

### Chi-square test for independence

1. The following table shows the results of placebo and aspirin in an experiment, with the number of people in each treatment group who did and did not develop thromboses. Decide whether the aspirin had or had not effect on thrombus formation.

	Developed thrombi	Free of thrombi	Total
Placebo	16	4	
Aspirin	6	14	
Total			

Give the percentage of developed thrombi in the Placebo group.....and in the Aspirin group.....

The name of the appropriate test:.....

What is the null hypothesis .....

What is the alternative hypothesis .....

Table of expected frequencies

	Developed thrombi	Free of thrombi	Total
Placebo			
Aspirin			
Total			

Assumption of the test .....

Test statistic :  $\chi^2 = \sum \frac{(O_i - E_i)^2}{E_i} = \dots\dots\dots$

or  $\chi^2 = \frac{(ad - bc)^2 (a + b + c + d)}{(a + b)(c + d)(a + c)(b + d)} = \dots\dots\dots$

Degrees of freedom: .....

Critical value in the table: 3.841.....

Decision .....

Conclusion.....

2. Two medicines are being compared regarding a particular side effect, 60 similar patients are split randomly into two groups, one on each drug. The results are presented in the following table:

	side effects	no side effects
Drug A	10	20
Drug B	5	25

Are drug type and side effects independent? ( $\chi^2_{table}=3.841$ )

H0: .....

Assumptions:.....

Test statistic:.....

Degrees of freedom .....

Decision .....

Conclusion.....

**Problems to be solved by SPSS.**

3. Open the data file QUEST2010.SAV. This file contains data of first year medical students. Examine the relationship between the answers of "pleased" and sex. Are the answers to the question "Are you pleased with SPSS" different given by male or female?

- a) State the null hypothesis.....  
and the alternative hypothesis.....

Run the appropriate program:

*Analyse/Descriptive Statistics/Crosstabs/ sex->rows, pleased->columns; ✓Display clustered bar chart, Statistics-> Chi-square; Continue, Celss: ✓Expected Frequencies;OK.*

Find the contingency table:

	Yes (pleased)	No (not pleased)
Male		
Female		

- a) Find  $\chi^2$ .....  
Find the degrees of freedom.....  
Find the p-value.....
- b) Check the assumptions of the expected frequencies.....
- c) Find Fisher's exact p-value:.....
- d) State a conclusion

2. Examine whether answers to the question "Is biostatistics difficult" depend on sex?

H0.....

Assumptions.....

Test statistic..... df..... p-values .....

Decision.....

3. Examine whether answers to the question "Do you like to eat" depend on sex?

H0.....

Assumptions.....

Test statistic..... df..... p-values .....

Decision.....

4. Open the file KERD97EN.SAV. Decide, whether the practical marks are independent of sex or not? Give the contingency table and write the frequencies here.

	2	3	4	5
Male				
Female				

What is the null hypothesis?.....

- Find  $\chi^2$   
Find the degrees of freedom  
Find the p-value
- Check the assumptions of the expected frequencies  
What is the decision about the independence? .....

5. Decide, whether the practical marks (variable PRACT) are independent of sex or not? Give the contingency table and write the frequencies here.

	2	3	4	5
Male				

Female				
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