

Introduction to Research

Scientific Method
Identifying Hypotheses

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Scientific Method

1. Choose a question to investigate
2. Identify a hypothesis related to the question
3. Make testable predictions in the hypothesis
4. Design an experiment to answer hypothesis question
5. Collect data in experiment
6. Determine results and assess their validity
7. Determine if results support or refute your hypothesis

The Scientific Method

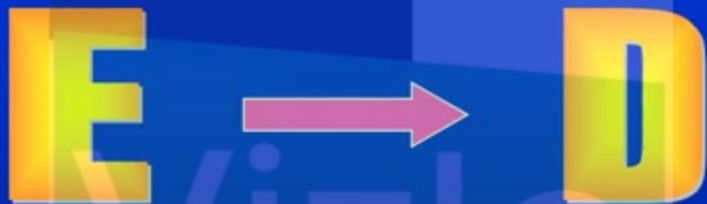
1. Suspicion that a factor (exposure) may influence occurrence of disease or a noted health outcome
 - Observations in clinical practice
 - Examination of disease/outcome patterns
 - Do subpopulations have higher or lower rates?
 - Are disease rates increased in the presence of certain factors?
 - Observations in laboratory research
 - Theoretical speculation



Basic Question in Research

Are exposure and disease/outcome linked?

Is there an association between them?



Exposure

Disease / Health
Outcome

The Scientific Method

Assess validity of association

- Does the observed association really exist?
 - Is the association valid?
 - Are there alternative explanations for the association?
 - Chance
 - Bias
 - Confounding

- Infectious and chronic diseases show great variation from one country to another.
- Some differences may be attributed to:
 - Climate
 - Cultural factors
 - Diet
 - Genetics

Person Factors

- Age, gender, race, ethnicity
- Genetic predisposition
- Concurrent disease
- Diet, exercise, smoking
- Risk taking behavior
- SES, education, occupation

Hypothesis Framing

Traditionally.....

H_0 : “Null” hypothesis (assumed)

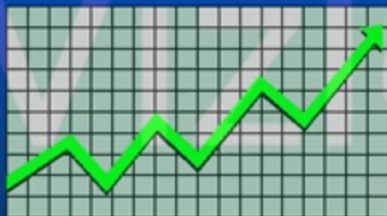
H_1 : “Alternative” hypothesis

Hypothesis Framing

Ways to Express Hypotheses:

1. Suggest possible events...

The rate of survival will increase after surgery.





Hypothesis Framing

Example Hypotheses:

POOR

Eating junk food is associated with the development of cancer.

GOOD

The human papilloma virus (HPV) subtype 16 is associated with the development of cervical cancer.



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