



CHAPTER ONE

EPIDEMIOLOGY IN HEALTH CARE ADMINISTRATION

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Learning Objectives

The reader will be able to:

- Define epidemiology
- Discuss the history of epidemiology
- Define managerial epidemiology
- Discuss the distinction between observational and experimental epidemiology

- Describe the uses of epidemiology
- Describe the field of social epidemiology
- Discuss the concept of populations and population health care management

Introduction

Epidemiology is recognized as a core discipline within the field of public health. It is a unique discipline which formally began as a result of the sanitary reform movement in 17th and 18th century England. Epidemiology is formally defined in a number of ways. First, epidemiology is the study of the distribution and determinants of diseases and injuries in human populations (Mausner and Kramer, 1985). A second definition emphasizes the study of all factors, and their interdependence, that affect the occurrence of health and disease in populations. Finally, epidemiology is the study of the distribution and determinants of health-related states and events in defined populations, and the application of this study to the control of health problems (Last, 1995).

Common to all of the preceding definitions is the concept of *populations*. Individuals are not the focus of epidemiology, but rather groups of individuals. Populations may represent large groups like the total population of the United States, as well as small groups such as the employees of a factory, store, or government agency. Central to the concept of populations is that groups of individuals exhibit certain commonalities. For example, a group of individuals who are related geographically, such as those living in the same city, represent a population. Also, a group of individuals who work in the same setting are a population. And a group of individuals who live and work together are a population, as in the case of military personnel. Groups of individuals of the same race or ethnic group are also considered populations.

Historically, epidemiology is a discipline that has experienced long and distinct development stages. It is reasonable to think that epidemiology began when man first walked on earth. The theory of “survival of the fittest” can be extended to assume that early man acquired, over time, an understanding of the relationship between environment and health. One simple example is the use of animal hides and furs as protective clothing.

The relationship between the environment and health and disease is mentioned in the Old Testament of the Bible. However, it wasn't until the Greek civilization was established that epidemiology began to emerge as a scientific

discipline. Hippocrates, who lived from 460 to 377 B.C., wrote the classic work “On Airs, Waters, and Places.” His work began what is referred to today as environmental epidemiology. His writings discussed the link between the environment and human health. Hippocrates provided accurate descriptions of the diseases tetanus, typhus, and phthisis (Singer and Underwood, 1962). His contribution, which is the first documented use of observational techniques, earned Hippocrates the title of father of epidemiology and the designation as the first epidemiologist (Newcomb and Marshall, 1990).

Girolamo Fracastorius, who lived from 1478 to 1553, first proposed what is now known as *germ theory* (Ackerknecht, 1982). He studied epidemics and was the first to make a science-backed statement of the nature of contagion, infection, disease germs, and modes of transmission. He identified ways in which infections can be transmitted. He discovered that infection was transmitted by direct contact, through droplet spread, from contaminated clothing, and through the air. Several hundred years later, Louis Pasteur would prove his theories were accurate.

Thomas Sydenham, who lived in the 17th century, is called the English Hippocrates (Meynell, 1988). He re-emphasized the theories of Hippocrates and expanded them to the 17th century. He was the first to describe the clinical manifestations of the condition known as Bell’s Palsy. He re-initiated scientific observations of health, Hippocrates’ contribution, into the core fabric of modern epidemiology.

James Lind, who lived from 1716 to 1794, was the first known clinical epidemiologist. As a pioneer of naval hygiene, he worked as a surgeon’s mate and sailed for many years around the world. He performed experiments in an attempt to determine the cause of scurvy. Scurvy, which causes loose teeth, bleeding gums, and hemorrhages, affected sailors. Lind adjusted their diets by adding foods such as cider, garlic, mustard, horseradish, vinegar, oranges, and lemons. He noted that the sailors who ate oranges and lemons recovered from the effects of scurvy, proving Lind’s theory that citrus fruits were the best treatment for the disease. Today we know that scurvy is caused by a Vitamin C deficiency. Later in this life, Lind contributed to the knowledge of typhus fever on ships and chronicled diseases.

Medical registration of deaths began in Great Britain in 1801. William Farr (1807–1883), a statistical abstracter in the General Registry Office in London, established a national system of recording causes of death (Eyler, 1980). This standard classification system was the precursor to the International Classification of Diseases and Related Conditions (ICD), which will be discussed in Chapter Two. Farr’s other contributions included involvement in the first modern census, use of the census to collect specific information

on diseases and conditions (blindness and deafness), and invention of the standardized mortality rate (Newcomb and Marshall, 1990).

A colleague of William Farr, John Snow, used epidemiologic principles to study outbreaks of cholera in London in the 1850s (Lilienfeld, 2000). Snow demonstrated how scientific evidence can be used to support hypotheses and analytical investigations. He identified the source of the infectious agent, contaminated water in the Broad Street pump, and the etiology of the cholera outbreak (Collins, 2003). His work has been described as a brilliant use of descriptive and quantitative epidemiologic principles (Winkelstein, 1995).

As the 20th century began, epidemiology was involved with infectious and communicable diseases. The main cause of these diseases was overcrowded conditions in the cities of the world. In 1900, the leading causes of death were pneumonia and influenza, followed closely by tuberculosis. Other leading causes of death in 1900 were diarrhea, heart disease, and nephritis. As the 20th century progressed, chronic diseases became more pronounced as causes of death. In 1930, heart disease became the leading cause of death, as it is today. The emergence of chronic diseases as the leading health concern continued through the 1940s and 1950s, with infectious diseases becoming less of a concern. The difference between the death rates of chronic and infectious diseases was widening as the 20th century moved along. By the end of the 20th century, the only infectious diseases remaining in the top ten of leading causes of death were pneumonia and influenza.

The period of time demarcated by World War II is the beginning of another important period in the development of epidemiology as a scientific discipline. Epidemiology methods continued to evolve, with a focus on individual diseases and conditions. The case-control study design was developed during the 1930s. Cohort studies were pursued to observe the relationship of tobacco usage and disease. Case-control studies became very popular in hospital-based studies, beginning in 1950 (Doll and Hill, 1950; Levin, Goldstein, and Gerhardt, 1950; Wynder and Graham, 1950). Since 1950 epidemiology has continued to develop, as cohort studies and clinical trials have gained popularity. Well-known cohort studies include the Framingham Heart Study, the Bogalusa Heart Study (Gordon and others, 1977; Voors and others, 1976), and the Jackson Heart Study (Auerbach and others, 2017).

At the dawn of the 21st century, epidemiology has begun to expand its focus to health status, health-related quality of life, and burden of disease. As a result of events of September 11, 2001, epidemiology has gained new roles in bioterrorism preparedness and management of health care services. With the significant number of emerging infectious diseases (including

HIV/AIDS, SARS, and Zika), epidemiology's initial role in the study of epidemics will regain prominence.

Hospital care in the United States was formalized because of infectious disease. In 1798 President John Adams signed the Act for Relief of Sick and Disabled Sailors, which provide health care services to all naval personnel and established a network of marine hospitals in the country. This led to the opening of the first marine hospital in 1801, and subsequent establishment of the federal Marine Hospital Service, which was directed by the predecessor to today's Surgeon General. The importance of the Marine Hospital Service is that it began to require that physicians be adequately trained to provide health care services (U.S. Public Health Service, 2017).

The Marine Hospital Service was tasked through the National Quarantine Act of 1878 to prevent the introduction and spread of contagious and infectious disease, such as yellow fever and smallpox. Several years later the U.S. Congress expanded the responsibility of the Marine Hospital Service, which today is known as the U.S. Public Health Service, with the investigation of human disease (tuberculosis, hookworm, malaria, and leprosy), sanitation, water supplies, and sewerage (U.S. Public Health Service, 2017).

Philosophical Framework

This population-based perspective of epidemiology lends itself quite well to the objectives of health care management in the 21st century. These relatively new objectives—focused on populations, not individual patient care—have forced a modification in the focal point of the science of epidemiology, which calls for the specialized concentration known as *managerial epidemiology*. This emphasis has been reinforced by recent federal health care reform, which will be discussed later in this chapter. Managerial epidemiology is one result of the 21st century demands of epidemiology, and it has become the core discipline for planning and managing health care for populations. A functional definition of managerial epidemiology—the use of epidemiology for designing and managing the health care of populations—is the study of the distribution and determinants of health and disease, including injuries and accidents, in specified populations, and the application of this study to promotion of health, prevention and control of disease, design of health care services to meet population needs, and health policy.

This adaption of epidemiology to a managerial focus has been nurtured by many different external forces. Included in this new focus is emphasis on performance by the health care delivery system, which is measured using

epidemiologic principles. Given the recent health care reform efforts, one set of forces is the transition from a traditional role of the health care executive to a population orientation. The traditional role of the health care executive has been in a facility context, encompassing such general management functions as planning, organization, leadership, and control. These functions all emphasize the management of facilities that provide health care services. Planning involves many activities, but in general it is the determination of courses of action for individuals and organizations. Organization is essential for the coordination of activities and resources, both human and physical. Leadership is centered on the ability or skill to motivate and manage people. Control involves monitoring and periodically evaluating these activities.

The discipline of health care management continues to evolve from the individual patient perspective toward a managed population perspective. The current stage of evolution is highlighted by management of a network of services, management across traditional organizational boundaries, and management of the continuous improvement of quality of care in clinical settings (Barkum-Gamez and Dowdy, 2017; Shortell and Kaluzny, 1997).

The primary evolutionary pressures on the discipline of managerial epidemiology are cost-containment and an underlying desire to maintain and improve the quality of health care. Epidemiology has become a primary discipline in achievement of the population-oriented objectives of health care management moving forward in time.

Focus and Uses of Epidemiology

Epidemiology initially centered on observations and descriptions of health, disease, and factors associated with health and disease. During epidemiology's maturation into a science, experimental considerations were added to the discipline in the 20th century. Over time, epidemiology developed a specificity for individual diseases, etiologic constellations (for example, injury, chronic disease, and infectious disease epidemiology), and situational uses (for example, environmental, occupational, molecular, and managerial epidemiology). Both observational and experimental aspects are characteristic in all of the uses of epidemiology.

Observational Epidemiology

Observational epidemiology involves the observation of health and disease in a population and the analysis of these observations. Observational study

activities are the most common in epidemiology. Observational study methods include descriptive studies, historically the first type of epidemiologic study, and analytic epidemiologic study designs (cross-sectional, cohort, and case-control designs). Cross-sectional studies measure prevalence of health and disease in a population. Cohort and case-control studies measure incidence and risk of health and disease in a population. Chapter Four presents a thorough discussion of these concepts.

Experimental Epidemiology

Experimental epidemiology is concerned with planned studies in which the exposure to potential health and disease risk factors is controlled. The objective of this method is to improve the validity, or accuracy, of epidemiologic studies. Exposure to potential risk factors is accomplished by random assignment. This randomization is used to avoid bias in the study and ensure validity. Clinical trials are the most commonly used experimental study design. Chapter Four discusses experimental epidemiology in greater detail.

Preventive Medicine

Epidemiology and medicine have been linked together for their beginnings as scientific disciplines. In fact, epidemiology is an important tool of community health and preventive medicine. Specific uses of epidemiology have included determining etiologic or causal factors of diseases; describing factors that are associated with adverse conditions; community diagnosis of the distribution of disease; predicting disease occurrence, impact, and distribution; estimating individual risk of suffering from diseases; evaluating preventive therapeutic and intervention activities; measuring efficacy of health measures; studying historical disease trends; identifying disease syndromes; planning for current health needs; and predicting future needs.

Epidemiology plays a major role in controlling the distribution, frequency, and severity of disease in populations. This is accomplished through prevention of new cases (known as *primary prevention*), as well as by eliminating existing disease and improving health status and survival of those with disease (known as *secondary* and *tertiary prevention*). Primary prevention involves the removal and/or modification of intrinsic and extrinsic factors that affect a change in health status from absence of disease to preclinical disease. Primary preventive measures include health promotion and specific preventive measures. Health promotion involves health education and the

provision of conditions that influence health (adequate food, housing, clothing, and so on). Specific preventive measures target diseases and groups of individuals, often based on the risk of acquiring a disease. These measures include purification of water supplies, immunization, protection from occupational hazards (for example, proper clothing and protective equipment), and protection from accidents (seatbelts, for example).

Secondary prevention, which involves screening, early disease detection, and early treatment, often allows for the reversal or delay of the progression from preclinical to clinical disease. This is particularly beneficial in diseases for which control measures exist, such as hypertension. Tertiary prevention involves arresting the progression from clinical disease to disability, and reversal of progression from disability to death, with restoration of function through rehabilitation.

Health Care Reform

The health policy experiments of various states, and the periodic policy debates at the federal level, focus on the evaluation and reformation of the manner in which health is promoted and disease and associated disability are controlled in the United States. The notions of improved or even universal access to more comprehensive and cost-effective health care services, and the reduction of unnecessary or unproven services, are central to such health system reform discussions. Understanding the health status and needs of populations is essential to proper planning and organization of the health care system.

Contemporary reform of the U.S. health care delivery system from a federal standpoint began in 1965, when Title XVIII of the Social Security Act Amendments created Medicare and Title XIX created Medicaid. Medicare provided financing of health care services for citizens over the age of 65 and for the disabled. Medicaid provided financing of health care services for the medically indigent. These programs were driven by the concept of social equity and represent the first time that the federal government became involved with financing and delivery of health care services for the general population.

In 1973, the U.S. Congress passed the Health Maintenance Organization Act, which encouraged the formation and proliferation of health maintenance organizations (HMOs). The intent of this legislation was cost containment through increased efficiency and utilization review. The federal government began to recognize that the managed care approach,

in general, and the HMO model, specifically, when successful, reduce the cost of provision of health care services and can motivate secondary and even primary prevention activities. This reform movement emphasized the federal government's concern with the continuing increase in cost of health care. A major change in the Medicare program occurred in 1982 with the creation of the prospective payment system (PPS). PPS was created by an act of Congress and focused on in-hospital Medicare charges (often known as "Part A"). A result of PPS was the establishment of diagnosis-related groups (DRGs) to permit the comparison of like admissions and the regulation of their cost. In 1990, Medicare was further reformed with the establishment of the resource-based relative value scale (RBRVS) for reimbursement of physician services (often known as "Part B"). RBRVS is an extension of PPS, and its intent is also cost-containment. In the year 2000, additional PPS efforts were implemented by Medicare's mandate to use the ambulatory patient classification (APC). Payment for services under the outpatient PPS system is calculated based on grouping outpatient services into ambulatory payment classification (APC) groups.

Another segment of the population that has been targeted for health policy is children. In spite of Medicaid coverage, a significant number of children are uninsured. The U.S. Congress passed the Balanced Budget Act of 1997, which created the children's health insurance program known as the State Children's Health Insurance Program, referred to as SCHIP (Hudson, Selden, and Bantlin, 2005). This program is intended to cover children of families who earn too much to be eligible for Medicaid benefits. It is similar to Medicaid in that each state administers its unique program. Common services covered are physician office visits, immunizations, hospitalizations, and emergency room visits. In 1997 Congress passed legislation that allows states to provide health insurance to more children in working families. These programs build on the Medicaid program that started covering children and adults in the mid-1960s. The Child Health Insurance Program (CHIP) is a free or low-cost health insurance provided to children through state-sponsored programs. The costs are different depending on the state and each family's income, but when there are charges they are minimal. Depending on income level and the state-specific program, it may be possible for an entire family to receive health insurance.

In 2000, the Outpatient Prospective Payment System (OPPS) was created by Centers for Medicare and Medicaid Services to reimburse outpatient services for Medicare beneficiaries. The resulting APC consists of 300 outpatient procedural groups. Each APC has a relative weight and geographic variation factors that affect the reimbursement (CMS, 2016).

Prior to 2003, Medicare coverage did not include a benefit for outpatient prescription medication. This resulted in a significant proportion of elderly Americans who had to purchase medications using out-of-pocket sources. The Medicare Prescription Drug, Improvement, and Modernization Act of 2003 (Public Law 108-173), which created Medicare Part D coverage, was intended to provide access to prescription drug coverage for seniors and individuals with disabilities for the first time in the history of the Medicare program. More than ten years after its implementation, information on Medicare Part D indicates it has helped elderly Americans. It has significantly reduced Medicare beneficiaries' risk of medication nonadherence due to costs (Donohue, 2014). It is also believed that Medicare Part D has reduced hospitalizations and non-drug-related medical spending among beneficiaries (McWilliams, Zaslavsky, and Huskamp, 2011).

In 2007, DRG-based PPS was further refined, resulting in fewer based DRGs. This new set of DRGs was subdivided, based on comorbidities and complications, into Medicare severity diagnosis-related groups (MS-DRGs). Each MS-DRG has a relative weight, and a provision for uncollected health care fees is included.

The Affordable Care Act, which is a part of the Patient Protection and Affordable Care Act and is an amendment of the Health Care and Education Reconciliation Act of 2010, was enacted with the main goal of increase access to health care for all Americans. Included in this goal is to provide affordable health care services, especially for those who were previously uninsured (Shi and Singh, 2015).

Important aspects of the Affordable Care Act that should be of interest to health care executives include a shift of focus from disease treatment to disease prevention and quality improvement; pay for performance to health care services providers; demonstrated community involvement; resulting increase of demand for health care services; and decreased reimbursement to providers of health care services. The Affordable Care Act will cause a need for a larger health care workforce, which will, initially, increase the shortage of trained health care providers, including physicians, nurses, and allied health professionals. The greatest demand will be for primary care services, an area currently with a significant workforce shortage.

Because health care reform activities will continue, with emphasis of performance-based reimbursement approaches, understanding the health status of populations is a critical success factor for health care executives. The health status of the population is dependent on the environmental conditions, socioeconomic factors, and the structure of the health care system. Future health policy efforts should focus on recognition of the

health care needs of the population, with emphasis on services and programs associated with disease prevention, chronic disease, and long-term care, as well as acute care. This can occur by refocusing efforts and objectives of the health care system to promote quality of care, quality of life, and quality of physical function of individuals in the population.

Health care reform efforts inevitably result in a deviation from the traditional public health disease prevention/intervention model, which focuses on communicable and infectious diseases. Health care reform has resulted in a shift from the treatment of illness to promotion and maintenance of wellness. Public health has begun to direct some of its efforts to behavioral interventions that are designed to reduce smoking, substance abuse, violence, risky sexual behaviors, and obesity. Disease screening, prenatal and child care, health education, and immunization have gained increased interest. Planning and implementation of such services does not focus on the individual, but is centered at the community or larger population levels.

The Concept of Populations and Communities

The concept of populations was first documented in the 17th century and has recently grown in its application to health care administration. A population is not defined by a fixed, standard number of individuals, but is defined by the specific group under study. It is common to associate the concept of a population with the total population, but subpopulations are more often the concern. The students in a school constitute a population, as do the students in a classroom.

Populations are typically defined by geographic boundaries—for example, residents in a country, regions of a country, states, cities, and sections of a city. Within these geographically circumscribed populations are specific subpopulations defined by age, sex, race, and other characteristics. This method of population definition occurs, in part, due to the ease of identifying population membership and the existing infrastructure for health and disease data collection. Geographically defined areas usually correspond to political/governmental units, with their associated public health agencies.

Subpopulations are the basic unit of comparison in epidemiology. The risk of acquiring a disease is studied across subgroups within a population. In a managed care environment, knowledge of health and risk of disease across subpopulations provides critical information for the actuarial estimation of prevention and treatment costs. Managed care focuses on the identification

of health and disease characteristics of groups of individuals in a population of covered lives.

An important consideration is that populations differ; traditional methods of measuring health in populations assume that populations are homogeneous (Tsevat, Slozan, and Kuntz, 1996), but this is not the case. Populations can be divided into several categories based on many variables, in addition to demographics. These different categories of patients are correlated with differing health care needs, and associated differences in utilization of health care resources (Kindig, 1997; Lui and others, 2017).

Social epidemiology is defined as the “study of the social distribution and social determinants of states of health” (Berkman and Kawachi, 2001). The aim of social epidemiology is to identify socio-environmental exposures that may be related to physical and mental health outcomes. The principal concern of social epidemiology is the study of how society and social organization influence the health and wellness of individuals and populations. In practice, social epidemiology studies the frequency, distribution, and social determinants of the states of health in a population. Social epidemiology links the traditional epidemiologic concepts with those from economics, sociology, demography, and biology.

Social epidemiology is attempting to explain the pathway between exposure to social characteristics of the environment and its effects on health. Social epidemiology allows for the incorporation of the social experience of populations into the traditional etiologic cause-and-effect relationship. This incorporation allows for a better understanding of how, where, and why social inequalities affect health.

Managing Health Care for Populations and Communities

Encouraged by the rapid growth of managed care, health care managers are in a transition from the traditional role of management to a population health care management model. A population-based orientation will require an additional set of management skills. These skills are requisite for successful management as health care reform policies continue to emphasize community-based health care services delivery issues. The “reformed” health care executive directly interacts with the community and its health insurance vehicles in the planning of medical services to be delivered, including allocation of human and material resources to preventive, curative, restorative, and rehabilitative services. The executive’s duties include the design of medical interventions and monitoring and evaluating medical services and

programs. Clinical outcome measurement and comparison has become a major source of information for management decision making, as well as reimbursement for delivery of health care services. Population health care design and planning will gain importance in the evolving integrated delivery systems.

Due to the community-based nature of health care, the population in a hospital service area can be challenging to describe. By definition, a community is all the people living in a particular area. These people are either loosely or closely associated due to political or economic advantage. Given the combination of the varying characteristics of a community, the different independent providers in an area, and the choice behavior of the consumers of health care, understanding the needs and concerns of the population is a difficult task. Population information is critical for planning and targeting the needs of the community. Administrative claims data, disease registries, and clinical information systems are valuable sources of current data for health care executives. Recent health care reform efforts have placed emphasis on community health assessment and the requirement of hospitals to develop plans to address the community's health care needs.

The overall health status of the population is an important concern of the health care executive in the population health care management model. Understanding patterns of health and disease in the population allows for appropriate planning for services and programs to meet legitimate health care needs. Cost containment, with the resulting health promotion and preventive services emphasis of portions of the delivery system, promises at last to align social and economic objectives, such that improving the health of the population has become a measurement of success for integrated providers in the health care system. Contemporary health care executives must be able to acquire data and understand the community by conducting their own investigative studies on the populations served. Such knowledge will be essential to profitability in fully capitated, full risk assumption models of care.

Objectives of the population health care management model focus on the health of the population and cost containment. Efforts to reduce utilization, which are not emphasized in the facility-based management model, as well as increasing efficiencies and to shift utilization to low-cost facilities (for example, outpatient settings or home care) are critical executive concerns under conditions of population-based management. Another objective of population health care management is to organize and align providers in network schemes. Clinical improvement focuses on improving the health status of the population and the integration of care across all settings and all

providers. Quality of care is documented and studied, and efforts are made to continually improve quality measures.

The change in the role of management is manifested by the modification of management objectives. In the traditional role, management's objectives include the maintenance of high-quality facilities and equipment, achievement of clinical improvement by attracting the "best" quality health care providers, and increase in market share and volume of delivered services across populations.

In the population health care management model, the management objectives change to include the reduction in volume of services utilized, shift of utilization to lower cost settings, achievement of clinical improvement by focusing on the health status of the population, integration of health care services, organization of providers into networks, and evaluation and documentation of quality. With the advances in health care technology, the need for large physical facilities is being replaced by telemedicine, remote sensing, virtual patient visits, and eMedicine.

Role of Epidemiology

Epidemiology will play a major role in the 21st century management of health care systems. The evolving nature of health care administration will forever require the principles and application of epidemiology due to the population-based perspective, as is seen in the managed care model. Information about prevalence of disease and disability in the population will serve as the obvious focal point for planning health care services and organizing health care delivery systems. Likewise, the insurance concept of community rating relative to risk of disease and hospitalization is founded in epidemiology and is dependent on epidemiologic data.

With the continuing threat of emerging infectious diseases, epidemiology will gain renewed prominence in assisting health care managers. New, as well as previously thought to be eradicated, diseases will become common cases in hospitals and other health care facilities. Severe acute respiratory syndrome (SARS) is a very specific concern. Most cases of SARS have occurred in close contacts with SARS patients. The largest number of infected persons was among hospital workers or other types of caregivers. In spite of infection control measures, transmission of severe acute respiratory syndrome (SARS) occurred across many hospital workers. A case-control study of hospital workers in Hong Kong indicated that inconsistent use of goggles, gowns, gloves, and caps was associated with a higher risk for

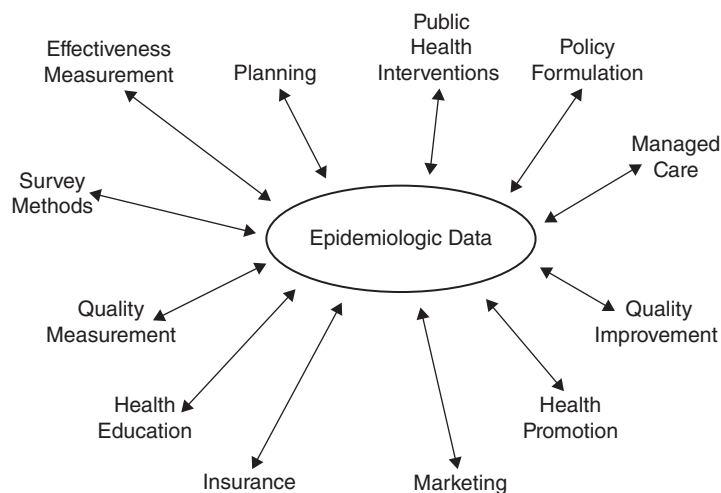
SARS infection. Infection is strongly associated with the amount of personal protection equipment used, duration of infection control training, and the level of understanding of infection control procedures (Lau and others, 2003). These requirements are known as “universal precautions” and are a mandatory training activity for human resource departments in order to be in compliance with OSHA standards.

Recent emerging infectious diseases have had an impact on the health care delivery system. Ebola virus has re-emerged as a very dangerous infectious pathogen associated with high levels of morbidity and mortality. Its high level of contagiousness has resulted in infection, and resulting illness and death, among health care providers.

Zika virus can cause devastating effects on infants, causing microcephaly. Zika has challenged the health care delivery system because of its rapid expansion to areas of the world. Health care providers have the responsibility to educate patients on the risk factors and prevention strategies, especially for pregnant women, and all women of child-bearing age (Honein and others, 2017).

Epidemiologic data and information as is presented above will be crucial for health care managers. Epidemiologic data has become a new, as well as more utilized, source of information that can impact managerial decisions and outcomes. The relationship of epidemiologic data to the many aspects of managerial epidemiology is illustrated in Figure 1.1.

FIGURE 1.1. EPIDEMIOLOGIC DATA



Summary

Epidemiology—once viewed by health care executives as a fringe element of public health—is, in fact, an essential discipline for contemporary health systems management. Knowledge of health and disease in a population is as important to the health care executive as it is to the public health officer. The evolution of health care administration into the 21st century requires additional disciplines and tools. Epidemiology provides a wealth of principles and applications that will affect planning, marketing, quality control, and policy formulation, which are fully dependent on epidemiologic data.

The perspective of management in the health care industry is changing from a fee-for-service, individual patient encounter, facility-based perspective to managing the health of populations. This population orientation of health care management requires a community-wide understanding of health and disease, with the health care executive participating directly in planning medical services and other interventions. Cost containment (through reduction in utilization of services) and improvement of the overall health of the population are important objectives of the population-based management model. Emerging infectious diseases and the threat of terrorism have resulted in epidemiology becoming more incorporated into today's health care administration.

Epidemiologic data are needed to plan and design health care systems, based on communities and groups of communities. Knowledge of epidemiology and understanding of epidemiologic data is a basic requirement for the successful health care executive. The following chapters will introduce terminology, measurements, and techniques of epidemiology. In addition, specific applications to health care management, health care planning, and health care policy will illustrate the benefits of using epidemiology in health care management.

Study Questions

1. Give a definition of epidemiology. Give an example of the use of epidemiology, based on this definition, in solving a health care management problem.
2. Discuss epidemiology from its historical perspective. What is the expected next development in epidemiology, as a scientific discipline?

3. Identify five other uses of epidemiology, and identify a health care management example of each use.
4. Discuss why health care managers should use population-based data for planning.
5. What is the main goal of the Affordable Care Act?

