

Epidemiological Study Designs

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1. Introduction

- Study designs structure how epidemiological evidence is collected and analyzed.
- The choice of design affects validity, feasibility, and the strength of causal inference.

2. Observational Designs

- **Cohort study:** follows exposed and unexposed groups over time to measure incidence.
- **Case-control study:** compares prior exposures of cases and controls; efficient for rare diseases.
- **Cross-sectional study:** measures exposure and outcome simultaneously to assess prevalence.

3. Experimental Designs

- **Randomized controlled trial:** participants randomly assigned to intervention or control, the gold standard for causation.
- Randomization and blinding reduce confounding and bias.

4. Choosing a Design

- Cohort studies suit rare exposures; case-control studies suit rare outcomes.
- Considerations include cost, time, ethics, and disease frequency.

5. Strengths and Limitations

- Experimental studies give strong causal evidence but may be costly or unethical.
- Observational studies are practical but prone to confounding and bias.