

University of York
Department of Health Sciences
Applied Biostatistics

Suggested answers to exercise: Significance tests

Question 1

- (a) *What is meant by 'P<0.01'?* P is the probability of a difference in attendance with croup as large as that observed in the sample, if the null hypothesis were true, i.e. if in the whole population of patients there were no difference in attendance between children given dexamethasone and children given placebo.
- (b) *How could 'NS' be more usefully reported?* The actual P value would be more helpful even if it is bigger than 0.05 and hence non-significant, since the P value shows the weight of evidence against the null hypothesis. A P value close to 0.05 would provide more evidence against the null hypothesis than a P value well above 0.05. This could only be judged if the actual value was given.
- (c) *How could 'P<0.01' be more usefully reported?* Again, the actual P value would be useful. It is $P = 0.0057$.
- (d) *What feature of this analysis makes the P values difficult to interpret?* We have five different outcome variables, only one of which is significant. We have a problem with multiple testing and we should make some adjustment for this.

Question 2

- (a) *For the number of days off school, which term best describes the shape of the distribution which is suggested by the data given?* The distribution is positively skew, because the mean is close to the lower end of the range.
- (b) *Which term best describes the strength of evidence that the delayed antibiotics increases the mean length of the illness?* We have strong evidence because the P value is less than 0.01.
- (c) *Which term best describes the strength of evidence that the delayed antibiotics increases the time off school?* We have little or no evidence, because the P value is more than 0.1.
- (d) *Which term best describes the strength of evidence that the delayed antibiotics decreases the risk of diarrhoea?* We have some evidence, because the P value is between 0.01 and 0.05.