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<http://www.annfammed.org/cgi/content/full/2/3/204/DC1>

Appendix 1. Basic Statistical Ideas

- α : indicates the probability of rejecting the statistical hypothesis tested when, in fact, that hypothesis is true. Usually set at 0.05.
- β : indicates the probability of failing to reject the hypothesis tested when that hypothesis is false and a specific alternative hypothesis is true.
- *Nesting*: a condition that results when elements of a study sample are obtained from one or more layers of preexisting groups. The simplest type of nesting, two-layer nesting, is often referred to as “clustering.” See text for figures and examples.
- *Power*: $1-\beta$, or the probability of avoiding a type II error. Largely depends on sample size. Preexperiment, the desired power is the basis for sample size calculations.
- *Random sample*: a selection of some members of a population such that each member is independently chosen and has a known nonzero probability of being selected.
- *Standard deviation*: the square root of the variance. More commonly used than the variance to describe the variability in a data set.
- *Type I error*: the probability of failing to recognize a significant difference. Usually set by α .
- *Type II error*: the probability of recognizing as significant a difference that is actually due to chance. Usually set by β .
- *Variance*: a measure of spread of the data around its central point, or “dispersion.” Helps to quantify random error. Technically, the sum of the squares of the distances of each data point from the mean.

$$s^2 = \frac{1}{n} \sum_{i=1}^n (y_i - \bar{y})^2$$

where y_i = any data point in the set, and \bar{y} = the mean of all the y values.

References

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