# Methods for Inferences About Two Independent Means.

In this activity, you will use the flowchart shown to review the best approach when making inferences about two independent means.

This flowchart shows that when making inferences about two independent means, consider whether the two populations have known standard deviations, which is very rare, or whether it can be assumed that the two unknown population standard deviations are equal, or whether neither of those two conditions apply.

The first step is to see if the population standard deviations are known.

If they are known, then you use a normal distribution with the standard error given in the flowchart.

However, because this case almost never occurs in the real world, you usually need to consider other approaches.

If the populations’ standard deviations are not known, which is typically the case, then you need to decide whether to assume that the two populations’ standard deviations are equal.

If you can assume that the two populations’ standard deviations are equal then you use a *t* distribution with the pooled standard error given in the textbook.

For example, if we randomly assign subjects to a treatment group and a placebo group, we know that both samples are from the same population, so it is reasonable to assume that the samples are from populations with equal standard deviations.

The advantage of using this approach is that the number of degrees of freedom is a little higher, so the hypothesis test will have more power and the confidence intervals are a little narrower.

Note that this approach should ONLY be used in specific instances where there is information that allows you to safely assume the population standard deviations of both groups are equal.

When we do not have the necessary information to safely assume that the two populations’ standard deviations are equal, we MUST proceed under the assumption that the two populations’ standard deviations are UNKNOWN.

Do NOT assume that the populations’ standard deviations are equal unless you have specific information otherwise.

In the event that the two populations’ standard deviations are UNKNOWN use the *t* distribution with the standard error given in the flowchart.

Now, it is time to test your knowledge.

Let’s try another one.

In this activity, we reviewed the best approach for making inferences about two independent means.

Usually, it is best to NOT assume that the standard deviations are known or are equal.

Congratulations, you have mastered an important concept of Statistics!

Only when you make enough to live on your own are you really of independent means.