

## USING EXCEL FOR DIFFERENCE OF MEANS TESTS

Excel will conduct a difference of means test. To do this you need to reorganize the data and make some informed decisions.

1. Cut and paste the data so that the you have two columns side-by-side with the variable for sample (Note: samples will represent each group, such as males and females; treatment versus control).
2. You can use **Tools, Data Analysis, Descriptive Statistics** to generate sufficient information to conduct a difference of means test
3. Or, you can use:

**t-test Two sample assuming equal variances** - use this for small sample problems (n for each sample < 30)

**t-test Two sample assuming unequal variances** - use this for large sample problems

**z-test, Two samples for means** - this test is for the unique case where we know  $\sigma_1$  and  $\sigma_2$  for the two populations

4. Be careful which you choose, and look carefully at what they ask for in terms of filling in the information

Variable 1 range  
 Variable 2 range  
 Labels in first row  
 Hypothesized mean difference  
 Alpha  
 Output range

For the z-test it will also ask for the variances for each group (since they are assumed known).

### DESCRIPTIVE STATISTICS FOR CHOLESTEROL LEVELS OF MALES AND FEMALES

<i>Cholesterol</i>	<i>Females</i>	<i>Males</i>
<b>Mean</b>	200.31757	196.085366
<b>Standard Error</b>	0.8812586	0.96610995
<b>Median</b>	201	196
<b>Mode</b>	194	196
<b>Standard Deviation</b>	10.720974	12.372244
<b>Sample Variance</b>	114.93928	153.072423
<b>Kurtosis</b>	-0.4930988	0.01540046
<b>Skewness</b>	-0.1089159	0.08632739
<b>Range</b>	47	61
<b>Minimum</b>	176	166
<b>Maximum</b>	223	227
<b>Sum</b>	29647	32158
<b>Count</b>	148	164
<b>Confidence Level(95.0%)</b>	1.7415714	1.90770209

## OUTPUT FROM EXCEL

Here is the results of Excel's Difference of Means Test assuming unequal variances. Excel does everything we do but uses a t value rather than a z-value for the critical region. I used  $\alpha = .05$  for this test.

### t-Test: Two-Sample Assuming Unequal Variances

	<i>Female</i>	<i>Male</i>
Mean	200.31757	196.08537
Variance	114.93928	153.07242
Observations	148	164
Hypothesized Mean Difference	0	
df	310	
t Stat	3.2364596	
P(T<=t) one-tail	0.0006706	
t Critical one-tail	1.6497825	
P(T<=t) two-tail	0.0013411	
t Critical two-tail	1.9676463	

## OUTPUT FROM SAS

SAS gives similar output but in a different form. Since it was not specified, SAS gives the results assuming equal variances and not assuming equal variances. It also gives a test on whether it is reasonable to assume that the variances are equal.