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 the Heart Failure Self-care Index scores are different for each of the three treatment groups.

**Steps in hypothesis testing**

1. State the null and alternative hypothesis, determine if directional and if using two-tailed or one-tailed test
   * Null:All treatment groups have a similar mean Heart Failure Self-care Index scores.
   * Alt: The mean Heart Failure Self-care Index scores will differ by treatment group.
   * Non directional using two tailed test
2. Decide what test statistic to use; Establish the level of significance (usually 0.05)
   * ANOVA 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 (treatment group) is nominal made up of 3 groups.
   * 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 Q-Q scatterplot 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 residual plot appears randomly distributed
    - Excel: the standard deviations of the 3 groups are 23.1, 18.8, 25.1 (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 F= 0.45
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 results of the ANOVA were not significant, *F*(2, 27) = 0.45, *p* = .642, indicating the differences in HF\_SCI among the levels of Group were all similar
   * Excel: critical value =3.35. Going back to the thinking if through section of the t-test module we learned if the absolute value of the computed value is < than the critical value the p-value is going to be >.05 meaning no group differences exist.
     1. Absolute value of Computed value=.44 <3.35
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:
   * A one-way between-groups ANOVA was conducted to explore if Heart Failure Self-care Index scores differed by treatment group (enhanced teaching in hospital, usual care in hospital, and enhanced teaching with home care). There was no significant difference in the group means (F=.44, p=.64). The mean score of the “enhanced teaching” was 51.7 (SD=23.1). The mean score of the “usual care” was the lowest (M=45.61, SD=18.8). The mean score of the “enhanced teaching with home care” were the highest of the three groups (M=55.0, SD=25.1).
   * Note :Further post hoc analyses would not be needed to determine which groups were significantly different from each other because we already determined none where different from each other.