Update on Activities of Topic Group 5 (Design) and Potential Collaborations with other STRATOS Topic Groups

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November 2, 2021

Topic Group 5 (Design)

- Aim: Provide accessible and accurate guidance on the design of observational studies
- Members: Suzanne Cadarette, Mitch Gail (co-chairs), Gary Collins, Peggy Sekula, Neus Valveny, Elizabeth Williamson
- Papers published, in development or planned
- Vision for future activities and recruitments (Douglas Altman, Stephen Evans, Neil Pearce and Mark Woodward are no longer active members)
- Potential collaborations with other Topic Groups

Papers Published, in Progress, or Planned

Open access Communication

BMJ Open

Design choices for observational studies of the effect of exposure on disease incidence

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To cite: Gail MH, Altman DG, Cadarette SM, *et al*. Design choices for observational studies of the effect of exposure on disease incidence. *BMJ Open* 2019;**9**:e031031. doi:10.1136/bmjopen-2019-031031

► Prepublication history for this paper is available online. To view these files, please visit the journal online (http://dx.doi.org/10.1136/bmjopen-2019-031031)

Douglas died on 3 June 2018.

Received 11 April 2019
Revised 30 August 2019
Accepted 07 November 2019

ABSTRACT

The purpose of this paper is to help readers choose an appropriate observational study design for measuring an association between an exposure and disease incidence. We discuss cohort studies, sub-samples from cohorts (case-cohort and nested case-control designs), and population-based or hospital-based case-control studies. Appropriate study design is the foundation of a scientifically valid observational study. Mistakes in design are often irremediable. Key steps are understanding the scientific aims of the study and what is required to achieve them. Some designs will not yield the information required to realise the aims. The choice of design also depends on the availability of source populations and resources. Choosing an appropriate design requires balancing the pros and cons of various designs in view of study aims and practical constraints. We compare various cohort and case-control designs to estimate the effect of an exposure on disease incidence and mention how certain design features can reduce threats to study validity.

it and case-control studies that include the cases of disease and a sample of controls chosen from the same source population and risk period.

Establishing an association of an exposure with disease incidence is often a first step on the quest to establish a causal effect. Experimental studies, in which the exposure is controlled by the investigator (and may be allocated by randomisation), provide strong evidence for a causal association, but are not ethical for exposures like tobacco smoking, and also may be infeasible for practical reasons. In the absence of randomisation, exposures may be associated with other measured or unmeasured factors called confounders that can distort (or even hide) a true association between the exposure and health outcome or induce an apparent

Paper in Development

- Peggy Sekula: “Design of Prognosis Research Studies – Standards, Challenges and Issues”
  - Clinically meaningful endpoints
  - Study populations (prospective cohort study; “add-on” studies, registries)
  - Data quality and completeness of prognostic factor and outcome data (Ideally outcomes measured with blinding to biomarkers under study).
  - Sample size
- Potential to involve investigators from other Topic Groups

Proposed Research Area: Designs for Evaluating Drug or Vaccine Adverse Events

- Suzanne Cadarette: “How to design a study to estimate the association of drug exposure on fracture risk: design considerations, examples and recommendations”.
- Neus Valveny: “Choice of control cohorts to evaluate the association of a drug or vaccine exposure with the risk of rare adverse health outcomes”
  - Cohort of persons treated with another drug in the same class
  - Cohort of persons treated with a drug in another class
  - Cohort of untreated members of the general population

Goals of TG5

- To educate and perhaps give guidance on sound design principles
- To conduct research and collaborate on currently planned and ongoing studies to address current important design issues

  Requires close cooperation with epidemiologic research teams.
- Conduct statistical methodologic research on properties of proposed designs

Implications for Recruitment

- Limited time for TG5 activities. Therefore, TG5 research should evolve naturally from the members' daily research activities and duties.
- For educating, providing guidance, devising new designs or assessing the practicality of proposed designs, epidemiologists who are designing observational studies can make a big contribution.
- Statistical expertise needed to understand the properties of proposed designs and make sure that the data acquired can answer the aims of the study
- Need for diversity of expertise

Some Examples of Possible Collaborations with other Topic Groups

- Missing data (TG1): missing by design; biased sampling
- Dose-response (TG2, TG3): optimal design
- Measurement error (TG4): prevention; real time QC; gold standard validation
- Building and validating risk models (TG6)
- Causal inference (TG7):Mendelian randomization; cross-over studies
- Survival (TG8): subsampling the cohort
- Omics (TG9):QC; power calculations(how to simulate);validation and replication studies

Summary

- Some ongoing and planned work
- Need to recruit members who can lead projects, probably related to their “day jobs”
  - Diverse expertise needed
  - Suggestions welcome
- Potential collaborations with other Topic Groups