

bias that occurs when the assumption that induction/latency periods can be described by a fixed constant does not hold.

**Methods** Analytical expressions and simulations illustrate bias and CI coverage under varying assumptions about the population distribution of induction/latency periods. We describe a method for joint estimation of parameters describing an exposure effect and the distribution of induction/latency periods. We illustrate the proposed regression estimation approach using data on cumulative asbestos exposure-lung cancer mortality associations among South Carolina asbestos textile workers.

**Results** Selecting the lag that maximises the effect estimate leads to bias away from the null; selecting the lag value that maximises goodness of model fit leads to CIs that are too narrow. These problems tend to increase as the within-person variation in exposure diminishes. The approach of lagging exposure assignment by a fixed constant leads to bias towards the null if the distribution of induction periods is not a fixed constant; the degree of bias increases as the variance of the population distribution of induction periods increases.

**Conclusions** Maximum likelihood estimation of latency periods can minimise bias due to misspecification of the distribution of induction times and provide CIs with more appropriate coverage.

## 5 LAGGING EXPOSURE INFORMATION IN CUMULATIVE EXPOSURE-RESPONSE ANALYSES

David Richardson,<sup>1</sup> Bryan Langholz,<sup>2</sup> Stephen Cole<sup>1</sup> <sup>1</sup>University of North Carolina, Chapel Hill, USA; <sup>2</sup>University of Southern California, Los Angeles, USA

10.1136/oemed-2011-100382.5

**Objectives** Lagging exposures is done to allow for induction and latency periods in cumulative exposure-disease analyses. We consider bias and CI coverage when employing the standard approaches of fitting models under several lags and selecting the lag that maximises either the magnitude of the effect estimate or model goodness-of-fit. Next we consider