Reviewer's report

Title: The Long-Term Economic Impacts of Arthritis through Lost Productive Life Years: results from an Australian Microsimulation Model

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Reviewer: Donald Staines

Reviewer's report:
Direct treatment costs were noted of $9.2 billion in 2012; PLYs $1.5 billion in 2015 rising to $2.4 billion by 2030 with impact on welfare and taxation changes adding to costs. GDP costs of labour force exits due to arthritis are due to rise from $6.2 to $8.2 billion from 2015 to 2030. The authors note that 'The effectiveness of arthritis interventions should be judged not only on healthcare use but quality of life and economic wellbeing.' Some aspects of this sentiment do not appear to be addressed comprehensively in the paper.

They go on to state that cost savings to government may accrue if more effective management of the illness occurs prior to exiting the workforce. Microsimulation models may generate 'what if' scenarios to assess the impact of effective interventions to prevent or delay the illness.

While understanding the scope of this paper is largely limited to PLY economics factors there appear to be some assumptions, albeit at the margin, which might be clarified:

* Could confounding of arthritis economic outcomes be due to failure into the future of the 'effective interventions' stated? For example there appears to be little consideration in the study for clinically associated conditions such as pain. Will pain management become more problematic due to impending restriction of analgesic medication? Will patients either generate more costs by requiring regular physician prescription or by neglecting to obtain satisfactory analgesia and hence suffer more disability impact of their illness? Have these considerations been factored into the projections?

* Have the authors considered the impact of a range of other medications or surgical interventions? Has the cost of inappropriate medications in some at-risk patients (e.g. use of anti-inflammatory drugs) resulting in death or disability due to gastric bleeds, strokes or other
complications? How will economic policy recommendations influence prescribing habits of physicians and what are the economic and healthcare consequences?

In summary the study presents a valuable model for PDY analysis of arthritis as a significant health issue in Australia and potentially other developed countries. More detailed analysis as to which interventions for 'effective management' are required, including their economic and clinical impact, perhaps in future studies.

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

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

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