Study Design Workshop

Robert L. Reid, M.D.

Queen's University

Retrospective Study

Design

- To study factors associated with development of congenital heart disease (CHD) in fetuses
- 200 women with first trimester spont AB in which CHD is identified on pathology
- Control group: induced 1st trimester AB with no CHD
- 100 Variables assessed by interview in 120/200 with CHD and 80 / 200 Controls

Findings

- CHD fetuses 3x more anti-nauseant exposure ($P < 0.05$)
- No difference in tranquilizer exposure
- CHD maternal age 23 vs. Control 18 yrs
- CHD coffee 3.7 cups/day vs Control 3.5 ($P < 0.05$)
- Of remaining 96 variables blonde hair and height > 5'6" significantly associated with CHD

Conclusions

- **Anti-nauseant drugs cause CHD**
- **Tranquillizers are safe**
- **Women should be encouraged to have children before age 20**
- **Coffee drinking should be avoided in pregnancy**
- **Unsuspected risk factors of height and hair colour were established**

Dogs Aren't Often Allowed in Elevators

Design

Assignment

Outcome

Analysis

Interpretation

Extrapolation

Design

What Design?

- **Was a Specific hypothesis stated**
- **Were study groups properly selected**

Design

- Case / Control
- Fishing Expedition
- Design

1) Assumes common etiology, CHD Septal Defects / Outflow Anomalies

2) Only detects CHD severe enough to

→ SpAB

Assignment

- Were Controls similar to Cases?
- What possible differences?

Assignment

Differences:

- **Age**
- **Attitudes to pregnancy**
- **Drug /Alcohol exposure**

Outcome

- How determined?
- Follow up rates satisfactory?
- Biases?

Outcome

- High “Lost to follow up”
  - Weakens conclusions
  - Fewer controls – supports different attributes
- Recall bias
  - SpAB highly emotional

Analysis

- Relationship CHD and anti-nauseants?
- Safety of Tranquillizers?
- Significance of height and hair colour?

Analysis

- Lack of cause – effect relationship
  - Cause precedes effect
  - Change Cause changes Effects
  - Dose / Response
  - Biological plausiblility
- Tranquillizers used by a small “n”
  - Sample size
- Height / Hair colour
  - 100 Variables, Bonferonni Correction

Interpretation / Extrapolation

- Are tranquilizers safe?
- Should teen pregnancy be encouraged?
- Should coffee be avoided?

Interpretation / Extrapolation

- No proof of tranquillizer safety
- Teen pregnancy → benefits vs. risks
  - Common sense
- Coffee - Statistical vs. Clinical significance