Reviewer's report

Title: Archetype-based Import and Export of Electronic Health Record (EHR) Content Models: Pilot Experience with a Regional EHR System

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Reviewer: David Moner

Reviewer’s report:

This paper covers a very interesting and fundamental part of the normalization process of legacy EHR systems. In particular the one related to the conversion of existing clinical models to standardised clinical models or archetypes and vice-versa. As the authors say, this is a fundamental step for the adoption of the two-level paradigm standards for the EHR systems.

Major compulsory Revisions

1. One doubt arises from the reading. It is not clear if the semantic mapping, conversions and validations between COSMIC templates and archetypes is a manual or a (semi)automatic method. It seems that the archetype-to-template conversion can be automated but the template-to-archetype requires manual validation. More information about the actual implementation should be provided.

2. Overall revision. The methods introduction (pages 5 and 6) should be reorganised since it overlaps the paper abstract and the methods section content. For example, there is repeated information in the abstract (page 3), the methods section (page 6) and the Archetype to COSMIC template section (page 16) related to the fifteen archetypes imported from the openEHR knowledge repository.

3. Background section. In the paper it is not clearly described the transition from EN13606 norm to openEHR specifications. As assured at page 4, the EN 13606 has been selected for the National Patient Overview project in Sweden. However, the presented work has used the openEHR specifications and tools. In spite of the proven compatibility of both standards, a justification of using openEHR should be provided.

4. Page 3, last line. References to previous works should be provided.

5. Page 5, first paragraph. The comparison between openEHR templates and COSMIC templates has little sense at this point of the paper since COSMIC templates have not yet been described. This could be moved to the discussion section.

6. Page 6. The ARCHETYPE_SLOT structure is presented in page 6 without further information until page 12.

7. Page 12, first paragraph. The mentioned post-coordination side-effect is not clearly described in the text until page 13.

8. Page 16, second paragraph. Figures 4 to 8 are of limited interest if they are
not deeply explained. To include just one or two screenshots of the COSMIC template environment combined with archetypes would be enough if they are correctly described and explained in the text.

9. Future works (use of openEHR templates, conversion rules for metadata, automatically assigning the correct openEHR ENTRY subclass to each COSMIC template, query to terminology services, etc.) that are scattered along the paper should be grouped in the conclusions section.

10. Page 17. The proposed strategy of adding archetype support in legacy EHRs lacks a fundamental step. The conversion between legacy clinical models and archetypes is described, but there is an additional conversion needed, the one referred to existing data instances. Communication of EHRs among different systems is not just a problem of using the same clinical models but also the same data structures. That is, we need to convert not only the models but also the data instances of those models. This should be discussed in the strategy.

Minor essentials revisions

1. Pages 3, 4 and 9. The EN 13606 norm references should be homogenised. Currently they appear as “EN ISO 13606”, “EN 13606” and “EN/ISO 13606-1”. Should be “CEN EN 13606” or “CEN/ISO 13606” instead.

2. Page 4, last phrase. “Such clinical content models will be valuable input…” should be “Such clinical content models will be valuable inputs…”.

3. Page 5, last paragraph. A reference to the Cambio website should be provided.

4. Page 9, last paragraph. “Entry”, “Observation”, “Evaluation”, “Instruction” and “Action” should be fully uppercase to meet the other openEHR classes mentioned in the paper.

5. Page 10, middle page. “COMSMIC” should be “COSMIC”.

6. Page 16, first paragraph. “the subject of conversion fall…” should be “the subject of conversion falls…”

7. Page 16, last paragraph. “but also in addition” seem redundant.

8. Page 16, last phrase. “Since the term names are directly used…” has no-sense all alone.

Discretionary revisions

1. Page 3. A short but deeper introduction about the two-level paradigm and archetypes should be included in the background section for the non-expert readers.

**Level of interest:** An article of importance in its field

**Quality of written English:** Acceptable

**Statistical review:** No, the manuscript does not need to be seen by a
statistician.

Declaration of competing interests:

I declare that I have no competing interests