London School of Hygiene and Tropical Medicine

PLANNING OF INVESTIGATIONS

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1. Preliminary comments

Convenient to separate design, analysis and interpretation, although part of good design is to ensure that incisive analysis will be possible.

Important to check that analysis of key questions will be feasible.

But complete specification of analysis in advance unwise.
2. Initial formulation

Formulation of questions
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Formulation of questions

- Units of study
- Intrinsic features
- Exposures
- Outcome
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Phases

- Design
- Measurement issues
- Data collection
- Analysis
- Interpretation
3. Types of study

- Descriptive cross-sectional study (possibly repeated)
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  1. Not everything has to be measured every time on every study individual
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- Analytic cross-sectional study
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- Analytic cross-sectional study
German study of Type 2 diabetes

- At single clinic visit, glucose control, and psychometric score of disease knowledge and attribution
- Years since diagnosis, educational status
- Prospective (cohort) study
• Prospective (cohort) study
Prospective (cohort) study
   2. Framingham study
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Retrospective (case-control) study
Prospective (cohort) study
2. Framingham study

Retrospective (case-control) study
1. Doll and Bradford Hill (1950)
• Prospective (cohort) study
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• Retrospective (case-control) study
  1. Doll and Bradford Hill (1950)
  2. All patients with carcinoma of lung at 20 London hospitals over a 18
     month period
     Control patient at same hospital, same age band and gender
     Interviewed by one of four almoners
     After some exclusions roughly 700 patients in each group
     Careful study of possible biases

• Experiment (intervention, usually but not necessarily randomized)
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● Mixtures of types

● Other possibilities
4. Broad objectives

- Avoid systematic distortion
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- Control of random error
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- Appropriate scale of effort
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- Factorial principle
5. The purposes of measurement

- intrinsic variables
- exposures
- outcomes
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- exposures
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Purpose of intrinsic variables

- to control unwanted sources of variability
- to check for stability of exposure effects
- to improve generalizability
Aspects of exposures

- factorial principle
- role of interactions
6. Some broader aspects

- Time scale of investigation
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- Metrology
6. Some broader aspects

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- Metrology
  1. Chromatography

Possible interpretations of potential patterns of response

- Prospective and retrospective
- Independent check on retrospective explanations

Previous experience in the field

- Deadhand of precedent
6. Some broader aspects

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  1. Chromatography
  2. Pain, quality of life, etc
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A veterinary example
Three treatments, 10 replicates:
Units of study; 30 10km radius “circles” grouped in sets of 3
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- Control, survey only
- Localized culling of wildlife after detection of disease in cattle
- Large scale culling annually of large area

Outcome: farm breakdown rate over 5 year period
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Anticipated pattern of response
Actual pattern on intermediate analysis
Interpretation
Bait-marking trial
SPECIFIC REFERENCES


'Student' (1931). The Lanarkshire milk experiment. Biometrika 23, 398-406. [Systematic error]
GENERAL REFERENCES