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Reply to Comment on ‘Premature deaths attributed to source-specific BC emissions in six urban US regions’

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In response to Morfeld and Erren’s comment that the estimations of premature deaths in our article titled ‘Premature deaths attributed to source-specific BC emissions in six US regions’ are potentially biased, we stand by the approach taken in our publication. Morfeld and Erren note that the theoretical bounds on $F = (RR1)/RR$ are quite large, where RR is the relative risk. They further claim that the uncertainty associated with an estimate of RR should be presented in terms of the % difference between the bounds and the value of RR employed. In our work, we account for uncertainty associated with RR using the 95% confidence interval reported in Krewski et al [1]. While the limits of RR may be bounded in the range as suggested by Greenland [2], the fit parameters from Krewski et al [1] are asymptotically normally distributed as discussed therein. Their reported uncertainty is thus interpreted as an error variance, and propagated through the dose-response equation (equation (1) of Turner et al [3]) using well-established (e.g., Ku [4]) error variance propagation techniques (equation (S1) of Turner et al [5]) to arrive at uncertainties in estimates of premature death. Hence, this use of the 95% confidence intervals from Krewski et al [1] is a valuable assessment of uncertainty, and more useful than stating the minimum and maximum theoretical bounds of $F$, as promoted by Morfeld and Erren, as the latter is not associated with any particular likelihood. Further, our interpretation of the error associated with estimating premature deaths using RR from Krewski et al [1] is consistent with several previous studies that have estimated uncertainties in health impact assessments when using the dose-response relationship based on Krewski et al [1], such as Li et al [6], Dedoussi and Barrett [7], Anenberg et al [8], Caiazzo et al [9].

References