

XXXIst Conference of the Austro-Swiss Region (ROeS) of the International Biometric Society



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Abstracts



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Abbreviations

KS **Keynote Speaker**
IS **Invited Speaker**
CS **Contributed Speaker**
YS **Young Statistician**
AL **Arthur-Linder Prize**
PO **Poster**

Summary

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Notes

- abstracts numbers refer to the conference program
- in case of co-authorship, the presenting author is underlined
- only the affiliation of the presenting author is given
- typos or other inaccuracies can be reported to ibs-roes2019@unil.ch
- this abstracts booklet will be further edited after the conference

From Controlled Trials to Big Data and Back

Statistical data analyses are sometimes classified as being either exploratory or confirmatory, while the reality of statistical practice often lies in between. This middle territory is exemplified by “model selection” issues and Frank Harrell’s famous words: “Using the data to guide the data analysis is almost as dangerous as not doing so”.

The most accomplished confirmatory statistical analyses are conducted in the context of controlled (clinical) trials, where regulations and guidelines are to ensure a fully protocolled and planned statistical analysis. On the other hand, we are now living in the era of “big data” and “data science”, where extreme forms of exploratory data analyses are encouraged with the hope that data quantity prevails over data quality.

While data science is currently in vogue, there is also some perception that “those who ignore statistics are condemned to reinvent it”, as Brad Efron once said. It might be a time to return from the big data paradigm towards more classical approaches and concerns, and to land somewhere between the two extremes of the purely confirmatory and purely exploratory data analyses.

The XXXIst ROeS statistical conference will be a timely occasion to try to define what this “middle ground” should or could be to best meet the expectations of scientists.

We are looking forward to welcoming you in Lausanne and hope that you will have a pleasant stay and a fruitful conference!

The conference organizers

September 2019

CS33

Paradoxical findings in observational research - a new example from coronary artery bypass surgery

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Keywords: Causality, paradox, collider.

Abstract: In the field of observational research, it is not uncommon that paradoxical results occur and, also, that findings from such association studies cannot be confirmed as causal in subsequent randomized trials. Recently, we were analyzing observational data from 2'553 patients under the age of 60 years with premature coronary artery disease (CAD) undergoing coronary artery bypass surgery (CABG) at the Innsbruck Medical University hospital. These patients were followed-up for a median of 8 years, aiming to assess whether a positive family history (PFH) of cardiovascular diseases (CVD) is associated with poor survival outcomes. Contrary to our initial hypothesis, PFH, which was highly prevalent in this patient group, was associated with improved survival outcomes after CABG.

A PFH of CVD is associated with increased mortality in the general population but paradoxically, in our study, with decreased mortality in younger individuals undergoing CABG. In order to explain this paradoxical finding, we discuss famous examples from the literature such as Simpson's paradox, Berkson's paradox, Lord's paradox and the Birth Weight paradox and graphically visualize potential underlying causal structures using directed acyclic graphs (DAGs).

The structure of our paradox could reflect collider bias, as found in the Birth Weight example. The collider in our paradox would be younger patients undergoing CABG. We argue that selecting the study population on this collider could have introduced a spurious association between PFH and CABG outcome. Thus, although the survival benefits of patients requiring CABG at younger ages with a PFH are real, owing to apparent collider bias, we cannot conclude that there is a true causal relationship between PFH and outcomes following CABG.