## Supplementary Table 4. Estimates of the regression parameters of the causal effect model, comparing pneumonia mortality with that of chronic obstructive pulmonary disease (COPD) in Japan

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| --- | --- | --- | --- |
| Parameters | Estimates | Lower 95% CI | Upper 95% CI |
| $$α\_{0}$$ | 5 | 1 | 10 |
| $$α\_{1}$$ | 1 | 1 | 2 |
| $$β$$ | -2 | -5 | 1 |
| $$γ$$ | 78 | 74 | 82 |
| $$δ$$ | -5 | -12 | 2 |

Figures should be interpreted as the yearly rate of reduction in pneumonia mortality per 100,000 individuals. All estimates are derived from the entire country data using model (1) with a COPD as a control group. The datasets in 2017 were included. Upper and lower 95% confidence intervals (CI) were derived from the profile likelihood.