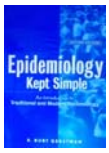
Epidemiology Kept Simple



Chapter 9: Types of Epidemiologic Studies

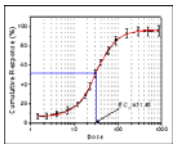
Stages of Study

- **Hypothesis generation** (from knowledge & insight)
- **Descriptive studies** (pre-existing data, surveillance data)
- **Analytic studies** (tests of causal hypotheses)

Hypotheses are like nets; only he who casts will catch.
-- Novalis

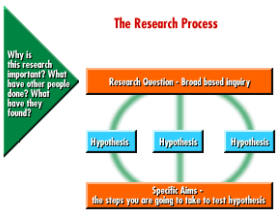
Elements of an Epi Hypotheses

1. Study population
2. Exposure variable
3. Disease variable
4. Dose-response
5. Time-response
6. Confounding variables



Research Question

1. Develop → refine → refocus
2. Sound causal mechanisms
3. Specific terms that can be tested



Rules of Sociologic Method

Durkheim, 1895

- Social explanations require comparisons
- Comparisons require classification
- Classification requires definition of facts to be classified, compared, and explained

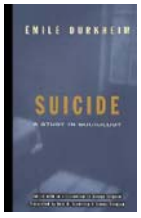
Durkheim differentiated between *notiones vulgares* (crudely formed concepts of natural and social phenomena) and social science

Emile Durkheim (1858-1917)

Example from *Le Suicide*

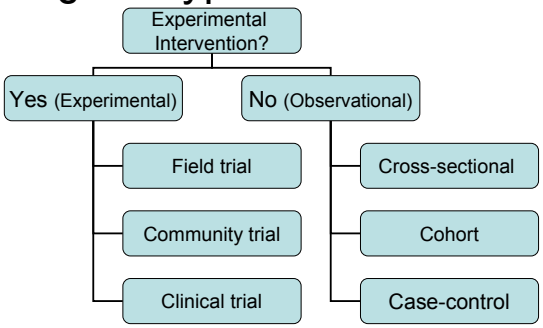
- What is the effect of marriage on suicide?
- Suicide rates (per million), 70–79 year-old men:

Married men:	704
Widowed men:	1,288
Unmarried men:	1,983



Durkheim, 1897

§9.2 Types of Studies



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Selected Design Elements

- Experimentation
- Unit of observation
- Individual follow-up
- Cohort vs. case-control sampling

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Experimental vs. Observational

Did the protocol assign the exposure?

- **Hypothesis**. Vitamin C prevents the common cold.
- **Experimental design**. Investigator *assigns* vitamin C supplementation to some subjects (E+) and gives others a sham (E-)
- **Observational design**. Investigator *classifies* people into those who take vitamin C (E+) and those who don't (E−)

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Person- vs. Aggregate-Level Data

Are data available on individuals?

- **Hypothesis**. Cigarettes cause lung cancer
- **Person-level data**. Classify *individuals* as smokers (E+) or non-smokers (E−) and compare incidence
- **Aggregate-level (ecological) data**. Classifies regions as high-smoking (E+) and low-smoking regions (E−) and compare incidences (data available on group level only)

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Longitudinal vs. Cross-Sectional

Individual experience tracked over time?

- **Hypothesis**. Does exercise prevents diabetes?
- **Longitudinal observations.** Identify exercisers (E+) & non-exercisers (E−) ⇒ follow individual experience
- **Cross-sectional observations**. Classify individuals as exercisers (E+) & non-exercisers (E−) and compare individual expereince (no follow-up)

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Cohort vs. Case-Control

Selection based on exposure (cohort) or disease (case-control) status

- **Hypothesis.** Cigarettes cause lung cancer.
- **Cohort**. Identify smokers (E+) and non-smokers (E-) ⇒ follow individuals
- **Case-control sample**. Identify lung cancer cases (D+) and non-cases (D-) ⇒ compare smoking history

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Simplified Taxonomy

- **Experimental Studies (Chapter 10)**
  - Field trial
  - Clinical trial
  - Community trial
- **Observational Studies (Chapter 11)**
  - Cross-sectional (including ecological)
  - Cohort
  - Case-control

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ComplexTaxonomy

I. Experimental

II. Observational

A. Person-level data

1. Longitudinal

(a) **Cohort**

(b) **Case-Control**

2. **Cross-sectional**

B. Aggregate-level data only (**Ecological**)

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