

Perspectives about integrating ICD and ICF through Ontologies

Eduardo Santana de Araujo

Abstract— Through ontologies it is possible to develop an information system that transcends the simple and common machine language, providing greater interoperability and information retrieval in Health. In this sense, our objective is to create an ontology that integrates ICD and ICF standards. We understand that the standards are complementary, therefore, our ontology will be able to assist health professionals preparing their reports, statistics and non-trivial data analysis, when combined with information systems.

Index Terms—OWN, ICF, ICD.

I. INTRODUCTION

The International Statistical Classification of Diseases and Related Health Problems (ICD) is relevant for registration of health conditions and it has provided statistical data on mortality and morbidity around the world over the years. The International Classification of Functioning, Disability and Health (ICF), in turn, stimulates a vision amplification, and can provide a better view about functional health status of a particular patient or population¹. The development of an ontology that integrates these two classifications into a single representation of the information model may contribute to a better interoperability of health information, improving the quality of health record, health indicators and may provide further statistical data for the Social Security. In general terms, it will associate categories of diagnoses joining elements of ICD and ICF².

II. METHODS

To the creation of ontology integration between ICD and ICF, we will use the method called Methontology³, developed by the Artificial Intelligence Laboratory of the Polytechnic University of Madrid. This method was chosen because it has the most detailed definition known about ontology rules and due the support provided for ontologies development with a high level of granularity.

The ontology development will be realized through the Protegé software⁴, which is a specific tool for building ontologies in Web Ontology Language format (OWN format). OWL is a semantic markup language that allows publishing and sharing ontologies.

Through these methods, it is expected to create an ontology that seeks integrates inferences between ICF and ICD and that returns nontrivial information between standards, facilitating health reports analysis⁵. This ontology is represented by meanings of an information system in Java language, that has specific libraries of the OWL language.

III. EXPECTED RESULTS

As a result it is expected that the development of an ontology easily integrates both health standards of World Health Organization (WHO). This ontology must be able to application on the health information systems, resulting in a larger information framework for decision making⁶. When a health professional chooses a code from ICD or from ICF, the system must be prepared to offer other codes related to that first one. Beyond the code itself, the ontology will bring other aspects from ICD or from ICF to record the impact of that to the others components involved, like disease, body functions, body structures, activities, participation or environment factors. The health professional will have a complete view from the probably functional health status and then, make decisions to end code and direct the treatment.

Both classifications when used in isolation, cannot offer all the information about health status. In the other hand, the joint use can lead to understanding of different health prospect of the patient, adding value and quality to the health report. When an ICD code is used, just like B24 (HIV), some codes from ICF can be used, as d910.80 (problems in community life) and e460.4 (negative social attitudes). In the other hand, when an ICF code is used, just like e1350.4 (inadequate tools for work), other codes from ICF and ICD can be used, just like b7150.8 (joint instability) and M70 (soft tissue disorders related to use, overuse and pressure).

For it code from ICF, there is one or more codes from ICF or from ICD that can be involved. The ontology integration will have start points from ICD to ICD or ICF, and from ICF to ICF or ICD.

The ontology must be able to bring, at least, causal references between the disease and its functioning restrictions and between environment factors and diseases added to the body functions and structures changes. Consequently, it will be able to express by web information system the health indicators⁷, that operates with the inferences rules of integrations ontology, created with the database that records the information and enables statistics.

IV. GENERAL CONSIDERATIONS

Studies indicate ontologies as a way to solve interoperability and integration between systems and standard. Through ontologies, it is possible to manage the knowledge, independent of language. The ontologies may enable greater interoperability between systems and facilitates the exchange of health information, structuring knowledge of different standards in a single view⁸.

Currently, many health information are lost due to the lack of system interoperability in terms of integration and retrieval of information. In this sense, this ontology unify two WHO tools, one the tip to disease and other that records the functioning and its relationship with the environment.

This ontology can be extremely useful for insurers, government programs of social security, generate statistics and epidemiology information and for teaching skills for health professional.

REFERENCES

- [1] Laurenti R. A mensuração da qualidade de vida. *Revista da Associação Médica Brasileira*. 2003; 49(4): 361-362.
- [2] Araujo ES, Neves SFP. ICF or ICPC: what is missing for primary care? *Acta Fisiátrica*. 2014;21(1):46-48.
- [3] Pickler MEV. Web Semântica: ontologias como ferramentas de representação do conhecimento. *Perspectivas em Ciência da Informação*. 2007;12(1): 65-83.
- [4] Sivakumar R, Arivoli PV. Ontology visualization PROTÉGÉ tools – a review. *International Journal of Advanced Information Technology*. 2011; 1(4):1-11.
- [5] Araujo ES, Buchalla CM. The use of the International Classification of Functioning, Disability and Health in health surveys: a reflexion on its limits and possibilities. *Revista Brasileira de Epidemiologia*. 2015;18(3):720-724.
- [6] Araujo ES, Neves SFP. Classificação Internacional de Funcionalidade, Incapacidade e Saúde, e-SUS e Tabwin: as experiências de Barueri e Santo André, São Paulo. *Revista Baiana de Saúde Pública*. 2015;39(2):470-477.
- [7] Araujo ES. Health indicators about functioning and disability. *Revista CIF Brasil*. 2014;1(1):27-33.
- [8] Araujo ES. CIF: Uma discussão sobre linearidade no modelo biopsicossocial. *Revista Fisioterapia & Saúde Funcional*. 2013; 2(1):6-13.