

Greenland, Sander

The impact of prior distributions for uncontrolled confounding and response bias: A case study of the relation of wire codes and magnetic fields to childhood leukemia. (English)

Zbl 1047.62106

J. Am. Stat. Assoc. 98, No. 461, 47-54 (2003).

Summary: This article examines the potential for misleading inferences from conventional analyses and sensitivity analyses of observational data, and describes some proposed solutions based on specifying prior distributions for uncontrolled sources of bias. The issues are illustrated in a sensitivity analysis of confounding in a study of residential wire code and childhood leukemia and in a pooled analysis of 12 studies of magnetic-field measurements and childhood leukemia.

Both analyses have been interpreted as evidence in favor of a causal effect of magnetic fields on leukemia risk. This interpretation is contrasted with results from analyses based on prior distributions for the unidentified bias parameters used in the original sensitivity analysis model. These analyses indicate that accounting for uncontrolled confounding and response bias under a reasonable prior can substantially alter inferences about the existence of a magnetic field effect. More generally, analyses with informative priors for unidentified bias parameters can help avoid misinterpretation of conventional results and ordinary sensitivity analyses.

MSC:

62P10 Applications of statistics to biology and medical sciences; meta analysis

62F15 Bayesian inference

Cited in **12** Documents

Keywords:

confounding; epidemiologic methods; risk assessment; sensitivity analysis

Full Text: [DOI](#)