# Methodology 3

## 181 INVERSE PROBABILITY WEIGHTED MODELS OF ARSENIC EFFECTS ON CANCER IN A COPPER SMELTER COHORT

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**Objectives** The healthy worker survivor effect (HWSE) describes a selection process in which workers with low propensity for adverse health events remain employed longer than other workers. Standard analyses of exposure-disease associations in occupational cohorts may be biased due to HWSE. Inverse probability (IP) weighting has been proposed as one method for estimating associations without bias in settings of time-varying confounding via a variable affected by prior exposure. The approach is appealing because it may be implemented using standard methods for weighted regression analysis.

**Methods** We propose IP-weighted excess relative risk (ERR) models for continuous exposures. These methods require the specification of a parametric model for the probability of exposure, conditional on covariates that may include confounders affected by prior exposure. We apply these methods to an analysis of the association between arsenic exposure and cancer mortality in a cohort of copper smelters followed between 1938 and 1989.

**Results** Estimates obtained using a proportional hazards regression analysis of the association between cumulative arsenic exposure (lagged 10 years) and cancer mortality will be compared to estimates obtained using an IP-weighted proportional hazards models.

**Conclusions** To our knowledge, this analysis is the first to apply IP-weighting to ERR models; and, we employ some novel approaches to the problem of non-positivity in IP-weighting of continuous exposures. IP-weighted ERR models offer a viable approach for analyses of exposure-disease associations in occupational cohorts where the HWSE is a concern.