

Chapter 1: Introduction

Definition of Chronic Diseases

Chronic diseases—heart disease, cancer, diabetes, arthritis, stroke, chronic lower respiratory disease, and others—are illnesses that persist over time, can gradually progress, do not resolve spontaneously, and may not be cured. They are leading causes of morbidity, mortality, disability, and decreased quality of life in the United States.¹ Chronic diseases account for at least 65% of all deaths, and about 84% of health spending in the United States.^{2,3} One out of four Americans have multiple chronic conditions,³ with hypertension being the most common condition among Medicare beneficiaries with multiple conditions.⁴ Additionally, chronic diseases are responsible for the widest health disparity gap among racial/ethnic groups in the United States. While chronic diseases are prevalent, costly, and potentially debilitating or fatal, they and/or their sequelae are, in part, preventable. Preventing chronic diseases is challenging due to a complex etiology: the interaction of genetics, cumulative behavior, and socio-political and physical environment. Chronic diseases can be characterized by uncertain etiology, multiple risk factors and a prolonged, progressive disease course that aging exacerbates. However, many known risk factors for chronic diseases, such as smoking, unhealthy diet, and physical inactivity, are amenable to change through interventions targeting individuals and communities.

Changing Patterns and the Need to Focus on Chronic Disease

In 1900, three groups of illnesses—(1) pneumonia and influenza; (2) tuberculosis; and (3) gastritis, enteritis and colitis—accounted for nearly one third of all deaths.⁵ However, public health and medical advances helped to prevent and control these conditions and contributed to an increase in life expectancy in the developed world. These factors, along with the aging of the population, have led to an increase in the number of U.S. residents living with one or more chronic diseases.⁶

Today, heart disease, cancer and stroke account for over half of all deaths—the result of an *epidemiologic transition* from acute infectious diseases to noninfectious chronic diseases as the predominant causes of morbidity and mortality, a transition described over 40 years ago.⁷ Ironically, the epidemiologic transition has been driven by the very technologic and economic developments that have

¹ CSTE. Essential Functions of Chronic Disease Epidemiology in State Health Departments. 2004.

² FastStats: Deaths and Mortality. Centers for Disease Control and Prevention Website. Available at: <http://www.cdc.gov/nchs/fastats/deaths.htm>. Updated February 6, 2015. Accessed February 16, 2015.

³ Anderson G. Chronic Care: Making the Case for Ongoing Care. Princeton, NJ: Robert Wood Johnson Foundation, 2010. Available at: <http://www.rwjf.org/content/dam/farm/reports/reports/2010/rwjf54583>. Accessed February 16, 2015.

⁴ Chronic Conditions Chartbook. Centers for Medicare and Medicaid Services Website. Available at: <http://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/Chronic-Conditions/Downloads/2012Chartbook.pdf>. Accessed March 9, 2014.

⁵ National Center for Health Statistics. Leading Causes of Death, 1900-1998. Centers for Disease Control and Prevention Website. Available at: http://www.cdc.gov/nchs/data/dvs/lead1900_98.pdf. Accessed February 20, 2014.

⁶ Anderson G. Chronic Care: Making the Case for Ongoing Care. Princeton, NJ: Robert Wood Johnson Foundation, 2010. Available at: <http://www.rwjf.org/content/dam/farm/reports/reports/2010/rwjf54583>. Accessed February 16, 2015.

⁷ Omran AR. The epidemiologic transition. *Milbank Mem Fund Q*. 1971; 49(4):509-38.

contributed to longer lives. The transition shifts the primary focus of healthcare from treating acute, infectious diseases to modifying risk factors to prevent and control chronic diseases.

The Institute of Medicine described the mission of public health as assuring conditions in which people can be healthy.⁸ In 1988, the Centers for Disease Control and Prevention (CDC) established the National Center for Chronic Disease Prevention and Health Promotion “to create expertise, information, and tools to support people and communities in preventing chronic diseases and promoting health for all.”⁹ With this mission to assure healthy conditions and promote health for all and with focused funding from CDC, many states have strengthened their chronic disease programs to support sound data-driven policies and public health interventions. Epidemiology is a central component of these efforts.

Public health departments prioritize problems that lead to illness, disability, or death (measured by their high prevalence or high fatality rate), that result in high health care cost, and/or that reduce quality of life. Chronic diseases in the population meet all three criteria of public health importance. Therefore, public health departments need to address chronic disease by increasing their number of chronic disease epidemiologists and by supporting at least one lead chronic disease epidemiologist to oversee and coordinate data collection, analysis, interpretation, and translation of data and research to public health practice.¹⁰

Role of Chronic Disease Epidemiology

Epidemiology is the “study of the distribution and determinants of health-related states in specified populations, and the application of this study to control health problems”.¹¹

In the case of infectious diseases, the presence of specific causative agents helps epidemiologists focus on host-agent-environment interactions and recommend interventions to prevent and control the diseases, especially during outbreaks of acute illness. Chronic diseases, which are not chronic infectious diseases such as HIV or tuberculosis, often have multi-factorial origins and complex determinants that play out over a lengthy time period.

The nature of chronic illness dictates that chronic disease epidemiologists understand all three stages of disease prevention. *Primary prevention* focuses on protecting healthy individuals from developing disease or experiencing injury with a focus on reducing risk factors and increasing protective factors in individuals across a population. *Secondary prevention* aims to prevent the onset of symptoms in the earliest stages of disease once an illness or risk factors have been diagnosed or identified. *Tertiary prevention* deals with minimizing the negative effects of disease and preventing disease-related

⁸ Institute of Medicine. *The Future of Public Health*. Washington, D.C.: National Academy Press, 1988. Updated 2002. <http://iom.edu/Reports/2002/The-Future-of-the-Publics-Health-in-the-21st-Century.aspx>

⁹ Chronic Disease Prevention and Health Promotion. Centers for Disease Control and Prevention Website. Available at: <http://www.cdc.gov/chronicdisease/about/> Updated November 14, 2014. Accessed February 16, 2015.

¹⁰ CSTE. Essential Functions of Chronic Disease Epidemiology in State Health Departments. 2004.

¹¹ Last JM. *A Dictionary of Epidemiology*. 4th ed. New York: Oxford University Press; 2001:62.

complications, total disability, and premature death by improving healthcare quality and individuals' management of complicated, long-term health problems.

In brief, the role of the chronic disease epidemiologist is to collect, analyze, synthesize, and disseminate disease-specific information—medical, societal and financial costs, spatial and temporal disease distribution, and risk factors or causes—so that the epidemiologist can:

- Assess the burden of chronic diseases across the lifespan.
- Inform policies and evidence-based programmatic activities to prevent and control chronic diseases.
- Promote collaborations with peer colleagues to address age-related chronic disease issues (e.g., the life span approach), health disparities, social determinants of disease, and health inequities.

In addition to these functions, chronic disease epidemiologists play a significant role in enhancing efficiency, focusing (or refocusing) public health program efforts, and allocating scarce resources.

Purpose of a Chronic Disease Epidemiologist Orientation Manual

Commonly, state chronic disease epidemiologists serve one categorical program, such as tobacco, or cancer. However, with recent and ongoing efforts to integrate and coordinate across and chronic disease programs, the role and influence of a chronic disease epidemiologist will broaden to address multiple program areas.

This manual is intended to serve as a “quick start” menu of resources for lead chronic disease epidemiologists working in state, territorial, tribal, or local health departments. Such an epidemiologist can demonstrate mid-level competencies in epidemiology, also known as CSTE Tier 2 competencies.¹² This epidemiologist might serve as the sole epidemiologist in the chronic disease program or as the lead chronic disease epidemiologist (the single point of contact for chronic disease epidemiology) responsible for coordinating or integrating chronic disease epidemiology activities across categorical programs. Throughout its chapters, this manual uses “lead chronic disease epidemiologist” to refer to this main target audience. This manual provides a road map and advice for serving in this capacity or role as the “lead chronic disease epidemiologist.”

Additional intended audiences and uses of the information and guidance in this manual include:

- Local epidemiologists who serve in a variety of capacities, including addressing chronic disease issues;
- Senior epidemiologists or senior professionals who hire, train, and/or mentor chronic disease epidemiologists;

¹² CSTE, CDC. Applied Epidemiology Competencies. 2008. <http://www.cste.org/group/CSTECDAEC>

- Entry-level chronic disease epidemiologists (CSTE Tier 1) who might focus on one disease and/or one type of data source and who is interested in increasing their knowledge and understanding of potential next steps in career development;
- Recent graduates in chronic disease epidemiology who have limited applied experience in a state public health department; and
- Epidemiologists with experience at state health departments but who are new to chronic disease prevention.

However, this manual is not everything to everyone and is not intended to be a comprehensive epidemiology manual. Still, it is the authors' hope that this manual will encourage discussion and collaboration to address challenges and spur innovation in the delivery of data-driven chronic disease epidemiology services throughout the United States.

Organization of the Chronic Disease Epidemiologist Orientation Manual

Chapters 2 through 8 begin with a brief description **highlighting the relevant content for each level of epidemiologist**, based on CSTE Tiers 1-3 of epidemiology competencies. **A summary at the end** of each chapter organizes the main points related to the three essential public health services in which epidemiologists are leaders:¹³

1. Surveillance
2. Communication
3. Consultation

If applicable, summaries will include main points related to **evaluation**, because there is a growing need for epidemiologists to respond to impact and accountability requests. Therefore, chronic disease integration elevates the need for epidemiologists to develop and measure SMART objectives (i.e., objectives that are specific, measurable, achievable, realistic, and time-phased) and performance measures that demonstrate accountability to funders and provides data to constituencies. Measuring the impact of an integrated program on the prevalence of a specific chronic disease (or its risk factors) will meet the needs of the categorical funders and constituent groups.¹⁴ **Chapter 9 describes technical assistance** offered by professional organizations and public health agencies that fund, provide training and technical assistance, and build workforce capacity. The last chapter, the **Summary Chapter**, is divided into two parts. The first part lists key points from this manual for the 1st week, 1st month, 1st 90 days, and 1st year. The second part shows the relationship between the essential public health services, the responsibilities of a lead chronic disease epidemiologist, and the chapters in this manual.

¹³ CSTE. Essential Functions of Chronic Disease Epidemiology in State Health Departments. 2004.

¹⁴ Slonim AB, Callaghan C, Daily L, et al. Recommendations for integration of chronic disease programs: Are your programs linked? *Prev Chronic Dis* [serial online] 2007. http://www.cdc.gov/pcd/issues/2007/apr/06_0163.htm

The Appendices provide links to additional resources and useful details, such as common acronyms, disease and procedure codes used in health care claims data, useful SAS statistical code for using data from the Behavioral Risk Factor Surveillance System, position descriptions, and more.

Below is a suggested timeline for using this manual and for activities related to building your competency and your relationships with your supervisor, colleagues, and partners.

In the first week

- Read Chapter 2: Understanding the Job.
- Copy the checklist in Table 2-1 into an electronic document. Use it to keep track of your ideas and personal action items that you identify as you read through the rest of the manual.
- Share a copy of the checklist in Table 2-1 with your supervisor.
- Ask for and collect or bookmark the documents and resources listed in Table 2-1 (the checklist).

In the first month

- Read Chapter 3: Chronic Disease Integration. Ask your supervisor to read and discuss it.
- Meet with key staff and colleagues within the department.
- Read through the documents and resources that you have collected.

In the first quarter

- Complete a self assessment of your competencies, using the CSTE tool,¹⁵ and share with your supervisor.
- Share your ideas and personal action items with your supervisor and ask him or her to prioritize them based on relevancy to your current job.
- Develop individual goals for the first year based on the self assessment and input and direction from the senior epidemiologist and your supervisor.
- Read Chapter 4: System Approaches and Social Ecological Model, Chapter 5: Evidence-based Public Health, and Chapter 6: Data Governance.
- Read additional chapters and related appendices based on the assessment and input.

In the first six months

- Read Chapter 7: Surveillance—Data Sources and Indicators, Chapter 8: Data Interpretation and Dissemination, and Chapter 9: Technical Assistance and Related Programs, if you have not already read the full chapters.

¹⁵ CSTE Workforce: Competencies Website. Available at: <http://www.cste.org/group/CSTECDCAEF> Accessed February 23, 2014.

- Discuss long-term goals for the work and for your career with your supervisor.

In the first year

- Meet with key external partners.
- Attend at least one meeting of every coalition or stakeholder group.
- Use the manual as a starting place for any new topic or new assignment, so that you are aware of the resources and information already available to you. Search the manual for keywords related to the topic or assignment.
- Submit an abstract for presentation at the annual conference of CSTE, a national or state public health association, or a CDC-sponsored conference.
- Consider setting up a learning community to share with colleagues and partners information from this manual or the many resources on the web cited in this manual. Exchange real-world examples and learn from each other.