What is Biostatistics?

Biostatistics is the branch of statistics specifically focusing on appropriate interpretation of scientific data generated in the health sciences. For any given results generated from a lab experiment, clinical trial or epidemiological studies there is a possibility of variation which may be due to chance, measurement error, or other characteristics of the individual subjects. Biostatistics assists with disentangling these different sources of variation. It seeks to distinguish between correlation and causation, and to make valid inferences from known samples about the populations from which they were drawn. (For example, do the results of treating patients with two therapies justify the conclusion that one treatment is better than the other?) Biostatistics is a broad discipline encompassing the application of statistical theory to real-world problems, the practice of designing and conducting biomedical experiments and clinical trials (experiments with human subjects), the study of related computational algorithms and display of data, and the development of mathematical statistical theory.

Biostatisticians are specialists in the evaluation of data as scientific evidence. They understand the generic construct of data and they provide the mathematical framework that transcends the scientific context to generalize the findings. Their expertise includes the design and conduct of experiments, the mode and manner in which data are collected, the analysis of data, and the interpretation of results. Meaningful generalization of experimental results requires the application of an appropriate mathematical framework for the scientific context. The validity of research results depends on this application and the reproducibility of the experimental methods. Biostatisticians use mathematics to enhance science and bridge the gap between theory and practice.