

# Author's Accepted Manuscript

Small-area health comparisons using health-adjusted life expectancies: A Bayesian random-effects approach

Marcel F. Jonker, Peter D. Congdon, Frank J. van Lenthe, Bas Donkers, Alex Burdorf, Johan P. Mackenbach



[www.elsevier.com/locate/healthplace](http://www.elsevier.com/locate/healthplace)

PII: S1353-8292(13)00063-4  
DOI: <http://dx.doi.org/10.1016/j.healthplace.2013.04.003>  
Reference: JHAP1315

To appear in: *Health & Place*

Received date: 11 October 2012

Revised date: 5 March 2013

Accepted date: 12 April 2013

Cite this article as: Marcel F. Jonker, Peter D. Congdon, Frank J. van Lenthe, Bas Donkers, Alex Burdorf, Johan P. Mackenbach, Small-area health comparisons using health-adjusted life expectancies: A Bayesian random-effects approach, *Health & Place*, <http://dx.doi.org/10.1016/j.healthplace.2013.04.003>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

## Small-area health comparisons using health-adjusted life expectancies: a Bayesian random-effects approach

**Marcel F. Jonker<sup>a\*</sup>, Peter D. Congdon<sup>b</sup>, Frank J. van Lenthe<sup>a</sup>, Bas Donkers<sup>c</sup>, Alex Burdorf<sup>a</sup>, Johan P. Mackenbach<sup>a</sup>**

<sup>a</sup>Department of Public Health, Erasmus MC, University Medical Centre Rotterdam, The Netherlands

<sup>b</sup>Department of Geography, Queen Mary University of London, London, United Kingdom

<sup>c</sup>Department of Business Economics, Erasmus University Rotterdam, Rotterdam, The Netherlands

\*Corresponding author. Tel.: +31 644 822 333.

Email: m.jonker@erasmusmc.nl

### Abstract

Health-adjusted life expectancy (HALE) is one of the most attractive summary measures of population health. It provides balanced attention to fatal as well as non-fatal health outcomes, is sensitive to the severity of morbidity within the population, and can be readily compared between areas with very different population age structures. HALE, however, cannot be calculated at the small-area level using traditional life table methodology. Hence we propose a Bayesian random-effects modeling approach that recognizes correlations and pools strength between genders, age-groups, geographical areas, and health outcomes. This approach allows for the calculation of HALE for areas as small as 2,000 person years at risk and with relatively modest health state survey sample sizes. The feasibility of the Bayesian approach is illustrated in a real-life example, which also shows how differences in areas' health performances can be adequately quantified. Such information can be invaluable for the appropriate targetting and subsequent evaluation of urban regeneration, neighborhood renewal, and community-based initiatives aimed at improving health and reducing health inequalities.

### Highlights

- Health-adjusted life expectancy (HALE) is an attractive summary measure of population health.
- The proposed random-effects life table methodology allows for the estimation of HALE at the small-area level.
- A real-life example and several extensions and practical implementations are discussed.
- Monte Carlo simulation evidence is presented that supports the validity of the methodology.

### Keywords

Small-area analysis; Bayesian analysis; Life expectancy; Health-adjusted life expectancy; Population health

Download English Version:

<https://daneshyari.com/en/article/7458950>

Download Persian Version:

<https://daneshyari.com/article/7458950>

[Daneshyari.com](https://daneshyari.com)