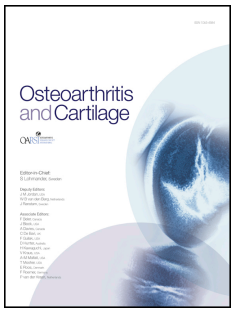
Accepted Manuscript



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PII: S1063-4584(18)30014-1

DOI: 10.1016/j.joca.2018.01.004

Reference: YJOCA 4142

To appear in: *Osteoarthritis and Cartilage*

Received Date: 26 May 2017

Revised Date: 19 November 2017

Accepted Date: 2 January 2018

Please cite this article as: Wilson R, Haxby Abbott J, Development and validation of a new population-based simulation model of osteoarthritis in New Zealand, *Osteoarthritis and Cartilage* (2018), doi: 10.1016/j.joca.2018.01.004.

Development and validation of a new population-based simulation model of osteoarthritis in New Zealand

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ABSTRACT

Objective

To describe the construction and preliminary validation of a new population-based microsimulation model developed to analyse the health and economic burden and cost-effectiveness of treatments for knee osteoarthritis (OA) in New Zealand (NZ).

Method

We developed the New Zealand Management of Osteoarthritis (NZ-MOA) model, a discrete-time state-transition microsimulation model of the natural history of radiographic knee OA. In this article, we report on the model structure, derivation of input data, validation of baseline model parameters against external data sources, and validation of model outputs by comparison of the predicted population health loss with previous estimates.

Results

The NZ-MOA model simulates both the structural progression of radiographic knee OA and the stochastic development of multiple disease symptoms. Input parameters were sourced from NZ population-based data where possible, and from international sources where NZ-specific data were not available. The predicted distributions of structural OA severity and health utility detriments associated with OA were externally validated against other sources of evidence, and uncertainty resulting from key input parameters was quantified. The resulting lifetime and current population health-loss burden was consistent with estimates of previous studies.

Conclusion

The new NZ-MOA model provides reliable estimates of the health loss associated with knee OA in the NZ population. The model structure is suitable for analysis of the effects of a range of potential treatments, and will be used in future work to evaluate the cost-effectiveness of recommended interventions within the NZ healthcare system.

KEYWORDS

Osteoarthritis; Simulation modelling; Microsimulation; Quality of life

Running title: Simulation model of OA in New Zealand