MRes in Medical Statistics
MMB8028

School of Mathematics and Statistics

Practical session on *t*-tests

1. Twenty-five children who had been exposed to particularly high levels of lead had their IQ assessed with the following results:

100	112	76	97	81
85	100	89	106	106
96	113	91	90	99
99	92	115	97	97
94	86	89	72	104

The assessment is designed so that the mean in the population is 100. Test this group for a difference from the population mean. Also provide confidence limits for the exposed children's mean. Do you think 25 children is the right size of sample? Why?

{these data need to be entered at the keyboard }

2. Ten non-smoking male students had their *maximum voluntary ventilation* (MVV) in litres/min, measured before and after smoking 3 cigarettes.

{these data can be downloaded from the webpage of the course}

Student	MVV (before)	MVV (after)
1	151	110
2	102	89
3	144	113
4	130	100
5	107	107
6	153	113
7	149	168
8	138	112
9	131	123
10	96	113

a) Obtain a 95% confidence interval for the change in MVV brought about by smoking 3 cigarettes.

b) Is there evidence that smoking 3 cigarettes alters MVV? Discuss your finding.

3. Twenty six people entered a trial involving a new drug thought to have potential for lowering serum cholesterol. Thirteen were allocated at random to the drug and 13

to a placebo. Fasting cholesterol levels were measured at the beginning of the trial and after 6 weeks.

{these data can be downloaded from the webpage of the course}

Subject	Treatment Cholesterol Before	(mmol/l) After	Subject	Placebo Cholesterol Before	(mmol/l) After
1	5.9	6.5	14	7.4	6.6
2	7.9	8.5	15	7.1	6.7
3	7.3	7.2	16	8.9	9.7
4	6.2	5.5	17	7.6	7.3
5	7.6	8.0	18	8.8	8.4
6	8.8	6.6	19	7.7	6.8
7	7.1	8.1	20	6.8	6.6
8	7.9	6.8	21	5.7	7.3
9	7.4	8.1	22	8.3	8.1
10	7.3	7.1	23	7.0	7.4
11	8.0	7.9	24	8.1	8.8
12	7.2	5.5	25	6.7	5.9
13	8.0	7.4	26	6.8	6.3

a) Summarise these data numerically and graphically in order to illustrate the relevant comparisons.

b) Is there evidence that the drug is effective?