

Epidemiological Statistics—II

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Encyclopedia of Statistical Sciences 2006. John Wiley & Sons.

<http://mrw.interscience.wiley.com/emrw/9780471667193/ess/article/ess6019/current/abstract>

Abstract

Epidemiological studies use statistical methods to understand the factors that cause, reduce, and prevent diseases in human populations. These studies estimate the parameters in a target population based on representative samples, and can be qualitative or quantitative, descriptive or comparative, and observational or experimental. Parameters of interest include levels of disease and associations between risk factors and disease outcomes. Concept maps are useful for showing causal paths between risk factors, disease outcomes, and intervening variables (confounders) that could distort the association. The statistical methods can be classified by the type and role of the data, and are subject to both inaccuracy or lack of statistical power (due to sampling variability) and bias (due to faulty measurement, differential selection of subjects, or confounding). Matching of subjects can improve accuracy. Mantel–Haenszel methods can reduce confounding bias. Meta-analysis is used to combine results from different studies. Statistical models include linear, logistic, and Poisson regression, and the proportional hazards model for handling censored data.