

7. Hypotheses about Mean and Proportion of two populations

Task 1. Work with *mice* data. Compare two weight parameters: ending weight and weight changes for 2 strains "C58/J" and "CAST/EiJ". Test hypothesis about means of these parameters. Provide the p-values for the comparisons.

Task 2. Based on complete *mice* data set, means of which parameters are significantly different for male and female population?

Task 3. Newly hatched chicks were randomly allocated into six groups, and each group was given a different feed supplement. Their weights in grams after six weeks are given along with feed types. See data *chickens* at <http://edu.modas.lu/data>

Compare mean weights under following diets: "sunflower" -vs- "soyabean", "sunflower" -vs- "casein"

Task 4. The table below gives the concentration of 2 drugs in the bloodstream 1 hour after administration. The same person is tested first for penicillin and two weeks later for amoxicillin. The measurements are in $\mu\text{g/ml}$ and are assumed to be normally distributed. Is the bloodstream of penicillin significantly different from that of amoxicillin? Which test will you use?

Person	Penicillin	Amoxicillin
1	42	36
2	34	44
3	57	61
4	40	35
5	28	35
6	48	50

Task 5. Work with *antidepressant* data at <http://edu.modas.lu/data>. Is there a significant effect of antidepressant treatment? Same persons were tested before and after treatment.

Task 6. Compare proportion of men and women preferring dark beer. Dataset *beer* at <http://edu.modas.lu/data>

Task 7. A Gallup poll found that 16% of 505 men and 25% of 496 women favored a law forbidding for sale of all beer, wine and liquor. Compare the proportions of men and women who favor such a ban.

Task 8. A case-control study was conducted to identify reasons of the exceptionally high rate of lung cancer among male residents of coastal Georgia. The primary risk factor under investigation was employment in shipyards during World War II. See table providing the data for non-smokers. Calculate p-value in order to approve or disapprove this hypothesis.

Shipbuilding	Cases	Controls
Yes	11	35
No	50	203