Written comment for the CASAC PM PA review. George Allen 12/3/19

Causal PM mortality literature examples. Only 1 is referenced in the draft ISA (Schwartz 2015). None are referenced in the draft PA.

Makar, Maggie, Joseph Antonelli, Qian Di, David Cutler, Joel Schwartz, and Francesca Dominici. "Estimating the Causal Effect of Fine Particulate Matter Levels on Death and Hospitalization: Are Levels Below the Safety Standards Harmful?." Epidemiology (Cambridge, Mass.) 28, no. 5 (2017): 627. https://insights.ovid.com/crossref?an=00001648-201709000-00001
This is the Medicare Current Beneficiary Survey cohort referenced in Di et al., NEJM2017.

Miles, Caleb H., Joel Schwartz, and Eric J. Tchetgen Tchetgen. "A Class of Semiparametric Tests of Treatment Effect Robust to Confounder Classical Measurement Error." arXiv preprint arXiv:1610.05005 (2016). https://arxiv.org/abs/1610.05005
We apply the methods to a multi-U.S.-city, time-series data set to test for an effect of temperature on mortality while adjusting for … PM2.5, which is known to be measured with error.

Schwartz, Joel D., Yan Wang, Itai Kloog, Maayan Yitshak-Sade, Francesca Dominici, and Antonella Zanobetti. "Estimating the effects of PM 2.5 on life expectancy using causal modeling methods." Environmental health perspectives 126, no. 12 (2018): 127002. https://ehp.niehs.nih.gov/doi/10.1289/EHP3130
We believe that this is the first study to directly estimate the effect of PM2.5 on the distribution of age at death using causal modeling techniques to control for confounding.

Schwartz, Joel, Kelvin Fong, and Antonella Zanobetti. "A national multicity analysis of the causal effect of local pollution, NO 2, and PM 2.5 on mortality." Environmental health perspectives 126, no. 8 (2018): 087004. https://ehp.niehs.nih.gov/doi/10.1289/EHP2732
We used three methods which, under different assumptions, provide causal marginal estimates of effect: a marginal structural model, an instrumental variable analysis, and a negative exposure control. The instrumental approach used planetary boundary layer, wind speed, and air pressure as instruments for concentrations of local pollutants; the marginal structural model separated the effects of NO2 from the effects of PM2.5, and the negative exposure control provided protection against unmeasured confounders.

Schwartz, Joel, Marie-Abele Bind, and Petros Koutrakis. "Estimating causal effects of local air pollution on daily deaths: effect of low levels." Environmental health perspectives 125, no. 1 (2016): 23-29. https://ehp.niehs.nih.gov/doi/full/10.1289/EHP232
Using an instrumental variable approach, we developed an instrument for variations in local pollution concentrations that is unlikely to be correlated with other causes of death, and examined its association with daily deaths in the Boston, Massachusetts, area. We also used Granger causality to assess whether omitted variable confounding existed.

Schwartz, Joel, Elena Austin, Marie-Abele Bind, Antonella Zanobetti, and Petros Koutrakis. "Estimating causal associations of fine particles with daily deaths in Boston." American journal of epidemiology 182, no. 7 (2015): 644-650. https://academic.oup.com/aje/article/182/7/644/107376
Author's response to comments: Schwartz, Joel, Petros Koutrakis, and Marie-Abèle Bind. "Three Authors Reply." American journal of epidemiology 183, no. 6 (2016): 595-596. https://academic.oup.com/aje/article/183/6/595/2196130
We used an instrumental variable approach, including back trajectories as instruments for variations in PM2.5 uncorrelated with other predictors of death. We also used propensity score as an alternative causal modeling analysis.

Wang, Yan, Itai Kloog, Brent A. Coull, Anna Kosheleva, Antonella Zanobetti, and Joel D. Schwartz. "Estimating causal effects of long-term PM2. 5 exposure on mortality in New Jersey." Environmental health perspectives 124, no. 8 (2016): 1182-1188. https://ehp.niehs.nih.gov/doi/full/10.1289/ehp.1409671
We applied a variant of the difference-in-differences approach, which serves to approximate random assignment of exposure across the population and hence estimate a causal effect.

Yitshak-Sade, Maayan, Itai Kloog, Antonella Zanobetti, and Joel D. Schwartz. "Estimating the causal effect of annual PM2. 5 exposure on mortality rates in the Northeastern and mid-Atlantic states." Environmental Epidemiology

(Philadelphia, Pa.) 3, no. 4 (2019): e052. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6693936/
Difference-in-differences approach in the Poisson survival analysis.