Reviewer’s report

Title: A Fast Healthcare Interoperability Resources (FHIR) Layer Implemented Over i2b2

Version: 0 Date: 03 May 2017

Reviewer: Diego Bosca

Reviewer's report:

This paper presents an implementation on providing a FHIR layer over an existing clinical data warehouse (CDW). Although FHIR is a popular topic, novelty of the paper should be better highlighted.

Methodology should be revised, as comparison with other Clinical Information Models (CIM) specifications should be made more clear. In particular, authors state that FHIR resources are similar to archetypes, which differs from the opinion of Thomas Beale (see https://wolandscat.net/2017/01/29/fhir-compared-to-openehr/). Taking this into account can be very useful to your paper introduction.

Also, it is not really clear which version of FHIR is this work based on, apart from looking at the now outdated bibliography link (your link does not point to FHIR 1.0.2 right now but to STU3). You should also state how your FHIR 1.0.2 solution compares to current STU3 FHIR version (and if you have any plans to update/move forward your system in the future).

In addition to that, other available papers tackling the topic of applying FHIR to i2b2 CDW should be reviewed in the introduction/methodology in order to better assess this paper novelty (just to name a few: C3-PRO: Connecting ResearchKit to the Health System Using i2b2 and FHIR, Read only SMART-FHIR façade for i2b2, Evaluation of SMART-on-FHIR i2b2 cell using PCORNET data model, SMART on FHIR Genomics: Facilitating standardized clinico-genomic apps, etc.).

Another thing not really clear in the paper is if the authors should use FHIR profiles or just use the FHIR resources as is. This is an important issue as if only resources are used means that: A) You left part of your data out of the mapping (and you should discuss why you left it out) or B) your data is exactly as the FHIR resource states (which is unlikely, but in any case you should justify it). If you define profiles then you should better discuss what additional fields were/need to be added and how do you plan to make these profiles available.

Discussion section also needs to be improved, as I believe that you have misinterpreted the "six-step" (there are seven...) CIM design and implementation process. It is strange that you argue that you did not do an analysis of the information of your domain (i.e. your CDW) when you discuss on the paper that FHIR resources covered all the concepts needed. I recommend you that you review again the steps of this methodology and try to classify the things you already did.
(scope definition, analysis, design or selection of CIMS...). Also, it is possible that you have not performed the steps 6 & 7 of the process, but probably it is useful for your project that you think about how you would deal with publishing, maintaining, and governing problems that can arise (and tell the reader your plans so we can all learn).

Some final considerations

The paper is full of links to external sites, please try to put them as proper bibliography or either footnotes if the journal allows it.

Please review the "FHIR query" from table 2, as even if the text has been masked, the URI still points to "10.149.219...". This in fact brings the topic of security to the table: Have the authors implemented any of the security mechanisms provided by the FHIR standard?

Finally, please review the use of English. Even if English quality is fine for most of the paper, a few pages should be revised in order to make them more understandable (e.g. second half of page 15)

**Are the methods appropriate and well described?**
If not, please specify what is required in your comments to the authors.

No

**Does the work include the necessary controls?**
If not, please specify which controls are required in your comments to the authors.

Yes

**Are the conclusions drawn adequately supported by the data shown?**
If not, please explain in your comments to the authors.

No

**Are you able to assess any statistics in the manuscript or would you recommend an additional statistical review?**
If an additional statistical review is recommended, please specify what aspects require further assessment in your comments to the editors.

Not relevant to this manuscript

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