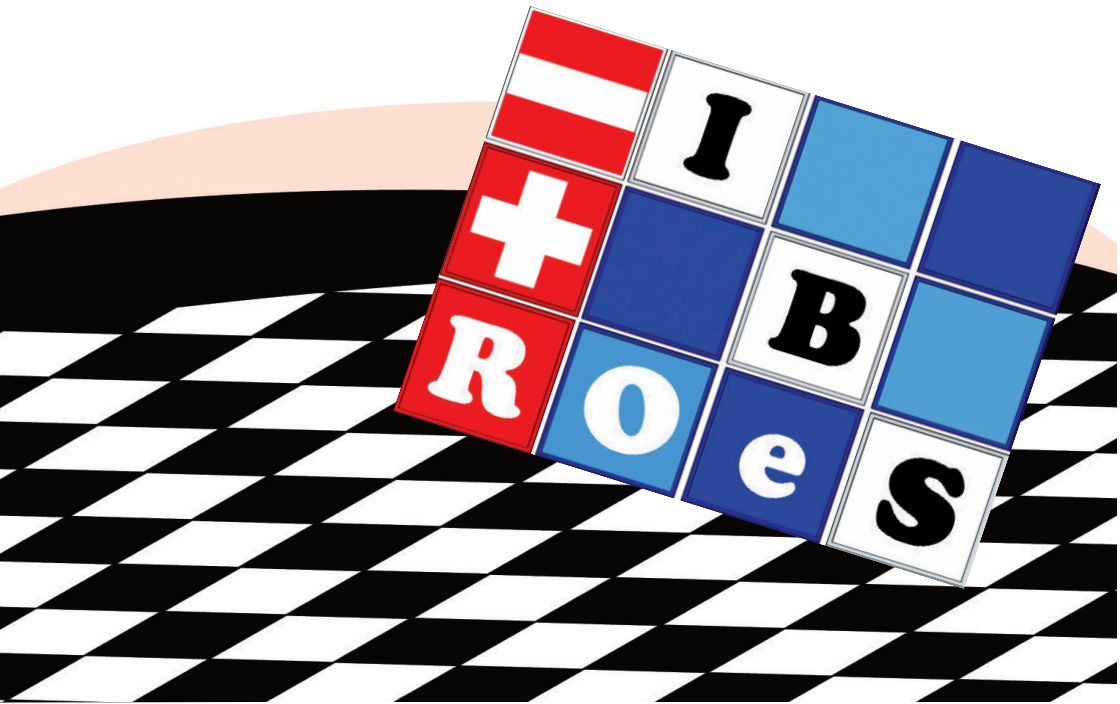
Department of Medical Statistics,
Informatics and Health Economics
Innsbruck Medical University

Sabrina B. Neururer
Hanno Ulmer
(editors)

ROeS 2013

9th - 12th September 2013. Dornbirn, Austria

Conference Program
Conference Proceedings



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organized by

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Dear Participant,

It is our great pleasure to welcome you to Dornbirn for this conference organized by the Department of Medical Statistics, Informatics and Health Economics of Innsbruck Medical University. The conference has brought together leading scientists from academia and industry across the disciplines of biostatistics, mathematical statistics, epidemiology, as well as clinical trials and promises to be a highly interactive event.

This conference features an exceptional program that includes the latest developments. It offers excellent networking and collaboration opportunities for scientists from a variety of research fields.

The conference venue, Dornbirn, the largest town in the Austrian state of Vorarlberg, benefits from its favorable location in a diverse cultural and natural setting, close to Liechtenstein, Switzerland, and Germany. It is a friendly, lively small city which has been able to keep its cozy traditional rustic character. This location comprises a perfect combination of a picturesque town in an impressive landscape.

On behalf of all of who contributed to the organization of this conference we would like to thank all our speakers, financial supporters, reviewers, and attendees, and extend a warm welcome to you in Dornbirn.

We hope you will enjoy your stay.

With best wishes,

Sabrina B. Neururer
Conference Director

Hanno Ulmer
ROeS President

STATISTICAL METHODS IN THE METABOLIC SYNDROME AND CANCER PROJECT (ME-CAN)

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In the Metabolic syndrome and Cancer (Me-Can) project health examination data from seven cohorts in Norway, Sweden, and Austria were pooled to a total of 578,700 participants. The research aim of Me-Can was to longitudinally investigate possible associations between single metabolic risk factors, the metabolic syndrome as entity, and subsequent risk of cancer. Metabolic risk factors include body mass index, blood pressure, total cholesterol, triglycerides and glucose. Outcomes were defined as cancer incidence and cancer mortality outcome information came from national and local cancer registries and were linked to the health examination data. This poster describes the statistical methods used in the Me-Can project. These include standard survival analysis techniques, such as the Cox proportional hazards regression, correction for measurement error and regression dilution bias, lag-time analyses, and the use of splines in order to model non-linear associations. As a proxy for the metabolic syndrome as an entity a score of the sum of the standardized z-scores of the single metabolic factors was constructed.

Statistical methods in the Metabolic syndrome and Cancer project (Me-Can)

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In the Me-Can project data from seven cohorts in Norway, Sweden, and Austria were pooled to a total of 578,700 participants (study period from 1972 till 2006). The cohort health examination included measurements of height, weight and blood pressure, and circulating levels of glucose, total cholesterol and triglycerides. The cohorts were linked to their respective national register for the assessment of cancer incidence (ICD-7), migration, vital status, and cause of death. Basically, the research aim focused on associations of the metabolic syndrome (MetS) factors and cancer (death) risk.

Generally, modelling was done by Cox PH regression with attained age as time-scale, stratified by cohort (to account for differences in measurement procedures) and adjusted for birth year, baseline age and smoking status (when appropriate also for sex and body mass index). In most instances the analyses were performed for males and females separately.

Quintile analysis
Quintile cut-points were determined separately within each of the seven cohorts, in both sex groups, and for glucose, cholesterol, and triglycerides also in categories of fasting time. After putting together the data, hazard ratios were estimated with the lowest quintile as the reference.

Analysis of z-scores
To allow the determinants to be compared on the same scale, the exposure variables were transformed to standardised z-scores with a mean of 0 and a standard deviation of 1 (glucose and triglycerides ln-transformed). Also, a combined MetS score was constructed from the standardised sum of the separate z-scores. We calculated extra models with further adjustments for the other MetS variables.

Measurement error
Based on repeated readings, correction for random error and within-person variability of the exposure measurements was performed, to counteract regression dilution bias of risk associations. The regression dilution ratio and the regression calibration method were applied (both based on linear mixed effect models).

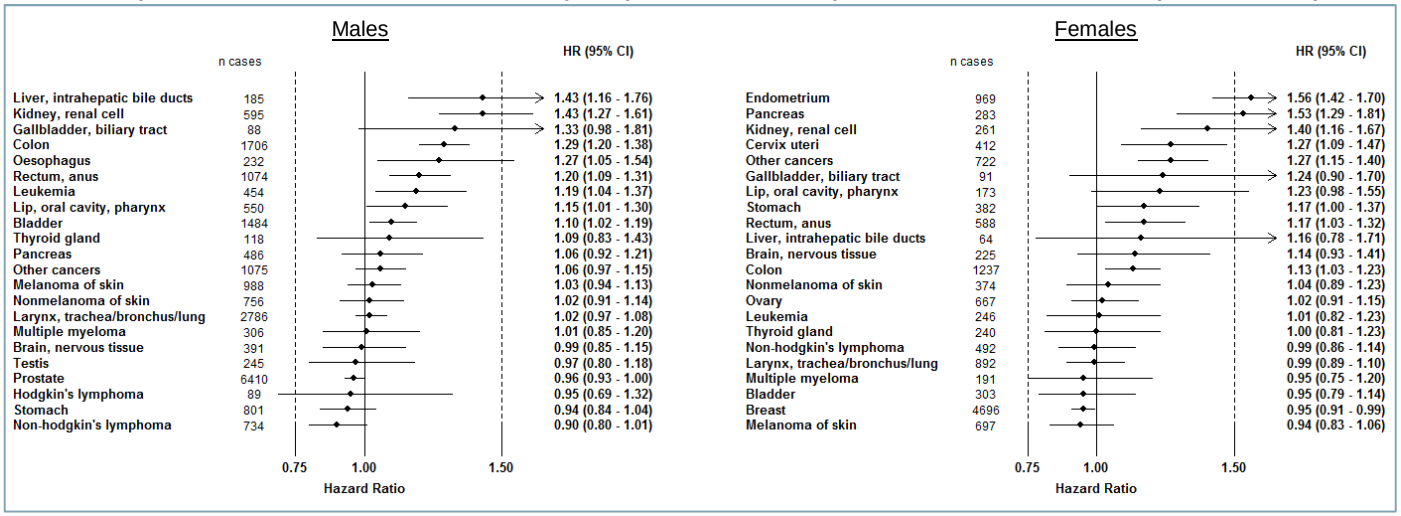
$$y_{ijr} = a + a_i + (b + b_i + c_1|t_{ijr}|)\, y_{ij\,0} + c_2 t_{ijr} + \sum_{k=1}^{p} \alpha_k x_{ij\,0,k} + \sum_{l=1}^{q} \beta_l z_{ij\,0,l} + \varepsilon_{ijr}$$

Regression dilution ratio = $(b+b_i+c_1|t_{ijr}|)$

Lag-time analysis
In the regression models the follow-up starting point was set at one year after the baseline examination in order to reduce the possibility of reverse causation. In some studies we did additional checks with a time lag of 5 years.

Splines
Investigation of the shape of the association of z-score factors with risk was analysed in certain studies by using restricted cubic spline regression with knots placed at the 5th, 35th, 65th and 95th percentiles and linear models, compared with likelihood ratio tests.

Sex-specific risk estimates of incident cancer by site per unit MetS score (standardised sum of the five separate z-scores)



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