Bias analyses

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Contents

"Continuation of Annual Screening Mammography and Breast Cancer Mortality in Women Older Than 70 Years" (2020), supplementary materials p16:

> A sensitivity analysis for unmeasured confounding can only conclude that, if there is much unmeasured confounding, there will be much bias in the estimates and, conversely, if there is little unmeasured confounding, there will be little bias in the estimates. But, if the magnitude of unmeasured confounding is unknown (as it often is), then the magnitude of confounding bias is also unknown. That is, sensitivity analysis for unmeasured confounding is, by definition, uninformative. The situation is different when investigators have some information about the unmeasured confounder(s). For example, our analysis did not adjust for cigarette smoking, which may be associated with both breast cancer screening (because smokers are less likely to use preventive services) and breast cancer death. If we knew the prevalence of smoking in screening-defined groups and the association between smoking and breast cancer death, then we could use published methods to correct the confounded effect estimates.
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> Unfortunately, these methods assume that the residual confounding can be summarized by a single variable that happens to be dichotomous, time-fixed, and unassociated with all measured variables that were adjusted for in the analysis (Lash et al. 2009; Schneeweiss 2006).

See also Fox et al. (2022) for an updated reference.

"Continuation of Annual Screening Mammography and Breast Cancer Mortality in Women Older Than 70 Years." 2020. *Annals of Internal Medicine* 172 (6): 381–89. https://doi.org/10.7326/M18-1199.

Fox, Matthew P., Richard F. MacLehose, and Timothy L. Lash. 2022. *Applying Quantitative Bias Analysis to Epidemiologic Data*. Second edition. Statistics for Biology and Health. Springer. https://doi.org/10.1007/978-3-030-82673-4.

Lash, Timothy L., Matthew P. Fox, and Aliza K. Fink. 2009. *Applying Quantitative Bias Analysis to Epidemiologic Data*. 1st ed. Statistics for Biology and Health. Springer. https://doi.org/10.1007/978-0-387-87959-8.

Schneeweiss, Sebastian. 2006. "Sensitivity Analysis and External Adjustment for Unmeasured Confounders in Epidemiologic Database Studies of Therapeutics." *Pharmacoepidemiology and Drug Safety* 15 (5): 291–303. https://doi.org/https://doi.org/10.1002/pds.1200.