Chapter 12
A Comprehensive Examination of Epidemiology:
Its Terms, Types, and Methods

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ABSTRACT

Epidemiology involves examining the frequency of disease occurrences within diverse population groups and investigating the various factors contributing to their prevalence. The information gathered through epidemiological studies is instrumental in formulating strategies to prevent illnesses and in managing affected individuals. This field employs specific techniques for data collection and interpretation, utilizing specialized jargon for technical terms. The objective of this book chapter is to offer a comprehensive overview of the epidemiological approach, covering its terminology, types, objectives, principles, and methods.

INTRODUCTION

The word epidemiology comes from the Greek words epi, meaning "on or upon," demos, meaning "people," and logos, meaning "the study of." Epidemiology is "the study of disease in populations and of factors that determine its occurrence over time." The aim is to delineate and pinpoint prospects for intervention (Last, 1988). The distribution and determinants of health and disease, morbidity, injury, disability, and death in populations are the focus of epidemiology. This intervention is intended to improve

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production in addition to health in veterinary epidemiology (Lilienfeld and Stolley, 1994). Humans, animals, or plants can all be considered members of the population at risk. Morbidity is the illness caused by a particular disease or health condition, and mortality is the death caused by a particular disease or health condition. The distribution implies that health outcomes, including diseases, do not happen at random within populations. Any element that results in a shift in a specific attribute, such as a health condition, is considered a determinant. Epidemiologists can assist with research design, data collecting and statistical analysis, interpretation, and findings distribution. An approach that is employed in clinical research, public health investigations, and, to a lesser degree, fundamental biological sciences research has been developed with assistance from epidemiology (Rothman et al., 2008).

The field of epidemiology did not take off until the 1940s, despite the fact that it dates back to Hippocrates, who flourished in the fifth century B.C. Hippocrates had a remarkable understanding of how conduct and surroundings affect an individual's well-being. Hippocrates is one of the forces that epidemiologists now see as being important in determining a person's health. John Snow was one of the scientists who helped to shape the field of epidemiology. In 1849, a London cholera outbreak led to the development and testing of a theory by an English physician called John Snow (Buck et al., 1988). Based on the information at hand, Snow conjectured that cholera was spread by dirty water through a process that was unknown at the time. He noted that districts of London served by the Lambeth Company or the Southwark and Vauxhall Company—both of which obtained their water from the Thames River at a place substantially contaminated with sewage—saw disproportionately high rates of cholera-related deaths. The Lambeth Company switched its supply to a section of the Thames between 1849 and 1854 because the water there was "quite free from the sewage of London." Whereas there was no change in the districts receiving water from the Southwark and Vauxhall Company, the rates of cholera decreased in the parts of the city supplied by the Lambeth Company. Ultimately, Snow came to the conclusion that tainted water was the cause of the cholera outbreak.

Many facets of the profession of human and animal health use epidemiology. The most important ones are: determining (diagnosing) the current health and disease burden in a population; identifying specific causes and risk factors of disease; distinguishing between intentional and natural events (e.g., bioterrorism); describing the natural history of a particular disease; contrasting various products and techniques for treatment and prevention; evaluating the effectiveness, cost, and outcome of interventions; prioritizing intervention strategies; and providing a basis for public policy (IOM, 1999).

An important factor in assessing a research study's scientific significance is its study design. Clinicians will be more equipped to practise evidence-based medicine if they have a basic understanding of research design fundamentals.

Physicians, mid-level practitioners, nurses, chemists, therapists, and other members of the inter-professional healthcare team must all be knowledgeable about the different study designs that are used in medical research. This information can be used to distinguish between studies and outcomes that are strong and those that are poor, assess the clinical applicability of study findings, and improve patient care by using data-driven research findings appropriately. Ignorance about research design and the quality of data offered by different kinds of studies can result in poor decision-making and detrimental effects on patient outcomes (Gordis, 2000).