

## Statistics and Data Analysis Literacy for Nurses

### Summary

statistics, the science of collecting, analyzing, presenting, and interpreting data. Governmental needs for census data as well as information about a variety of economic activities provided much of the early impetus for the field of statistics. Currently the need to turn the large amounts of data available in many applied fields into useful information has stimulated both theoretical and practical developments in statistics.

Data are the facts and figures that are collected, analyzed, and summarized for presentation and interpretation. Data may be classified as either quantitative or qualitative. Quantitative data measure either how much or how many of something, and qualitative data provide labels, or names, for categories of like items. For example, suppose that a particular study is interested in characteristics such as age, gender, marital status, and annual income for a sample of 100 individuals. These characteristics would be called the variables of the study, and data values for each of the variables would be associated with each individual. Thus, the data values of 28, male, single, and \$30,000 would be recorded for a 28-year-old single male with an annual income of \$30,000. With 100 individuals and 4 variables, the data set would have  $100 \times 4 = 400$  items. In this example, age and annual income are quantitative variables; the corresponding data values indicate how many years and how much money for each individual. Gender and marital status are qualitative variables. The labels male and female provide the qualitative data for gender, and the labels single, married, divorced, and widowed indicate marital status.

Sample survey methods are used to collect data from observational studies, and experimental design methods are used to collect data from experimental studies. The area of descriptive statistics is concerned primarily with methods of presenting and interpreting data using graphs, tables, and numerical summaries. Whenever statisticians use data from a sample—i.e., a subset of the population—to make statements about a population, they are performing statistical inference. Estimation and hypothesis testing are procedures used to make statistical inferences. Fields such as health care, biology, chemistry, physics, education, engineering, business, and economics make extensive use of statistical inference.

Methods of probability were developed initially for the analysis of gambling games. Probability plays a key role in statistical inference; it is used to provide measures of the quality and precision of the inferences. Many of the methods of statistical inference are described in this article. Some of these methods are used primarily for single-variable studies, while others, such as regression and correlation analysis, are used to make inferences about relationships among two or more variables.

## Reference

[Teaching Qualitative Research: Strategies for Engaging Emerging Scholars](#)

[The Extracellular Matrix and Ground Regulation: Basis for a Holistic Biological Medicine](#)