

What is randomization in statistics and can you give an example?

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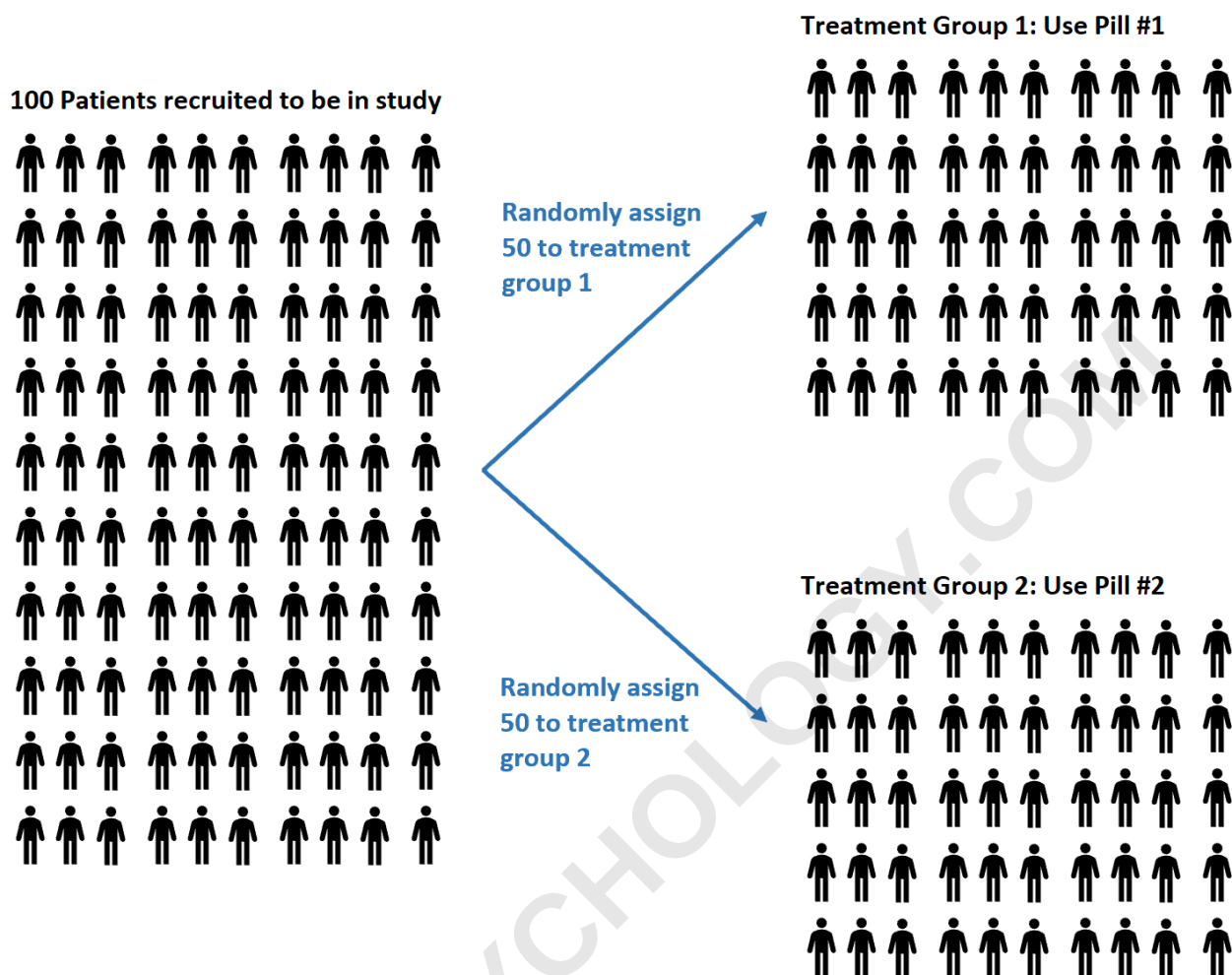
Randomization in statistics refers to the process of selecting a sample from a larger population in a way that every individual has an equal chance of being chosen. This is done to eliminate bias and ensure that the sample is representative of the population. For example, in a study examining the effectiveness of a new drug, researchers may randomly select participants from a pool of patients with the same condition, rather than hand-picking individuals who they believe will respond well to the drug. This helps to ensure that the results of the study are not influenced by any predetermined factors and can be generalized to the larger population. Randomization is an important tool in statistical analysis as it allows for more accurate and unbiased conclusions to be drawn from the data.

Randomization in Statistics: Definition & Example

In the field of statistics, randomization refers to the act of randomly assigning subjects in a study to different treatment groups.

For example, suppose researchers recruit 100 subjects to participate in a study in which they hope to understand whether or not two different pills have different effects on blood pressure.

They may decide to use a random number generator to randomly assign each subject to use either pill #1 or pill #2.



Benefits of Randomization

The point of randomization is to control for - variables that are not directly included in an analysis, yet impact the analysis in some way.

For example, if researchers are studying the effects of two different pills on blood pressure then the following lurking variables could affect the analysis:

Smoking habitsDietExercise

By randomly assigning subjects to treatment groups, we maximize the chances that the lurking variables will affect both treatment groups equally.

This means any differences in blood pressure can be attributed to the type of pill, rather than the effect of a lurking variable.

Block Randomization

An extension of randomization is known as block randomization. This is the process of first separating subjects into blocks, then using randomization to assign subjects within blocks to different treatments.

For example, if researchers want to know whether or not two different pills affect blood pressure differently then they may first separate all subjects into one of two blocks based on gender: Male or Female.

Then, within each block they can use randomization to randomly assign subjects to use either Pill #1 or Pill #2.



The benefit of this approach is that researchers can directly control for any effect that gender may have on blood pressure since we know that males and females are likely to respond to each pill differently.

By using gender as a block, we're able to eliminate this variable as a potential source of variation. If there are differences in blood pressure between the two pills then we can know that gender is not the underlying cause of these differences.