**APPENDIX D: Estimates of the Magnitude of Immortality Bias**

Immortal time bias arises when the treatment status is determined after a waiting period following entry into study, and the time between entry into study and treatment is not included in analysis as unexposed time period. Suissa (2007)[[1]](#footnote-1) derives the relative magnitude of the immortal time bias as a ratio of the rate ratio in the presence of immortal time bias and the unbiased rate ratio that would result when the time between entry into study and treatment is properly classified as unexposed. Let

T0=total person-time for control group

T1=total person-time for treatment group

k=ratio of person-time T0/T1, and

p=proportion of T that is unexposed

Then, based on Suissa (2007), the immortal time bias in event-based cohorts when the rate of outcome is constant over time is given by

$$Bias=^{RR\_{b}}/\_{RR\_{u}}=^{k(1-p)}/\_{(k+p)}$$

where RRb is the biased rate ratio, and RRu is the unbiased rate ratio.

The bias calculations for the analysis samples used in our paper are presented in Table D1 below.

**Table D1. Magnitude of the Immortal Time Bias**

|  |  |
| --- | --- |
| Condition Group | Bias=RRb/RRu |
| MDC=04 Respiratory  | 0.987  |
| MDC=05 Circulatory  | 0.984  |
| MDC=06 Digestive  | 0.982  |
| MDC=08 Musculoskeletal & Connective Tissue  | 0.989  |
| MDC=18 Infectious & Parasitic DDs | 0.985 |

1. Suissa S. Immortal time bias in pharmaco-epidemiology. Am J Epidemiol. 2008. Feb 15;167(4):492-9. Epub 2007 Dec 3. Review. [↑](#footnote-ref-1)