

Nonparametric statistics: Practical session III

1. It was suspected that the consumption of contaminated fish was causing an increase in the mercury levels in the blood cells. Data were collected from exposed as well as control groups. All subjects in the exposed group had more than three meals a week of contaminated fish for more than three years. None of the control subjects had a history indicating regular consumption of contaminated fish. Mercury levels (nanograms per gram) in blood cells of two groups of subjects are:

Control (X): 5.3, 15, 11, 5.8, 17, 7, 8.5, 9.4, 7.8, 12, 8.7, 4, 3, 12.2, 6.1, 10.2

Exposed (Y): 20, 18, 17.5, 30, 28, 26, 18.2, 25, 32, 19, 21, 19.2, 23, 24.27, 24.2, 24.7, 22, 17.2, 29, 29.2, 22.5, 21.7, 20.6, 12.8, 42, 47.

Can we conclude on the basis of these data that the two populations represented have different distributions? Use $\alpha = 0.05$.

2. Let X and Y be the heights of coffee plants, measured in centimeters, in two large plantations. These heights are compared by measuring 12 plants selected at random from each of the sites. Use median test at $\alpha = 0.01$ to test the hypothesis whether the median heights of plants from the two sites are identical or not using the following data.

X: 90.4, 77.2, 75.9, 83.2, 84, 90.2, 87.6, 67.4, 77.6, 69.3, 83.3, 72.2

Y: 92.7, 78.9, 82.5, 88.6, 95, 94.4, 73.1, 88.3, 90.4, 86.5, 84.7, 87.5.

3. The following are the lengths of time (in minutes) spent in the operating room by 20 patients undergoing the same operative procedure. Eleven of the patients are from hospital A and nine patients are from hospital B.

Hospital A: 35, 30, 33, 39, 41, 29, 30, 36, 45, 40, 31

Hospital B: 45, 38, 42, 50, 48, 51, 32, 37, 46.

On the basis of these data, can we conclude that for the same operative procedure, patients in hospital B tend to be in the operating room longer than patients in hospital A? Use $\alpha = 0.01$.