

## INFERENCEAL STATISTICS III: CHI-SQUARE TEST OF INDEPENDENCE

### Learning Objectives:

- Chi-Square Test of Independence: Microsoft Excel
  - Cross Tabulation using Pivot Table
  - Using Formulas to Calculate Expected Cell Frequencies
  - Using Functions for a Chi-Square Test of Independence
- Quantifying the relationship between dichotomial variables: EpilInfo

### Problem

A survey research project was carried out to gather information about the influence of breast-feeding on ferriprive anemia on newborn children. The study was conducted in Cluj-Napoca. There were included into the study a sample of 110 new born children, born at Gynaecology I Clinic, between 1 January 2006 and 1 April 2006. The survey included the breastfeeding (as dichotomial variable: yes / no) and existence or not of ferriprive anemia at 4 months (as dichotomial variable: yes / no). The data were collected and stored in **PA6-2.xls** file.

### A. CHI-SQUARE TEST OF INDEPENDENCE: MICROSOFT EXCEL

1. Is the ferriprive anemia dependent by breastfeeding?
2. Is the ferriprive anemia dependent by sex?

### Requests

1. Download and save the **PA6-2.xls** file.
2. Create a new sheet named Chi-Square. Copy in this sheet the Sex, BreastFeeding, and FerripriveAnemia.
3. Create the observed 2x2 contingency table with *Sex* variable on rows and *FerripriveAnemia* on columns.
4. Create the observed 2x2 contingency table with *BreastFeed* variable on rows and *FerripriveAnemia* on columns.
5. Create the expected 2x2 contingency table with *Sex* variable on rows and *FerripriveAnemia* on columns.
6. Create the expected 2x2 contingency table with *BreastFeed* variable on rows and *FerripriveAnemia* on columns.
7. Compute the chi-square statistics and associated probability according with the example bellow (one table for each test):

| L                                                                | M    |
|------------------------------------------------------------------|------|
| <b>Chi-square test of independence: sex vs ferriprive anemia</b> |      |
| H <sub>0</sub> hypothesis                                        |      |
| H <sub>a</sub> hypothesis                                        |      |
| alpha                                                            | 0.05 |
| df (degrees of freedom)                                          |      |
| Critical Chi-square                                              |      |
| p-values                                                         |      |
| Observed Chi-square                                              |      |
|                                                                  |      |
| Statistical conclusion                                           |      |
| Clinical conclusion                                              |      |

8. State statistical and clinical conclusion.

## B. QUANTIFYING THE RELATIONSHIP BETWEEN DICHOTOMIAL VARIABLES: EPIINFO

1. Is Sex a risk factor for ferriprive anemia?
2. Is the mean of haemoglobin at 12 months different for patients with daily treatment compared to patients with biweekly treatment?

### Requests

1. Create a new sheet named EpilInfo. Copy in this sheet the Sex, BreastFeeding, and FerripriveAnemia.
2. Replace yes with 1 and No with 2 for both *BreastFeeding* and *FerripriveAnemia* variables.
3. Test the requested hypotheses by using Tables – from Statistics (EpilInfo program):
  - a. Sex = exposure variable – FerripriveAmenia = outcome variable.
  - b. Breastfeeding = exposure variable – FerripriveAmenia = outcome variable

## C. PRESENT RESULTS USING POWERPOINT

- 1<sup>st</sup> slide:
  - Title: CHI-SQUARE TEST OF INDEPENDENCE
  - Subtitle: your first and second name, university, faculty and year of study.
- 2<sup>nd</sup> slide: **MICROSOFT EXCEL**
  - Copy the observed and expected contingency tables (4 tables)
- 3<sup>rd</sup> slide: **MICROSOFT EXCEL: RESULTS**
  - Copy the table with results and conclusions (2 tables)
- 4<sup>th</sup> slide: **EPIINFO**
  - States the hyposthesises
- 5<sup>th</sup> slide: **EPIINFO: RESULTS**
  - Copy the results from EpilInfo
- 6<sup>th</sup> slide: **EPIINFO: INTERPRETATION**
  - Interpret the results.
- 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 named **ChiSquare**.