

Suggested answers to exercise: a nurse-run asthma school

- (a) *In Section 3.1, what is meant by 'p<0.001'? What can we conclude from this?* This is the probability of getting a difference as big as that observed the sample if the null hypothesis, that there is no difference in the population from which the sample comes, were true. As the probability is small and less than the 0.05 conventional cut-off, the difference is significant. There is good evidence that the knowledge of asthma is increased between starting the Asthma School and 12 months later.
- (b) *In Section 3.2, what is meant by 'n.s.'? What can we conclude from this?* This means 'not significant'. The probability of getting a difference as big as this if the null hypothesis were true is greater than 0.05. We can conclude that we have failed to show that there is a difference in the population, i.e. that smoking decreases following Asthma School. We cannot conclude that there is no difference. There may be a difference which the sample is not large enough to detect.
- (c) *In the SIP table, what is the most frequent score for the baseline score in the ambulation dimension?* We are told that the range is 0.0 to 20.3, so the smallest observed value is 0.0. The median is 0.0, so half the observations are 0.0 or less, Hence half the observations must be 0.0 and 0.0 is the most frequent score. We call the most frequently observed value the mode.
- (d) *What limitations does the lack of a control group lead to?* We cannot say whether any changes which took place over the year would have taken place anyway, without the Asthma School. Patients will be exposed to many other influences apart from the School. A randomised control group, comparable apart from the Asthma School, would enable us to conclude that any differences were the effect of the Asthma School.
- (e) *What bias, if any, might there be in the patients' response concerning the use of a PEF-meter (Section 3.3.)?* The assessment of PEF-meter use is by patients' own reports. The patients know what the researchers want to hear, because the Asthma School has told them. Thus they may report using the PEF-meter, for example, because they think they should, not because they actually do it. This would be response bias.
- (f) *What bias, if any, might there be in the FEV1 measurement (Section 3.4.)?* The FEV1 is an objective measurement, so less subject to this bias. It seems unlikely that patients could make their FEV1 larger to please the researcher.
- (g) *In the SIP table, why should we be cautious in interpreting the significant change in the physical dimension?* The problem here is multiple testing. This is one of 15 tests of significance looking at the changes in SIP. If the null hypothesis that the SIP does not change in any dimension is true, the probability that we would get at least one of the P values less than 0.05 is quite high. We should always beware of one lone significant difference among a group of non-significant ones. Inspection of the table shows that for some dimensions the score is higher post Asthma School, for some lower, and for the total score the means are the same. There is nothing to suggest that SIP has decreased.