Reviewer's report

Title: Estimating the number and length of episodes in disability using a Markov chain approach

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Reviewer: Long Khanh-Dao Le

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Manuscript title: "Estimating the number and length of episodes in disability using a Markov chain approach"

Thank you for the manuscript "Estimating the number and length of episodes in disability using a Markov chain approach" providing an application to use Markov model to estimate number and length of episodes spent in a state. The study use two examples, one using trial data for evaluating prednisolone treatment for liver cirrhosis patients and another one evaluating frailty and disability among elderly. This is a well-written study, however I have a couple of comments, and hope to improve the manuscript further.

1. The authors may need to explain or discuss the implications of this study within clinical and economic evaluation context. For example, if the trial that did not collect number and length of episodes, whether they can use the model to support the efficacy of prednisolone in the example? With using number and length of episodes, how it impacts on the cost effectiveness results. It is useful if the authors put more effort to discuss the real usefulness of this method.

2. Relate to point 1, I would suggest that the authors need to spend more space with more understandable language if they consider the method to reach out broader audiences.

3. In the introduction, the 2nd sentence "They are popular in part because they are easy to apply" -> please explain easy to apply in terms of what? I think decision tree should be easier than Markov model.

4. The sentence "Third, we re-analyze datasets taken from the literature from a new perspective". I am not clear with "new perspective" here. Is it a "new method"?

5. The first section "basic notation and preliminaries" seem repeating the definition of Markov that are using in the literature. The authors should put the appropriate reference for this section.

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