

MATH 204 - ASSIGNMENT 3

Please Hand in Assignment in the Lecture on Monday 7th April.

For this assignment, all calculations can be done by hand with a calculator. However, you may use SPSS or other statistics packages.

1. A randomized experimental study is to be carried out into four alternative treatments for lowering high cholesterol in humans. The study is to be carried out at three centres, and power studies have revealed that a total sample size of 24 subjects per centre is suitable. According to the design, subjects are recruited, and then allocated at random with equal probability to one of the four treatment arms as they enter the study. The observed allocations are recorded in the following table:

Centre	Arm			
	1	2	3	4
1	6	8	5	5
2	6	9	3	6
3	7	10	1	6

Using a separate Chi-squared test for each centre, test whether the randomization of subjects to treatment arms has been carried out according to the required design.

Comment on the validity of the test results using the usual guidelines for the Chi-squared test concerning sample sizes.

8 Marks

2. The following table contains counts (in cells/mm³) of the numbers of T₄ and T₈ cells in two groups of patients with lymphocyte abnormalities; Group 1 are patients in remission from Hodgkin's disease, Group 2 are patients in remission from other malignancies.

Group 1		Group 2	
T ₄	T ₈	T ₄	T ₈
396	636	375	340
568	978	375	330
1212	1678	752	627
171	212	208	153
554	670	151	101
1104	1335	116	72
257	272	736	449
435	446	192	108
295	262	315	177
397	340	1252	575
288	236	675	318
1004	786	700	320
431	311	440	200
795	449	771	289
1621	811	688	263
1378	686	426	157
902	412	410	140
958	286	979	310
1283	336	377	108
2415	936	503	163

Reference: Shapiro ED, Berg AT, Austrian R, Schroeder D, Parcells V, Margolis A, Adair RK, Clemens JD. (1991) The protective efficacy of polyvalent pneumococcal polysaccharide vaccine. *New England Journal of Medicine*, 325(21):1453-1460.

The data, in appropriate formats, can be downloaded from the course website.

Using appropriate non-parametric testing procedures, assess the following research hypotheses.

(a) Patients in Group 1 have a significantly **higher** T_8 count than T_4 count.

6 Marks

(a) Patients in Group 2 have a significantly **different** T_4/T_8 ratio compared to Group 1 patients.

6 Marks

Give justification for the non-parametric tests you use.