

Effective Use of Numbers and Statistics

San Francisco Edit

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English grammar and syntax are important in the writing of scientific manuscripts, but the use and presentation of numbers and statistics are just as important. The misuse of numbers and statistics can jeopardize the acceptance of your manuscript by the journal.

Numbers and data are the core of most scientific research. Although there are many ways to present data; every journal has specific guidelines for their use and presentation. Whatever style you choose, it is important to be consistent throughout the manuscript.

Statistics should be used to substantiate your findings and help you to state objectively your significant results. Statistics in text should include sufficient information, be reported accurately, and permit the reader to corroborate the analysis. It is always wise to have a Statistician check your work before submitting your manuscript.

The list presented here covers some general guidelines to which most journals adhere, but check with the journal to determine their specific guidelines.

Numbers:

- Preferably use Arabic rather than Roman numerals.
- Use the symbol ~ to mean: approximately equal to.
- When beginning a sentence with a number, spell out the number. It is usually better to rewrite a sentence so you don't start it with numbers greater than ninety-nine.
- When several numbers appear in the same sentence or paragraph, express them all in the same way.
- Use numbers and words to express large numbers: a budget of \$1.2 million; 2 million kilometers.
- Use hyphenation to reduce confusion when there is more than one modifier: fifteen 2-week-old mice.
- Use Arabic numbers for units such as weights, percentages, and time.

- Put a space between numbers and units: for example, 75 kg. The exception: 75% for some journals.
- Do *not* use leading zeros before a decimal point when the number cannot exceed 1. For example, report $a = .05$. *Do* use leading zeros before a decimal point when the number can be greater than 1. For example, report mean serum creatinine level = 0.973 mg/dl.
- When you quote numbers, make sure you use the minimum number of significant digits or decimal places. For example, 23 ± 7 years is appropriate but not 23.4 ± 6.6 years; the loss of accuracy is not important because the measurement is not significant to the first decimal place. However 23.4 ± 0.6 is correct because this measurement is accurate to the first decimal place.

Statistics:

- Always report the mean (average value) along with a measure of variability (standard deviation(s) or standard error of the mean). Make sure the significant digits of the mean and standard deviation are consistent.
- Summarize frequency data in the text with appropriate measures such as percents, proportions, or ratios.
- For summary statistics (e.g., means, standard deviations), report one digit more than was present in the raw data. For example, if age is recorded to the nearest whole year, report the mean age to the nearest tenth of a year (e.g., mean = 54.3 years).
- For percentages, the nearest whole percent (e.g., 25%) is usually adequate, although many journals prefer percentages to the nearest tenth of a percent (e.g., 25.4%).
- For test statistics, such as chi-square statistics, t statistics, and F statistics, use two decimal place accuracy. For example, report t statistic = 2.56.
- For P values, two significant digits are usually acceptable.
- Show 95% confidence intervals for effect statistics like a correlation coefficient or the difference between means.

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