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## Statistics at Square One

## **Answers to exercises**

- 1.1 Median 0.71, range 0.10 to 1.24, first quartile 0.535, third quartile 0.84 $\mu$ mol/24 hr
- 2.1 Mean = 2.41, SD = 1.27.
- $2.2~Mean = 0.697 \mu mol/24~hr$  ,  $SD = 0.0214 \mu mol/24~hr$  , range .  $0.215~to~1.179 \mu mol/1$
- 2.3 Points 0.10 and 1.24. 2/40 or 5%.
- $3.1 \text{ SE(mean)} = 0.074 \mu \text{mol/24 hr}$
- 3.2 A uniform or flat distribution. Population mean 4.5, population SD 2.87.
- 3.3 The distribution will be approximately Normal, mean 4.5 and SD  $287/\sqrt{5} = 1.28$ .
- 4.1 The reference range is 12.26 57.74, and so the observed value of 52 is included in it.
- 4.2 95% CI 32.73 to 37.27.
- $5.1 \ 0.42 \ \text{g/dl}$ ,  $z = 3.08 \ 0.001 < P < 0.01$ , difference = 1.3 g/dl, 95% CI 0.48 to 2.12 g/dl.
- 5.2 0.23 g/dl, P<0001.
- 6.1 SE (percentage) = 2.1%, SE (difference) = 3.7%, difference = 3.4%. 95% CI -3.9 to 10.7%, z = 0.94, P = 0.35.
- 6.2 Yes, the traditional remedy, z = 2.2, P = 0.028.
- 7.1 37.5 to 40.5 KA units.
- 7.2 t = 2.652, d.f. = 17,001 < P < 0.02.
- 7.3 0.56g/dl, t = 1.243, d.f.=20, 0.1 < P < 05, 95% CI -0.38 to 1.50g/dl.
- 7.4 15 days, t = 1.758, d.f. = 9, 0.1<P<05, 95% CI -4.30 to 34.30 days.
- 8.1 Standard  $\chi^2 = 23.295$ , d.f. = 4, P>0.5. Trend  $\chi^2 = 2.25$ , d.f. = 1, P = 0.13.

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- 8.3  $\chi^2$  = 0.931, d.f. = 1, 0.1<P<0.5, difference in rates 15%, 95% CI -7.7 to 38%.
- 8.4  $\chi^2$  = 8.949, d.f. = 3, 0.02<P<0.05. Yes, practice C; if this is omitted the remaining practices give  $\chi^2$  = 0.241, d.f. = 2, P>0.5. (Both  $\chi^2$  tests by quick method.)
- 9.1 Sickness rate in first department 28%, in second department 8%, difference 20% (approximate 95% CI = -6 to 45%, P = 0.24 (Fisher's Exact test mid P)). P is calculated from 2 x (0.5 x 0.173 + 0.031).
- 10.1 Smaller total = -30. No.
- 10.2 Mann-Whitney statistic = 74. The group on the new remedy. No.
- 11.1 r = -0.848.
- 11.2 rs = -0.867.
- 11.3 y = 36.1 2.34 x. This means that, on average, for every 1 mile increase in mean distance the attendance rate drops by 2.34%. This can be safely accepted only within the area measured here.
- 11.4 SE = 0.39, 95% CI = -2.34 2.145 x 0.39 to -2.34 + 2.145 x 0.39 = -3.1 to -1.5%.
- 12.1  $O_A = 6$ ,  $t_A = 8.06$ ,  $O_B = 8$ ,  $E_B = 5.94$ . Log rank  $\chi^2 = 1.24$ , d.f. = 1, 0.1<P<0.5.
- 12.2 Risk = 0.55, 95% CI 0.19 to 1.60.
- 13.1 Matched case control study.
- 13.2 Cohort study.
- 13.3 Cross sectional study.
- 13.4 Randomised controlled trial.
- 13.5 Quasi experimental design.

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