

## ◆ New CSE Short Course Instructs Editors in Statistics

### Heather Shebel

Medical and scientific journals should present research clearly and accurately, especially with regard to data analysis; however, about 50% of published papers reviewed have been found to contain statistical errors. Surprisingly, the errors generally reflect misuse of basic, not advanced, statistics. The new CSE short course in statistics for editors, given on 21 May before the CSE annual meeting, addressed the issue by reviewing statistical issues relevant to scientific publication.

Forty-two registrants, mostly manuscript and managing editors, attended the day-long course, which was given by Jessica Ancker (of the Mailman School of Public Health, Columbia University) and Tom Lang (of Tom Lang Communications). Discussion was encouraged, and no one was afraid to ask questions, even though most of the course was mathematically heavy, showing the mathematical processes behind the statistical tests. Many participants asked about issues that had arisen in their everyday encounters with authors and their manuscripts. For example, one participant asked whether standard error (SE) and standard error of the mean (SEM) are the same; although an author insisted on using one abbreviation in preference to the other, SE equals

SEM. Good and bad examples were given to illustrate many key points of the course, and the material was presented concisely and understandably, with excellent explanations.

The morning part of the workshop started with a quick review of descriptive statistics and confidence intervals; progressed to material on hypothesis testing, interpretation of *P* values, and identification of flaws in research; and ended with a few practical exercises. Highlights included learning that whereas the mean and standard deviation should be used only to describe normally distributed data, authors commonly use them to describe data that are not normally distributed; markedly nonnormal (skewed) distributions should be described with the median and either the range or the interquartile range. Authors also tend to use SE more often than SD because it can make their data look better. However, SE is an estimate of the expected variability between multiple sample means, not a description of the data collected in a single sample. It is thus an inferential statistic rather than a descriptive one and shouldn't be used to describe samples.

It was noted that descriptive statistics should be included in every article with identification of the statistical software used; specifying that well-known, quality-tested statistical software was used adds



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### Jessica Ancker presents to the short course.

weight to an article. When reporting continuous data in graphs known as box plots, authors often neglect to label such items as the upper and lower boundaries of data and error bars (whiskers); for clarity, editors must request such items and ensure that they are explained in the figure caption. Authors also often misuse statistical terminology. For example, they use *significant* as a synonym for *important*. Editors should ask authors to clarify or look up the definitions of statistical terms.

The afternoon part of the workshop addressed critical appraisal (which requires studying and dissecting an article, not merely reading it), statistical query (asking the author to report a different statistic to display data better), and reporting of risk. Risk can be reported in several ways, each of which can influence how it is interpreted. The several types of ratios (for example, odds ratios and hazard

ratios), rates (for example, mortality), and risks (for example, absolute risk, relative risk, and risk ratios) are each distinguished by what groups are in the numerators and denominators. Reporting at least the absolute risk of both benefits and adverse events for each treatment group is preferred. Authors should be aware of how description of risk might influence its interpretation, especially when data are reported in the news media and can influence patients' medical-care decisions.

The short course ended too soon, as we ran out of time to review examples; however, we could read additional examples in the handouts at our leisure. I think more time at the end of the workshop for demonstrations and discussion would be helpful. We also were not administered a promised 15-question test—to the relief of some participants. This new course is a fine addition to the short courses offered before the CSE annual meeting, and I believe it should be taken by most science editors.

HEATHER SHEBEL, a senior manuscript editor at JAMA, attended the CSE short course in statistics for editors.