Linked Health Data: how linked data can help to provide better health decisions

Fernanda Farinelli[a], Maurício Barcellos de Almeida[b], Yóris Linhares de Souza[c]

[a, b] *School of Information Science, Federal University of Minas Gerais, Brazil.*
[c] *Institute of Technical Education of Minas Gerais, Brazil.*

Abstract

This paper provides brief survey about the use of linked data in healthcare to foster better health decisions and increase the health knowledge. We present real cases from the Brazilian experience and emphasize some issues in research. This paper not intending to be fully comprehensive, we discuss some open issues and research challenges in linked data and the technologies involved. We concluded that even thought linked data has been adopted in many countries, some challenges have to be overcome, for example, interoperability between different standards. Define a solution able to foster the semantic interoperability between different standarts must to be develop. As benefits brought by linked health data involving better decision making on diagnostics, assertive treatments, knowledge acquisition, improvement on quality healthcare service to citizens.

Keywords:
Linked health data, linked data, ontology, decision making.

Introduction

The World Health Organization (WHO) considers health should be promoted by complete cooperation between individuals and states. The use of the Internet is an effective way of improving this cooperation. One alternative is Linked Data (LD) [2]. We present a brief discussion at about the uses of LD and challenges as interoperability.

Materials and Methods

We conducted a bibliographic research using CiteSeerx, BioMed, ScienceDirect, Pubmed, ACM Digital Library, to mention a few. We selected cases that portrait the Brazilian reality.

Results

We survey some cases. First, a cohort study applied on data from different healthcare units through LD technology, contributed to assess prenatal care [3]. Secondly, semantic linked data about nursing found in web aided in providing treatments [4].

Despite LD research is increase on medical field, are still major challenges encountered. An error in data linkage can cause a decision making error and consequently a wrong diagnostics that can cause a fatal loss of the patient [5]. We need to worry about security or privacy protection about the patient identification. To share and open the data we must provide a secure mechanism to guaranty data privacy and protection [6].

Semantics of data or semantic interoperability is the biggest challenge. Health information originate from several sources, and can have different meaning. In addition, biomedical field develop several terminologies and ontologies [7]. An alternative is to rely on initiatives such OBO Foundry, which are based on formal ontologies [1]. Formal ontologies can enable the effective semantic interoperability because the disambiguation in the definition of terms [1].

Conclusion

Some common challenges are both linkage data errors and privacy But, the most important issue is interoperability. Healthcare information came from heterogeneous sources, and there are different terminologies in use.

Indeed, in recent years it has been observed a proliferation of policies, standards and norms in many countries. The creation of these instruments follows a trend of modernization of public administration to provide better services to citizens. Overcoming challenges, a global data opening in health is able to permit sharing, retrieval, combination and analysis of a multitude of health information.

References

[1] Smith et al. The OBO Foundry. Nature biotechnology 2007: 25 (n. 11): 1251-1255.

[2] Berners-Lee, T. Design: Linked data 2006.

[3] De Almeida, M.; De Mello, M. O uso da técnica de linkage de SIs em estudos de coorte sobre mortalidade neonatal. Rev. S. Púb. 1996: 30 (n. 2): 141-7, 1996.

[4] Campos, L. et al. Dados Abertos Interligados e o espaço do profissional de informação: XIII ENANCIB 2012. RJ.

[5] Harron, K., et al. Evaluating bias due to data linkage error in electronic healthcare records. BMC medical research methodology. 2014: 14 (n. 1): 36.

[6] Kelman, C. W. et al. Research use of linked health data: a best practice protocol. Australian and New Zealand journal of public health. 2006: 26(n. 3): 251-255.

[7] Word Health Organization. Management of patient information: trends and challenges in Member States: based on the findings of the second global survey on eHealth. Global Observatory for eHealth series. 2012: 6.

Address for correspondence

fernandafarinelli@eci.ufmg.br