In a study of 30 patients hospitalized with heart failure who participated in a randomized trial of three treatments: enhanced teaching in hospital, usual care in hospital, and enhanced teaching with home care we explore whether there is a gender difference in the Heart Failure Self-care Index scores.

**Steps in hypothesis testing**

1. State the null and alternative hypothesis, determine if directional and if using two-tailed or one-tailed test
   * Null:Males and females have similar mean Heart Failure Self-care Index scores.
   * Alt: Males and females have different mean Heart Failure Self-care Index scores.
   * Non directional using two tailed test
2. Decide what test statistic to use; Establish the level of significance (usually 0.05)
   * Independent t –test with alpha=0.05
3. Check the data to see if meet the necessary assumptions for the test statistic chosen
   * For this class we will assume the participants have been randomly sampled.
   * Level of measurement: DV(HFSC scores)= continuous (interval/ratio) and the IV (gender) is nominal
   * This is a small sample size so the normality assumption is not likely to be valid, but if the central tendency measures are somewhat equivalent the t-test can still be used- look if mean=median=mode . (since we are just learning how to do this we are using small datafiles so assumptions are bound not to hold, but good practice to learn the steps for real life situations)
     + IS users will find the Shapario-Wilk = *W* = 0.91, *p* = .018 indicating not a normal distribution
     + Excel: the over mean =51 and median =45 of the HFSC score

* Variances in the groups similar?
  + - IS users will find this assumption met as the Levene’s test is not significant (*F*(1, 28) = 1.82, *p* = .188).
    - Excel: the standard deviations of the two groups are Males 16.9 and females 22.2 (not drastically different and if one runs the t-test for equal variance as well as the one for unequal variance you will see the finding is essentially the same)

1. Compute the test statistic
   * + IS & Excel users *t*= -2.86
2. Compare test statistic to critical value- decide to accept or reject the null hypothesis; Obtain p-value- determine statistical significance
   * IS users don’t see the critical value The result of the two-tailed independent samples *t*-test was significant based on an alpha value of 0.05, *t*(28) = -2.86, *p* = .008, indicating the null hypothesis can be rejected.
   * Excel: if you choose the run the t-test with equal variances the critical value for two tailed test is 2.05. Going back to the thinking if through section of this module we learned if the absolute value of the computed t-value is > than the t critical value the p-value is going to be <.05 meaning group differences exist.
     1. Absolute value of Computed value=2.86 > 2.05
3. Clearly state the conclusion in words using the statistics as evidence not the finding in of themselves. (e.g., so you found significant differences in the means -well this alone doesn’t tell anyone anything. Instead describe what the results mean by writing it in words what test you used, which group had what value, how the means differed, etc.)
   * Regardless of what statistical program you used you can still report the findings the same way:
   * An independent samples t-test was conducted to compare Heart Failure Self-care Index scores for males and females. There was a significant difference in mean scores between males (M=40.47, SD=16.91) and females (M=61.07, SD=22.24); t=-2.86, p=.008, two tailed. Females have higher scores on the Heart Failure Self-care Index than Males.