II–4.

Barnet Woolf: On Estimating the Relation Between Blood Group and Disease. Annals of Human Genetics 1955; 19:251–253.

Woolf's "On Estimating the Relation Between Blood Group and Disease" is most often cited for its introduction of what was probably the first common odds-ratio estimator for a set of two-by-two tables (or studies), and a test for heterogeneity of the odds ratio across the tables; these are now known as Woolf's estimate and Woolf's test of homogeneity (see, e.g., Schlesselman [1982]). Though these statistics have been supplanted by Mantel-Haenszel and maximum-likelihood methods, the paper contains more than just bare mechanics, as it touches on a number of important points which were generally unappreciated in the early literature.

Woolf was motivated by concern about the then-prevalent practice of analyzing and comparing case-control results by computing the difference in exposure proportions between case and control groups. As he notes, this difference would vary with the background frequency of exposure, and artifactual differences between study results could be expected. Instead he chose to work with the ratio of incidence rates, and recognized (independently of Cornfield) that this ratio could be estimated from case-control data, even if the absolute rates could not. (He did not, however, delineate sufficient conditions for the sample odds ratio to estimate the incidence ratio.) He also noted some subtle points that many later users of his methods overlooked, one being that his variance formula for the common odds ratio applied only under the homogeneity assumption.

Reference:

Schlesselman JJ. *Case-control Studies: Design, Conduct, Analysis*. New York: Oxford University Press, 1982.