

## INFERENCEAL STATISTICS II: TESTING HYPOTHESIS ON TWO SAMPLES MEANS

### Learning Objectives:

- Testing Hypothesis on Two Sample Means by using Microsoft Excel:
  - Testing the equality of variances (F-test)
  - t-Test for Two Independent Samples
  - Paired-Samples t-Test

### Problem

A study was conducted in order to assess two different therapeutic schemas for treatment of ferriprive anemia in newborn child. There were included into the study newborn from rural and urban environments. Two different schema were studied: a daily schema (one a day the mother must to give to her child the treatment, every day on week), and a bi-weekly schema (in Monday and Thursday mother must to give to her child the treatment). The data from the **PA5.xls** were collected.

### A. TESTING THE EQUALITY OF VARIANCES (F-TEST)

1. Is the variance of Haemoglobin at 6 months different for patients with daily treatment compared to patients with bi-weekly treatment?
2. Is the variance of Haemoglobin at 12 months different for patients with daily treatment compared to patients with bi-weekly treatment?

### Requests

1. Download and save the **PA5.xls** file. The analysis is conducted under assumption of normal distribution of quantitative variables.
2. Create a new sheet named Variance Analysis. Copy in this sheet the value of "Haemoglobin (mg/dl) 6 months", "Haemoglobin (mg/dl) 12 months", and "Treatment schema" columns. Sort data ascending by *Treatment schema* variable.
3. Apply the F-test [**Data – Analysis – Data Analysis - F-test Two-Sample for Variances**] to test if the variances of Haemoglobin at 6/12 months for patients with daily treatment and bi-weekly treatment are equal or not.
4. Decide if the T-test assuming equal or unequal variances will be used to compare means. Write the conclusion in Variance Analysis sheet at the bottom of each F-test table.

### B. MEANS COMPARISON: T-TEST FOR TWO INDEPENDENT SAMPLES

1. Is the mean of haemoglobin at 6 months different for patients with Daily treatment compared to patients with Bi-weekly treatment?
2. Is the mean of haemoglobin at 12 months different for patients with Daily treatment compared to patients with Bi-weekly treatment?

### Requests

1. Create a new sheet named Independent Samples. Copy in this sheet the value of "Haemoglobin (mg/dl) 6 months", "Haemoglobin (mg/dl) 12 months", and "Treatment schema" columns. Sort data ascending by *Treatment schema* variable.
2. Apply the correct t-test for independent samples. Display the results starting to E2 cell for haemoglobin at 6 months and I2 for haemoglobin at 12 months.

3. State at the bottom of each table the statistical. In your opinion, what clinical conclusion could be drawn?

### C. MEANS COMPARISON: PAIRED T-TEST

1. Is the mean of haemoglobin at 6 months different by the mean of haemoglobin at 12 months for patients with daily treatment?
2. Is the mean of haemoglobin at 6 months different by the mean of haemoglobin at 12 months for patients with biweekly treatment?

### Requests

1. Create a new sheet named Paired samples. Copy in this sheet the value of "Haemoglobin (mg/dl) 6 months", "Haemoglobin (mg/dl) 12 months", and "Treatment schema".
2. Apply the Paired T test in order to find the answer to both questions.
4. State at the bottom of each table the statistical conclusion. In your opinion, what clinical conclusion could be drawn?

### D. PRESENT RESULTS USING POWERPOINT

- 1<sup>st</sup> slide:
  - Title: TESTING HYPOTHESIS ON TWO SAMPLES MEANS USING MICROSOFT EXCEL
  - Subtitle: your first and second name, university, faculty and year of study
- 2<sup>nd</sup> slide: Outline
  - **TESTING THE EQUALITY OF VARIANCES (F-TEST)**
  - **MEANS COMPARISON: T-TEST FOR TWO INDEPENDENT SAMPLES**
  - **MEANS COMPARISON: PAIRED T-TEST**
- 3<sup>rd</sup> slide: **TESTING THE EQUALITY OF VARIANCES (F-TEST)**
  - Copy the table with the results. Include here also statistical and clinical conclusion.
  - Include also an action button to link the presentation with Excel file. The name of the button will be F-Test.
  - If necessary create 2 slides for results on testing variances.
- 4<sup>th</sup> slide: **MEANS COMPARISON: T-TEST FOR TWO INDEPENDENT SAMPLES**
  - Copy the table with the results. Include here also statistical and clinical conclusion.
  - Include also an action button to link the presentation with Excel file. The name of the button will be T-Test Independent.
  - If necessary create 2 slides for results on testing means on independent samples.
- 5<sup>th</sup> slide: **MEANS COMPARISON: PAIRED T-TEST**
  - Copy the table with the results. Include here also statistical and clinical conclusion.
  - Include also an action button to link the presentation with Excel file. The name of the button will be T-Test Paired.
  - If necessary create 2 slides for results on testing means on paired samples.
- 6<sup>th</sup> slide: **Ending slide**
  - Include here a picture (search the picture using <http://images.google.com/>).

Save the presentation as PowerPoint show under the named of TwoMeans.