Inference of age-dependent case-fatality ratios for seasonal influenza virus subtypes A(H3N2) and A(H1N1)pdm09 and B lineages using data from the Netherlands

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Abstract

Background. Despite the known relatively high disease burden of influenza, data are lacking regarding a critical epidemiological indicator, the case-fatality ratio. Our objective was to infer age-group and influenza (sub)type specific values by combining modelled estimates of symptomatic incidence and influenza-attributable mortality. Methods. The setting was the Netherlands, 2011/12 through 2019/20 seasons. Sentinel surveillance data from general practitioners and laboratory testing were synthesised to supply age-group specific estimates of incidence of symptomatic infection, and ecological additive modelling was used to estimated influenza-attributable deaths. These were combined in an Bayesian inferential framework to estimate case-fatality ratios for influenza A(H3N2), A(H1N1)pdm09 and influenza B, per 5-year age-group. Results. Case-fatality estimates were highest for influenza A(H3N2) followed by influenza B and then A(H1N1)pdm09, and were highest for the 85+ years age-group, at 4.76% (95% credible interval (CrI): 4.52-5.01%) for A(H3N2), followed by influenza B at 4.08% (95% CrI: 3.77-4.39%) and A(H1N1)pdm09 at 2.51% (95% CrI: 2.09-2.94%). For 55-59 through 85+ years, the case-fatality risk was estimated to double with every 3.7 years of age. Conclusions. These estimated case-fatality ratios, per influenza sub(type) and per age-group, constitute valuable information for public health decision-making, for assessing the retrospective and prospective value of preventative interventions such as vaccination, and for health economic evaluations.

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