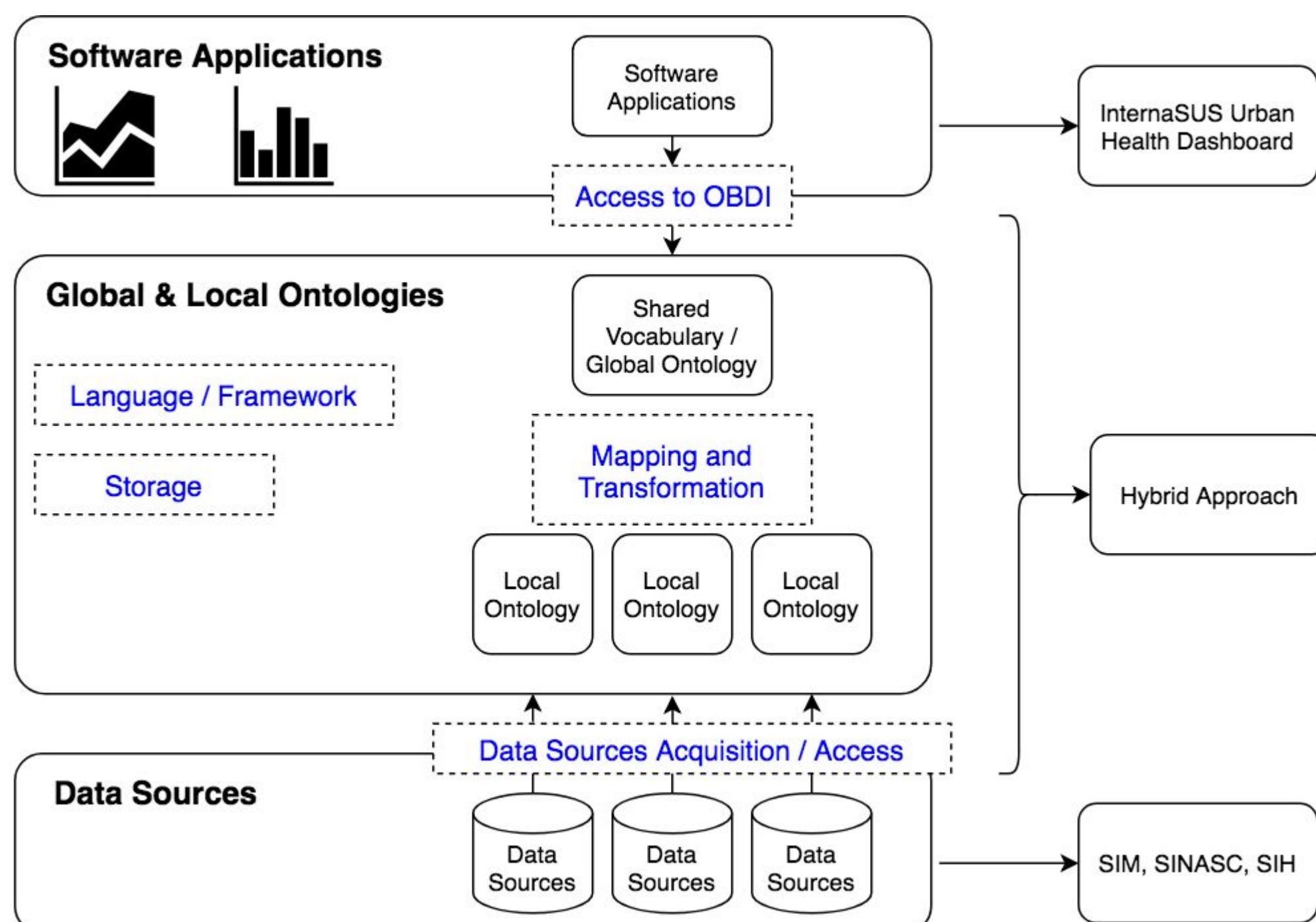


Figure 1(a). OBDA elements, by F. J. Ekaputra et al. [2]

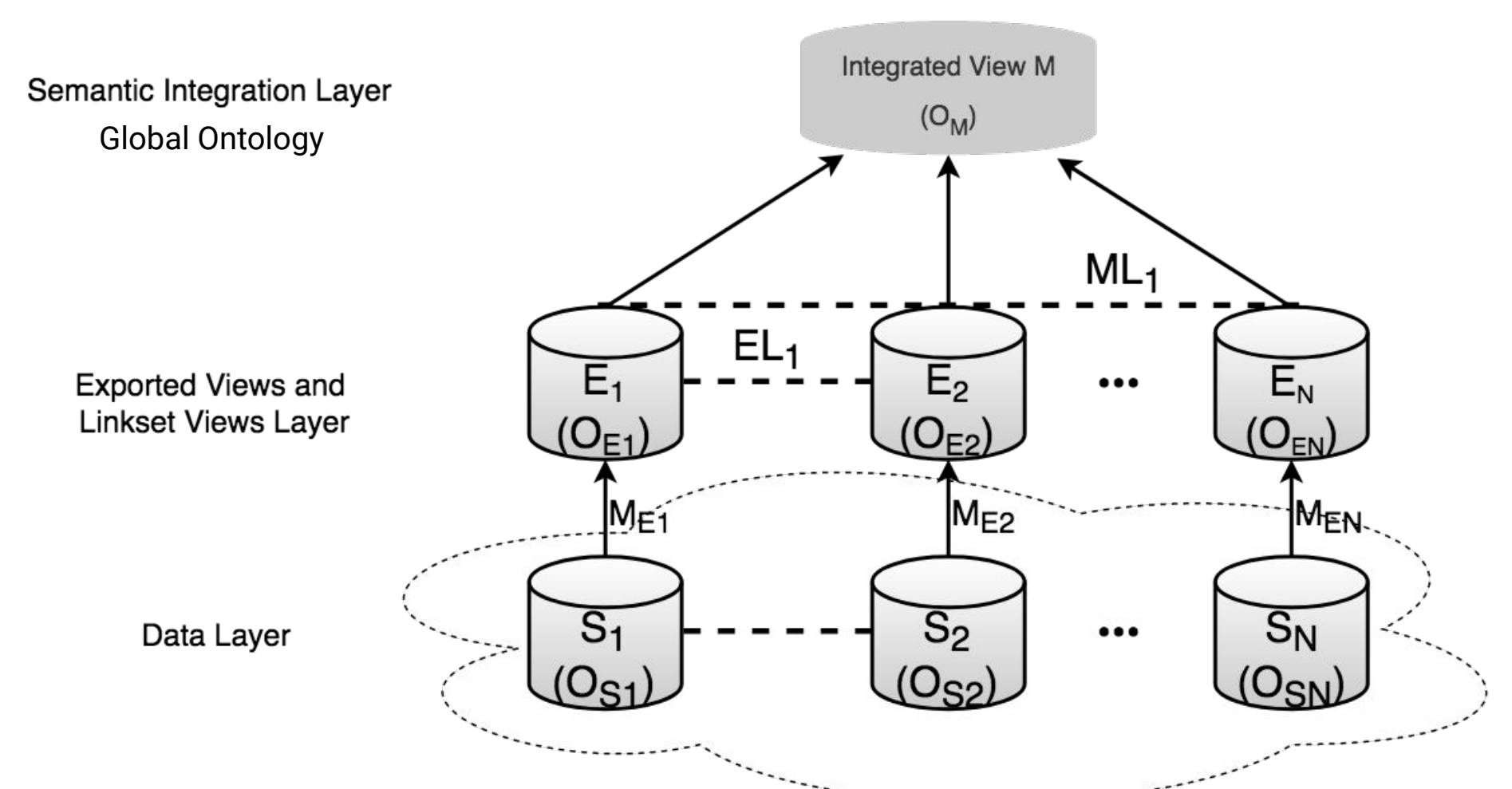


Figure 1(b). Hybrid Approach from ontology layer, by Vidal, V. M. et al. [3]

4. Current and Expected Results

The ontologies of the proposed application are being created and validated by a board of experts, as described in Table 1. A clipping of the Global ontology is shown in Figure 2. For the next steps, we will publish ontologies in open standard and integrate the ontology layer with the visualization layer.

Table 1. Ontology creation stage

Ontology	Stage
SINASC_DT	Validating
SIM_DT	Validating
SIH_DT	Will be created
SINASC_EX	Validating
SIM_EX	Validating
SIH_EX	Creating
Global	Creating

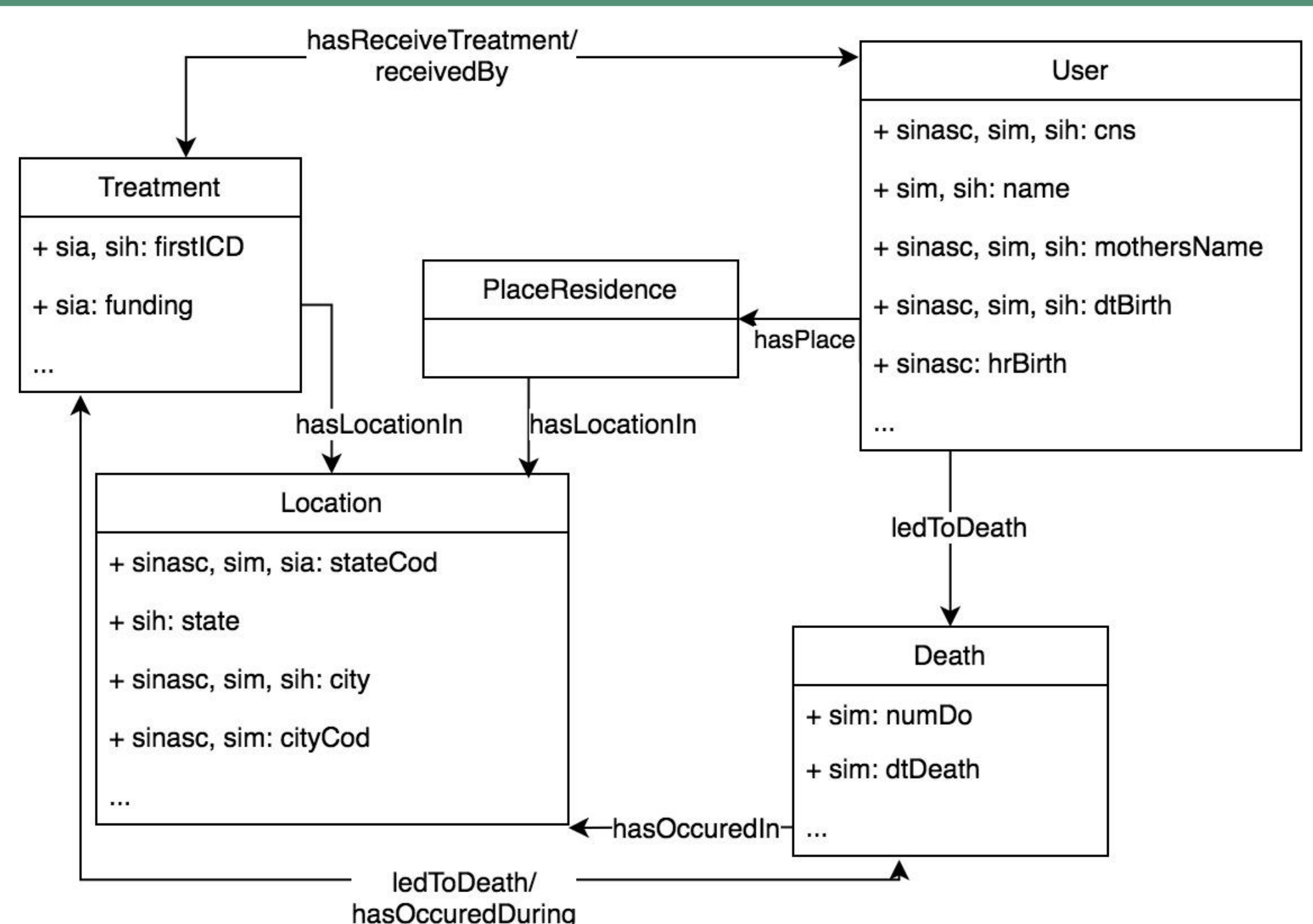


Figure 2. Clipping of the Global ontology.

5. Acknowledgements

This research is part of the INCT of the Future Internet for Smart Cities funded by CNPq proc. 465446/2014-0, CAPES proc.88887.136422/2017-00, and FAPESP proc. 14/50937-1 and FAPESP proc. 15/24485-9.

6. References

- [1] Ministério da Saúde. Sistemas de Informação da Atenção à Saúde: Contextos Históricos, Avanços e Perspectivas no SUS (Org. Pan-Americana da Saúde, 2015).
- [2] Ekaputra, F. J., Sabou, M., Serral, E., Kiesling, E. & Biffi, S. Ontology-based data integration in multi-disciplinary engineering environments: A review. Open J. Inf. Syst. (OJIS)4, 1–26 (2017).
- [3] Vidal, V. M. et al. Specification and incremental maintenance of linked data mashup views. In International Conference on Advanced Information Systems Engineering, 214–229 (Springer, 2015).