

Selecting a Valid Sample Size for Longitudinal and Multilevel Studies in Cancer Research: Software and Methods

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Outline

- Introduction
- Multilevel and longitudinal studies in cancer research
- GLIMMPSE power and sample size calculation
- Questions



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SampleSizeShop Website

<https://samplesizeshop.org>

CALCULATE SAMPLE SIZE NOW ►



SampleSizeShop Resources

- Power and sample size software
- Power and sample size short course materials
- Webinars
- Tutorials
- Talks
- Type I error lookup table for cluster-randomized trials
- Cancer screening study bias correction software
- Related publications

GLIMMPSE



GLIMMPSE

SampleSizeShop.org

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Start Your Study Design

Welcome to GLIMMPSE. The GLIMMPSE software calculates power and sample size for study designs with normally distributed outcomes. Select one of the options below to begin your power or sample size calculation.

Guided Study Design

Build common study designs including ANOVA, ANCOVA, and regression with guidance from the study design wizard. This mode is designed for applied researchers including physicians, nurses, and other investigators.

Matrix Study Design

Directly enter the matrices for the general linear model. This mode is designed for users with advanced statistical training.

Upload a Study Design

If you have previously saved a study design from GLIMMPSE, you may upload it here. Click 'Upload a Study Design' to select your study design file.



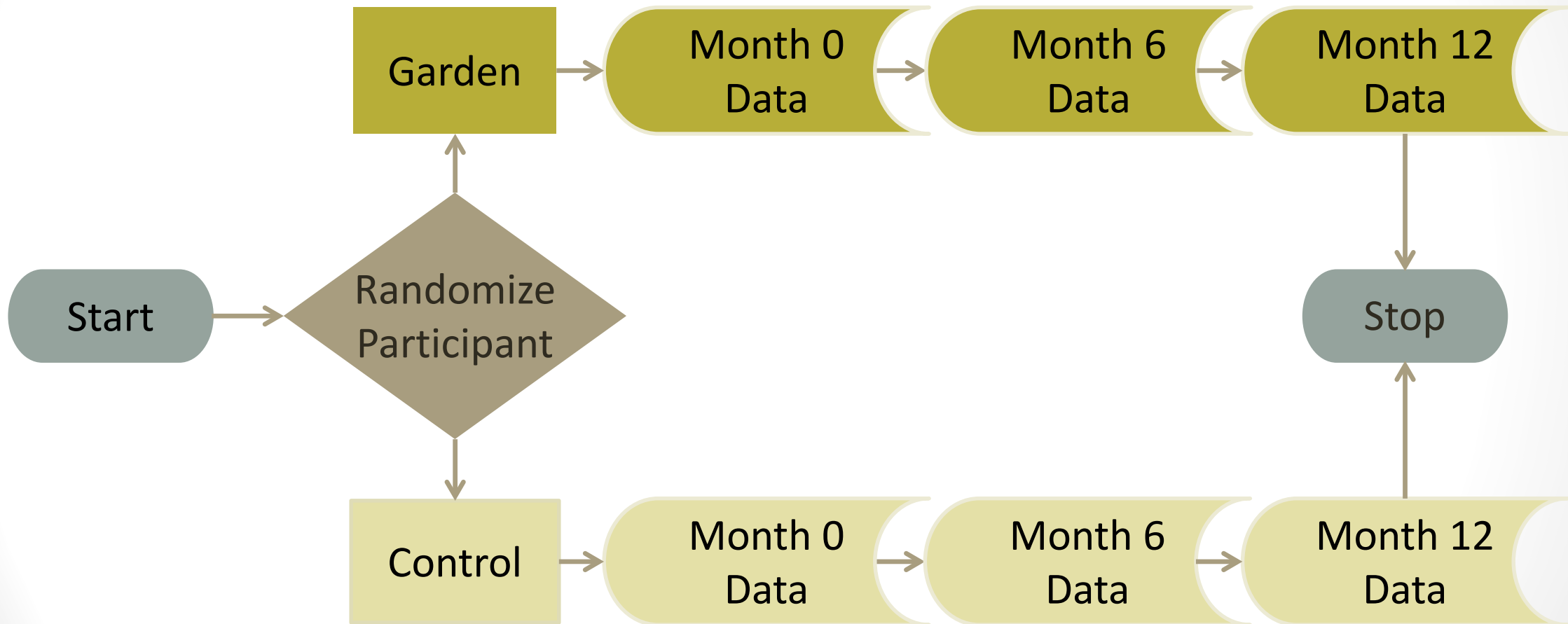
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Longitudinal Studies

A longitudinal study evaluates a research question by analyzing two or more measurements on the same independent sampling unit over time.

Longitudinal Study Design



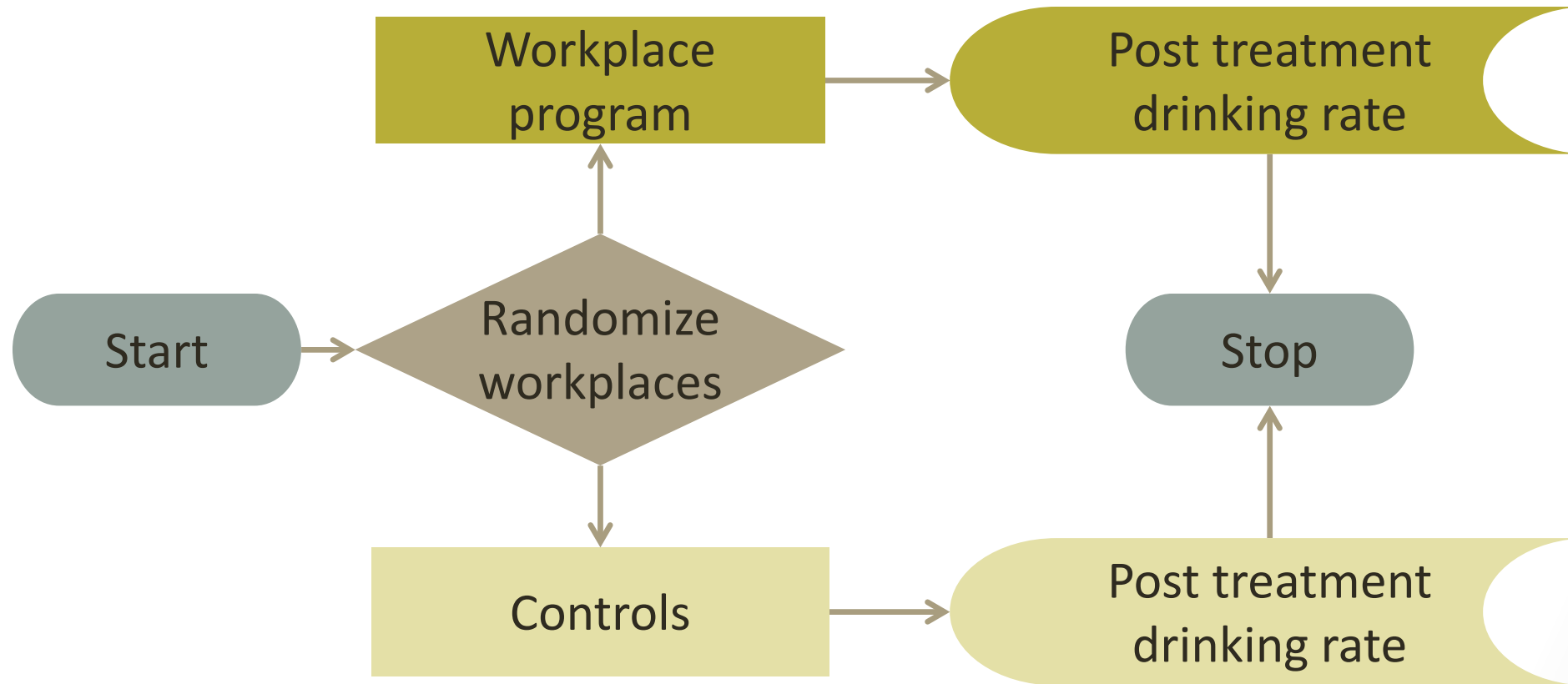
Studies of Groups or Clusters

Levels of correlation:

Patients within clinics are correlated.



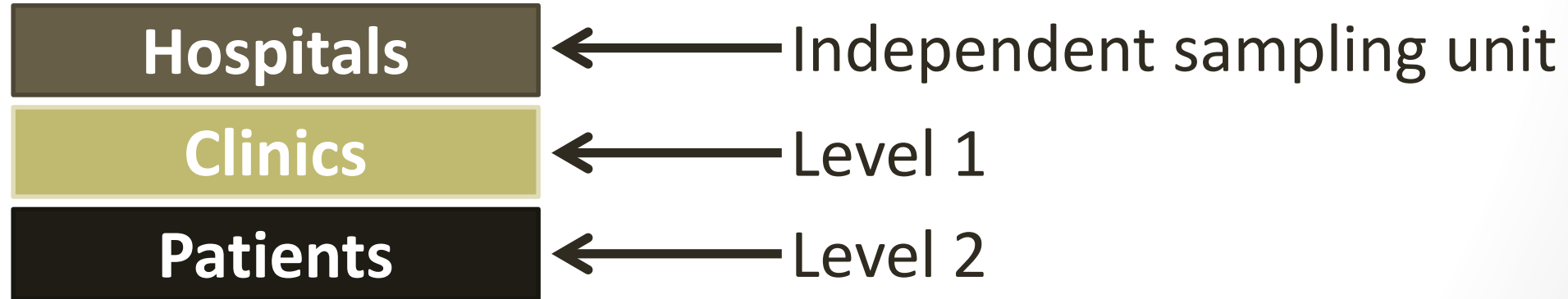
Cluster Randomized Study Design



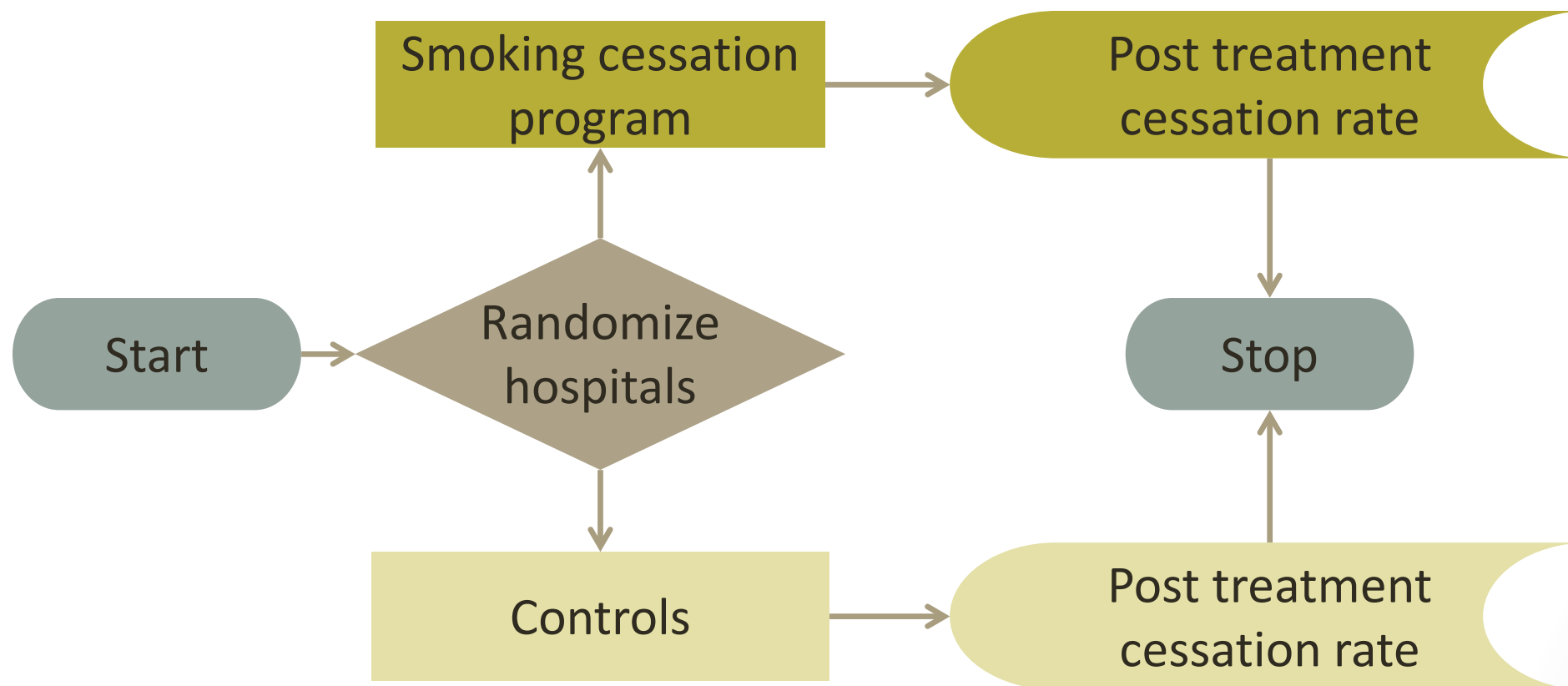
Multilevel Designs

Levels of correlation:

1. Clinics within hospitals.
2. Patients within clinics.



Multilevel Study Design

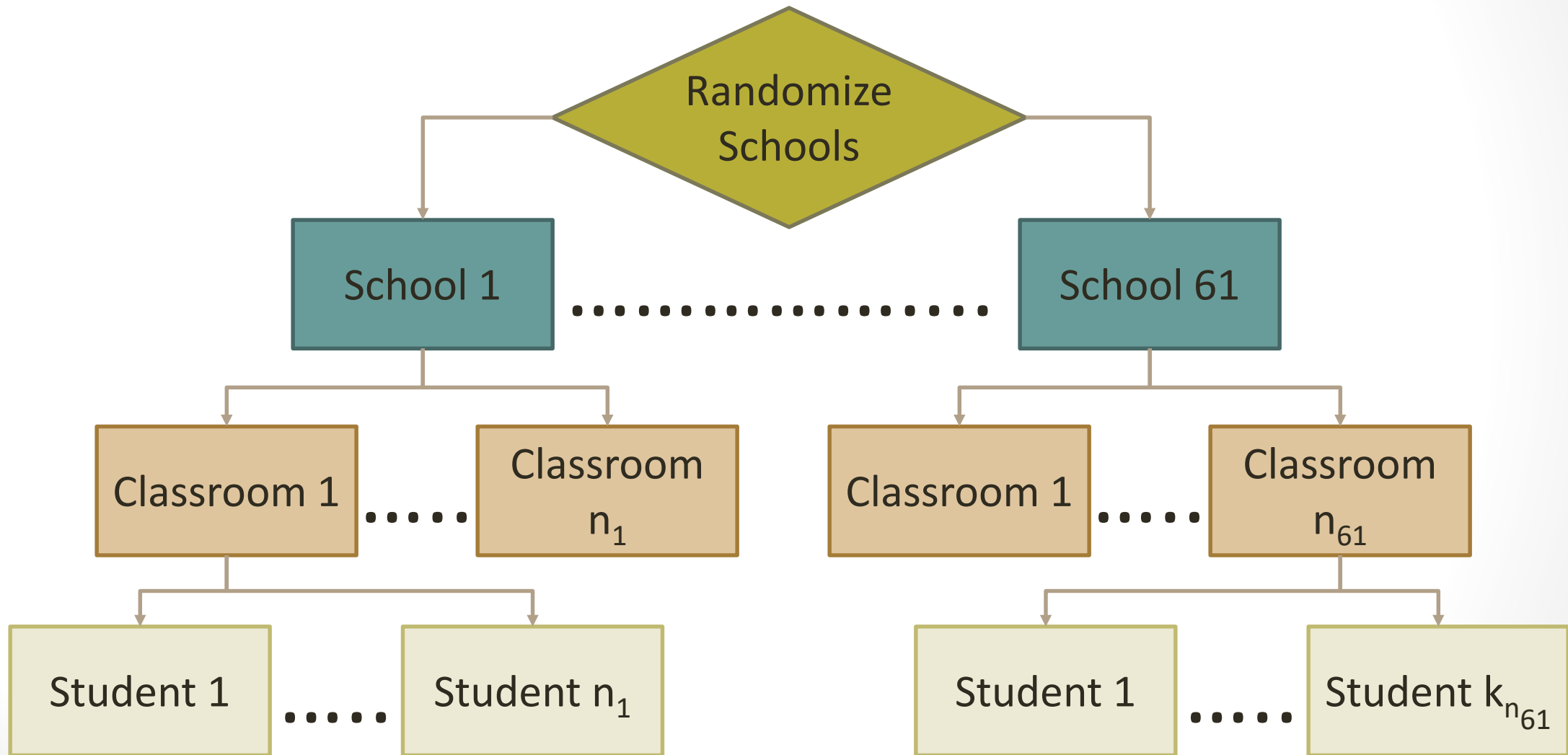




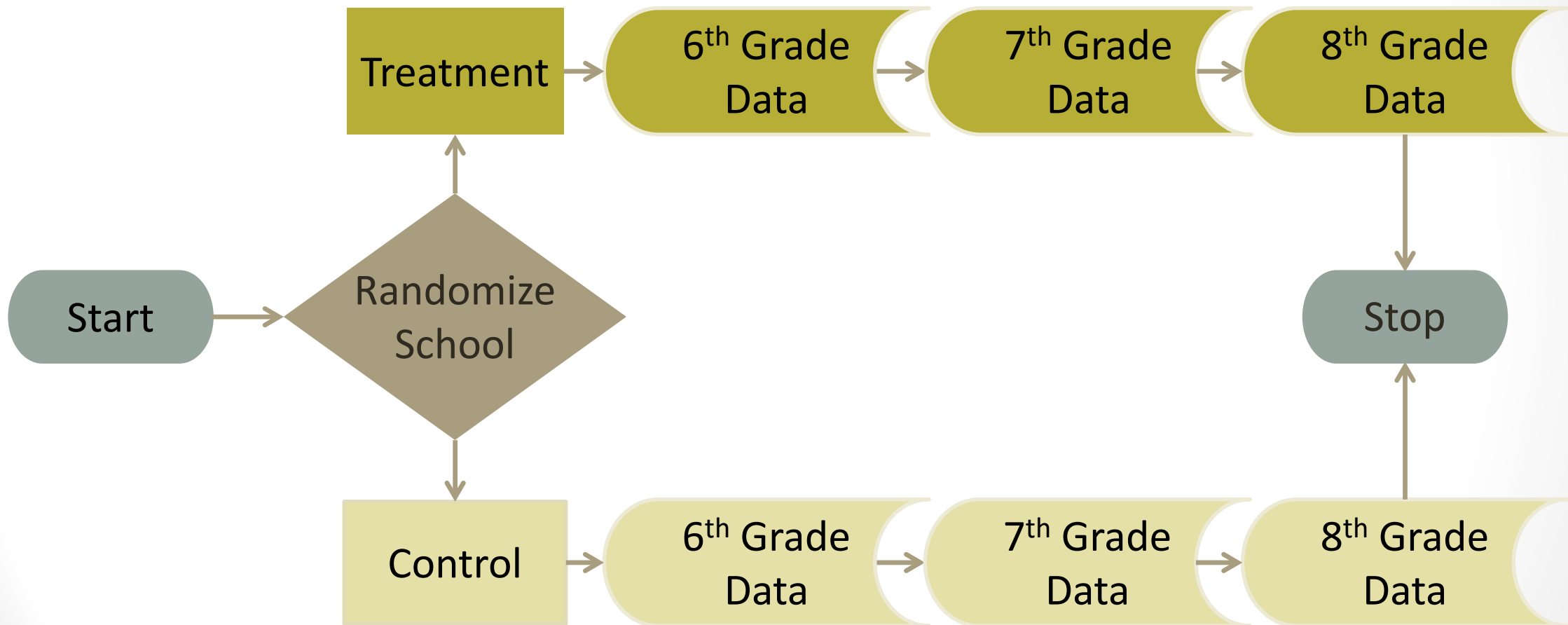
Multilevel and Longitudinal Designs

- Longitudinal features induce correlations across time.
- Multilevel features induce correlations within levels, also known as groups or clusters.

Multilevel Feature




Longitudinal Feature



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Create a Study Design

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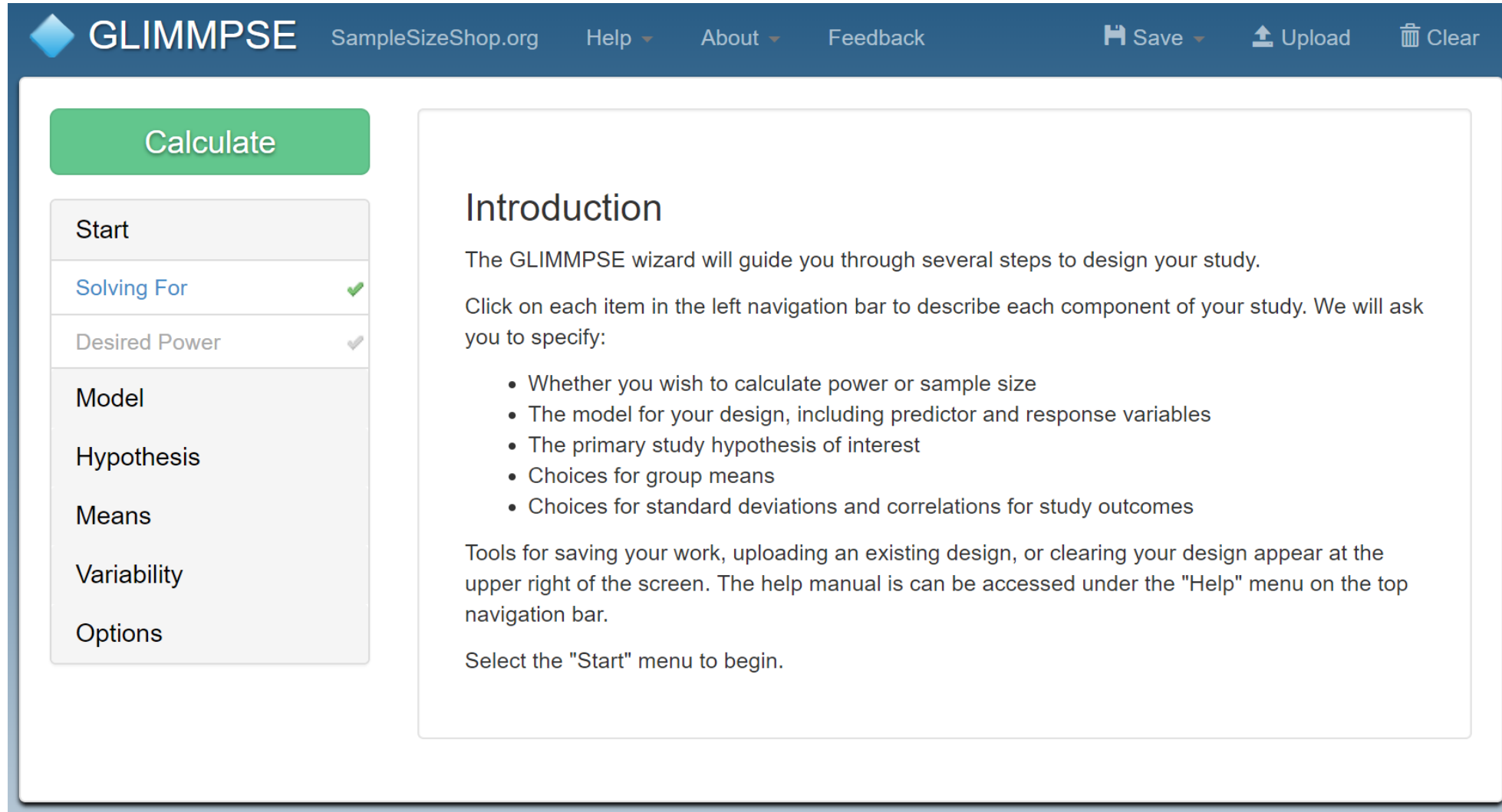
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Main Application Screen



The screenshot displays the GLIMMPSE application interface. At the top is a dark blue navigation bar containing the GLIMMPSE logo, the website URL 'SampleSizeShop.org', and menu items for 'Help', 'About', and 'Feedback'. On the right side of this bar are icons and labels for 'Save', 'Upload', and 'Clear'. Below the navigation bar, the main content area is divided into two sections. On the left is a vertical sidebar with a green 'Calculate' button at the top. Below the button is a list of menu items: 'Start', 'Solving For' (highlighted in blue with a green checkmark), 'Desired Power' (with a grey checkmark), 'Model', 'Hypothesis', 'Means', 'Variability', and 'Options'. The right section of the main area is titled 'Introduction' and contains the following text: 'The GLIMMPSE wizard will guide you through several steps to design your study. Click on each item in the left navigation bar to describe each component of your study. We will ask you to specify:'. This is followed by a bulleted list: 'Whether you wish to calculate power or sample size', 'The model for your design, including predictor and response variables', 'The primary study hypothesis of interest', 'Choices for group means', and 'Choices for standard deviations and correlations for study outcomes'. Below the list, it states: 'Tools for saving your work, uploading an existing design, or clearing your design appear at the upper right of the screen. The help manual is can be accessed under the "Help" menu on the top navigation bar.' and concludes with 'Select the "Start" menu to begin.'

GLIMMPSE SampleSizeShop.org Help About Feedback Save Upload Clear

Calculate

Start

Solving For ✓

Desired Power ✓

Model

Hypothesis

Means

Variability

Options

Introduction

The GLIMMPSE wizard will guide you through several steps to design your study.

Click on each item in the left navigation bar to describe each component of your study. We will ask you to specify:

- Whether you wish to calculate power or sample size
- The model for your design, including predictor and response variables
- The primary study hypothesis of interest
- Choices for group means
- Choices for standard deviations and correlations for study outcomes

Tools for saving your work, uploading an existing design, or clearing your design appear at the upper right of the screen. The help manual is can be accessed under the "Help" menu on the top navigation bar.

Select the "Start" menu to begin.

Repeated Measures

Dimension (Repeated Measure 1)

month

Type

Numeric ▼

Number of measurements

3 ▼

Spacing

18

27

39

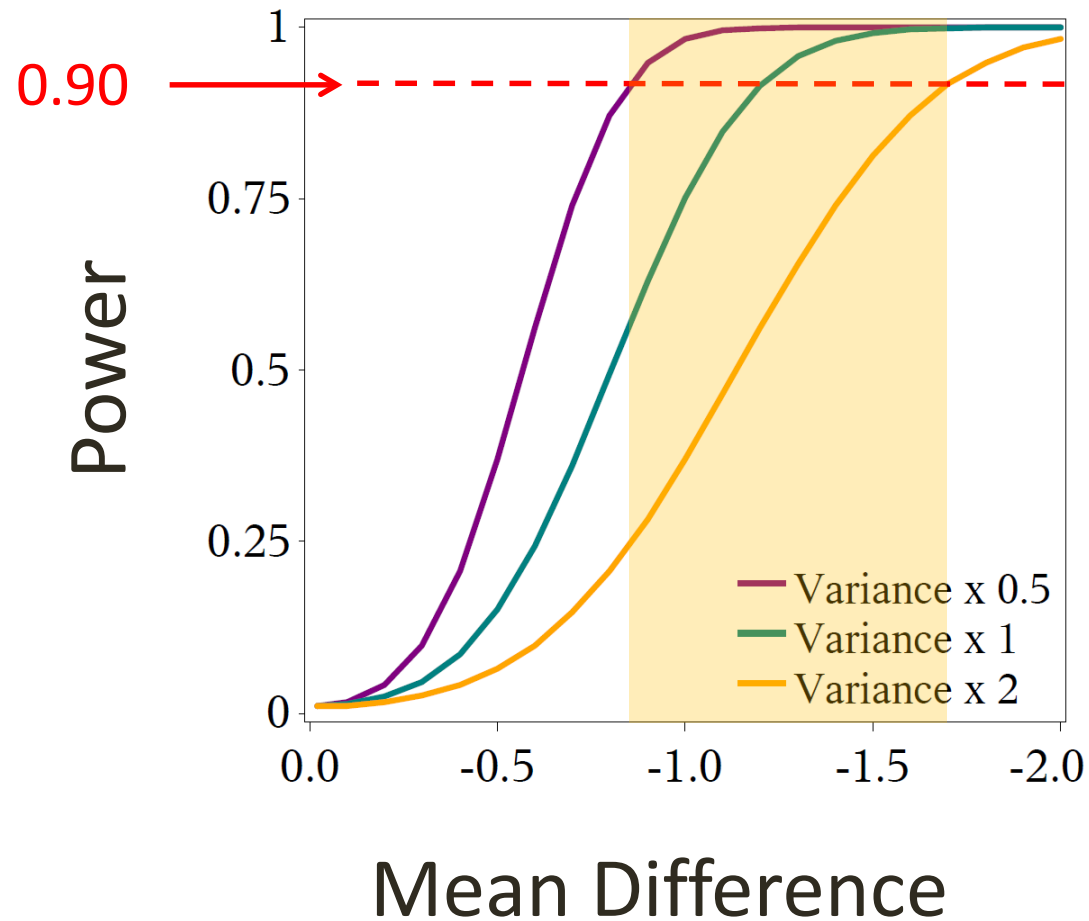
[Reset to Equal Spacing](#)

Add Repeated Measure

Remove Repeated Measure



Clear All

Accounting for Uncertainty



GLIMMPSE Results

| Results |
|--------------------------|
| Table |
| Plot |
| Matrices |

| Start |
|---|
| Solving For  |
| Desired Power  |
| Model |
| Hypothesis |
| Means |
| Variability |
| Options |

Power Results

Click on a result for more details.

| Power | Total Sample Size | Means Scale Factor | Variability Scale Factor | Test | Type I Error Rate |
|-------|-------------------|--------------------|--------------------------|------|-------------------|
| 0.583 | 624 | 7 | 7.8 | HLT | 0.05 |
| 0.886 | 1224 | 7 | 7.8 | HLT | 0.05 |
| 0.712 | 624 | 8 | 7.8 | HLT | 0.05 |
| 0.956 | 1224 | 8 | 7.8 | HLT | 0.05 |
| 0.516 | 624 | 7 | 9 | HLT | 0.05 |
| 0.832 | 1224 | 7 | 9 | HLT | 0.05 |

Publications

[Link to Publications](#)

Questions?

