

Statistical analysis of the editor

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This issue's special feature, on which these questions are based, was commissioned from independent authors. The new Life-long Learning scheme is supported by an educational grant from Martindale Specials but the company has no editorial input. The information in the box below should help readers to identify knowledge gaps and undertake continuing professional development. Readers are also invited to complete the questions overleaf to test their knowledge of the articles, and send their answers, together with a stamped and addressed C5 envelope, to:

Life-long Learning — statistical analysis
Hospital Pharmacist
 1 Lambeth High Street
 London SE1 7JN

Name: _____

RPSGB registration number: _____

Address: _____

Post code: _____



Entries must be received by 26 March 2007. Results will be returned with a certificate of completion.

New Life-long Learning competition

Last month saw the launch of a new Life-long Learning competition, sponsored by Martindale Specials. The entrant who achieves the highest marks overall in this series of six exercises will win attendance at the European Association of Hospital Pharmacists annual congress, to be held in Maastricht, The Netherlands, in spring 2008. This is the second set of questions.

The best five scores from the six exercises in this series, which will run from January to July/August 2007 (excluding the March issue, which will not carry Life-long Learning questions) will be taken into consideration.

The runner-up will receive registration and travel expenses for the *Hospital Pharmacist* conference in 2008. Third and fourth place will receive Pharmaceutical Press vouchers or British Society for the History of Pharmacy china mugs.

Your name, address and scores will be held on a database for the purpose of awarding prizes. Should you not wish your details to be held in this way, please tick the box. If you do this, you will be sent a certificate, but you will be ineligible for a prize.

How to undertake continuing professional development

Identify knowledge gaps

- ◆ The factors to consider when choosing the most appropriate method to analyse data
- ◆ Interpreting the results of clinical trials according to how the data were analysed

Act

- ◆ Read the articles in this issue
- ◆ Test your knowledge by answering the multiple-choice questions overleaf

Evaluate

- ◆ What have you learnt?
- ◆ How has it added value to your practice?

- ◆ What will you do now and how will this be achieved?

The feature on statistical analysis has been accredited by the College of Pharmacy Practice against the Royal Pharmaceutical Society's general and hospital practice areas of competence, which can be accessed via *Hospital Pharmacist* online (www.pjonline.com/links/hp)

Reading the feature and completing the questions will help readers to fulfil aspects of the following competency areas, depending on their area of practice and application of learning: G1, G5, G8, HP2.

Completion of the questions entitles undergraduates to one point towards the Professional Development Certificate, a joint initiative between the British Pharmaceutical Students' Association and the College.



The assistance of the College of Pharmacy Practice is acknowledged in producing the CPD elements of this month's special feature.

Further information on how hospital pharmacists are approaching the challenges of CPD can be found in articles in the February 2005 issue of *Hospital Pharmacist* (2005;12:65-72).



To answer the questions, tick either the True or False column

	True	False		True	False
1. Statistical tests:			6. Use of plots:		
a) Most statistical tests can be used to analyse any type of data			a) A funnel plot can be useful in detecting publication bias		
b) Presenting data pictorially may make its distribution more apparent			b) Forest plots are used to summarise the results of meta-analysis		
c) Many parametric tests assume a normal distribution			c) Time to event data can be displayed using Kaplan-Meier plots		
d) Assumptions of a statistical test should be checked before performing an analysis			d) Dot plots and boxplots can only be used to display continuous variables within one group		
e) In any study the primary analysis should always be the "per protocol" analysis			e) Dot plots may be "jittered" for ease of viewing		
2. Data types:			7. Distribution:		
a) Height is an example of categorical data			a) The Kolmogorov-Smirnov test can be used to test whether data are normally distributed		
b) Nominal data may be displayed in the form of a bar chart			b) The Kolmogorov-Smirnov test may be too sensitive for small sample sizes		
c) Ordinal data can be summarised using the median			c) For analysis of variance and regression the residuals should be normally distributed		
d) Interval data has equidistant values between each measurement			d) Binary logistic regression does not require the residuals to be normally distributed		
e) Gender is an example of ratio data			e) Normally distributed data forms a funnel shape when displayed as a histogram		
3. Study design:			8. Correlation:		
a) Allocating treatment by age is an example of randomisation			a) Correlation coefficients should be used to measure agreement		
b) Studies must always show complete blinding			b) In negative correlation, one variable decreases as the other increases		
c) In cluster randomised trials, the cluster must be the unit of analysis			c) Correlation does not imply causation		
d) An equivalence trial usually requires a larger population than a superiority trial			d) Pearson's correlation coefficient is seldom used nowadays		
e) Study results should not be extrapolated beyond the population tested in the study			e) Pearson's correlation only measures linear association		
4. P-values:			9. Odds ratios, hazard ratios and NNT:		
a) The P-value is the probability that an outcome is due to chance alone			a) The results of Cox regression analysis are reported in terms of odds ratios		
b) P-values describe clinical significance			b) Odds ratios are generally more intuitive than reporting the number needed to treat (NNT)		
c) Power calculations can be used to bring clinical significance and statistical significance into line			c) The NNT is one divided by the absolute risk reduction		
d) P-values should be rounded up to the nearest 0.05 unit			d) Comparison of the NNT between treatments depends on there being a similar baseline risk		
e) A result is clinically significant if the clinically significant difference lies inside the confidence interval			e) It is not necessary to report 95 per cent confidence intervals if using hazard ratios		
5. Risk:			10. Other analyses:		
a) A negative absolute risk reduction indicates that an intervention is beneficial			a) The chi-squared test is commonly used to analyse categorical data		
b) Relative risks are usually reported in cohort and cross-sectional studies			b) Cox regression allows for the presence of censoring		
c) A relative risk of three means that the risk of the event in the treatment group is 0.75 times that in the control group			c) A meta-analysis is more accurate than a randomised controlled trial		
d) Absolute risk reduction is the difference in risk between the control group and treatment group			d) The one-sample t-test assumes that the data are sufficiently normally distributed		
e) Where a disease is not rare, odds ratios may be incorrectly interpreted as relative risks			e) The Friedman test is an extension of the sign test		

Answers will appear in the April issue

