

Biostatistics

What is Biostatistics?

The studies of biology and statistics combine to form [biostatistics](#), which uses statistical methods in order to provide analysis for biological study. This dual methodology can be utilized in a wide variety of practical applications. It provides a framework for understanding the outcomes of scientific experimentation in logical, concrete terms. Keep reading to learn about the origins of this form of study and the ways in which it is used in modern research.

Uses in Medical Research

Methods from this form of study are used significantly in medical research as a way of obtaining, analyzing and interpreting data in order to reach conclusions that guide the medical community. In fact, the role of biostatistics is quite crucial in the understanding of a multitude of important health issues. The data provided through the lens of such study is used to provide insights that determine if a treatment is effective, as well as to isolate factors that are contributing to disease. These examples are just a few relevant ways that statistical methods can guide biological study in medicine.

Uses in Epidemiology

Epidemiology is an umbrella term covering the wide range of public health matters. The cause, progression and spread of disease are analyzed using biology and statistics. This information gives researchers insight into such considerations as specific symptoms, mortality rates and when outbreaks may occur. The development of vaccines and other medical interventions are guided through such knowledge. No longer is medical research merely observation-based. Much more can be accomplished through the use of detailed statistical analysis and evidence.

Cancer Research

While statistical methods are a benefit to medical research in general, the incorporation of statistics in the realm of cancer research is particularly useful. Because treatments such as chemotherapy are so hard on the body and can cause such drastic side effects, medical professionals want to be able to discontinue the use of particular therapies as

soon as possible if they are not having the desired effect on patients. The use of statistical evidence can show medical personnel more clearly and quickly which methods are making a difference and which aren't helping so that a new course of action can be more readily employed. As with other medical research, biostatistical methods are also a guiding force in the clinical trials and cause identification of cancer.

As you can see, the combination of statistics with biological science has had a tremendous impact on the fields of medicine and health. Through this combined lens, scientists and researchers are able to isolate the causes and development of numerous health issues, determine the kinds of treatments that are most effective and direct future research in the most efficient and useful direction. So many life-changing developments could never have come to fruition without the logical, concrete information provided through this unique combination of statistics and biology. Biostatistics is invaluable when it comes to the quality of life we lead and in the number of lives that are saved each year.

Why Are Statistics Important in the Health Care Field?

By Rae Casto

Quantitative research guides health care decision makers with statistics--numerical data collected from measurements or observation that describe the characteristics of specific population samples. Descriptive statistics summarize the utility, efficacy and costs of medical goods and services. Increasingly, health care organizations employ statistical analysis to measure their performance outcomes. Hospitals and other large provider service organizations implement data-driven, continuous quality improvement programs to maximize efficiency. Government health and human service agencies gauge the overall health and well-being of populations with statistical information.

Health Care Utilization

Researchers employ scientific methods to gather data on human population samples. The health care industry benefits from knowing consumer market characteristics such as age, sex, race, income and disabilities. These "demographic" statistics can predict the types of services that people are using and the level of care that is affordable to them. Health administrators reference statistics on service utilization to apply for grant funding and to justify budget expenditures to their governing boards.

Resource Allocation

Health care economists Rexford Santerre and Stephen Neun emphasize the importance of statistics in the allocation of scarce medical resources. Statistical information is invaluable in determining what combination of goods and services to produce, which resources to allocate in producing them and to which populations to offer them. Health care statistics are critical to allocative and production efficiency. Inevitably, allocation decisions involve trade-offs--the costs of lost or missed opportunities in choosing one economic decision over another. Reliable statistical information minimizes the risks of health care trade-offs.

Needs Assessment

According to Frederick J. Gravetter and Larry B. Wallnau, statistics "create order out of chaos" by summarizing and simplifying complex human populations. Public and private health care administrators, charged with providing continuums of care to diverse populations, compare existing services to community needs. Statistical analysis is a critical component in a needs assessment. Statistics are equally important to pharmaceutical and technology companies in developing product lines that meet the needs of the populations they serve.

Quality Improvement

Health care providers strive to produce effective goods and services efficiently. Statistics are important to health care companies in measuring performance success or failure. By establishing benchmarks, or standards of service excellence, quality improvement managers can measure future outcomes. Analysts map the overall growth and viability of a health care company using statistical data gathered over time.

Product Development

Innovative medicine begins and, sometimes, ends with statistical analysis. Data are collected and carefully reported in clinical trials of new technologies and treatments to weigh products' benefits against their risks. Market research studies steer developers toward highly competitive product lines. Statistics indirectly influence product pricing by describing consumer demand in measurable units.