

Practicals #6 – Contingency tables

1. 128 Plants were cultivated in a green-house experiment. In this experiment, half of the pots were fertilized by potassium while the other half not. Flowering was recorded after two weeks of the continuous potassium treatment. 51 plants of potassium treated produced a flower while in the control plant it was 33. Does potassium significantly affect probability of flowering?

2. 812 citizens of the same age were monitored during their lifetime in a town in Central China by a local medical authorities. It was recorded whether they drink tea and if so, whether they prefer green or black tea. It was also monitored who of the experimental group developed cancer by 70 years of age. The data were as following:

	healthy	cancer
no tea	130	55
green tea	357	65
black tea	160	45

Do the data suggest that drinking tea could protect against cancer? If so, is there any difference between the types of tea?

3. In a total set of 500 vegetation plots, 150 were of the wet meadow habitat.

Carex nigra had 30 records in the dataset. Of that 26 was in wet meadows.

Festuca rubra had 246 records. Of that 120 was in wet meadows.

Cannabis sativa had 10 records in the dataset. Of that none was in wet meadows.

How are these species associated with the wet meadow habitat?

4. During a month period, 115 persons were taken to hospital in Sierra Leone due to cholera. It was also recorded whether they had been vaccinated against tetanus. 55 patients survived cholera of 60 vaccinated against tetanus while 15 patients survived of 55 non-vaccinated. Does vaccination against tetanus protect also against cholera?

5. During an outbreak of flu, 80 of 170 students of faculty of education, 190 of 220 of students of faculty of science and 22 of 290 of students of faculty of philosophy became ill. Does susceptibility to flu differ among students of the faculties?

A. 10% of 120 female students of faculty of teaching became pregnant during a certain period. The conception rate accounted for 20% of 160 of students of faculty of science and 5% of 160 at faculty of philosophy. Is there a difference in probability of becoming pregnant among female students of the three individual faculties? If so, which faculty differs from which?

B. A dentist has 350 patients in his database that undergo regular checks for the teeth health. In addition to the information on tooth decay, he asks his patients whether they drink tea unsweetened, sweetened by sugar or sweetened by honey. The resulting data are following:

Sugar: 60 with decay/18 without decay

Honey: 90 with decay/45 without decay

Unsweetened: 50 with decay/87 without decay

Does the type of tea sweetening affect health of teeth? If so, how?

C. Two species *Humulus lupulus* and *Alnus incana* have following records in a set of vegetation plots: cooccurrence – 26 plots, *Humulus* only 6 plots, *Alnus* only 81 plots, none of the species 23 plots. Are these species significantly associated? If yes, how?

D. A group of student volunteers agreed to take part in an experiment studying the effect of supportive drugs on cognitive capacity. Before taking an exam, the students were randomly assigned to four groups. Members of each group were administered a type of drug potentially supporting their performance at the exam. The exam results are summarized in the table below

	passed	failed
tea	65	37
coffee	60	41
chocolate	71	29
energy drink	55	46

Do the drugs significantly support students performance at the exam? If so, can the identified trend be interpreted as really causal effects? In case of significant result, describe the differences between the effects of individual drug types.

E. The incidence of asthma in the adult population of Czech Republic is 6%. Two large Czech cities were surveyed for asthma incidence based on a sample of 500 randomly chosen adult inhabitants in each of the cities. 26 persons within the sample were diagnosed to suffer from asthma in Brno while the figure was 106 persons in Ostrava. Does asthma incidence in these cities differ significantly from the nation-wide incidence?