Wiener Biometrische Sektion
der Internationalen Biometrischen Gesellschaft
Region Österreich – Schweiz

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Einladung zum

Biometrischen Kolloquium

am Dienstag, dem 18. Jänner 2011 um 10:30 Uhr (s.t.)

im Seminarraum (Ebene 4, Raum 88.04.513) des Instituts für klinische Biometrie, Zentrum für Medizinische Statistik, Informatik und Intelligente Systeme, Medizinische Universität Wien
Spitalgasse 23, 1090 Wien

Vortragender:

Dr. Jenő Reiczigel
Szent István University, Faculty of Veterinary Science, Budapest, Hungary

Estimation of prevalence and relative risk in case of an imperfect test

Der Vortrag wird auf Englisch gehalten. Wir freuen uns auf zahlreichen Besuch.

Georg Heinze   Martin Posch
Präsident   Sekretär

Estimation of prevalence and relative risk in case of an imperfect test

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Estimation of prevalence of disease, including construction of confidence intervals, is essential in surveys for screening as well as in monitoring disease status. In most analyses of survey data it is implicitly assumed that the diagnostic test has a sensitivity and specificity of 100%. However, this assumption is invalid in most cases. Furthermore, asymptotic methods using the normal distribution as an approximation of the true sampling distribution may not preserve the desired nominal confidence level. Here we propose exact two-sided confidence intervals for the prevalence of disease, taking into account sensitivity and specificity of the diagnostic test.

Comparison of risk in the treated group relative to the control is usually expressed by the relative risk or risk ratio (RR). While the effect of misclassification on point estimates of RR has been studied since 1954, only a few tests taking into account that the observed data is subject to classification errors have been proposed. Our aim is to develop estimation and testing methods that control for sensitivity and specificity of the diagnostic test. We combine the adjustment method by Reiczigel, Földi and Ózsvári (2010) with the procedure described in Reiczigel, Abonyi and Singer (2008) operating on the two-dimensional parameter space of probabilities p_1 and p_2 to obtain an exact unconditional test for H_0: $RR = RR_0$. First the adjustment for sensitivity and specificity is applied to each of p_1 and p_2, resulting in an adjusted line in the parameter space, along which RR is constant. Then the hypothesis about RR is tested by means of the intersection-union principle. Confidence intervals can be obtained by inverting the test. The proposed procedure may be useful in clinical and vaccine trials.

Reiczigel J, Abonyi-Toth Z, Singer J (2008) An exact confidence set for two binomial proportions and exact unconditional confidence intervals for the difference and ratio of proportions, Computational Statistics and Data Analysis 52, 5046–5053.

Reiczigel J, Földi J, Ózsvári L (2010) Exact confidence limits for prevalence of a disease with an imperfect diagnostic test, Epidemiology and Infection, 138, 1674–1678.