Reviewer’s report

Title: Untapped potential of multicenter studies: a review of cardiovascular risk prediction models revealed inappropriate analyses and wide variation in reporting.

Version: 0 Date: 15 Oct 2018

Reviewer: Catrin Tudur Smith

Reviewer's report:

1. Title doesn't accurately reflect that this is a review of one specific area - suggest rewording to include 'cardio-vascular'

2. The study is described as a systematic review. However, I don't believe that this study satisfies the criteria of a systematic review as it is based on a random sample of papers from a registry and so does not provide a complete, exhaustive summary of current literature. The title and methods should be adapted to reflect this.

3. Whilst the aims of the descriptive study of characteristics of the 50 predictive models were clear to me, the aims of the two additional illustrative examples were not entirely. Illustrative example 1 describes the difference between marginal and predictive probabilities and sets out to illustrate the consequences of ignoring clustering yet is just based on one 'simulated' dataset. To most usefully describe the differences between marginal and conditional probabilities then a range of scenarios and multiple simulated datasets should be examined. In example 2 the concept of transportability is examined but this concept hasn't really been described in detail. As in example 1, the second illustrative example focuses on just one example and so is potentially misleading in terms of describing the properties and concept of transportability.

4. The paper is almost exclusively focussed on prediction models in cardio-vascular disease and so it's unusual that the data in illustrative example 2 is then taken from the cancer field.

5. Referral bias and spectrum bias are mentioned on page 16 but not described.

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