

# Stat 104 – Lecture 11

## Controlling Cholesterol

- Does a higher dose of a new drug lower cholesterol more?
  - 30 participants.
  - Factor – drug dose.
  - Treatments: 10 mg or 20 mg.
  - 15 subjects randomly assigned to each treatment.
  - Response – change in cholesterol.

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## Experimental Principles

- Control
- Randomization
- Replication

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## Control

- Control outside variables that may affect the response.
  - Have subjects of the same age, gender, general health, ethnic group.
  - By controlling outside variables you prevent those variables from causing variation in the response.

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## Control Comparison Group

- Have a group that receives 0 mg.
  - The 0 mg pill is called a placebo (no active ingredient).
  - The control group allows the experimenter to establish whether the drug is effective at all in reducing cholesterol.

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## Randomization

- Randomly assign subjects to treatment groups.
- Randomly select subjects from a population.

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## Random Assignment

- Random assignment tends to spread the effects of uncontrolled outside variables evenly across the treatment groups.
- Random assignment reduces the chance that an uncontrolled outside variable will bias the results.

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## Random Selection

- Randomly selecting subjects from a population makes it possible to take the results of the experiment and make broader generalizations to the population as a whole.

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## Randomization

- Random assignment of subjects is essential.
- Random selection of subjects is nice but not necessary for an experiment to be valid.

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## Replication

- Within an experiment.
  - Have several experimental units in each treatment group.
  - Able to assess the natural variation in the response for units treated the same way.

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## “Replication”

- Repeating the entire experiment.
  - This is especially important if the subjects in an experiment are not randomly selected from a population.
  - Are the results of the entire experiment repeatable with a new set of subjects?

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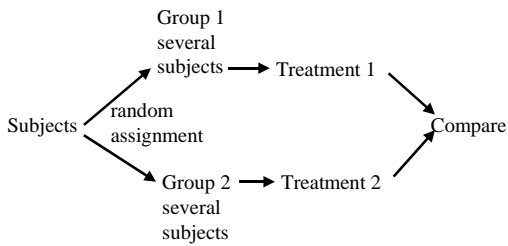
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## Diagram



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## Multiple Factors

- Factors
  - Calculator (yes, no)
  - Formula sheet (yes, no).
- Treatments
  - calculator and formulas, calculator but no formulas, formulas but no calculator, no calculator and no formulas.

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