A state-of-the-art text for how to do urban health research

The essays commissioned for this book analyze the impact of city living on health, focusing primarily on conditions in the United States. With 16 chapters by 24 internationally recognized experts, the book introduces an ecological approach to the study of the health of urban populations.

This book assesses the primary determinants of well-being in cities, including the social and physical environments, diet, and health care and social services. The book includes chapters on the history of public health in cities, the impact of urban sprawl and urban renewal on health, and the challenges facing cities in the developing world. It also examines conditions such as infectious diseases, violence and disasters, and mental illness.

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Cities and the Health of the Public

Edited by Nicholas Freudenberg, Sandro Galea, and David Vlahov
Cities and the Health of the Public
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Preface

Several global trends make the early twentieth-first century an opportune time to revisit the connections between city living and health. First, more and more people are living in cities. By 2007, more than half the world’s population and by 2030 more than three-quarters will be in urban areas. Moreover, cities are growing, sprawling into suburbs, dominating cultures, exporting disease but also creating new opportunities for health promotion. Finally, in the past decades cities have been the source for the world’s most challenging health problems—HIV infection, SARS, avian flu, drug addiction, and interpersonal and political violence, as well as the disparities in health that doom the poor to premature and preventable mortality. In this volume, we summarize a wide variety of recent scholarship on the impact of city living on health. Our central thesis is the public health axiom that living conditions are the most important determinant of population health and that improving these conditions is the most promising strategy for improving the health of urban populations.

This book has five parts. In Chapter 1, we present our framework for the study of urban health. We argue that daily living conditions, the primary and most remediable influence on the health of city dwellers, shape the choices individuals make about health and shape the environments in which they live. We identify four principal dimensions of urban living conditions—population, the social and physical environments, and the system of health and social services. These are in turn influenced by higher-level factors, such as government, markets, and civil society at the municipal level and by broader global and national forces, such as migration, suburbanization, the changing role of government, and global economic changes. In Chapter 2, we illustrate this framework by applying it to changes in U.S. cities in the six decades since the end of World War II.
Guided by this framework, the authors in Part II review the principal determinants of health in cities. In Chapter 3, Adam Coutts and Ichiro Kawachi describe the dimensions of the urban social environment and discuss some of the pathways by which exposures to these settings influence patterns of health and disease. In Chapter 4, Susan Klitzman, Thomas Matte, and Daniel Kass review the many physical exposures related to the urban environment, from leaded paint and dust to contaminated water supplies. In Chapter 5, Dennis Andrulis describes the urban health and social services systems and discusses the tension between maintaining a robust set of safety-net providers in low-income urban areas and meeting the particular needs of patients presenting for service. Food availability and consumption patterns are shaped by these three determinants and also, in their own right, influence many other more proximal determinants of population health. In recent years the rise in obesity has threatened the health of urban dwellers around the world. In Chapter 6, Ming-Chin Yeh and David Katz describe the unique features of the urban food system and its influences on health and disease. The chapters in this part show that determinants of health operate at multiple levels to shape the health of urban populations and that changing living conditions in cities create new patterns of health and disease. Thus, any approach to urban health must be dynamic rather than static—attuned to the particularities of time and place.

In Part III, the authors explore these dynamics and provide varying perspectives on changing cities. In Chapter 7, David Rosner presents a historical perspective on U.S. cities, showing how colonial settlement, industrialization, and urbanization affected the health of city dwellers. Howard Frumkin, in Chapter 8, focuses on urban sprawl, the tendency for cities to expand into surrounding metropolitan areas, and assesses the many health consequences of this trend. In Chapter 9, Mindy Fullilove examines what sprawl leaves behind: communities damaged by urban renewal, redlining, hurricanes, terrorist attacks, and other assaults on the urban fabric. She describes the many ways that urban policies can harm health. Finally, in Chapter 10, Gordon McGranahan and David Satterthwaite provide a developing-world perspective, reviewing the status of water supply and sanitation in cities in Africa, Asia, and Latin America. They show that many cities in the global south have yet to solve the basic problems resolved a century ago in more developed nations. These different perspectives help readers to grasp both the constant features of city life—population density and diversity, complex systems, links to higher and lower levels of social organization, and the dramatic differences between, for example, New York City in the 1860s and New York City today, or between the slums of Washington, D.C., today and those of Mumbai in India. Grasping the similarities and differences simultaneously is a prerequisite for the development of a science of urban health.

The three chapters in the Part IV discuss three very different health indicators that may be of particular concern to urban populations and that can be models for how to consider the relations between other urban living and health. Although at first glance infectious diseases, individual and mass trauma, and mental health may have little in common, they offer good illustrations of the relationships between cities, urban living conditions, and population health. In Chapter 11, David
Vlahov and Emily Gibble describe how changes in urban living conditions have contributed to changes in patterns of infectious disease in U.S. cities. In Chapter 12, Kenneth J. Ruggiero, Amy Van Wynsberghe, Tomika Stevens, and Dean G. Kilpatrick examine the consequences of both interpersonal violence and disasters on the physical and mental health of urban individuals and populations. In Chapter 13, Sandro Galea, Michaline Bresnahan, and Ezra Susser consider how urbanization and urban conditions influence serious mental illness. All three chapters in this part seek to explain why cities may be different and how urban living determines these particular outcomes. They highlight more recent empiric work that is beginning to show how macro-level factors are associated with health independent of more proximal, individual-level factors.

Finally, in Part V, the chapters summarize some possible directions for research and intervention. In Chapter 14, Sandro Galea and Amy Schultz review methodological approaches to the study of urban health and describe the benefits and limitations of current methods. In Chapter 15, Nicholas Freudenberg describes what is known about public health interventions in U.S. cities and suggests new directions for urban health promotion. In Chapter 16, we assess next steps and propose an agenda for action that will contribute to the development of a science and practice of urban health.

The chapters in this book have been written by epidemiologists, environmental health scientists, health educators, psychiatrists, psychologists, sociologists, nutritionists, and historians. They demonstrate the necessity of interdisciplinary approaches to the study of urban health and, we hope, the value of considering and synthesizing findings across disciplines, levels of organization and health outcomes. Ultimately, our goal is to improve the health of urban populations—if this volume helps readers grasp the complexity and the potential of this objective, then we have succeeded.

Many colleagues, friends, and strangers helped us to produce this book and we gratefully acknowledge our debts to them. At Hunter College, colleagues in the Program in Urban Public Health, the Center on AIDS, Drugs, and Community Health (now the Center on Urban and Community Health), the City University of New York Urban Health Collaborative, and students in classes and seminars at Hunter and the City University of New York Graduate Center helped us to refine our thinking and challenged us to present our ideas more clearly.

Dr Jeremiah Barodness, Dr Alan Fleischman, and the late Dr David Rogers nurtured the study of urban health at the New York Academy of Medicine and set the stage for the development of some of the concepts developed here. Our colleagues at the Center for Urban Epidemiologic Studies, particularly Dr. Danielle Ompad and Jennifer Ahern have shared our vision for a systematic study of the health of populations in cities and worked with us on studies that have tested this notion.

The Centers for Disease Control and Prevention (CDC) Urban Research Centers program stimulated attention on the issues of health in urban populations and allowed us to work together and develop the ideas presented here. At the CDC, Mary Guinan and Donna Higgins helped focus interest in urban health and to get...
our work started, as did our colleagues in the Seattle and Detroit urban health research centers.

Several research assistants at Hunter College and the New York Academy of Medicine helped to produce the book, including Salwa Nassar, Sarah Bradley, Emily Gibble, Sasha Rudenstine, Sara Putnam, Melissa Tracy, and Maria May.

Our colleagues in the International Society for Urban Health and all those who participated in the International Conferences on Urban Health in New York City in 2003 and in Boston in 2004 stimulated a number of the ideas discussed in this book and made useful comments on talks that later turned into chapters.

Many colleagues reviewed early drafts of one or more chapters and provided valuable feedback. We thank Juan Battle, Theodore Brown, Giovanni Caracci, Wendy Chavkin, Bradford Gray, Shiriki Kumaniyka, Linda Landesman, Thomas R Matte, Meredith Minkler, Kenrad Nelson, Edith Parker, Susan Saegert, and Guido Schmidt-Traub as well as several anonymous reviewers for their many helpful suggestions. Of course we are responsible for the final product. We also thank Michael Ames at Vanderbilt Press for his consistent support and help in making this book a reality. We would also like to thank the New York City Health and Hospitals Corporation for permission to use the Romare Bearden collage, which is on display at Bellevue Medical Center, for the cover of the book.

Finally, we thank partners, families and spouses—Wendy Chavkin, Sasha Freudenberg Chavkin, Margaret Kruk, and Robyn Gershon—for their support on this and many other endeavors.

Nicholas Freudenberg
Sandro Galea
David Vlahov
New York City, January 2006
PART I

Introduction
1

A Framework for the Study of Urban Health

Sandro Galea, Nicholas Freudenberg, and David Vlahov

Introduction

Today, city life is the norm for an ever-growing proportion of the world’s population, and recent projections estimate that half of the world’s population will live in urban areas by 2007 and three-quarters by 2030. Much of this growth will be in the developing world: By 2030, all of the world’s largest cities are projected to be in Africa, Asia, and Latin America. This international expansion of cities reflects population growth, increased survival, and migration and deserves attention from public health professionals because the urban environment influences every aspect of health: the food people eat, the air they breathe, the water they drink, where (or if) they work, the housing that shelters them, their sex partners and family arrangements, where they go for health care, the danger they encounter on the street, and who is available for emotional and financial support. More than ever before, understanding what causes health and disease and how to improve public health around the globe requires an improved awareness of how urban life affects well-being.

The aim of this chapter is to introduce a framework for the study of urban health, but first we require consistent definitions of key terms, a significant challenge because of the multiple disciplines (including public health, social sciences, urban planning and architecture) that have been involved in the study of facets of urban health. We begin, therefore, by addressing terminology, viewpoints, and considerations that can inform our focus on the health of urban populations. We then present a conceptual framework that we find useful to help think about how cities shape population health. We elaborate on elements of this framework in Chapter 2.

Although we aim to contribute to a global perspective on urban health, in this
book we focus on the circumstances and conditions of the United States. We take this perspective because our own experience is here and we believe that an understanding of urban health must emerge from concrete analysis of specific situations. Where appropriate, we link broader global forces to the experience in the United States (e.g., immigration); however, we recognize that the experience in the United States does not and cannot adequately describe or address the effects of urban living in developing and other developed countries. In the United States, urbanization and urban development have been major historical trends for the past 150 years, driving changes in multiple areas, such as economic development, education, criminal justice, transportation, and housing. Therefore, in this book we aim to draw lessons from the U.S. experience that can guide research and intervention domestically and globally.

Key Terms and Definitions

Defining Urban

The U.S. Bureau of the Census defines “an urbanized area” as “a place and the adjacent densely settled surrounding territory that together comprise a minimum population of 50,000 people.” Moreover, “the ‘densely settled surrounding territory’ adjacent to the place consists of territory made up of one or more contiguous blocks having a population density of at least 1,000 people per square mile.” The Census Bureau thus provides a dichotomy, designating territory, population, and housing units within specific size and density parameters as urban areas and all others are nonurban.

The U.S. Census definition is limited in many respects. First, a more nuanced appreciation of gradations of urban may be helpful. In the early 21st century, few cities exist in isolation, clearly set apart from other urban areas by vast underpopulated space (e.g., Las Vegas 10 years ago). Most cities (e.g., Hartford, Conn., Atlanta, Ga., Los Angeles, Calif., Detroit, Mich.) are part of a far-reaching, densely populated area that continues relatively uninterrupted for miles beyond the actual city and city-center. This broader zone is often called a “metropolitan area,” which the U.S. Census Bureau defines as “a city with a population of at least 50,000 people or an urbanized core area of at least 50,000 people who are closely integrated socially and economically with the core.” Figure 1.1 illustrates the changing proportion of the U.S. population living in metropolitan areas.

In the past two decades, urban and suburban settlements within metropolitan areas have converged and now share many features of urban living and their consequences; a dichotomous definition of urban fails to recognize this metropolitan phenomenon. Since half the U.S. population lives in this suburban interface, excluding suburbs from a study of metropolitan health risks missing important public health issues related to the urban condition.

While seemingly straightforward, the Census definition threshold of 50,000 is also problematic. Although a “threshold” population size facilitates demographic analyses, it is conceivable that areas with fewer people, particularly in sparsely populated areas, may also share many characteristics of cities. For example, the city of Whitehorse, in the Canadian Yukon Territory, has a population of fewer
Within the United States, 80% of Americans now live in metropolitan areas, and these areas continue to increase in size. Between 1990 and 2000, the U.S. metropolitan population grew more rapidly than the nonmetropolitan area population, 13.9% compared with 10.2% (see table). Almost 60% of the U.S. population lived in metropolitan areas of more than 1 million people. In 2000, about a quarter of the U.S. population lived in central cities (the urbanized core of metropolitan areas), and half in the suburban areas surrounding these cities.

Population Change and 2000 Share by Metropolitan Status and Size Category: 1990 to 2000

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<thead>
<tr>
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<tr>
<td>United States</td>
<td>281,421,906</td>
<td>13.2</td>
<td>100.0</td>
</tr>
<tr>
<td>Total for all metropolitan areas</td>
<td>225,981,679</td>
<td>13.9</td>
<td>80.3</td>
</tr>
<tr>
<td>5,000,000 or more</td>
<td>84,064,274</td>
<td>10.8</td>
<td>29.9</td>
</tr>
<tr>
<td>2,000,000–4,999,999</td>
<td>40,398,283</td>
<td>19.8</td>
<td>14.4</td>
</tr>
<tr>
<td>1,000,000–1,999,999</td>
<td>37,055,342</td>
<td>17.7</td>
<td>13.2</td>
</tr>
<tr>
<td>250,000–999,999</td>
<td>45,076,105</td>
<td>13.1</td>
<td>16.0</td>
</tr>
<tr>
<td>Less than 250,000</td>
<td>19,387,675</td>
<td>11.1</td>
<td>6.9</td>
</tr>
<tr>
<td>Total nonmetropolitan</td>
<td>55,440,227</td>
<td>10.2</td>
<td>19.7</td>
</tr>
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Several other definitions of urban have been adopted by various countries, some of which stem from an attempt to address the complexities just described. Among 228 countries on which the United Nations has data, about half use administrative definitions of urban (e.g., living in the capital city), 51 use size and density, 39 use functional characteristics (e.g., economic activity), 22 have no definition of urban, and eight define all (e.g., Singapore) or none (e.g., Polynesian
countries) of their population as urban.\(^3\) Official statistics (i.e., all the statistics above) rely on country-specific designations and do not use a uniform definition of urban. In specific instances, definitions of urban in adjacent countries vary tremendously (e.g., Democratic Republic of the Congo v. Burundi). Thus, global statistics on urbanization depend on international definitional differences that may be as much a function of statistical expediency as an effort to characterize urban as a distinct construct. Compounding these difficulties, definitions of urban have changed in different ways in different countries.

Hence, depending on who is using it, the word *urban* may denote a range of settings from city centers to periurban fringe cities to densely populated isolated regions. Although this lack of uniform definition may hinder investigation of what is unique in urban versus nonurban living and its relation to health, it also highlights the dynamic nature of urban as a construct. Furthermore, it underscores that both the condition of *being urban* and the *process of urbanization* are important considerations. The diverse definitions of urban suggest that a core set of characteristics (e.g., housing quality, access to health care services), driven, to an extent, by population size, density, heterogeneity, and distance from other such centers, are common to urban areas and shape the conditions of living within these areas. These factors have been shaped by the forces that have driven urbanization in the past several centuries and also directly and indirectly shape the health of urban populations.

**Static versus Dynamic Definitions of Urbanness**

To expand the somewhat limiting definitions offered by the U.S. Census Bureau, we define several different dimensions of *urbanness* that may affect our understanding of how changes in urban living conditions across time and place affect health. At the risk of introducing additional complexity, these concepts provide a more dynamic view of variation within and between cities. Two of the terms—*urbanicity* and *urban dominance*—refer to status measured at given time (cross-sectional view), while the other three—*urbanization*, *urban development*, and *metropolitan development*—refer to ongoing processes (longitudinal perspective). By analogy, the first two are snapshots of cities and their regions, while the others are videos of changing urban conditions. Each provides important perspectives for studying urban health.

*Urbanicity* refers to the unique characteristics of an urban area at a given time. These unique characteristics specify the living conditions in a city, which include physical (e.g., transportation routes) and social (e.g., racial/ethnic segregation) conditions that in turn reflect political, economic, and social forces. Because urban conditions vary both within and between cities, it is possible to assess the impact of urbanicity on health within different neighborhoods and between populations in different cities at a particular time. The intent is to be able to describe the health impact of current (or some other defined period) urban living conditions. Rather than focusing on the factors that contributed to producing these conditions, this perspective seeks to draw associations or links with living conditions and health. For example, to understand differences in asthma hospitalization rates, which are
higher in cities than in nonurban areas and vary between cities or neighborhoods within a city, researchers could compare access to health care, housing conditions, air pollution, and poverty rates. By identifying urban characteristics associated with higher asthma hospitalizations (e.g., inexperienced health care providers, poor housing conditions, or air pollution), public health authorities could design interventions to reduce hospitalizations. Several national studies are now under way that will help to define those features of urbanicity that contribute to asthma prevalence and severity.4

It is worth noting that, ultimately, urbanicity is socially constructed and changes with time and place. In the United States, there is a vast scientific and popular literature on urban life.5–7 In American culture, cities are seen both as the epitome of freedom, culture, and democracy and as the embodiment of sin, corruption, crime, and pollution.8 These conflicting images have shaped changing views on the influence of urban life on health.

*Urban dominance* describes a stage in societal development when cities have become leaders of political, social, cultural, and economic life in their region or nation and the point of origin for major social problems and their solutions. As a society reaches the “tipping point”9 of becoming predominantly urban, city influence on health predominates. The national diffusion of urban forms such as gay communities, community health centers, youth gangs, or the concept of protected parkland illustrates this phenomenon. Each has had a major influence on health, both inside and outside cities. The tipping point may also reverse, as when certain cities lose their population and influence to their suburbs and are reduced in their dominance within a region. The experiences of Detroit and other Rust Belt cities in the 1980s and early 1990s are examples of this process.

The first two concepts provide tools to consider the different ways that urban conditions affect health as place varies. The next three terms are classifications of urban processes: Urbanization, urban development, and metropolitan development incorporate the dimension of time. *Urbanization* describes the movement of people and resources from nonurban areas to urban ones. This historical process reached its peak in Western Europe and the United States between the late 19th and first half of the 20th century; an example is the migration of millions of African Americans in the rural South to the cities of the East and Midwest in the middle third of the 20th century.10 Urbanization is now occurring at a rapid pace in Asia, Africa, and Latin America, where it will have a powerful impact on health (see Figure 1.2).

*Urban development* signifies the movement of people and resources within cities. The concentration of low-income African Americans and Latinos within a few low-income neighborhoods in many cities;11 the creation of new commercial zones, such as the Inner Harbor in Baltimore, Faneuil Hall in Boston, and the Galleria area in Houston; and the replacement of street cars with highways for automobiles in Los Angeles in the early 20th century are all examples of urban development. The process can make living conditions better or worse, and since no city is static, this development is continuous, though it may vary in pace.

The final process, *metropolitan development*, describes the movement of peo-
Part I: Introduction

Figure 1.2. Urbanization in a Global Context

The proportion of the global population that lives in urban areas is growing. A recent report about growth of urban populations from the United Nations Population Division\(^1\) notes that although just under half of the world’s population now lives in urban areas, within the next 30 years nearly two-thirds of the world’s population will live in cities. In addition, most of the world’s population growth in this period is expected in urban areas, primarily in less wealthy regions of the world (growth from 1.9 billion in 2000 to 3.9 billion in 2030) with the most rapid pace of growth expected to occur in Asia and Africa.\(^2\)

While North America and Europe are currently the most urbanized regions, the number of urban dwellers in the least urbanized region, Asia (1.4 billion) is already greater than the urban population in North America and Europe combined (1.2 billion) in 2000.\(^3\), \(^4\)

Cities of different sizes are expected to grow at different rates. The proportion of people living in mega-cities (cities with population greater than 10 million) is expected to rise from 4.3% of the global population in 2000 to 5.2% in 2015. The growth rate of mega-cities in the developing world will be much higher than in developed world (e.g., anticipated growth 2000–2015 Calcutta is 1.9% compared with New York City, 0.4%). In 1975, only five cities worldwide had 10 million or more inhabitants, of which three were in developing countries. The number will increase to 23 by 2015, all but four of them in developing countries. Also, by 2015 an estimated 564 cities around the world will contain 1 million or more residents. Of these, 425 will be in developing countries.

While large cities of developing countries, however, will account for 20% of the increase in the world’s population between 2000 and 2015, small cities (less than 5 million) will account for 45% of this increase.\(^3\) Thus, in the 21st century a growing number of relatively small cities throughout the world will contain most of the world’s population, and a few mega-cities will undoubtedly face unique challenges. These projections highlight the importance of viewing urban health as an international and global issue.

References

ple and resources between an urban core and its surrounding suburbs. Examples include the creation of mostly white suburbs surrounding most U.S. cities in the post World War II period,¹²,¹³ the integration of urban and suburban economies in the past two decades,¹⁴ and the emergence of edge cities.¹⁵

These three urban processes unfold with specific characteristics in different places and historical periods. Although each has distinct dynamics linked to health, they also share common antecedents. As we explain in Chapter 2, for example, in the post World War II period in the United States, the driving social forces for all three urban processes have been four broad trends: migration, suburbanization, changes in the role of government, and the globalization of the U.S. economy.

**Health**

Health has traditionally been used to describe the absence of disease, but gradually its meaning has been expanded to include wellness and even human potential. A broad range of outcome measures, discussed throughout this book, are now used in studies comparing health differences between and within metropolitan areas (see Figure 1.3 for one example). These measures include disease rate, or morbidity, and mortality, an extension of disease rate that may also reflect nondisease outcomes such as injury or trauma. Where morbidity and mortality are shown not to differ, other dimensions of health may be significant. Individual-level behaviors, such as poor diet, lack of physical exercise, smoking, and substance abuse, for example, produce disease and can be measured as precursors to disease or as outcomes to target for preventive interventions. Several other measures such as quality of life, quality of life adjusted years, and years of productive life lost, add another important dimension.

**Contrasting Approaches to Urban Health**

Recent research on urban health has in general taken two different approaches: urban health penalty and urban sprawl;¹⁶ both are descriptive of different phenomena that have characterized cities in the United States. Urban health penalty grows out of earlier work on the impact of industrialization on the health of urban populations in Europe in the late 19th and early 20th centuries.¹⁷–²⁰ This approach posits that cities concentrate poor people and expose residents to an unhealthy physical and social environment. As a result, cities bear a disproportionate burden of poor health. The urban sprawl approach focuses on the adverse health effects of urban growth into outlying areas: increasing automobile pollution and accidents, sedentary life-styles and the rise in obesity, and social isolation and the breakdown of social capital.²¹

Both of these approaches make important contributions. The urban penalty approach correctly describes the appalling health conditions that persist in many inner cities,¹⁹,²² the growing racial/ethnic and socioeconomic inequalities in health that result from these conditions, and the necessity of improving health conditions in inner cities if the United States is to achieve its health goals. Similarly, the urban sprawl approach focuses attention on the pervasive and health-damaging
The size of metropolitan areas in the United States is often linked to higher absolute counts of disease and often also to higher rates of disease. The graph below shows the status and trends in the nationally reported data for the acquired immunodeficiency syndrome (AIDS) by size of metropolitan areas in the United States. The higher AIDS rates in the larger metropolitan areas indicate that conditions within these larger areas are likely contributing to these higher rates and require attention. However, the higher absolute numbers of infections in the larger metropolitan areas also indicates that resources need to be focused where people are concentrated. The narrowing gap between rates of AIDS in central and outlying counties also hints at some of the urban processes described in the text that are shaping the health of cities and their outlying areas.

Average AIDS Incidence per 100,000 Population, by Metropolitan Area Population, 1993–2000, United States

Source: Centers for Disease Control and Prevention, HIV/AIDS Surveillance Reports 1994–2000; 6 [no. 2]–12 [no. 2].

Note: The AIDS example, highlighting the higher level of AIDS infections by size of metropolitan area in the United States, while engaging, is not universal. Other health outcomes, such as homicide, show variable relationships with population size. Variation in this relationship of morbidity and size of metropolitan area suggests that other factors are operating.
consequences of unchecked urban spread and raises important national policy issues. By taking urban health beyond the inner city, this approach has the potential to reach broader constituencies that may be needed to bring about improvements in urban conditions.

It is important to note that there may be a third approach, which has been called the “urban health advantage” perspective. While not as commonly discussed in the literature, it may equally contribute to thinking about urban health. This approach refers to the observation that some health indicators are not only better in urban than rural areas (more prominently in less wealthy nations) but that among the poor in each area, indicators are better for urban residents. For example, the infant mortality rate (per 10,000) for the combined areas of North Africa, sub-Saharan Africa, Asia, and Latin America using the Demographic and Health Surveys are as follows: rural 0.086, urban poor 0.075, urban nonpoor 0.056. These indicators suggest that even when controlling for poverty, some measures of health in cities are better than in nonurban areas (hence an urban health “advantage”) and lend insight into factors that may contribute to enhanced population health in cities. Among these factors may be socioeconomic heterogeneity, which provides an opportunity for heterogeneity of affluence and education in social networks, stronger social movements, and better (or more) health and social resources.

These approaches, however, also have limitations. Each captures a dimension but not the totality of urban health. The urban penalty approach tends to equate “urbanness” with class and race, with urban health becoming synonymous with conditions among the minority poor of the inner cities. This approach undervalues the financial and social assets of cities, including those of poor neighborhoods and often fails to recognize that cities also house and affect the health of middle-income and wealthy people, though in different ways than for poor people. The urban penalty concept does not adequately account for the diffusion of poverty outside cities, the increased racial and ethnic diversity of suburbs, or the links within metropolitan regions that have emerged in the past two decades. Similarly, an urban health advantage perspective focuses on the positive assets of cities without allowing us to account for, or to balance, the health burden among disadvantaged populations in cities and the potential detrimental impact of city living on population health. Proponents of urban sprawl often overlook the inner city altogether, missing the most vulnerable populations. In addition, while sprawl can be described, its specific impact on health in Los Angeles or Honolulu, for example, remains to be defined, and to date, analytic methods for accounting for these differences are sparse.

A Conceptual Framework for Urban Health

The limitations of current approaches to urban health indicate a more comprehensive model is needed that can integrate these approaches yet expand to consider other features of living in cities that promote health. One key challenge for researchers in urban health is to explain differences in health between urban and nonurban areas and among different types of cities and urban neighborhoods. So
far, we have focused on such characteristics as population size, density, and diversity. However, metropolitan areas also differ in what we more broadly call urban living conditions. Urban living conditions describe the immediate circumstances in which city residents live: the people who surround them, their physical and social environments, and the range of available services. These living conditions are in turn shaped by broader municipal factors, such as government, markets, and civil society. More distant still are global and national trends that shape the context in which the local factors operate. To consider the totality of these factors and how they may influence the health of urban populations, we propose a conceptual framework that explains how variables operating at different levels influence the living conditions that are the primary, proximate, and most remediable determinants of the health of urban populations.

The framework, illustrated in Figure 1.4, shows that the health of urban populations is a function of urban living conditions, municipal-level determinants, and global and national social, economic, and political trends. Because urban living conditions are postulated as the primary modifiable determinant of the health of urban populations, the model suggests that the most promising strategies for improving urban health are those that seek to make specific and targeted changes in these living conditions. The framework identifies a limited set of variables that influence living conditions and provides a basis for considering alternative courses of action to achieve specific goals. The model further assumes that the urban environment in its broadest sense (physical, social, economic, and political) affects all strata of residents, either directly or indirectly. Because cities are intimately linked to their larger societies, this view of urban health recognizes that all people, rich and poor, urban, suburban, and rural, are ultimately affected by the totality of living conditions in cities.

We base the framework on our own experience as urban health researchers and our understanding of the recent literature on the health of urban populations. Social and political scientists will tend to consider the model from left to right, thinking first about the broader social and political movements and how these influence municipal determinants that shape the urban characteristics that determine health. Clinicians and epidemiologists will consider the model from right to left, looking first at the level of health and disease in an urban population, next at the proximal “risk factors” of individuals, and then at various urban characteristics and so on. The first challenge is to consider the model from one’s own field and the second to consider it from another field. The ultimate challenge is to develop a common approach to urban health.

The framework also builds on a variety of models used in social epidemiology and other social sciences. Influences on health are proximate or “downstream” in McKinlay’s formulation (e.g., individual behavior) and move progressively more distant or “upstream” (e.g., municipal, national, and global factors). The pathway of influence is not entirely linear. The factors influence each other, but each also has an independent level of effect on health. We discuss briefly here each of the components of the proposed framework.

*Enduring social structures and conditions*, shown in the bottom row, include
the prevailing political and economic systems, such as liberal democracy and capitalism in the United States. These structures provide the context in which social conditions that affect health can change. While they are not immutable, they usually change on a slower time scale than what we call major global and national trends (column 1). Since social alterations occur only in the context of these political, social, and economic structures, it is important to understand how they enable or constrain various approaches to improving the health of urban populations. For example, free market capitalism, whether in its more regulated or in its unfettered models, creates the opportunity structures in which individuals, corporations, and governments take action related to health.

Global and national social, economic, and political trends shape cities in the shorter term. They influence the previously described urban processes and determine the resources available to a particular city or region. For the post–World War II period in the United States, we identify four such trends: migration, suburbanization, changes in the role of government, and globalization of the U.S. economy. These trends, as we explain in Chapter 2, have had a powerful influence on the social conditions that determine health in urban populations. As a result, they
explain an important portion of the variation in health within and between cities. Operating both directly and through the other pathways shown in Figure 1.4, they create the social and environmental exposures that determine cities’ impact on health. To examine urban health in other periods or places, one would need to consider different trends. In earlier periods of U.S. history, for example, trends such as industrialization, war, or territorial expansion might be salient while in the developing world, urbanization itself is a dominant trend.

**Municipal level determinants** of health (column 2) include all government activities, local markets, and the actions of civic society that operate at the city level. **Public health interventions** (column 3) describe activities specifically organized for the purpose of improving the health of the public. Interventions can seek to bring about changes both in municipal factors (column 2) and in urban living conditions directly (column 4). All these spheres are influenced by the enduring structures and the international and national trends, but they operate and affect health primarily at the municipal and community levels. Thus, for example, local government policies on housing, the housing market, citizen action on housing conditions, and local lead-poisoning control programs interact to influence rates of lead poisoning in a particular city.

**Urban living conditions** (column 4) describe the characteristics that shape the day-to-day life of urban residents, the proximate actualization of previously described determinants. They include population characteristics, such as individual attitudes and behavior and demographics (e.g., socioeconomic status and race/ethnicity); the urban physical environment (e.g., housing stock, pollution levels, parkland); the social environment (e.g., social networks, community organization); and the service system, which either meets or fails to meet various needs. These urban characteristics can be viewed as both “pre-existing conditions” that public health interventions seek to change and intermediate outcomes, the pathways by which interventions lead to improvements in health. To return to the previous example, to reduce lead-poisoning rates, a lead-poisoning control program can make changes in housing conditions, provide additional support for parents of children at risk, or offer health services, such as screening or treatment.

Finally, both **health and non-health outcomes** (column 5) represent the endpoint of public health attention. Including non-health outcomes allows interventionists and researchers to specify the broader contributions of public health. Improving housing in low-income urban neighborhoods, for example, may lead not only to less lead poisoning but also to increased neighborhood stability, reduced crime, and improved economic development, allowing planners, policy makers, and residents to have a more accurate and comprehensive picture of the costs and benefits of various solutions.

The framework allows the research focus to be narrowed to specific areas or broadened to more general perspectives. For example, consider the question of how mass transit systems affect health. Our model allows one level of analyses relating to the congestion and confinement of people in subways where the risk of air-borne transmission of infectious diseases, dispersion of bioterror agents, commission of violent crime, or emission of debilitating noise can affect people across
racial, ethnic, income, and neighborhood boundaries, an approach that considers the health effects of unique urban features. Alternatively, investigators could work on another level, examining the municipal determinants (e.g., how the mass transit system is managed and financed, local incentives and penalties for automobile use), and national trends (e.g., declining federal support for cities and mass transit). Each level of analysis suggests directions for intervention to improve health.

A second example illustrates the framework’s use in comparing urban and nonurban areas. Food distribution systems reach all populations, and differences in distribution can have various health effects, including outbreaks of gastroenteritis or unhealthy eating habits that increase the risk for heart disease, cancer, obesity, or chronic hunger. How do differences in urban and nonurban food systems (e.g., food pantries, fast-food outlets, street food vendors, large discount supermarkets) affect food choices in these areas and how do these choices contribute to health or disease? Findings can guide national or state food policies, municipal-level interventions, or community campaigns.

By providing researchers with a defined list of variables, the model may enable them to create a more consistent body of literature that can guide research and practice. By including variables of interest to epidemiologists, clinicians, political scientists, sociologists, anthropologists, psychologists, geographers, urban planners, architects, and others, the model promotes synthesizing findings across relevant disciplines. Finally, by proposing that cities influence health by exposing their residents to a set of conditions that can be compared in different time frames and places, the model offers a more unified and useable guide to intervention.

Though it does provide a schematic approach to the study of a limited number of variables that can still capture the complexity of urban well-being, this model is not unique to urban health. We invite others to consider its relevance to the study of rural and suburban areas as well as to developing world cities and make modifications as needed. We offer the model here as a guide to interpreting and integrating the perspectives in the subsequent chapters of this volume. In the final chapter, we return to this model to assess again its usefulness, summarize what we have learned from the following chapters, and revise as needed. Ultimately, of course, its value will be determined by how readers use it.

### Conclusion

As public health professionals and researchers confront recurrent and emerging urban challenges, they will need new tools, concepts, and theories to study and then reduce the health problems of the 21st-century city. The devastating epidemics of infectious diseases, violence, and drug use that peaked in many U.S. cities in the late 1980s and early 1990s, the concentration of social pathologies in some urban populations, their dispersion to suburban areas, the growing realization that urban sprawl poses threats to both urban and suburban regions, and the persistence of a health care system that cannot provide insurance coverage for millions of Americans, mostly in urban areas, suggest that a “business-as-usual” approach to the health needs of cities is unlikely to lead to improvements
in public health. Indeed, it appears that the ability of the United States to achieve the ambitious health goals identified in the U.S. Department of Health and Human Services’ Healthy People 2010 report depends in large part on its success in finding better ways to improve health in cities.

We conclude with a few observations. First, cities continue to grow, and a majority of people in both developed and developing nations will be living in urban areas throughout the 21st century, making the question of urban health an urgent priority. Second, though most reliable estimates of the prevalence of various health conditions suggest that the burden of disease in cities is greater than that in nonurban areas, it has not always been so and is certainly not true of all cities and diseases today. And though in academic discourse on urban health, cities are often assumed to have a deleterious effect on health, there are also many positive and health-enhancing aspects of cities and urban living. Documenting the health benefits of cities, and developing the interventions to maximize them, is an important priority. Third, to understand urban health we must shift our focus of inquiry from disease outcomes to urban exposures, the characteristics of the urban context that influence health and well-being in cities. Such an approach will enable us to move from description to intervention. Fourth, the study of urban health must acknowledge the reality of complexity. There are no simple solutions for the multidimensional health problems facing cities today. As Perrow has shown, this complexity can cause or exacerbate problems; a response to one part of a problem can precipitate an accident or disastrous unintended consequences. Ecological approaches that recognize the importance of studying interactions at multiple levels are a useful tool for the study of urban health. Fifth, many disciplines need to contribute to the study of cities. New methodologies in epidemiology, geography, and the quantitative social sciences; insights from anthropologists, psychologists, and historians; and the technical contributions of engineers, architects, and urban planners are among the strands that will contribute to a science of urban health. Finally, improvements in the health of urban populations has always depended and will continue to depend not only on new scientific understanding but also on continuing political mobilization and a commitment to social values that support healthy cities. Advances in all three domains are needed to translate new knowledge about cities into healthier urban communities.

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Changing Living Conditions; Changing Health
U.S. Cities since World War II

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Introduction
In the previous chapter, we proposed a framework for the study of the determinants of the health of urban populations. Here, we use this framework to examine changing patterns of health and disease in U.S. cities in the six decades since World War II, calling attention to the key elements of the framework and discussing how these processes and factors have affected the health of urban populations in one specific place and time.

In the United States, underlying social and economic structures have been shaped by the nation’s origins as a European colony, its conquest of indigenous peoples and importation of slaves from Africa, its rise as a world power in the 19th century, and its global economic and military reach in the 20th. The U.S. political traditions of representative democracy, division of political authority among three levels of government, free speech, and two-party system create numerous opportunities for political participation, but substantial stratification of economic and social opportunity allows the persistence of inequitable distribution of basic goods such as education, employment, and health care. Since World War II, the public health community in the United States has rarely challenged these enduring structures, in part because they are so difficult to change. The course of human history has shown, however, that such changes to underlying structures have the potential to improve population health dramatically.1-3 Our focus here on more proximate determinants of health reflects not a lack of appreciation of the importance of enduring structures but rather our emphasis on achieving more immediate change in the health of urban populations.
Global and National Trends and the Health of Cities

As cities change, so too does the health of its citizens. To begin, we look at the four broad social trends that we believe explain much of the historical and geographic variation in health in U.S. cities since 1945: migration, suburbanization, changes in the role of government, and changes in the global economy. These trends influence urbanization and the movement of people and resources into cities, as well as urban and metropolitan development and the movements of people and resources within cities and their larger metropolitan areas.

Migration and Immigration

Today, more than 140 million people in the world live outside their country of birth and migrants constitute more than 15% of the population of at least 50 nations. Increasingly, people move from the countryside to the city or from a developing to a developed world city, making immigration primarily an urban phenomenon. Economic inequality, poverty, wars, and political discrimination are among the factors that have pushed people to move to cities or to change the country in which city they reside. Immigration has profound economic implications, as much for countries or regions that lose citizens as for those in which immigrants make their new homes.

The number of legal immigrants entering the United States between 1980 and 1990 doubled compared with the decade of the 1950s. According to the 2000 Census, there were 31.1 million U.S. residents, 11.1% of the population, who were foreign born and 13.2 million of these, or 4.7% of the overall population, came to the United States between 1990 and 2000. The U.S. Immigration and Naturalization Service estimates that the number of “illegal” immigrants in the United States increased from 5 million in 1996 to 8 million in 2000.

This dramatic increase in immigration to the United States had a disproportionate affect on cities. In 1990, 93% of foreign-born Americans lived in metropolitan areas, compared with 73% of native-born Americans. Many observers credit immigrants, both documented and undocumented, with contributing to economic growth in U.S. cities in the 1990s. In previous decades, most new immigrants first settled in cities, primarily New York, Los Angeles, Chicago, Miami, San Francisco, and Boston, but in the past 10 years growing numbers of new immigrants have moved to smaller cities and suburban areas, contributing to the diversity of these areas and linking them in new ways to immigrant communities in larger cities.

Before 1965, most immigrants came to the United States from Europe, but new immigration laws in 1965 and 1986 brought more from Central and Latin America and Asia. As a result, by the start of the 21st century, several big U.S. cities no longer had white majorities, but instead three or more ethnic/racial groups, none with majority status.

Cities change immigrants but immigrants also change cities, and both
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these dynamics influence health. For example, while powerful global forces have pushed millions of Latino immigrants into U.S. cities in the past two decades, these new residents have transformed many urban areas, contributing to new cultures, diets, and forms of community mobilization. Growing Latino and Asian populations have also changed political dynamics in Los Angeles, New York, Houston, and other big cities, creating new opportunities for coalitions and the reallocation of resources affecting health.

In the area of health, studies show, on one hand, that immigrants bring lifestyles and support systems that protect them against some of the adverse outcomes that other low-income urban residents experience, such as poor birth outcomes and diabetes. Some of these protections fade after a generation or two of exposure to U.S. urban conditions. On the other hand, immigrants from some regions are often burdened with a higher prevalence of some diseases than long-term residents of the host country. Providing health care to the growing number of immigrants in the United States, especially in big cities, is also a problem. Children of immigrants face the task of balancing old and new worlds, a tension that can affect health. Many immigrants lack insurance coverage, face language and cultural barriers to medical care, and fear that encounters with public authorities, including health care providers, may lead to legal problems, including deportation.

In the United States (and other industrialized countries with a low birth rate), immigration has been an important source of population growth. Sometimes this influx of impoverished people to a city in search of jobs and services has taxed available infrastructure, including transportation, housing, food, water, sewage, jobs, and health care. Overtaxed sanitary systems may directly lead to rapid spread of disease, as it has many times in North America during the past century and continues to do so in the developing world today. Also, the population strain on available jobs may result in falling wages, higher unemployment, and other declines in socioeconomic status for persons previously living in a given city. This lowering of socioeconomic status that is frequently associated with the immigrant condition can result in more limited access to health care and to poorer health. In some cities, immigration has become a contentious political issue, leading to conflict over public resources including health care.

A true picture of the impact of immigration comes from considering the full range of benefits and costs of new residents. Despite recent efforts to control immigration in the United States, Europe, and other industrial nations, increasing global movement of people appears as inevitable as increasing global trade of goods, services, and information.

It is also important to note that migrants move to cities from other countries but also to other regions within a country. The mass migration of African Americans and Puerto Ricans in the middle of the 20th century changed the composition of urban populations in many U.S. cities. In the middle of the last century, these new urban residents joined the manufacturing work force, contributing to the post World War II economic boom. At the same time, however, the social networks that had sustained health in rural areas, such as kinship and community, financial and
emotional support,\textsuperscript{20} often broke down in the city, leading to increasing health and social problems. As the tax base of cities declined, they were less able to offer the health and social services needed to address these emerging needs.

In summary, in the past 60 years, migrants from within the United States and from other countries have dramatically changed the population composition of urban America, increasing diversity and often maintaining population density in the face of countervailing trends such as suburbanization. They have sustained urban economies by filling low wage entry-level positions in the changing urban economy. In some cases, immigrants have put new pressures on the urban physical environment and its service delivery systems, but they have also added to the mix of urban social networks, contributed social capital, and thus modified the social environment in cities and their surrounding metropolitan areas.

\textbf{Suburbanization}

Beginning in the second quarter of the 20th century and especially after World War II, federal housing, tax, and transportation policies encouraged millions of middle-class people to move from U.S. cities to the suburbs.\textsuperscript{21-23} Housing loans and low-cost mortgages for veterans, federal subsidies for highway construction that facilitated commuting from suburban homes to urban jobs, and tax breaks for home mortgages all contributed to a major shift in population.\textsuperscript{7, 24}

Between the 1940s and the 1990s, millions of mostly white middle-class and working-class Americans left cities for the surrounding suburbs.\textsuperscript{24} This migration led to dramatic reductions in population size, density, diversity, and resources in many cities. Cleveland, Ohio, for example dropped from 915,000 people in 1950 to fewer than 500,000 in 2000. Even though Cleveland now has 400,000 fewer people, mostly poorer than before, it still has to maintain the same streets, sewers, and water lines,\textsuperscript{24} despite a smaller tax base. The exodus also deprived cities of many of the people who had been civic leaders, depleting urban social capital. As conditions in inner cities further deteriorated in the 1970s and 1980s, many middle-class people of color also left, making it even harder for these communities to cope with changing economic and social circumstances.\textsuperscript{25, 26}

Residential suburbanization supported a parallel movement of jobs. Lower land costs and an educated work force encouraged some employers to move, reducing job opportunities in the city. Suburbanization also put new demands on the physical environment—factories once confined to urban industrial zones now polluted a wider area, new highways increased automobile traffic and pollution, and the new housing reduced the amount of open space and tree cover that had surrounded cities.\textsuperscript{27}

More recently, social scientists have noted that cities and their surrounding suburbs may be becoming more similar.\textsuperscript{7} Between 1990 and 2000, the proportion of people of color, recent immigrants, and poor people living in suburbs increased significantly.\textsuperscript{5} In addition, the growth of “edge cities,” poverty suburbs, and exurban sprawl has further blurred the distinction between urban and nonurban areas.\textsuperscript{28, 29}

In the past decade, attention has focused on urban sprawl and its health impli-
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In part as a result of suburbanization, cities—or newer urban forms—have spread beyond their political borders. These exurban areas are characterized by lower population density, heavy reliance on automobiles, and perhaps increasing social isolation. Some investigators have linked sprawl to the rise of obesity and type 2 diabetes, primarily through reduced opportunities for physical activity.27

As people move between cities and suburbs so do health and social problems. The changing demographics, politics, and social conditions of the urban/suburban divide has led some observers to propose that cities and their suburbs be viewed as a single system rather than a dichotomy.30, 31 This metropolitan analysis, which has earlier roots,23 has proven useful in studying a variety of social issues, from transportation and crime to health.

In the past two decades, for example, problems such as HIV infection, tuberculosis, drug use, and violence32–34 have moved both within and between metropolitan regions. During the period of TB resurgence in New York, the TB incidence rates in suburban counties were associated with the proportion of residents commuting to the city, as well as with the county’s population density and poverty rate.34 While the specific manifestation of a problem may change as it moves to the suburbs, underlying dynamics link the two phenomena. For example, gun violence in the suburbs may involve male loners going on a shooting spree in a school or workplace, while urban gun violence may result from turf battles between drug gangs. Both events are shaped by easy access to weapons, a culture that glorifies guns, and the lack of early intervention programs for people with uncontrolled anger.

Urban dominance, the term we use to describe the ideological hegemony of urban forms in a given region or period, may help to explain the diffusion of various urban life-styles from city to suburb and then to the nation as a whole. Heroin, crack, and HIV infection first spread in urban subpopulations in the 1970s and 1980s but were then disseminated throughout the country. On a more positive note, consumption of tropical fruits and vegetables, originating in U.S. urban ethnic enclaves, and long-distance marathons, starting in big cities, have also now proliferated throughout the nation. Both health-damaging and health-promoting habits are spread by people who move between areas but also by the mass media, which often glamorize urban life-styles.

While suburban populations usually fare better than urban ones on most health outcomes, both types of area have difficulty achieving national health goals. In a study of health conditions in the 100 largest U.S. cities and their surrounding suburbs, Andrulis35 found that only 30 cities and 56 of their suburban areas had met the goals for infant mortality set by the U.S. Department of Health and Human Services’ Healthy People 2000 process. On tuberculosis, only six of the 76 cities and 34 of the 75 suburbs for which data were available met the goals. Only two suburbs and no cities met the goals for reduction in low birth weight. Few cities or suburbs are expected to meet the Healthy People 2010 goal of eliminating ethnic and racial disparities in health, in part because of the failure to reduce residential segregation.36

Finally, suburbanization may have different impacts on the health of subpopu-
lations. The isolation of some suburban women and people of color from urban social networks, for example, may contribute to psychological distress, while men and children have readier access to alternate networks such as work or school.

In summary, the combined trends of migration and suburbanization changed the socioeconomic and racial/ethnic composition of U.S. cities in the postwar period. Suburbanization also put new pressures on municipal governments by reducing their tax base, on the physical environment by decreasing open space and increasing pollution, and on urban civil society by removing experienced community leaders. For suburban residents, the move from the city improved housing and often education but by the early 21st century, the health costs of the sprawl associated with suburbanization attracted more attention.

**Changing Role of Government**

The third national trend we highlight is the changing role of government. From the Great Depression through the 1970s, the federal government played an expanding role in improving urban conditions. It supported urban economic development, created safety-net programs to protect vulnerable populations, contributed to the construction of urban infrastructures for water, sanitation, and sewage, and subsidized an increasing portion of municipal budgets. Many of the signature federal programs of the New Deal and its successors (e.g., Aid to Families and Dependent Children, Medicaid and Medicare, Head Start, Model Cities, Jobs Corps) particularly benefited cities, in part because of the urban concentration of poverty.

A comparison of government response to declining economic conditions in New York City in the early 1930s and the mid 1970s illustrates the magnitude of these changes. In an effort to improve living conditions after the onset of the Depression, New York City Mayor Fiorello H. La Guardia and President Franklin D. Roosevelt initiated a broad set of new programs in 1935. With federal support, New York City hired 246,000 people to repair streets and highways and build new public housing projects, community swimming pools, water mains, sewer lines, and a sewage treatment plant. Works Progress Administration employees also built and repaired public hospitals, staffed the city’s first outpatient venereal disease clinic, and established two dozen baby health stations.

In contrast, when New York City faced another fiscal and social crisis in 1975, the city cut funds for the Department of Health by 25% and staffing by 30%, laid off all narcotics detectives, and closed firehouses and tuberculosis control programs. Some health researchers argue that these government decisions contributed to the resurgence of tuberculosis in the late 1970s and to the rapid spread of HIV infection and crack addiction among the city’s most vulnerable populations.

Thus, over the decades, as the need in cities increased, the public resources available to meet those needs declined. In 1978, the federal government was the source of 15% of municipal revenues in the United States, but by 1999, its contribution had fallen to 3%. In the past 25 years, more government functions have devolved to state and local governments; taxes have been cut at the federal, state, and local levels; some environmental and consumer regulations have been loosened; and many previously public services (e.g. sanitation, water, health care)
have been privatized. These political and economic changes have been accompanied by ideological shifts that challenge the ability of government to solve social problems and advocate instead free market solutions.45-48

These changing dynamics between cities and suburbs also reduced the political voice of urban residents. For much of the 20th century, urban political machines and labor unions had strong voices in many city and state governments and in Washington. By the last quarter of that century, however, in part as a result of the decline of urban political machines and lower urban voter turnout, the influence of suburban voters often surpassed that of urban ones.49 The devolution of responsibility for many health and social services from the federal to the state level, the changing role of government (illustrated by the 1990s Republican Contract with America proposals) further reduced urban influence. In recent times, some cities have experimented with more metropolitan forms of governance and some urban researchers have advocated a “metropolitics” that links the fate of cities with their surrounding suburbs.24, 31 These national trends in the role of government have affected the financial and political support that municipal governments can mobilize to confront new threats to health.

Globalization

The fourth factor shaping U.S. cities has been changes in the global economy. Globalization describes the increased mobility of goods, services, labor, technology, and capital throughout the world. Although cities have always been connected to the global economy, beginning in the post World War II period, and accelerating in the 1990s, the U.S. economy became ever more dependent on international trade and more capable of moving capital from one part of the world to another.

As manufacturing in cities declined, information and service industries became more important.50 Multinational corporations grew in size and power and a handful of “world cities” emerged as the command and control centers of international capital.51, 52 Globalization has affected the well-being of urban residents in several ways. First, the new mobility of U.S. capital allowed corporations that were once physically and politically tied to a place to move as the opportunity to reduce costs or increase profits emerged.53 Since many U.S. manufacturing corporations were located in or near cities, their departure led to reduced municipal revenues, unemployment, and population loss. Combined with the losses of people and jobs to the suburbs, these changes had catastrophic effects on some cities. Between 1975 and 1995, for example, Detroit, the center of the U.S. automobile industry, lost a third of its population but doubled its poverty rate.54

In the first half of the 20th century, manufacturing jobs had attracted immigrants and provided a pathway out of poverty for many urban residents and sustained municipal tax bases and economies.25, 26, 55 However, the subsequent job loss contributed to urban unemployment and underemployment, poverty, and the increasing racial and class segregation of the very poor.26, 56 Concentration of urban poverty among blacks and Hispanics further exacerbated the racial divide in the United States.57, 58 It also increased the pool of people available to the informal economy, including the drug trade, which had also become ever more globalized.59
In some cities, globalization has thus contributed to community destabilization and its attendant health problems.

At the same time, a new urban economy of information and services emerged.\(^5\) On one hand, cities continued to be the economic engine of the U.S. economy and the focal point for global interchanges of people, services, products, and money.\(^6,6\) On the other hand, the new economy created relatively few high-paying jobs and many low-wage ones, contributing to economic inequality and poverty.\(^26\) In both developed and developing countries, cities became the generators of economic inequality.

Globalization has created new winners and losers within cities. Populations that lack the skills, networks, and education to succeed in the global economy become marginalized and increasingly have trouble meeting the needs for housing, education, and health care that contribute to well-being. The growth of what some have called the “urban underclass”\(^26,45\) with its concentration of health and social problems is in part the result of these economic changes. Public health studies show that some sectors of the urban underclass have rates of mortality many times higher than the general urban population.\(^6,6\) This burden contributes to the “urban health penalty,” the excess morbidity and mortality associated with urban living.\(^6\)

In contrast, the winners of globalization, higher socioeconomic status urban and suburban residents, have new opportunities to maintain their health using their higher levels of wealth and education. With access to food from around the world, the best health care, and fitness centers and personal trainers, the upper sectors of the U.S. population have achieved an unprecedented standard of living. In some cases, wealthy urban residents may be a magnet for resources that can also improve the health of their less wealthy neighbors. This “urban health advantage”\(^6\) may explain lower rates of some health conditions and risky behaviors among urban compared with nonurban populations.

At the same time, however, even the privileged classes also face new global threats of infectious disease, terrorism, and other forms of political conflict.\(^6,6\) Since most world travelers and commercial goods first enter the country through a city, urban residents are on the frontlines of global disease interchanges. Cities have long taken measures to protect their residents from “foreign” diseases,\(^6,6\) measures now applied to avian flu, severe acute respiratory syndrome (SARS), the Marburg virus, and other emerging infections.

By the early 21st century, globalization brought a new threat to U.S. cities: terrorism, although some terrorist attacks had local origins. Terrorist attacks had the potential to impose substantial mortality and also to precipitate a range of other social responses, from increasing psychiatric symptoms to diversion of public health resources from dealing with persistent problems to combating potential attackers.

On another level, globalization has also profoundly affected American diets. By 1996, more than half of many types of produce consumed in the United States was grown outside the country.\(^70\) As more food enters the United States from other countries, residents have access to a more diverse diet but also face the risk of
biological or chemical contamination of food originating in countries with lower environmental standards. Because of multinational food markets, ethnic enclaves, and proximity to ports, urban residents appear to consume more foreign-grown food than do nonurban residents.

Globalization has shaped the world’s environments in ways that have both a direct and an indirect impact on cities. As the United States increases its dependence on and use of fossil fuels, often imported from other nations, it contributes to acid rain and ozone depletion,71 two global environmental problems. Recent studies suggest that thousands of urban deaths in the United States are caused by air pollution from transportation.72

In summary, globalization moves people and resources around the world, usually for the economic benefit of the most powerful sectors of society. Since cities are the nodes of global trade, these movements usually pass through cities, changing their physical and social environments and the resources available for health. For some people in some cities, globalization has brought important benefits—new jobs, a more varied food supply, and a cleaner environment as polluting manufacturing plants left. For many other urban residents, however, both in the United States and elsewhere, the free market globalization of the late 20th and early 21st centuries has reduced economic opportunity, marginalized vulnerable populations, and contributed to environmental degradation.

Municipal-Level Determinants
While recent national and international trends have influenced living conditions in U.S. cities directly, they are also mediated by a set of variables that in our framework we label municipal-level determinants of health. Here we examine how government, markets, and civil society have influenced the health of U.S. urban populations in the past 60 years.

Government
Government influences the health of urban populations by providing municipal services, regulating activities that affect health, and setting the parameters for urban development. Government policies can exacerbate or reduce social inequality and support living conditions that promote or damage health. Government activities in many sectors affect health, including those in public education, public transportation, public safety, criminal justice, welfare, housing, and employment. While the governmental structure in the United States—three levels of government each with three separate branches—creates a complex array of sometimes overlapping responsibilities, our interest here is in the operation of government at the local level. Table 2.1 lists the services that most local governments provide and describes their functions related to health and some health outcomes these functions influence. In this section, we consider local agencies that do not have a direct mission related to health; later, we consider the role of health care and public health services.
<table>
<thead>
<tr>
<th>Agency</th>
<th>Functions related to health</th>
<th>Health-related outcomes affected by agency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schools, education</td>
<td>Health and physical education, school health services, school safety, food programs, environmental protection</td>
<td>Injuries, chronic disease management, nutritional status, fitness</td>
</tr>
<tr>
<td>Social services, human resources</td>
<td>Safety-net programs, such as public assistance, food and Medicaid, child protection, family support</td>
<td>Health care utilization, nutritional status, family violence, mental health</td>
</tr>
<tr>
<td>Police</td>
<td>Prevention of interpersonal violence, reduction of substance abuse, control of community disorder, prevention and control of disasters</td>
<td>Injury, homicide, community conflict</td>
</tr>
<tr>
<td>Courts, jails; probation</td>
<td>Correctional health services, discharge planning, jail-based drug treatment and violence-prevention services</td>
<td>Tuberculosis, violence, drug use, use of mental health services</td>
</tr>
<tr>
<td>Fire services</td>
<td>Control and prevention of fires, building inspections</td>
<td>Fire-related injuries and deaths, community abandonment</td>
</tr>
<tr>
<td>Housing</td>
<td>Regulation of housing conditions, maintenance of public housing</td>
<td>Lead poisoning, asthma control, hypo- and hyperthermia</td>
</tr>
<tr>
<td>Homeless services</td>
<td>Shelter and health and social services for homeless</td>
<td>Substance use, infectious diseases, various pediatric conditions</td>
</tr>
<tr>
<td>Parks and recreation</td>
<td>Access to safe opportunities for exercise and recreation</td>
<td>Physical fitness, obesity, exposure to pollutants, perceptions of community well-being</td>
</tr>
</tbody>
</table>

(continued)
<table>
<thead>
<tr>
<th>Agency</th>
<th>Functions related to health</th>
<th>Health-related outcomes affected by agency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sanitation</td>
<td>Removal and safe disposal of trash, promotion of recycling, pest control</td>
<td>Exposure to pollutants associated with solid waste, perceptions of community well-being</td>
</tr>
<tr>
<td>Environmental protection, water supply</td>
<td>Control and reduction of air, water, soil, and noise pollution</td>
<td>Exposure to variety of pollutants</td>
</tr>
<tr>
<td>Streets and highways, traffic control</td>
<td>Traffic and roadway maintenance</td>
<td>Injuries and deaths related to motor vehicles, exposure to air and noise pollution</td>
</tr>
<tr>
<td>Mass transit</td>
<td>Development and management of buses, subways, and other modes of transit</td>
<td>Physical activity, motor vehicle injuries and deaths</td>
</tr>
<tr>
<td>Consumer protection</td>
<td>Regulation of food and other markets, consumer education</td>
<td>Food-related illnesses, access to tobacco and alcohol, consumer-product injuries or illnesses</td>
</tr>
<tr>
<td>Economic development</td>
<td>Increased employment opportunities, management of adverse health effects of development projects</td>
<td>Household income, exposure to project-related pollution</td>
</tr>
<tr>
<td>Human rights</td>
<td>Monitoring and control of discrimination and stigma</td>
<td>Injuries and mental health impact of bias-related attacks, level of social support for marginalized populations</td>
</tr>
<tr>
<td>Zoning and urban planning</td>
<td>Siting of undesirable or unhealthy facilities, management of population density</td>
<td>Exposure to toxins, perceptions of community well-being</td>
</tr>
</tbody>
</table>
Public transportation and local regulation of private transportation offer one example of how municipal services in non-health arenas can affect health. Public transportation facilitates population mobility in densely populated urban areas, increasing access to employment, health care, or stores that sell fresh fruits and vegetables. Lack of transportation has been identified as one determinant of low employment levels in inner cities. Effective traffic management and good public transportation reduce automobile injuries and deaths and speed the delivery of emergency medical services. It has been shown that more densely populated cities have worse cardiovascular survival, which may be due to the longer response times of emergency medical and fire services trying to reach persons after unexpected cardiac events.

Changes in mental health policy in the middle of the last century illustrate how policy shifts can have profound and unintended consequences on urban living conditions. In the 1960s and 1970s, many state governments closed mental hospitals in response to the development of new psychiatric medications, public outrage at the inhuman conditions in many hospitals, and a desire to save money. Over the next two decades, increasing numbers of mentally-ill people found their way onto city streets and into homeless shelters and jails. The terrible conditions in these settings endangered the health of the mentally ill themselves and raised public fears about crime, violence, and disorder. A policy change intended to improve the lives of the mentally ill instead contributed to worse outcomes for the mentally ill and more widespread perceptions of urban decline.

In the past few decades, the previously described national trends in government—the decline of urban political machines, a continuing squeeze on local tax revenues, and the political belief that government should do less rather than more—have reduced the ability of cities to respond forcefully to threats to health. For example, Klinenberg in his “social autopsy” of the more than 700 heat-related deaths during the Chicago heat wave in 1995 describes how these long-term changes in government affected that city’s capacity to respond to this disaster. By the mid 1990s, municipal officials, journalists, and other opinion makers believed that community organizations and families rather than the city agencies should take the lead in protecting vulnerable individuals, that people in need should be active consumers of often-privatized social services, able to find what they need in times of crisis, and that most problems that city governments faced should be solved by the paramilitary services (e.g., police and fire) that remained in the stripped-down municipal governments of the 1990s. As a result, Chicago failed to coordinate the many services that could have protected frail and isolated citizens, leading to hundreds of preventable deaths.

Other examples that illustrate the role of municipal government in health include the resurgence of tuberculosis in New York and other cities in the 1980s, related in part to the establishment of crowded, poorly ventilated homeless shelters and jails, as well as cuts in public health services, and the outbreak of cryptosporidium-related diarrhea in Milwaukee in 1993 that sickened 200,000 residents after a breakdown in the water filtration system.

Municipal governments have the capacity to modify the urban physical and
social environments and to deliver or oversee the delivery of public health, health care, and social services. To the extent that municipal governments have the political will, the financial resources, and the technical expertise to take on this role, they can play a powerful role in health promotion and disease prevention.

In the past several decades, cities have faced a host of new problems, including growing concentrations of poor people, increasing income inequality, epidemics of infectious diseases and substance abuse, increased public demands to control violence, loss of manufacturing jobs, and the inability of urban school systems to prepare most graduates to meet the demands of the new economy. At the same time, cities have fewer resources, a diminished local tax base, reduced federal support, and no national leadership advancing an urban agenda. City leaders debate whether to view municipal services as a strategy for community building or a consumer product that should be organized to respond to market forces. The outcome of this debate will determine how local governments use their resources to meet social needs.

The collapse of most municipal services in New Orleans in 2005 in the aftermath of Hurricane Katrina provides a stark illustration of the health and social consequences of municipal breakdowns. The government reaction to Katrina also shows the challenge of coordinating federal, state, and local public responses to threats and the high costs of inadequate coordination.

**Markets**

In early human history, the density of urban populations and the resulting specialization of labor created the conditions for markets. As a method of allocating scarce resources, markets are a quintessentially urban form. Today, local, national, and global markets play a central role in shaping the conditions that determine the health of urban populations. Markets allocate housing, jobs, food, medical care, and transportation and, because of privatization, increasingly play a role in education, public safety, and other sectors previously confined to the public realm.

The historical improvement in the standard of living in U.S. cities (and other areas) and the ensuing improvements in health are in large part a function of the free market’s ability to provide most people in this country with a growing supply of the necessities of life. Yet, persistent and growing socioeconomic disparities in urban health, the staggering toll from tobacco, concentrations of pollution in some urban areas, and a growing epidemic of obesity are among the indicators of markets’ limitation in protecting health.

Since employment has such a strong influence on health, the job market plays a particularly important role. Wilson describes how national and local factors interacted to reduce employment opportunities for disadvantaged urban residents after the 1970s. This failure of job markets contributed to the economic and social isolation of inner-city neighborhoods and their related health problems. For recent immigrants, the job market created urban niche employment in construction, garment production, household services, and other sectors, each with characteristic occupational health risks; immigrant construction workers, for example,
often face especially perilous working conditions. On a positive note, national prosperity in the 1990s made it easier for low-income urban residents to find work and, as a result, income inequality briefly narrowed.

An examination of housing and food provides other examples of the importance of markets to the health of urban populations. Despite unprecedented economic prosperity in the 1990s, the number of people who were homeless actually increased during that period. Homelessness has been associated with a variety of adverse health outcomes. While homelessness has many determinants, most observers agree that the fundamental cause of the increase was a decreasing supply of affordable low-income housing. New York City, for example, where Wall Street led the 1990s national prosperity, had a shortage of 250,000 to 500,000 housing units at the end of the decade. Housing investors made higher profits in high- and middle-income housing, government reduced support for subsidized housing, and the housing market was unable to meet this pressing demand, placing hundreds of thousands of mostly urban people at risk.

Markets also influence the availability of food. A recent study found that black Americans living in neighborhoods with supermarkets were more likely to consume fresh fruits and vegetables than those in neighborhoods without supermarkets. Previous studies suggest that poor urban neighborhoods often lack such stores. Market forces can also lead to improvements in diet, as the recent growth of urban farmer’s markets, which sell fresh produce directly to consumers, demonstrate.

Markets shape urban living conditions by distributing the necessities of life among various sectors of the population, according to the rules of the free market system. These market-determined housing, food, and employment niches offer differing opportunities for health. Where current markets fail to provide some people with sufficient food, shelter, or health care to maintain health, government or civil society needs to step in or population health will suffer. In the past decades, several vulnerable populations have emerged in U.S. cities: children living in poverty, the homeless, the frail elderly, certain sectors of people losing welfare benefits, recent immigrants, and inmates released from correctional facilities. Often, the current food, employment, housing, and health care markets have met their needs poorly, risking not only their own health but also the well-being of urban populations more broadly. What level of suffering or disease is socially acceptable is of course a political decision.

At the same time, markets can also affect the health of middle- and upper-income residents (as well as low-income groups) by making unhealthy products too easily available. The epidemic of obesity, easy access to tobacco, guns, and alcohol, and the rapid spread of polluting, rollover-prone sport utility vehicles in upscale urban neighborhoods demonstrate that market “successes” can be public health failures. Understanding the pathways by which specific markets influence health may lead to the development of more effective interventions, whether market-driven or government-sponsored.
Civil Society

Civil (or civic) society defines the space not controlled by government or the market where residents interact to achieve common goals. While these three sectors are conceptually distinct, in practice they work closely together. In the past decade, politicians from the left and the right, as well as academics from several disciplines have debated the role of civil society, whether it is contracting or expanding and what influence it has on health.90–93 Related concepts include social capital, social cohesion, social support, community capacity, and community competence.94–96

Several participants in civil society influence the health of urban populations. Community-based organizations, such as neighborhood associations and tenants groups, provide services, mobilize populations, and advocate for resources. Churches and faith-based organizations offer social support, safe space, and political leadership.97, 98 Social movements struggle for institutional and policy change.99 The state of civil society in a community at a given time can influence its ability to protect the health of residents, promote social cohesion, and counter isolation, stigma, or marginalization.

A few examples illustrate the roles these stakeholders have played in U.S. cities. Community-based organizations (CBOs) have a long history of working to improve urban living conditions.40 In the 1960s and 1970s, sometimes with government support, urban CBOs promoted economic development, established health centers, advocated for improved public education, and built new housing. In the 1980s and 1990s, CBOs were at the forefront of the struggle against the AIDS epidemic, playing a key role in health education, linking people to services, and encouraging policy change.100

In the last half of the 20th century, new social movements emerged, many with roots in urban communities.101 The civil rights, women’s, environmental, and gay rights movements each took on health issues, and their accomplishments contributed to higher levels of political participation, improved health care, reduced discrimination, and stronger environmental protection. While some of these movements eventually developed a national perspective, their origins and their most successful actions were usually in cities, whose dense social networks, defined political spaces, and histories of struggle provided fruitful recruiting grounds. More recently, movements for environmental justice, food security, and living wages demonstrate their potential for improving the health of urban populations.

Unlike municipal governments, which are obligated to employ traditional political strategies to achieve their objectives, social movements can use nontraditional and “contentious” strategies,102 thus promoting public debate and citizen involvement in deciding such health-related questions as the right to abortion services, the appropriateness of needle exchanges for injecting drug users, or the appropriate response to polluting hazardous-waste facilities.

Civil society is a powerful influence on a city’s social environment. Its strength and assets can determine to what extent a particular urban social environment supports health by buffering people against stressful conditions and events. For urban
health researchers, finding valid ways to assess the state of civil society and analyze its impact on specified health outcomes is an important task.

**Urban Living Conditions**

Urban living conditions are the most proximate influence on the health of city residents. These conditions are shaped by global and national trends, as well as the municipal characteristics described in the preceding section. Four such characteristics of urban life that are especially important to health include the people who live in a city, the physical and the social environment in which they live, and the array of health and social services that are available. Urban settings differ from nonurban ones in such dimensions as population size, density, and diversity, the level of development of the human-built environment, and the number and diversity of social networks and formal and informal service agencies. These characteristics are independent variables (i.e., determinants of health) and intermediate outcomes, the object of change necessary to achieve desired improvements in health. We consider here some of the ways that these characteristics have changed in the past several decades and the implications for the health of urban populations in the United States.

**Population**

Compared with nonurban areas, U.S. cities have higher concentrations of poor people, people of color, and recent immigrants. Some cities also have higher proportions of children and multi-millionaires. But although urban and nonurban residents differ in important ways, it is important to acknowledge that these differences are not inherent within individuals—there is no urban genotype with unique genetic characteristics. Rather, social processes such as immigration and suburbanization have sorted people into various urban and nonurban settings. Similarly, other social processes, for example, racial and gender discrimination, housing markets, and access to higher education, sort urban residents into different communities and social strata. Within these niches, the inherent characteristics of individuals interact with the particular social and physical environment to produce an “urban phenotype.”

Biological and social markers of the “urban phenotype,” the observable characteristics of city dwellers, might include lungs blackened by exposure to higher levels of air pollution, immunity to prevalent infectious diseases, psychological distress related to the quality of the living environment, and membership in several social networks (including the potential for drug using and sexual networks and gangs, as well as a variety of civic and social clubs). This belief that the characteristics of place are as important as those of people has led to “place-based” research that seeks to link health outcomes to exposure to various dimensions of the urban environment. How a unique set of urban conditions becomes “embodied” in a particular population and how those states of health in turn influence the health of others defines a key question for urban health researchers. For example, the compromised immune systems of urban homeless and drug using populations...
changing living conditions; changing health

in U.S. cities in the 1980s reflected ("embodied") their strenuous living conditions and in turn contributed to the wider spread of tuberculosis and HIV infection.\textsuperscript{104}

As we have previously observed, in the United States, some of the differences between urban and nonurban areas are diminishing. Moreover, there is still wide variation in population characteristics within urban neighborhoods and between different cities and metropolitan areas. This variability provides urban health researchers with rich opportunities for studying the interactions between population characteristics and the other dimensions of urban life.

**Physical Environment**

The urban physical environment includes the built environment, the air city dwellers breathe, the water they drink and bathe in, the indoor and outdoor noise they hear, the parkland inside and surrounding the city, and the unique geological and climate conditions. McNeill\textsuperscript{71} has argued that what distinguished the 20th century from previous ones and cities from nonurban areas is the degree to which humans have become the primary influence on the physical environment.

The human-built environment includes housing, which can influence physical and mental health, increasing incidence of asthma and other respiratory conditions, injuries, and psychological distress, and negatively affecting child development.\textsuperscript{105} As the United States faces a growing shortage of affordable housing in its cities, these housing-related health problems may increase.\textsuperscript{106} Urban design may also influence crime and violence rates,\textsuperscript{107, 108} demonstrating the close interactions among urban physical and social environments.

Highways and streets can pollute water through runoff, destroy green space, influence motor vehicle use and accident rates, and contribute to the urban heat sink, absorption of heat that can increase the temperature in cities by several degrees. The urban infrastructure is also part of the physical environment and determines how a city provides water and energy and disposes of garbage.\textsuperscript{39} As this expensive infrastructure ages in a period of declining municipal resources, breakdowns may increase, causing health problems related to water, sewage, or disposal of solid waste. Depending on their construction, city structures like bridges and skyscrapers may be vulnerable to natural or human disasters, as the San Francisco earthquake and the September 11, 2001, attack on New York City demonstrated.

In the first half of the 20th century, air pollution in the United States increased steadily as industrialization progressed, industries and homes used coal for power and heat, and automobiles proliferated. Cities had the worst air pollution.\textsuperscript{71} In the second half of the century, however, and especially in the past 25 years, many forms of air pollution decreased as coal was phased out, manufacturing plants moved to the suburbs or abroad, lead was banned from gasoline, and the automobile industry was forced to build cleaner cars. The environmental movement played an important role in these improvements, prodding local and federal governments to adopt and enforce environmental regulations that protected human health.\textsuperscript{109} Despite these advances, however, as late as the mid 1990s, researchers estimated that urban air pollution contributed to 30,000 to 60,000 U.S. deaths a year.\textsuperscript{72, 110}
Other threats to public health such as hazardous-waste landfill sites, often located in or near urban areas, may be associated with risks of low birth weight, birth defects, and cancers. Noise exposure, a common urban problem, may contribute to hearing impairment, hypertension, and ischemic heart disease. Some environmental threats are concentrated in low-income urban neighborhoods, exacerbating disparities with better-off areas.

Social Environment

The social environment describes the structure and characteristics of relationships among people within a community. Components of the social environment include social networks, social capital, and the social support that interpersonal interactions provide. For a comprehensive definition of many of these factors, see Berkman and Kawachi. The social environment influences health through a variety of pathways, including the support of individual or group behaviors that affect health (e.g., smoking, diet, exercise, sexual behavior), buffering or enhancing the impact of stressors, and providing access to goods and services that influence health (e.g., housing, food, informal health care). A city’s social environment can support or damage health.

Many of the national- and municipal-level changes discussed in this chapter have exposed urban residents to new social conditions in the past century that have had profound, but complex, effects on health. For example, in the United States the number of persons living in the 100 largest cities has increased from 42 million to 56 million between 1950 and 2000. Nearly half of the 100 largest cities are now home to more “minorities” than whites, with 71 of these cities losing white residents and a 43% increase in the number of Hispanics. Immigration to cities continues; for example, there are 76 different language groups in Brooklyn, a single borough in New York City. More Americans now have the opportunity to interact with people who look different, have different values and beliefs, and may speak a different language. These opportunities have the potential both to enhance health (e.g., improve diet, broaden social support) and to damage it (e.g., break down health-protecting values related to drug or sexual behavior). Similarly, overall racial diversity may simply mask increased regional segregation. Between 1980 and 2000, segregation of blacks in the United States declined, but levels of segregation were still highest for blacks, and several measures of the segregation of Hispanics and Asians increased. Segregation has been associated with poor health outcomes and probably operates through several pathways.

The variety of social settings available within cities can affect the well-being of many urban residents. The individual who may be considered “deviant” in a homogeneous community can find others with similar characteristics in a more diverse setting. The emergence of urban gay communities illustrates this phenomenon. The young immigrant may identify with both the culture of the country of origin and urban youth culture, reducing the dissonance of transition. Another prominent example of the complex changes in the social fabric of cities during the past century has been the interplay between racial stratification and segregation.
Ultimately, the growing role of mass media in particular and market forces in general has had a profound effect on the changing social environment of modern U.S. cities. Today parents, schools, and churches, traditional mainstays of the urban social environment, compete with hip hop stars, tobacco and clothing advertisers, and Hollywood for the attention of their children. As Madison Avenue and Wall Street search for new markets, they have packaged and disseminated selective elements of inner-city (and mainstream) culture—a glorification of misogyny, violence, and drug and alcohol use and worship of consumerism. This barrage of messages now constitutes an important part of the urban social environment, as yet unstudied in systematic ways by health researchers.

Health and Social Services
Cities are characterized by a rich array of health and social services. Even the poorest urban neighborhood often has dozens of social agencies, each with a distinct mission and service package. Their organizational life-span may be short, the funding inadequate, the quality of services uneven, and the coordination with other providers limited, but these assets provide an important resource for health that may not be available in rural or even in suburban neighborhoods. Many of the inner-city health successes of the past two decades, for example, tuberculosis control and reductions in HIV transmission, teen pregnancy rates, and new cases of childhood lead poisoning, have depended in part on the efforts of these groups.

Low-income urban residents, however, face significant obstacles in finding health care. First, low-income people, blacks and Latinos, overrepresented in urban areas, are more likely to lack health insurance coverage. In turn, uninsured persons face barriers to care, receive poorer quality care, and are more likely to use emergency systems. Recent immigrants, homeless people, and inmates released from jail or prison, all disproportionately represented in urban areas, also face specific obstacles in obtaining health care. These populations then put a burden on health care systems not adequately funded or prepared to care for them.

Social services for disadvantaged or marginalized populations are often susceptible to an economic cycle that leaves cities least able to support services when needs are greatest as a result of declining living conditions. In the past few years, for example, the decline in the national economy and tax revenues has forced many cities and states to reduce services at the very time unemployment, homelessness, and hunger are increasing.

U.S. cities are characterized by sharp disparities in wealth between relatively proximate neighborhoods. These disparities are often associated with disparities in quality of care. The presence of well-equipped, lucrative, practice opportunities in the same city decrease the likelihood that service providers will work in lower paid, public service clinics, particularly when these latter services are burdened by limited resources and wavering political commitment.

In summary, the interactions among the availability, affordability, accessibility and quality of health care and social services and the relative demands for service by high-need populations determine their role in improving the health of
urban populations. While health care advocates in urban areas are rightly pressing the U.S. health care system to resolve issues of access and quality, most public health researchers agree that improvements in health care constitute only one part of a comprehensive strategy to improving health.\textsuperscript{124}

**Public Health Intervention and Research**

While public health interventions are at the center of our interest in this volume, it is only after considering the range of factors that influence urban living conditions that we can profitably turn our attention to this task. For public health professionals, the specific characteristics of the urban setting for which they are responsible shape the opportunities and constraints for intervention. The attributes of the population, the urban physical and social environments, and the health and social service systems constitute the raw materials for constructing public health programs. Combining these ingredients into effective interventions that address the realities of urban life at the start of the 21st century is the challenge that faces public health today.

The urban public health community includes those whose primary mission is to undertake action or research for the express purpose of promoting health and preventing disease. It consists of local and state health officials, some health care providers, and some participants in civil society. Its ability to contribute to health is shaped by enduring structures, global and national trends, and the actions of government, markets, and civil society. In the past few decades, U.S. public health practitioners have carried out a wide variety of programs designed to improve the health of urban populations.\textsuperscript{125, 126}

Historians have debated the relative influence on urban health of organized public health efforts compared with more general improvements in living conditions.\textsuperscript{127, 128} Recent research suggests it may be more useful to examine this question in the particular than in general,\textsuperscript{129} suggesting another priority for urban health researchers. For example, experience with resurgent tuberculosis in U.S. cities indicates that adequately funded public health programs (e.g., directly observed therapy or DOT programs) can contain some epidemics without addressing the more fundamental social conditions that contribute to their spread.\textsuperscript{104}

How do changing social and economic conditions interact with public health interventions and medical advances to influence health outcomes? In the 1990s, homicide rates declined precipitously in many U.S. cities, teenage pregnancy rates dropped, and new cases of AIDS fell sharply. Some studies suggest that police practices, sexuality and HIV education, and the wider availability of antiretroviral medications contributed to these respective outcomes, but it is also true that all three trends unfolded in a period of national prosperity, when living conditions for at least some vulnerable populations improved. Future research should focus on understanding these relationships. It may be that developing interventions that can “ride the wave” of improving social conditions can achieve better outcomes than those forced to fight the tides of negative trends.

In the United States, public health interventions have used various strategies
to promote health and prevent disease among urban populations. These include strategies to modify individuals, usually by education to change risk behavior; to modify social environments by providing increased social support, enhancing social networks, or changing social norms; to change physical environments by improving housing, regulating pollution, or promoting new approaches to urban planning; and to modify health and social services by increasing access, offering enhanced services, training providers, and improving the quality of care. A recent review of published reports on health interventions designed to reduce selected health problems in U.S. cities found that the changing individuals and health care services were the most frequently used methods and that few interventions operated on more than one or two levels.126

The framework proposed in Figure 1.4 in Chapter 1 suggests that interventions to improve health are more likely to be effective if they address the full range of determinants of urban living conditions.

Conclusions

Enduring structures, global and national trends, municipal determinants, and urban living conditions in communities have interacted to create the unique patterns of health and disease that characterized U.S. cities in the last half of the 20th century. In the 19th and 20th centuries, public health researchers focused on the health consequences of industrialization and urbanization. In recent decades, urban researchers have emphasized the impact of the diffusion of urban characteristics to wider metropolitan regions. To develop policies and programs that can make healthy cities a reality in the United States and in other developed and developing nations in the 21st century, we need to move beyond describing the health-related characteristics of various urban populations and analyze how living conditions in cities and metropolitan areas affect health, especially differentially between groups within cities. Such a shift in framework is necessary if we are to make comparisons that can inform interventions at the appropriate level and evaluate their effectiveness in improving the health of urban populations.

References


PART II

Determinants of Health in Cities
The Urban Social Environment and Its Effects on Health

Adam Coutts and Ichiro Kawachi

Introduction
Do the places where people live make a difference to their health? An awareness of community variations in health status has existed since at least the 19th century. However, the empirical examination of area-level influences on health represents a relatively recent phenomenon made possible by the introduction of multilevel analytical methods into public health and epidemiology. Although most empirical investigations so far have focused on attempts to isolate “neighborhood”-level influences on health, the literature in this area is also highly relevant to the burgeoning field of urban health, highlighting how characteristics of one’s place of residence directly or indirectly shape health.

Based on the accumulated multilevel evidence, there is now broad consensus that specific characteristics of neighborhood of residence (e.g., socioeconomic position) are associated with the likelihood of better or worse health even after controlling for individual characteristics. The individual outcomes examined in these studies have ranged from health-related behaviors, such as physical activity, smoking prevalence, and diet to biological markers of cardiovascular disease risk, such as body mass index and systolic blood pressure, and, ultimately, to major health endpoints, including all-cause mortality, heart disease incidence and mortality, and self-rated health.

Although an extensive range of health indicators has been studied, there are two principal limitations of this work in the context of the study of the urban environment and its relation to population health. First, the characterization of neighborhood-level variables in the same studies remains somewhat limited. The majority of studies so far have focused on a single dimension of neighborhood structure—the prevalence of economic deprivation—in relation to health
outcomes. Therefore, we still have a limited understanding of what it is about poor neighborhoods that leads to poor health outcomes. In the study of the urban context in particular, the predominant focus of the neighborhood literature on deprived communities and on how neighborhood deprivation affects health has resulted in a limited understanding of how a full range of characteristics of urban neighborhoods may be responsible for shaping population health, both negatively and positively.

Second, most of the literature in this area has focused on documented multi-level relationships with much more limited focus on the mechanisms that explain the associations between characteristics of the neighborhood environment and health in cities. Thus, we need to begin to unpack the observed association between neighborhood poverty and poor health into its component pathways and mechanisms.\textsuperscript{2, 15} Such an understanding would provide an important step toward developing interventions to improve population health.\textsuperscript{15, 16} For example, studies have shown that the number of supermarkets is lower\textsuperscript{17} and the number of liquor stores and fast food outlets higher\textsuperscript{18–20} in more deprived neighborhoods. In turn, the availability of services and amenities (such as grocery stores and pharmacies, as well as recreational spaces) may facilitate or constrain a person’s ability to engage in health-promoting behaviors such as eating fresh vegetables, obtaining medicines, or getting regular exercise.\textsuperscript{21, 22}

We suggest that a good place to begin to think about neighborhood influences on health is to distinguish between different dimensions of neighborhood environments that may affect health in urban areas.\textsuperscript{2} Broadly speaking, three dimensions of urban neighborhoods may be distinguished: (a) the service environment (i.e., access to and quality of neighborhood services and amenities), which has already been alluded to, (b) the physical environment (e.g., air pollution, traffic patterns, housing stocks), which is discussed in Chapter 4, and (c) the social environment (i.e., the social norms and values shared by members of social groups as well as the quality, content, and volume of interpersonal interactions within urban communities).

This chapter provides an overview of the characteristics of the urban social environment and how they may be linked to health outcomes through diverse processes, including social disorganization, contagion, collective socialization, and social capital.

**A Framework for Understanding the Urban Social Environment**

A starting point for understanding the urban social environment is to distinguish between social processes that are “pathogenic” and those that tend to promote healthy norms and behaviors (Table 3.1). This framework is deliberately simplified; for example, processes that are listed on the “positive” side of the ledger (such as social capital) do not invariably promote good health and vice versa. In addition, there is considerable overlap between the concepts listed in the table; for example, “social disorganization” (on the “pathogenic” side) is partly defined by a
lack of social capital (on the “salutogenic” side). The framework is therefore best approached as a memory aid. We discuss each concept in turn.

**Social Disorganization**

Social disorganization theory stems from Shaw and McKay’s seminal work from the Chicago School, which sought to explain the existence and persistence of ecological patterns of crime and delinquency in Chicago. According to Shaw and McKay, structural characteristics of certain urban neighborhoods—such as persistent poverty, high population turnover, and ethnic heterogeneity—impeded the establishment of social connections and community attachment, resulting in the inability of residents to realize common goals. These conditions, which Shaw and McKay referred to as “social disorganization,” resulted in the lowered ability of communities to exercise social control over the development of delinquency and crime.

The concept of social disorganization thus originated from urban criminology. However, various offshoots of the theory have been examined in public health settings. For instance, residential exposure to crime and violence (a direct manifestation of social disorganization) has been linked to health outcomes such as asthma prevalence, as well as to patterns of physical activity.

An additional example of the application of social disorganization theory to health outcomes is represented by attempts to measure residential exposure to physical and social disorder—or what Macintyre and colleagues have termed “incivilities,” consisting of environmental manifestations of vandalism and deterioration in public infrastructure accompanied by a decline in the reputation of the neighborhood. James Q. Wilson’s “broken windows” theory represents a variation on this theme and suggests that the appearance of the local physical environment provides certain cues that control and influence behaviors, such as high risk sexual behaviors.

In an ecological study of 107 U.S. cities, Cohen and colleagues found that the prevalence of abandoned housing was associated with rates of sexually-transmitted disease, homicides, suicides, and all-cause premature mortality rates, even after controlling for sociodemographic factors. In an earlier study, Cohen and colleagues found that an index of broken windows (made up of the proportion of houses with major structural damage, street segments with graffiti, street segments with accumulated garbage, and street segments with abandoned vehicles) explained more of the community variance in gonorrhea rates within New Orleans than did measures of poverty. Among communities with a low broken-window index, poverty rates were not associated with gonorrhea rates, whereas the highest rates were found among communities with both high poverty and high broken windows. The authors speculate that boarded-up housing and broken windows may be related to worse health outcomes because of their potential adverse impact on social relationships and opportunities to engage in healthful behaviors.

Ross and Mirowsky analyzed a 1995 survey of a representative sample of 2,482 Illinois residents and found that individuals who report living in neighborhoods with high levels of crime, vandalism, graffiti, danger, noise, and drugs were
Table 3.1. A Framework for Conceptualizing the Urban Social Environment

<table>
<thead>
<tr>
<th>Pathogenic influences</th>
<th>Salutogenic influences</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Social disorganization</strong>&lt;sup&gt;1&lt;/sup&gt;</td>
<td><strong>Collective socialization</strong>&lt;sup&gt;5&lt;/sup&gt;</td>
</tr>
<tr>
<td>- Residential exposure to crime and violence&lt;sup&gt;2&lt;/sup&gt;</td>
<td>- Adult role models&lt;sup&gt;6&lt;/sup&gt;</td>
</tr>
<tr>
<td>- “Incivilities” and “broken windows”&lt;sup&gt;3&lt;/sup&gt;</td>
<td>- Informal social control&lt;sup&gt;7&lt;/sup&gt;</td>
</tr>
<tr>
<td>- Reduced informal social control</td>
<td>- Collective efficacy&lt;sup&gt;7&lt;/sup&gt;</td>
</tr>
<tr>
<td><strong>Social isolation</strong>&lt;sup&gt;4&lt;/sup&gt;</td>
<td><strong>Social capital</strong>&lt;sup&gt;8–10&lt;/sup&gt;</td>
</tr>
<tr>
<td>- Decline of community institutions</td>
<td>- Psychological sense of community&lt;sup&gt;11, 12&lt;/sup&gt;</td>
</tr>
<tr>
<td>- Reduced informal social control</td>
<td>- Neighboring and neighborhood cohesion&lt;sup&gt;13–15&lt;/sup&gt;</td>
</tr>
<tr>
<td><strong>Behavioral contagion</strong>&lt;sup&gt;5&lt;/sup&gt;</td>
<td>- Community competence&lt;sup&gt;16, 17&lt;/sup&gt;</td>
</tr>
<tr>
<td>- Social learning of risk behavior</td>
<td></td>
</tr>
<tr>
<td>- Negative role models</td>
<td></td>
</tr>
</tbody>
</table>

more likely to mistrust others. They suggested that the sense of powerlessness, which is common in such neighborhoods, amplifies the effect of neighborhood disorder on mistrust (see the discussion under “Social Capital”).

**Social Isolation**

William Julius Wilson’s<sup>30, 31</sup> theory of social isolation provides an additional mechanism by which individual well-being may be affected by larger social and economic processes in urban areas. Specifically, Wilson has posited that middle-class flight from the inner city over decades (combined with residential segregation) has resulted in the progressive decline of the social and economic viability of local institutions—such as churches, schools, voluntary organizations, and the family. This process has been accompanied by subsequent declines in the capacity of residents to maintain informal social control. As the regulatory power of the local community has dwindled, residents have been increasingly exposed to problem behaviors, such as crime, substance abuse, and violence, while simultaneously becoming isolated from mainstream norms (such as regular employment). In turn, potentially health-compromising behavioral orientations have been transmitted across generations, further contributing to community decline.

According to Wilson, the combination of persistent poverty and social immobility gives rise to the social and spatial isolation of residents from mainstream
References


Sources of influence. Residents adopt behavioral orientations in order to survive, such as displays of “tough” behavior (for an example, see Anderson’s work). The cultural transmission of violent and other risky behaviors, such as smoking, drinking, risky sexual activity, and poor diet, in these contexts may have serious health consequences. Indeed Fitzpatrick and LaGory suggest that disadvantaged communities with limited access to local mainstream institutions may experience the emergence of “health related subcultures.” These subcultures may in turn promote a tolerance for risky life-styles and detachment from mainstream values.
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Behavioral Contagion

A third “pathogenic” mechanism operating within the urban social environment is referred to as the “contagion model.” According to this model, if children grow up in a community where “their neighbors commit crimes, have children out of wedlock, or drink too much, the children will be more likely to do these things themselves. Conversely, if the children grow up in a neighborhood where most others ‘set a good example,’ the children will tend to follow that example.” In other words, the contagion model can be thought of as analogous to the spread of infectious disease; the uptake of adverse health behaviors is hypothesized to occur through social learning.

Since undesirable behaviors are also more prevalent in disadvantaged neighborhoods, the contagion model has been put forward as a potential mechanism to account for the clustering of poor health outcomes among lower socioeconomic individuals, particularly in densely populated urban areas. A child raised in a disadvantaged neighborhood is more likely to take up health-damaging behaviors than one raised in a more affluent neighborhood, regardless of his or her family background. Social epidemiologists have sometimes referred to this phenomenon as “dependent happenings,” that is, an individual’s risk of engaging in a particular behavior is determined by the population (or community) rate of that same behavior. Some evidence suggests that contagious processes apply to rates of attempted suicide as well as to the initiation of smoking among minors. The phenomenon of positive adult role models (which is, in turn, an aspect of collective socialization) can be thought of as the mirror-image process of contagion and is discussed in the next section.

Collective Socialization

On the “positive” side of the ledger (Table 3.1), collective socialization refers to the role of community adults—not just a child’s own parents—on child development, behaviors, and health outcomes. Three overlapping processes can be distinguished: adult role models, informal social control, and collective efficacy.

Adult role models within the community provide important cues to youth, such as labor market attachment. Crane examined the effect of the number of adult role models in a community, as assessed by the proportion of adult residents who were in professional occupations. He found little differences across communities in pregnancy rates or school drop-out rates when the proportion of professional adults within communities ranged between 5% and 40%. However, when the number of professionals fell below 5%, a “tipping point” was reached. Among black schoolchildren, as the percentage of professional workers fell from 5.6% to 3.4%, community rates of school drop-outs and teenage child-bearing doubled. We hasten to add that the ability of adults in the community to serve as role models hinges on upstream structural conditions. Thus, as Elijah Anderson cautions in his ethnographic study of a deprived urban community in the United States:

Today, as the economic and social circumstances of the urban ghetto have changed, the traditional old head [the local terminology for adult role models]
had been losing prestige and credibility as a role model. One of the most important factors in this loss is the glaring lack of access to meaningful employment in the regular economy, resulting in more and more unemployed and demoralized young black people. When gainful employment and its rewards are not forthcoming, boys easily conclude that the moral lessons of the old head concerning the work ethic, punctuality, and honesty do not fit their own circumstances. (p. 72)

A second aspect of collective socialization, informal social control, refers to the capacity of a group to regulate the behavior of its members according to collectively desired (as opposed to forced) goals. In other words, in contrast to externally enforced actions (such as a police crackdown), informal social control focuses on “the effectiveness of informal mechanisms by which residents themselves achieve public order.”36 Examples of informal social control include “the monitoring of spontaneous play groups among children, a willingness to intervene to prevent such acts a truancy and street-corner ‘hanging’ by teenage peer groups, and the confrontation of persons who are exploiting or disturbing public space.”36 As is evident from the foregoing description, informal social control has been primarily evoked in the context of the community’s ability to control deviant (and criminal) behavior. However, the concept can also be generalized to health behaviors and health outcomes. For instance, the prevalence of smoking and drinking by minors, as well as drug abuse and other “deviant” health behaviors, are likely to be influenced by the extent to which adults in the community (not just the children’s parents) exercise informal social control over such behaviors. Validated scales to measure informal social control exist (for example, from the Community Survey of the Project on Human Development in Chicago Neighborhoods),36 but their utility in public health settings remains to be tested.

A third dimension of collective socialization is collective efficacy, which is the neighborhood counterpart to the concept of individual efficacy, that is, the global willingness of residents to intervene on behalf of the common good.36 In terms of measurement, collective efficacy is conceptualized as the combination of informal social control and neighborhood social cohesion. According to the theory of collective efficacy, the willingness of local residents to intervene for the common good depends crucially on the presence of mutual trust and solidarity among neighbors.36 To this extent, the concept of collective efficacy overlaps with social capital. The theory thus links mutual trust and solidarity (i.e., elements of social capital) within a community with shared expectations for pro-social action (informal social control).37

The pathways through which neighborhood collective efficacy may influence health outcomes include—in addition to informal control over deviant behaviors—the ability of residents to extract resources and to respond to threatened cuts in public services (such as the closing of health clinics), as well as to engage in sustained collective action to manage neighborhood physical hazards (e.g., the location of toxic-waste sites).37, 38 Initially, Sampson and colleagues36 demonstrated the association of collective efficacy with neighborhood variations in crime within Chicago city, suggesting that health may be indirectly promoted by limit-
ing the health damaging consequences of violent victimization. There are plausible grounds to believe, however, that the concept of collective efficacy may be associated with health outcomes through additional pathways, such as the ability of residents to undertake coordinated action (e.g., pass local ordinances to restrict smoking in public places). As for informal social control, a validated instrument exists for the measurement of collective efficacy at the community level.

Social Capital

The concept of social capital broadly refers to “the resources available to individuals and groups through social connections.” The “capital” aspect of social capital is embodied in the exchange of social support and levels of interpersonal trust, as well as patterns of civic engagement and voluntarism that exist within communities. In one sense, the concept of social capital is not new; an extensive prior literature in community psychology has identified related constructs such as “the psychological sense of community” and “neighboring” as well as “community competence,” which share much in common with the core dimensions of social capital.

Despite the increasing use of the concept in public health, social capital remains a “fuzzy” and contested concept. There is lack of uniformity across studies in the choice of indicators to measure social capital. Most studies have used some combination of measures of trust, perceived reciprocity, and social participation aggregated to the community (or other group) level. However, other proxy measures have also been used, including volunteerism, community attachment, and even electoral participation. The heterogeneity of indicators used to measure social capital reflects the changing use of the concept, which was originally imported into public health through sociology, political science, and criminology, as well as the reliance of investigators on secondary sources of data (i.e., surveys carried out for purposes other than public health).

An increasing number of ecological studies have demonstrated an association between community social capital and population health outcomes (for a review of the evidence see Kawachi et al.45). For example, in a study utilizing the Community Survey data collected as part of the Project on Human Development in Chicago Neighborhoods, Lochner and colleagues found that neighborhood social capital—as measured by reciprocity, trust, and civic participation—was associated with lower neighborhood mortality rates after adjustment for neighborhood material deprivation. Higher levels of neighborhood social capital were associated with lower neighborhood death rates for total mortality as well as death from heart disease and “other” causes for white men and women and, to a less consistent extent, for black men and women.

Recent work that has explicitly tested cross-level interactions has begun to demonstrate the simultaneous presence of both the beneficial and negative aspects of community social capital. In an analysis of the Social Capital Community Benchmark Survey involving 21,456 individuals nested within 40 U.S. communities, Subramanian and colleagues found that individuals who reported high levels of trust of others in the community benefited from living in places where oth-
ers also shared the same opinion. On one hand, the higher the level of trust within the community, the lower was the probability of reporting poor self-rated health among trusting individuals. On the other hand, a trend was found in the opposite direction for individuals expressing mistrust of others: the more trusting the community in which they lived, the worse their health status. In another study, Caughy O’Brien and colleagues examined 200 African American families with young children residing in 39 Baltimore neighborhoods. They found that for children living in poor areas, having a mother with low community attachment was associated with lower levels of behavioral and mental health problems, whereas for children living in more affluent areas, having a mother with low levels of community attachment was related to higher rates of such problems.

These intriguing but preliminary findings suggest that any intervention to strengthen social capital within communities is likely to be associated with both risks and benefits to different groups. It also points to the necessary examination of the interactions between individuals and their social contexts.

**Conclusion**

Although the discussion in this chapter is confined to the potential health-relevant processes within the urban social environment, it goes without saying that the urban social environment is shaped by the surrounding physical environment and vice versa. We acknowledge the vast empirical literature establishing the ways in which housing affects physical and psychological health (see, for example, Burridge and Ormandy; Gill and de Wildt; Howden-Chapman; Thompson et al.). Indeed in neighborhood renewal and regeneration, emphasis tends to be placed on the physical improvement of the house and the built environment in order to generate health changes among residents. As noted in other chapters of this book, there are many studies that document the health effects of the indoor physical aspects of housing, such as air quality, dust mites, mouse allergens, heating, and damp housing, as well as the psychological health impact of residential noise and the ultimate housing problem, homelessness.

The social environment, however, has tended to receive less systematic attention from researchers and policy makers. The nascent research field examining the pathways linking neighborhood social environments to health marks a promising development in efforts to address the social determinants of urban health as interdependent and multilevel. As interest in urban health grows, research that better characterizes elements of the social environment that shape the health of urban populations and, specifically, the mechanisms through which these characteristics shape population health may offer guidance to urban planning and public health efforts aimed at improving population health in cities.

**References**


The Urban Physical Environment and Its Effects on Health

Susan Klitzman, Thomas D. Matte, and Daniel E. Kass

Introduction

This chapter explores the relationship between characteristics of the urban physical environment and health. An understanding of the relationship between the urban physical environment and health must be ecological, taking into account issues of multilevel causality, reciprocity, social inequality, and change. In Chapter 1 of this volume and elsewhere, urban and public health scholars have proposed dynamic, multilevel models that consider the range of macro- and micro-level factors that influence health. In this brief review, we focus on two primary spheres of influence: underlying or community-level factors, which include population density, land-use patterns, physical infrastructure systems, and buildings, and mediating or proximate-level factors, which include air and water quality, dust and noise levels, local climate, pests, and physical safety and security. A framework for these influences is illustrated in Figure 4.1.

The defining characteristics of the urban physical environment—density, diversity, and complexity—are identical to those of the urban social environment. The convergence of large numbers of people, engaged in a variety of commercial, industrial, and residential activities and confined to a finite area, has a profound impact on the physical environment and, in turn, on the health of its inhabitants. Some of the connections are obvious: vehicle emissions, exposure to air pollution, and respiratory health; sewage spills, water contamination, and gastrointestinal illness; and poorly maintained older housing, lead-paint hazards, and childhood lead poisoning. Others are less direct but increasingly recognized as important, such as the relationship of land-use patterns to the propensity of people to walk, maintain fitness, and reduce risks of obesity.
Figure 4.1. A Conceptual Framework for the Urban Physical Environment and Health

Social context

Underlying, community-level factors → Mediating, proximate-level factors → Health

Underlying, community-level factors:
- Population density
- Land-use patterns
- Physical infrastructure systems
- Buildings

Mediating, proximate-level factors:
- Air quality
- Water quality
- Dust level
- Noise level
- Local climate
- Pests
- Physical safety and security

Health
There are several challenges to specifying and sorting out the relationship among aspects of the urban physical environment and health. First, most urban environmental problems do not respect physical or conceptual boundaries. Issues relating to air and water quality, worker health and safety, sanitation and waste management, land use, the built environment and transportation are often intertwined at neighborhood, city-wide and regional levels. Recent events illustrate this interconnectedness: West Nile Virus, terrorist threats, and the Northeastern blackout of August 2003. In the latter incident, localized power outages touched off a chain reaction that ultimately affected 50 million people. Disruptions in one element of the physical infrastructure (the electrical power grid) had a rapid impact on transportation, sewage, commerce, communications and health care delivery.

Second, the physical and social environments interact in complex ways to influence health and well-being. Distinguishing the health impact of the urban physical and social environments sometimes involves studying different pathways with the same origins and often the same health endpoints. Decisions about building, land use, and air and water quality may be influenced by concerns for human health, but they also are based on economic and political considerations, with the result that exposure to many urban environmental hazards is socially patterned. For example, low-income communities of color are often disproportionately exposed to old, dilapidated housing and the related problems of lead paint, vermin, mold, indoor air pollution, and physical safety risks. Indeed, much of what is known about the relationship between the urban environment and health is made possible unfortunately by the inherent intra- and intercity variability in environmental conditions. This variability is largely a function of the interaction between income on one hand and race and ethnicity on the other. Nationally, low-income urban communities have older housing stock, and children living in older housing stock are 30 times more likely to have elevated blood-lead levels (>10 ug/dl) than middle-income families in newer housing. Among those in older housing, low-income children are four times more likely than middle income and 18 times more likely than affluent children to have elevated blood-lead levels.

Within and between cities, the distribution and severity of environmental concerns frequently parallel economic inequity and racial disparity. Low-income homes, on average, have more lead paint, more mold, more allergens, and more indoor air pollutants and are in greater disrepair. Low-income and segregated minority communities are more likely to be located near industry, hazardous materials, and host truck routes and bus depots and to be adjacent to manufacturing and industrial land use. While there continues to be debate about whether the urban poor and manufacturing are both drawn to cheaper property values or whether local policy encourages these inequities, in both instances, many low-income residents live in more noxious environments.

Third, urban physical characteristics and their health sequelae vary markedly across time and place. As the noted urban historian Martin Melosi remarks in *The Sanitary City*, cities, like any other ecological niches or ecosystems, “are in a constant state of change, growing upward and outward, constricting and sprawling, being paved over and dug up. The transformation of the urban landscape in-
fluences the flow of water into and out of the region, the intensity of the heat focused on the city island, and the quality of the air above it" (p. 119).

The physical condition of North American cities is quite different today from what it was during the Industrial Revolution and at the turn of the 20th century. As U.S. cities first developed, crowding, unregulated housing and sanitation, and industrial-residential co-location became associated with squalor, infectious disease outbreaks, and acute and chronic illnesses. During the rapid growth of cities in the late 1800s and early 1900s, the absence of physical infrastructure systems and regulatory frameworks—sewage and sanitation, building codes, occupational safety and health regulations, air pollution regulation, treatment of drinking water—often meant that residence in the inner city conferred more risks than benefits. In New York City, for example, the mortality rate a century ago was three times that of today (see Figure 4.2). Today, cities as a whole are no longer focal points of pestilence but focal points of commerce, with vibrant and largely healthy populations. Cities generally are also centers of social, cultural, and physical amenities, providing access to parks and recreational facilities, social support networks, opportunities to exercise while walking or bicycling to work or school, and access to state-of-the-art medicine. Recent data show, for example, that urban dwellers have lower obesity and overall mortality rates and are less likely to limit their activities because of chronic health conditions, compared with their rural counterparts. Still, significant disparities in socioeconomic conditions, environmental exposures, and health outcomes (as described in this chapter and throughout this volume) persist within U.S. cities.

The transformation of American cities was hardly spontaneous but rather the result of a broad-based sanitary and public health reform movement that spawned modern infrastructure systems. Advances, such as indoor plumbing, water chlorination, light and air requirements for housing, and sanitation regulation have led to marked improvements in population health and longevity and rank among the most significant public health achievements of the 20th century.

Underlying Community-Level Factors
Population Density and Growth

Greater population density is the defining characteristic of urban settings. Since the founding of the country in 1776, U.S. population density has increased by nearly 2,000%, from 0.007 to 0.125 people per acre, with the greatest increases continuing to occur in cities. Measured in numbers of households, residents, or workers per unit area, population density is typically used to quantify housing or commercial development needs. Density alone does not account for urban resource consumption patterns, however. Clearly, resource consumption occurs within a particular cultural, political, and economic context. To illustrate, U.S. cities have lower population densities than European and Asian cities, yet consume between 4 and 10 times as much gasoline per capita.

Density also has clear implications for the physical environment: as urban population density rises, increasingly complex infrastructure systems are needed
Figure 4.2. The Conquest of Pestilence in New York City, 1800-2000, as Shown by the Death Rate as Recorded in the Official Records of the Department of Health and Mental Hygiene

to deal with human needs for water, waste removal, communication, electricity, and transportation. In densely populated cities with complex and interconnected infrastructure systems, seemingly small environmental problems can have large population effects.

**Land Use Patterns and Zoning**

Urban population growth is probably the single most important factor that has changed and continues to change the land environment of the United States. The amount of land in urbanized areas has more than doubled since 1960, now accounting for 3% of the total land mass, and 80% of the U.S. population now lives in metropolitan areas, which include central cities and their surrounding suburbs.

Historically, the growth of cities—with concentrations of people, industry, and commerce—prompted many local governments to regulate land use for both economic and health reasons. As early as the 1600s, municipal governments began imposing restrictions on “noxious uses” in densely populated areas, referring, for example, to tanneries, soap-making operations, distilleries, and slaughterhouses, and the principal land use strategy became zoning—the geographic separation of uses. In 1916, the first local zoning ordinance was promulgated in New York City. In 1926, a landmark Supreme Court case (*Euclid, Ohio v. Ambler Reality*) established local governmental authority to separate land uses through exclusionary zoning, presumably based on the “unhealthy” effects of the co-location of residential and industrial uses. By the 1930s, the majority of states had adopted zoning laws. By 1967, 97% of all U.S. cities with populations over 5,000 had zoning laws.

In densely populated cities, complete separation of land uses is at once impractical and often undesirable. As many cities struggle with declining manufacturing bases, growing immigration, and increased needs for affordable housing and infrastructure services, former industrial zones are increasingly becoming home to everything from power plants and waste transfer stations to megastores and residences. Ironically, health-based exclusionary zoning developed for industrial cities may now contribute adversely to health. Separation of residential, office, and retail uses makes it less likely that people will walk to shop or to work. Conversely, mixed-use commercial-manufacturing-residential zones are socially desirable and have become economic engines for urban redevelopment. They are associated with fewer car trips and appear to promote more walking, with the attendant benefits of physical activity. An ongoing challenge for evolving cities is determining what mix of uses is appropriate, desirable, and protective of public health.

**Physical Infrastructure Systems**

At first glance, the centrality of urban infrastructure systems to the health and well-being of city dwellers may seem obscure. This impression can be attributed, in part, to the fact that physical infrastructure systems (e.g., water, waste, transporta-
tion, power, communication) have gradually migrated beneath the surface—physically and metaphorically. Massive networks of ducts, pipes, tracks, conduits, and wires are now largely hidden underground. Since the mid 1800s, many urban areas have become separated from the raw materials that built and sustained them, drawing their water and power from, and disposing of their waste in, increasingly remote locations. As a result, many urban dwellers now have little understanding of the complexity, cost, or technologies involved in providing basic infrastructure services or their impact on health and well-being. Increasingly, however, aging urban infrastructures have brought many potential hazards, such as asbestos exposure from water main breaks and steam-pipe explosions and lead-based paint exposure from deteriorating bridges, highways, and elevated train lines, into public consciousness.

TRANSPORTATION SYSTEMS

Urban transportation systems consist of a network of roadways, bridges, tracks, and air routes and the mass and individual transit vehicles that travel on them. While the Clean Air Act and Intermodal Surface Transportation and Efficiency Acts have dramatically reduced pollutants from motor vehicles, they still remain the major source of urban air pollution today.

There are now almost 4 million miles of public roads and streets in the United States, 22% of which are located in urban areas. Paved roads, parking lots, sidewalks, rooftops, and other impermeable surfaces characterize cities and influence environmental conditions and human exposures. In the “natural” environment, unpaved surfaces are highly permeable and absorb, retain, and purify rainfall and snowmelt. By contrast, impermeable surfaces restrict infiltration of water into underlying soil. Research has shown that when impervious surfaces reach as little as 10–20% of a watershed area, the natural hydro-geologic cycle may be adversely affected, contributing to polluted runoff. Contaminants that are discharged onto urban roadways and parking lots include gasoline emissions from vehicles, pesticides and fertilizer from lawns and parks, and pathogens from failed septic systems. As rainwater and melted snow transverse paved surfaces, they can carry contaminants into surrounding waterways, exacting natural and environmental health consequences, especially when drinking water is derived from these waters.

A disproportionate number of urban roadways and bridges are in disrepair, compared with their rural counterparts. Roadway disrepair contributes to environmental degradation in several ways. Rougher surfaces lead to more wear and tear on tires and automobiles, reduced fuel efficiency, and therefore greater emissions. Physical disrepair increases pedestrian and vehicle-related accidents and injury and contributes to fiscal liability for many municipalities. The natural aging and the maintenance processes contribute to environmental degradation. Deposition of dust and paint chips from deteriorated lead-based paint on bridges and elevated highways under repair, for example, can contaminate surrounding residences and open spaces where young children play. Until recently, the dust from such repairs was largely uncontained, resulting in environmental contamination
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and human exposure. Even with proper containment, repair workers themselves face substantial lead exposure.

Urban public transportation systems (mainly buses, trains, and subways) are prominent features of the physical environment. In contrast to private automobiles, urban public transportation systems are more energy-efficient, less polluting, and per rider safer. Yet, public transportation use varies widely across urbanized areas, with higher use in older, more densely developed urbanized areas where land-use patterns were largely determined before the development of the interstate highway system. Though public transit ridership into and within cities reduces private automobile miles traveled and improves regional and urban air quality, a large proportion of federal transportation funds are spent on subsidizing infrastructure for private transportation. The allocation of transportation funds is regressive with respect to income and disproportionately benefits whites. Even public transit funds provide greater subsidies to white and middle-class riders than to minority and low-income riders.

Solid Waste and Sewage

The modern era of urban public health protection began in the 1840s with England’s Public Health Act, which formally ushered in sanitary codes designed to address sewage and sanitation. The early goal of separating humans from their waste and refuse has not changed dramatically. The approaches, however, have evolved to incorporate the goals of resource and environmental protection, and the complexities and costs of sewage and sanitation systems have grown in absolute terms and as percentages of municipal budgets.

Today, more than 98% of the U.S. population has access to sanitation services. Good thing, too, since the United States generates more solid waste per capita than any other country. In the United States, municipal solid waste generation has risen more than 60% in the past 40 years (from 2.7 pounds per person each day in 1960 to 4.4 pounds in 2003). Growing and more densely packed urban populations create both more waste and more demand for separation through land-use regulations from that waste. A “throwaway” culture, which has replaced the more conservationist culture of the past, results in further waste production. At the same time, environmental regulations require ever greater protection from landfill leachate, waste water, contamination, and incineration byproducts. The results of these interacting factors have often meant that increasing concentrations of waste and sewage must be disposed of in more environmentally protective ways, in increasingly remote locations, and at exponentially greater costs to minimize potentially deleterious effects on the environment and the population.

Housing and Buildings

Shelter is a basic necessity of life. Fortunately, the majority of North American urban dwellers now have access to the basic housing amenities: relatively clean water, indoor plumbing, heating, and related services. Yet, compared with their nonurban counterparts, urban dwellers are more likely to live in substandard hous-
ing with its related environmental problems of overcrowding, dampness, inadequate insulation, pest infestation, noise, dust, and poor indoor air quality. Many of the most vulnerable urban residents (the poor, children, and the elderly) are disproportionately affected by these problems, with an increasing threat of unaffordable housing and homelessness.

Physical housing conditions can influence a wide range of health conditions; among them, lead paint and housing-related asthma triggers are perhaps the best studied. While lead poisoning remains a significantly urban phenomenon, both the absolute number and the incidence rate of childhood lead poisoning has declined markedly over the past several decades (Figure 4.3). The phase-out of lead in gasoline that was completed in 1986 eliminated the most significant bio-available form of lead exposure. Lead-containing paint, banned first in New York City residences in 1960 and later by other cities, is no longer added to the environment and is slowly being removed through housing repair and replacement. As lead is removed from the environment, the underlying conditions of housing have less influence on lead exposure itself.

Many housing-related health issues result from a small number of common

![Figure 4.3. Cases of Severe Lead Poisoning in New York City, 1983–2001](image)


Note: BLL = blood-lead level
underlying causes. For example, excess moisture from condensation, plumbing leaks, and defects in building exteriors can predispose a dwelling to mold growth, pest infestation, excessive cold or heat, and water damage leading to deteriorated lead paint. Combustion products from gas stoves, portable heaters, synthetic rugs, floor tiles, and furniture produce indoor air pollutants that can exacerbate asthma. Allergens from dust mites, mold, cockroaches, rodents and pets also have the potential to cause or exacerbate asthma and other allergic diseases. The intent of light and air requirements of early housing regulations was to improve ventilation and reduce exposure to infectious agents. In many cities today, poorly maintained homes with inadequate fresh air circulation, stemming from tightly sealed windows and thermally insulated walls, have concentrated indoor air quality problems.44

Many policy makers, economists, and researchers have described a crisis in the quality and supply of affordable urban housing. There has been no significant change in the number of housing units owned by public housing authorities, and programs like the Federal Section 8 housing subsidies may effectively lower the cost of housing for low-income residents but do little to address supply concerns. The crisis favors suppliers and reduces competition for good quality housing, one effect of which is to create structural disincentives to maintain existing housing.45

Proximate Level, Environmental Mediators

The issues considered in the preceding section do not affect health directly; rather, they often lead to the release of environmental pollutants into various exposure media (e.g., air, water, land, and food). In this section we review some of the key hazards associated with exposure, a proximate cause of illness.

Water Quality

Prior to the regulation of sewage discharge in the late 1980s, the major source of urban water pollution was direct discharge of high volumes of untreated sewage at the point of production. Today, the major source of water pollution is from non-point-source urban runoff from roads, parks, walkways and rooftops and storm sewers.46 In cities, these pollutants include fuel and oil from vehicles, pet waste, sediment from construction sites, pesticides, and nutrients from turf and gardens, pharmaceuticals, antibiotics, and food additives.47

Recently published data from the National Water-Quality Assessment Program48 reveal that nearly half the urban streams sampled had concentrations of at least one pesticide that exceeded a guideline for the protection of aquatic life. Some of the highest concentrations included currently used pesticides (such as diazinon, Carbaryl, and Malathion) as well as pesticides that are no longer used but persist in the environment (such as DDT, Dieldrin, and chlordane). Direct human exposure to these toxins is more likely if drinking water is drawn or fish is consumed from these waters.

Most urban drainage systems are designed for flood control but can actually
exacerbate the impact of surface runoff pollutants as well as increase the risk of downstream flooding.\textsuperscript{49, 50} Notably, approximately 772 U.S. cities (mostly in the Northeast, Great Lakes Regions, and Pacific Northwest) have combined sewer systems. These outdated remnants of early infrastructure systems collect rainwater runoff, domestic sewage, and industrial wastewater in the same pipe. During heavy rainfall or snowmelt, the volume can exceed the capacity of the sewage treatment plant, creating a combined sewer overflow, which discharge runoff and untreated wastewater directly to nearby streams, rivers, and other water bodies.\textsuperscript{51} While the direct public health impacts of urban runoff are not easily quantifiable, there is evidence that urban runoff is associated with pathogenic microbial contamination and waterborne disease outbreaks, especially during periods of increased rainfall.\textsuperscript{52, 53} Waterborne disease outbreaks associated with urban water systems can be due to both treatment deficiencies and distribution problems. While the number of annual waterborne disease outbreaks associated with community water systems has declined since the early 1980s, there is evidence that nonepidemic levels of waterborne gastrointestinal illness still occur in communities served by public water systems meeting all Environmental Protection Agency guidelines\textsuperscript{54, 55} and that such lower-level transmission may precede large waterborne outbreaks.\textsuperscript{56} Compounds found in waterways downstream from urbanized areas, such as caffeine and triclosan (a disinfectant), suggest a source of treated sewage discharge, but the health implications of such contamination are speculative at this point.\textsuperscript{57}

\textbf{Air Quality}

Despite reductions in urban air pollution levels as a consequence of the Clean Air Act and Intermodal Surface Transportation and Efficiency Acts,\textsuperscript{58} the sources of air pollution are still present in the urban environment. Mobile sources (especially cars and trucks) continue to produce the most air pollution, though stationary sources (e.g., industrial processes and fossil fuel combustion for power and heat) also play a role. In 1997, vehicles accounted for 57\% of carbon monoxide emissions, 30\% of nitrogen oxides, and 27\% of volatile organic compounds, 60\% of benzene emissions and 33\% of formaldehyde emissions.\textsuperscript{45, 48} Metropolitan statistical areas (MSAs) are much more likely to exceed National Ambient Air Quality Standards than non-MSAs for ozone (51\% vs. 4\%), particulate matter (14\% vs. 1\%), and carbon monoxide (16\% vs. 1\%). Urban areas generally have higher annual average small particulate concentrations; urban sites in the East contain large percentages of carbon, sulfates, and ammonium, while those in the Mid- and far West\textsuperscript{55} contain more organic materials. Proximity to traffic is associated with exposure to higher levels of particulate matter,\textsuperscript{59} including diesel exhaust particles,\textsuperscript{60} and with respiratory illness.\textsuperscript{61, 62}

Overall, air quality has improved in the United States even in the face of growing populations and economies (Figure 4.4). But, according to data collected from 1982 to 2001, there was little change in the last two decades of the 20th century in levels of ozone, a pollutant linked to cardiovascular disease, premature mortality, and asthma exacerbations, with many cities still failing to meet ambient standards (Figure 4.5).
Settled Dust and Soil

Fallout from urban air emissions can contribute to contaminated dust and soil. Weathering, demolition, and structural fires can disperse contaminants found in building materials—the destruction of the World Trade Center being a dramatic example of the latter two mechanisms. In addition, abandoned industrial sites, or brownfields, can contain persistent soil contaminants, such as heavy metals and chlorinated hydrocarbons, from prior operations, such as metal smelting and paints, plastics, and metals manufacturing. Although the health impact of urban brownfields is not often clear, it is well established that contaminants in dust and soil can result in human exposure through ingestion (e.g., by children through hand-to-mouth activity) of outdoor dust or dust that has been blown or tracked indoors.

Lead is the most studied contaminant of urban dust and soil. Despite the phase-out of leaded gasoline and paint, an important reservoir and potential source of soil and dust contamination exists in the millions of older dwellings and other structures coated with lead-containing paint. Renovation, remodeling, or demolition activities have the potential for dispersing lead in paint as leaded

![Figure 4.4. Comparison of Growth Measures and Emission Trends, 1970–2001](source: EPA, Office of Air Quality Planning and Standards, Latest findings on national air quality: 2001 status and trends [Washington, DC: EPA; September 2002].)
dust. Although homes with leaded paint are also found in less urbanized areas, the higher density of housing in inner cities increases the potential for human exposure from uncontrolled demolition.\textsuperscript{29, 65} A study in Baltimore found that demolition of older housing can raise levels of lead in dustfall in neighboring residences 40-fold to levels that exceed Environmental Protection Agency standards for lead in house dust.\textsuperscript{66} Contamination of urban dust from past vehicular emissions and from weathered paint from more densely clustered older structures may account for ecologic associations observed between higher blood-lead levels in children and population density.\textsuperscript{65} Similar mechanisms may also account for the geographic association of soil lead levels and blood-lead levels with higher proportions of minority residents.\textsuperscript{67, 68}

Interventions to remove or prevent exposure to contaminated urban dust and soil present potential benefits and problems. Properly done soil remediation and brownfield redevelopment can contribute to economic revitalization of blighted urban neighborhoods. Disturbance of soil and structures, however, has the potential for exposing nearby residents to reservoirs of contamination.\textsuperscript{64} Addressing contaminated soil on individual properties is logistically challenging but poten-

**Figure 4.5. Ozone and Air Quality, 1982–2001, Based on Annual 4th Maximum 8-Hour Average**

![Graph showing ozone and air quality data from 1982 to 2001.](image)


Note: NAAQS = National Ambient Air Quality Standards
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Potentially effective at reducing health risks. For example, there is some evidence that replacement of lead-contaminated soil in urban yards has been associated with a significant reduction in soil lead levels and mean blood-lead levels of exposed children.69

Noise

The greater density of vehicles, aircraft, and people in urbanized areas contributes to greater noise exposure. Low-frequency noise, such as the rumble of subway cars and large trucks, is efficiently conducted through the steel, stone, and concrete of cities, and buildings are not able to shield their occupants. Though noise can be objectively measured in terms of its physical properties, its potential to annoy and influence health is far more subjective. Loudness judgments and annoyance reactions may be greater for low- than for high-frequency noise.70 The annoyance and presumed mechanisms by which noise influences health may be more influenced by sudden and large shifts in noise frequency and magnitude than by its absolute power.71 In addition, noise exposure can cause behavioral problems, including sleep disturbance and difficulty completing complex tasks. Industrial and community studies have found associations between noise exposure and increased catecholamine secretion, an indication of a harmful stress-induced response.72 Furthermore, noise exposure has been associated with increased cardiovascular risk in occupational studies, although such findings have been less consistent for community noise. Despite epidemiologic evidence of noise-related health effects, implementation of noise abatement measures has not always been followed by improved health measures,73 suggesting a need for further research and interventions in this area.

Local Climate: Urban Heat Island and Heat-Related Morbidity and Mortality

The densely clustered buildings and concentration of paved surfaces that characterize many urban cores increase their tendency to retain heat, especially at night, producing the “urban heat island” effect. As a consequence, heat-related public health impacts are greater in highly urbanized than in less urbanized areas.74, 75 Heat-related deaths include those from heat stroke, as well as cardiovascular and respiratory disease during periods when heat index levels (a combined measure of temperature and relative humidity) are elevated.76 Within cities, higher mortality risk is also associated with living in top floors of apartment buildings and with markers of socioeconomic disadvantage.77

From 1979 to 1999, an average of 182 U.S. deaths a year were related to excessive heat.78 The risk of heat-related mortality appears to be more a function of the departure from temperatures to which a population is accustomed and adapted than of simply a high absolute temperature. Consequently, northern cities experience greater heat-related increases in mortality than do southern cities. Life-style and built environmental adaptations, such as increased use of air conditioning and better public health preparedness and response, may explain the south-north gradi-
ent of increasing heat-related death rates.\textsuperscript{79, 80} Conversely, the failure to recognize the potential health impact of heat fluctuations, especially on high-risk populations, can contribute to urban public health disasters. Klinenberg,\textsuperscript{81} in his description of the social and political dimensions of the 1995 Chicago heat wave, which killed more than 700, observes that the impact was not random but disproportionately affected the elderly, the poor, and the socially isolated.

It has been suggested that one way to mitigate urban heat island effects is through landscape design, roof gardens, parks, and small bodies of water. Though not well studied, these approaches may produce localized reductions in the heat stress index during daytime hours.\textsuperscript{82}

While concerns have been raised that global climate changes will contribute to increasing heat-related deaths in the future, trends in daily mortality in relation to temperature since the 1960s suggest that adaptation is blunting the impact of summer heat on mortality, and increases in heat-related mortality from global warming might be less significant than some have predicted.\textsuperscript{79}

\textbf{Pestilence}

One characteristic common to most U.S. cities is their apparent isolation from much of the “natural” world. Yet the recalcitrance of rodents, cockroaches, and other vermin demonstrate that cities have in a sense created an alternative nature, and it is highly conducive to unpleasant and unhealthy neighbors. Though epidemic infectious diseases once linked to rodent and insect infestations are few in urban areas (for example, 90\% of the 362 cases of human plague in the United States during a 50-year period occurred in Southwestern states in rural and suburban areas), rodents remain a feature of urban life. The Norway rat and the house mouse, the two most common rodents in urban areas, are responsible for a small number of cases of diseases like rat-bite fever, leptospirosis, salmonellosis, and trichinosis, although cases are rare and generally isolated.\textsuperscript{83} Recently, rodent infestation has been linked with allergen exposure, sensitization, and atopy in exposed inner-city children.\textsuperscript{84} Urban rodents may no longer be responsible for significant outbreaks of the plague, but their presence in U.S. cities continues to vex public officials. Pestilence, perhaps more than any other single environmental condition, motivated regulatory, structural, and physical changes in urban design more than a century ago. A convergence of factors in many cities led to a resurgence in rat populations: cities facing severe budget shortages through the 1970s and 1980s reduced funding for rodent inspection and control and collected refuse less frequently, owners spent less on preventive maintenance of older housing stock, and per capita waste volume increased.

Like rodents, arthropods are making public health news. Though less is known about trends in the prevalence of insect and arachnid infestations, the emergence of West Nile virus and recent research on the role cockroaches play in asthma morbidity have caused public health departments to pay increased attention to concerns largely considered nuisances in most cities. Mosquitoes, which are responsible for malaria transmission in much of the world, are now targeted for their role in West Nile virus transmission. Young asthmatics who live in homes infested
with cockroaches (as well as rodents) and their allergens are more likely to have severe symptoms, be hospitalized, and to miss school compared with asthmatics in uninfested homes. Pesticide-use surveillance data from California and New York have revealed that significant proportions of pesticides sold are applied in urban areas, pointing to health concerns from infestations and the measures used to control them. Rodents, arthropods, and even avian pests exert a secondary effect on the health of cities by contributing to and accelerating housing disrepair. All pests depend on access to food, water, and shelter, and effectively controlling their populations depends on limiting these necessities. The National Institutes of Health, Department of Housing and Urban Development, and the Centers for Disease Control and Prevention have given funding to health departments and researchers to investigate integrated pest control approaches that are less dependent on pesticides. These more costly approaches have been shown to be effective at pest reduction, though efforts to reduce allergen levels prove more difficult.

Disasters, Safety, and Security

Increases in both the frequency of urban disasters and the number of people affected have focused attention on safety and security as a public health problem, especially in the wake of the September 11, 2001, terrorist attacks. Urban safety and security risks encompass a wide range of occurrences—naturally occurring events (e.g., earthquakes, hurricanes, and floods), technological failures (e.g., residential, transportation, industrial, and nuclear “accidents”), and acts of intentional violence—with impacts ranging from a single individual to entire communities.

Are cities more dangerous than nonurban areas? Interestingly, there is substantial evidence that safety-related morbidity and mortality is actually lower in urban areas. Urban residents have lower overall rates of injury mortality, motor vehicle-related fatalities, and self-reported nonfatal injuries, compared with their rural counterparts.

Although the “natural environment” may seem remote to many urban dwellers, millions of North Americans are at risk from earthquakes, floods, and hurricanes. Earthquakes are among the most damaging and costly. Thirty-nine states in the United States are seismically active, thus placing 70 million people at significant risk of injury or death from earthquakes. Six major cities with populations greater than 100,000 are located within the seismic areas of the New Madrid fault. The fact that the recent physical and human health impacts of hurricane Katrina on the Gulf Coast were disproportionately experienced by lower income and African American communities exemplifies how the impacts of disasters may be associated with existing social inequities.

While it appears the urban physical environment may not exacerbate the environmental or health consequences of disasters, as Vlahov notes, “The density and diversity, the crowding and the commotion make the image of a disaster worse in cities than outside these urban areas.” Moreover, urban disasters frequently damage infrastructure systems (e.g., transportation, communication, water, waste) and can make it difficult to meet basic population needs. This fact, in conjunction with the horrific images that can flow instantly through mass media when
large cities are struck by disasters, may continue to make them attractive targets for terrorist attacks with their attendant acute and sometimes long-term impact on physical and mental health.

The stereotype of crime-ridden cities persists in the popular imagination, but the reality is more complex. Any effort to attribute crime risk to the physical environment of cities is complicated by the strong relationship between social disadvantage and risk of crime victimization and differences in crime reporting between cities and rural jurisdictions. A simple measure of neighborhood physical deterioration—an index of boarded-up buildings—was linked to homicide mortality as well as all-cause mortality. A parallel association with gonorrhea rates suggests that a connection of building conditions to health might be mediated by interference with social relationships and increasing opportunities for engaging in risky behavior. At the same time, the perceived or actual risk of violent crime associated with physical decay of a neighborhood may, in turn, adversely impact persons with conditions sensitive to stress, such as asthma.

**Conclusion: Toward Protecting the Urban Physical Environment**

Little more than a century ago, the high rates of morbidity and premature mortality associated with North American cities were due in no small part to the absence of physical infrastructure systems and regulatory frameworks around sanitation, housing, land use, and water and air quality. Today, scientific, technical, and regulatory frameworks exist to manage many urban environmental problems and have contributed to significant improvements in overall environmental quality and in the health of urban residents, who are now, by many measures, healthier than nonurban populations. Urban trash and sewage management is routine, if imperfect. Air-pollutant levels are now a fraction of what they were at the launch of the Clean Air Act in 1970. As urban water systems have become more centralized and tightly regulated, average pathogen and chemical-contaminant levels in urban water have declined substantially. Despite improvements in health and environmental conditions, many challenges remain for protecting, preserving, and improving health beyond its current state today.

Improving urban environments depends largely on maintaining and improving the quality of existing systems, buildings, and infrastructure. The physical and social environmental prescriptions for healthy living that are described by the anti-sprawl movement and urban design school of thought are best applied in still-growing suburban and exurban areas. The rate of urban growth is a fraction of what it was 50 years ago, which means that improving cities now depends on maintaining, reconstructing, and retrofitting, the costs of which often come at the expense of other priorities. The most successful approaches for urban physical environmental improvements have used “upstream” or “point-of-origin” strategies—the removal of lead as an additive in gasoline and in residential paint; engineering more fuel efficient engines and pollution control technologies on vehicles; purifying drinking water prior to its delivery; land use rules that require distance
between residential and industrial areas; and housing codes requiring windows, ventilation, light, and fireproofing. By contrast, approaches designed to manage and mitigate extant urban environmental problems have been much less successful—cleaning up abandoned industrial and toxic waste sites, maintaining older substandard housing, and reducing emissions from existing plants and facilities.

Urban population changes impose new demands on the environment and will require new understandings of the interactions between humans and their habitat. As life expectancy has increased, the mechanisms by which the urban environment influences health have changed. The “conquest of pestilence,” illustrated in Figure 4.2, has meant that people now live long enough to experience the consequences of chronic, relatively low levels of exposures to air toxins, noise pollution, poor diet, and sedentary life-styles. Though air quality has improved markedly, there is significant cause for concern about lifetime exposure to even comparatively low concentrations of air pollutant levels when measured against lifetime risk of cardiovascular disease. Though infectious diseases from vermin are largely eradicated, chronic exposure to allergens from cockroaches and mice are now a concern for their link to respiratory illness. Cities such as Chicago, Seattle, Oakland, New York, and Houston have increasing numbers and proportions of foreign-born residents. The populations of many cities are also growing older. These trends may impose new informational, behavioral, and infrastructural pressure on cities built, and the future health of the populous will depend on cities’ abilities to respond.

Health within an urban environment is influenced by myriad environmental factors whose origins are beyond the borders and regulatory power of cities and even states. In some parts of the United States, urban air quality is less a function of local traffic and commerce than it is of upwind development and industry. In the cities of the western states, water quality is influenced by environmental regulation two or more states away. Global warming policies (or lack thereof) may impose unprecedented burdens and costs on cities, but these externalities are visited upon, but not solvable by, cities. Cities are statutorily prohibited from exercising control around some hazards and exposures, such as interstate trucking and electromagnetic radiation from telecommunications. Around many concerns, cities can do little to directly influence the environmental health of its residents.

Since the creation of separate public health and environmental protection agencies, there has often been a disassociation between “human” and “physical environment” concerns. There are many examples of ways in which environmental and public health protection have diverged, much in the same way, and for similar reasons, that public health and urban planning have diverged as disciplines. For example, the Centers for Disease Control and Prevention, a nonregulatory agency, monitors illness but is completely divorced from promulgating and enforcing policies that regulate environmental conditions that affect health. The Environmental Protection Agency has historically focused on regulating the ambient environment but has avoided regulating environmental exposures in indoor environments where people spend more than 90% of their time. For all the benefit gained by greater categorical funding, scholarship, academic training, and technical advances, there
have also been disadvantages, notably their different regulatory strategies and agendas, the emergence of separate and distinct stakeholders and advocacy organizations, and the absence of cross-disciplinary academic training, interventions, and programs.

There is evidence, however, that some of these challenges are being met through innovations in research, training, funding, and enforcement. Housing and Urban Development, the federal agency charged with building and maintaining housing, now dedicates tens of millions of dollars to its Healthy Homes effort, which integrates research, maintenance, and construction of housing units that are mindful of the myriad ways in which housing influences health. The academic discipline of New Urbanism, with its emphasis on urban design, integrates planning, environment, health, and economics to understand better the role cities play in the physical, mental, and social health of their residents. Environmental review, once largely limited to the analysis of the natural resource effects of proposed development, now frequently involves assessing impacts on neighborhood character, delivery of services, human health, and the environment. These integrative efforts benefit from and are helping to advance new analytic methods in geospatial analysis, data mining, and forecasting. In 2003, the Centers for Disease Control and Prevention dedicated substantial funding for a new program called Environmental Public Health Tracking, which attempts to build state and local capacity to assess the connections between local environments and local health. And, at a local level, many cities describe greater interagency collaboration, helping to end the regulatory segregation that has been common since the 1970s. Although it is too early to say whether we are experiencing a paradigm shift in how to assess and improve urban environmental health, there are positive signs that there is greater recognition of the importance and integration of public health, urban planning, and environmental sciences.

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Access to High-Quality Health Care in U.S. Cities
Balancing Community Need and Service System Survival

Dennis P. Andrulis

Introduction
For decades, health care in the urban United States has been a study in contrasts. Hospitals in many U.S. cities are renowned for providing the best quality of care in the world. The term centers of excellence has come to represent mostly urban-based academic medical centers and other facilities that have developed a reputation for providing emergency services, trauma care, and complex specialty care. These service settings are the providers for many privately insured individuals from within and beyond urban borders.

This portrait of access and quality, however, does not extend as broadly for the uninsured, underinsured, Medicaid recipients, many racially and ethnically diverse urban communities, immigrants, and other vulnerable populations. For these residents, responsibility for care in the nation’s cities falls primarily on a smaller, dedicated but frequently fragmented and financially fragile group of providers: public hospitals, community health centers, clinics, health departments and others that, by mission or mandate, constitute the urban “safety net” for health care. Both residents and these providers face a complex set of challenges perpetuated and exacerbated by the consequences of inadequate support, entrenched health problems, and limited access to high-quality health care. These conditions are set in the broader context of other pressing issues, such as the cost of care, including prescription drug costs, which represented 11% of all health expenditures in 2003,¹ and the ever-expanding arsenal of new and expensive medical procedures; competitive pressures from managed care to slow the growth rate of health care costs; and overall increases in uncompensated care, which rose from $18.5 billion to $21.6 billion between 1997 and 2000.² Adding to these well-recognized concerns are new uncertainties, such as capacity to respond to threats of bioterrorism.
This chapter presents and discusses the circumstances, challenges, and needs facing the most vulnerable urban residents and the providers they rely on for care. The next section describes the characteristics of urban residents most likely to rely on the safety net services. It is followed by a description of the urban health care safety net. The fourth section identifies the challenges to access and quality of care facing vulnerable urban populations and is followed by a discussion of the pressures and forces affecting the current and future prospects of urban safety-net providers. A concluding section identifies efforts and proposes directions to insure the viability of these providers in the nation’s cities. While U.S.-focused, many of these experiences are likely to have similar implications and applications for other nations and their cities.

**Health Needs of Vulnerable Residents in Cities and Reliance on Safety-Net Providers**

The ecology of urban communities and the scope of challenges to health and health care frequently set them apart from suburban and rural areas. As a result an “urban health penalty” defines many central cities, with poverty, disease, and mortality rates well above the averages for the country. The elements that comprise “pathologies” confronting daily urban life also set the context for the challenges facing health care providers who make up the community’s safety net.

The scope of vulnerable populations that are dependent on the urban health care safety net is extensive. Those with conditions or circumstances that may be seen financially or by patient profile as “less desirable” to other providers includes those with certain diseases and health conditions, low income, neglected care, and complex community concerns. Thus, individuals with alcohol or other drug addiction; patients with tuberculosis, HIV, or sexually transmitted diseases; and victims of violent crime, domestic abuse, or homelessness are typically very dependent on safety net institutions. Others suffer from classic inner-city problems, such as lead poisoning, carcinogens related to environmental toxins, and related conditions exacerbating asthma. Rates of diabetes, cancer, and heart disease are higher as well.

The primary reasons for dependency on safety net institutions are lack of health insurance and poverty. Individuals likely to be affected include such diverse populations as the employed (especially those in low-wage positions), the unemployed, immigrants and native residents, older individuals, those from diverse racial or ethnic heritage, and children. In 2003, almost 45 million Americans were uninsured, an increase of 5 million since 2000. More than one-third of the poor are uninsured, a status that affects a larger proportion of residents in urban areas than in nonurban areas: in 2000 more than 17% of the residents of urban areas fell below the federal poverty level compared with a national rate of 12%.

Finally, racial and ethnic minorities, who tend to be concentrated in cities, are more likely to rely on safety-net providers. The reasons for their dependence on these providers are complex and are related to historic patterns of discrimination and neglect and to the fact that these populations are disproportionately poor and
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uninsured (in 2004 blacks and Hispanics accounted for over half of the uninsured nationally while representing about one-third of the U.S. population), and they are more likely to suffer from a higher burden of disease. Review of national data on the 100 largest cities found that poverty for blacks and Hispanics living in these urban areas was, respectively, 27% and 24%, well over the 12% average for whites.

Defining the Health Care Safety Net

Most cities in the United States have a health care safety net for populations that otherwise would have limited or no access to health care. While the composition, breadth, and depth of responsibility of safety-net providers may vary across the country and change over time, these settings share certain characteristics. A report published in 2000 by the Institute of Medicine on the health care safety net lists two “distinguishing characteristics” of traditional “core safety-net providers”: “(1) by legal mandate or explicitly adopted mission they maintain an ‘open door,’ offering access to services to patients regardless of their ability to pay; and (2) a substantial share of their patient mix is uninsured, Medicaid and other vulnerable patients” (p. 21). Thus, these providers assume a high market share of uncompensated care and such care represents a high percentage of their payer mix, especially when compared with that of other health care sectors, such as for-profit hospitals. Fitting this description are community health centers or clinics, which are likely to be supported by federal, state, or local assistance, public hospitals, and city or county health departments. Other public and private facilities that, by mission, meet the criteria often include teaching or community hospitals (mostly nonprofit) and clinics, especially those located in inner cities. Community-based practitioners also provide care to these residents.

Although these providers can be found in many urban areas, cities vary in the composition of their health care safety nets according to factors such as politics, service need, population, and finances. In some cities, public facilities play a major, though not exclusive, role. In Houston, for example, publicly owned providers—hospitals in particular—are usually overseen or supported by the state or county government. Los Angeles and New York have also relied primarily on a public system of care to provide a broad range of primary, inpatient, and specialty care for the uninsured. In other urban areas, such as Cleveland, public and private, usually nonprofit hospital services have shared responsibility, while in Philadelphia, Detroit, and St. Louis (where public hospitals have closed), the private, nonprofit sector assumes primary responsibility. Some cities, such as San Diego, arrange contracts with private providers to care for uninsured residents.

Many major cities also rely heavily on federally funded community health centers to offer basic health care services and on public health departments, whose involvement may range from providing direct care to providing more limited surveillance and prevention activities. For those that participate more significantly in the safety net role, the responsibility of care can be substantial. Urban health departments, an additional part of the safety net, reported that about one-half of
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their clients were uninsured in 1998. Finally, nonprofit clinics often offer charity or reduced-rate care for vulnerable populations.

Urban Safety Net Hospitals and Services to Vulnerable Populations

Studies of health care providers indicate that both public and private providers contribute significantly to care for vulnerable populations. Figure 5.1 describes some of the differences between urban public and private hospitals. For example, between 1990 and 1996, gross patient revenues attributed to self-pay (i.e., primarily charity care) and Medicaid by private nonprofit hospitals in the 100 largest cities rose from almost $16 billion to over $24 billion. For the much smaller number of public hospitals in these cities (84 in 1996, compared with 514 nonprofit and 174 for-profit facilities), “revenues” for such care almost doubled, from just over $7 billion to about $14 billion for the same years. These findings confirm that in urban areas many providers assume some burden of responsibility in caring for the uninsured. Other evidence also shows, however, that a subset of providers assumes a disproportionate burden. According to the National Association of Public Hospitals and Health Systems, an organization that represents the great majority of large, publicly owned or operated urban health care institutions, as well as other private, nonprofit safety net hospitals, 78 of its members provided more than 20 percent of all the uncompensated care in the country in 2000—averaging 24 percent of total costs, compared with 6 percent for the rest of the industry. These 78 providers also offer substantial amounts of specialty care in their markets, including over one-fifth of HIV/AIDS services and emergency room visits, over half of burn care beds; and over one-quarter of pediatric intensive care and neonatal intensive care beds. Assistance to safety-net providers generally is substantial, with subsidies coming from local and state governments, as well as the federal government ($34 million–$38 million at the end of the 1990s). However, the remaining and continuing shortfall still requires those providers to cost shift from other payers and take other measures to limit spending to cover patients unable to pay for their care.

Community Health Centers, Health Departments, and Other Community-Based Providers

In 2004, 890 community health center grantees representing almost 5,000 service delivery sites served more than 12 million patients, with a large segment of their patients living in urban areas. Almost 67% of federally supported community health center patients were nonwhite; 40% were uninsured with Medicaid accounting for another 33%, and all but 14% were below 200% of the federal poverty level. These providers are located in federally designated underserved areas. They provide comprehensive primary care and offer services regardless of patients’ ability to pay. Studies have shown that introducing community health centers to distressed areas can increase access to medical and dental care, reduce dependency on hos-
hospital outpatient clinics, and reduce inpatient admissions (see Figure 5.2). A review of studies cited by the U.S. Department of Health and Human Services, Health Resources and Services Administration identifies that Medicaid enrollees using health centers were 22% less likely to be admitted to a hospital for avoidable conditions than those not using these facilities. Also, health centers made progress in reducing racial and ethnic disparities among their patients. The rate of low birth-weight deliveries for black women cared for in health centers is more than 20% below the national rate for black women (10.3 and 13.1, respectively, for 1998–2000).

Almost one in five using federally qualified health centers required interpretation services, and 556 of the 671 centers provided such services in 1997.

Urban health departments, while overseeing the health of all populations within their area, have historically concentrated their efforts on providing services to those who have less access to private sector providers. For example, 68 health departments of the 100 largest cities reported, on average, that 44% of the clients they served were non-white in 1993; 32% were black, and 20% were Hispanic. In the remainder of the metropolitan areas outside these cities, nonwhites comprised less than 20% of all clients, on average.

**Figure 5.1. Comparison of Urban Public and Private Hospitals**

- Discharges in urban public hospitals averaged 17,329 in 1996, well above the averages for nonprofit and for-profit hospitals (14,672 and 7,409, respectively).

- Medicaid inpatient days in public hospitals during 1996 averaged 45,046, more than 2.5 times the average for nonprofit and more than 8 times the average for for-profit institution averages (16,358 and 5,764, respectively). Medicaid hospital discharges demonstrated similar trends.

- Medicare discharges were considerably higher in nonprofit institutions than in public hospitals (5,358 and 3,393, respectively).

- Emergency department visits in public facilities approached 2 times the rate for nonprofit hospitals and 3.5 times the rate for for-profit institutions (60,350, 33,163, and 16,830, respectively).

- Outpatient visits in public hospitals during 1996 were well above the average for nonprofit and for-profit institutions (259,541, 144,572, and 47,656, respectively).

Source: Andrulis D, Goodman N, *The social and health landscape of urban and suburban America* [Chicago: American Health Forum; 1999].
Other settings such as free or reduced-cost clinics also provide care in many urban areas, although their role is considerably smaller, in general, than hospitals and federally supported health centers. In particular, free clinics, where outside, private physicians may donate their time, may be severely limited in the amount of care they can provide since they must rely on the largesse of those willing to offer services without pay. A health professional commenting on referring uninsured patients to specialists at a free clinic in Arlington, Virginia, said the clinic “tries not to call in favors too often.”

**Community-based Practitioners**

Health care practitioners tend to be concentrated in cities. Summary findings on physician distribution indicate that, on a per population basis, urban areas have three times as many general internists, four times as many pediatricians, and five times as many OB/GYN physicians as those in non-metropolitan communities. Numbers, however, do not necessarily translate to vast resources of care to vulnerable populations. In fact, city-specific studies attest to a significant imbalance in distribution, with poor areas suffering from inadequate numbers of providers. The poor Los Angeles community of El Monte, for example, had one doctor for every
2,216 residents, compared with a doctor-to-population ratio of 1:125 in Beverly Hills; in Washington, DC, the more well-off northwestern area had a pediatrician-to-child ratio of 1:400, whereas in the poorer southeastern area that ratio was 1:3,700. A California-based assessment found the lowest doctor-to-population ratios in poor urban communities with the highest proportion of black and Hispanic residents. Nationally, the proportion of physicians treating individuals without insurance has declined from over 76% in 1997 to 72% in 2001, in significant part because of pressures from managed care. Moreover, almost 75% of the practitioners who do treat the uninsured estimated that they spent less than 5% of their practice time on this population.

What do these statistics say about the importance of the safety net and its ability to meet demand? Studies of service patterns for the uninsured found that closeness to community health centers or hospitals seen as safety net facilities was associated with at least modestly greater access to health care services. Specifically, the evidence also suggests that safety-net providers help fill the gap in access to primary care and some inpatient care for vulnerable populations. As summarized by the Institute of Medicine, “In many underserved inner-city . . . communities, core safety-net providers may be the only available source of primary health care services for the vulnerable populations residing in these areas” (p. 4).

**Barriers and Challenges Affecting Access to High-Quality Health Care for Vulnerable Populations in Cities**

How do the circumstances of populations who are likely to rely on urban safety-net providers for care affect their access to the quality of health care they need, and why are these populations most likely to suffer from poorer health as a result? The following section identifies three challenges and related consequences that are likely to perpetuate disparities in health: lack of insurance, nonfinancial barriers to care, and issues specific to the growing numbers of residents from racial and ethnic minorities.

**Consequences for the Uninsured**

One of the major misperceptions in the United States is that individuals without insurance can obtain access to care when they really need it. As succinctly stated by James Mongan, past president of the Massachusetts General Hospital:

> Many [Americans] assume that the uninsured get help when they need it and in a sense they are right—but also very wrong. For some acute, visible episodes such as childbirth or a broken leg, almost everybody does get treatment. What is not well understood is that the uninsured often do not receive care for many serious illnesses, such as cancer, diabetes, and hypertension, and in many instances defer care until their illness has reached an advanced stage.
Extensive research has documented in significant detail the health care access and quality consequences facing the uninsured.\textsuperscript{28–30} The uninsured obtain about 60\% of the services received by those with insurance, after controlling for income, family status, and geographic place of residence; 30\% of uninsured adults failed to fill a prescription or did not receive a medical test due to cost in the past year. Sixty-seven percent of uninsured whose health was fair or poor faced problems receiving medical care, and as a result of delaying care and other factors, the likelihood of being hospitalized for avoidable conditions, such as diabetes, is at least 50\% greater among uninsured persons compared with persons who are insured.

The consequences of poverty and lack of insurance can have significant impact on intensity of care, quality of care, and outcomes for urban residents. Low-income asthma patients discharged after hospitalization from a Boston hospital were found to have significantly worse pulmonary health and physical function post-discharge compared with non-poor patients.\textsuperscript{31} These findings correlated with less intense follow-up as defined by less continuous or no regular source of care. Five metropolitan hospitals in Massachusetts reported longer stays and greater resource use by poor patients compared with other patients.\textsuperscript{32} Hospital charges were higher, differing by as much as 13\%, and length of stay differed by as much as 21\%, after controlling for age, severity of illness, and other factors. The studies suggest that hospitals caring for this population may require payment adjustments to offset higher costs.

Hospitals may unintentionally compound these problems by their own inattention to the uninsured.\textsuperscript{33} A survey of almost 6,500 uninsured concerning their self-reported experiences in seeking health care primarily in urban areas found that, overall, three in five needed help paying their medical bill, but almost half stated that staff never offered assistance of any kind. Seven in 10 using emergency departments stated that assistance was never offered. In addition, two in 15 reported not obtaining some or all of their medications because of cost. In all, almost half reported having unpaid medical debt to the facility, reaching as high as two in three for those using emergency departments. About one in four of those with medical bills stated that their debts would deter them from seeking care from that facility in the future.

These experiences demonstrate how poverty and lack of insurance can discourage people from seeking care. They document that the health care decisions made by the uninsured can threaten their well-being, drive up costs and create a greater dependency on inpatient and specialty care among safety-net providers.

**Nonfinancial Access Barriers**

The link between cost and access to health care for the uninsured and other poor is indisputable. Nonetheless, in many situations, cost becomes only one part of a broader set of environmental, social, and other circumstances that adversely affects access to health care for urban residents.

A study of almost 4,000 primarily low-income, minority patients at a large urban public hospital found that insurance was only one of several barriers to using
Access to High-Quality Health Care in U.S. Cities

A regular source of care. Several environmental circumstances and other factors delayed or otherwise adversely affected access, including lack of transportation, exposure to violence, lack of insurance, and less than a high school education. Other inner-city stresses and fewer resources for coping in stressful environments may also lead to higher risk of death from disease. A door-to-door survey of more than 400 nonelderly poor in Dayton, Ohio, found most reported multiple barriers to care, including lack of information about reduced-cost or free sources of care, concerns about costs of care and child-care needs, as well as problems related to transportation and lack of a telephone.

Perceptions of problems in accessing care among vulnerable populations can also affect health care decisions. A 1998 study on hospital care in New York City found that almost 75% of patients using hospital emergency rooms had conditions that could be treated in primary care settings or were not emergency events. An additional 7% were seen for conditions that were preventable. The authors suggest that this extensive emergency room use may reflect uncertainties about the ability of the primary care system to meet residents’ needs. A study in urban California found that residents who perceived themselves as having poor access to care were more likely to have preventable hospitalizations for chronic health conditions, such as diabetes and heart disease, after controlling for demographics, income, and other factors.

Resource allocation decisions that lead to scarcity and extend into the community further exacerbate the health penalty faced by urban residents. For example, a survey of pharmacies in New York City identified only about one-quarter of those in primarily nonwhite neighborhoods as having adequate access to prescription drugs for treating severe pain, compared with almost three-quarters of pharmacies in predominantly white areas of the city.

The Special Challenges Facing Racially and Ethnically Diverse Populations

Challenges involving access and quality of care take on a special meaning and intensity for racially and ethnically diverse populations. As summarized in the 2002 Institute of Medicine report, Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care, racially and ethnically diverse populations face special access problems related to lack of insurance and poorer health, leading to higher disease rates.

Research on racial and ethnic disparities, which is especially relevant for urban areas because of the high proportion of racial and ethnic minorities in many cities, paints a stark and consistent picture, documenting that blacks and Hispanics are more likely to say they could not get adequate health care when needed. In addition, black patients are less likely to be assessed as appropriate candidates and are more likely to have incomplete evaluations related to transplants than whites, and the race or ethnicity of patients affects practitioner treatment determinations around offering cardiac catheterization.

Finally, failure to recognize the role of nonclinical aspects of care may per-
petuate these disparities. A review of 280 urban community health center medical records by race and ethnicity focusing on hypertension and diabetes as they relate to life-style and prevention found that regular access to care alone was not related to improved clinical outcomes. The findings reinforced the need for developing actions that encourage a healthy life-style among low-income populations with these conditions, including using social and family networks to help manage their diseases.

Conclusions based on the substantial body of evidence describing disparities in access to and quality of care reinforce the contention that one’s race or ethnicity predicts not only how difficult it is to get needed health care but also the quality of an encounter when it occurs.

**Forces Influencing the Future of the Safety Net**

The fragility of the urban safety net is in its efforts to meet the needs of residents without becoming overwhelmed by the attendant financial shortfalls and service responsibilities. The current status and future forecasts are not optimistic for reducing entrenched barriers to care.

This section discusses challenges facing urban safety-net providers, identifies the forces likely to affect the urban safety net and focuses on three major factors significantly influencing their ability to balance community need with their survival: financial support, managed care, and competition and other changes in the health care marketplace.

**Financial Support**

The financial lifeblood of the urban health care safety net is a patchwork of primarily public sources, most notably Medicaid, the federal-state program for the poor. Safety net hospitals, in particular, depend on three primary sources of support for serving uninsured and low income populations: state and local government subsidies, Medicaid, and Medicaid and Medicare reimbursement adjustments, called disproportionate share hospital payments. Teaching hospitals also receive additional payments from the federal government to offset their relatively higher costs. Community health centers are supported in large part by direct subsidies from the federal government and by Medicaid reimbursements. Funding for health departments comes primarily from state, county, and city sources, while private clinics rely on Medicaid and in some cases subsidies from other sources, such as local government or religious affiliations. Additional general support may come from government assistance at the state, county, or city level, usually from tax revenues, and from health care providers who assume financial losses related to caring for individuals from whom they receive little or no reimbursement.

As a result of its dependency on public assistance, core components of the urban safety net are especially sensitive to reductions in financial support and to population changes. As noted in the 2000 Institutes of Medicine report, “their dependence on Medicaid revenues and federal, state, and local subsidies exposes...
these providers to exceptional financial risk if Medicaid payment levels are further reduced, if Medicaid volumes decline or other sources of direct or indirect support . . . are reduced” (p. 24). Threats to the stability of these providers stemming from this dependence are a significant and chronic problem. A report on 99 safety net-based Medicaid managed care plans described challenges such as access to capital and dependence on public programs for enrollees with a weak political base. The majority of these programs, which are generally sponsored by community health centers, government, and academic health centers, faced substantial financial consequences: Fewer than 10% reported that they broke even, and 60% stated they had lost money in 1998, an increase from 28% in 1997.

In the 1990s safety net hospitals with the highest burden of uncompensated care faced the greatest risk of closing. In general, margins for safety net hospitals declined compared with those of non-safety net facilities. A review of financial status among community health centers during the mid-to-late 1990s revealed that more than half reported operating deficits. Those reporting the greatest increases in uninsured—at least 20%—and Medicaid managed care enrollees were most likely to face deficits.

Perhaps the greatest threat to the viability of the urban safety net and implied by these trends is its susceptibility to the vicissitudes of funding from sources that are, in turn, subject to “boom or bust” cycles, political changes, or program shifts in priority. One manifestation of this vulnerability is that the downturn in the U.S. economy that occurred during the early 2000s has resulted in cutbacks in Medicaid spending and curtailed support from local government and other essential sources. During this period, states reduced provider reimbursement to contain Medicaid costs, cut back on outreach, froze Medicaid enrollment, and in some cases dropped newly eligible populations, such as immigrants and parents of children eligible for the State-Children’s Health Insurance Program. Moreover, the economic downturn and increases in health insurance premiums cut into employers’ bottom lines, leading them to shift costs to workers with the likelihood that fewer employees will be able to afford to keep their health insurance.

The plight of many urban public hospitals also demonstrates the financial consequences emerging from insufficient support. One of the greatest concerns among urban safety net institutions is the threat of increasing imbalance between losses associated with care for low-income populations and sources of revenue. The National Association of Public Hospitals reported that its members’ financial health had worsened significantly by the end of the 1990s as indicated by average margins of -1% in 2000 after years of positive margins. In that year, almost half of their membership reported negative margins, an increase from 30% in 1996. Both findings vary significantly from the averages compiled by the American Hospital Association, whose members are primarily private hospitals. The association reported average margins of 4.6% and that the proportion of hospitals reporting negative margins was 30% in 2000.

Even in the best of times, however, the lack of support for meeting the needs of both populations and providers in cities remains a problem of chronic under-
funding. Absent a universal health care program for the nation, economic cycles, chronic financial shortfalls, and political forces will leave the urban safety net vulnerable and fragile.

**Managed Care**

The significant influence that managed care continues to exert on health care providers has important implications for services and access in cities. Its benefits for safety-net providers, however, remain uncertain. Research has found that Medicaid managed care has been more successful in reducing waiting times, improving the likelihood of having a regular source of care, and achieving greater levels of satisfaction compared with beneficiaries not enrolled in these programs.50 Yet others more skeptical about the ability of safety-net providers to benefit from either direct service or contracts with others have suggested it could be a “nail in the coffin” for them—another financial and health care burden to bear.51

Some evidence supports those who are not fully persuaded about the benefits for these providers. An analysis of trends in hospitals serving the uninsured at a time of increased managed care penetration during the 1990s found that care for these patients became significantly more concentrated in fewer hospitals.52 In particular, urban academic health centers absorbed greater responsibility for the uninsured, especially where levels of managed care were the greatest. As managed care took hold in urban America, the burden of care for the uninsured became more unevenly distributed during the early to mid-1990s. Noting that more intense competition brought on by managed care may have contributed significantly to this shift, Weissman and colleagues52 conclude that “the trends should leave policymakers concerned about the future ability of safety net institutions to bear an increasing share of the burden of providing charity care” (p. 93).

Managed care has also increased pressure on other urban health care sectors. As noted previously, community health centers with larger proportions of Medicaid managed care and uninsured are most likely to suffer financially.45, 47 Also, managed care is placing added stress on community-based practitioners to increase efficiency and reduce care that is not fully paid. Managed care may also have difficulty providing adequate access and utilization to racially and ethnically diverse populations in urban areas. For example, research has found that Hispanic and Asian managed care enrollees were more likely than non-Hispanic whites to report longer waits in getting needed care.53 Compared with non-managed-care settings, these enrollees were also more likely to report dissatisfaction with care. With growing proportions of eligible Medicaid populations being enrolled in managed care, these findings raise concerns about its ability to reach and effectively serve a large segment of urban residents.

**Competition and Other Changes in the Health Care Marketplace**

The competitive reality for the urban safety net is that market pressures are diminishing options for supporting care to many city residents. Historically, urban area
hospitals, community health centers, and other providers of care to the poor and uninsured have used revenues from privately insured patients to offset, in part, the costs of uncompensated care. This “cost shifting” has become increasingly difficult to maintain as insurers seek the lowest rates from providers.

While the U.S. health care environment naturally promotes competition, financial stresses related to downturns in the U.S. economy compound competitive pressures on safety-net providers in cities in other ways, with potentially significant consequences for services and residents. First, many providers will be reluctant to render services to patients they are not fully compensated for, thereby increasing the likelihood that greater numbers of uninsured or underinsured will be concentrated in fewer facilities. Second, as the sources of revenue become more constricted, private providers in particular will be increasingly inclined to widen the marketing range of prospective clients they find financially attractive to include healthier Medicaid enrollees and others who are primarily cared for by safety net facilities. A 2003 *New York Times* article entitled “Some Concerns Thrive on Medicaid Patients” points out that many private health insurers target for enrollment Medicaid recipients such as children and women with relatively fewer health care needs. Finally, while some would argue that competition is only leading to greater efficiencies in health care by closing unprofitable providers, it may create a less desirable outcome. As Whiteis summarizes:

The withdrawal of services from poor and minority communities is attributed to impersonal “market forces” and defined as a problem of fiscal management and business efficiency. According to this argument, most hospital closures are the result of a market-driven streamlining of a bloated industry, where inefficient competitors are squeezed out by rational economic forces. (p. 803)

The contention that competition will essentially weed out the less financially competent providers does not easily apply to those serving the urban poor and other vulnerable populations, who do not easily fit within a market model that stresses maximizing profitable care.

**Conclusion: Initiatives to Sustain and Enhance the Health Care Safety Net for Vulnerable Urban Residents**

Recognizing that failure to balance the present and future viability of the safety net with the vulnerable populations may be a recipe for illness and hardship, some local, state, and federal government agencies are taking action to position these providers for survival and growth in meeting access and quality challenges. This section presents three areas for such initiatives: reinforcing health care financing for vulnerable populations, capitalizing on community commitment, and promoting culturally competent care for racially and ethnically diverse populations. The conclusion suggests strategies for increasing support for and improving the quality of urban health care.
Current and proposed efforts at the local, state, and national levels suggest that survival and success in the face of considerable challenges for these providers and their communities are not impossible. However, actions to protect and strengthen safety-net providers in cities will need to address the immediate and longstanding concerns around support of care for vulnerable populations. At the same time, safety-net providers must take advantage of the commitment to community inherent in their mission.

Reinforcing Health Care Financing for Vulnerable Populations

A review of the status of safety-net providers in 12 communities by the Center for the Study of Health System Change found that many have become more resilient and stronger since the mid-1990s. Externally, the economic upturn in the late 1990s offered the opportunity for expanded coverage at the state level, especially evident in Medicaid and the State-Children’s Health Insurance Program. Additional support for federally funded community health centers and Community Access Program grants to improve care for the uninsured also assisted local areas to improve care. During the subsequent economic downturn that started in 2001, some states took steps to protect these providers’ subsidies, affirming their support for public insurance.

Some of the more successful safety net programs have also adopted business strategies and positions in the marketplace that have helped them grow and become more efficient. A limited but promising federal initiative that emerged in the early 2000s is the commitment to greatly expand the numbers, scope, and reach of community health centers. With significant growth supported by the Bush Administration, officials estimate that by 2006 the federal government will have provided funding for 645 new and 555 expanded centers, serving as many as 16 million people. In addition to increasing care for the vulnerable populations, early results indicate support has been used to expand hours, open new facilities, add services, hire staff, coordinate care for the uninsured more effectively, and organize information more efficiently.

These actions, while far from comprehensive, strengthen the financial foundation under these providers, thereby lessening the effect of other revenue reductions and perhaps preventing the failure of certain hospitals or clinics, at least in the short term. The community health center expansion, while not addressing inpatient, pharmaceutical, specialty, or long-term care, offers important opportunities to improve entry-point and nonacute services in many cities. None, however, address the core issues around distribution of the burden of care for the poor and other vulnerable populations that leaves the safety net especially vulnerable or how to finance the spectrum of essential care for the millions of uninsured. Absent a national program, more substantial solutions include improving support using disproportionate share allocations and targeted financial initiatives for the safety net, offering technical assistance to help institutions reach a competitive position in the health care marketplace, improving support for emergency care and coor-
Capitalizing on Community Commitment

Increasingly, leaders at the local level have realized their role in advancing the health of resident populations. Community development and political empowerment are seen as essential ingredients for advancing public health goals to overcome entrenched political and economic disenfranchisement and inattention to chronic local problems. The mission and mandate of community health centers stress health care “at the source” and active involvement with communities in carrying out their work. In addition, some communities have undertaken initiatives aimed specifically at community-level interventions and collaboration. For example, a Chicago-based randomized trial involving low-income areas found that the most effective actions to prevent asthma attacks were not related to medical treatment or drug interventions but instead involved eliminating cockroaches, minimizing pesticide use, and identifying allergen sources through peer education, especially at the neighborhood level.60

St. Louis University School of Public Health has collaborated with the city Department of Health and Hospitals and other agencies to promote health in public housing projects.61 The initiative focuses on multiservice coordination for the 4,500 residents while supporting self-management by the tenant board. Health fairs and involvement of families in planning events are part of the effort. Parkland Health and Hospitals System in Dallas works with a network of community-based health centers, homeless shelters, school health programs, churches, and senior citizen centers in organizing and providing community-based services tailored to population needs.62

Finally, community commitment to the uninsured has led some cities to undertake initiatives that extend beyond the service level to organize and finance programs that provide insurance to individuals left out of mainstream care.63 Indianapolis, Milwaukee, Tampa, San Antonio, Boston, and other cities have redirected existing sources or found new taxing authority to support these efforts. Such programs offer additional support to traditional safety-net providers or attempt to encourage other health care organizations to participate in spreading responsibility for vulnerable populations.

These examples highlight how health programs are reorienting or reinforcing their emphasis on community-based programs. Their experiences and objectives also recognize the core tenet that health care is a local concern that requires neighborhood and city collaboration.

Promoting Culturally Competent Care for Racially and Ethnically Diverse Populations

A substantial and growing compendium of evidence is giving greater support to the need for providers in cities and elsewhere to address the shortcomings in caring for racially and ethnically diverse populations.40 Experiences to date suggest,
however, that advancing competent care among health systems and practitioners will require a systems-wide adaptation that includes active collaboration and involvement with communities of concern; organizational commitment that involves assessment of staff training and education needs; staff representation of diverse communities at all levels; reassessment of mission statements and business strategies; and determination of language, health literacy, or interpreter needs. Service initiatives will require tailoring programs to the cultural concerns and priorities of urban residents that extend from birth to death. Finally, practitioners must recognize the multiple causes of disparities in health and health care and what can be done to eliminate them. Building that knowledge base should take into account racial and ethnic differences and disparities based on genetics or biological predispositions, barriers to access, inequities in quality of care, problems in communication, and patient preferences that can affect the clinical encounter (e.g., gender issues, role of family, and level of trust). As an indication of significant progress, attention to race, culture, and health has broadened to include not only documentation of problems but actions to address them. Supplementing reports on disparities by the Institute of Medicine and other agencies, the Office of Minority Health, U.S. Department of Health and Human Services, offers guidance to providers in its publication of Culturally and Linguistically Appropriate Standards; the Center for Medicare and Medicaid Services directed health plans to include cultural competence or disparities reduction initiatives as part of their Quality Assurance/Performance Improvement requirements; and many states, foundations, and systems, such as Kaiser Permanente, as well as individual health care settings, have developed or supported programs to improve care for diverse enrollees and patients. These efforts offer new resources to assist urban providers and others in promoting culturally competent care.

Rethinking the Future for Health Care in Cities

Despite the most well-intentioned efforts, unless major changes are made in U.S. health care, the longstanding financing and health care “non-system” structure will continue to perpetuate a patchwork of services for urban poor. Some contend that state and local governments focus on cost-saving actions that perpetuate the current service structure without addressing the social and community factors driving morbidity and mortality rates that could improve access and quality of care for vulnerable populations. Examples of less far-reaching efforts include public or major safety net hospital closures in St. Louis (e.g., St. Louis Regional Medical Center), threatened or actual county health clinic closures in Los Angeles, and the elimination of public health departments in Texas. Medicaid managed care was seen as one way to promote preventive care among poorer populations, but evidence to this effect is less than compelling. Moreover, managed care frequently does not address barriers to obtaining care among the poor, such as threat of violence, lack of transportation, and lack of community-based providers willing to take Medicaid. As a result, a two-tiered structure continues to characterize health care in the United States, wherein poor and often minority communities have fewer health care options and many health care providers choose not to prac-
tice in poor neighborhoods or limit how much care they provide to the poor and uninsured.

Severe stresses on the urban safety net have in some instances led to more broad-ranging proposals for averting disaster. Los Angeles presents a graphic example of a city forced to contemplate major change. Chronic budget deficiencies in Los Angeles County have led the County Board of Supervisors in 2003 to recommend the closure of 11 health clinics and two of the six county hospitals. Among the challenges facing the system are protracted waits for emergency care of up to four hours and an increase in the number of emergency room services despite growing proportions of the population enrolled in managed care. There remains great concern over the county’s ability to sustain this system. Recommendations from health policy leaders and officials include more effective linking of public health functions with other components of the health system, both public and private; more effective integration of medical education training programs into public health functions and priorities; and improved affiliation agreements between public hospitals and medical schools to support public health and the health care delivery system overall.

The Los Angeles story is just one example of how reassessments of the size, shape, and scope of urban health care are taking place. Others have argued for more significant if not radical restructuring of the health care system. Hurowitz has suggested a significant modification, if not break, in the symbiotic relationship between the health care establishment and financial supporters of medical care that leaves emergency rooms, clinics, and inpatient units with the fallout from domestic abuse, violence, homelessness, drug abuse, lead based paint, and many other social and environmental issues. This scenario for improving health requires hospitals and other providers to share responsibility and financial resources with other service sectors, such as social services, schools, and housing. Through new initiatives and collaborations, these sectors would help break the reactive cycle that leads to dependency on the health care system to address broader societal failures. Those providing support—federal, state, and local governments, employers, and others—would acknowledge broader commitment and direct dollars accordingly.

Examples of related initiatives include the creation of “community development corporations” that work with residents of low-to-moderate income neighborhoods to address poor housing conditions, unemployment, crime, poor health care and other inner-city challenges. These multisite efforts have renovated housing units and created employment opportunities, as well as revitalized areas around hospitals. Similarly, the city of Chicago, Sears, Roebuck, and a Chicago builder have joined to revitalize the North Lawndale area, originally a corporate location for Sears. Businesses have partnered with Rush-Presbyterian-St. Luke’s Medical Center to reduce teen pregnancy and other health challenges while working to build affordable housing and to bring commerce to the area.

Shekar has recommended that the recent federal decisions to increase funding for community health centers, with their emphasis on primary care, prevention, and health promotion, could be a significant step toward refocusing health care support on stress prevention and primary care over higher cost tertiary and in-
patient services. One potential goal of this expansion is to use the success, scope, reach, and increasing attractiveness of community health centers to encourage use by poor and nonpoor alike as a way to eliminate the two-tier structure of care in the United States.

Ultimately, choices for cities may very well come down to how much health care is seen as a “public good” or as something that can be privatized. Communities and policy makers in cities may have to choose from among three major options: a fully vested safety net with support sufficient to meet vulnerable population needs but with sufficient assistance that allows it to grow, based on its effective and well-established connections to communities, the high quality of its care, and its critical role as a service provider to the broader urban population; a residual sector that “picks up the pieces”—the lives or services—that for-profit providers see as unprofitable; or a greater privatization of urban safety net care that essentially turns over much of that responsibility to the marketplace.

The future of the health care safety net will continue to be debated in cities across the country. However, hopes for the nation’s urban centers will ultimately lie in the ability of communities and their providers to deliver high-quality services that promote the health and well-being—and not the sickness—of their residents.

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Food, Nutrition, and the Health of Urban Populations

Ming-Chin Yeh and David L. Katz

Introduction

In the past century, Western nations have witnessed a dramatic transformation in the impact of nutrition on the health of the public. In the early decades of the 20th century, and before, food and nutrient deficiencies were the prevailing scourges. Now the problem of nutritional excess has overtaken deficiency as a leading threat to health in the United States and increasingly throughout much of the world.¹,²

According to the U.S. Census Bureau, 80% of Americans live in central cities and their suburbs. Therefore, the health problems of the nation are concentrated among these metropolitan populations, which differ from nonmetropolitan populations in several ways. For example, the foreign born are more likely than native-born U.S. residents to live in central cities (44% vs. 26%). Overall, 12% of U.S. residents are foreign born, whereas in cities like Miami, New York, San Francisco, and Los Angeles, more than a third of the residents are foreign born.³ In addition, U.S. urban populations have higher proportions of African Americans, Hispanics, and Asians than nonurban areas, as well as a higher proportion of people living in poverty. Both ethnicity and income are associated with increased morbidity and mortality.⁴ As the following discussion reveals, the nutritional problems that city dwellers face are a consequence of the composition of urban populations, especially the disproportionate representation of poor people, and the unique characteristics of the urban food system.

This chapter provides an overview of a range of nutrition issues that are related to health in a variety of urban settings. While the focus is on nutrition, we also consider physical activity because of the important role it plays in obesity. This chapter focuses on several major areas: the current epidemiology of public
health nutrition, with an emphasis on the obesity epidemic; the relationship between neighborhood characteristics and dietary and chronic disease risks; challenges to staying healthy in an urban setting; and strategies to improve health in urban settings. We conclude with recommendations for future directions in research and intervention.

Current Epidemiology of Public Health Nutrition

Dietary factors contribute substantially to the burden of preventable illnesses. Epidemiological studies have shown consistently that high-fat foods are associated with obesity as well as several chronic diseases, including cardiovascular disease, diabetes, and certain types of cancer. Dietary patterns, however, that include high consumption of fruits and vegetables, whole-grain foods, and limited saturated fat intake from red meats are associated with decreased risk for these chronic conditions. Cardiovascular disease (e.g., coronary heart disease and stroke), cancer, and diabetes account for nearly two-thirds of all deaths in the United States and approximately $700 billion in direct and indirect economic costs. Although tobacco use is the leading cause of death, accounting for 18.1% of U.S. deaths in 2000, poor diet and physical inactivity come in second, accounting for 15.2% of U.S. deaths.

Obesity Epidemic

The prevalence of obese (defined as a body mass index, or BMI, at or above 30 kg/m²) and overweight (25 kg/m² ≤ BMI < 30 kg/m²) Americans has increased to epidemic levels in the past few decades. A recent government report has shown that approximately 65.1% of the adults aged 20 years or over were overweight or obese, whereas 31.0% of children and adolescents aged 6–19 years old were at risk of overweight or overweight in 1999–2002. The condition for immigrants is also alarming. A recent cross-sectional study was conducted to examine obesity among U.S. immigrant subgroups. Results showed that even though immigrants were generally less likely than the U.S.-born to be overweight or obese, the longer an immigrant stayed in the United States, the more likely he or she became obese. The obesity prevalence for immigrants who stayed in the United States for at least 15 years was close to that of U.S.-born adults. Furthermore, the obesity epidemic is not confined to the United States or other developed countries. With acculturation to a Western life-style increasing, developing countries are in a state of a nutritional transition that could propel obesity into a global pandemic.

The health consequences of obesity are well documented. Obesity is associated with increased risk of cardiovascular disease, diabetes, cancer, arthritis, and many other morbidities. The U.S. Surgeon General estimated the total cost for obesity was $117 billion in 2000. While obesity is a problem for all demographic groups, it affects certain population subgroups disproportionately. Studies have shown that ethnic and racial minorities and those with low incomes have exceedingly high rates of obesity. Although obesity rates have increased across all
races and ages, and in both genders, socioeconomic disparities in obesity prevalence still persist. For example, women of lower socioeconomic status (SES) have significantly higher rates of obesity and overweight rates than do women of higher SES. This is particularly true among white women.16

Fundamentally, obesity is about too many calories in (suboptimal dietary behavior) and too few out (suboptimal physical activity). Various factors, such as increased away-from-home food consumption and large food portion sizes contribute to this excess of calories. A similarly powerful array of factors contributes to too few calories expended; these include new technologies that replace physical exertion in both work and leisure activities; sedentary diversions, such as television and video games; and policies such as dropping physical education from school curricula.13 Thus, energy balance and healthy weight maintenance are often elusive goals for both urban and nonurban populations.

CHANGES IN DIET

In the past three decades, Americans have increased their calorie intake.17 According to recently published national data, American men consumed an average of 2,618 calories a day in 2000 compared with 2,450 calories in 1971, an increase of 7% in 30 years. During that same period, women’s daily caloric consumption increased 22%, from 1,542 to 1,877 calories. The increased calories come largely from the consumption of refined grains and foods high in added sugar.18

The observed increase in energy intake has been attributed to several dietary changes. The most significant trend is the shift of energy intake from home to away-from-home sources. Between 1977 and 1996, the energy consumed at home has declined from 76.9% to 64.5%.19 The majority of the away-from-home food sources were purchased from restaurants and fast-food outlets.20 The increase in the proportion of food purchased from restaurants and fast-food outlets has led to higher proportions of high-fat, calorie-dense foods, such as the cheeseburgers, French fries, pizza, and soft drinks that are typically offered at take-away food establishments.19 Contrary to popular perception, these changes occurred across all age groups, not just among children and adolescents.19

Increased total energy intake was also found to be linked to increases in portion size.21 In the past decades, the portion sizes of most commonly available food items are larger than those established by government agencies and larger than they were in 1970s,22 a trend that has been implicated in the obesity epidemic.23 Recently, media and scientists have described how the food industry has pursued its own economic gain without adequately considering the health of the general public.24, 25 Brownell and Horgen26 have labeled the overabundance of high-fat, high-sugar foods as a “toxic environment” that contributes to obesity. One example of the toxic environment is the increasing size of portions of both at-home and away-from-home food items, such as salty snacks, desserts, and French fries, with the largest portions consumed at fast-food outlets.27 The increased portion size seen in fast-food establishments that could lead to overconsumption of energy-dense foods is a characteristic of the “super-sizing” phenomenon,28, 29 derided in a popular documentary film (Super Size Me) in 2004.30
Since the mid 1980s, there has been an increased interest in the study of the association between television viewing and increased risk of obesity, especially among children. One study has shown that children’s food consumption patterns were strongly influenced by the advertisements they saw on TV. Foods consumed during TV viewing tended to be high in fat and sugar content. Furthermore, TV viewing increased snacking frequency. The TV viewing-related frequent consumption of calorie-dense food combined with an associated reduction in physical activity has raised concerns about a worsening of the current epidemic of pediatric obesity. The association between TV viewing and obesity in adults is not as well studied as in children. Nevertheless, recent data showed that adult TV viewing was associated with obesity as well.

THE ROLE OF PHYSICAL ACTIVITY
A sedentary life-style and physical inactivity are the hallmarks of modern Western societies, with leisure-time physical activity contributing only 5% of the population’s total energy expenditure. Health experts recommend at least 30 minutes of moderate-intensity physical activity on most days of the week to promote good health. Yet the proportion of people who comply with this recommendation is disappointingly low. It is estimated that, not including routine physical activity, 25% of the population reported no leisure-time physical activity at all in 2002. According to a report published by the U.S. Surgeon General’s office, a lack of physical activity is associated with adverse health outcomes, such as increased risk of mortality and morbidity from coronary heart disease, high blood pressure, diabetes, and obesity-related outcomes, to name just a few.

Neighborhood Characteristics, Dietary Patterns, and Chronic Disease Risks
Neighborhood characteristics are closely related to nutrient intake and dietary patterns, physical activity levels, and risk of heart disease. For example, using a semi-quantitative food-frequency questionnaire to assess diet, Diez-Roux and colleagues showed that compared with residents of higher-income neighborhoods, those in low-income neighborhoods generally had increased intake of meat and decreased intake of fruits, vegetables, and fish. A recent study in the United Kingdom also found that the cheaper foods in poorer areas tended to be energy-dense, high-fat, and high-sugar goods. Residents of lower SES communities consumed fewer fruits and vegetables and had less physical activity.

A recent U.S. study has shown that neighborhood characteristics are associated with the location of food stores and food service places. Results from this study indicated that there were more than three times as many supermarkets in the wealthier neighborhoods compared with the poorer areas. At the same time, fast-food restaurants, such as McDonald’s and Wendy’s, were found to be more prevalent in the poor areas than in the wealthy areas. Improving the local food environment was found to have a positive impact on the residents’ dietary intake. For example, with each additional supermarket (where more healthful foods at
low prices are found) in the neighborhood, fruit and vegetable intake increased by 32% and 11% by African American and white American residents, respectively.\textsuperscript{46}

Because cities have higher concentrations of poor people than do nonurban areas, the studies that link socioeconomic status to healthy diets have special relevance to cities. Urban neighborhood characteristics can also influence residents’ physical activity. Unsafe neighborhoods, for example, have been shown to discourage physical activity among urban residents, especially among children and adolescents.\textsuperscript{47} Other studies have shown that the built environment has an impact on physical activity levels and obesity rates.\textsuperscript{48, 49}

Individual-level risk factors, such as social class, have been associated with incidence, prevalence, and mortality of chronic diseases, including coronary heart disease (CHD).\textsuperscript{50, 51} However, factors operating at the level of communities (or neighborhoods) may affect individual-level health outcomes and may explain differences that are not captured by individual-level factors.\textsuperscript{52, 53} Three mechanisms by which neighborhood environments may be related to CHD have been postulated: availability and cost of foods in the area; availability and distribution of recreational spaces, such as parks and walking trails; and availability of resources within the community to cope with the stress to which individuals are exposed.\textsuperscript{54}

A study with a large sample size from four U.S. communities (the ARIC study)\textsuperscript{54} assessed the relationship between neighborhood environments and coronary heart disease prevalence. The data showed that, after adjusting for individual-level variables, living in deprived neighborhoods was associated with increased prevalence of CHD and increased levels of risk factors. Similarly, based on a 3-component social environment scale: population SES, environment/housing, and commercial stores in the neighborhood, data from a large cohort in California has shown that residents in neighborhoods whose social environment was rated low had a higher mortality risk than those in areas where the social environment was rated high.\textsuperscript{55} Residents of disadvantaged, urban communities were at high risk for CHD.\textsuperscript{56}

**Challenges to Staying Healthy in an Urban Setting**

This section summarizes the factors that may be responsible for the increased risk of obesity and other food-related health problems in urban areas: reduced accessibility to healthy foods, the emergence of fast-food restaurants, and food insecurity. Reversing these trends poses political, economic, and social challenges, especially in low-income urban neighborhoods.

**Reduced Accessibility to Healthy Foods**

The term “food desert” refers to densely populated urban areas, such as inner cities, where residents do not have access to affordable and healthy food items.\textsuperscript{57} In recent decades, many traditional food-retailing firms have become larger and the total number of stores has decreased. The increase in the size of superstores,
such as large supermarkets and other large food stores, has increased the selection of food items and has generated greater profit margins for the companies.\textsuperscript{58} However, dense markets of wealthier suburbanites and the high costs of land and development in urban areas led many superstore chains to locate their facilities in suburban sites.\textsuperscript{59, 60} As a result, the food supply within inner cities became smaller and included less variety, denying some urban residents the benefits of healthy foods at affordable prices. Since large food stores, such as supermarkets, tend to have a wider selection at lower prices compared with smaller local food stores,\textsuperscript{61, 62} city dwellers generally pay more for their groceries in local stores compared with suburban residents who purchase the same items at large supermarkets.\textsuperscript{61} Furthermore, healthy foods, such as fresh vegetables, are harder to find in some poor urban neighborhoods than in more affluent areas.\textsuperscript{63} Thus, the exodus of supermarkets from urban communities plays a role in the less optimal nutrition among the urban poor.\textsuperscript{64}

A recent study\textsuperscript{65} investigating the nutritional environment in the Los Angeles metropolitan area helped to explain the role of nutritional resources in residents’ efforts to live a healthy life. The authors found that target areas where poor and predominantly African American people reside lacked an equitable set of healthy nutritional resources. Supermarkets were far apart and carried a limited variety and low quality of fruits and vegetables; such items as low-fat and skim milk, low-fat and nonfat cheese, soymilk, and tofu were also limited. The authors concluded that it is more difficult to adhere to the healthy lifestyle associated with decreased chronic disease risks for those in the low-resource neighborhoods than for those in high-resource areas.\textsuperscript{65} The low availability of foods recommended for diabetic patients, such as fresh fruit, fresh green vegetables, and diet soda, was also observed in a predominately minority, resource-limited neighborhood in East Harlem in New York City.\textsuperscript{66} Similarly, children living in communities with limited resources tended to have decreased access to affordable foods and poor school performance.\textsuperscript{67} The cost of food is often cited as a significant barrier that keeps people from making good dietary choices,\textsuperscript{68} and finding ways to get healthy foods to residents in deprived urban neighborhoods poses significant challenges. Increasing evidence suggests that ethnic-minority communities, especially African American communities, have been targeted disproportionately for the increased marketing and advertising of unhealthful rather than healthy foods.\textsuperscript{69} In addition, since poor areas have fewer and smaller supermarkets and retail outlets than better-off areas,\textsuperscript{70} lack of transportation is a major barrier for those living in poor inner cities. Some urban residents, especially those who are elderly and live in an unsafe neighborhood, need to drive or be driven to the closest suburb in order to obtain foods such as fresh vegetables.\textsuperscript{71, pp. 97–101} African Americans and Hispanics with low SES are least likely to own private vehicles.\textsuperscript{72} Extra out-of-pocket expenses for car services to shop at a distant supermarket may be required and would further stretch already thin food budgets. Thus, the location of food stores can play an important role in nutrition for low-income populations.\textsuperscript{73} In recent years, some supermarket chains have returned to central cities, a development that may increase access to healthier foods.
The Emergence of Fast-Food Restaurants

The number of fast-food outlets in the United States has increased from about 30,000 in 1970 to approximately 233,000 in 2003, generating sales of more than $136 billion.\textsuperscript{74} It is estimated that these sales will continue to increase in coming years.\textsuperscript{74} Despite the industry’s effort to include healthier items, such as salads, hamburgers and French fries continue to be leading items of sales volume.\textsuperscript{75} Because of their convenience and availability, and the time constraints of the modern urban society, fast foods will likely increase as a public health concern.\textsuperscript{76}

The consumption of foods away from home increased from 18% to 32% of total calories between 1977–78 and 1994–96.\textsuperscript{77} In the early 1970s, 20% of the household food dollar was estimated to be spent on food away from home; by 1995, it was estimated to be 40%.\textsuperscript{79} A substantial proportion of this increased spending occurs in fast-food restaurants. Data from the 1994–1996 USDA Continuing Survey of Food Intakes by Individuals\textsuperscript{79} revealed that approximately one-third of the U.S. adults who reported eating away from home on any given day ate at a fast-food outlet.\textsuperscript{79}

Fast-food restaurants are more concentrated in low-income neighborhoods, with people living in the poorest SES areas having 2.5 times the exposure to fast-food restaurants as those living in the wealthiest areas.\textsuperscript{80} In a pre–Hurricane Katrina study in New Orleans, researchers mapped fast-food restaurants within the city limits and found that neighborhoods with predominately low-income, African American residents had 2.4 fast-food restaurants per square mile compared with 1.5 fast-food restaurants per square mile in neighborhoods with predominately moderate-income, white residents.\textsuperscript{81}

The association of fast-food consumption with unhealthy diets has been documented in recent studies. For example, a survey of 4,746 adolescent students found that fast-food consumption was positively associated with intake of total energy, percentage of energy from fat, and daily servings of soft drinks, and French fries and was inversely associated with daily servings of fruits and vegetables.\textsuperscript{82} Similar findings were observed among adults and children,\textsuperscript{76} and, in a separate study, women.\textsuperscript{75} Further, using data collected from the 2002 Behavioral Risk Factor Surveillance System of all states in the United States (including the District of Columbia and excluding Alaska), with state-level data as the unit of analysis, investigators found that both the number of residents per fast-food restaurant and the number of fast-food restaurants per square mile were strongly correlated with statewide obesity prevalence.\textsuperscript{83} Therefore, the greater concentration of fast-food outlets in poor, urban neighborhoods\textsuperscript{80} puts residents living in those areas at a greater risk of becoming obese.

Food Insecurity

Food insecurity and hunger still pose serious nutrition and health concerns to certain segments of the population in food-rich countries such as the United States. According to the U.S. Department of Agriculture, food insecurity is defined as “limited or uncertain availability of nutritionally adequate or safe foods or the un-
certain ability to acquire acceptable foods in socially acceptable ways,” whereas
hunger is defined as “uneasy or painful sensation caused by a lack of food, a re-
current and involuntary lack of access to food, which may produce malnutrition
over time.”84 According to recent U.S. national data, approximately 12.1 million
American households (11.1% of households) are food insecure; of these, 3.8 mil-
lion households experience hunger.85 The rates observed in urban communities
are higher. For example, in interviews conducted in urban medical centers in five
states and Washington, DC, researchers discovered that 21.4% of the household
were food insecure and 6.8% experienced hunger.86 In another survey of Latino
and Asian immigrants attending urban clinics and community centers in Califor-
ia, Texas, and Illinois, 40% of the households reported food insecurity without
hunger and 41% reported food insecurity with hunger.87

Food insecurity has both direct consequences, such as the physical and physio-
logical symptoms of suboptimal nutritional status, and indirect effects that influence
individuals’ perceptions of overall health, including social and mental health,
as well as quality of life.88 Not surprisingly, food insecurity and hunger have ex-
acted a heavy toll on infants, toddlers,86 and grade-school children.89 Food insecur-
ity can affect the health of children through either or both biological mechanisms
involving decreased food supplies and food intake, lowered food quality, micro-
nutrient deficiencies, or inferior BMI status,89-91 and psychological mechanisms
involving increased family stress, depression, or poor maternal mental health.92, 93
For example, interviews of caregivers of more than 11,500 children younger than
36 months old86 showed that food-insecure children were more likely to have “fair
or poor” health than food-secure children. The authors also found that as the se-
verity of food insecurity increased, the level of health problems also increased. In
addition, food-insecure children were more likely to have been hospitalized than
food-secure children. Other studies have shown that food-insecure children ex-
perience compromised psychosocial functioning,94 anxiety and aggression,95 and
poor academic performance.92

Adult populations also experience health problems related to food insecurity.96
Since Dietz97 published the observed positive association between obesity and food
insecurity in the mid-1990s, the seemingly paradoxical phenomenon of food
insecurity among the overweight and obese has been studied extensively.94, 98, 99 For
example, in a nationally representative sample, Townsend and colleagues98 showed
that for women, the prevalence of overweight (defined as BMI > 27.3 kg/m²) in-
creased as food insecurity increased, from 34% to 41% to 52% for those who were
food secure, mildly food insecure, and moderately insecure, respectively. After
adjusting for potential confounding variables, such as demographic and life-style
factors, food insecurity remained a significant predictor of overweight status.

A possible explanation of this phenomenon is that after people are deprived
of food temporarily, they develop a tendency to binge eat when food is plenti-
ful again, as is evidenced by diet program participants.100 Binge eating has been
shown to result in weight gain.101 Thus, owing to an unfortunate food acquisition
cycle—the “feast and famine” cycle—the food stamp recipients were found to
have a high prevalence of overweight due, in part, to this involuntary, temporary
food restriction. In addition, individuals from food-insecure households often have limited financial resources and are forced to consume more low-cost but energy-dense foods to maintain adequate energy intake. This overconsumption of energy-dense foods could lead to higher percentage of fat and total energy intakes, the major factors associated with obesity. Thus, food-energy density and energy costs could also contribute to the obesity and poverty/food insecurity association.

Strategies to Improve Health Status in Urban Settings

Health-related problems, including poor nutrition and physical inactivity, in urban settings are complex and multifactorial. No single-level approach can address the magnitude of the problems urban populations are facing today. Effective strategies are often intertwined and are based on the success of the others. Thus, a closer look at strategies at the individual, community, and government-policy levels is needed. In this section, we focus on nutritional strategies while acknowledging the importance of combining nutrition and physical-activity interventions. For additional information on the categories and effectiveness of interventions to increase physical activity, readers can consult a systematic review prepared by the Centers for Disease Control’s Task Force on Community Preventive Services.

Individual-Level Interventions

Individual life-style choices and attitudes have strong influences on a person’s diet, health, and body weight. Therefore, it is not surprising that the most common type of intervention to change dietary behaviors has been conducted on the individual level. Intervention strategies often involve nutrition education to change individuals’ behaviors to decrease fat intake and increase fruit and vegetable consumption to prevent disease. Empowerment of consumers, including urban consumers, with skills and strategies for finding and selecting more healthful foods is the focus of several popular books. Intervention studies employing novel approaches to promote long-term nutritional health and weight control, such as providing nutrition instruction in grocery stores, should be encouraged and deserve further investigation.

People report a number of reasons for not being physically active, including lack of time, lack of social support, bad weather, and disruption of routines. Setting small goals, developing a social support group, and partnering with others when exercising can be potential strategies to promote more physical activity. Health professionals have advocated increased walking and bicycling as good forms of moderate physical activity to improve health. A recent study found that each additional kilometer walked per day was associated with an almost 5% reduction in obesity. Similarly, Saelens and colleagues reported that residents had significantly higher physical-activity levels and lower obesity in a more walk-
able environment. Prior data has shown that walking appears to be an acceptable, accessible exercise activity among low-income, unemployed, and obese persons.\textsuperscript{119} Also, residents of poor neighborhoods were more likely to walk than those in less disadvantaged areas.\textsuperscript{120} Since walking is the most common form of physical activity for an individual, understanding environmental influences on walking and developing strategies to promote walking in cities is critical.\textsuperscript{121–23}

Possible strategies to increase daily walking are using the stairs rather than an elevator, walking to a meeting or work-related errand, using public transportation, or parking farther away from the office.\textsuperscript{124} Use of a pedometer has been found to be an effective strategy to increase daily steps (walking) in obese participants.\textsuperscript{125}

In the past, public health nutritionists have relied on these and similar strategies for changing the nutrition and physical activity of individuals. However, interventions that target only the individual level do not fully address the dimensions of such complex health problems as obesity and food insecurity,\textsuperscript{110, 126} and thus recent interest has turned to higher and multilevel interventions.

\textbf{Community-Level Interventions}

City living presents many challenges to good nutrition, such as reduced accessibility to healthy foods and the abundance of fast-food outlets. But cities also offer opportunities to promote good nutrition. For example, the establishment of farmers’ markets can provide fresh, nutritious, and locally grown fruits and vegetables to resource-poor residents. One study has shown that providing vouchers to low-income seniors for use at local farmers’ markets may increase consumption of fruits and vegetables.\textsuperscript{127} In addition, farmers receive benefits by selling more products, thus contributing to the vitality of the local economy. By consuming locally grown products produced by local farmers, residents contribute to a greater degree of regional self-sustainability.\textsuperscript{128, 129}

One recent study has shown that improving public transportation can also improve the food environment of those living in low-income urban areas.\textsuperscript{130} Since the majority of the poor lacks private vehicles, an improved public transportation system within an urban setting can provide easier access to places where fresh, inexpensive, and nutritious foods are available.

In one study, urbanicity has been associated with healthier dietary habits, such as consuming more fruits and vegetables,\textsuperscript{131} suggesting that city living may increase the variety and availability of foods. In a recent study,\textsuperscript{132} we assessed multi-ethnic adults’ attitudes and perceptions of barriers to increased fruit and vegetable consumption. The preliminary focus group results suggested that one of the major perceived barriers for people, especially new immigrants, is the lack of variety and availability of familiar food items. The presence of street vendors with push-carts and green grocers selling fruits and vegetables in urban ethnic and immigrant communities may help to overcome this barrier.

Thus, policies that increase the number of farmers’ markets and fruit-and-vegetable street vendors could help to increase consumption of healthier food in low-income urban communities. To sustain such changes, community programs
to engage children in food and nutrition activities can also help. For example, local organizations can sponsor student-run organic gardens with cooking classes or employ students to disseminate sophisticated understanding of food and nutrition issues. In addition, the “food justice” movement seeks to increase access to healthy foods as a way of promoting social justice and is currently thriving in some cities on the East and West Coasts.

The physical structure or the built environment of cities can confer health benefits by encouraging increased opportunities for physical activity. A report examining the self-reported physical activity by degree of urbanization has shown that residents living in rural areas have engaged in significantly less leisure-time physical activity than their urban counterparts. With compact development and bike lanes in many urban settings, for example, residents can be more physically active by walking or bicycling to many destinations that would require a car ride in nonurban environments. The proximity of stores encourages residents to shop by walking rather than driving. The various public parks and trails in the city also facilitate walking, jogging, and bicycling. Some communities have addressed the fear of safety in one’s neighborhood, a potential deterrent to outdoor physical activity, by organizing volunteer patrols or “Take back the night” campaigns. In addition, nonprofit organizations such as YMCAs and other youth agencies can offer indoor facilities to support active living in the city. The spread of commercial gyms and fitness centers into lower-income urban neighborhoods can also make physical activity more accessible. Employers can encourage their employees to use stairs rather than elevators in buildings or provide workplace recreation facilities.

**Government-Policy-Level Interventions**

In recent years, local governments have launched new initiatives to combat obesity-related health problems. For example, New York City has improved its school lunch programs so that meals contain lower fat and sodium levels and more vegetable, fish, and plant-based protein. In addition, to curb obesity, California, New York, and other states have banned unhealthy foods, such as doughnuts, hard candy, and soda from school vending machines. Further, many local governments have sponsored after-school programs to promote physical activity in children.

On a national level, participation in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) and food stamp programs was found to have beneficial effects in terms of energy and micronutrient intakes, especially among young children. Therefore, even small increases in the use of such programs could benefit many women and children in need. For example, three strategies to increase the use of the WIC program have been proposed: improvements in efficiency of office administration, improvements in the food package, and improvements in nutrition education.

Participation in food-assistance programs is associated with better weight status in children, particularly school-aged, food-insecure girls. However, among adults, food-assistance programs have been under scrutiny in recent years for their possible role in “fattening the poor,” because a recent study has shown that par-
Participation in food stamp programs was associated with an increased risk for obesity in low-income women. The author cautioned that selection bias and failure to control for food insecurity in the statistical models may have biased the results. Postulated mechanisms for the association between obesity and food stamp participation include increased energy consumption and food insecurity. Strategies to reduce overconsumption of energy include more or better nutrition education or changes in the types of food covered by food stamps. In addition, increasing the food stamp benefit and teaching recipients how to budget their allocation over the month may help to break the food-insecurity-induced “feast and famine” cycle.

Policy changes in our food environment offer potentially effective strategies to promote health. The most notable proposals are the provision of free or subsidized healthy foods, such as fruits and vegetables, and the imposition of taxes on unhealthy foods, such as soft drinks and snack foods. The 2002 Farm Bill authorized $6 million for the U.S. Department of Agriculture to sponsor a one-year pilot project to provide fresh and dried fruits and fresh vegetables free to 107 elementary and secondary school children in the United States. The interim report showed that this project was well-received by the schools and students and was effective in increasing students’ interest in fruit and vegetable consumption. The government should support programs that offer free or subsidized nutritious foods and assess their short-term feasibility and long-term efficacy and effectiveness. Another more controversial policy change is the “junk food tax.” It has been estimated that a small tax on foods such as soft drinks, candy, chewing gum, or snack foods could generate approximately $1 billion a year nationally. While these tax rates may be too small to affect sales, the revenues they generate could be used to sponsor often underfunded nutrition or other health-promotion initiatives. Public health nutritionists should develop other proposals to prevent childhood obesity. For example, a recent Institute of Medicine report has called for policy changes to provide regulatory guidance to promote healthy marketplace and media environment for children.

Policy approaches to increase physical activity include encouraging the creation of and providing better access to places conducive to physical activity. Such policies have recently been reviewed by the CDC’s Task Force on Community Preventive Services. In addition, the American Journal of Public Health (September 2003) and the American Journal of Health Promotion (September/October 2003) explore how urban design can support physical activity.

Conclusion

Living in an urban setting brings challenges as well as benefits. The challenges include reduced accessibility to healthy foods, fewer community resources, the abundance of fast-food restaurants, and food insecurity. Opportunities for improving nutrition and physical activity include farmers’ markets, street vendors for fresh and nutritious foods, and the greater variety and availability of food items that are familiar to many immigrants. Because of the close proximity of shops and stores, the urban environment also encourages residents to walk more. Parks in
cities offer opportunities for walking, jogging, and bicycling. In addition, many
nonprofit organizations offer indoor spaces for physical activity.

While the available evidence supports action to improve the nutrition of ur-
ban residents, more research is needed to set priorities and more clearly establish
the pathways between specific features of the urban environment and nutritional
status. Research priorities include the evaluation of school-based interventions to
promote healthy dietary habits and physical activity among inner-city children;
the development of participatory research methods tailored to the needs of ur-
ban residents; improvements in social welfare programs, from WIC to food stamp
to school nutrition programs to help participants find the appropriate balance be-
tween increasing food security and reducing obesity; and the development and
evaluation of economic and other incentives for establishing recreational facilities
and supermarkets in underserved neighborhoods. Finally, more research is needed
to understand better the connections between nutrition and physical activity at the
individual, community, and government-policy levels.

In the policy arena, promising approaches that warrant further attention are
the creation of food subsidies for healthy food items such as fruit and vegetable
and taxes on unhealthy foods such as soft drinks. To increase opportunities for
physical activity in urban settings, policies to increase the number of and access
to places conducive to physical activity should be pursued. By pursuing these re-
search and policy questions, public health nutritionists and other health profes-
sionals can contribute to the goal of healthier cities for all.

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Part III

Local and Global Perspectives on Changing Cities
Social Development and Urban Health

In the United States, as elsewhere, the health of urban populations has been shaped by the shifting nature of the country’s economic, social, and political life. From early in U.S. history, health status and social development have been intimately connected. In the 16th and 17th centuries, most Americans lived in rural areas. Many studies of Colonial New England written in the 1970s reveal an extraordinarily successful experience with disease as measured by available statistics on average length of life. According to Philip Greven¹ and other colonial historians, men living in the first Andover settlement and elsewhere lived into their sixties, seventies, and eighties while their English counterparts were dying in their mid-thirties. More recent research, however, appears to contradict some of the more rosy conclusions of these earlier studies.²

In Virginia, by contrast, yellow fever and malaria, both mosquito-borne diseases, contributed to high morbidity and mortality. While these diseases were both widely reported in 17th-century New England, their impact on the colonists of Jamestown was inordinately greater. The first Virginia colonies were plagued by starvation that led to susceptibility to malaria, yellow fever, and other epidemics. Early death, constant infirmity, and infertility marked the experiences of these settlers. The differing experiences with disease in New England and Virginia were probably related to the distinct social and economic bases for these colonies. The New England colonies were settled by families seeking to establish stable, self-sufficient communities based on sustainable agriculture. The Virginia colonies, in contrast, were settled largely as exploitative settlements of men who sought to plunder the land and the peoples of the area to extract wealth in the form of the cash crop tobacco. The lack of commitment to establishing permanent, ongoing
settlements helps explain the relative dearth of women among the first generations of colonists, their inability to establish successful economic and social institutions, and their inability to ward off starvation and susceptibility to epidemic diseases.3, 4

Urbanization

By the end of the 18th century, an extensive commercial economy combined with a growing, increasingly urbanized and poor population to make epidemic diseases a much greater threat to Americans. Epidemic disease, once a local phenomenon circumscribed by the relative lack of mobility among self-sufficient and isolated rural communities, began to sweep through the nation along the well-established trade routes as the nation’s boundaries and population expanded, displacing local relatively isolated farming economies that had predominated earlier.4 Growing cities and ships traveling along coastal, river, and, by the early decades of the 19th century, the extensive canal system all created conditions for epidemic diseases to dominate the growing urban areas.5 By the middle of the 19th century, the highly crowded and increasingly poor cities experienced death rates that were as high as those of European cities. Cholera, dysentery, tuberculosis, and a host of other water- and air-borne infectious conditions were endemic in the country’s teeming urban centers, such as New York, Boston, Philadelphia, and New Orleans.6

Water-borne and air-borne conditions began to sweep through poor communities in the growing cities and ports of the nation.7 Cholera, a disease that causes severe dehydration through acute diarrhea, had a dramatic and fearsome impact in cities from New Orleans to New York and Boston in 1832, 1848, and 1865.8 In the absence of sewerage systems, pure water, systematic street cleaning, pure or fresh food or milk, and decent methods for preserving or freezing meats, diphtheria and whooping cough, and any number of fevers and influenzas became constant threats to babies and young children in the filthy urban trading centers of the nation.6, 9 By the second half of the century, death and disease rates in U.S. cities had increased substantially and Americans’ average length of life was by then no better than that of Europeans.5, 10

Along with crowding went a decided decline in the quality of life for many. In the nation’s growing cities, it is estimated that there were as many as one horse for every 10 to 20 residents, and each horse deposited between 20 and 25 pounds of manure and two quarts of fresh urine a day on the city’s streets. In the largest cities this meant literally thousands, and in New York, hundreds of thousands of horses carrying people, goods, and construction materials into and out of towns. As the railroad systems spurred the centralization of commerce in the commercial cities of the East Coast and the urban economies became dependent on moving goods from terminals and ports to distribution points and storage facilities, the horse population grew dramatically. In 1880, according to public health reports from around the country, thousands of dead horses, goats, pigs, and cattle lay imbedded in uncollected filth, often for days and weeks. The streets of Boston, Chicago, New York, New Orleans, and other growing communities were filthy with accumulations of manure from the horses that traversed the area, dead dogs, cats,
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and rats, household and vegetable refuse that in winter accumulated to depths of three feet or more.10, 11

With no effective pure water supply system capable of delivering water to the poorer communities, and limited or nonexistent sewerage systems, overflowing privies in back alleys of grossly over-crowded tenement houses were the only alternative. Garbage boxes, rarely emptied, overflowed with offal, animal carcasses, and household waste. “Pools” of stagnant water collected in the carcasses of dead animals and over sewer drains that were generally clogged. According to an 1865 New York sanitary report,11 “Filth of every kind [was] thrown into the streets, covering their surface, filling the gutters, obstructing the sewer culverts, and sending forth perennial emanations which must generate pestiferous diseases. . . . Drainage is generally imperfect, the courtyards being . . . below the level of the streets,” and “everything is thrown into the street and gutters at all times of the day.” While poorly designed, generally open sewers had been installed in some communities, most urban residents depended on the outdoor one or two-foot deep trenches that ran onto the courts, stones, and boards and privies in the courtyards of the tenement buildings, close to wells used for drinking.11

For much of the 19th century, removal of refuse, “night soil” (human waste), and manure, as well as dead horses was left to the vagaries of private decisions, generally meaning that organic matter was left in the streets of poorer neighborhoods to fester. Where private contractors rarely had incentive to tread, waste regularly made streets impassible. During the spring thaws and rains, waste regularly seeped into the basements and ground floors—and the wells—of the tenements where the poorest of the poor lived.

Every aspect of a city’s life was affected by the disruption of the urban environment. Moving around streets that rose between three and five feet during the winter months because of the accumulation of thousands of pounds of organic waste was immensely difficult. The wealthy could sometimes escape by moving to enclaves farther from the commercial heart of cities, into housing with high stoops that allowed them to enter their houses on the second floor, literally rising above the filth. But the poor had little choice but to stay downtown, close to the ships and ports that provided them with jobs.10, 11

Filth and garbage, and the consequent odors, created a social dividing line between the relatively clean, respectable classes and the stinking, dank tenements and bodies of the poor.7, 8, 11 Class relationships were replicated in the smells, sights, and sounds of the different neighborhoods of the city. In the absence of any public accountability for the suffering created by what Elizabeth Blackmar12 describes as the “bifurcated housing market,” landlords profited from the “invisible hand” of the market that created disease and coincidentally also helped to increase the demand for more expensive housing in salubrious neighborhoods. The economy of the city transformed living patterns. The poor increasingly moved into rental housing where absentee landlords refrained from the expense of hooking up to the growing water supply and sewer systems while the wealthy moved to more spacious and better maintained townhouses in distinct neighborhoods farther from the crowded central city. As Blackmar points out, in the skewed housing market
of 19th century New York, much as today, disease in some neighborhoods encouraged those with the necessary resources to move, to “buy” health in wealthy areas, thereby turning health into a commodity like housing, clothing, and food.\textsuperscript{12, 13} In Baltimore, strict racial segregation furthered the isolation of the black community in neighborhoods dominated by “lung blocks,” where tuberculosis was prevalent.\textsuperscript{14}

Cholera, diarrhea, and typhoid regularly ravaged communities in violent waves of fearsome epidemics. And chronic plagues of diseases such as tuberculosis found fertile ground in the close quarters of the crowded immigrant and other poor, often black communities.\textsuperscript{14} Merchants and physicians alike complained that “pestilential diseases” laid bare “the impotence of the existing sanitary system.” Further, outbreaks of disease paralyzed the commercial and political life of the community: “The people are panic-stricken [and] the interests of commerce suffer by the insensible and certain loss of millions.” Health was a commodity and disease a threat. On one hand, infectious disease served to increase the value of salubrious neighborhoods, because those with wealth fled from those in which disease seemed to fester. On the other hand, disease was a threat to the commercial economy of cities because incapacitated workers made for an unstable workforce, quarantines undermined the ports that were most cities’ life-blood, and disease destroyed the reputation of cities as a good place to do business. Disease, increasingly, could be measured in dollars and cents. Infectious disease not only devoured the lives of the poor but threatened anyone who had a maid, employed a laborer, or came in contact with people on the street. “Disease, debasement, and pauperism . . . are found closely allied” and “seriously endanger the sanitary safety of all other classes” including the rich.\textsuperscript{11, p. 76}

\textbf{Vulnerable Urban Populations}

Health and disease were not only biological events but also they were understood as signs of individual worth, morality, and social position.\textsuperscript{15} During the closing decades of the 19th century, the growing association of disease with the immigrant poor further undermined attempts to address the social conditions that had created it. As millions of immigrants from eastern and southern Europe flooded into growing industrial cities in the East and Midwest, poverty, illness, and crowding came to be associated with “foreignness.” To older, largely Protestant Americans, it was difficult to deny the connection between “plagues and people.”\textsuperscript{16} Nor was it possible to avoid incorporating nativist beliefs into the various programs aimed at controlling disease. In Boston, New York, and Chicago, for example, among the first actions of city authorities at times of epidemic was to forcibly close down bars and dram shops in Irish neighborhoods, an act that was justified as a means of stopping gatherings and therefore spread of disease but that was often perceived of as a class and anti-Catholic action. Smallpox, cholera, typhoid, yellow fever, and a host of intestinal diseases in the young and old accompanied the recognition of poverty, population increase, and immigrants. The wealthy, as Alan Kraut\textsuperscript{16} points out, found ways to blame the poor, the immigrant, and the dependent for the af-
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The changing experience of disease was often used as part of a broader political agenda to stigmatize the poor and identify immigrants as a cause, rather than as victims, of crowded housing, unhealthful living conditions, overflowing privies, and a general lack of basic public services, such as pure water, sewerage, and street cleaning. This use was particularly important in the 19th century amid the urbanization, industrialization, and large-scale immigration that transformed the nation’s economy and environment. Especially in eastern port cities, the demographic and physical transformation of the country was hard to miss as an English-speaking, largely Protestant community became, by the 1880s, home to thousands of Catholic and Jewish immigrants and poor and a largely impoverished industrial working class. While some embraced these socioeconomic and demographic changes as signs of future growth and possibility, others expressed alarm at the increasingly visible poverty, illness, crowding, and “foreignness” of disease itself. To more established, largely Protestant residents, the connection between “plagues
and people” seemed clear. Epidemic diseases became powerful symbols of uncontainable social decline—and were largely blamed on the immigrant poor.\textsuperscript{16, 19}

High death rates and pestilence had long affected rich and poor communities alike. Yet, patterns of disease in recent decades appeared to contemporaries to confirm cities’ decay. By mid century, Americans’ health had dissolved. Vital statistics showed that in 1863 while one out of every 44 people died in Boston and in Philadelphia, in New York the rate had risen to one in 36.\textsuperscript{10, 11, 15}

**The Sanitary Condition of Cities**

Amid this atmosphere of alarm over the “conditions of the poor,” civic leaders throughout the nation launched major investigations into the social and environmental as well as the individual causes and consequences of disease, and with them began to pave the way for the public health movement, and its advocacy of improved sanitation, in the United States. In Chicago, social reformers in Hull House focused on living conditions as the reason for the declining health and well-being of workers, women, and children. In Boston, charity workers looked at the slums in which the Irish lived as the cause of social unrest and disease spread. In Philadelphia, New York, and Boston, reformers focused on housing as a cause of the city’s physical, social, and moral decline. The observation that housing, politics, morals, and health were all intertwined underscored reformers’ perceptions of what needed to be done in the coming years.

**Death and Disease in the New Environment**

Underlying the social geography of disease documented by sanitary investigations were patterns of economic development and land use in urban centers that had created some of the world’s worst crowding and most depressing health statistics. Although epidemics were relatively minor contributors to overall death rates, the highly visible and often dramatic experience of seeing people literally dying in the streets had an enormous impact, affecting where and how cities developed. In the late 18th century, yellow fever had caused elites to flee from cities to relatively distant suburbs, beginning a spatial segregation of the rich and poor that would develop over the next century.\textsuperscript{5}

The commercial city of the late 19th century had created a skewed market for land and housing that provided landlords and absentee owners enormous profits and denied to workers and their families wholesome living quarters. Older early 18th-century housing patterns in which artisans and working people lived and worked in the same dwelling were replaced by land-use patterns that separated work and home, wealthy and poor, immigrant from native, owner from occupant. The market for housing, created “unnatural” social relationships and market-driven scarcities of housing and land that, in turn, created the preconditions for the disastrous health experience as market values replaced human values in the legal and social environment.\textsuperscript{13, 18}
Sanitary Reform

The “sanitarians” that led reform efforts generally saw themselves as more than technical experts or professionals trained in a specific skill. Some had come from elite merchant families and others had been trained in the ministry. They defined their mission as much in moral as in secular terms and believed that illness, filth, class, and disorder were intrinsically related. Individual transgression and social decay were equally at fault for poor health. In this period before the widespread acceptance of the notion that there was a specific pathogen for a particular disease entity, public health, medical practitioners, and lay people alike understood disease in highly personal and idiosyncratic terms. Much of public health practice as well as medical therapeutics rested on the belief that disease was a reflection of individuals’ special social, personal, hereditary, and economic circumstances. Maladies were based, in part, on the peculiarities of the individual and his or her life. The special relationship between an individual and a complex, highly particularized environment was at the root of illness.

With the turn to bacteriology that followed the discoveries of Louis Pasteur, Joseph Lister, and Robert Koch in later decades of the 19th century, a new faith in laboratory science emerged among physicians and public health workers. “Bacteriology thus became an ideological marker, sharply differentiating the ‘old’ public health, the province of untrained amateurs from the ‘new’ public health, which belonged to scientifically trained professionals,” Elizabeth Fee points out. Despite the different professional mandates of public health workers and physicians, those who identified themselves with the science of medicine and public health began to share a common faith in the significance of the disease-specific germ entity. A new model was gaining greater acceptance: a bacillus made people sick. The slums of large cities were “breeding grounds” that were “seeded” with tuberculosis bacilli waiting to infect the susceptible victim. Tuberculosis was a disease that could be transmitted to susceptible individuals by means of air impregnated with bacteria from dried sputum or breathing. The dusting of furniture could throw into the air the “dried sputum” of tuberculars. Crowded public spaces and unclean homes with moist, warm, and stagnant air were seen as the most likely conduits for the disease.

Despite the ambiguous messages that came from public health sanitarians, epidemiologists, and bacteriologists, a vibrant urban reform effort fundamentally transformed housing conditions for city dwellers in the decades at the turn of the century. New housing was more likely than not to have indoor plumbing and connections to the new water and sewer lines that were replacing wells and privies. Tenement laws were passed that mandated that all rooms in newly constructed buildings have windows that opened to the outside so that relatively fresh air and light could filter in. Restrictions on housing density and new nuisance laws that required property owners to keep their own properties clean began to have an effect on rates of tuberculosis and other devastating diseases. Laws requiring the refrigeration of food stuffs, and meat-inspection laws, pure-milk laws, and the like began to be reflected in improvements in overall health, and with
these changes came a decline in the prevalence of infections of all kinds. Outbreaks of smallpox and influenza still occasionally hit communities but (with the exception of the 1918–19 outbreaks) seemed to wane in intensity and duration.\textsuperscript{26} Former scourges like cholera and some diarrheas subsided as major threats during summertime.\textsuperscript{10, 26}

**Urban Health in the 20th Century**

*New Public Health and Old Health Conditions*

After decades of agitation, however, and a rapidly evolving view that housing and poor sanitation and poverty were at the heart of the epidemiological crisis of the late 19th century, the nation still faced daunting environmental hazards. In 1912, New York’s Health Department issued an annual report that, in dispassionate language, detailed the continuing environmental problems that New Yorkers faced. The Department of Health picked up over 20,000 dead horses, mules, donkeys, and cattle from the city’s streets during the year and recorded 343,000 complaints from citizens, inspectors, and officials about problems ranging from inadequate ventilation and leaking cesspools and water-closets to unlicensed manure dumps and animals kept without permits. It also removed nearly half a million smaller animals, such as pigs, hogs, calves, and sheep.\textsuperscript{27, 28} The pasteurization of milk and the control of the sale of impure milk products, meats, and other foods further lowered the infant mortality and child mortality rates.\textsuperscript{29}

While such environmental hazards had by then become familiar, somewhat startling to officials was the emergence of changing patterns of death in the city. The infectious diseases of the 19th century, such as smallpox, typhoid fever, diphtheria, and pulmonary tuberculosis appeared to be claiming fewer and fewer children and young adults. But cancer, heart disease, and pneumonia were claiming larger and larger numbers of elderly. To public health officials, these findings were significant because, on one hand, they showed measurable progress in the battle against infectious diseases, but on the other hand, the statistics suggested the need to broaden the focus to reduce mortality from diseases increasingly associated with middle and old age and industrialization.\textsuperscript{27}

As public officials’ approach became more medicalized, their conceptualization of the public health challenge became less individual and personalized. By the twentieth century, public health activities had taken on a distinctly commercial tone that carried none of the moral perspective common to the works of early 19th-century writers. For health officials, history had taught that "the full benefits of the methods and practice of sanitary science are available to any intelligent and well-organized community which will make the necessary expenditures, it may be truly said that within certain limits public health is purchasable."\textsuperscript{27}

**The 20th-Century City and Its Impact on Health**

If the 19th century was marked by an intensive use of land and a concomitant crowding in tenements of poor, often malnourished, and powerless immigrants in
the cities of the East Coast, the new century saw fundamental change in land use and transportation that improved health in many respects but created new hazards and new diseases for urban America. In particular, the rapid growth of the Midwestern industrial cities in the late 19th and early 20th centuries created distinct housing patterns and new types of problem that, during the latter decades of the century, preordained the creation of chronic diseases. Exposures to toxins and synthetic materials, an increasing life-span, air, water, and soil pollution, and the creation of a huge marketing industry that promoted toxic materials for consumer uses—such as lead paints and tobacco—led to an epidemiological revolution as older infectious diseases declined in importance and major killers and new chronic conditions emerged. If epidemics were a hallmark of the crowded, centralized cities of the East Coast during the 19th century, then cancers and other chronic conditions became the paradigmatic conditions that plagued those in the 20th century. 

Crowding and lack of infrastructure were clearly at the heart of the crisis in health that plagued 19th-century Americans. But fundamental changes in the organization of cities profoundly affected health by the early decades of the new century. A leading explanation for the improvements in mortality statistics and the increase in the importance of cancer, heart disease, and other chronic conditions may be the redistribution of populations that occurred in old and new cities in the first half of the 20th centuries. In just a few decades, the highly concentrated tenements, where the lack of even the most fundamental amenities, such as indoor plumbing, had led to epidemics of tuberculosis, diarrhea, and a host of childhood infections, were replaced, reordered, or reformed. The rapid introduction of an electric-trolley system in the 1890s in Boston, New York, Philadelphia, Baltimore, and other East Coast cities allowed huge numbers of people to move away from the commercial centers to surrounding “streetcar suburbs” where single-family houses became much more commonplace. While composed primarily of new families of clerks and other white-collar workers, these new urban neighborhoods were created in a short time, spurred by the vast system of trolleys. They came with amenities that only a few decades before had been solely the province of the wealthy: indoor plumbing and connections to newly developed public water supplies. By the 1920s, the growing use of the automobile and the development of roadways and public transportation routes accelerated the spread of populations from the central city. Entire boroughs of New York were opened, Boston and Philadelphia annexed neighboring towns, and population densities declined dramatically. In the newer cities of the industrial Midwest, low-rise housing spread out away from central business districts and in some communities it became unclear where particular cities ended and others began. By later in the century, entirely new cities, such as Los Angeles, Phoenix, and Tucson, grew up with the automobile, freeways, and gasoline stations and strips that have come to characterize more recently developed U.S. cities.
Emergence of Suburbs

In the late 19th and early 20th centuries, millions of working-class Americans moved into single-family houses throughout the United States. Oliver Zunz documents that between 1880 and 1920 home ownership in Detroit became more of an immigrant-working-class than a middle-class phenomenon. Margaret Garb notes a similar pattern in Chicago where urban and suburban communities developed as Chicago’s borders spread from along Lake Michigan into the Illinois plains. While the 1920 census showed that only 46% of all Americans were homeowners (and the percentage was much lower in most major cities), by the end of the 1940s home ownership had become the norm. The single-family house was defined “as the healthiest, most moral, and most secure place to shelter the American family.”

These new “suburban” homes boasted amenities not available to any but the wealthy earlier in the 19th century. Even for working-class families, indoor plumbing replaced the outdoor, overflowing privy, except in the tenements of large urban centers. Immigrant workers turned to private builders and savings and loan associations for the $700 to $1,700 needed to finance construction of small, private dwellings in the growing industrial communities of the Midwest. Workers could afford to buy a small two-bedroom house that could comfortably sleep a family of four. For $1,700, a bathroom with running water and flush toilets connected to the new sewer and water systems would be included. In addition, ice boxes, telephones, and electric lights became common among more upscale families and were even within the reach for the most marginal middle-class families.

Improving Urban Conditions

Better nutrition, housing reforms, the introduction of pure water supplies and sewerage systems and improvements in street-cleaning technology led to a generally cleaner, more sanitary urban environment for children. The horse was replaced by the electric streetcar and trolley in the 1890s and the automobile in the early 1900s, leaving the city streets looking and smelling better. The numerous granaries needed for the maintenance of hundreds of thousands of horses in urban communities began to disappear, making it easier to control the huge rat and rodent problem that was linked to the spread of lice and tick-borne diseases. Similarly, the creation of public health stations that provided pasteurized milk, settlement houses that provided emergency shelter, visiting nurses, and educational programs for mothers and their children also improved the chances of childhood survival. The development of maternity hospitals as well as pediatric and foundling hospitals further improved the conditions for children.

The Development of the Automobile and the Redistribution of Risk

The demographic transformations and the changing technologies that now defined the 20th-century city transformed the environments in which disease spread
and took form. One technology that dramatically changed the patterns of disease was the automobile, which overwhelmed cities both large and small in the first decades of the new century. In the early 1920s General Motors found itself on the verge of bankruptcy. Ford’s Models A and T had simply proven so durable—that people were not buying cars from GM. The company decided to try to save itself with a new marketing strategy. To compete with the unchanging Tin Lizzie, GM would offer increasingly powerful cars whose styling and features would change yearly, ensuring that consumers would thus be seduced by the need for newer and newer cars. Owners of a four-year-old car would now be faced with a newer, spiffier, and more powerful automobile. By building in obsolescence, GM could guarantee itself a steady market. GM’s fortunes turned around, and by 1927 even Ford was forced to abandon the Model T and join in the “automotive arms race” of ever-changing exteriors and ever-increasing power.

The automobile and its fuels affected mortality statistics in several ways. First, with the widespread use of new, faster cars, automobile accidents quickly emerged as a national concern. Throughout the country, “accidental” deaths became more and more common as huge numbers of cars replaced the slow-moving horse and carriage or horse-drawn trolley. Second, the creation of smog as an integral part of city life by the 1940s and 1950s led to increases in the diagnosis of lung diseases. Finally, exposures to the host of toxins, most notably lead, in the burning of fuels, slowly poisoned the environment and led to generations of children whose blood-lead levels were unnecessarily raised.

Cities and Worker Health

Unlike the 19th-century East Coast cities, such as New York, Boston, and Philadelphia, that were largely commercial centers in which goods and produce from the countryside were sold and traded, many of the new cities of the Midwest that arose in the late 19th and early 20th century were huge industrial towns dependent on one or more large industries. Pittsburgh emerged as the center of an increasingly important steel industry; Detroit was the center of the automobile industry; and Milwaukee, of the beer industry. Other cities from Dayton to Cleveland developed industries ancillary to the automobile and products central to the emerging industrial economy, such as steel, oil, and ships. Workers from the countryside and from Europe were drawn into the mines, mills, and factories. Increasing numbers of accidental deaths and injuries began what journalists in the early decades of the century called “the death roll of industry.” By the early 1900s, it was said to be more dangerous to be a worker in the United States than to be a soldier in war. Also, as larger and larger numbers of workers entered the factory, exposures to a host of toxic materials were identified as the cause of their death. Lead poisoning among painters and battery workers, radiation-related deaths among watch makers, phosphorus poisonings and mercury poisoning, along with lung diseases among asbestos, metal, and coal miners all gained greater and greater attention as the industrial United States emerged from its largely agricultural and commercial
past. As more and more children and women were drawn into garment manufacturing, textiles, even foundry and war-related industries, what were once largely male diseases now affected broad cross-sections of the population.\textsuperscript{23, 30, 36}

While infectious diseases continued to be important problems particularly for the poor living in large cities, the causes of death as noted in various reports from the first half of the 20th century slowly shifted to chronic conditions, many of which appeared associated with new life-styles and the new industrial and consumer economies. Heart disease, cancer, and stroke replaced tuberculosis, pneumonia, and influenza as the leading causes of death by the second half of the century. Certainly, the transformation of U.S. urban life accounted for this epidemiological shift. Ironically, the success of the postwar decades in developing a wider and wider range of technological innovations left the nation almost unprepared for the new scourge of the 1980s, Acquired Immune Deficiency Syndrome, or AIDS. Public health departments were underfunded and understaffed, and a generation of public health and medical practitioners had been reared in the belief that medical science and technology could protect us from widespread epidemic. A giant fiasco that marked the 1970s—in which millions of dollars were spent of the development and distribution of a vaccine for a swine flu epidemic that never occurred—also undermined our ability to mobilize against a disease that primarily affected gay men, intravenous drug users, and their partners.\textsuperscript{37} Also, some have accused government and research scientists of deliberate inaction because of the association of AIDS with immorality among groups already disliked by large cross-sections of the population.\textsuperscript{38}

**Conclusion**

The health problems we face today are largely of our own making as a society and also are potentially under our own control. AIDS, tuberculosis, SARS, and diseases associated with poverty and homelessness are social creations and, therefore, can be addressed through social decisions. In a recent essay on what he calls “framing” disease, Charles Rosenberg\textsuperscript{39} notes that “disease is at once a biological event, a generation-specific repertoire of verbal constructs reflecting medicine’s intellectual and institutional history,” and “a sanction for cultural values.” Pointing out that disease is a “social phenomenon,” he illustrates that in large measure, “disease does not exist until we have agreed that it does, by perceiving, naming, and responding to it” (p. xiv). Yet, disease takes specific forms at different moments in history. Not only do we define different symptoms as pathological events, we also create the physical environments and social relationships that allow for the emergence of new problems. In a very real way, one lesson from this history is that we create our environment and hence we create the conditions within which we live and die.

**References**

8
Cities, Suburbs, and Urban Sprawl
Their Impact on Health

Howard Frumkin

Introduction
All would agree that Harlem, Piccadilly Circus, the Latin Quarter, and the Ginza are parts of cities, and all would agree that Yosemite, Ayers Rock, and the African savannah are not. But in the vast middle ground—the transitional zones between the urban and the rural, the regions known as “suburbs” and “exurbs”—the boundaries are not so clear.

This middle ground is important because in demographic and physical terms it is one of the defining realities of modern urbanization. As described in Chapter 1, urbanization is proceeding rapidly in much of the world. Ongoing migration from rural areas to urban centers and high birth rates in cities combine to increase the urban population in both absolute and relative terms. However, an equally dramatic change is occurring in many cities, especially in developed countries: Cities are changing their traditional form, sprawling over vast geographic areas, and embodying new patterns of land use, transportation, and human activity. These changes have important consequences for health.

This chapter begins by reviewing the history of suburbanization, leading to the modern pattern that has become known as “urban sprawl” (or, interchangeably, “suburban sprawl”). It then defines sprawl and outlines several potential health implications of sprawl. Finally, it turns to the future, speculating on the growth patterns of sprawling cities during coming decades and presenting some options for healthy place-making across metropolitan areas.

At the outset, it is important to acknowledge an aspect of sprawl that is deeply relevant to health but is not discussed here: poverty in the central city. In many cities during the past half century and longer, as capital investment and economic opportunity shifted from the center to the periphery, pockets—and sometimes wide
swaths—of deprivation were left behind.\textsuperscript{1,2} Cities have been home to poor people since ancient times, but the intense concentration of poverty in cities—to the point that “urban health” is functionally equivalent to “health problems of poverty”—is an artifact of the sprawling abandonment of cities of the past half century. These aspects of urban health are discussed in the other chapters of this book.

### The Origins of the Suburbs

From Ur to Babylon to Rome, from Athens to Paris to London, people have settled outside cities for as long as there have been cities, seeking privacy, rural amenities, and other advantages.\textsuperscript{3,4} Yet the modern suburb, based on commuting between a suburban home and an urban workplace, originated in the 19th century and reached its full bloom during the latter half of the 20th century. As explained by Kenneth T. Jackson\textsuperscript{5} in his authoritative history, *Crabgrass Frontier*, several factors drove this evolution. By the early 19th century, Jackson explains, cities shared five features: they were densely settled and congested; there was a clear distinction between city and country; there was a mixture of functions, including housing, commerce, manufacturing, recreation, and education; distances were short, and people lived close to where they worked—a necessity when commuting was on foot; and finally, the most fashionable and respectable addresses tended to be located close to the center of town. In fact, it was the lower classes that tended to live at the edges, and “sub-urb” connoted moral inferiority, the lairs of prostitutes, ne’er-do-wells, and rascals. “Suburbs, then,” according to Jackson, “were socially and economically inferior to cities when wind, muscle, and water were the prime movers of civilization” (p. 19). Gradually, however, a combination of technical advances, cultural values, commercial opportunities, and policy initiatives recast the suburbs and how they were viewed. Each of these deserves mention.

The *technical advances* that made suburbs possible on a large scale occurred principally in transportation and construction. The “transportation revolution” of the 19th century introduced one after the other the steam ferry, omnibus, commuter railroad, horsecar, elevated railroad, and cable car. It became practical for the first time for large numbers of people to commute to a job in the city from a residence well beyond walking distance. Trolleys played a special role after their introduction in the 1880s. Within 20 years there were 30,000 miles of trolley lines in the United States, most of it electric. Trolleys, together with contemporary technological advances such as elevators and skyscrapers, were a major contributor to the phenomenal growth of cities from 1890 to 1950. Large numbers of workers could now converge on central locations, increasing, in turn, the value of urban real estate, an indirect spur to suburban growth. Balloon-frame housing, introduced in the first half of the 19th century, helped speed the construction of suburban housing.

The automobile was the transportation advance that truly drove suburbanization. Early forerunners of the automobile appeared as early as the 1860s in both Europe and the United States, technology (including mass-production techniques) advanced rapidly, and by the mid 1920s, automobile ownership was an essential
part of normal middle class life. Many interests promoted publicly funded road building, including the tire, oil, automobile, and road-building industries, while public transportation continued to be viewed as a private initiative that needed to be self-supporting. Limited-access expressways first appeared on a large scale between 1906 and 1911 with construction of the Long Island Motor Parkway, and by the 1920s a large number had been built across the country. Simultaneously, trolley ridership peaked (in 1923) and declined steeply. As automobile use became widespread, a suburban land boom occurred in city after city. From 1920 to 1930 the suburbs of the largest 96 cities grew twice as fast as the core cities. By 1933, the President’s Research Committee on Social Trends noted that “imperceptibly, car ownership has created an ‘automobile psychology.’ The automobile has become a dominant influence in the life of the individual and he, in a real sense, has become dependent upon it” (p. 196).

Longstanding cultural values, some rooted in European thinking, blossomed in the United States and encouraged the growth of suburbs. One was domesticity; religious principles placed high value on the family. The home came to be seen as a morally valued setting in the face of industrialization, and business leaders promoted homeownership to “chain” homeowners to their mortgages. Another was privacy—a benefit of separate single-family homes surrounded by land. Land ownership itself had for centuries been an important marker of wealth and social position. These and other values supported suburban migration.

Early land developers such as Llewellyn S. Haskell, landscape architects such as Frederick Law Olmsted, and railroad companies such as the Pennsylvania Railroad all saw commercial opportunities in suburban land development and promoted such venues as Llewellyn Park in West Orange, New Jersey (in the mid 19th century), Brookline and Chestnut Hill, Massachusetts (in the late 19th century), and Philadelphia’s Main Line (in the late 19th and early 20th centuries), respectively. Finally, several public policy initiatives helped promote suburban growth: construction of infrastructure such as roads and sewers at public expense; zoning that separated residential districts from industrial and commercial uses; federal housing and lending practices, including mortgage and tax initiatives; and Federal Housing Administration standards for home construction and even rated neighborhood composition.

The forces that gave rise to sprawl were complex and varied. More recent developments—the cyclic concentration of poverty in central cities, the decline of urban school systems, the rise of crime and racial tensions—further encouraged migration to suburbs. The emergence of “home entertainment,” principally the television, may have reinforced the preference for suburban homes far from traditional urban entertainment districts. Many of these forces probably operated bidirectionally, both promoting sprawl and being promoted by sprawl.

**Defining Urban Sprawl**

Urban sprawl is difficult to define, but its characteristic features are well known. As cities extend into rural areas, large tracts of land are developed in a low-density,
“leapfrog” manner. Different land uses—housing, retail stores, offices, industries, recreational facilities, and public spaces such as parks—are kept separate from one another, enforced by both custom and zoning laws. Extensive roads need to be constructed, and most trips, even to buy a newspaper or a quart of milk, require driving a car. Moreover, the road networks tend to be a “loop and lollipop” configuration rather than a traditional “grid” arrangement, and “connectivity”—the ease of getting from one point to another along surface streets—is low. Alternatives to automobile travel, such as sidewalks, bicycle paths, and mass transit, are scarce. Newly built suburbs are relatively homogeneous in both human and architectural terms, compared to the diversity found in traditional urban or small town settings. There is a shift of capital investment and economic opportunity from the center to the periphery. Regional planning and coordination are relatively weak.5, 8–13

In recent years, the systematic study of sprawl has expanded rapidly, as researchers have attempted to characterize its environmental, economic, political, and health implications. As a result, quantitative measures have become necessary. Early studies of sprawl tended to focus on a single dimension, such as population density or the relative growth rates of urban area and population. More recently, multidimensional measures of sprawl have appeared. One of the best known was proposed by Ewing and colleagues.14 These researchers focused on land use and transportation and identified four categories for measurement: the strength or vibrancy of activity centers and downtown areas, accessibility of the street network (reflecting connectivity), residential density, and land-use mix. Using 22 specific measures grouped under these four categories, they created the Sprawl Index. It showed the most sprawling metropolitan areas to be in the South and Southeast, with a few in California. The least sprawling areas are in the Northeast, California (San Francisco), and Hawaii (Honolulu).

More important, sprawl is not a binary variable, an attribute that a place either has or does not have. Many patterns of land use and transportation are intermediate between Manhattan and the Poconos, and some seem sprawling in some respects but not in others. For example, a stretch of suburban road lined by strip malls may contain nearby apartment housing (often for lower-income groups). This locale might have moderately high density and a diverse land-use mix but poor connectivity; walls are typically constructed between apartment buildings and the rear of the malls, requiring long and circuitous journeys to travel what would otherwise be a very short distance. Because sprawl is so variable, those interested in health may do best to address specific design features, such as land-use mix, rather than use a broad (and, to some ears, derogatory) term such as sprawl.

The Health Effects of Sprawl

Clearly, the move to the suburbs reflects a life-style preference shared by many Americans. But such a major shift in the nation’s demographics and in the form of our environment might also be expected to have health implications, both positive and negative. Some of these impacts relate directly to the heavy reliance on automobiles: air pollution and the injuries and fatalities related to automobiles
among drivers, passengers, and pedestrians. Others relate to the land-use patterns that typify sprawl: decreased physical activity and threats to water quantity and quality. Finally, some health effects—mental health and social capital—are mediated by the social dimensions of sprawl.

Many of these effects are well recognized environmental health challenges, and certain aspects of sprawl, such as automobile reliance, have been identified more broadly as public health issues. Yet the issues that underlie sprawl—land use, transportation, urban and regional design, and planning—have been the intellectual “property” of engineers and planners, and public health has provided neither an intellectual framework nor policy guidance. This is a striking departure from the legacy of the 19th and early 20th centuries, when public health and urban design were overlapping and largely indistinguishable concerns.

The Role of Driving

One of the cardinal features of sprawl is driving, reflecting a well-established close relationship between lower-density development and more automobile travel. For example, in the Atlanta metropolitan area, one of the nation’s leading examples of sprawl, the average person drives 33.8 miles each day—an average that includes the entire population, both drivers and nondrivers. Denser cities have far lower per capita daily driving figures: 19.5 for Philadelphia, 20.4 for Chicago, 22.2 for San Francisco. Within metro areas, the same pattern is observed. The inverse relationship between vehicle miles traveled and neighborhood density is well established.

Automobile use offers extraordinary personal mobility and independence. However, it is also associated with health hazards, including air pollution, motor vehicle crashes, and pedestrian injuries and fatalities.

Air Pollution

Motor vehicles are a leading source of air pollution. Automobile and truck engines have become far cleaner in recent decades, but the sheer quantity of vehicle miles driven results in large releases of carbon monoxide, carbon dioxide, particulate matter, oxides of nitrogen (NOx), and hydrocarbons into the air. NOx and hydrocarbons form ozone in the presence of sunlight. Nationwide, cars and trucks account for approximately 33% of NOx and 30% of human hydrocarbon emissions. (Other “mobile sources,” such as farm and construction equipment, aircraft, and boats, account for an additional 22% of NOx and 18% of hydrocarbons.) However, in automobile-dependent metropolitan areas, relative contribution of mobile sources may increase substantially. In the 10-county metropolitan Atlanta area, for example, on-road cars and trucks account for nearly two-thirds of NOx emissions and nearly half of hydrocarbon emissions, figures that underestimate the full impact of vehicle traffic since they exclude emissions from related sources such as fuel storage facilities and filling stations.

In various combinations, these pollutants, especially NOx, hydrocarbons, ozone, and particulate matter, account for a substantial part of the air pollution
burden of U.S. cities. Some pollutants, such as carbon monoxide, reach their highest concentrations alongside roadways (apart from near-point sources such as generators), so homes, schools, and other places near heavy traffic routes pose special exposure risks. Other pollutants, most notably ozone, are formed as precursors move downwind, so the highest levels may occur miles away. Thus, air pollution is a problem not only alongside roadways (or other sources) but also on the scale of entire regions. In fact, it is essential to consider spatial scales when assessing the effects of air pollution. While suburban roadsides may offer cleaner air than dense urban streets, suggesting a suburban advantage on the small scale, the effect of suburban expansion is to increase pollution across an entire region.

The health hazards of air pollution are well known. Ozone is an airways irritant; higher ozone levels are associated with more respiratory symptoms, worse lung function, more emergency room visits and hospitalizations, more medication use, and more absenteeism from school and work. While healthy people may demonstrate these effects, people with asthma and other respiratory diseases are especially susceptible. Particulate matter is associated with many of the same respiratory effects and, in addition, with cardiovascular disease, lung cancer, and increased mortality. Air pollution has also been linked to birth defects and other diseases. Those who are especially susceptible include the elderly, the very young, and those with underlying cardiopulmonary disease.

An additional driving-related emission is carbon dioxide, the end-product of burning fossil fuels such as gasoline. Carbon dioxide is the major greenhouse gas, accounting for approximately 80% of global warming potential weighted emissions. Motor vehicles are also a source of other greenhouse gases, including methane, NOx, and volatile organic compounds. Automobile traffic is a major contributor to global climate change, accounting for approximately 26% of U.S. greenhouse gas emissions. During the 1990s, greenhouse gases from mobile sources increased 18%, primarily a reflection of more vehicle miles traveled. Global climate change, in turn, is expected to threaten human health in several ways, including through the direct effects of heat, aggravation of some air pollutants, and increased prevalence of some infectious diseases.

Sprawl is associated with high levels of driving; driving contributes to air pollution, and air pollution causes morbidity and mortality. In heavily automobile-dependent cities, driving can account for a substantial portion of air pollution emissions, increasing the chance that pollution will rise to hazardous levels.

MOTOR VEHICLE CRASHES

Automobiles now claim more than 40,000 lives a year in the United States, a number that has slowly declined from about 50,000 a year over the past four decades. Automobile crashes are the leading cause of death among persons one to 24 years old, account for 3.4 million nonfatal injuries, and cost an estimated $200 billion annually. Rates of automobile fatalities and injuries per driver and per mile driven have decreased substantially thanks to safer cars and roads, laws that discourage drunk driving, and other measures, but the absolute toll of automobile crashes remains high.
The automobile is a relatively dangerous way to travel. Depending on the assumptions used, a mile of automobile travel is between 30 and several hundred times more likely to result in the traveler’s death than a mile of bus, train, or airplane travel. The National Safety Council uses such data to calculate the “odds of dying” while traveling. According to these figures, the lifetime odds of dying as an automobile driver or passenger are 1 in 242, compared with 1 in 179,003 as a bus passenger, 1 in 119,335 on a train, and 1 in 4,608 on a plane (this calculation reflects both the different amounts of time spent in each travel mode, and the different risks of each mode). Since sprawl means more driving and greater exposure to the dangers of the road, it would be expected to increase an individual’s probability of being involved in a motor vehicle crash.

Several additional aspects of suburban driving bear on the risk of crashes. First, suburban roads may be a special hazard, especially major commercial thoroughfares and “feeder” roads that combine high speed, high traffic volume, and frequent “curb cuts” where drivers enter and exit stores and other destinations. Second, suburban drivers are often driving long distances—commuting, chauffeuring their children, running errands—and can be tired, busy people. Fatigue and driving are a dangerous combination. Indeed, large numbers of drivers are driving sleepy, especially commuters and long-distance drivers. Fatigue, in turn, is an important risk factor for traffic crashes, and falling asleep at the wheel may account for as many as one in five crashes. The increasing use of cellular phones while driving further increases the risk of crashes.

These observations would predict that sprawling metropolitan areas, where people spend more time in automobiles, would have higher automobile fatality rates. Data from the National Highway Traffic Safety Administration suggest exactly that pattern, although with some exceptions. In general, denser cities, which require shorter trip distances and rely more on walking and public transportation, have lower automobile fatality rates (including drivers and passengers, but excluding pedestrians) than more sprawling cities: 2.45 per 100,000 population per year in San Francisco, 2.29 in New York, 3.21 in Portland, 6.67 in Chicago, and 5.26 in Philadelphia, compared with 10.08 in Houston, 16.15 in Tampa, 12.72 in Atlanta, 11.35 in Dallas, and 9.85 in Phoenix. (There are notable exceptions to this pattern, such as 5.79 per 100,000 population in Los Angeles and 10.93 per 100,000 in Detroit.)

A more systematic study of this relationship was performed by Reid Ewing and colleagues. They considered 448 metropolitan counties in the 101 most populous metropolitan areas in the United States and ranked each one using the Sprawl Index described in the “Defining Urban Sprawl” section of this chapter. After controlling for factors such as age, income, and household size, they found a strong relationship between sprawl and traffic fatalities (including both pedestrian and vehicle occupant fatalities). For every one point decrease in the Sprawl Index (on a scale that ranged from about 60 for very sprawling areas to more than 200 for very compact areas), the traffic fatality rate increased by 1.49%. In the most sprawling counties in the nation—Geauga County (outside Cleveland), Clinton County (outside Lansing, Michigan), Fulton County (outside Toledo), Goochland
County (outside Richmond, Virginia), and Yadkin County (outside Greensboro, North Carolina)—the traffic fatality rates were nearly 10 times higher than in the most compact counties. If Geauga County had the same traffic fatality rate as New York, then each year, the families of 15 people in that county would be spared the grief of losing a loved one.

Traffic fatalities and injuries are not random occurrences; they have well-known determinants. In the words of the American College of Emergency Physicians,47 “Traffic crashes are predictable and preventable, and therefore are not ‘accidents.’” Public health interventions, from seat belts to traffic signals, have dramatically reduced injury and fatality rates in the three-quarters of a century since automobile use became widespread. However, a relatively overlooked risk factor is simply the act of driving and the number of miles driven. As noted by the injury expert Ian Roberts,48 “Strategies which reduce the need for car travel or substitute car travel with safer forms of transport would substantially reduce population death rates.”

Pedestrian injuries and fatalities represent a second category of injuries that may also be linked to urban sprawl. Each year, automobiles cause about 5,000 fatalities and 110,000 injuries among pedestrians nationwide. Pedestrians account for about one in eight automobile-related fatalities. Sadly, a mile of walking or biking is more likely to be fatal than a mile of driving. In 2001, a mile of walking was 23 times more likely to kill a pedestrian and a mile of biking 12 times more likely to kill a bicyclist than a mile of driving was likely to kill a car occupant.49

Pedestrian and bicyclist injury and fatality rates, however, are decreasing not only in the United States but also in other industrialized nations.50 This is a Pyrrhic victory in public health terms, since the trend seems to be attributable to less walking and bicycling. Data on school travel are illustrative. According to data from the National Personal Transportation Survey, half of U.S. children are driven to school in a private vehicle, approximately one-third travel by school bus, and fewer than one in seven trips to school is made on foot or bicycle, a substantial decline from a generation ago.51 In an analysis of data by the Centers for Disease Control and Prevention from the 1999 nationwide HealthStyles survey, only 19% of respondents with school-aged children reported that their children had walked to or from school, and 6% reported that their children had biked to or from school at least once a week during the preceding month. The two leading barriers reported to walking or biking to school were distance and traffic; while “safety” was not offered as a perceived barrier, the concern with traffic is presumably a safety concern.51

Fortunately, strategies for controlling pedestrian fatalities and injuries are well known. Two are relevant to this discussion: decreasing the quantity of driving and optimizing the design of walking and biking routes.

Just as for automobile crashes, less driving is likely to make pedestrians and bicyclists safer. An unintended experiment in New Zealand demonstrated this point. Following the 1973 energy crisis, the New Zealand government restricted automobile use. This policy remained in place for seven years and effectively limited traffic volume. During that time, child pedestrian mortality decreased 46.4%.52
a long-term study of child pedestrian deaths in the United States, a similar pattern emerged; during years when traffic volume fell, so did pedestrian fatality rates. Design is also important. Three kinds of environmental modifications offer great promise in protecting pedestrians and bicyclists: separating pedestrians and bicyclists from vehicles, making pedestrians and bicyclists more visible and conspicuous to drivers, and reducing vehicle speeds. In addition, dedicated bicycle lanes can help prevent collisions between pedestrians and bicycles. Pedestrians can be separated from vehicles in time, such as with pedestrian-activated crossing signals, favorable traffic signal timing, or no-right-on-red laws. They can be spatially separated from vehicles with pedestrian overpasses, wide sidewalks on both sides of the street, and pedestrian refuge islands in the middle of wide streets. In some cities, motor vehicles are banned from designated streets or entire zones, a strategy that has been widely used in Europe. Similarly, infrastructure for pedestrians and bicyclists, such as the extensive path systems in Holland and Germany, helps prevent injuries from motor vehicles. Pedestrians can be made more conspicuous to drivers in several ways; examples include increased roadway lighting, raised intersections and crosswalks, and “bulb-outs” that extend the sidewalk corners into the street. Vehicle speeds can be reduced with traffic circles, narrowed traffic lanes, curving or zigzag roadways, raised intersections, and speed bumps. In some Dutch cities, the *woonerf* (street for living) is designed for shared use among pedestrians, bicyclists, and motor vehicles, which are limited to “walking speed.” These techniques are collectively known as “traffic calming,” and there is good evidence that they help prevent pedestrian injuries and fatalities. Ironically, given the falling pedestrian fatality rates that accompany less walking, more walking and bicycling, under the right circumstances, is associated with lower rates of injuries and fatalities to pedestrians and cyclists. In countries where walking and bicycling are far more common than in the United States, such as Holland and Germany, pedestrians and cyclists are killed at far lower rates. In observational studies of intersections in Sweden and Ontario, heavier pedestrian and bicycle traffic predicted lower rates of collisions with automobiles. Recently, this relationship was confirmed in studies of California cities, Danish towns, and European countries. That sprawl decreases foot and bicycle trips in both relative and absolute terms may help explain decreased injury rates among pedestrians and cyclists, but a marked increase in foot and bicycle trips, with all that entails—greater awareness among drivers, and better roads and paths—also decreases the injury risk to pedestrians and cyclists.

A final point helps place the risk of traffic-related injuries in perspective. The fear of crime may contribute to sprawl, driving some people to exchange the menace of the city for the safety of the suburbs. But William H. Lucy, of the University of Virginia School of Architecture, recently challenged this assumption. Looking at 15 medium and large metropolitan areas over a 15-year period, he analyzed the risk of dying from two causes, traffic crashes and murders by strangers. Like Ewing and colleagues, Lucy found that the risk of dying in traffic was highest in the most sprawling places. Moreover, in each metropolitan area studied, the risk of dying in traffic in the suburbs was far higher than the risk of being murdered...
by a stranger in the central city. Even in central cities, the traffic fatality rate was generally higher than the stranger homicide rate. Lucy concluded that “homicides are not nearly so great a danger as traffic fatalities.” The risk of dying in traffic, he notes, is “largely unrecognized as a danger to be factored into residential location decisions.”

The Role of Land-Use Patterns

Land use and travel patterns are closely linked. If different land uses are separated, distances among them are great, and roads are more available than sidewalks and paths, then people shift from walking and bicycling to driving. In the Netherlands 30% of all trips are on bicycles and 18% are on foot, while in England these figures are 8% and 12%, respectively. In the United States, a nation of drivers, 1% of trips are on bicycles and 9% are on foot. Approximately 25% of all trips in the United States are less than one mile, and of these, 75% are by car.

Physical Activity

According to the Behavioral Risk Factor Surveillance System (BRFSS), more than half of American adults are not physically active on a regular basis, and just over one in four reports no leisure-time physical activity at all. In 2000, only 26.2% of adults were classified as meeting recommended levels of physical activity (defined as any physical activity for at least 30 minutes a day at least five days a week, or vigorous physical activity for at least 20 minutes at least three days a week). In 2001, when the recommended level of physical activity had been slightly redefined and the BRFSS questions changed, the proportion of adults meeting recommended levels of physical activity rose, but only to 45.4% (ranging from a low of 28.9% in Kentucky to a high of 55.8% in Wyoming). Among children aged 9 to 13, the pattern is similar; 61.5% participate in no organized physical activity when not in school, and 22.6% engage in no free-time physical activity.

Sedentary life-styles result from many factors: ubiquitous labor-saving devices, television viewing, computer use, and others. However, the built environment plays an important role. A considerable body of research establishes that sprawl—as measured by low residential density, low employment density, low “connectivity,” and other indicators—is associated with less walking and bicycling and more automobile travel.

Low physical activity threatens health directly and indirectly. A sedentary life-style is a well-established risk factor for cardiovascular disease, stroke, and all-cause mortality, while physical activity prolongs life. The cardiovascular risk of low physical fitness is comparable to, and in some studies greater than, the risk of hypertension, high cholesterol, diabetes, and even smoking. Physical activity also appears to be protective against cancer.

In addition to its direct effects on health, physical inactivity is also a risk factor for weight gain. While food intake clearly plays a role, inactivity is just as clearly part of the explanation for the epidemic of overweight in recent years. In 1960, 24% of Americans were overweight (defined as a body mass index, or BMI,
of at least 25 kg/m²), and by 1990 that proportion had increased to 33%. During
the same interval, the prevalence of obesity (defined as a BMI of at least 30 kg/m²)
early doubled. According to data from the Behavioral Risk Factor Surveillance
System, this trend continued during the 1990s, with the prevalence of obesity rising
from 12.0% in 1991 to 20.9% in 2001.

Being overweight or obese, in turn, is a well-established risk factor for a number
of diseases: ischemic heart disease (overweight increases the risk up to 4-fold
in the 30–44 age group, less at older ages), hypertension, stroke, dyslipidemia,
osteoarthritis, gall bladder disease, and some cancers; obese people die at as much
as 2.5 times the rate of nonobese people. Being overweight increases the
risk of type 2 diabetes up to 18-fold, and the current epidemic of type 2 diabetes
tracks closely with the increase in overweight. A recent report from the American
Cancer Society’s Cancer Prevention Study II, which has followed more than
one million Americans since 1982, showed a dramatic relationship between body
weight and risk of cancer. People in the highest category of body weight had sig-
nificantly increased risks of a wide range of cancers, including common sites such
as colon-rectum, prostate, and breast. For these sites, even a small increase in rela-
tive risk translates to a large increase in the number of cases and a large burden
of excess disease across the population. Obesity is also associated with depres-
sion, perhaps through genetic traits that predispose to both conditions and perhaps
through such mechanisms as low self-esteem. The combination of poor diet and
physical inactivity is second only to tobacco as the leading cause of death in the
United States.

A growing body of evidence documents the association between urban sprawl
and this complex of health behaviors and outcomes—sedentary life-styles, over-
weight, hypertension, diabetes, and others. For example, many studies in the
transportation literature have compared “high-walkable” and “low-walkable”
neighborhoods with respect to travel behavior. The high-walkable neighborhoods
are characterized by high density, high land-use mix, high connectivity, good walking
infrastructure, pleasing aesthetics, and safety, while the low-walkable neighbor-
hoods lack many or all of these features. People in both kinds of neighborhood
keep travel logs to record their travel behavior. In general, people in high-walkable
neighborhoods record more walking trips per week, sometimes by a factor of four
or five, especially for utilitarian trips such as errands and going to work. This
finding translates into a higher total amount of physical activity with all the health
benefits that brings. Some of the strongest individual predictors of walking are
design features such as land-use mix and nearby footpaths and sidewalks, features
typical of older towns and cities but rarely seen in sprawling areas.

At the larger scale of a metropolitan area, specific neighborhood features are
too variable to measure, but the overall extent of sprawl can be characterized. Ew-
ing and colleagues studied physical activity in nearly 400,000 people across
the United States in relation to the Sprawl Index of the counties and metropoli-
tan areas in which they lived. There was a clear relationship between the degree
of sprawl and the amount of walking; more sprawl predicted less walking. More
sprawl also predicted less leisure-time physical activity, although this relationship
did not reach statistical significance. Interestingly, the investigators went a step further and looked at related health outcomes such as obesity, hypertension, diabetes, and coronary heart disease. As the level of sprawl increased, so did hypertension, body weight, and the probability of being obese. More sprawl also tended to predict a higher prevalence of diabetes and coronary heart disease, but these relationships were weaker and did not reach statistical significance.

Overall, people in sprawling areas seem to walk (and bicycle) less, and walking is a key form of physical activity. Community design that encourages “active living” integrated into urban planning could offer important public health benefits.

**WATER QUANTITY AND QUALITY**

Americans take for granted the availability of clean, plentiful, and cheap water. Indeed, the development of an excellent water supply—the result of social policy, civil engineering, and health advocacy over more than a century—is credited with playing a central role in improving public health during the first half of the 20th century. Sprawl, however, may threaten both the quantity and the quality of the water supply. A defining feature of sprawl is the change in land use from forest and grassland to residential neighborhoods, which include large areas of impervious surface—rooftops, driveways, roads, parking lots, even compacted lawns. Roads and parking lots are a major contributor, accounting for more than 60% of impervious surfaces in sprawling areas.

Such terrain does not effectively absorb rainwater and return it to groundwater aquifers; instead, the runoff flows to streams and rivers and is carried downstream. In one study, 15% of rainfall on suburban land was lost as runoff, compared with about 4% on undeveloped grassland. In a study of land use changes in suburban Indianapolis over nearly 20 years, an 18% increase in impervious areas resulted in an estimated 80% increase in annual average rainwater runoff. A similar pattern is seen for melting snow.

According to both empirical data and hydrologic modeling, development densities greater than about 10 to 20% (of built-upon surface area) lead to dramatic increases in runoff. Dense urban development exceeds this threshold and also presents much impervious surface, but when considered on a per capita basis across a region, a balance of dense development with preserved green space may provide less impervious surface overall. This effect is so well established that impervious surface has been suggested as a key environmental indicator, much like air pollutant levels. With less groundwater recharge, communities that depend on groundwater for their drinking water—about half of U.S. communities—may face shortages.

Water quality may be affected in several ways. With better control of “point sources” of water pollution—factories, sewage treatment plants, and similar facilities—“non-point source” water pollution has emerged as the major threat to water supplies. Non-point source water pollution occurs when rainfall or snowmelt moves over and through the ground, picking up contaminants and depositing
them into surface water (lakes, rivers, wetlands, and coastal waters) and groundwater. Much of this problem relates to agricultural land, the primary source of contamination by fertilizers, herbicides, and insecticides. However, a growing form of non-point source pollution is oil, grease, and toxic chemicals from roadways, parking lots, and other surfaces. Others are sediment from improperly managed construction sites, areas from which foliage has been cleared, and eroding stream banks. Suburban development increases surface-water levels of a range of contaminants, including polycyclic aromatic hydrocarbons, zinc, and organic waste. Similarly, high levels of runoff can carry microbial contaminants, including bacteria, viruses, and parasites, either as direct runoff from pets and wildlife or in sediment. As a result, waterways downstream from developed areas tend to be contaminated after significant rainfalls, increasing the risk of water-borne diseases.

An additional part of the water story relates to rural-urban differences in water sources and sewage management. Urban water systems typically bring piped water from reservoirs, treat it, and distribute it to consumers. Rural users, in contrast, often drill wells into groundwater under their property. Similarly, urban sewage systems typically carry sewage through pipes to treatment facilities before releasing it into surface waterways, while rural homes often use septic tanks. Suburban water systems may follow either model. In situations where suburban development relies on well water and septic tanks and where the density of septic systems overwhelms the soil’s ability to accommodate it, contamination of well water may result.

Water quantity and water quality may be threatened by land use and development patterns, and evidence suggests that sprawl contributes to these problems in specific ways. Source water protection, both upstream (as best exemplified by New York City’s extensive upstate reservoir system) and in residential areas, is an important aspect of health protection, but one that is often overlooked in rapid suburban development.

Social Aspects of Sprawl

Mental Health

Some of the original motivations for moving to the suburbs had to do with mental health: the escape from overcrowded urban neighborhoods, the sense of “getting away from it all” after a day of work in the city, the allure of a bit of nearby nature. People like trees, birds, and flowers, and these are more accessible in suburbs than in dense urban areas. Moreover, contact with nature may offer benefits beyond the purely aesthetic; it may benefit both mental health and physical health. In these senses, suburban living may offer health benefits.

Certain aspects of sprawl, however, may exact a mental health toll. Psychologists, geographers, architects, and planners have much to say about the form, scale, and speed of the environments we inhabit and of how they make us feel. The high speeds of suburban boulevards, on which everything rushes by quickly, the
large scales of “big box” stores and vast parking lots, the absence of tranquil and attractive “places of the heart” in daily travels: Could these features undermine mental health, or at least forfeit important opportunities to promote it?

A potential source of stress in sprawling areas is driving—one of the archetypal activities of sprawl. Driving was identified as a physiological stressor in research dating to the 1950s and 1960s. Markers of this stress include increased heart rate and blood pressure and increased levels of stress hormones measured in urine. Driving-related stress is aggravated by certain personality traits, high levels of life stress in general, and situations such as crowded roads, unpredictability, and rude behavior by other drivers. It is therefore no surprise that automobile commuting—unavoidable, time-pressured driving performed 10 times a week at crowded times of the day—has long been recognized as a stressor. Evidence links automobile commuting with back pain, cardiovascular disease, and self-reported stress. As people spend more time on more crowded roads, an increase in these health outcomes might be expected.

One of the best-known studies of commuters involved 100 employees at two industrial firms in Irvine, California. The commuters were stratified according to their commute length. During a week of daily observations, researchers measured the commuters’ blood pressure, heart rate, self-reported mood, and task performance when the commuters arrived at work in the morning. Both systolic and diastolic blood pressure and self-reported “tense” and “nervous” feelings were significantly associated with commute length (“irritable” and “impatient” feelings also tended to increase but did not achieve statistical significance). During 18 months of follow-up, several health parameters were associated with features of the commute. For example, the number of days hospitalized was related to the total number of interchanges between surface streets and expressways, and the frequency of colds, flu, and sick days off work was associated with the number of freeways and the number of road changes on the commute. Other studies have linked commuting (or its close cousin, professional driving) with such outcomes as cardiovascular disease and back pain. These and other results document adverse impacts of automobile commuting on both mental and physical health.

One possible indicator of such problems is aggressive driving. Substantial proportions of drivers report aggressive feelings while driving and confess to such behaviors as swearing out loud at other drivers, making threatening or hostile gestures, and even feeling that they “could gladly kill” other drivers. In a recent nationwide survey, for example, 62% of drivers reported sometimes or often saying bad things to themselves about other drivers, 52% reported sometimes or often complaining or yelling about other drivers to passengers in their vehicles, and 21% reported sometimes or often honking or yelling at rival drivers. More than 1 in 20 reported sometimes or often thinking about physically hurting another driver. These confessions are likely to be undercounts, but even if taken at face value, they reveal a remarkable level of hostility on the roads.

These aggressive thoughts can escalate into action, in episodes that have come to be called “road rage,” episodes when “an angry or impatient driver tries to kill or injure another driver after a traffic dispute.” According to the American Auto-
mobile Association’s Foundation for Traffic Safety, the interval from 1990 to 1996 saw a 51% increase in reported incidents of road rage. The foundation documented 10,000 reports of such incidents, resulting in 12,610 injuries and 218 deaths. A variety of weapons was used, including guns, knives, clubs, fists, or feet, and in many cases the vehicle itself.

Accounts of road rage are not difficult to find, and they range from the tragic to the comic. In 1994, Donald Graham, a 54-year-old church deacon and bookkeeper, became embroiled in a heated, ongoing traffic dispute with Michael Blodgett, age 42, as they drove on Interstate 95 in Massachusetts. After several miles, they both pulled onto an access road and exited their cars. Graham took a crossbow from his trunk and killed Blodgett with a 29-inch arrow. In September 1999, 21-year-old Shaun Mohr was driving his Isuzu Rodeo on Interstate 275 near Cincinnati when he came up behind a Dodge Colt driven by 27-year-old Kraal Wiggins. The two men jockeyed for position, and Mohr eventually passed Wiggins. As Wiggins pulled up behind Mohr, Mohr slammed on his brakes, Wiggins struck Mohr from behind, and Mohr lost control of his vehicle. It rolled several times, throwing his passenger, 21-year-old Tiffany Frank, from the vehicle and seriously injuring her. In January 2000, 38-year-old Chris Duron got into a dispute with another driver as they drove in the high-occupancy-vehicle lane of Interstate 75 south of Atlanta. Both drivers stopped their cars, and Duron ran toward the other car, prompting his rival to shoot him. When police arrived, Duron’s engine was running, his driver’s door was open, his lights and radio were on, and he lay dead 30 feet from his car. A few days later, Sara McBurnett was picking up her husband at the airport in San Jose, California. In rainy weather and bumper-to-bumper traffic on the airport approach road, she accidentally bumped a sport-utility vehicle in front of her. The driver left his vehicle, approached her car, grabbed her small dog through an open window, and threw it into oncoming traffic, where it was killed.

Road rage is not well understood, and there is a multiplicity of reasons for it. Stress at home or work may combine with stress while driving to elicit anger. Data from Australia and Europe suggest that both traffic volume and travel distance are risk factors. Long delays on crowded roads are likely to be a contributing factor.

It seems reasonable to hypothesize that anger and frustration among drivers are not restricted to their cars. When angry people arrive at work or at home, what are the implications for work and family relations? If the phenomenon known as “commuting stress” affects well-being and social relationships both on the roads and off and if this set of problems is aggravated by increasingly long and difficult commutes on crowded roads, then sprawl may in this manner threaten mental health.

Social Capital
In the years after the Second World War, as Americans flocked to the suburbs, one of the strongest attractions was the promised sense of community. Indeed, as Robert Putnam writes in *Bowling Alone*, the “postwar wave of suburbaniza-
tion produced a frontier-like enthusiasm for civic engagement” (p. 209). William Holley Whyte, in his description of Park Forest, Illinois, in the 1950s, observed an almost frantic pace of socializing, a “hotbed of participation.” In his pioneering study of Levittown (now called Willingboro), New Jersey, Herbert Gans describes “the beginnings of group life”: initial casual meetings that blossomed quickly into bridge groups, weekly and even daily “coffee-klatsches” and mah-jong games, and a multitude of more formal organizations such as service clubs, veterans’ groups, and religious groups. More than 50% of the subjects Gans interviewed reported that moving to the suburbs had increased their level of organizational activity. In their study of Levittown, Long Island, Rosalyn Baxandall and Elizabeth Ewen describe the many social organizations that formed during the 1950s: babysitting co-ops, joint shopping trips (since many women did not drive), Tupperware parties, service on the school board and PTA, participation in the Little League, and others. There was apparently no absence of community involvement in the early days of the suburban boom.

But another, darker side of suburban social life has also been described. As early as 1938, Lewis Mumford, in The Culture of Cities, called suburbia “a collective effort to lead a private life” (p. 412). Kenneth Jackson, a historian of suburbanization, concluded, “A major casualty of America’s drive-in culture is the weakened ‘sense of community’ ” (p. 272). Similarly, Reid Ewing, a city planner, believes that “strong communities of place, where neighbors interact, have a sense of belonging, and have a feeling of responsibility for one another are harder to find” in suburbs than in traditional small towns or cities. “It is no coincidence,” the Yale architecture professor Philip Langdon observes, “that at the moment when the United States has become a predominantly suburban nation, the country has suffered a bitter harvest of individual trauma, family distress, and civic decay” (p. 1). Indeed, a perceived erosion of civic engagement and mutual trust—a loss of what is called “social capital”—has been widely noted and discussed in recent years, and some authors have attributed this decline, in part, to suburbanization and sprawl.

How could this be? First, and most simply, urban sprawl restricts the time and energy people have available for civic involvement. A commuter who arrives home at 6:30 after a grueling 50-minute commute, feeling tired, depleted, and irritable, is not likely to go back out for a 7:30 meeting of the PTA or the neighborhood association. As early as the 1950s, sociological studies in Coburg, a suburb of Eugene, Oregon, and in Claremont, outside Los Angeles, showed that commuters in suburban communities participated less than non-commuters in voluntary associations. The Claremont study showed a direct relationship between longer commutes and less community participation, leading the author to a blunt conclusion, “Usually the commuter participates very little in community affairs.” In Bowling Alone, Robert Putnam reports that commute time is more important than almost any other demographic variable in predicting civic involvement. He writes that “each ten additional minutes in daily commuting time cuts involvement in community affairs by 10 percent”—fewer public meetings attended, fewer committees chaired, fewer petitions signed, fewer church services attended, and
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so on,” (p. 213; italics in original). Putnam points out that the “civic penalty” of commuting is seen not only in commuters but also in their neighbors, not only on workdays but also on weekends. The erosion of social capital related to commuting seems to pervade entire suburban communities.147 Second, sprawl could undermine social capital by reducing opportunities for spontaneous, informal social interaction. Purely residential suburbs have few if any “great good places”—the “cafes, coffee shops, bookstores, bars, hair salons, and other hangouts at the heart of a community” where people traditionally gathered to schmooze.159 (The phenomenal growth of Starbucks in suburban shopping centers may be a market response to this need, although the regular provision of “drive-thru” windows is ironic.) Certainly, people in their cars are less likely to mix and mingle than people on the sidewalk or in the cafe. In fact, as discussed above, driving might actually engender hostility and mistrust, at least in some drivers under some circumstances. Hence, spontaneous, informal social interaction might consist of honking or shouting at the driver in the next car!

Third, sprawl privatizes the public realm. As G. Scott Thomas160 has written, “Suburbanites reject the underlying tenets of city life, believing in decentralization, not density, and placing a higher value on the individual than on the community” (p. 139). This view implies a causal process that may operate in two directions: individualists may selectively move to the suburbs, and, once there, the suburbs may reinforce their individualism. People who work out in their basements rather than jog on public trails or relax in their back yards rather than stroll or picnic in parks may have little feeling for parks and other public assets. By sanctifying the private realm, sprawl may undermine people’s support for public initiatives. Analysis of recent voting trends supports this view.147, 161, 162 Suburban voters prefer limited government programs. Relative to urban and small-town voters, they place little emphasis on such social goals as eliminating discrimination and reducing poverty, and they tend to reject initiatives such as park acquisition and mass transit. In contrast, suburban voters generally support funding for education and highway construction, which may benefit them more directly.

Fourth, sprawl creates relatively homogeneous communities, segregated by social class and race. J. Eric Oliver162 suggests that in homogeneous suburban communities, social conflicts between citizens are transformed into conflicts between political institutions. This removes incentives for people to become personally involved in the political process, reducing levels of civic participation. Moreover, the social stratification that is structured into suburban communities may have some of the same effects that income inequality in society does more generally, eroding social capital.163

Finally, sprawl might undermine social capital by disrupting continuity of community life as people age. A homogeneous neighborhood of four-bedroom houses and large lots might appeal to a family with small children. Yet when the children have grown up and left for college and the couple wants to downsize, the neighborhood offers no options. Typically, the now middle-aged parents will sell their house and move to a different neighborhood that offers smaller houses, apartments, or condominiums. (The use of property taxes to fund schools may be
a further incentive for empty nesters to move away from communities with young families.) This discontinuity—the systematic departure of families after about 20 years of living in a neighborhood—cannot be good for social capital.

Research in community psychology, sociology, and related fields provides considerable empirical data on the level of “sense of community” or social capital in relation to community design. In general, this literature suggests that walkability, public spaces, and mixed-use are associated with improvements in social capital, while automobile dependence, absence of public spaces, and low density seem to have a negative impact. This finding is significant because social capital, in turn, is a powerful predictor of good health. More and better social relationships are associated with health benefits. Conversely, social isolation, social stratification, and income inequality are associated with higher all-cause mortality, infant mortality, and mortality from a variety of specific causes, independent of income and poverty, according to data from the United States and Great Britain. Therefore, to the extent that sprawl is associated with social stratification and loss of social capital, and these phenomena are in turn associated with increased morbidity and mortality; sprawl may have a negative health impact on this broad scale.

**Populations at Special Risk**

As with many social forces, sprawl is likely to affect some groups more than others. Public health analysis routinely inquires whether some populations are disproportionately affected. In the case of sprawl, the answer may be affirmative with respect to women, children, the elderly, poor people, people of color, and people with disabilities.

Women play a disproportionate role as chauffeurs in sprawling areas—taking children to school, play dates, or soccer games; taking elderly parents to the doctor; and running errands to the grocery store, post office, or bank. A 1999 report by the Surface Transportation Policy Project, *High Mileage Moms*, found that two-thirds of all chauffeur trips are made by women. The report found that married women with school-aged children were averaging more than five automobile trips a day, 21% more than the average for men. On the way home from work, 61% of women made at least one stop for an errand, compared with 46% of men. Among women, 50.4% of trips were made for chauffeuring, compared with 41.1% among men. The average woman was spending 64 minutes a day in the car, a figure that rose to 66 minutes for married women with school-aged children and 75 minutes for single mothers. The image of the suburban “soccer mom” in a mini-van turned out to reflect long hours at the wheel providing transportation and delivery services. As one mother of three- and five-year-old children wrote, “the stress women incur from driving their kids around town is tremendous, if not yet quantifiable. Ask any mother; road rage is a tame descriptor when you’re stuck in traffic with a screaming child in the back seat.” For women in sprawling areas, faced with a large burden of driving, sprawl must seem very much a women’s health issue.

Children are also a vulnerable population, in several ways. First, the burdens
of air pollution fall heavily on children, since they breathe disproportionately more air than adults, have more outdoor exposure time, and have developing respiratory systems. Asthma prevalence is high in children, and asthmatic children are especially susceptible to exposure to ozone and other respiratory irritants. Recent results have suggested that ozone not only increases acute respiratory symptoms in children in the short run but may also impair lung growth and increase the probability of developing asthma following long-term exposure. Second, children have been hard hit by the physical inactivity associated with sprawl. The disappearance of walking and bicycling to school, discussed earlier, together with other changes in activity patterns and diet have contributed to a rapid increase in childhood overweight and obesity. The consequences include low self-esteem, increased risk of diabetes, hyperlipidemia, and other diseases as well as an increased risk of being overweight in adulthood. Third, children are especially susceptible to automobile-related injuries and fatalities, particularly when they are pedestrians or bicyclists. Fourth, children who are driven everywhere may not learn to navigate their neighborhoods and communities independently, forfeiting an important developmental step. Finally, the decline of social capital may be especially worrisome for children. The adage that “it takes a village” reflects a traditional understanding, supported by both theory and empirical research, that children benefit from cohesive communities.

The elderly represent the fastest growing segment of the U.S. population. Aging inevitably brings with it some decline in function—impaired vision, impaired mobility, and so on. Many elderly people become unable to drive. Sprawling communities, where driving is the only practical means of transportation and walkable destinations are scarce, are therefore designed to disenfranchise elders. In contrast, walkable communities, where destinations such as stores, libraries, and churches are located close to where people live, offer ideal opportunities for elders to maintain their mobility and independence. Physical activity is a powerful protector of health in the elderly.

Poor people and people of color, as indicated in the introduction to this chapter, are often marginalized by the spatial dynamics of sprawl. In fact, racial discrimination has been a subtext of suburbanization since at least the 1930s, when the Home Owners Loan Corporation implemented the discriminatory standards that became known as red-lining. By the 1960s, John F. Kain had identified a systematic “spatial mismatch”: blacks were trapped in the inner city by housing discrimination, while the job base was increasingly moving outward. “Sprawl is related to poverty and inequality,” Paul Jargowsky writes, “mainly because sprawl creates a greater degree of separation between the income classes.” (p. 51) For those left behind—often without automobiles—public transit rarely provides affordable, efficient access to suburban jobs. “The health consequences of poverty, especially as experienced in urban centers, are thoroughly discussed in the other chapters of this book.

Some of the specific health effects of sprawl fall disproportionately on poor people and people of color. Pedestrian fatalities are an example. In metropolitan Atlanta, pedestrian fatality rates during 1994–98 were 9.74 per 100,000 for His-
panics, 3.85 for blacks, and 1.64 for whites. In suburban Orange County, California, Latinos comprise 28% of the population but account for 43% of pedestrian fatalities. In the Virginia suburbs of Washington, Hispanics comprise 8% of the population but account for 21% of pedestrian fatalities. The reasons for this disproportionate impact are complex and may involve the probability of being a pedestrian (perhaps related to low access to automobiles and public transportation), road design in areas where members of minority groups walk, and behavioral and cultural factors such as being unaccustomed to high speed traffic.

Finally, people with disabilities are poorly served by sprawl. Transportation systems designed for cars rather than pedestrians are unfriendly to pedestrians and doubly so to those with special transportation needs. People in wheelchairs need sidewalks and paths that are sufficiently wide and level to allow safe and convenient passage, with curb cuts at appropriate locations. People with visual impairments need audible pedestrian signals at intersections to let them know when it is safe to cross. Crossing signals need to be timed to allow people with disabilities enough time to reach the other side. In some cases, traffic-calming measures designed to protect most pedestrians, such as roundabouts, pose special challenges for those who are blind. Careful planning is needed to provide safe and convenient mobility for all, and design guidelines are available. Undertaking such changes requires an awareness of the needs of people with disabilities, as well as a broader orientation to safe, nonmotorized travel—an orientation that is rarely built into sprawling communities.

Urban Health in the Age of Sprawl

If sprawl has become a defining feature of American metropolitan areas, what does this mean for the future of cities? And if sprawl has a wide range of health effects, what does this mean for the future of urban health?

Many of the forces that gave rise to sprawl will continue. In particular, the U.S. population will continue to grow; according to the mid-range projections of the Census Bureau, the nation’s population will nearly double to 570 million by the end of the 21st century. Much of this population growth will be in urban areas. People will continue to look for a bit of land on which to build a home. Internet communication will increasingly permit working from home, allowing homes to be built in far-flung locations. These forces will continue to promote the spread of metropolitan areas.

Some of the impetus for sprawl, however, will be transformed. Sprawl depends on automobile travel, which requires cheap, plentiful fuel. At some point, probably during the first half of the 21st century, the supply of available oil will dwindle. Automobile travel as we know it will become impossible, and the land-use patterns that depend on it will have to change. If technology advances to the point that vehicles can operate on a sustainable energy source, this change will be blunted, but the necessary technology will not be available soon.) Sprawl also depends on a supply of cheap, plentiful land around cities. As with oil, the supply of cheap land around cities is largely depleted because many cities have expanded.
to the very edge of commuting practicality. These facts will inhibit the continued spread of metropolitan areas.

Cities of the next century will change their form in profound—and not entirely predictable—ways. Clearly this calls for a reconception of “urban health.” Those who care about the impact of urban form and urban life-styles on health need to expand their view of cities from the traditional urban core to the entire metropolitan area. As they metastasize across political jurisdictions, social and ethnic enclaves, watersheds, airsheds, and ecosystems, metropolitan areas retain an organic quality. The effects of infrastructure decisions, land-use policies, and demographic trends in one part ripple throughout, affecting the public’s health and well-being broadly.

Several emerging or established movements address the redesign of cities and provide possible blueprints for urban change in the next century. Some primarily grow out of environmental goals, including the Sustainable Cities and the Ecological Cities movements. Others have emerged from public health, such as the Healthy Cities movement. Still others grow out of the worlds of design and architecture, including New Urbanism and Smart Growth. Together these movements converge on a set of design principles that may be a framework for urban health in emerging metropolitan areas.

The Sustainable Cities movement originated with the 1992 United Nations Conference on Environment and Development in Rio de Janeiro. The Brundtland Commission report prepared for that conference proposed a now-standard definition of sustainability: “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (p. 4). Urban planners, elected officials, and community groups recognized the implications of this vision for urban development. In the early 1990s, the United Nations Environment Program and the United Nations Human Settlements Program (UN-HABITAT) launched their Sustainable Cities Program (www.unhabitat.org/programmes/sustainablecities/). This program aimed to build capacity in urban environmental planning and management, with a focus on sustainability, using cross-sectoral and stakeholder participatory approaches. Projects are under way in Europe, Asia, Africa, and Latin America. Complementary efforts, the European Sustainable Cities & Towns Campaign and the European Sustainable Cities Project (www.sustainable-cities.org/) began in 1994 at the First European Conference on Sustainable Cities and Towns in Aalborg, Denmark. The conference adopted the Aalborg Charter, which provides a framework for local sustainable development. In North America, the International Centre for Sustainable Cities in Vancouver (www.icsc.ca/), the Institute for Sustainable Communities in Montpelier, Vermont (www.iscvt.org/), the Ecological Cities Project at the University of Massachusetts (www.ecologicalcities.org/), and other groups pursue similar visions, domestically and internationally. While many of the Sustainable Cities movements do not explicitly list human health as a priority, the solutions they contemplate—more environmentally sound transportation, communities designed with mixed land uses, and so on—would directly address some of the health consequences of sprawl.
Healthy Cities is a rubric that, as the name implies, takes human health as its primary focus. In 1987, the World Health Organization Regional Office for Europe initiated its Healthy Cities Project (www.who.dk/healthy-cities). This movement took a holistic approach, defining a healthy city as one that is “continually creating and improving those physical and social environments and strengthening those community resources which enable people to mutually support each other in performing all the functions of life and achieving their maximum potential.” Through the project, approximately 50 cities around the world have formally joined the Healthy Cities Network by committing to a portfolio of activities, and more than 1,000 cities have undertaken selected healthy city initiatives. Mayors and political leaders from affiliated cities have met at the end of each five-year cycle of the Healthy Cities Project and have issued “declarations” affirming the importance of healthy city principles, including design and planning that promote health. In October 2003, for example, the Belfast Declaration for Healthy Cities espoused a range of initiatives from social justice to good government. It included a commitment to “building safe and supportive cities sensitive to the needs of all citizens, actively engaging urban planning departments and promoting healthy urban planning activities.” Corresponding initiatives in the United States have included the Healthy Communities movement, launched in 1989 by the National Civic League with federal support, and its successor, the Coalition for Healthier Cities and Communities, founded in 1994 and including at one time more than 1,000 cities. These initiatives have advanced the vision of cities and communities as health-enhancing places.

Finally, initiatives in the planning and architecture professions emerged beginning in the 1990s that offer a radical new vision of urban development, although one that borrows many elements from traditional cities and towns. New Urbanism, Traditional Neighborhood Development, and neo-traditional development are partially overlapping terms that describe some of these approaches. Many of these approaches are encompassed by Smart Growth, a set of land use and transportation principles that in many ways are the opposite of sprawl. Smart Growth principles include mixed land uses, higher density balanced by the preservation of green spaces, transportation alternatives including pedestrian infrastructure and transit, attractive communities with a strong sense of place, and effective, coordinated regional planning based on community and stakeholder participation.

Achieving this vision requires more than good design at the local level. It requires changes in building and zoning codes, in subdivision regulations and, more important, the emergence of new forms of regional government. Strategies will include growth management to concentrate growth in specific parts of metropolitan areas, land conservation, and spending to upgrade and modernize existing infrastructure such as sewer and water lines and to create new infrastructure such as mass transit. It is essential that equity considerations play a large role in Smart Growth plans to overcome the legacy of discriminatory housing and segregation characterizing many metropolitan areas.

Urban health, then, must expand its scope in recognition of the sprawling growth patterns of modern cities. Combining the perspectives of environmental-
ists, architects, designers, and planners, public health professionals must apply such tools as indicators to assess evolving urban health concerns and Health Impact Assessment to guide healthy urban design. They must conceive of cities on spatial scales that range from the local to the regional and address “upstream” determinants of health that range from federal transportation law to local zoning regulations. As sprawling cities expand and evolve in coming years, the field of urban health must do some sprawling of its own.

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The findings and conclusions in this chapter are those of the author and do not necessarily represent the views of the Centers for Disease Control and Prevention/Agency for Toxic Substances and Disease Registry.


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Fifty Ways to Destroy a City
Undermining the Social Foundation of Health

Mindy Thompson Fullilove

Introduction

On the short list of factors that are fundamental to health are adequate food, proper sanitation, clean water, clean air, and social order, the topic of this chapter. Social order does not produce health in the way that Vitamin C prevents scurvy: it is not a silver bullet. Instead, social order produces health by organizing people to work together to solve their common problems. Social order—which links people with different capabilities and needs into a cohesive whole—is the result of people’s efforts to manage their conflicting emotions and behaviors so that a greater good (both personal and collective) may be achieved. People working together can move mountains, drain swamps, build colossal buildings, and unravel mysteries of the universe. It is this collective effort to solve problems and improve the human condition that ultimately creates health.

Alexander Leighton, a leading social psychiatrist who had extensive experience working with communities in turmoil, argues that a human settlement is a “self-integrating system,” that is, “a patterned and patterning system, with functions and components. Moreover, although the whole is under the influence of its components, it has qualities and characteristics of wholeness which are the synthesis rather than the mere addition of the parts” (p. 196). But absent the patterning of human interaction, he observes, individuals confront each other in confusion, which undermines their well-being. The following proposition guided, and was confirmed by, his classic study of mental health in Stirling County:

Given that human society is composed of functioning self-integrating units based on patterns of interpersonal relationship which include communications,
symbols, and sentiments, it follows that social disintegration will affect personalities in such a manner as to foster psychiatric disorder. (p. 290)

While Leighton focused on the link between social disintegration and mental illness, other studies have demonstrated that undermining the self-integrating social unit can lead to increases in many diseases. The ecologists Rodrick Wallace and Deborah Wallace, in a major study of the link between social disorder and disease, demonstrated that the destruction of a section of the Bronx, in New York City, led to increases in AIDS, violence, infant mortality, addiction, and obesity. Others have noted that the destruction of the Bronx was also associated with a major cultural transformation signaled by the emergence of rap and hip-hop. This example is not intended to suggest that social disruption will always lead to specific diseases—these or any others—but rather to suggest that social disruption will always cause some form of social and health problems.

In this chapter, I examine the many ways in which we can observe the disruption of cities and city neighborhoods. The human settlements considered here—ranging from those not usually considered cities to major urban areas—are dense and complex entities. Complexity implies parts. The parts of a city may be defined in many ways. Vertical strata, concentric circles of development, zones of activity, major paths for exchange, and the location of markets are but a few of the useful ways for organizing the components and their linkages. Each part of the city has layers and connects to the developmental process of the whole; each part has multiple, particular kinds of activity and is linked by roads to markets and other points of exchange. The differentiation of the parts creates particular kinds of antagonism, including competition for power and influence. The differentiation of parts also creates interdependencies and mutual aid, which drives the whole toward cooperation. All complex settlements are simultaneously drawn together and pulled apart by the different attractions offered by competition and cooperation.

One of the ways in which people achieve coherence in complex systems is through the creation of a set of collective assumptions. As applied to cities this principle is manifest in the development of logic. Whether it is that of the city organized around a castle or temple, or that of the expansive city of the plains that extends from a town square to the horizon, the nature of the logic is less crucial for the organization of the city than is the existence of the logic. Specifically, the logic of the city holds the parts together in a specific, instrumental fashion that is dictated by the major social, economic, and political interrelationships of the people who live in the city.

The existence of the logic that organizes the parts into a whole also predicates the transmission of disorganization from an injured part to the body of the whole. When even a single part of the city is injured, the whole city will suffer. The underlying interdependencies of the city are often obscured by competition and other processes of differentiation, yet this overshadowing should not be mistaken for absence.

In the second section, I review an important list of destructive processes that
have injured cities or their parts. In the third section, I discuss the complex mix of diseases that is set off by social disruption. In the fourth section, I review the problems that attend mediation and hence may lead to secondary traumatization and an augmentation of the negative effects of destruction. In conclusion, I argue that we cannot achieve the goals of a healthy public without creating cohesive and functional urban centers.

**Injuring the city**

*Managing “Internal Enemies”*

**JAPANESE INTERNMENT**

After the bombing of Pearl Harbor, anti-Japanese sentiment was widespread in the United States, and a policy of exclusion was urged. Among those in favor of such a policy was General John L. DeWitt, who wrote:

> The area lying to the west of Cascade and Sierra Nevada Mountains in Washington, Oregon and California, is highly critical not only because the lines of communication and supply in the Pacific theater pass through it, but also because of the vital industrial production therein, particularly aircraft. In the war in which we are now engaged racial affiliations are not severed by migration. The Japanese race is an enemy race and while many second and third generation Japanese born on United States soil possessed of United States citizenship, have become “Americanized,” the racial strains are undiluted.9

Based on such thinking, President Franklin Delano Roosevelt signed Executive Order 9066 on February 19, 1942. A Congressional report examining wartime relocation noted: “This gave the secretary of war and the military commanders to whom he delegated authority, the power to exclude any and all persons, citizens and aliens, from designated areas in order to provide security against sabotage, espionage and fifth column activity. Shortly thereafter, all American citizens of Japanese descent were prohibited from living, working or traveling on the West Coast of the United States.”9

At the time the internment was ordered, Japanese Americans lived in ethnic enclaves up and down the coast, engaged in fishing, farming, and some commercial activity. One such settlement was the neighborhood in East San Pedro, California, known as Terminal Island. This community was typical of many Japanese fishing communities that flourished because of residents’ ingenuity in gathering and preserving fish. By 1907, several hundred people, mostly men, lived in the area. Gradually, women arrived, and the neighborhood developed cultural, social, and educational institutions, such as the 1916 Fishermen Hall, which was the community center. By 1942, 3,000 people lived and worked in Terminal Island.

When the internment order was signed, Terminal Island residents were the first to be forced out of their homes. Many of the men were arrested just after the bombing of Pearl Harbor. Thus, the remaining women and children had to man-
Fifty Ways to Destroy a City

Japanese Americans were evacuated from their homes. In the second stage, they were ordered to report for internment. At that point, they could bring only personal effects. People lost their businesses, homes, and goods in this period.

More than 120,000 people were interned for two to four years. For the people of Terminal Island, the end of the internment was a signal to settle elsewhere in the United States. Though some retained strong feelings for Terminal Island, they did not move back. Fifty years later the only trace of the Japanese community was the Terminal School, which had been taken over by the U.S. Marine Corps. The rest of the buildings erected by the Japanese community had been replaced by industry of various kinds.

RELOCATING NATIVE AMERICANS

Throughout its history, the United States has pursued a policy of Native American relocation that started with the first arrival of Europeans in the 15th century. These recurrent relocations have been particularly pernicious in retraumatizing people before they could achieve complete recovery from prior displacements. One of many stories of such repeated traumatization is the story of the building of the Garrison Dam on land that had been given to the Three Affiliated Tribes, the Mandan, Hidatsa, and Arikara.

These tribes lived in the area that came to be known as the Dakotas. They were devastated by epidemics of smallpox that followed contact with Europeans. The tribes, which had been independent entities, banded together to survive in the face of major population loss and social disorganization. They settled on a reservation area near Fort Berthold in North Dakota and began the task of rebuilding their society. The sources of complexity in this settlement include three different tribes, each bringing a language, history, and culture and many religions. Conflict between traditional beliefs and values and the beliefs and values of the surrounding U.S. society was a source of tension, as was the need to rebuild a functioning economy. Despite numerous difficulties, the Three Tribes were successful in these efforts. As one marker of their success, they had lower rates of alcoholism and welfare dependence than did neighboring whites. In 1944, the U.S. Congress passed a law for the development of the Missouri River Basin, which included the building of the Garrison Dam on tribal lands. More than 300 families were forced to move from 153,000 acres of land that would be flooded by the new dam.

They were resettled on land of inferior quality that lacked access to the river and all of its attendant benefits. Hard-pressed to reestablish their economy under such conditions, tribal members have suffered from inferior housing, poverty, cultural clashes, increased rates of disease, and psychological distress. They have been largely excluded from the some of the new sources of income related to the dam, such as a new tourist trade. They continue to struggle for a more equitable relationship to the river, which would allow them to build a sound economic foundation for the group’s life.
Disinvestment

Redlining

Redlining is defined as “the practice of refusing to serve particular geographical areas because of the race or income of the area’s residents.” Redlining became an important public policy in the United States during the 1930s. In a time of widespread bankruptcy, banks and other financial institutions became extremely cautious about financing the purchase of homes. Federal funds, intended to encourage home building and economic recovery, were made available through the Federal Housing Administration. To guide the distribution of funds, a method of assessing the value of property was established. A massive assessment of the nation’s housing stock was conducted by the Home Owner’s Loan Corporation (HOLC), which was established in 1936. Among other criteria that helped appraisers judge the “quality” of an area was the presence of minorities, including African Americans, Jews, Poles, and Italians. One writer noted, “Even a single home occupied by a minority family in a distant corner of a neighborhood could cause the entire area to be declared unfit for mortgage insurance.”

The HOLC mapped hundreds of U.S. cities, indicating four categories of land: “A” areas, colored green, were considered the best sites for investment; “B” areas, colored blue, were good neighborhoods starting to run down; “C” areas, colored yellow, were slightly rundown neighborhoods, in which foreign-born or nonwhite citizens were beginning to make their homes; and “D” areas, the red ones, were the most deteriorated neighborhoods, occupied by the poorest people. These were often inhabited by an “undesirable population.”

Thus redlining has its roots in federal government lending practices. These practices had the effect of funneling investment to the periphery of the cities, while letting the center deteriorate. Furthermore, as neighborhoods aged, they were downgraded, initiating a moving front of investment away from the oldest parts of the city in the center to the latest ring of suburbs at the periphery. To the extent that abandonment of the center cleared the land there, reinvestment in the center of the city was reinitiated, drawing lenders and buyers back from the edges of the urban area to the center.

Disinvestment-Induced Human Ecosystem Collapse

Several processes contributed to de-urbanization in the aftermath of World War II, including the massive building of highways to new suburbs, urban renewal that decimated older neighborhoods in city centers, and the economic shifts that undermined manufacturing in urban areas of the North and East. The “shrinkage” of the cities led some to call for a “planned” process that would guide the downsizing of urban areas. In particular, it was proposed that poor neighborhoods be leveled, concentrating the population elsewhere in the city. Roger Starr, a major proponent of this “planned shrinkage,” wrote:

This sort of internal resettlement—the natural flow out of areas that have lost general attraction—must be encouraged. . . . Gradually the city’s population
in the older sections will begin to achieve a new configuration, one consistent with a smaller population that has arranged itself at densities high enough to make the provision of municipal services economical. . . . The stretches of empty blocks may then be knocked down, services can be stopped, subway stations closed, and the land left fallow until a change in the economic and demographic assumptions makes the land useful again.19 quoted on pp. 176–77

“Planned Shrinkage” was implemented through a variety of policy mechanisms, including diminished public transit, cutbacks in police and fire protection, reduced housing-assistance programs, and curtailed sanitation services.19 This denial of services to specific areas was the equivalent, Gratz points out, of a government-sponsored redlining program. The “internal resettlement,” so desired by Starr and his colleagues was “encouraged” through a firestorm that swept through vulnerable New York City neighborhoods throughout much of the 1970s and 1980s.

According to the studies conducted by Wallace and Wallace,4–6 planned shrinkage increased rates of infant mortality, addiction, HIV infection, violence, asthma, and obesity, both in the area directly affected and in the surrounding metropolitan region. In fact, they have demonstrated that the levels of HIV/AIDS in the Bronx are closely linked to the levels of HIV/AIDS in the entire United States.7

In many U.S. cities, the processes associated with planned shrinkage are evident, but the policy initiatives were given other names. In general, investment in targeted neighborhoods fell below the threshold required for sustainability. The more generic term, disinvestment-induced human ecosystem collapse (DIHEC), can be applied across all of these affected areas. DIHEC represents a shift from redlining, which is a system of minimizing investment in selected areas, to a system of actively withdrawing resources, as evidenced by the closing of the fire stations.

Development-induced Destruction

1950s-Style Urban Renewal

In 1949, the U.S. Congress passed the Housing Act of 1949. This act and its subsequent amendments provided funds for cities to condemn blighted areas and clear them for resale and redevelopment. By 1973, when President Richard Nixon ended it, this legislation had supplied funds for 2,532 projects in 993 cities.20 The funds were used to clear large tracts of land, mostly near-downtown residential neighborhoods, which were then converted to use for amenities that might entice the well-to-do back to the city from the suburbs. Another use of the land was for the construction of housing projects that concentrated the poor and people of color.

Urban renewal projects were planned by city authorities and approved by regional urban renewal offices of the federal government. Residents of the blighted areas were largely excluded from the decision-making process. Once the selection and condemnation proceedings had been completed, large tracts of land could be
cleared very rapidly. Displaced people were given some compensation for property they owned but otherwise were left to find new housing and make their own way. While white people could move anywhere, African Americans faced great difficulty because they could relocate only in ghetto areas and these were often overcrowded before destruction began. The problems that this created were many. In fact, 1950s-style urban renewal fell heavily on African Americans: They were the most likely to be displaced (63% of those displaced were African American), and they were the least likely to be part of the decision-making process and the least likely to have private funds to smooth the hardships associated with displacement.21

HIGHEST CONSTRUCTION

After World War II, the United States embarked on an extensive effort to build highways connecting its cities. These massive interstates were, in the main, designed to cut through the center of the city, bringing suburban commuters all the way to their jobs. Because the highways caused a great deal of destruction, the planners sought to take them through relatively weak neighborhoods that would have minimal ability to protest. Thus, African American neighborhoods that were considered “blighted” by urban renewal leaders were likely sites for highway construction. In Roanoke, Virginia, for example, planners said that they would replace housing in an area that was to be cleared by urban renewal. They never did, because the decision was made to build a highway and the land used for that instead.21

One of the most remarkable stories in this vein is one recounted by Richard Mohl,22 concerning the building of the interstate through Miami. By 1930, an African American ghetto had developed in “Colored Town,” a near-downtown neighborhood, later known as Overtown. Nearly as soon as Overtown came into existence, the city leaders began to develop plans to relocate the black residents of the neighborhood away from the center of the city. They first developed public housing five miles away. Later they proposed building “model negro towns” (p. 269) on the edges of the city as the site for the relocation, though these plans did not materialize. Redlining maps created in 1936, Mohl contends, “essentially designated the northwest area of Miami and Dade County for future black settlement” (p. 270).

Despite having the idea and specific resettlement locations, not until the construction of Interstate 95 were city leaders able to implement their relocation strategy, routing the massive highway right through the Overtown neighborhood.

When the downtown leg of the Interstate 95 expressway was completed [Mohl22 writes,] in the mid-1960s, it ripped through the center of Overtown, wiping out extensive housing as well as the black business district. One massive expressway interchange alone took up twenty square blocks of densely settled land and destroyed the housing about 10,000 people. Some 40,000 African Americans made Overtown home before the interstate came, but less than 8,000 now remain in an urban wasteland dominated by the expressway. By the
end of the expressway era, little remained of Overtown to recall its days as a thriving center of African American community life. (p. 273)

**UN SOUND PLANNING**

In the 1960s, planners advocated the creation of tall housing projects. Though there existed at the time a large body of information that described what made housing projects work, in many cases, this knowledge was not incorporated into what was built. Instead, very poor design choices were made. For example, housing projects were built with inadequate elevator service, tiny kitchens, long interior corridors without windows, and other features that undermined group and family life in the buildings. In addition, the buildings were mono-functional and grouped in large units, leaving vast stretches of urban residential terrain underserved by all the other kinds of urban infrastructure that create resilience in a neighborhood. These unsound buildings were likely to deteriorate with the worsening of social conditions for the poor due to deindustrialization and other problems, such as the virulent and disruptive crack epidemic of the 1980s. As conditions became intolerable, policy makers decided that these buildings should be destroyed. The first such building was the Pruitt-Igoe Housing Project in St. Louis, which was destroyed in 1972. Pruitt-Igoe was designed by the same architect who designed the World Trade Center, and the photographs of the buildings’ demise are eerily reminiscent one of the other. In 1992, the federal government adopted an even more widespread policy, called HOPE VI, which provided funds for the destruction of “dysfunctional housing communities.” Many of the housing projects that were destroyed were the poorly planned units that had been dysfunctional from the outset.

**Mistreatment of the Environment**

Many American neighborhoods have been affected by the improper disposal of toxic waste. Love Canal, a neighborhood in the city of Niagara Falls, New York, was one of the first U.S. neighborhoods to be evacuated because of the danger from toxic waste. Love Canal was an abandoned canal that became a dumping ground for 21,800 tons of toxic waste. It was presumed that the clay walls of the canal and the metal drums containing the waste would contain the material. A neighborhood of small houses was built on the site. By the 1970s, area residents began to notice strong odors and skin rashes. A reporter uncovered sludge that, on analysis, revealed the presence of a very large number of chemicals. Later investigation revealed that 82 chemicals had been dumped at the site. Studies also documented numerous health problems, including high rates of birth defects and cancer. Through a federal program run by the U.S. Environmental Protection Agency and its partners, Love Canal became the nation’s first “superfund” site designated for clean-up of uncontrolled hazardous waste sites that pose current or future threat to health. Residents were evacuated for more than 20 years while clean-up went forward. In 2004 Love Canal was finally taken off the superfund list, a sign that cleanup was nearly complete.
Since that time, many other communities have discovered that they have been exposed to toxic levels of waste. Anniston, Alabama, for example, was home to a Monsanto plant that was a major producer of polychlorinated biphenyls for over 50 years, until production was discontinued in 1971. The U.S. Agency for Toxic Substances and Disease Registry found high levels of PCBs in the city’s soil, as well as in young children, born well after the manufacture of PCBs was ended. Relocation of some affected people was required and a long-term clean-up was initiated.25

Research has found that toxic facilities are likely to be sited in poor and minority neighborhoods, the “redlined” areas first identified in the 1930s. While the concept of redlining referred initially to investment, it has also come to include the reverse process, that of preferential siting of noxious facilities in redlined areas. This practice adds additional troubles for already poor and marginalized neighborhoods.

**Armed Conflict**

**WIDE-AREA BOMBING**

Wide-area bombing was a tactic used by both sides during World War II. First employed by the Germans, during the bombing of London, it was later adopted by British and U.S. forces bombing German cities and by Americans bombing Japanese cities. Wide-area bombing is distinguished from tactical bombing by the nature of the target: The former is directed at large segments of cities, the latter at designated targets of military significance, including railroads and munitions dumps. Wide-area bombing is designed to destroy the enemy city, undermine morale, and raise the costs of fighting the war. Tactical bombing breaks critical links in the war machine, causing it to falter. During World War II, military tacticians debated the relative merits of these two methods of bombing, and both were used. Tactical, or pin-point, bombing has subsequently undergone enormous development, as technology has increased the ability to visualize a target and direct a bomb. Though the bombs sometimes miss, what is at issue is not the intention of the method but rather the imprecision of the technique or the technicians.

Hermann Knell,26 who lived in Würzburg, Germany, during World War II, wrote a book about the intensive bombing that destroyed the city in 1945. Several bombing attacks were made in 1942 and 1944, but the major effort was the night of March 16–17, 1945. The raid lasted only minutes but destroyed most of the city through a combination of direct hits and post-explosion fires. A core part of the city was destroyed in the bombing. In summing up the toll of the evening’s destruction, Knell noted that 21,000 homes housing 90,000 citizens were destroyed. Only 6,000 inhabitants could continue to live in the city limits.

**TERRORIST ATTACKS**

Terrorist attacks can take many forms and the amount of habitat destruction will vary widely. In general, pinpoint attacks serve the purpose of disrupting daily life,
rather than destroying infrastructure. However, terrorists have also been interested in the destruction of bridges, tunnels, highways, rail lines, and other strategic parts of the city structure. The terrorist attack on the World Trade Center stands out because it represents an attack on a set of buildings that were the equivalent of a modest city in the number of people gathered there, the importance of the area as a transportation hub, and the commercial activities located there. Although only 16 acres on the ground, the World Trade Center contained 13 million square feet of Class A office space, the equivalent of the office space in Atlanta or Miami. The eight subbasements contained as much space as the Empire State Building. When the World Trade Center was destroyed, the stock markets across the world were incapacitated for days. The enormous extent of the habitat destruction led to a great deal of damage to the city, in addition to the grief associated with substantial loss of life.

**Natural Disaster**

**VOLCANIC ERUPTION**

Pompeii is the most famous city to be destroyed by a volcano, and archaeological explorations have uncovered its lost glory. Less famous is the story of the small Hawaiian settlement of Kalapana that was inundated by the volcano Kilauea. Located on the big island of Hawai‘i, Kalapana was one of a group of villages occupied by native people who incorporated ancient tradition into their lives. The settlement had lived in harmony with nature and the volcano. A key feature of this accommodation to nature was that people held the land in common; when the lava covered a portion of the land, they could resettle nearby. In 1840, private ownership of land was introduced into the Hawaiian Islands, and this practice would be of fundamental importance to the people of Kalapana when Kilauea began erupting in 1983.27

Unlike other volcanoes that have had massive, singular eruptions, Kilauea spewed lava for many years. Encroaching lava flows consumed nearby settlements as well as popular swimming pools, a National Park Service Visitor Centers, and other sites of local importance. The lava moved slowly and erratically, consuming a house or two and then stopping and starting again. The unpredictableness of the flow, which left some few buildings standing while destroying others, created a desperate kind of hope in people that their home or store would be the one spared. From 1983 until 1990, when the last bits of Kalapana were destroyed, residents held an agonizing vigil. As the homes were consumed by lava, and they were displaced, the settlements slowly disintegrated. Some people moved to nearby areas; others left for other islands or even other countries. The entire area was declared too dangerous for resettlement.

The volcano destroyed 1,000 lots, some built, some unbuilt, and caused 50 million dollars’ worth of damage. Its slow pace added to the emotional turmoil of the residents, who lost their homes and way of life. Part of their suffering was caused by their no longer being able to move as the volcano dictated. The ancient rhythm of their lives was destroyed when the land was privatized, causing prices
to escalate out of reach of many people. Piilani Kaawaloa, whose family had lived in the area for many generations, commented:

I feel sorry for our people. They can’t afford to buy land any more. The only ones who can afford to buy land are the ones who go off to the Mainland or somewhere else to work to make big money. Why is that? Why do we have to move away from our own island to make money to try to outbid the person who just came in? At the same time we’re fighting for our land, we’re fighting for our culture. We’re losing it.\textsuperscript{27, p. 148}

**HURRICANE**

One of the most important hurricanes to make landfall in the United States was Hurricane Andrew, which hit the southern coast of Florida on August 24, 1992. At its landfall in Homestead, Hurricane Andrew’s central pressure was 27.23 inches, making it the third most intense hurricane to hit the United States. Because recording instruments were destroyed, there was no accurate measure of the intensity of the wind, although it reached 169 miles an hour during sustained gusts and the real numbers may be higher. It produced a 17-foot storm surge. According the National Hurricane Center, in the United States, Andrew caused 23 deaths, and $26.5 billion in damage (of which $25.5 was in South Florida).\textsuperscript{28} The *Sun-Sentinel*, in a 10-year retrospective, noted that 126,000 homes had been destroyed, 180,000 people left homeless, and 80% of area farms were wiped out.\textsuperscript{29}

The intense winds, massive destruction, and homelessness caused severe psychological distress in adults and children, which abated slowly as life returned to normal. Some of the most intense impressions of the event, however, continued to linger. One mother, whose family huddled in the bathroom for safety during the peak hours of the storm, reported that her children played “hurricane!” and then running to hide in the closet.\textsuperscript{30}

The destruction triggered major changes in the epicenter of the damage, in the surrounding counties and elsewhere in the United States. One major change was population movement.\textsuperscript{31} Tens of thousands of people moved out of the area. A massive housing boom followed in Broward County, just outside the area devastated by Andrew. Not only did many people move but the ethnic mix shifted to include a more diverse group of residents. In addition, housing codes were altered—which increased housing costs, insurance premiums went up for Homewood and the rest of South Florida, 11 insurers declared bankruptcy, and disaster response protocols were improved.

The problems caused by Hurricane Andrew, and the long period of destabilization that followed, is overshadowed by the damage inflicted on the Gulf Coast in 2005 by Hurricanes Katrina and Rita, where weather conditions and public policies combined to cause more than a thousand deaths and many long term health problems.
Health Consequences of Disruption of Human Settlements

With urban disruption people experience:

- Loss of the social networks that encouraged them to be productive and to limit their tendency to be self-indulgent (in the largest sense of the word), permitting the emergence of social pathologies and social disorder
- Exposure to dangerous conditions or pathogens that were controlled by the existing order of the settlement
- Exposure to an altered disease ecology caused by the creation of new niches in the ecosystem, which alter the disease ecology
- Impeded ability to manage daily life and its exigencies because of the destruction of resources
- Grief and stress because of the loss of home and an ordered way of life.

These processes, as noted earlier, do not dictate specific outcomes. Rather, they create a greater burden of disease in several categories. First, shifts in the environment of both host and agent increase the spread of infectious diseases. People face new kinds of exposure. In the United States, where many infectious diseases are well controlled, outbreaks of sexually transmitted disease are the most notable problem in this category. Increases in syphilis, gonorrhea, and HIV/AIDS have all been reported following urban upheaval. The increase in sexually transmitted diseases is related to other problems that emerge in the absence of strong social networks, specifically delinquency and addictive disorders.

Second, the psychological distress people experience related to the trauma of losing home and social group translates into higher rates of psychiatric disorders, such as posttraumatic stress disorder, anxiety, and phobias, as well as addictive disorders, which have an additional etiology in the loss of social networks.

Third, widespread stress and loss of resources contribute to the development of cardiovascular disease, eating disorders, and immune disorders, among others. Furthermore, stress and impoverishment make the management of disease more difficult.

In addition to these primary effects, peculiar synergies can have important multiplier effects. Here I point out two. Planned shrinkage was implemented in the Bronx borough of New York City just as HIV had been introduced into the population. The dispersal of area residents had the result of “shotgunning” HIV throughout the Bronx, leading to one of the highest rates of AIDS in the United States. In another vein, the destruction of Homestead by Hurricane Andrew occurred at a time of rapid migration into the South Florida. The hurricane accelerated population changes that had been anticipated.

Failure of Mitigation

In the U.S. situation, vulnerability to both destruction and inadequate mitigation has been linked to poverty and race, such that the poor and the nonwhite are more
likely to experience area destruction and are less likely to receive adequate mitigation. These patterns were established at the beginning of European settlement of the Americas and have occurred repeatedly since then. At the time of European arrival in the Americas, Native Americans, who combined farming with hunting and gathering, roamed over large areas of land. White settlers established a distinctly different relationship with the land by creating much more settled communities that tilled well-defined properties. As the number of white settlers increased, they needed to occupy and own more and more land. Though Native Americans resisted fiercely, between 1600 and 1900 European settlers step by step usurped most of the Americas. For example, an early set of treaties asked that Native Americans relocate west of the Appalachian Mountains. Later, this agreement was revised to push Native Americans west of the Mississippi. Large territories were then taken away, and Native Americans were confined to specific reservations. The reservations were shifted, as white settlers reappropriated reservation land that was situated in choice spots, and Native Americans were allocated less desirable land.

At each step, the internal resettlement of Native Americans involved negotiations in which white leaders took advantage of their military superiority and control of legal processes. Native Americans were minimally compensated for the land, confined to other land that was too small to support their traditional hunting and gathering and often incompatible with farming. During this process, millions of Native Americans died from disease, malnutrition, and forced marches to new homes, as well as in battle.

The other important heritage influencing the process of city stewardship in the United States is the legacy of exploitation of the soil by industrial farming that was established by plantation owners in the slave South. Growing cash crops like cotton and tobacco that depleted the soil, southern plantation owners exhausted their land quickly. The westward push in the South was not simply due to newcomers wanting land. Much more important, it resulted from the exhaustion of soil by plantation agriculture and the need for new lands to cultivate. This super-exploitation of the soil left exhausted lands on the Atlantic Coast that were turned over to poorer and less powerful farmers while wealthier plantation owners moved on to virgin territory.

Because of these fundamental processes—the usurpation of land from the poor and the super-exploitation of the land—we can confidently predict that mitigation of any disruptive process will replicate, and augment, existing inequities. This effect creates a secondary traumatization that aggravates the primary insult and increases the burden of disease. Hence, in each of these scenarios, we can expect the maximum impact on the health status of vulnerable populations.

**Repair**

**Reknitting the City**

Urban neighborhoods differ dramatically, but all are composed around lines of competition. The central enabling feature of neighborhood life is the ability to develop a fine pattern of daily interconnections, what the great urbanist Jane Jacobs...
Fifty Ways to Destroy a City
dubbed the “sidewalk ballet.” In her book *The Death and Life of Great American Cities*, she writes:

The stretch of Hudson Street where I live is each day the scene of an intricate sidewalk ballet. I make my own entrance into it a little after eight when I put out the garbage can, surely a prosaic occupation, but I enjoy my part, my little clang, as the droves of junior high school students walk by the center of the stage dropping candy wrappers. How do they eat so much candy so early in the morning?

While I sweep up the wrappers I watch the other rituals of morning: Mr. Halpert unlocking the laundry’s handcart from its mooring to a cellar door, Joe Cornacchia’s son-in-law stacking out the empty crates from the delicatessen, the barber bringing out his sidewalk folding chair, Mr. Goldstein arranging the coils of wire which proclaim the hardware store is open, the wife of the tenement’s superintendent depositing her chunky three-year-old with a toy mandolin on the stoop, the vantage point from which he is learning the English his mother cannot speak. . . . It is time for me to hurry to work too, and I exchange my ritual farewell with Mr. Lofaro, the short, thick-bodied, white-aproned fruit man who stands outside his doorway a little up the street, his arms folded, his feet planted, looking solid as earth itself. We nod; we each glance quickly up and down the street, then look back to each other and smile.

We have done this many a morning for more than ten years, and we both know what it means: All is well. (pp. 66–67)

A sidewalk ballet is largely composed of what sociologists call “weak ties,” the slight connections among people who see each other in passing. Weak ties are a foundation of neighborhood life because they link together people who are ostensibly different. An important feature of an urban neighborhood is that neighbors are likely to eat different vegetables, celebrate different holidays, and pray to different gods. In the safest and happiest urban neighborhoods, propinquity becomes a basis for courtesy. As Jane Jacobs makes clear, the familiar smile of a neighbor provides much-needed comfort to city dwellers.

Weak ties are enabling relationships. The expression “six degrees of separation” refers to the ability of the ordinary person to contact another person, let’s say the president of the United States. The average person has a connection, however slight, with a store where he shops on a regular basis, and the owner of that store provides the first link in the chain of connection. The storekeeper is connected to important people in the local business community. They, in turn, are connected to local politicians. Local politicians are connected to national politicians, and they, in turn, to the president of the United States. These chains operate within the neighborhood, as well, forming a dense net of relationships that allows people to communicate and cooperate to achieve the common good.

Within a neighborhood, then, a set of social relationships is formed by daily routine. And because they depend on place, the destruction of a place destroys the material basis for these site-based relationships. What will endure as people scat-
ter to new lives are the relationships based on strong ties, to work, family, church, or school. Strong ties are circumscribed ties that belong to a particular group. By definition, they not shared with others. Strong ties are tribal ties, but the weak ties make neighborhoods and cities function. It is a matter of some urgency, therefore, to recreate weak ties in the aftermath of disaster.

**Principles of Collective Recovery**

As it is used here, collective recovery refers to recovery from injuries to group life. Because there are interactions among all levels of scale, recovery of the collective will have important implications for recovery of individuals. But it cannot be inferred that recovery of the collective will happen as a result of the recovery of many individuals. The following principles provide a basis for planning and carrying out collective recovery.

**PRINCIPLE 1: THERE IS NO “THERE,” NO “THEM.”**

Theories of complex systems have helped us understand that all things in the world are interrelated, and small changes in initial conditions can lead to vast differences in final outcomes. For example, a butterfly flapping its wings in one part of the world can change the weather in another.38 Thus, the idea that a disaster happened to “other” people is incompatible with current ecological thinking. While it may be difficult to recognize the ways in which a disaster that happened somewhere else will affect “my” place, the working assumption should be that it will. The slogan of Project Liberty, sponsored by the Federal Emergency Management Agency to provide mental health services to those affected by 9/11 exemplifies this ecological perspective: “We’re all in this together.”

**PRINCIPLE 2: THE COLLECTIVE IS NOT THE TRIBE.**

The sundering of social ties at the neighborhood level of scale breaks intertribal relationships, and people fall back on their tribal connections to survive. But the collective that has been injured is a supra-tribal entity. The repair of this system requires reconnections among groups and people who have lost the propinquity—the neighboring—which was what they had in common.

**PRINCIPLE 3: THE INJURY IS NOT TO THE SELF.**

Though individuals experience enormous pain at the loss of a neighborhood, the injury of interest to collective recovery is the injury to the collective, that is, the system of the neighborhood, itself. Oddly enough, this injury is obscured both by the obvious grief of many people and by the disappearance of the neighborhood. It is hard to see the injury when the injured thing has disappeared. Because people find new places, within which they continue their lives, the focus moves from the “then” place to the “now” place. In this strange configuration of lost place and present anguish, people find it hard to grasp the collective injury. But, when the collective is repaired, people prosper again with a rapidity we would not
Principle 4: The festival heals the collective.

Practitioners of collective recovery have begun to identify the modalities that lead to new ties among strangers, such as theater performances, gardening, and crafts workshops. These may be thought of as creating a festival, a concept developed by Hirofumi Minami, an environmental psychologist from Hiroshima, Japan. Though holding a party-like event in a time of tragedy may seem counterintuitive, it turns out to be what is needed, and the need grows as time goes by. The festival is at the right level of scale, and it can encompass soothing and inspiring interactions that enable people to re-envision the manner in which they will live together.

In sum, it is possible to heal the problems that are created by policies that destroy part or all of the city. However, these interventions can never replace all that was lost, or stop the grieving for what was. As centers of dense human settlement, cities are a precious artifact of civilization. Changes to city form and organization need to be implemented in a manner that is commensurate with the human capacity for adaptation. Abrupt change of a large area that disperses populations and destroys their resources is difficult for people to manage. Slower, more organic changes are more likely to be absorbed in a manner that promotes health and increases the vitality of the city.

Conclusion

A city is a self-integrated system of people who are in competition with one another. Many processes can disrupt the integrity of the human settlements linked to cities. This chapter presents examples of managing some of the “internal enemies”: disinvestment, development-induced displacement, mismanagement of the environment, armed conflict, and disaster. There are many more examples in each of these categories and other categories that could be elaborated. The cases presented here are important historical examples of phenomena that cause increased rates of morbidity and mortality, that continue to occur, that occur in ways that increase the disadvantage of marginalized populations, and that ripple out from the confines of the immediately injured zone to affect the larger region and even the nation.

Social order, to repeat, is one of the major factors in good health. Social order is not achieved by political decree. Rather, it is the result of people’s interacting with one another, often acting against what is narrowly construed as “self-interest” and thereby creating the possibility that the human species will continue to be a part of the earth’s ecosystem. Whether by omission or commission, by nature’s winds or the hand of man, we are continually taking our world part. Therefore, we must continually put it back together, always conscious of our tendency to exclude and abandon. A healthy society takes care of all of its members, all of the...
time. The final lesson is that we must constantly strive to create social order, and thereby we will insure the best possible health for all the people.

References
18. Quoted in Syracuse then and now. Available at www.syracusethenandnow.net/.
Introduction

Water and sanitary improvement rose to international prominence when health in the industrializing cities of the 19th century was far worse than in their rural surrounds, and reformers claimed to have found the means to counter this urban penalty: clean piped water and sewered toilets. While there have been enormous improvements since the mid 19th century, according to the most recent global burden of disease assessment, unsafe water, sanitation, and hygiene still account for almost 6% of the burden of disease in “high-mortality developing regions,” exceeding all but two other risk factors.¹ Unsafe water and sanitation is still closely associated with poverty, and eliminating water and sanitation deficiencies is also still central to the development goals and targets that have been adopted internationally, including most notably the Millennium Development Goals, a blueprint for action to meet the needs of the world’s poorest agreed to by all the world’s countries and its leading development institutions. Although the urban penalty is no longer evident, eliminating urban deficiencies in Africa, Asia, and Latin America remains a major part of the challenge.

In this chapter, we review the international statistics on existing deficiencies in urban water and sanitation provision, reexamine the standards used to assess progress in eliminating these deficiencies, discuss some of the underlying data problems, and describe how better information of water and sanitation deficiencies could help to motivate improvements and thereby improve health.

We argue that the international statistics being used to monitor progress toward the Millennium Development Goals provide a misleading basis for identifying urban water and sanitation deficiencies. Extremely inadequate and unhealthy water supplies (or sanitation) end up classified as “improved,” along with reli-
able and safe household water connections (or sanitary facilities). As a result, water and sanitation deficiencies appear to be restricted to rural areas, even in countries where a large share of urban dwellers clearly have health-threatening water, sanitation, and hygiene problems. Moreover, the international statistics do not provide the sort of information that local groups need to motivate and plan local improvements.

In the long run, it is important to develop internationally comparable data sets that enable water and sanitation deficiencies relevant to health and well-being to be monitored and located accurately. Without such information, it is impossible to say with any confidence whether internationally agreed targets are being met and where the greatest challenges are.

In the short run, however, the priority must be to help local groups get the information they need to motivate and plan improvements in deprived communities. The information priorities for local action are not the same as those for international monitoring. It is all too easy for data specialists to get swept up in the technical concerns that are of particular relevance to achieving international comparability and to neglect qualities that are critical to local relevance. Moreover, even if local information, collected to drive local action, does not provide reliable statistics at the national level, it can be used to challenge unreliable national statistics and inform improvements in an international monitoring system.

**International Statistics on Water and Sanitation Coverage**

Official statistics for water and sanitation suggest that only a small minority of urban dwellers lack provision (see Table 10.1). Even in Africa, by 2000, 85% of the urban population had “improved” provision for water and 84% had “improved” provision for sanitation. Problems seem much more serious in rural areas where most of those lacking “improved provision” live.²

The statistics in Table 10.1, however, are based on a definition of “improved” provision for water and sanitation where the risk of human contamination from fecal-oral pathogens for those with improved provision can still be very high.³ The Global Assessment² from which the statistics in Table 10.1 are drawn describes how it is not able to calculate the proportion of people with “adequate” provision or with “safe” water because of the lack of data in most low- and middle-income nations. The assessment was able to calculate only the proportion of people with “improved provision,” which may be neither adequate nor safe, particularly in the high-density and low-income settlements where most of the urban dwellers without piped water connections or sewered toilets live.

For water supply, “improved” provision is defined as “reasonable access” to water from a household connection, public standpipe, borehole, protected dug well, protected spring, and rainwater connection—with at least 20 liters per person per day available from a source within 1 kilometer of the user’s dwelling.² But in urban settings, standpipes or other publicly available water sources available within 1 kilometer may be shared with hundreds and occasionally thousands of
persons (so gaining access can be very difficult and time consuming), and there are often serious deficiencies in the quality of the water and the regularity of the supply.\textsuperscript{4} \textsuperscript{5}

For sanitation, “improved” provision is defined as access to a private or shared toilet with connection to a public sewer or a septic tank or access to a private or shared pour-flush latrine, simple pit latrine, or ventilated improved pit latrine.\textsuperscript{2} But in many urban settings, dozens of households share each latrine, so access is difficult and maintenance often inadequate and most pit latrines lack provision for hand washing.\textsuperscript{4} As with water, one would expect the same sanitation facilities to be less healthy in conditions of urban overcrowding and overuse.

A global assessment of how many urban dwellers lack water and sanitation based on the standards for provision expected in urban areas in high-income

<table>
<thead>
<tr>
<th>Region</th>
<th>Urban population (millions)</th>
<th>Percentage with “improved” provision</th>
<th>Number of people unserved (millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global</td>
<td>2,845</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban water supply</td>
<td>94</td>
<td></td>
<td>173</td>
</tr>
<tr>
<td>Urban sanitation</td>
<td>86</td>
<td></td>
<td>403</td>
</tr>
<tr>
<td>Africa</td>
<td>297</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban water supply</td>
<td>85</td>
<td></td>
<td>44</td>
</tr>
<tr>
<td>Urban sanitation</td>
<td>84</td>
<td></td>
<td>46</td>
</tr>
<tr>
<td>Asia</td>
<td>1,352</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban water supply</td>
<td>93</td>
<td></td>
<td>98</td>
</tr>
<tr>
<td>Urban sanitation</td>
<td>78</td>
<td></td>
<td>297</td>
</tr>
<tr>
<td>Latin America and the Caribbean</td>
<td>391</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban water supply</td>
<td>93</td>
<td></td>
<td>29</td>
</tr>
<tr>
<td>Urban sanitation</td>
<td>87</td>
<td></td>
<td>51</td>
</tr>
</tbody>
</table>

nations would produce very different figures from those in Table 10.1. In high-income nations, the need for all urban dwellers to have water piped to their home that is safe (i.e., drinkable) and regular (available 24 hours a day), internal plumbing (so piped water is available in bathrooms, kitchens, and toilets) and their own sanitary toilet within the house or apartment (usually connected to sewers) is unquestioned. These are also standards that are available to virtually all the population of certain cities in middle-income nations, such as Porto Alegre in Brazil and Seoul in South Korea. These are known to be good standards from a public health viewpoint and also the standards preferred by households, if these are not too expensive, because they eliminate the hard work fetching and carrying water and getting rid of human wastes and waste water. But by these standards, most of the urban population in low- and middle-income nations has inadequate provision both for water and for sanitation. Most urban centers in Africa, Asia, and Latin America have less than half their population with water piped to their home, and less than a third have good quality sanitation. Most urban centers in sub-Saharan Africa have no sewers, including many large cities. Perhaps as many as 100 million urban dwellers in Africa, Asia, Latin America, and the Caribbean have to defecate in open spaces or into wastepaper or plastic bags (“wrap and throw”) because they have no toilet in their home and public toilets are not available or are too distant or too expensive.

In many nations, detailed case studies on water and sanitation show that provision was much worse than that suggested by official statistics. For example, official statistics for Bangladesh suggest that 99% of its urban population had access to “improved” water by 2000, but detailed studies in its two largest cities (Dhaka and Chittagong) showed large sections of their populations having to rely on poor quality water that was difficult to access. In nations such as Tanzania and Kenya, official statistics suggest that virtually all their urban populations had “improved sanitation,” but detailed studies in their major cities and smaller urban centers showed otherwise, especially in the large informal settlements where a high proportion of the population of Dar es Salaam and Nairobi live.

Despite these misleading statistics, it is almost certainly true that, in virtually all countries where water and sanitation deficiencies are severe, a higher share of rural than urban dwellers face deficiencies below any reasonable criterion of acceptability. The reason for this difference, in large part, however, is that most of the affluent people in such countries choose to live in urban settlements. It is of little consolation to urban dwellers living in poverty that wealthy people also live nearby.

**Setting Standards to Improve Water and Sanitation in Low-Income Countries**

As illustrated in the preceding section, the impression given by statistics on water and sanitation coverage depends on the standards against which water and sanitation deficiencies are judged as well as the quality of the underlying data. While there are pragmatic reasons to select standards that can be represented by avail-
able data, when the wrong standards are used to guide policies they can help to justify inequitable outcomes.

There is a danger in setting the standards for “adequate provision” too high. In any city or smaller urban center with large sections of the population with very inadequate provision (and low incomes) and with limited resources available to the utility that is meant to provide water and sanitation, setting too high a standard could work to the disadvantage of those with the worst provision. It could mean that all available resources go to providing a small proportion of the population with high standards—because it will generally be the higher-income groups who are already closest to achieving these high standards and who have the greatest political influence in any case. In such circumstances, it can be argued that the priority should be to ensure that everyone has “improved” provision, with higher standards provided to areas of the city where the inhabitants are willing and able to pay the full cost of these. From a public health perspective or a poverty reduction perspective, it is better to provide a whole city’s population with safe water supplies to taps within 50 meters of their home than to provide only the richest 20% of households with water piped to their home.

But set the standards too low and “the problem” may disappear. A survey that asks urban households whether they have access to piped water can find that most say yes because there are standpipes that they use, whereas a more detailed set of questions about whether they have water they regard as safe that is easy to access with a regular supply that they can afford produces very different results. Many case studies show how cities and smaller urban centers have water in their piped systems for only a few hours a day (or less) and the piped water is unfit for drinking. One-third of the urban water supplies in Africa and in Latin America and the Caribbean and more than half of those in Asia operate intermittently and many do not disinfect their water.

Perhaps the most relevant basis for setting standards for provision for water and sanitation is the extent to which provision reduces the very large health burden that arises from inadequate provision. Non-health criteria for provision are also important—for example, price (affordability) and convenience—but these are partially covered by a focus on reducing health burdens in that high prices and inconvenient supplies lead to levels of water use that are inadequate for personal hygiene and are then reflected in higher health burdens. Among the diseases associated with inadequate water and sanitation, the “fecal-oral” diseases are the most significant in terms of health impact on urban dwellers.

The risks of human contamination from fecal-oral diseases vary with different levels of provision for water, sanitation, and hygiene (see Figure 10.1). This variation illustrates the difficulty in setting the appropriate benchmarks for assessing provision for water and sanitation, since—even ignoring the variation at each level—it is unclear where within Figure 10.1 to draw the line between “adequate” and “inadequate” provision.

The benchmark for assessing who has adequate provision for water and sanitation can be set close to the top of the figure, so those who have access to shared standpipes and pit latrines are considered to have adequate provision. But as the
Figure 10.1. How the Risk of Transmission of Fecal-Oral Pathogens Varies According to the Quality of Provision for Water, Sanitation, and Hygiene

Based on Prüss A, Kay D, Fewtrell L, Bartram J, Estimating the burden of disease from water, sanitation, and hygiene at a global level, *Environ Health Perspect*. 2002; 110:537–42, table 2 and figure 2; modified to reflect urban situations.)
figure suggests, the risk of human contamination from fecal-oral pathogens with this level of provision remains very high. Using this dividing line does not measure who has safe water or sufficient provision for water or who has safe sanitation. The dividing line can be set at the bottom of the figure, where the risk of human contamination from fecal-oral pathogens is very low, but doing so implies a quality of provision with unit costs that are unrealistic in most urban centers in low-income nations and many in middle-income nations.

The figure therefore suggests the need for assessments that use more than one benchmark—for example, assessing who has “improved” provision, “adequate” provision, and “good” provision. The use of more than one benchmark would allow a focus on ensuring “improved” provision to everyone and supporting better than “improved” provision wherever possible. It is also important to recognize that the quality of provision varies within improved sources, and that, for example, even having piped water in the home may not be “adequate” if the supply is regularly interrupted.

Collecting Data to Help Address Urban Water and Sanitation Deficiencies

Detailed assessments of who has improved, adequate, and good provision depend on appropriate and reliable data. The most urgent need for better data on the quality and extent of provision for water and sanitation is at the level where the deficiencies in provision are to be tackled—data for each household available for each urban area or for districts or municipalities within urban areas. National and global data sets are also needed to help guide national governments and international agencies, but these are of secondary importance. Unfortunately, little detailed data are available on the quality of provision for water and sanitation for much of the world’s urban population. There are two problems: the level and quality of detail and the extent of the coverage. In relation to both of these problems, an undue focus on collecting information that can be aggregated to provide national and international statistics actually makes it more difficult to extract information that can help motivate and guide local action.

In regard to detail, much of the data on which national or global surveys of provision for water and sanitation rely are drawn from censuses or household surveys that do not ask many of the critical questions about the adequacy of provision, so they cannot provide information on who has “safe and sufficient” water and “adequate sanitation.” For example, questions are usually asked about whether there is a piped supply to the house or “water available on the premises” but not about the regularity of the supply, the respondent’s perception of its quality, the cost, and whether the household uses other water sources. Similarly, assessments of provision for sanitation are often based on the type of toilet that people use, but the health risks from using toilets in many urban settings may be more linked to the number of people sharing each toilet than to the kind of toilet used. It is rare for data to be collected on the extent of toilet sharing. For example, in the demographic and health surveys (which provide the main source of data on provision
for water and sanitation in many low-income nations), no information is gathered on the time that households spend accessing shared, communal, or public facilities or the frequency with which these facilities are cleaned.8

Thus, we face a paradox—the worse the quality of provision for water and sanitation, the more sophisticated the data must be to ascertain what should be done. For example, if a household has a regular supply piped to the home that is not too expensive, no questions are needed about the other water sources they use and the quality, accessibility, regularity, and cost of each (and how these vary seasonally). If a household has a water-flushed toilet within the home that does not have to be shared with other households and that is connected to sewers (and water supply for flushing is regular), few questions are needed about how the excreta is disposed of within the neighborhood (especially the extent to which the contamination of the neighborhood with excreta is avoided) and the extent of provision for toilet cleaning. Ascertaining the quality of provision for sanitation is particularly complicated when there are no facilities within a home and all household members have to rely on shared, communal, or public facilities. Public or communal toilets can greatly improve provision in low-income settlements but only if these are easily accessed by each member of a household (close and inexpensive enough for children to use; accessible at night and with public lighting in the roads or passages to it and inside it; not dangerous for women and girls to use it at night). To ascertain whether households have adequate provision for water and sanitation would require far more questions than those currently included in censuses or household surveys.

Even with many more questions, internationally comparable statistics on the safety and adequacy of water and sanitation provision are likely to remain elusive, and their pursuit can become part of the problem. There is too much variety in the sanitary technologies, hygiene behaviors, and environmental conditions to achieve fully comparable criteria for safety and adequacy let alone to assess these criteria on the basis of questionnaire surveys. In striving for comparable criteria, there is also the risk that the more important pursuit of information relevant to local action and supportive of locally appropriate standards will be sacrificed. According to the Global Assessment, for example, buying water from a mobile vendor is taken to indicate that a household does not have access to improved water supplies, on the grounds that the quantity of water purchased is unlikely to be sufficient to meet all of a household's basic needs. This assumption ignores the very different local contexts that may lead a household to purchasing water from a vendor. More important, it can actually detract attention from improvements to the water vending system and the information needed to achieve such improvements—which may not bring their users up to the desired standard but may be critically important nevertheless.

Similar issues arise in relation to coverage. There are no data on provision for water and sanitation for most (urban and rural) households in many low-income nations. In most such nations, the only recent data on provision for water and sanitation come from sample surveys of households. These may provide accurate statistics on the proportion of the population that has water on the premises and
access to a latrine, but they do not show where the people lacking such provision live. These surveys usually have a sample size large enough to allow the statistics on provision to be disaggregated to “rural” and “urban” populations and sometimes to a few specific cities (or just the largest city in the nation). But it does not help a city utility or a local authority much to know the proportion of the households in their jurisdiction that lacks water on their premises but not to know which households, neighborhoods, and districts these people live in.

The records of the utilities or agencies responsible for providing water and sanitation should be a good information source about the quality of provision for each household, but these generally have details only for those households to whom these agencies provide services directly (and in some cases not even these), and it is common for half or more of the population of urban centers in low-income nations to have no connection to official piped water supplies and for more than three-quarters to lack connection to sewers or drains.\textsuperscript{5} In most small urban centers in low- and middle-income nations (and many larger urban centers), there are no sewers at all, so local utilities have no information on provision for sanitation. In addition, the quality and extent of provision for water and sanitation may be underestimated if only the records of water and sanitation companies are drawn on.\textsuperscript{2} These records rarely cover the households that have invested in provision for sanitation. They may not record the piped water and sanitation systems installed by communities. For example, in Karachi, in a high proportion of the \textit{katchi abadis} (informal settlements) in which about half the city’s population live, there are piped water systems and sewers that were installed by self help, not by government agencies.\textsuperscript{4, 10}

Censuses are generally the only information source that provides details of provision for each household; the quality and level of detail of their data on water and sanitation may be limited for the reasons outlined, but at least this is information on each household. In many low-income nations, however, there has been no census for many years. In many nations where censuses have been held, the data on provision for water and sanitation by households or by neighborhood are not available to city authorities or to water and sanitation utilities. There are cities where detailed, house-by-house and shack-by-shack assessments of provision for water and sanitation have been built “from the bottom up” by city authorities, local NGOs, and federations of the urban poor.\textsuperscript{4} These are the exception. Nevertheless, they do indicate that there are alternatives to sample surveys, which have received far less attention despite their many advantages, particularly if the goal is local action rather than international comparability.

The Millennium Development Goals and Motivating Urban Health Improvement

Governments and international agencies now agree almost unanimously on the need to improve and extend provision for water and sanitation. For water, this agreement can be seen in the explicit target within the Millennium Development Goals to halve the proportion of people without “sustainable access to safe drink-
ing water” by 2015. The Millennium Development Goals neglected sanitation improvement as a target, but the World Summit on Sustainable Development in 2002 included the need to halve by 2015 the proportion of people who do not have access to basic sanitation, and this goal was subsequently added to the Millennium Development Goals. The Millennium Development Goals also include a commitment to significantly improve the lives of at least 100 million slum dwellers by 2020, which also implies improvements in provision for water and sanitation.

These water and sanitation targets should provide a strong incentive to create healthier cities, starting with some of the worst environmental health problems faced by many urban poor groups. To repeat, however, the international indicators that are meant to monitor progress toward these targets give the misleading impression that the urban water and sanitation problems are not very serious. Moreover, considerable time and resources are necessary to develop internationally comparable indicators that provide an accurate assessment of the adequacy of existing water and sanitation conditions in low-income settlements. It is, therefore, important to make the case for urban water and sanitary improvement on the basis of the patchy information that is available internationally and to support action-oriented efforts to identify what needs to be done locally.

In the long term, it may be possible to develop a monitoring system that provides the basis for assessing who has provision for water and sanitation to a standard that can be considered “adequate” from a public health perspective. This system could in turn provide a basis for establishing the number of people in need and for assessing progress. To justify developing such a system, the flaws in the existing statistics need to be recognized. It should be possible to reach agreement on what constitutes “adequate provision” for water and sanitation and even to reach agreement on the need for different criteria for rural and urban areas. But to ascertain who has “adequate” provision would require much more detailed assessments of provision for water and sanitation—for example, including data on quality, reliability, price, and convenience that most current information systems (censuses and household surveys) are unable or unwilling to collect.

In the short term, it is important not to let the lack of internationally comparable indicators undermine support for urban water and sanitary improvements targeting those whose health is at risk. International comparability is not an important criterion when it comes to collecting information to support local action. Identifying exactly what level of service should be considered adequate is not important when it is clear that major improvements are needed. There is often plenty of locally available information demonstrating that existing conditions are far from adequate. This information can be used to challenge the international statistics, even if it cannot replace them. More important, information generated locally can be used to bring constructive pressure to bear on local policy makers, enable successful initiatives to claim the credit they deserve, and ensure that unsuccessful initiatives are recognized as such.

It is not always necessary or even desirable for health specialists to take the lead in collecting information to motivate water and sanitation improvements. However, inadequate water and sanitation remains an important public health is-
sue in many of the world’s cities and towns. The health sector does have a responsibility to inform policy debates on water and sanitation. In some cases, this may involve advising on whether particular water and sanitation options are “safe” and developing better monitoring systems. In other cases it may involve more active engagement in inherently uncertain processes. In all cases it is important not to allow the lack of good statistics to detract attention from the very inadequate conditions that clearly exist in so many of the world’s cities and towns.

Conclusions

In most nations, official statistics seriously underestimate the scale and depth of the deficiencies in provision for water and sanitation in urban areas, in part because definitions of what constitutes “adequate” provision are inappropriate and in part because these statistics are very inadequate and biased. The statistics reinforce a tendency for governments and international agencies to give too little attention to addressing such deficiencies in urban areas, despite the commitments to improving provision for water and sanitation within the Millennium Development Goals.

It is tempting to respond by focusing narrowly on more rigorous international definitions of what constitutes adequate provision of water and sanitation and recommending that the resources be made available to collect internationally comparable information with which to monitor changes in the share of different populations that lack adequate provision. However, the need for locally relevant information to drive local action is even more pressing than the need for internationally comparable information to monitor global progress. Also, there are common challenges to collecting locally relevant information on deficiencies in water and sanitation provision and putting it to use, even in very different urban centers. Informing local initiatives is central to achieving the international water and sanitation targets, whether or not the information provides the basis for less biased and more internationally comparable indicators. Moreover, in the short run, information collected in support of local action can also challenge misleading national estimates, and in the long run it could even provide the basis for replacing such estimates. In these circumstances, a narrow focus on international comparability is inappropriate and could be counterproductive.

References


PART IV
Health Outcomes and Determinants
Introduction

The burden of infectious disease in the United States underwent a marked decrease in the 19th and 20th centuries, producing a dramatic reduction in population mortality. Although many of the infectious diseases that were a problem in the 19th century have been controlled, some remain endemic, others appear in more sporadic outbreaks or reappear, and novel infections emerge. City characteristics that influence patterns of infectious diseases include land area, infrastructure, population density, immigration patterns, rate of urbanization, and percentage of the population living in poverty.

The conditions and determinants presented in the first two chapters of this book offer a framework for how these factors contribute to the burden of infectious disease within cities. On one level, disease is related to individual factors, such as lack of access to health care, substance use that can disinhibit risk behaviors, and the increased susceptibility that accompanies youngest and oldest age groups, through either immature or degrading immune systems. On another level, disease outcomes are affected by social and physical environments, such as the strength of informal networks of neighborhood communication and the integrity of physical infrastructure and services, including public transportation, which can be a link for transmission within cities. Health service delivery systems, including insurance coverage, are important, especially primary care and preventive services in areas of concentrated disadvantage. Public health interventions and the degree to which they contribute to infectious disease prevention and control are in turn influenced by municipal-level variables, such as city policies, the services and support that community organizations provide, and the markets that distribute basic goods and services, such as housing, food, and employment. These municipal
factors affect funding for disease prevention and control, the public acceptance of control activities, and the daily living conditions of various urban populations. Finally, national and international trends influence or set the context for local decisions; for example, policies on transportation, immigration, or economic globalization enable or constrain cities in making decisions about health.

Using this conceptual framework, this chapter explores how factors at each level—operating alone or interacting with other factors across levels—can create conditions in which urban populations or specific subpopulations within cities become vulnerable to infectious disease. Though this chapter focuses on contemporary characteristics of cities that make their populations vulnerable to infectious disease outbreaks, we begin by setting up the historical context of infectious disease—risk, outbreak, and control—in urban areas across the country.

Cities and Infectious Diseases in U.S. History

Throughout history, cities have been linked to infectious diseases—particularly in terms of epidemics and outbreaks. Thucydides reported on the Plague of Athens during the Peloponnesian War in 430 B.C., the cause of which continues to be debated.1 The Black Death, or bubonic plague, during the 15th and 16th centuries is thought to have reduced the population of London by two-thirds.2 Reports of these epidemics did not establish a connection between disease and cities, but they are the earliest evidence available to those attempting to explore and define such a connection.

Disease Patterns and Risk Factors

In the United States from colonial times through most of the 19th century, deadly outbreaks wreaked havoc in cities and towns. Chapter 7 explores this topic in detail.) During this period, cholera made its first appearance in New York City, and outbreaks of yellow fever occurred repeatedly in the port cities of New Orleans, Baltimore, Philadelphia, Boston, and New York City.3 Smallpox epidemics occurred in New York City throughout the 19th century (despite the availability of a vaccine, which remained unacceptable to much of the population),4 and Boston, Philadelphia, and Baltimore saw smallpox outbreaks as well. Typhus epidemics also threatened several U.S. cities.5 Though cholera, yellow fever, smallpox, and typhus generated fear because of their episodic and highly fatal occurrences, the major causes of urban mortality in the first half of the 19th century were endemic infectious diseases, including tuberculosis and pulmonary disorders (accounting for the largest numbers of deaths among adults), pneumonia, diphtheria, measles, whooping cough, and scarlet fever. Among infants and children, the most common cause of death was diarrheal disease.

A variety of factors in 19th-century U.S. cities probably contributed to the predominance of infectious diseases. Water sources at the time included shallow wells, and sewage was untreated and commonly disposed of in unpaved streets with poor drainage. Food handling, preparation, and storage methods were also unsanitary. Housing was cramped and poorly ventilated, with damp cellars or
internal rooms without windows for the poorest occupants. Immigration and commerce made port cities especially vulnerable to the importation of pathogens from other ports (e.g., yellow fever from the Caribbean trade). The population became increasingly more mobile as advances in ship design made foreign travel faster and more appealing. As ground transportation evolved from lumbering wagons to rapidly moving railroads and distant locales became more easily reachable, volume increased correspondingly, creating more opportunities for pathogen transmission. Through extensions from port cities along the coast and into the interior, infectious diseases spread to other urban areas, as well as to non-urban areas.6,7

The patterns of mortality in U.S. cities in the 19th century suggest two features that were particularly influential: degree of port activity and rate of urbanization. In the 19th century, mortality rates (mostly due to infectious disease) were higher in New York and New Orleans than in Baltimore, Philadelphia, or Boston. New York and New Orleans had ports receiving ships and immigrants from foreign locales in greater numbers than the other three cities.2 They were also characterized by a fast pace of growth that outstripped the available sanitary resources. Indeed, many of the problems that the United States faced 150 years ago—dirty water, inadequate sanitation, rapid population growth, and limited infrastructure—are now primary determinants of the burden of infectious diseases in developing world cities.

Decline of Infectious Disease Rates

Toward the end of the 19th and into the 20th century, infectious disease rates began to decline and life expectancy to increase.8 Smallpox, yellow fever, and cholera outbreaks became less frequent and progressively less deadly. This decline preceded the age of antimicrobial therapy and, with few exceptions, preventive vaccines. Rates of yellow fever and cholera started to fall before pathogenesis was understood or treatment was available. Because mortality from many infectious diseases declined in the presence of only modest controls, the attenuation of pathogenicity likely played a role in the decline in disease rates during this time. For example, scarlet fever, early on associated with considerable morbidity and mortality, began to show a more mild presentation, with lower rates of illness and death.

A decrease in disease virulence was not the only change taking place, however. By the middle of the 19th century, observers had noted that filth in cities was related to mortality,7 and the “Sanitary Awakening”9 heralded clean water, waste disposal, and improved ventilation as critical to reversing mortality. In the late 19th and early 20th centuries, immunization rates increased and public health interventions became more organized. Efforts to implement sanitation were associated with a decline in urban mortality seen in data from England8 and Imperial Germany,10 where excess mortality in cities compared with rural areas was reversed.

Epidemiologists use the terms control, elimination, and eradication to refer, respectively, to stopping the spread of disease, removing all cases within an area,
and confirming the global disappearance of disease. The greatest success has been with the eradication of smallpox, which fueled optimism that other infectious diseases could also be eradicated, although some researchers have discussed the limitations of this optimism. Public health programs and social improvements in cities contributed to successes in the control of childhood infectious diseases, including measles, mumps, rubella, polio, and whooping cough, as well as such adult diseases as tuberculosis, yellow fever, and malaria, though these diseases have not been eliminated.

Factors Associated with Infections in Cities
Emerging, newly recognized, and reemerging infections present challenges for today’s cities as well. These infections represent, respectively, new pathogens, pathogens that were previously undetected, and infections that were previously detected but either uncontrolled or modified into resistance. HIV infection is probably the premier example of emergence. Hanta virus, Legionnaires’ disease, Lyme disease, and hepatitis C, E, and G viruses, previously classified as Non-A Non-B hepatitis but now separately identified because of improving laboratory diagnostic capabilities, are newly recognized infections. Tuberculosis is an example of reemergence. Previously considered controlled, it increased in the early 1980s. Multidrug-resistant tuberculosis is an example of how reemerging infections can be complicated by resistance to drugs.

Multiple factors affect the probability of having emerging and reemerging infections, especially in cities. These factors include higher levels of travel, changes in patterns of immigration, concentrated poverty in inner cities, decaying infrastructure of inner cities, changes in social mores, epidemics of drug-use, overuse of antimicrobials in humans and livestock, and increased intrusion into woodland and marsh habitats.

Travel
As with the 19th century evolution of transportation from sail to steam ships and wagons to trains, the 20th century’s increase in speedy air travel, especially between continents through major urban hubs, facilitates transmission of infections across borders—usually first into major cities. Examples include the spread of HIV infection, West Nile virus, the annual waves of influenza, and, more recently, SARS.

The implications of travel and infectious diseases are not limited to international travel; examples abound for intercity and intracity travel. In Africa, for example, one early hypothesis for the spread of HIV was the diffusion process, in which major roads served as a conduit for virus spread between cities (and into rural areas) through truck drivers and commercial sex workers. Also, some evidence from molecular studies suggests an origin of multiple-drug-resistant tuberculosis in one city that migrated to six other cities. Within cities, one study in North America showed a spatial-temporal clustering with public transportation and HIV rates (and rates for HIV treatment), suggesting a link between local
transportation and diffusion of HIV infection on one hand and access to HIV care on the other. 32

**Changing Patterns in Immigration**

The U.S. immigrant population has grown considerably in the past three decades, from 9.6 million in 1970 to 32.5 million in 2002. 33 Immigration has always provoked concern about the control of infectious diseases. 34, 35 For example, in the United States, immigration from Southeast Asia in the early 1980s was associated with the increase in tuberculosis in the United States; that was complicated, however, by reduced resources to detect and treat tuberculosis in the United States at that time. 36, 37 The issue of multidrug-resistant tuberculosis among recent immigrants from Southeast Asia and the Caribbean has received continued attention. 38

A review of studies involving health status of refugees to the United States noted that tuberculosis, intestinal parasites, chronic hepatitis B infection, lack of immunization, nutritional deficiencies, and depression are major problems in many immigrant groups. The great variation in the health and psychosocial issues as well as cultural beliefs among refugees adds to the challenge for care. 39 In Minneapolis, screening of Africans who had immigrated in the prior five years revealed active tuberculosis, hepatitis B, trichuriasis, amebiasis, schistosomiasis, ascariasis, HIV infection, and malaria, suggesting that African immigrants should be screened for communicable diseases despite a healthy appearance and prolonged residence in the United States. 35 This issue is complicated by the observation that foreign-born residents are less likely to have health insurance than U.S. citizens, irrespective of race or ethnicity. 40 Related is the historic and current discrimination against and among immigrants and the fear of deportation, all of which are deterrents to seeking care, even when it is available. 41

**Size, Density, and Diversity of Cities**

The larger the size and the more concentrated the population, the more likely the spread of infectious disease through interpersonal contact or water-borne, air-borne, or vector-borne routes. For example, tuberculosis transmission has been associated with urban residence and overcrowding, especially in homeless shelters, jails, and prisons, and is more likely to occur among racial and ethnic minorities and those with low socioeconomic status. 42 Racial and ethnic disparities in tuberculosis have been associated with residential segregation; the putative mechanism suggests that segregation concentrates poverty, overcrowded conditions, and dilapidated housing and social disintegration in minority areas and limits access to health care.

In particular, two dimensions of residential segregation (isolation and concentration) may have direct effects on tuberculosis transmission. The isolation of minorities confines tuberculosis to segregated areas and prevents transmission to the rest of the population. 43 Surveillance data on AIDS in the United States among urban areas by size shows higher incidence in cities with the largest populations size, 44 suggesting a concentration of persons at risk. However, after 1996, when
effective therapy became available, the decline in AIDS incidence was steepest in the largest cities. Whether this decline is due to higher priority for more concentrated specialized health care, or a greater role of specialized health education outreach and support is unknown, but the evidence does suggest that city size might be implicated in spread of infection and may also possibly have a protective effect in terms of response to infectious diseases.

Decaying Infrastructure

As inner cities age and resources flow with middle-class groups to more affluent suburban communities or edge cities, municipal physical infrastructures deteriorate. With limited resources, cities are unable to renovate and repair sidewalks, roads, and bridges, and they may be forced to reduce or curtail funding for police, fire, public health, and social services in all or parts of the city. A deteriorating infrastructure and reduced services can have a direct, negative impact on public safety that may be magnified in the areas of extreme deprivation in which the poor who have less clout to demand protection and services are concentrated.45

The reduction in municipal services in New York City following the fiscal crisis in the late 1970s, some researchers have argued, reduced the city’s ability to respond to emergencies, such as fires, or to public health emergencies, such as the HIV and crack epidemics in the poorest neighborhoods.45, 46 The reemergence of tuberculosis has been attributed in part to reductions in funding for services,47 and the emergence of multidrug-resistant tuberculosis has been related to improper prescribing practices and poor patient adherence. Some researchers have also noted the role of an inadequate public health infrastructure, which they see reflected in declining support for TB clinic and disease control specialists, for example, and reductions in the hiring of public health nurses to assist with treatment adherence such as directly observed therapy.48 Thus, inadequate funding for public health infrastructure impaired the city’s ability to control communicable diseases. Cohen and colleagues49 have suggested that the “broken windows” theory of crime (i.e., that small transgressions like broken windows and public drinking lead to more serious crime) also applies to community health. They present data showing that areas with greater building deterioration, trash accumulation, and property defacement also had higher rates of sexually transmitted infections. Issues that still need to be addressed include the extent to which the physical environment is a marker for risk behavior and for lack of services and the extent to which it concentrates high-risk persons and presents an environment where social controls and supports are reduced.50

Concentrated Poverty

Poverty is associated with excess morbidity and mortality.51–53 Some analyses suggest, however, that this excess is not purely a function of income and that the physical and social environment can influence health.54, 55 Areas of concentrated poverty or disadvantage show excess morbidity and mortality.56–58 Other studies in the United States have shown that this association is more pronounced in the urban poor compared with the general population or to the rural
poor, especially among low-income minorities within particular urban areas.

Historically, the effect of concentrated poverty on a broad range of infectious diseases has been observed consistently with tuberculosis and sexually transmitted disease and more recently with HIV infection. Multiple factors may come into play in the transmission of sexually transmitted infections in areas of concentrated poverty, including the role of survival sex (commercial sex workers eking out a living, sometimes exacerbated by drug withdrawal), substance abuse that involves parenteral transmission (and noninjection drug use that disinhibits sexual restraint), geographically limited sexual networks that include many already infected individuals, limited infection-prevention education, and reduced access to preventive and therapeutic health services. Some have argued that the cycle of concentrated poverty is intertwined and complicated by criminal justice systems that may represent an extension of impoverished communities and potentially are a bridge between such communities. Others have called for specific policies in U.S. urban areas to address HIV infection and AIDS, including more aggressive, consistent, and culturally appropriate prevention education; expanded and improved drug treatment, harm-reduction and needle-exchange programs; better outreach to vulnerable populations; and increased support for making antiretrovirals available to all who need them.

Social Mores

Social customs are always changing, and cities are often at the forefront of such change. The historical relaxation of certain mores throughout society in general has been studied. Cities are often at the forefront of social movements, and in the last quarter of the 20th century both the gay rights movement and the women’s movement had a profound influence on sexual behavior, especially in cities. Sexual behavior also changed among adolescents, with evidence showing that an earlier age of onset of sexual intercourse and increased expression of sexual activities (e.g., more sexual partners on average) facilitated transmission of sexually transmitted infections. More recently, however, after the onset of the AIDS epidemic and intensive health education campaigns, sexual activity among U.S. adolescents has declined and the use of condoms has increased.

Changes in sexual behavior in the gay and lesbian community are more complex. Initially, a greater openness associated with “gay liberation” and some sense of a reduction in stigma and discrimination led to increases in sexual activity and contributed to the spread of HIV infection and other sexually transmitted diseases. However, the HIV epidemic and the mobilization of the gay community to combat the epidemic contributed to dramatic reductions in sexual risk behavior. By the late 1990s risk behavior again increased, especially among young men who have sex with men. The dramatic effect of highly active antiretroviral therapy, which changed HIV/AIDS from a disease that was inexorably fatal to a chronic treatable infection, contributed to this increase. These trends illustrate the dynamic influences on urban sexual behavior and their role in the transmission and control of infectious diseases.
Drug-Use Epidemics
Illicit drug use through multiple reuse of syringes has been long associated with transmission of blood-borne infections in urban areas, including malaria (from a drug user returning from the tropics),85 HIV,86, 87 hepatitis,88 hepatitis C,89 human T-lymphotropic virus II,90 and others.91 The epidemics of heroin, especially in the late 1960s and early 1970s, coincided with emerging epidemics of hepatitis B virus infections among drug users that could be transmitted to others.92 Likewise, the emergence of the cocaine epidemic in cities in the early 1980s coincided with the spread of HIV infection,93 thought to occur first in gay men through travel,94, 95 then cross over to injection-drug users,96 and then to heterosexual partners.97, 98 This process was noted especially in impoverished communities where crack addiction fueled survival sex, facilitating transmission within the drug subculture and to the general community.93 More recently, hepatitis C virus has been linked to excess mortality in drug users.99

Drug Resistance
In the 19th and early 20th centuries, infectious diseases were major causes of morbidity and mortality. With the development of antimicrobials, many infections have been successfully treated. However, the medical community has prescribed widely and frequently,100 and patients often fail to follow prescribed regimens.101 This combination contributes to the development of drug resistance.102 Pharmaceutical innovation has difficulty maintaining pace with a continued evolution of resistance. The net effect is that the challenge of infectious diseases continues to evolve. While this is a problem overall, the prevalence of oral antibiotic treatment among adult Medicaid beneficiaries in North Carolina diagnosed with nonspecific upper respiratory infections, colds, pharyngitis, bronchitis, and influenza was higher in rural than in urban residents.103 Still, the concentration of patients and clinicians in cities makes for larger absolute numbers that drive concerns about resistance in urban areas.

Food Safety
While considerable advances have been made during the past two centuries in proper food storage and handling, lapses occur104, 105 and new challenges exist. For example, the livestock industry has made considerable use of antibiotics in feed that may facilitate ongoing exposure to antibiotics that can in turn contribute to drug resistance.106 Although this does not at first glance appear to be an urban issue, evidence is mounting that drug-resistant organisms are being tracked from livestock to retail outlets to humans.107 Techniques to monitor enteric diseases in urban populations continue to be developed,108 as this issue has become more important with increasing globalization and the importation of foods from other countries with different safety standards. A recent example of food-borne infectious disease is the outbreak associated with raspberries imported from Guatemala.109
Habitat Expansion
As cities expand and suburbs are created, humans come into greater contact with the wildlife in these new habitats, exposing them to new pathogens and diseases, such as Lyme disease and rabies. Lyme disease exists where deer harbor ticks (*Ixodes*) that can then inoculate with spirochetes (*B. burgdorferi*) susceptible suburbanites who have had contact with recently deforested areas that border new housing or new roads. In the New York City metropolitan area, cases are noted in the adjacent counties of Westchester and Essex. Rabies, although rare, is more likely in areas such as expanding suburbs where new housing borders woodland.

Importation of Animals and Animal-Human Contact
In recent years there have been reports of infectious diseases linked with the importation of animals. Animals brought from West Africa that were infected with monkey pox, for example, transmitted the infection to prairie dogs in the United States. One theory for the origin of West Nile virus in the United States is the importation of an infected exotic bird from an endemic area. An epidemic of raccoon rabies spread to several urban and peri-urban areas after the relocation of raccoons from Florida to North Carolina. Domestic animals are also a source of disease; humans can contract cat-related toxoplasmosis when cat litter is not disposed of before *T. gondii* cysts become infectious. SARS and H5/N1 influenza, also known as avian flu, are other recent epidemics with an animal reservoir.

In the case of avian flu, human-animal contact in other nations contributes to concerns about epidemics in the United States.

Bioterrorism
Although concern over biological attacks had been discussed by public health leaders, the anthrax attacks in 2001 in New York City, Washington, D.C., and southern Florida made this issue concrete. Other agents of concern for bioterrorism include smallpox, plague, tularemia, botulism. Planning for mass casualty events is complex; the major targets for bioterrorism are in big cities, and large gathering places such as stadiums, auditoriums, and subways are difficult to protect in such attacks. Although bioterrorism events are rare, they are now part of the framework in thinking about infections in cities.

Conclusion
From the 19th century to the present, cities have played a central role in the introduction, transmission, and control of infectious diseases. Throughout this period, immigration, commerce, transportation, and an expanding habitat have introduced infectious agents into urban populations. Transmission is enhanced through concentrated poverty and segregation, decaying infrastructure, and patterns of social behavior and substance abuse. Despite advances in diagnostic and therapeutic medical technologies and public health interventions, infectious diseases present an ongoing threat to urban populations.
Multiple levels of factors can affect the introduction and spread of disease, including individual factors, local social and physical environments, municipal policies, and national and international trends. In the short run, few public health authorities have the capacity or resources to intervene on all levels to achieve control of infectious diseases. Reducing poverty, segregation, and substance abuse are worthy but long-term goals. Fortunately, evidence from the public health responses to resurgence and outbreaks of disease, such as multidrug-resistant tuberculosis and AIDS, shows that even limited activities can make an immediate difference. Aggressive case finding, isolation, and treatment accomplished a reversal of the resurgence of multidrug-resistant tuberculosis in New York City. Some evidence suggests that outreach education and programs such as needle exchange resulted in drastically lower incidence of HIV infection in New York and other cities.

To build on these successes and short-term strategies, funding for surveillance (locally and nationally), detection (including state, national, and international reference laboratories), clinician training, public education, and accessible and affordable preventive and therapeutic services applied broadly at the local and national levels is needed to achieve sustained control of infectious diseases. Social supports, community agencies, civic association, and market influences have received limited attention in the public health literature for the role they might play, but they hold great potential for incorporation into a strong long-term strategy. The example of the mobilization of the gay community to educate about AIDS, provide supportive services, and lobby for successful modifications of regulatory practices for novel medications is instructive and should be developed for use by other populations. In the development and implementation of a strategy for immediate as well as sustained responses to the spread of infectious diseases in cities, a broad conceptual approach should be considered that takes into account control at multiple levels.

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12

Traumatic Stressors in Urban Settings

Consequences and Implications

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Introduction

Violence, disasters, terrorism, and other potentially life-threatening events present serious challenges to health in urban settings. Such events, which affect most urban residents at some time in their lives, can produce extreme stress reactions and raise the risk of a wide range of mental and physical health problems.\textsuperscript{1-9} Also, these events are responsible for an enormous economic burden at the national, state, and local levels, stemming from consequences such as damage to the physical environment, lost productivity, medical costs of victims, and reduced quality of life.\textsuperscript{10-12} Throughout this chapter, we refer to these events collectively as \textit{traumatic stressors} for two reasons: to reflect our focus on the mental- and physical-health-related impact of these events on victims and to acknowledge that different forms of violence, disasters, and other stressor events have serious economic effects as well as similar mental and physical health effects.\textsuperscript{1} Thus, we use the term \textit{traumatic stressors} to refer to each of the following classes of stressor event: interpersonal violence (e.g., physical assault, rape, witnessed violence), natural disasters (e.g., hurricanes, floods, earthquakes), technological disasters (e.g., oil spills, fires), terrorist attacks (e.g., Oklahoma City bombing, September 11 attacks), and serious and injurious accidents (e.g., motor vehicle accidents). Note that the term \textit{potentially traumatic stressors} is technically more accurate because such events do not always produce stress reactions. However, we omit the word \textit{potentially} throughout the chapter in the interest of brevity and flow.

This chapter draws from several areas of the traumatic stress literature to describe the prevalence of exposure to traumatic stressors, mental- and physical-health-related consequences, and how this research can be brought to bear on the study of urban health. First, we briefly summarize epidemiological research
on the prevalence and correlates of traumatic stressors, with emphasis on studies conducted with nationally representative samples. Next, from our own data on prevalence of exposure to traumatic stressors between individuals who live in urban and rural settings, we offer comparisons that suggest that living in urban settings heightens risk of exposure. Third, we focus specifically on the prevalence of mental and physical health problems among adolescents and adults living in urban and rural settings. Fourth, we discuss the research-to-practice implications of findings from epidemiological and treatment-outcome research, refer to relevant mechanisms, health systems, and practices, and outline policy issues that deserve further consideration as well as research avenues that can guide the policy-making process.

Prevalence and Correlates of Traumatic Stressors

Prevalence of Traumatic Stressors

Several studies with large probability samples have found that the prevalence of exposure to traumatic stressors ranges between 55% and 70% of U.S. adults. Prevalence estimates are similarly high among youth. With a nationally representative sample of adolescents, Kilpatrick and colleagues found that approximately 50% of American youth aged 12 to 17 years had experienced one or more of the four forms of traumatic stressor assessed in the study: sexual assault, physical assault, physical abusive punishment, witnessed violence. Also noteworthy is the number of individuals who are exposed to multiple types of traumatic stressor. Saunders found that among adolescents with a history of exposure to traumatic stressors, over 40% reported having been exposed to at least two different types of traumatic stressor and that those exposed to multiple types were at substantially higher risk for mental health problems than those exposed to a single type of stressor.

Limited data are available on the prevalence of traumatic stressors in urban settings specifically and in comparison to rural settings. Breslau and colleagues estimated the prevalence to be 39.1% with an urban sample of 1,007 young adults, but methodology for this study differed substantially from studies cited above, thus precluding direct comparisons between studies. The only national sources that have regularly tracked prevalence of exposure to various types of traumatic stressor in rural and urban settings are the National Crime Victimization Survey and FBI Uniform Crime Reports. These sources reliably have estimated relatively higher rates of violent crime in urban populations—rates that are 70% to 170% higher per capita in urban versus rural settings. However, as discussed elsewhere, the National Crime Victimization Survey and the Uniform Crime Reports are significantly limited in scope and methodology and offer limited guidance to policy makers and providers of victims’ services.

Taken together, data suggest that the prevalence and rate of exposure to traumatic stressors may be higher in urban than in rural settings. As noted in subsequent sections, more research is needed to fully understand the nature of these
differences, the mechanisms underlying them, and policies and urban design strategies that may aid in prevention. Moreover, urban settings are particularly vulnerable when considering major disasters or mass-casualty incidents (e.g., natural disasters, terrorist attacks). Such events have greater potential to produce devastating levels of casualty and resource loss in urban settings, where a single event can affect thousands or even millions of people. New York City alone houses more than 8 million people, higher than the combined population of the District of Columbia, Alaska, Delaware, Idaho, Montana, New Hampshire, North Dakota, South Dakota, Vermont, and Wyoming. Thus, although social and economic resources may not be as easily accessible in rural settings as in urban settings, high demand for resources in the aftermath of a large-scale incident may create a bottleneck effect in densely populated urban areas, producing significant delays in the provision of medical services and access to resources to meet basic needs. These issues relate in important ways to the study of urban health.

Prevalence of Mental and Physical Health Problems

Over the past decade, epidemiological research has examined the prevalence of mental and physical health problems at the national level. Because a comprehensive review is beyond the scope of this chapter, we selected a small number of studies that examined mental and physical health problems for which traumatic stressors are known to increase risk. The National Comorbidity Survey was a national probability study (n = 5,877) that examined the prevalence of numerous mental and physical health problems among persons aged 15 to 54 years. Past-year prevalences were 10.3% for major depressive episode, 2.3% for panic disorder, 3.1% for generalized anxiety disorder, 2.5% for alcohol abuse, 7.2% for alcohol dependence, 0.8% for drug abuse, and 2.8% for drug dependence. In a separate report, lifetime prevalence of posttraumatic stress disorder (PTSD) was estimated at 7.8%. Research with younger samples has found that many adolescents are affected by these mental and physical health problems as well. The National Survey of Adolescents, a national probability study of youth aged 12 to 17 years (n = 4,023), yielded 6-month PTSD prevalences of 6.3% (girls) and 3.7% (boys) and 6-month major-depressive-episode prevalences of 13.9% (girls) and 7.4% (boys). In another National Survey of Adolescents report, past-year prevalences of substance-use problems were 4% for alcohol abuse or dependence, 4% for marijuana abuse or dependence, and 1% for hard-drug abuse or dependence, with 15- to 17-year-old participants being at substantially higher risk.

A handful of researchers also have examined the prevalence of mental and physical health problems associated with living in urban versus rural settings, with mixed results. Blazer and colleagues found that urban adults (n = 3,921) had a higher prevalence of major depressive episode than rural adults but were unable to replicate these findings in a separate study that revealed no relation between depression and urbanicity. Other studies have suggested that rates of suicide tend to be higher in urban than in rural settings, but a sharper rise has occurred in rates of suicide in rural relative to urban settings over the past two decades. Blazer and colleagues also found that the prevalence of drug abuse or dependence was
higher for adults in urban than in rural settings, but the prevalence of alcohol abuse or dependency was lower in urban relative to rural settings. Consistent with these findings, Warner and colleagues\textsuperscript{35} found that the lifetime prevalence of drug use in the National Comorbidity Survey was higher in urban than in rural settings.

Since the comorbidity survey, two other national household studies have examined mental and physical health problems associated with living in rural versus urban settings.\textsuperscript{36} The United Kingdom Household Survey\textsuperscript{37} of adults aged 16 to 64 years (\(n = 9,777\)) revealed that prevalence of drug dependence was higher in urban relative to rural settings, consistent with earlier studies.\textsuperscript{28, 35} However, in contrast with earlier findings,\textsuperscript{28} prevalence of alcohol dependence with the U.K. sample was also higher in urban relative to rural settings.\textsuperscript{37} The Australian national survey of adults aged 18 to 99 years (\(n = 10,601\)) revealed no differences between rural and urban samples for affective disorders, anxiety disorders, or alcohol or drug dependence.\textsuperscript{38} Other studies similarly have failed to find major differences between rural and urban samples in mental and physical health problems.\textsuperscript{3, 36, 39} Results also are mixed with youth samples: Some researchers have reported significantly higher prevalences of substance-use problems in rural versus urban settings, whereas others have reported higher prevalences in urban relative to rural settings.\textsuperscript{40, 41} Discrepancies of this nature likely are the result of several factors, including methods of measurement and differences between countries or across regions within a country\textsuperscript{42} (e.g., in the latter case, upstate New York and South Africa\textsuperscript{40, 41}). Of further importance, limited research has been done to examine the role of housing conditions, social strain, social capital, access to parks or greenspace, and other possible mechanisms that may relate in important ways to differences between urban and rural settings.\textsuperscript{43}

\textbf{Mental and Physical Health Correlates of Traumatic Stressors}  
Research on the correlates of traumatic stressors has found high prevalences among victims relative to nonvictims and of PTSD, depression, suicidality, generalized anxiety, and comorbidity, as well as disruptive, violent, and delinquent behavior.\textsuperscript{1, 4–6, 14, 44–50} Further, several researchers have hypothesized that mental health problems may be an independent risk factor for various physical health problems, particularly health-risk behavior.\textsuperscript{27, 51–53} Victims at greatest risk for mental health problems are those who experience traumatic stressors that result in physical injury, are interpreted as life threatening, occur on multiple occasions or with sudden and unpredictable onset, are associated with human intent, and coincide with a loss of resources or weak social support or both.\textsuperscript{14, 48, 54, 55}

The literature on physical health correlates of victimization is underdeveloped relative to research examining mental health outcomes. Nevertheless, attention to physical health problems has increased in recent years, and researchers have examined traumatic-stressor exposure in relation to several health-status variables, including self-reported physical health, health-care utilization (e.g., physician visits, hospitalizations), health-risk behavior (e.g., substance-use problems, risky sexual activity, HIV-risk behavior, cigarette use, sleep patterns, eating habits), and prevalence of medical diagnoses.\textsuperscript{51, 56, 57} In a recent review, Norris and colleagues\textsuperscript{1}
related that, relative to nonvictimied adults, disaster victims had elevated somatic complaints, medical conditions, sleep problems, physiological indicators of stress, and, to a lesser extent, problems associated with alcohol, drug, or cigarette use. Similarly, victims of violent events are more likely than nonvictims to experience significant physical health problems, as evidenced by greater health care utilization and heightened prevalence of cardiovascular conditions, central nervous system problems, digestive tract conditions, urogenital conditions, disability, substance-use problems, HIV-risk behavior, and cigarette use.

As noted earlier, social and economic resources generally may not be as easily accessible in rural settings as in urban settings. Lower economic resources and literacy rates in rural settings may further hinder access to care. However, in addition to concerns related to overwhelming demand for resources and services in the aftermath of large-scale incidents in highly dense urban settings, there is also concern in urban areas regarding the impact of cumulative burden of stressors. The issue of cumulative burden is particularly relevant to individuals who (a) have a prior history of exposure to traumatic stressors or (b) are faced with significant ongoing stressors, such as living in a high-crime area, having few economic or social resources, experiencing joblessness, or having relationship difficulties. That is, the mental and physical health impact of new traumatic stressors may be exacerbated by the additional burden of other ongoing stressors. For this reason, it is important to study the impact of new traumatic stressors on mental and physical health as a function of key economic, crime-related, and other stress-relevant characteristics of the physical and social environment.

Moreover, it is important to consider mechanisms underlying how the urban context itself may relate to cumulative burden and, more generally, to the prevalence and impact of traumatic stressors on mental and physical health. For example, specific features of the urban physical environment (e.g., housing conditions, access to parks and walking areas) may affect the rate of violence and criminal activity, health-risk behavior, and levels of physical activity, all of which may relate in important ways to the stress reactions of individuals exposed to traumatic stressors. Greater attention to these issues with a focus on key characteristics of urban physical and social environments may yield critical implications for primary and secondary prevention in urban settings. Our data (described below) unfortunately do not shed light directly on the role of key characteristics of urban and rural environments. However, the representative nature of the data allows for meaningful comparisons between adolescents and adults living in urban and rural settings in regard to the prevalence and impact of traumatic stressors.

Urban Living, Traumatic Events, and Mental and Physical Health

Description of Methodology

Accurate and representative information about the scope, nature, and mental and physical health consequences of traumatic stressors in urban and rural settings can contribute useful information and guidance to prevention and policy efforts in
these settings. Existing sources provide an inconsistent picture of the nature and scope of traumatic-stressor exposure in urban and rural settings. For this reason, we explored the prevalence of traumatic stressors and selected mental and physical health problems in urban and rural samples of the National Women’s Study (NWS) and National Survey of Adolescents (NSA). Also, we examined differences in global perceptions of threat (e.g., neighborhood safety) in urban and rural populations.

The NSA and NWS were two epidemiological studies conducted by researchers at the National Crime Victims Research and Treatment Center with large, national probability samples. Both studies were designed to assess the prevalence of traumatic stressors, as well as various mental and physical health problems. The NWS sample was composed of 4,008 women aged 18 years and older, whereas the NSA sample was composed of 4,023 adolescents (51% boys, 49% girls) aged 12 to 17 years. Methodology and main outcomes for the full NWS and NSA samples are presented elsewhere.5–7, 14, 27 Briefly, the NWS and NSA were telephone surveys conducted using a highly structured interview designed to collect information on sociodemographic variables, histories of traumatic stressor exposure, and mental and physical health functioning. Participants were contacted randomly from stratified samples of counties within areas identified as Central City, Metropolitan Statistical Area (MSA), and non-MSA within the four regions of the country. To ensure that both listed and unlisted telephone numbers were accessed, random-digit dialing was used within these sample strata. However, these studies were limited in that methodology precluded recruitment of individuals residing in homes without telephones, as well as certain high-risk individuals (e.g., those who were homeless or housed in jails, juvenile correctional facilities, or inpatient health care facilities). Samples were brought in line with Census-based estimates of the U.S. population by weighting the data on the basis of age and gender (NWS, NSA), as well as racial or ethnic status and geographic stratum (NSA).

In the NWS, type of place originally was categorized into three levels: (a) MSA included every place defined as a central city by the Bureau of the Census; (b) MSA-Remainder (MSA-R) included every place that is not a central city but is within an MSA as defined by the Census Bureau; and (c) non-MSA included all other towns, villages, hamlets, or identifiable land divisions. For all analyses with NWS data, the urban sample consisted of women living in MSA or MSA-R areas (n = 2,944), and the rural sample consisted of women living in non-MSA areas (n = 1,065).

In the NSA, type of place was determined by parent report. Parents were asked, “Would you describe the place in which you live as being a large city, the suburb of a large city, a large town (25,000–100,000), a small town, or a rural area?” For findings relating to perceptions of threat, we retained all five levels of this variable. However, for all other analyses using NSA data, we operationalized the urban sample to consist of cases in which the family lived in a “large city,” “suburb of a large city,” or “large town (25,000–100,000)” (n = 2,068). The NSA rural sample consists of cases in which the family lived in a “small town” or “rural area” (n = 1,833).
Perceptions of Threat in Urban and Rural Communities

Parents of children living in large cities were much more likely to report being “very concerned” about their children’s safety and risk of violence exposure in the school and neighborhood than were parents of children living in less population-dense areas (Figures 12.1 and 12.2). Differences were not evident between parents living in rural areas and those living in suburbs, large towns, and small towns. Other descriptive findings from the NSA are consistent with these data. For example, 15% of adolescents living in large cities stated that violence is “a very big problem” in their community, compared with 8% of adolescents living in suburbs or large towns, 5% of those living in small towns, and less than 3% of those living in rural areas. Also, 28% of adolescents living in large cities stated that drug abuse is “a very big problem” for young people in their community compared with 14% in rural areas (percentages for other settings were 23% in suburbs, 26% in large towns, and 24% in small towns). Taken together, these and other findings from the NSA suggest that adolescents and families living in large cities are significantly more likely than those living in less population-dense settings to express concern about risk of violence exposure or other health-related risks in their community.

Prevalence of Traumatic Stressors in Urban and Rural Communities

Results from the NWS (see Table 12.1) indicated that women living in urban settings (nearly 1 in 7 women) were more likely than those in rural settings (1 in 10 women) to have a history of completed rape. However, prevalences of physical assault and witnessed injury or death in the NWS did not differ as a function of type of setting. Note that these estimates for urban and rural settings are based on where participants lived at the time of the interview rather than where they had been victimized, and these estimates may have been influenced by the extent to which women were victimized in one type of setting despite currently living in another (e.g., living in a rural area but victimized while visiting or previously living in a large city).

Results from the NSA (Table 12.1) consistently indicated higher risk for traumatic stressor exposure among adolescents living in urban settings relative to those living in rural settings. This outcome was particularly true for girls living in urban settings, who, relative to girls in rural settings, were 37% more likely to have been sexually assaulted, 40% more likely to have been physically assaulted, 43% more likely to have experienced physically abusive punishment, and 32% more likely to have witnessed serious violence. Boys also were more likely to have witnessed serious violence or to have experienced physical assault if they lived in urban settings, but differences in prevalence estimates were somewhat less pronounced across settings than for girls, and no differences emerged across settings among boys in prevalence of sexual assault and physically abusive punishment.

Table 12.2 presents differences in victimization prevalence more broadly across settings. Among youth living in urban settings, 61.5% of girls and 66.5% of boys experienced at least one form of traumatic stressor exposure (i.e., sexual
assault, physical assault, physically abusive punishment, witnessed violence, or natural disaster). Significantly fewer youth in rural settings, 50.5% of girls and 54.4% of boys, experienced at least one form of stressor. Prevalence was slightly higher for women living in urban settings in the NWS (47.6% vs. 43.0%).

Table 12.2 also illustrates the pervasiveness of exposure to multiple types of traumatic stressors. Among youth in urban settings, 44% of victimized girls and 47% of victimized boys experienced more than one form of stressor. In the NWS, 35% of victimized women in urban settings experienced more than one form of traumatic stressor. Clearly, exposure to multiple types of traumatic stressors is not uncommon among youth and women in urban settings, and research has suggested that such individuals are at higher risk for mental and physical health problems than individuals exposed to a single type of traumatic stressor.15 Taken
together, these findings underscore the need for (a) preventive action guided by research on mechanisms underlying differences in urban versus rural patterns of stressor exposure and (b) brief, evidence-based secondary prevention programs that aim to reduce risk for subsequent victimization among individuals exposed to traumatic stressors.68

Mental Health in Relation to Traumatic Stressor Exposure in Urban and Rural Communities

Across the NWS and NSA, results consistently identified youth and adults exposed to traumatic stressors as being more likely than nonexposed individuals to be diagnosed with PTSD or depression or to report having committed a delinquent offense at some time in their lives. In fact, adolescents exposed to one or more
traumatic stressors, relative to nonvictims, were nearly 3 times more likely to meet criteria for depression, roughly 6 times more likely to meet criteria for PTSD, and over 10 times more likely to report having committed a delinquent offense. Whereas differences were clear and consistent between individuals who were and were not exposed to traumatic stressors, findings were mixed across rural and urban settings. For nonvictimized youth and adults, no differences were found between urban and rural settings in the prevalence of mental health outcomes. In contrast, for youth and adults exposed to traumatic stressors, some differences across settings emerged. First, a significantly higher lifetime prevalence of delin-
frequency was found among victimized youth living in urban (21.7%) relative to rural (16.2%) settings. Second, lifetime prevalence of depression among victimized women was slightly higher in rural (42.6%) than in urban (36.8%) settings. However, no differences were found between urban and rural settings for depression prevalence among youth exposed to traumatic stressors or for PTSD prevalence among youth and women exposed to traumatic stressors (see Table 12.3).
Multivariable logistic regression analyses were conducted to examine whether delinquency in adolescents and depression among adult women remained associated with type of setting (urban vs. rural) when controlling for both demographics (i.e., gender, racial, or ethnic status, income, age) and type of traumatic stressor exposure (i.e., natural disaster, physical assault, rape [NWS] or sexual assault [NSA], witnessed injury or death [NWS] or witnessed violence [NSA], physically abusive punishment [NSA only]). Indeed, risk for depression in adult women remained higher in rural than urban participants (odds ratio [OR] = 1.2, confidence interval [CI; 95%] = 0.7–1.0, \( p = .05 \)), and risk for delinquency among youth remained higher in urban than rural participants (OR = 1.3, CI [95%] = 1.1-1.7, \( p < .05 \)).
Physical Health in Relation to Traumatic Stressor Exposure in Urban and Rural Communities

Findings from the NSA revealed that, for all health-risk outcomes examined (i.e., alcohol abuse, marijuana abuse, hard-drug abuse, cigarette use), adolescents exposed to traumatic stressors had higher prevalences than nonvictimized adolescents (see Table 12.3). Notably, youth exposed to traumatic stressors were roughly 5 and 7 times more likely than nonvictimized youth to meet criteria for alcohol abuse and marijuana abuse, respectively. Also, women exposed to traumatic stressors were over 50% more likely than nonvictimized women to have substance-use problems during their lifetime.

As with mental health outcomes, comparisons in the prevalence of physical health outcomes across rural and urban settings yielded mixed findings. First, no differences in physical health outcomes emerged across settings for nonvictimized youth, with the exception that substance-use problems were slightly more prevalent among nonvictimized adolescent women in urban compared with rural settings (21.3% vs. 17.5%). Second, for youth exposed to traumatic stressors, no differences emerged across settings in prevalence of alcohol abuse and hard-drug abuse. However, differences were found across urban and rural settings for marijuana (8.2% vs. 5.5%) and cigarette (51.4% vs. 55.6%) use among adolescents exposed to traumatic stressors and for substance abuse among adults exposed to traumatic stressors (34.5% vs. 26.0%). Thus, traumatic-stressor-exposed youth in urban settings were 50% more likely than those in rural settings to meet criteria for marijuana abuse, and victimized women in urban settings were 33% more likely than those in rural settings to have substance-use problems.

As with mental health problems, multivariable logistic regression analyses were conducted to examine whether marijuana abuse and cigarette use in adolescents, as well as substance abuse in adult women remained associated with type of setting (urban vs. rural) when controlling for both demographics and traumatic stressor exposure. Risk for substance abuse among adult women remained higher in urban than rural settings (OR = 1.4, CI [95%] = 1.2–1.7, \( p < .001 \)), and risk for marijuana abuse among youth also remained higher in urban than rural participants (OR = 1.6, CI [95%] = 1.1–2.2, \( p = .01 \)). However, cigarette use among youth did not remain significantly associated with type of setting after accounting for demographics and history of exposure to traumatic stressors (OR = 0.9, CI [95%] = 0.8–1.0, \( p = .11 \)).

Summary of Findings from the NWS and NSA

Several studies have examined mental and physical health problems associated with living in urban versus rural settings, with mixed results. Fewer studies have examined prevalence of exposure to traumatic stressors as a function of the settings in which people live. We used data from the NWS and NSA to explore both of these issues, and findings are summarized as follows. First, results consistently suggested that adolescents and families living in large cities have substantially higher levels of concern about school safety, neighborhood safety, substance-
abuse problems among youth, and other health-related risks than do youth and families living in less population-dense settings. Second, youth exposure to traumatic stressors was consistently more prevalent in urban than rural settings, and differences across settings were particularly pronounced for girls. Similarly, women’s lifetime prevalence of completed rape was higher in urban than in rural settings, although history of physical assault and witnessed injury or death did not differ across settings for women. Third, a high percentage of victimized youth and women have experienced multiple forms of traumatic stressor exposure, placing them at high risk for mental and physical health problems. Thus, urban youth and women were at higher risk for exposure to traumatic stressors, as well as for exposure to multiple types of traumatic stressors, than were rural youth and women. Fourth, we found an apparent interaction between history of exposure to traumatic stressors and urbanicity: behavioral and physical health problems tended to be more prevalent in urban than in rural settings among victimized individuals but not among nonvictimized individuals. This finding may not hold for emotional outcomes, as no differences across settings occurred for victims or nonvictims in the prevalence of PTSD and depression, except for slightly higher risk among victims in rural settings, relative to victims in urban settings. Behavioral and physical health problems, however, were more consistently associated with living in urban settings among victims but not among nonvictims. In particular, delinquency and marijuana use were more prevalent among victims in urban settings than among their counterparts in rural settings, and substance-use problems were more prevalent among urban women exposed to traumatic stressors than among victimized rural women. Differences across urban and rural settings remained significant after controlling for variance accounted for by demographic (i.e., age, race or ethnicity, income, gender) and traumatic stressor variables.

Potential mechanisms underlying these differences are unclear, and data from the NWS and NSA cannot speak directly to this. However, it is notable that publicly observable behavioral problems (i.e., delinquency, substance use, marijuana use) were the three outcomes more prevalent in urban than in rural settings given exposure to traumatic stressors, whereas less publicly observable emotional reactions (i.e., depression, PTSD) were not differentially associated with type of setting. This pattern of findings suggests that social contagion may play an important role in delinquency and substance-use risk given traumatic-stressor exposure, particularly in high-crime urban areas. More research is needed to examine this potential mechanism and, more broadly, to investigate the potential role of a wide range of possible mechanisms that may explain why urban environments may confer greater risk.

Implications for Practice and Policy
An alarming number of youth and adults encounter traumatic stressors at some time in their lives, and risk for exposure is especially high in urban communities. In addition to urban residents being at greater risk for exposure to traumatic stressors, findings from the NSA and NWS suggest that urban residents also may
be more vulnerable to its effects—particularly effects that relate to delinquency and substance-use problems. Because differences in delinquency and substance-use problems between urban and rural participants persisted after controlling for demographic and traumatic stressor variables, it appears that factors specific to living in urban versus rural settings may account for these differences. Community-level factors were unable to be explored with NSA and NWS data; thus, it is unclear whether accessibility of appropriate mental health services differed for urban and rural participants.

Further, it is unclear whether the higher prevalence of delinquency and substance-abuse problems among victimized individuals in urban relative to rural settings is in part a consequence of belonging to more population-dense neighborhoods, school systems and classrooms, and social outlets in which the likelihood of interaction with at least one delinquent or substance-using peer or colleague might be increased. Indeed, a growing body of research on social learning theory and social contagion has suggested that interacting with antisocial youth or delinquent peer groups is a powerful risk factor for delinquency and substance abuse among adolescents. The number of delinquent neighbors, classmates, and peers with which one interacts presumably is higher in densely populated urban settings than in less densely populated rural settings, and victimization experiences may increase the likelihood that youth will establish relationships with delinquent peers. As noted earlier, future research should attempt to examine social-observational learning and social contagion as potential mechanisms underlying differences in urban- versus rural-dwelling individuals with exposure to traumatic stressors. Further, research is needed to explore large-scale (e.g., mass-media) interventions that could be directed to reduce the mental- and physical-health-related impact of traumatic stressors in densely populated urban areas. For example, education through mass media may reduce or offset shifts in social norms and norms for social network behavior, both of which are influenced by social-observational learning.

This research underscores the importance of policy initiatives and prevention and intervention efforts that aim to reduce risk of exposure to traumatic stressors in urban settings and, collaterally, related mental and physical health problems. To this end, research is needed that provides sound guidance to any policy and prevention initiatives. Unfortunately, limited information exists about risk and protective factors for traumatic stressor exposure at the community and sociocultural levels, such as economic and family resources, residential stability, and social cohesion or access to social capital. Research that narrows these gaps in our evidence-based knowledge and that focuses on potentially modifiable risk and protective factors could offer significant contributions to risk-reduction efforts. For example, research is needed that examines the impact of policies directed at minimizing the likelihood of traumatic stressors in cities (e.g., better street lighting to minimize risk of assault) and at reducing the impact of traumatic stressors and large-scale incidents in densely populated urban areas (e.g., better use of the mass media to counter potential psychological consequences).

Whereas the present research carefully assessed several forms of exposure
to traumatic stressors, several others were not comprehensively assessed (e.g., technological disasters, mass-casualty events). Thus, inferences cannot be drawn directly from the NWS and NSA concerning differences between urban and rural communities of mass-casualty events and other events that were not assessed in the study. However, as underscored by the tremendous number of people affected by the terrorist attacks of September 11, 2001, there is a significant need for systematic research that informs mass-casualty response efforts in urban settings. When mass-casualty events directly affect urban populations, risk for a wide range of mental and physical health problems is likely to increase, necessitating the availability of effective and efficient large-scale response efforts.

Further, we have shown that a significant body of research documents higher prevalences of mental and physical health problems among individuals exposed to multiple types of traumatic stressor relative to those exposed to one type of risk for mental and physical health problems. Thus, mass-casualty events in urban settings, which as a whole house a high percentage of youth and adults who have been previously exposed to traumatic stressors, may create a particularly high burden of need. This potential underscores the need for research examining the role of cumulative burden of stressful life circumstances in densely populated urban settings. As noted previously, cumulative burden of stressors (e.g., a new disaster affecting an urban neighborhood with few economic and social resources, high crime, and high rates of prior traumatic-stressor exposure) may assume a significant role in exacerbating the mental and physical health impact of new traumatic stressors.

In addition, communities often do not have well-developed disaster preparedness plans that facilitate collaborative relationships between researchers, local mental health and public health centers, and governmental agencies.72 Thus, to improve the capacity for evidence-based disaster response plans, it is also essential to include evaluation and research components in response to planning for mental health and public health.

Policy makers play an important role in the planning, implementation, and evaluation of research on services for individuals exposed to traumatic stressors. For example, agencies within the Department of Justice (e.g., National Institute of Justice, Office for Victims of Crime, Office of Juvenile Justice Delinquency and Prevention) have coordinated efforts with researchers and social scientists on prevention and intervention practices related to sexual assault,73 youth victimization,5 domestic violence,74 school violence,75 community violence,76 and other stressors. These efforts largely have reflected a dominant focus of the legal system on offenders, with the goal of adopting laws and regulations that aim to punish lawbreakers without impinging on constitutionally protected rights.77, 78 The prevailing position of many policy makers, particularly judges, prosecutors, and law enforcement officials, appears to be that the apprehension and incarceration of criminals will reduce recidivism and deter others from committing similar offenses.79 These efforts, while essential, tend to underemphasize the needs and treatment of individuals exposed to violence and other traumatic stressors77 as well as key charac-
teristics of the physical and social environments in urban and rural settings that are promising targets for new advances in research and urban design practices and policies.

Research suggests that public policy efforts should place greater emphasis on victims’ access to effective services and adequate resources to ensure that the mental and physical health needs of victims are being met at all stages of the criminal justice system process. This increased emphasis would be beneficial for several reasons. For example, excellent services to such individuals might be expected to reduce risk of revictimization through education-based protocols designed to directly serve this purpose. Also, such services presumably would reduce risk for revictimization through secondary and tertiary prevention efforts that address the mental and physical health needs of victims. In the light of research illustrating higher prevalences of mental health problems among individuals exposed to multiple types of traumatic stressor relative to those exposed to one type, policies that emphasize the prevention of revictimization among victims may, in addition to preventing subsequent violence in a higher percentage of cases, be effective in preventing stress-related problems from developing, treating them if they do develop and, collaterally, reducing stress-related economic costs.

The magnitude of the problem of traumatic stressors in the United States has required policy makers to adopt prevention and intervention strategies before a significant scientific-evidence base is available to support these strategies. Whereas some of these programs have been evaluated favorably by researchers, rigorous evaluations of others have demonstrated little to no effect on offender behavior. Thus, it is critical that existing policies and programs undergo rigorous research evaluations to determine whether prevention strategies and other victim services are producing beneficial outcomes. Further, to the greatest extent possible, public-policy decisions should be based on the best empirical evidence available to policy makers. Accordingly, it is also important that dissemination efforts be designed to reach and speak to policy makers in addition to researchers and practitioners. Finally, significant opportunities for advancement in the field center on the study of mechanisms by which the urban context can affect mental and physical health in the aftermath of traumatic stressors, including large-scale disasters or mass-casualty events. As greater explanation is achieved with new and innovative research, more will be known about features of the urban context that relate in important ways to mental and physical health. To the extent that such features are potentially modifiable or able to be balanced in their effects with primary prevention or intervention efforts, the feasibility of reducing the mental health, physical health, and economic burden of traumatic stressors to cities worldwide will be strengthened.

References


Mental Health in the City

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Mental Health: Global and Local Burden

Mental and behavioral disorders affect more than 25% of people during their lifetime and are estimated to be present in 10% of the adult population at any time. The Global Burden of Disease report for 2000 estimates that mental health problems account for 12% of the total disability adjusted life years (DALYs) lost worldwide and for 31% of the years of life lived with a disability. The most common mental disorder, unipolar major depression, is the fourth leading cause of DALYs among all ages and both sexes, accounting for 4.4% of the total DALYs worldwide. In specific age and gender groups, mental health problems account for an even higher proportion of DALYs. For example, among women aged 15 to 44, unipolar major depression is the second leading cause of DALYs worldwide, accounting for 10.6% of DALYs. Beyond their impact on the individual, mental health and behavioral problems are frequently accompanied by social and economic impact on families and society. Mental health problems impose a substantial burden on health services, particularly primary health care. Anxiety and depression have been shown to be the most common presenting complaint in primary care settings in multiple studies conducted worldwide; it is estimated that anxiety and depression account for up to a third of all presentations in primary care settings.

Despite the persuasiveness of the evidence on the high prevalence of mental health problems worldwide, public health attention on mental health disorders has long lagged behind public health attention paid to physical disorders. For example, the World Bank’s 1993 World Development Report focused on health but barely mentioned mental health problems in the text of the report, although mental health did feature in tables in the report appendices. The suffering caused by...
mental illness and the relative neglect the topic has received makes it particularly important to consider how cities and urban living—rapidly becoming the norm for populations worldwide—may affect mental health.

A full discussion of all the issues relevant to the study of mental health in cities can occupy several volumes and thus is beyond the scope of a single chapter. Therefore, in this chapter, we limit ourselves to three principal areas of discussion. First, we discuss key concepts that underlie the study of urban mental health. Second, we discuss the evolution of thinking about urban living conditions and health and provide an overview of the primary empiric evidence that has explored the relations between urban living and mental disorders in the past century. Third, to better explore how urban living may be associated with urban health, we consider the example of schizophrenia and synthesize the best evidence for the relation between urban living and schizophrenia. Drawing on the issues raised in these three sections, we conclude with a discussion of the potential implications of our observations and identify viable avenues for research.

City Living and Mental Health

Cities have long been the subject of literary and academic interest as a powerful force shaping the health of populations. Writers from several eras in Western European history considered cities as places that were detrimental to health, and in many ways, for much of history, cities were characterized by features that were unquestionably linked to poor health. Literary figures, commentators, and social theorists observed the problems endemic to these growing cities and suggested that they had a role in shaping individual well-being. The 19th-century English romantic poet Percy Bysshe Shelley observed, “Hell is a city much like London.” Indeed, a full collection of the writings that have denounced cites or deplored living conditions in cities would fill several volumes.

It is worth considering why historically so many leading thinkers have considered that cities could be detrimental to health. Most of the early thought about cities and how they may unfavorably influence human health arose from the growing role played by cities in European life over much of the past millennium. As cities grew, particularly as the Industrial Revolution accelerated, population density, numbers of marginalized populations, pollution, and crime frequently increased, resulting in health in cities being worse than it was outside of cities in many countries. Literary observers and social commentators, reflecting on these observations, ascribed to city living an etiologic role in shaping health.

In many ways, it was the process of rapid urbanization itself during the 18th and 19th centuries that prompted developments in public health. For example, in France, rapidly changing demographics and the economic situation in urban areas contributed to hygiène publique, or public health, becoming formally constituted as a science. During the first half of the nineteenth century, Louis René Villerme and other hygiénistes recognized the contribution that inadequate water supplies, overcrowding, and poor housing were making to poor health in France’s burgeoning cities and implemented programs aimed at improving urban living
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conditions. Indeed, the urban environment in many Western cities improved dramatically at the turn of the 20th century, and coincident with this improvement, health of urban populations also improved. In many parts of the world, however, the conditions that were prevalent in Western cities during the 18th and 19th centuries remain prevalent today at the beginning of the 21st century.

Why should cities and city living affect disorders, and more particularly, why should cities affect mental health? Before addressing this question, a couple of cautions are in order. First, there is no “one way” in which city living may affect mental health. Although, for the sake of explication, we generally discuss mechanisms and mental health, it is frequently different mechanisms that are important potential explanations for the relations between urban living and different medical disorders. As we discuss potential mechanisms we consider “mental health” as one construct but make reference to specific theoretic distinctions and empiric examples that suggest how different factors may be differently important for diverse mental disorders. In this chapter we restrict ourselves to considering mental disorders and refer to the related construct of mental health overall. We do not attempt to address psychological distress or other psychological conditions.

Second, cities are ultimately places. Although, as other chapters in this book discuss, cities are not static and the very dynamism of cities is one of their defining features, considering mental health in cities is ultimately the study of how a particular type of place may affect mental health. Explanations for these potential effects then rest primarily on how characteristics of places—in this case cities—may be important determinants of mental health. There are several characteristics of cities that may be important determinants of mental health, each having multiple implications for urban dwellers. Building on the extant literature, we consider here five concepts that may be particularly relevant to mental health: social disorganization or strain, social resources, social contagion, spatial segregation, and the urban physical environment. Although there is overlap between each of these concepts, considering each in turn lends insight into the potential causal relations between urban living and mental health.

Social Disorganization or Strain
One of the primary explanations for the relation between urban living and health that has been posited in different guises in several disciplines can be conceptualized within the rubric of social disorganization or social strain theories. Social disorganization theory was first developed in studies of urban crime by sociologists in Chicago in the 1920s and 1930s. In brief, social order, stability, and integration are conducive to conformity, while disorder is conducive to crime and poor integration into social structures. More recent theoretical and empirical refinements to social disorganization theory have held that social control is the hallmark of social disorganization theory and affects the likelihood of crime in cities. A parallel theory, frequently referred to as anomie or strain theory while arising from a separate disciplinary focus, similarly suggests explanations for the relations between social structure and behavior. Émile Durkheim used the term anomie to refer to the state of a lack of social regulation in modern society as one of the conditions
that makes for higher rates of suicide; drawing on this work, Robert Merton\textsuperscript{21} suggested that anomie is the lack of societal integration that arises from the tension between aspirations of industrialized persons and the means available to them to achieve those aspirations. In the United States in particular, the exposure of persons of all social classes to high aspirations that are practically unachievable produces strain or pressure on these groups to take advantage of whatever effective means to income and success they can find, even if these means are illegitimate or illegal. Hence, Merton argues that social strain can be associated with crime.

Contemporary anomie or strain theories, such as general strain theory, expand on the connection between sources of strain, strain-induced negative emotion, and individual criminal behavior. Agnew\textsuperscript{22} suggests that there are other sources of strain in modern living, including confrontation with unpleasant stimuli. In a recent modification of general strain theory, Agnew\textsuperscript{23} more clearly specifies that the types of strain most likely to lead to criminal or delinquent coping are strains that are seen as unjust and high in magnitude and that emanate from situations in which social control is undermined and pressure the individual into criminal or delinquent associations.

Social disorganization and social strain theories have important implications for mental disorders in cities. A substantial body of research has documented the role of stress in shaping health in general and mental health in particular.\textsuperscript{24, 25, 26, 27} Although most of this work has considered stress processes at the individual level,\textsuperscript{26, 27} there is a growing appreciation of the fact that environmental context may itself be an important determinant of health or may shape the impact of other stressors on individual mental health.\textsuperscript{28} Urban areas are generally characterized by higher social disorganization, socioeconomic disparities, dense and diverse populations, higher crime rates, and migratory populations, posing considerable stress on their residents. It is worth noting the particular role that migration may play in generating social strain in urban areas, particularly in rapidly urbanizing countries in the developing world. Rural-urban migration and emigration between world cities have changed the demographics of countries worldwide. The social strain accompanying migratory waves may be substantial. Among the consequences of these relocations are diminishing social ties that are salutary for mental health,\textsuperscript{29} increasing interfamilial conflict between generations of emigrant families,\textsuperscript{30} and the increase in stressors of daily living that co-occur with the precarious economic situations that frequently accompany migration.\textsuperscript{31}

Urban areas also potentially include a substantial number of daily stressors (e.g., noise, pollution) that can result in greater social strain. A few studies have supported these theories and documented a relation between social disorganization, social strain, and mental health. For example, a study assessing the relationships between perceptions of one's neighborhood and depressive symptoms found that perceptions of neighborhood characteristics (vandalism, litter or trash, vacant housing, teenagers hanging out, burglary, drug selling, and robbery) predicted depressive symptoms at a nine-month follow-up interview. These results suggest that social disorganization and social strain are determinants of depressive symptoms.\textsuperscript{32} Several studies have shown that social strain is associated with poorer overall men-
Mental health, depression, and substance use, though few of these studies have specifically assessed the relations among the urban environment, social strain, and mental health. Urban areas characterized by more deviant behavior also may have a higher likelihood of traumatic-event experiences for their residents (e.g., rape, interpersonal violence), which are consistently linked to poorer mental health, including anxiety and mood disorders.

**Social Resources**

Further refinements on social strain theory in urban areas include an appreciation of the fact that in urban areas persons with different socioeconomic status both may be faced with stressors and have disparate access to resources that may help them cope with stressors. In particular, formal local resources can complement or substitute for individual or family resources for highly transient urban populations. Therefore, the relation between urban stressors and mental disorders is likely buffered by salutary resources (e.g., health care, social services) that are frequently more prevalent in urban compared with nonurban areas. Although these resources may be available to urban residents, socioeconomic disparities in cities are linked to differential access to these resources, suggesting that persons at different ends of the socioeconomic spectrum may have different opportunity to benefit from the resources available in cities. This discrepant exposure to stressors and access to resources has been called the “differential vulnerability” hypothesis, positing that persons with lower socioeconomic status are exposed to more stressors and also have fewer resources to help cope with them. This hypothesis may be particularly important in urban areas characterized by socioeconomic disparities.

Individual social experiences also may be important determinants of mental disorders in cities. For example, limited social support may predispose persons to poorer coping and adverse health. In one national forensic autopsy of suicides, it was shown that urban suicides were more likely to be preceded by a recent separation from a partner than were rural suicides, suggesting that social connectedness may play a different role in determining mental disorders in urban versus rural areas. More important, there is scant evidence that social connectedness in cities is better or worse than in nonurban areas. It is more likely that the nature of individual connections vary in different contexts, and it is the interrelation between urban social and physical environmental stressors, availability and access to material resources, and psychosocial resources that ultimately would explain any relation between urban living and mental disorders.

Several other forms of social resource have been shown to affect health in cities. Informal social ties are an important feature of city living that affects social support, networks, and cohesion. Social capital effects, including manifestations at the contextual level (e.g., at the level of the whole city or of urban neighborhoods) and the social network level, are thought to help offer general, ongoing economic and social support and also make specific resources available at times of stress. Social capital is often defined in terms of features of social organization, and as such, it has been hypothesized that social capital is associated with lower levels of criminal activity through the enforcement of social norms as dis-
cussed earlier. However, the relation between social capital and crime is likely reciprocal: While social capital is associated with lower crime rates through the suppression of deviant behavior, high crime rates erode bonds in communities and weaken protective institutions, allowing for further criminal activity. In the context of cities, the greater spatial proximity of one’s immediate network may well accentuate the role of networks in shaping health. Social networks have been shown to be associated with a range of health behaviors, including misuse of substances.

Social Contagion

Other theories that explain how urban living may affect mental disorder emphasize the role of group influence on individual health and behavior. Social learning theory emphasizes the importance of observing and modeling the behaviors and attitudes of others, especially in densely populated areas where there are several persons on whom behavior can be modeled. In diverse urban settings, social learning can both set social norms and set norms for social network behaviors. Similarly, theories of collective socialization emphasize the influence of group membership on the individual. These theories suggest that persons who are in positions of authority or influence in specific areas can affect norms and behavior of others in direct and indirect ways. Institutional socialization theory has been closely linked to the allocation of social resources within city neighborhoods, which in turn has implications for health in cities as discussed earlier.

One of the concepts that is linked to social learning and may have substantial implications for public health is “contagiousness.” Models of biological contagion, particularly in the context of infectious disease, are well established. However, newer theories include the possibility of contagiousness of ideas and social examples. Contagion theory is employed by sociologists as one explanation for crowd behavior. In epidemiology it is understood that—all things being equal—urban populations, characterized by high population density, are at higher risk of transmission of biological organisms. Also, because concentrated urban populations share common resources (e.g., water) the practices of one group can affect the health of others. These observations may be extended to behavior and to mental disorder. A classic example has been referred to as the Werther effect. The Werther effect suggests that media representations of suicide may have some influence on the actions of those exposed to them such that suicide becomes more likely. Several studies have provided both theoretical and empirical reasons to suggest that media representations of suicide could have some influence on a person’s suicidality.

In the urban context, the concentrated proximity of both persons and sources of information may be a “crucible” for the exacerbation of this effect. One obvious such example would be the consequences of an urban disaster. A disaster in a densely populated urban area may well have substantial implications for mental health and behavior that would not be true in a disaster in a less densely populated urban area. Taking for example the case of the September 11, 2001 terrorist attacks, the North Tower of the World Trade Center (WTC) in Manhattan, New
York City, was hit by an American Airlines Boeing 767 passenger plane at 8:45 a.m. on Tuesday, September 11, 2001. New York City residents learned of the crash in near real-time through the Internet, or all-news channels or by looking up to see the WTC burning on the morning commute to work. New Yorkers were watching early reports of the first attack when a second plane struck the WTC South Tower. In the hours that followed, two other airplanes crashed elsewhere, the WTC towers collapsed, and thousands of persons were evacuating from lower Manhattan, searching for missing family and friends, or assisting in the rescue efforts. In New York City, the days and weeks after September 11 were characterized by a growing awareness of the magnitude of the loss of life and fear of other potential terrorist attacks. Therefore, the attacks on the WTC were experienced by a substantial proportion of New Yorkers in real time, either by seeing these events firsthand or hearing about them by word of mouth. Subsequent research after the attacks has shown that up to one-fifth of persons interviewed in a representative sample of residents of New York City report seeing some of the events in person, and there was a substantial proportion of the population not directly affected by the attacks who reported symptoms consistent with posttraumatic stress disorder related to the September 11 attacks. Intriguingly, the persons who were not directly affected by the attacks (those who did not see the attacks or lose possessions or relatives) would not be considered as “exposed” to the traumatic event by classic criterion definitions proposed by the American Psychiatric Association’s Diagnostic and Statistical Manual, Fourth Edition (DSM-IV). It can be argued that the urban context in general was instrumental for the contagion of both exposure to the event in New York City and the subsequent development of mental health symptoms.

Spatial Segregation

Spatial segregation of different racial or ethnic and socioeconomic groups may also be an important determinant of mental health in cities. Many cities worldwide are highly segregated with multiple historical, logistical, and practical barriers to mixing of social groups. In their seminal work on mental disorder in urban areas, Faris and Dunham describe in detail a Chicago that had concentric circles wherein dwelled distinct groups whose social status was relatively unchanged even with gradual migration of populations. Spatial segregation can have multiple effects, including the enforcing of homogeneity in resources and social network ties, which suppresses diversity that may benefit persons of lower socioeconomic status. Considering the role of spatial segregation in conjunction with concepts of social learning, spatial proximity to beneficial role models may be critical for socioeconomically disadvantaged persons to identify avenues to improve their social status. Perhaps more important, spatial proximity to persons of higher socioeconomic status could permit the formation of social networks that are critical for obtaining employment and opportunity for social mobility. Spatial heterogeneity also permits persons of higher socioeconomic status to appreciate the issues faced by others and to use their power, money, and prestige to influence the development of better-distributed salutary resources.
Conversely, it is worth noting that spatial segregation may minimize social strain by keeping persons who are different apart from one another. It has been shown in some studies that minorities living in highly segregated areas who come into contact with other racial or ethnic groups only infrequently experience discrimination less than do minorities who regularly come into contact with persons of other racial or ethnic groups. Discrimination in turn has been associated with poor mental health. However, it is important to note that segregation of minority groups into urban or peri-urban slum areas in many developing-world countries represents a substantial threat to these populations' physical health and—as increasingly suggested by empiric research—mental health.

The Urban Physical Environment

Urban areas typically feature a heavily built environment, reliance on human-made systems of water and food provision, and reliance on housing that is frequently substandard. It has been argued that the primary feature distinguishing the 20th century from previous centuries and cities from nonurban areas is the degree to which humans have become the primary influence on the physical environment. The urban physical environment interacts with the other domains discussed earlier to shape health in cities. As cities grow, the features of the physical environment that can affect health also grow. Highways and streets can destroy green space, influence motor vehicle use and accident rates, increase urban noise, and heighten the daily hassles of urban living. Green space has been associated with overall health and better mental-health functioning in several studies. Automobile use of unleaded gasoline can increase lead levels in the environment. In turn, higher lead levels may be teratogenic in utero; prenatal exposure to teratogens has been associated with adult onset of mental illness. Noise exposure in turn may contribute to hearing impairment, psychological distress, and hypertension. The urban infrastructure is also part of the physical environment. As the expensive urban infrastructure ages in a period of declining municipal resources, breakdowns may increase, not only causing physical health problems related to water, sewage, or disposal of waste but also limiting municipalities’ ability to adequately provide salutary resources. Ultimately, urban design may also influence crime and violence rates, demonstrating the close interactions among urban physical and social environments. Additionally, as we discuss later in the chapter, differential exposure to environmental toxins may contribute to the incidence of psychiatric disorders in urban areas. Recent empiric research that has assessed how characteristics of intra-urban environments are associated with health has improved our understanding of the relation between the urban physical environment and mental health.

In summary, there are several mechanisms that may explain how cities affect mental health, with different mechanisms being potentially important for different mental disorders. Indeed, a “big picture” perspective on the relation between characteristics of city living and mental health would suggest that any such relations are undoubtedly complicated. While specific features of cities may affect certain conditions adversely, other features may offer protection. Interrelationships be-
tween features of the urban environment (e.g., between spatial segregation and potential social strain) complicates attempts at generalization. Similarly, the empirical work that has explicitly assessed how urban living affects mental disorder has only begun to “scratch the surface” of the topic. In the following section we summarize the key research in the area in three distinct eras.

The Evidence

Before DSM-III (1980)

The past century has seen a flourishing of empiricism in health research, and in hand with that, several epidemiologic studies have sought to understand the potential relations between urban living and mental disorders. Empiric work produced conflicting results at the beginning of the 20th century. For example, in a U.S. study, White found mental disorders to be higher in urban areas, while in a study of four regions of Scotland, Sutherland found higher rates of insanity in rural areas. Sorokin and Zimmerman reviewed data from a number of sources and concluded that psychiatric morbidity was higher in urban areas in the United States overall. These early studies were limited by a number of methodologic difficulties, primarily the use of crude definitions of outcomes and issues of sampling. Still, they acknowledged and established that place of residence and characteristics of the urban (and rural) environments may play a role in shaping individual mental health. In landmark research that laid the groundwork for much of the thinking behind the relation between urban living and mental health, Faris and Dunham conducted an ecological study in Chicago neighborhoods and found a high degree of association between different types of psychosis and certain community conditions. As we discuss further in subsequent sections, although recent work suggests that the association between urban living and psychotic disorders is likely complex, in many ways Faris and Dunham’s work presaged thinking about identifying the characteristics of urban neighborhoods that may be associated with mental health.

During this period, a seminal study provided a basis for comparison between urban and rural areas and had a marked influence on subsequent research. The fundamental postulate of the 1962 Midtown Manhattan study was that “sociocultural conditions . . . have measurable consequences reflected in . . . mental health differences” and built explicitly on some of the earlier theoretical work that suggested that sociocultural features of urban living (such as disorganization) may shape mental health. This study was a cross-sectional, in-person survey study, sampling residents (including hospitalized or institutionalized persons) of midtown Manhattan between 20 and 59 years old (n = 1,660). Among the principal findings from this study, it was shown that there was particularly high prevalence of mental pathology among single men, and low parental and adult socioeconomic status was associated with a greater likelihood of psychological impairment. The authors suggest that economic factors, potentially linked through pathways of discrimination, shape psychological factors that may affect adult mental health. Subsequently, other work compared the prevalence of psychiatric disorders in less
urban areas to data obtained in the Midtown Manhattan study using comparable assessment methods. Using records from Minnesota, Laird estimated that the prevalence of severe psychiatric disorders in rural areas in Minnesota was one-tenth that reported by the Midtown Manhattan Study. In contrast, in a comparison of psychiatric morbidity from the Stirling County Study (a study of the prevalence of psychiatric morbidity in rural Nova Scotia), Srole concluded that the prevalence of psychiatric disorders was lower in Midtown Manhattan than it was in rural Nova Scotia.

Some of the most interesting research in this era that considered potential relations between urban living and mental disorder was concerned with psychiatric disorders in children. In a small study of 175 five- to six-year-old preschool children, Kastrup did not find differences in the prevalence of psychiatric disorders between children recruited from the urban municipality of Åarhus and Samsø County, Denmark. This study was limited by a relatively small sample size and by crude assessment of psychiatric disorders. In contrast, a contemporaneous study of adolescents, using personal psychiatric interviews, questionnaires, and school information to assess total psychiatric disorder among 483 adolescents in Norway, found that the prevalence of psychiatric disorders was 16.9% in Oslo compared with 7.9% in a rural area in South-East Norway.

In the mid 1970s, an influential series of studies, collectively referred to as the Isle of Wight Studies, rigorously and systematically assessed psychiatric disorders in nine- to eleven-year-old children and provided some of the most compelling data relevant to questions of interest here. In a comparison between 10-year-olds in the Isle of Wight and 10-year-olds attending school in an inner-city London district, it was shown that the prevalence of psychiatric disorder was twice as high in London as it was in the Isle of Wight, and this discrepancy was more pronounced in girls (26.2% vs. 10.8% comparing London to the Isle of Wight) than it was in boys (18.3% vs. 13.0%). Reading retardation was nearly three times higher in London than in Isle of Wight children (9.9% and 3.9%, respectively). These studies were notable in their efforts to take into account the possible confounding effects of migration and social selection and in considering the principal reasons that might explain these differences. The authors suggest that the higher proportion of children with psychiatric disorders in London was linked to a relatively higher proportion of family discord and social disadvantage in London than in the Isle of Wight. In some ways these observations foreshadow more recent studies, some of which are discussed in the next section, that have begun to consider how characteristics of urban neighborhoods contribute to intra- and interurban differences in the incidence and prevalence of both adult and child psychiatric disorders.

Dohrenwend and Dohrenwend summarized the principal epidemiologic work in the area during most of the 20th century review that considered the best empiric evidence in an attempt to determine whether there was substantiation that urban settings were associated with a greater prevalence of psychiatric disorders than rural settings. Having limited their observations to nine epidemiologic studies that reported prevalence of adult psychiatric disorders in both urban and rural sites conducted from 1942 to 1969 (in multiple cities including Tokyo, Japan, Reykl-
vik, Iceland, and Abeokuta, Nigeria), the authors suggest that a consistent pattern emerged from these disparate studies and that “there appears to be a tendency for total rates of psychiatric disorders to be higher in urban than in rural areas.” A substantial portion of the difference in the urban-rural prevalence of mental disorders was influenced by higher prevalences of neurosis and personality disorders in urban communities. The authors note, however, that many of the studies they reviewed were limited by substantial methodologic difficulties, making comparisons across studies challenging. Dohrenwend and Dohrenwend’s conclusions have been challenged by authors who note that the samples that were the subject of this review were small and that the urban-rural differences reported were also small.

In addition, several of the “urban” areas in the studies reviewed by Dohrenwend and Dohrenwend were atypically small urban communities and not usefully representative of modern urban areas.

Community Prevalence Studies

The past two decades have witnessed a dramatic systematization of the study of psychiatric epidemiology in general, and more than a dozen community surveys have been published that have described the urban versus rural epidemiology of different mental disorders. In the United States, the Epidemiologic Catchment Area (ECA) project, a multi-stage probability sample of U.S. residents using in-person interviews, was the first community survey to assess psychiatric disorders using standardized instruments based on the DSM-III. Analyses using ECA data have specifically assessed urban-rural differences in the prevalence of psychiatric disorders in the United States, finding a two-fold higher prevalence of major depression in persons living in urban areas compared with those living in rural areas but no difference between small metropolitan areas and rural areas. The prevalence of drug abuse or dependence was also higher in large metropolitan areas assessed in the ECA. The question of urban-rural differences was reconsidered using data from the National Comorbidity Survey (NCS), a community survey carried out in five sites across the United States. Using similar large and small metropolitan- and rural-area definitions as the ECA did, two NCS analyses found no difference in the prevalence of major depressive episodes, affective disorders, substance-use disorders, antisocial personality disorder, or psychological disorders overall between persons living in different size metropolitan or rural areas. A Canadian study using similar methodology also failed to document an urban-rural difference for a range of psychiatric disorders. It is worth noting that all of these studies used lay administration of structured instruments, leaving open the possibility of nondifferential misclassification. Although this observation has several implications for inference that can be drawn from these studies, it is unlikely to affect the validity of the urban-rural comparisons of interest here.

In Europe, population-based surveys (two U.K. and one Dutch) have assessed the prevalence of mental disorders and examined urban-rural differences. In the first of these studies, the U.K. Health and Lifestyle Survey, an association was found between urban residence and the prevalence of psychiatric morbidity; this study used interviewers’ subjective assessment of respondents’ homes to deter-
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mine urban versus rural living. Subsequently, the Household Survey of National Morbidity of Great Britain, a multistage community sample using in-person interviews, also used interviewer-rating to determine urban versus rural residence and found that urban residents had higher prevalence of psychiatric morbidity in general as well as alcohol and drug dependence. The Netherlands Mental Health Survey and Incidence Study, a multistage, stratified, random study in the Netherlands, documented higher likelihood of mood, substance use, and psychotic disorders in urban versus rural residents. The same study did not find urban-rural differences in anxiety disorders. Other European studies that have focused on the relation between urban living and schizophrenia are discussed later in this chapter.

Four studies have assessed urban-rural differences using population-based surveys in Asian countries. The first of these was a multistage random sampling of households using in-person interviews (administered as part of the Clinical Interview Schedule) in Taiwan. This study found no significant differences in the prevalence of total psychological morbidity, anxiety states, or depression between the urban and rural areas; no differences were observed in symptom profile between the areas, either. A contemporaneous larger multistage random community sample, using in-person interviews based on the DSM-III, assessed persons in metropolitan Taipei, small towns, and rural villages in Taiwan. In contrast to the findings of Hwu et al., this study found that the small-town samples had higher lifetime prevalence of eight disorders, including major depressive disorders, dysthymic disorder, panic disorder, generalized anxiety disorder, alcohol abuse or dependence, and drug dependence. A comparable study, carried out in Korea, found a higher lifetime prevalence of many psychiatric disorders in less urban areas compared with Seoul, including alcohol abuse or dependence, agoraphobia, panic disorder, and cognitive impairment. This study found a higher prevalence of antisocial personality disorder in Seoul compared with the rest of the country and no differences in schizophreniform disorders or affective disorders (including depression). A smaller study of persons over age 65 in Korea also failed to find urban-rural differences in depression. One study in New Zealand that used a cross-sectional random community mail survey found no rural-urban differences in measures of psychiatric morbidity.

In summary, the studies in the past 20 years that have documented urban-rural comparisons in the prevalence of psychiatric disorders do not suggest that there is a consistent urban-rural difference in mental morbidity in general or for specific mental disorders with the possible exceptions of psychosis and child behavior disorders. The published data do hint that certain morbidities, particularly alcohol abuse or dependence may be more likely in rural versus urban areas, although the inconsistency in the assessment of alcohol abuse or dependence across these studies suggests the need for further work to clarify this suggestion. It is important to note that none of these community surveys has been carried out in developing-world countries; emerging work from South Africa may provide an invaluable contribution to our understanding of the role of urban living and psychiatric disorders in Africa and in the developing world.
Studies That Consider Characteristics of Urban Areas and Mental Health

While the advent of community prevalence studies over the past 20 years provided rich opportunity for urban-rural comparisons, most of the relevant studies in those years were not predicated on the earlier theoretical work that, as summarized earlier, suggested specific mechanisms through which urban living may be associated with mental health. As such, these studies ultimately have limited usefulness in determining whether city living is a determinant of mental health, what the features of urban living are that may affect mental health, and how urban areas may affect the health of the residents within them. It is not surprising that different urban-rural comparisons have provided conflicting evidence about the relative burden of mental health in urban and nonurban areas. Changing conditions within cities and differences in living conditions (e.g., qualities of the built environment, exposure to environmental toxins) between cities suggest that these studies at best provide a snapshot of how the mass of urban living conditions at one time may be affecting population mental health.

More recently, several studies have assessed how particular characteristics of urban living are associated with mental disorders in individuals. This group of studies typically focuses on spatial groupings of individuals (often conceived as “neighborhoods,” although several studies assess the contribution of administrative groupings that are not necessarily meaningful to residents as neighborhoods) and considers the role of one’s community of residence within an urban area in shaping individual mental health. These studies come full circle, applying new empiric methods to earlier theories that describe how city living may affect health. The growing use of multilevel modeling techniques in epidemiology has made these studies both more common and more methodologically robust and provides insight into how features of the urban physical and the social environment may influence health. However, most of the literature in the area has focused on physical health, with few published studies that consider mental health outcomes.

A recent systematic review of neighborhood characteristics and health outcomes identified only one study (out of 25 reviewed) that considered mental disorders. That study with a random sample of adult residents in Amsterdam failed to observe a relation between living in socioeconomically disadvantaged urban neighborhoods and mental disorders. A study discussed earlier showed that neighborhood social disorganization was associated with depressive symptoms. Another study looking at the association between features of the urban built environment and mental health assessed the relation between the quality of one’s living environment and the likelihood of depression using a cross-sectional survey. The study found that persons living in poor quality physical environments were more likely to report symptoms consistent with depression after accounting for individual characteristics. Other work has shown that living in more deprived neighborhoods is associated with higher levels of child problem behavior and a higher incidence of nonpsychotic disorders. A recent study corroborating these observations made use of a randomized controlled trial in which families were
moved from public housing in high-poverty neighborhoods to private housing in nonpoor neighborhoods in New York City. This experimental study showed that both parents and children who were moved to the better housing and better neighborhoods reported fewer psychological distress symptoms than did control families who were not moved (although the difference in mental health was noted in boys but not in girls).

Thus, while a relatively nascent area of research, multilevel analyses assessing relations between characteristics of urban environments and individual mental health promise to advance our understanding of the question well beyond the insights possible from the comparative descriptive studies of the 1980s and 1990s. The implications of such multilevel analyses, however, may be difficult to generalize to other cities or urban areas more broadly. For example, the observation in one study that the quality of residences in London is associated with the likelihood of depression among urban residents may not necessarily be relevant in another urban context where the social environment plays an equally important role in shaping individual mental health. This observation reflects both the complexity of the factors that may shape mental health in cities and the limitations of extant methods in fully assessing how urban living conditions may affect health.

**The Example of Schizophrenia**

To date, the psychiatric disorder that has been most thoroughly investigated with respect to urban rural differences is schizophrenia. The notion that urbanization may be linked to severe mental disorder emerged in 19th-century debates over apparent increases in insanity in Europe and the United States. Dramatic increases in asylum populations during the 19th century were a fact, but whether these increases represented an increase in the occurrence of mental illness was disputed. Many believed, however, that the societal transformations of the era had been handmaiden not only to advancing “civilization” but to insanity. Urbanization was a significant feature of these transformations. By the end of the century, evidence that “the proportion of insane is highest where we find the greatest congestion of population” had taken shape. For most of the 19th century, however, we do not have direct evidence bearing on schizophrenia.

Early studies in social psychiatry brought the urban detail of schizophrenia into sharp focus. We again refer to the landmark study by Faris and Dunham. What is notable is that these early researchers conceived of the urban environment as causal, hypothesizing that neighborhood characteristics produced social isolation, thereby encouraging the development of key features of schizophrenia. For most of the last half of the 20th century, however, higher rates of schizophrenia in urban centers were seen as an artifact of selective migration. Accordingly, urban risk was thought to be explained by individuals with schizophrenia selectively migrating or drifting into urban environments in response to the illness or its prodrome. The evidence for social or geographic drift was limited; however, the alternative theory—that urban environments somehow contribute to the occur-
rence of schizophrenia—was difficult to prove and appeared less consistent with the growing domination of genetic theories of the disease.

More recently, evidence for a causal effect has grown much stronger. For this reason, attention has shifted to refining the timing of urban impact and exploring mechanisms of influence on schizophrenia. A series of recent studies conducted in Europe, adopting prospective designs executed in large unselected populations, have begun to elucidate the ways in which urban environment may be related to risk of schizophrenia. Linking various population and national psychiatric case registries, these studies establish residence at various points early in the life course and follow the population for onset of schizophrenia. The studies also incorporate explicit definitions of levels of urbanization. These design features provide the basis for excluding selective migration and strong inference for urbanicity as a risk factor for schizophrenia.

The first in the series is the Swedish conscript study. Data was obtained from 49,191 military inductees (1969–70); those who reported “mostly growing up” in urban environments were at 1.65 times increased risk of subsequently developing schizophrenia (1970–83) compared with those growing up in rural environments. The risk of schizophrenia increased stepwise from rural areas to small towns, to larger towns, to cities. The association was not explained by family economic circumstances, family history of mental disorder, or other potential confounding factors, including cannabis use. More recent work from Sweden has shown that the incidence rates of hospitalization for psychosis increased with increasing urbanization; those living in the most densely populated urban areas had 68% to 77% more risk of developing psychosis compared with those living in the least densely populated areas.

This Swedish conscript study was followed by a second group of studies based in the Netherlands. Following the 1942 to 1978 Dutch birth cohorts for psychiatric admissions from 1970 to 1992, Marcelis and colleagues reported a significant association between urban birth and subsequent risk of schizophrenia. Although the effect was strongest for schizophrenia, increased risk was also observed for affective and other psychoses. At the highest level of urban exposure, the risk of schizophrenia narrowly defined was double that at the lowest exposure. A subsequent analysis focused on sorting out the timing of the urban effect. Because urban birth, upbringing, and adult residence are highly correlated, Marcelis and colleagues sought to establish whether the risk-increasing effect was related to residence at the time of onset, earlier in life, or both. Cases with onset occurring before 1995 were identified among all live births, 1972 to 1978, and the effect of urbanicity at birth and residence at onset were assessed simultaneously. The main effect of urbanicity was related to residence at birth rather than residence at the time of onset.

A third series of studies issued from Denmark. Based on 1.75 million individuals identified in the population registry, Mortensen and colleagues found that risk of schizophrenia was associated with the degree of urbanization of place of birth, increasing by dose response. Those born in the capital city were at 2.4
times greater risk compared with those born in rural areas, an effect that remained after controlling for family history of disorder. These findings were subsequently replicated using cases of schizophrenia diagnosed using the *International Classification of Diseases* (10th ed.) and identified in registry records, including inpatient and outpatient treatments and using broader control of family history and refined definitions of urbanicity. Addressing the issue of exposure timing, Pedersen and Mortensen established a large population-based cohort; information on residence during upbringing was available for 807,000 cohort members. Examining residence in one-year intervals from birth to age 15, they reported that there was no most-vulnerable age during childhood, and the effects of urbanicity appeared to be cumulative. Also emerging from this study was the finding that change of municipality of residence in childhood, a move that would trigger a change in school, was associated with increased risk of schizophrenia, particularly in adolescence.

Taken together, these studies provide strong evidence for a relation between urban living and schizophrenia. The relationship is probably at least in part dependent on factors acting early in life. These studies also provide strong evidence against selective migration within or across generations as the main explanation for the association. It is also unlikely that differences in case detection based on differences in the likelihood of treatment and diagnosis between urban and rural settings fully account for the findings. The severity of the illness argues against the possibility of differential presentation for treatment: Historically, even in remote areas of Sweden it was found that affected individuals were known to health care providers. With respect to availability of treatment, there is evidence of comparability across urban and rural settings in the Netherlands and Denmark, and access is ensured because treatment is free. Significant urban/rural differences in diagnostic practices are possible but unlikely, particularly in small countries such as the Netherlands and Denmark. Furthermore, conservative diagnostic practices in rural settings would need to include underdiagnosis of all nonaffective psychosis to account for the full range of findings reported. Yet many investigators remain skeptical of a valid association between urbanicity and schizophrenia, since there is no known mechanism or defined mediator, and it is still possible that the finding could be the result of some unknown bias.

Several hypotheses have been advanced to explain the association. First, environmental toxins such as lead, noise, and air pollution are all more prevalent in urban settings. Lead is known to affect neurodevelopment and behavior in children, and prenatal exposure may increase risk of schizophrenia in adulthood. Related evidence that exposure to noisome occupations increases risk for schizophrenia may be relevant to the overall hypothesis with respect to noise and air pollution. Air pollution has been shown to affect fetal development and neurodevelopment in young children; suggestive findings relating specific component pollutants to the risk of schizophrenia have been reported.

Second, the spread of contagion in an urban environment is more effective. Evidence relating pre- and perinatal exposure to infection (influenza, rubella, HSV-2, encephalitis) and risk of schizophrenia is accumulating. Behavioral contagion is a potential feature of the urban environment affecting risk of schizophrenia, and cannabis use in adolescence has been linked to increased risk of
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Although it was not found to fully account for the urban effect reported in the Swedish conscript study, cannabis and other substance use have not been thoroughly investigated in the context of urban risk.

Third, the social context of urban environments and neighborhoods, although little explored, potentially is a determinant of schizophrenia. Evidence indicates that neighborhoods matter in determining adult psychiatric outcomes and child behavior problems. Early ecologic studies reported higher rates of schizophrenia in areas characterized by social isolation as defined by the proportion of single-person households. More recently, multilevel studies have produced results consistent with and elaborating on the social isolation hypothesis. In a small city in the Netherlands, neighborhoods with a higher proportion of single and divorced persons were found to have higher rates of schizophrenia; however, single individuals were at highest risk of schizophrenia when living in a neighborhood of predominantly married individuals. Similarly, a study conducted in London found that ethnic minorities living in neighborhoods of predominantly majority ethnicity were reported to be at higher risk of schizophrenia compared with ethnic minorities living in minority neighborhoods. Whether these circumstances taken to indicate social isolation closely track with the continuum of urbanicity has not been established. Furthermore, these and other studies of neighborhood characteristics related to isolation and discrimination were conducted in adult populations; it is not known whether these represent the environments of their childhood. A specific mechanism for translating a social context affecting all members of the population to individual risk has not been established. One possibility is that those vulnerable to developing schizophrenia may also be particularly vulnerable to the impact of these environments.

The notion that the urban environment plays a role in the occurrence of schizophrenia, a condition known to have a strong genetic basis, may be counterintuitive to some schizophrenia researchers. Indeed, the magnitude of relative risk conferred by urban living is far less than that conferred by family history of disease. In the Danish population study described above, having a mother or father or sibling with schizophrenia was associated with a 7- to 9-fold increased risk of developing the disease, whereas the highest level of exposure to urbanicity was associated with a 2.4-fold increase in risk. The population-attributable fraction, however, reverses the importance of these factors. A family history of schizophrenia accounted for 5.5% of cases, whereas urban place of birth accounted for 34.6% because few individuals have a family history of schizophrenia, whereas many people are born and raised in cities.

Schizophrenia is among the most disabling and costly of major mental illnesses; therefore, it is of major importance that a common exposure such as urbanicity may contribute to this disorder. The fact that urbanicity has been associated with psychotic symptoms among the nondiseased as well as those with psychotic disorders indicates an even broader scope of impact. This series of findings also suggests that in seeking to determine the impact of urban environments on mental health, we should not restrict attention to those disorders that are conceptualized as stress-related diseases. The global impact of urban environments on mental disorders may be far less intuitive.
A Research Agenda: What Are the Features of Urban Living That Affect Mental Health?

In 1991, the World Health Organization identified mental illness as one of the diseases that deserved special attention in the light of trends (including urbanization) that could have an impact on mental health.\textsuperscript{133, 134} However, mental health continues to be an underfunded area of research, considering its relative importance for the global burden of disease and because significant questions concerning the impact of urbanicity and urbanization on mental health remain unanswered. The recent resurgence of interest in urban health\textsuperscript{135} provides an opportunity to frame and consider questions about mental health and urbanicity. There are four primary areas of research that urgently need exploration as we seek to improve our understanding of the relation between cities and health.

First, as we hope the discussion here shows, both the theoretical considerations that explain why cities may affect mental health and the conflicting evidence on the relation between city living and mental health suggest that research needs to move beyond thinking about cities as a whole and can more fruitfully consider the features of cities that may contribute to poor mental health or improve mental health. The cross-sectional surveys that highlighted the potential differences in the prevalence of mental health problems between urban and rural areas unfortunately raise more questions than they answer. It is likely that the primary reason for the conflicting results documented by these surveys is the complexity of urban factors that may affect mental health. Prevalence studies cannot differentiate between the determinants of incidence of psychiatric disorders and the determinants of prevalence of these disorders, which may include factors that affect disease duration and severity that may be different than those associated with disease onset. Also, it is difficult to adequately control for factors such as selective migration or socioeconomic factors that may introduce bias or unmeasured confounding, particularly in cross-sectional surveys.\textsuperscript{136}

Although there is growing evidence of the role that characteristics of neighborhoods may play in determining physical health, relatively little of this work has concentrated on mental health. Recent work, discussed above, has provided early experimental evidence that living in poor neighborhoods is associated with psychological distress, anxiety or depressive symptoms, and dependency,\textsuperscript{102} suggesting avenues for future research and intervention. Better study designs, particularly the use of longitudinal or experimental studies, will obviate some of the concerns about most of the extant research. Nevertheless, it will be more helpful to appreciate that a diverse set of risk factors determines mental health and that the complexity of urban circumstance and urban living frequently results in these factors manifesting differently in different contexts. Thus, it is important that future research focus on understanding specific characteristics of urban living that shape mental health and how these characteristics interrelate.

Second, while assessing the urban determinants of mental health is an important first step, elucidating the mechanisms through which risk factors are associated with mental health is equally important and particularly germane to the de-
development of effective interventions. As discussed in this chapter, a diverse set of mechanisms including stress processes, the availability of resources, varying degrees of social connectedness, and exposure to infectious agents and environmental toxins may explain how characteristics of cities affect urban health. Clearer elucidation of the pathways between urban determinants and mental health involving empiric tests to determine which mechanisms may be more important in particular contexts can guide interventions and the development of cities that promote health. For example, if the relation between the urban built environment and depression is mediated by how the built environment facilitates (or discourages) social ties, different solutions are indicated than if stress processes mediate the relation between the built environment and mental health. If the former pathway is correct, one could easily conceive of efforts to promote social connectedness as a way of minimizing depression in lieu of ambitious and expensive renovation of dilapidated built environments. However, if the latter pathway is correct, successful interventions must improve the quality of the built environment itself to plausibly affect depression in the urban context.

It is likely, of course, that multiple mechanisms are responsible for the relations between different urban characteristics and mental health and that observed epidemiologic relations are mediated through multiple etiologic pathways. Improved understanding of associations, effect modifiers, and mediators can provide insight into how mental health interventions in cities can best be designed and tailored to maximize effectiveness. As a corollary to this direction, future work that considers how the urban environment jointly affects poor physical and mental health may provide insight into the role of the urban context in shaping overall population disability and function.

Third, as the pace of urbanization in less wealthy countries far exceeds urbanization in wealthier countries, consideration of the urban determinants of mental health in different country settings acquires increasing importance. Although mental health in developing countries has historically received less attention than other causes of morbidity, particularly communicable disease, mental health is an increasingly important issue in developing countries. For example, for women in less wealthy countries, neuro-psychiatric diseases account for the second largest burden of disease after cardiovascular disease among all noncommunicable diseases. However, most of the research in the area has been conducted in wealthier countries, to the detriment of our understanding of how urban living in other contexts may shape mental health. A research agenda for urban mental health must include work that identifies the unique urban determinants of mental health in different national contexts and how urbanization, a process that is much more prevalent in developing countries than it is in developed countries, is itself a determinant of mental health. It is likely that differences in baseline vulnerability, social resources, the physical environment, social connectedness, and conceptions of health and illness all may contribute to differences in the role that cities play in shaping mental health in different parts of the world. Research in developing countries and comparative multisite research can help elucidate these differences and direct creative solutions.
Fourth, it is worth noting that the role of HIV infection in shaping the prevalence and incidence of mental disorders, particularly in sub-Saharan Africa, is only beginning to be understood. HIV is the public health challenge of our time, and its impact on all aspects of health in many countries remains incalculable. For example, in South Africa it has been estimated that one-sixth of the country’s population will be infected with HIV by 2010.\textsuperscript{137} The distribution of HIV infection is associated with multiple social and economic factors, and in many countries migrant workers bridging urban and rural communities have contributed to the transmission of HIV.\textsuperscript{138} In the coming decades we can expect disproportionate numbers of children orphaned as their parents die of AIDS, massive bereavement, and changes in the social environment—all of which may have a powerful impact on the distribution of mental health globally. Future empiric research with modeling of the associations between HIV incidence and the consequences of this disease may hold promise for future understanding of how HIV/AIDS may broadly affect population mental health and specifically affect mental health in urban areas.

Ultimately, the primary goal of public mental health research in this area is the identification of relevant characteristics of urban living that may guide interventions and improve population mental health. The broad agenda outlined here rests on the fact that our understanding of mental health in the urban context remains limited. We have limited evidence about how and why urban living conditions may influence mental health and even less evidence that can suggest appropriate intervention. In a rapidly urbanizing world, it is incumbent upon public mental health professionals to advance our understanding of how cities may affect mental health and, in so doing, to identify ways in which we can build healthier cities.

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PART V
Next Steps:
Research and Intervention
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Methodological Considerations in the Study of Urban Health

How Do We Best Assess How Cities Affect Health?

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Introduction

In this chapter we discuss research methods that may be applicable to the study of urban health and consider some methodological challenges that arise in urban health research. Several research questions may be considered pertinent to the study of urban health, and as the discipline continues to evolve, it is inevitable that the range of questions considered important will expand and become more complex. For example, there are important methodological concerns in the definition of “urban,” the specification of urban limits, and the establishment of meaningful boundaries between urban communities. There are separate, equally important issues that pertain to the evaluation of public health interventions in urban areas. The focus of this chapter is on methodological issues pertaining to etiologic research, that is, research aimed at understanding how urban living may affect health. Our discussion of these methods is organized into broad quantitative and qualitative categories and concludes with a discussion of the potential contributions a combination of methods can make to an understanding of health in urban contexts. We consider issues that pertain to study design, analysis, and interpretation, all relevant when discussing methodological considerations in this context. We hope that some of the observations made here can be generalized to other questions that may pertain to the field.

Studying Urban Health: Complex Questions, Methodological Challenges

Forging urban health into a coherent discipline and advancing empiric studies of how urban living may affect health requires a consideration of the complexities in
urban health research. The conceptual framework presented in Chapter 1 of this book suggests that a full understanding of how cities affect health may not necessarily lend itself to the easy application of a single empiric method. This complexity and other features that make the study of urban health challenging are not unique to urban health but rather are characteristics shared by the study of complicated human systems in general. In considering such systems, simple paradigms of single exposure and disease are inadequate.

All etiologic research must begin with clear specification of a research question; this is often one of the hardest steps. Indeed, we suggest that the greatest challenge in the study of urban health is in adequate specification of research questions that address how and why urban living may affect health. There are three primary reasons why this task may be particularly challenging in urban health. First, much of what may be considered urban health research in the literature thus far has arisen from diverse disciplines using different theoretical frameworks and applying various disciplinary orientations and terminologies. For example, in demography and epidemiology, research into the role of urbanization in shaping health may focus on how population change in cities, resulting from migration and population growth, may influence the distribution of diseases. In contrast, the study of urbanization in sociology may focus on social activities and social organization in cities and their association with changing behaviors and their consequences. Thus, in a study about how urban living may affect health, it is important to look at change in urban population size and individual adoption of different urban lifestyles. Useful research should help us understand the role of each in influencing health and behavior; however, few researchers have posed questions that enable them to consider both of these perspectives.

Second, many questions in urban health research are not meaningful in isolation. Understanding how urban living affects health requires consideration of multiple—often competing—influences. For example, while social capital associated with group membership may be salutary, identification with tightly knit homogeneous ethnic communities may result in spatial racial segregation that has been associated with poor health. Different disciplines might study various aspects of urbanization that coexist and potentially exert varying effects on population health. This interdependence of research questions complicates the empiric task of assessing how cities may affect health. Specification of relevant research questions must at least acknowledge, if not take into account, the interrelated processes that ultimately determine health in cities.

Third, as in all research, clear specification of a research question rests, at least implicitly, on the acknowledgment of a theoretical framework that suggests how and why the characteristics of interest may affect health. The absence of such a framework in the study of urban health complicates the specification of research questions in the field as well as the interpretation of research findings. In recent years several investigators have proposed more comprehensive models that may help to unify these different strands of urban research.

As several chapters in this book point out, cities are complex communities of heterogeneous individuals, and multiple factors may be important determinants of population health in cities. For example, understanding the role that racial and
ethnic heterogeneity plays in shaping the health of urban populations requires an understanding of the role of segregation in restricting access to resources in urban neighborhoods and of the potential for greater tolerance of racial and ethnic differences in cities compared with nonurban areas. Assessing how urban living may affect health raises issues often not easily addressed through the application of simple analytic methods.

Empiric inquiry in health presupposes that there are identifiable factors that influence health and that these factors can usefully be identified (and potentially intervened upon). For example, a typical public health study might imply that we can generalize about how different foods will affect health across individuals, at least within the confines of effect modification across groups (e.g., age groups) or under different circumstances (e.g., at different levels of caloric intake). However, cities are characterized by multiple factors (e.g., population density, heterogeneity, etc.) that in some respects may make each city unique. Although certain aspects of city living may be universal (e.g., population density) and relevant for the health of populations in different cities, other urban characteristics that are important in one city (e.g., local transportation patterns and air pollution) may not be important in others, limiting the generalizations that can be drawn about how urban living influences health. Further complicating this task is that cities change, a fact that has implications for the relative contribution of different factors in determining health in cities. For example, municipal taxation of alcohol and cigarettes may be an important determinant of alcohol and cigarette consumption in a particular city at a particular time. However, changing social norms around smoking and alcohol use may either obviate or reinforce the influence of taxation. Therefore, when considering urban characteristics that affect health, it is important to note both the prevailing context within which such characteristics operate and that the role of these characteristics may change.

While the challenges posed here may appear daunting, we argue that the study of urban health is exciting because it lends itself to the creative application of methods from multiple disciplines and the nuanced appreciation of the role of multiple factors that may determine population health in cities. In the next section we summarize how empiric studies have addressed questions related to urban health, and in the final section we discuss how different quantitative and qualitative methods may be applied to further the study of urban health.

**Different Perspectives on the Empiric Study of Urban Health**

A review of the literature suggests that a broad array of methods in multiple disciplines has been used to address questions that pertain to urban health. We consider three general types of published study that attempt to address somewhat different questions relevant to urban health: those comparing rural and urban communities, those comparing cities within countries or across countries, and those examining intra-urban variations in health. Each type of study answers different questions and have different roles in the empiric study of urban health.
Studies of Differences between Rural and Urban Communities within Countries

Until recently, studies that compare rates and prevalence of morbidity and mortality in urban and rural areas were the most common form of urban research. These studies typically contrast several urban areas with rural areas in the same country or consider morbidity and mortality in urban versus nonurban areas, the latter frequently being defined as all areas that do not meet “urban” criteria. While we acknowledge the methodological difficulties inherent in such definitions, their full discussion is beyond the scope of this chapter; further discussion of these issues can be found in Chapter 1 of this book or in other publications. Essentially, these studies ask, “How is the burden of morbidity and mortality different in urban areas than in nonurban areas?”

Though urban-rural or urban-nonurban comparisons are useful in drawing attention to particular features of urban areas that may be associated with health and merit investigation, these studies are limited in their ability to shed light on what these features may be and on the pathways through which they affect the health of urban residents. Because conditions within cities change and there are differences in living conditions, it is unsurprising that different urban-rural comparisons have provided conflicting evidence about the relative burden of disease in urban and nonurban areas. At best, these studies provide a crude snapshot of how the mass of urban living conditions at one time may be affecting population health. Studies taking a rural versus urban perspective may be most relevant in areas where urbanization is still proceeding rapidly (e.g., China or India), helping public health officials to anticipate changing national health profiles as the proportion of the population living in urban areas increases.

Studies of Differences across Cities within or between Countries

The second type of research perspective on urban health involves comparisons of health between cities, either within a country or between countries. Using the city itself as the key unit of analysis, such studies compare different cities to address questions about which features of cities may promote or harm population health; they may suggest practices at the city level that are amenable to intervention that can improve population health. For example, Rodwin and Gusmano have compared health systems in New York City, London, Paris, and Tokyo, providing insights into how mega-cities in wealthy countries can better organize health services. However, by considering the city as the unit of analytic interest, these studies implicitly assume that aggregate behaviors or characteristics at the city level are equally important for all residents of those cities. Looking at health system organization and function across four large cities does not permit analysis of differential access to health care services within cities because of location of residence, intraurban variability in barriers to care, or variations in quality of services provided to different urban residents. This approach then limits our understanding of the differential impact of urban characteristics on the health of urban residents. More important, urban-urban comparisons, such as the work of Rodman and Gus-
mano, may be critically important for municipal and state policy makers who can use insights from such work to guide choices about service provision throughout a city.

**Studies of Intra-urban Differences**

The third group of studies that have contributed to our understanding of how city living may affect health are frequently not conceived as studies of urban health. Research in this group examines how specific features of cities are associated with the differential distribution of morbidity and mortality within cities. The volume of such investigations has risen considerably in the past decade; most commonly, these studies focus on spatial groupings of individuals (usually conceived as “neighborhoods,” although several studies assess the contribution of administrative groupings that are not necessarily meaningful to residents as neighborhoods) and typically consider the role of one’s community of residence within an urban area on individual health. An example of this type of research is the seminal work in Chicago through the Project for Human Development in Chicago Neighborhoods, which identified collective efficacy as a determinant of violence in urban neighborhoods.\(^{13}\) Significantly, intra-urban comparison studies have the potential to guide specific interventions to improve urban health. Building on work carried out in the Chicago project, public health interventions have been developed that attempt to increase collective efficacy and the related construct social capital in urban neighborhoods.\(^{14,15}\)

While such research may contribute important insights into urban conditions and their implications for health, it may be difficult to generalize to other cities or to urban areas more broadly. For example, the relation between collective efficacy and violence may be modified by differential access to illicit substances in another urban area. Similarly, though several studies have shown that the quality of neighborhood sidewalks is associated with the likelihood of physical activity among urban residents,\(^{16,17}\) this association may not necessarily be relevant in another urban context where fear of assault is an important determinant of outdoor activity. Relatively fewer studies have considered how membership in other types of urban community, particularly social networks, may be associated with behavior and health.\(^{18}\)

**An Overview of Methods That May Pertain to the Study of Urban Health**

**Quantitative Methods**

Multiple quantitative methods lend themselves to the study of urban health, and as discussed earlier, certain analyses may be more applicable to particular questions in the field. This section presents three quantitative methods relevant to the study of urban health and discusses particular considerations that may influence the choice of quantitative method employed and the interpretation of results from empiric studies employing each of these methods.
Correlations and Associations in Ecologic Analyses

Ecologic analyses consider associations between factors at the group or aggregate level. For example, this method can be used to consider the association between average income and all-cause mortality rates across cities. Simple correlations can suggest features of cities that co-vary with measures of population health at the city level, and more sophisticated techniques, such as regression analyses, can consider how particular factors co-vary with others while accounting for the contribution of other potentially important variables. Historically the primary method used in interurban comparisons discussed above has been ecologic analysis. Currently, ecologic-level research in the study of urban health is principally used for generating hypotheses about features of cities that may affect health. For example, ecologic studies demonstrating that income distribution within cities was associated with mortality in U.S. cities\(^1\) generated theories about the role of relative income as a determinant of psychosocial stress in cities and as a determinant of social capital and the attendant availability of human and social resources within cities.\(^2\)

While potentially useful in identifying urban elements that may shape population health, ecologic analyses have limited usefulness for determining how these characteristics of cities may be associated with individual health. Causal inferences at the individual level cannot be drawn from ecological associations. For example, the ecologic observation that cities with high aggregate income have lower smoking rates does not necessarily imply that wealthier individuals are less likely to smoke. Such a cross-level inference is frequently referred to as the ecologic fallacy and demonstrates the limited interpretations that can be drawn from ecologic observations. Still, ecologic analyses will probably continue in their role in urban health research as tools for generating hypotheses and suggesting characteristics of cities that may influence population health. Additionally, ecologic studies are not limited to interurban comparisons but can equally well generate hypotheses about features of intra-urban units that may shape population health (e.g., neighborhoods, social networks).

Contextual Analyses

Contextual analyses assess how urban living as an individual characteristic is associated with health, and these analyses have been most commonly employed in the studies of urban versus rural (or nonurban) health discussed earlier. Thus, contextual analyses attribute the individual a variable that represents whether or not one lives in an urban versus rural context; analytic methods ranging from contingency tables to regression analyses are applied to determine whether an individual’s likelihood of having a particular health status (including the presence or absence of disease or morbidity from a particular disease) is higher or lower in urban individuals compared with nonurban individuals. Contextual analyses consider urban as a variable with a fixed effect on individuals, meaning that the urban variable has the same effect on all individuals in an analysis. Simple methods consider the association of the urban variable with health status without controlling for the role...
of other potentially confounding or modifying variables. More sophisticated methods (e.g., Mantel-Haenzel adjustment, multiple regression) can assess the role of the urban variable while taking into account conceivably important variables (e.g., gender). While contextual analyses have been applied to considering urban living itself as the variable of interest, they can also be used in intra-urban studies, for example, comparing living in a densely populated urban neighborhood with living in a less densely populated neighborhood.

Although contextual studies are relatively common in urban health research, the inferences that can be drawn from these analyses have limitations. As mentioned, studies comparing health in urban and rural settings have produced conflicting results, with comparable studies frequently disagreeing about whether urban living matters for particular health outcomes. This conflict is likely a reflection of the complexity of urban living. Also, considering urban as a single variable can at best produce only a summary of how the city as a whole may shape overall health.

MULTILEVEL METHODS THAT CONSIDER THE ROLES OF MULTIPLE LEVELS OF INFLUENCE

Relatively new to the study of urban health, multilevel analyses allow researchers to consider how characteristics of cities or of units within cities contribute to individual health independent of the contribution of other individual and contextual variables. For a full review of the methods behind multilevel analyses we refer the reader to other published work. In brief, multilevel analyses consider the contribution of variables at multiple levels to the variability in a particular individual-level dependent variable. In its simplest application to urban health, a multilevel analysis uses data from individuals in multiple cities to consider whether city living independently explains inter-individual variability in health status after controlling for other relevant individual characteristics.

More useful to the study of urban health, however, is the consideration of how different characteristics of urban living at multiple levels may be associated with health. For example, multilevel analysis can test whether social capital at the city level is associated with individual mental health while controlling for social ties at the neighborhood level and for individual characteristics. Multilevel analyses also allow the investigator to consider the possibility that urban living has a different effect on individuals in different urban communities by introducing random slopes that allow for varying strengths of the associations between urban characteristics and health. For example, multilevel analyses may show that the salutary effect of green space is different in different areas of a particular city. Therefore, multilevel methods allow for the analysis of how characteristics of urban living may affect health and how these associations may differ in different urban communities, taking into account factors at other levels that may be important determinants of health. If applied to inter-urban datasets, multilevel methods can assess the role of city-level variables as well as of variables at different levels within cities. These methods hold much promise in urban health research.
CONSIDERATIONS IN THE USE OF QUANTITATIVE METHODS TO STUDY URBAN HEALTH

The three broad categories of quantitative method discussed here can be applied in many different contexts and in conjunction with multiple study designs. There are several considerations, pertaining both to the particular research questions of interest and to each of the analytic methods discussed here, that merit discussion as we consider the role of quantitative methods in urban health. We discuss in turn considerations regarding choice of study design, issues of variable specification, and complex causal pathways.

Choice of study design. The methods summarized here may be applied to several study designs. Much of the current literature on urban health is based on cross-sectional observations; indeed, cross-sectional observation is the basis of most of the existing urban versus non-urban contextual analyses and also represents the most common study design for multilevel analyses. The ubiquity of cross-sectional studies primarily reflects the fact that they are easier and less expensive to design and execute than longitudinal studies. However, longitudinal designs are becoming more important to advance hypothesis testing in urban health.

While cross-sectional investigations can document associations between characteristics of urban living and health, they cannot provide information about the temporal relations between characteristics of urban areas and the onset of disease, an essential step in causal inference. For example, a cross-sectional multilevel study can establish that living in urban neighborhoods characterized by a deteriorating built environment is associated with greater sexual risk behavior but cannot confirm that the urban built environment causes riskier behavior. It is equally plausible that persons who engage in risky sexual behavior migrate to neighborhoods where deteriorating buildings are the norm (and are potentially cheaper to live in). Longitudinal studies (or well-designed case-control studies that mimic longitudinal studies through careful control selection) are needed to advance thinking about how urban characteristics may cause different health behaviors and outcomes and ultimately to suggest which urban characteristics can fruitfully be subject to intervention. New research suggests that longitudinal research that takes into consideration life course perspectives, that is, how exposures in one’s early life may affect subsequent health, may have a particular contribution to make in considering the role of urban living in shaping population health.

More challenging—but potentially even more useful—experimental studies that manipulate characteristics of the urban environment can help establish how features of the urban environment may affect health. Although experimental studies in urban health are uncommon, a few have shown promising results. For example, in a natural experiment in Chicago, specific housing projects were landscaped while others were not, and investigators were able to show that persons living in the upgraded housing projects had improved functioning, fewer episodes of interpersonal violence, and better concentration than persons in the control group. Such studies can convincingly demonstrate the role that particular aspects of the urban environment play in shaping health and, perhaps more important, identify avenues for intervention.
Limitations regarding sample size and the statistical power available for multilevel or inter-urban analyses are an important consideration in selecting a study design. The size of the analytic sample at both the individual level and the group level becomes a relevant concern for multilevel designs. Power calculations for multilevel analyses remain limited, but it is clear that in comparisons of the role of group-level variables, sufficient numbers of groups must be included for a particular study, requiring larger study samples and more complex study designs.29

Issues of variable specification. Quantitative analyses frequently rest on the reduction of constructs of interest to simple variables that can then be analyzed using some of the methods discussed here. Although such reduction is appropriate in all quantitative analyses, it may be particularly important in urban health studies, where variables need to be specified to represent complicated constructs often with varying meaning in different contexts. Urban, a term that is referred to throughout this chapter as a potential variable of interest, is nonetheless challenging to define, and definitions vary between countries and between studies, limiting interstudy comparisons and generalizations. Clear and reproducible definitions of urban may facilitate such comparisons.

More notably, specification of the “exposures” of interest is a critical issue in all quantitative urban health research. Throughout this chapter we discuss how constructs at multiple levels (e.g., qualities of the built environment, social ties) may be assessed in urban health studies. Several other chapters in this book elaborate further on what these constructs are and how they may influence health. Recognizing that the role of specific constructs may be different across urban contexts makes the careful specification of the key exposures of interest critical. Therefore, while we encourage consideration of multiple levels of potential influence in the urban context, we also note that more work needs to be done on appropriate specification of important urban constructs before convincing quantitative work can assess whether these constructs influence health. For example, the Project for Human Development in Chicago Neighborhoods, discussed earlier, was accompanied by substantial conceptual development about the definition and potential role of collective efficacy in regulating violence in urban communities.13, 31

Complex causal pathways and nonlinear associations. A third consideration in thinking about quantitative analyses in urban health pertains to the complexity of urban living as a variable of interest. We discussed earlier how contextual urban versus non-urban analyses are frequently not replicable, probably reflecting the complexity of each individual urban setting and the inability of a single “urban” variable to summarize multiple relevant dimensions. However, fully explaining the key relations between all relevant urban characteristics and population health is beyond the capability of commonly used analytic techniques. It is likely that many characteristics of cities affect health by modifying the effect of other factors that are causally linked to health. For example, transportation routes may not be causally linked to cardiac arrest survival, but the efficacy of emergency medical services systems in reducing cardiac arrest mortality may be different in neighborhoods with easy ambulance access than it is in neighborhoods that do not have easy ambulance access. Studies that are adequately powered to detect effect modi-
fication across levels need to have larger sample sizes than conventional studies aimed strictly at detecting associations.

In addition to the modifying role that characteristics of cities may play, characteristics of cities at different levels may also mediate or confound relations between other characteristics and health. For example, while municipal-level spending on public hospitals within a city may be associated with health in the aggregate, it is likely that this relation is modified by baseline quality of care in the public hospitals and mediated by access that persons with substantial morbidity have to hospital care. This latter consideration reflects the complex causal chain that most accurately reflects how urban features may influence health. Most quantitative analyses in urban health and across disciplines rely on assumptions of linearity for hypothesis testing; however, in complex systems, nonlinear associations are common. The application of innovative methods that take into account nonlinear relations may be particularly important in considering how cities may affect health.

**Qualitative Methods**

The quantitative methods of data collection and analysis described in the preceding section are particularly useful for testing hypotheses related to the distribution or occurrence of events and behaviors, for example, whether particular events are more common in urban versus rural environments or are associated with health outcomes under some conditions. Qualitative methods of data collection and analysis, in contrast, are particularly useful for developing in-depth understandings of phenomena (e.g., race or class relations within a particular context, processes through which inequalities are maintained), generating hypotheses, and understanding the meanings or interpretations that events may hold for people. Qualitative or interpretive analyses are particularly useful in situations where meaning is problematic, such as when the researcher is an outsider to the community or when meanings may be contested between different groups. In such instances, methods that emphasize thorough description, self-reflection, discussion, and interpretation can be crucial. While qualitative methods can be used in ways that do not emphasize meanings or interpretations and can be applied in ways that are not systematic, here we emphasize qualitative data that is gathered and analyzed systematically with the intent of understanding patterns of human action within social contexts—in this instance, urban environments—and their implications for health.

In the following paragraphs, we describe four commonly used methods for gathering qualitative data: participant observation, in-depth interviews, focus groups, and document review. There are other methods that may be of use in studying questions of interest to urban health, but as with quantitative methods, a comprehensive review is beyond the scope of this chapter and we refer interested readers elsewhere. Following our description of specific data collection methods, we briefly discuss ethnographic and case study approaches as well as sampling considerations in the application of qualitative methods to understanding urban environments and health.
GATHERING DATA

Participant observation involves systematic observation of a phenomenon of interest while engaging as a participant in that setting. Participant observation offers opportunities for the researcher to develop an in-depth understanding of a particular social context through his or her experience as an actor within that context. Some of the classic studies of urban life were developed using participant observation, including Stack’s All Our Kin and Whyte’s Street Corner Society. A more recent example of participant observation in an urban community is Hartigan’s study of negotiations of whiteness within the context of three Detroit neighborhoods. This study highlights the unstable, contingent, and constantly negotiated nature of whiteness within the context of a city whose political structure and demographic composition are predominantly African American. Participant observation has also been used to understand strategies employed by health movement activists as well as the strategies of corporate health actors within urban contexts. This application is particularly useful for examining dynamic processes and contexts and for gaining insights into the ways that individuals or collective actors negotiate those dynamics.

In-depth interviews are designed to elicit—in the respondents’ own words—information about their experience, interpretations, understandings, and reactions to a particular phenomenon. Unlike quantitative interviews, which generally offer respondents a set of predetermined response categories from which to choose, qualitative interviews are generally open-ended and invite respondents to discuss the topic of interest in their own words. The structure of in-depth interviews ranges from a set of predetermined questions presented in a predetermined order to a set of topics to be covered in no particular order within the span of the interview. Similarly, in-depth interviews can be analyzed by methods that range from the application of predetermined categories to more inductive approaches in which the goal is to identify constructs and their relationships based on their presentation in the interviews.

Within urban contexts, in-depth interviews can be used productively to elicit residents’ understandings of their environments and perceptions of the ways that those environments influence residents’ health. Correspondingly, they can be used productively with urban residents, health providers, and key decision makers to develop mechanisms to improve social contexts and address health issues within urban environments. Sampling decisions should be shaped by the question of interest and may range from random sampling to specific selection of key informants (e.g., decision makers, long time neighborhood residents).

Focus groups generally include between six and 12 people who are brought together to discuss in detail a topic or process of interest. Focus groups are often used when the topic is not highly sensitive and when a goal is to enable participants to interact with one another around the topic. Focus-group interviews often rely on interactions among group members on a topic provided by the researcher (who may take the role of facilitator). Participants discuss ideas, issues, insights, and experiences among themselves, commenting, criticizing, or elaborating on the views expressed by previous speakers. As with in-depth interviews, focus groups
can be relatively structured or unstructured: A facilitator knowledgeable about the topic of interest, skilled in group facilitation, and able to develop rapport with the focus group participants is essential. Analysis of focus-group interviews may proceed using a deductive approach with predetermined categories or with an inductive approach that seeks to develop themes and categories out of the focus group material itself. For example, in a study examining aspects of the community that influence physical activity, Kieffer and colleagues identified themes inductively based on focus-group interviews with women residing in urban communities.

Document review involves systematic analysis of themes in documents relevant to the phenomenon of interest. Maantay used document review combined with in-depth interviews with key informants to understand zoning decisions and their implications for land use in New York City. For a study like Maantay’s, minutes from public hearings or meetings in which zoning regulations were discussed can provide important insights into the perspectives of residents and officials who make decisions on these regulations. Documents can also reveal areas of conflict, involving, for example, the siting of incinerators in urban areas or the placement of trucking routes or bus stations. Additional insights may be obtained from newspaper articles and newsletters of local groups that mobilize around a particular issue.

CONSIDERATIONS IN THE USE OF QUALITATIVE METHODS TO STUDY URBAN HEALTH

Decisions about the research design to be employed when qualitative methods are used should be shaped by the goals and objectives of the research and should take into consideration the generalizability of the study, the study’s ability to highlight social dynamics in detail, and its ability to elucidate dynamics across heterogeneous contexts and settings. Below we discuss several considerations for researchers interested in using qualitative methods in urban health research, either alone or in conjunction with other analytic methods.

Sampling. A wide range of sampling strategies may be employed when using qualitative methods. Snowball sampling methods, for example, are particularly useful in identifying rare cases or identifying people who may be willing to participate because they are referred by a known and trusted member of their social network. Grounded-theory methods of qualitative analysis emphasize the use of theoretical sampling, developed iteratively through the analytic process, to generate and flesh out the emergent theory developed through this process.

The choice of sampling strategy depends on whether the units of analysis are individuals, organizations, or communities; the key is to identify the relevant conceptual categories to vary across cases. For example, if the primary research questions involve how individual socioeconomic conditions shape health within the context of an urban environment, one might hold the environment itself constant (e.g., focus within a geographically defined urban area) and conduct observations, focus groups, or in-depth interviews with individuals sampled to reflect varying socioeconomic strata. In contrast, if the main study questions are focused on contextual effects, one might sample communities based on variations in socio-
economic status or racial composition and compare across those community contexts. Pardo,\textsuperscript{46} in her study of women’s movements to address environmental health threats, compared groups in East Los Angeles, a racially segregated community with limited economic resources, with those in a neighboring middle-class, ethnically diverse suburban area to identify similarities and differences in environmental health challenges and mobilization strategies.

Depending on the research question, additional sampling strategies involve identifying extreme cases to sample (e.g., wealthy residents of predominantly low-income urban communities, urban communities that are extremely racially segregated versus those that are well-integrated) or using representative or proportionate sampling (e.g., sampling communities proportionate to their distribution on some characteristic of interest). Several recent efforts have used random sampling strategies to conduct in-depth interviews with the goal of increasing the generalizability of results. Considerations in decisions about sampling strategies include the research question, the extent to which generalizability is a goal versus an in-depth understanding within a particular context, and the availability of resources. For an extended discussion of sampling considerations, the authors again refer the reader to relevant literature.\textsuperscript{35}

**Ethnographic research.** Ethnography is a methodological approach that aims to describe human social systems in detail through the systematic collection and analysis of information. Ethnographers may use multiple methods to collect data toward that end, including document review, analysis of census or vital statistics data, surveys, participant observation, in-depth interviews, or focus groups. Ethnographies may be undertaken, for example, as case studies of social relationships within a particular context.\textsuperscript{47}

In their ethnography of relationships between urban environments and reproductive health among African American women, Mullings and Wali\textsuperscript{48} used survey, participant observation, in-depth interviews, and census data to offer a rich and textured description of the social factors that shape the lives and health of African American women in Harlem. This case study examines in some detail the social context of women’s lives in Central Harlem, outlining a variety of pathways through which that particular social environment may affect women’s health and childbearing outcomes. They find that, while African American women may choose to reside in Harlem in order to live in a predominantly African American community where they experience some protection from discriminatory encounters, they experience multiple daily assaults and stressors related to work conditions, access to housing, and daily life events. These experiences affect women across class. Drawing on recent advances in the study of physiological effects of stress, Mullings and Wali suggest pathways through which these constant stressors associated with social context may contribute to high rates of infant mortality among African American women in Harlem.

**Case studies** can also be undertaken across multiple contexts, in an effort to compare social phenomena as they unfold under differing social conditions. Such efforts can be useful to develop a more complete understanding of the ways that social phenomena may be influenced by a variety of contextual factors, such as
historical relationships between racial or ethnic groups within an urban area or the history of economic patterns in an area. Such approaches may combine a variety of data-collection methods or may focus on use of a single data-collection method. In a recent study of race and class in urban contexts, Fine and Weiss relied predominantly on focus-group interviews to examine the experiences of young, poor, and working-class men and women in Buffalo, New York, and Jersey City, New Jersey. Their comparisons across racial and ethnic groups, gender, and urban contexts provide a nuanced analysis of young adults’ experience of the urban communities in which they live.

Case studies and ethnographies may use both qualitative and quantitative data sources and a variety of sampling strategies. They are characterized by in-depth analysis of social relationships or processes as they unfold within a particular context or across a set of contexts. Ethnographic case studies that combine multiple methods and encompass several sites (e.g., urban areas selected to vary according to specific criteria) can help to address some of the limitations related to generalizability that pose challenges for researchers interested in understanding urban settings and their influence on health. For example, Fine and Weiss’s study of young poor and working-class men and women in two urban communities could be expanded to incorporate additional cities, chosen according to degree of race-based residential segregation, mix of employment opportunities available (service, professional, industrial), or other characteristics of urban environments thought to be relevant to the experience and health of poor and working-class young people. This expansion would help to further describe the extent to which those contexts vary and the implications of those variations in urban characteristics for the health of urban residents. Identifying such variations can be essential for public health efforts to improve health outcomes because they help to identify potential points of intervention.

Conclusion

There are several points worth reiterating about the application of different research methods to the study of urban health. First, appropriate specification of the research question of interest is critical. For example, understanding how living in a city as a whole may affect smoking behavior requires a different set of tools than do questions about how intra-urban differences in pollution affect variability in neighborhood prevalence of asthma. Similarly, understanding the quantitative relation between social capital in urban communities and resident well-being requires different tools than do questions about why social capital may have different implications for health in different communities or how social capital is produced or eroded in urban contexts.

Second, the choice of an appropriate urban health framework may dictate, at least implicitly, both the choice of question asked and of methods used in addressing the question. For example, a comprehensive framework that includes national-level policies that shape municipal financing may suggest that inquiry into and intervention with national policies may be of primary importance to urban health. In contrast, a framework that considers primarily physical characteristics of cities
will focus questions on how features of the built environment at the local level can affect resident health. Relatively little has been written about the processes through which urban living may affect health; efforts such as this book may better guide our thinking about cities and health in the future.

Third, the application of any individual method to the study of urban health is likely to be insufficient in providing a clear answer about how urban characteristics shape health. In a study of deaths related to the 1995 heat wave in Chicago, Klinenberg\(^5\) analyzed patterns of mortality by race and neighborhood, reviewed public documents such as autopsies and service records of municipal agencies, analyzed newspaper coverage of the heat wave, and interviewed public officials, survivors, and family members of heat-wave victims. Each of these methods offered unique insights into how and why Chicago experienced more than 800 deaths in the heat wave and suggested avenues for neighborhood-level and policy interventions.

Theoretically informed efforts that combine the perspectives of different traditions or disciplines, use quantitative and qualitative methods as appropriate, and apply theoretically driven sampling strategies are more likely to provide answers to questions about both how and why characteristics of urban living may affect health. Quantitative and qualitative methods may inform each other as well as help minimize the extent to which decisions about conceptual frameworks may shape the hypothesis being tested and the answers obtained from such inquiries. Ultimately—and more ambitiously—as the study of urban health advances, methodological development in urban health may introduce methods that go beyond the combination of extant qualitative and quantitative procedures and that further advance inquiry and insight into how urban living affects health.

References

22. Part V: Next Steps


15

Interventions to Improve Urban Health

Nicholas Freudenberg

Introduction

The goal of public health is to “assure the conditions of health” for populations. Thus, the highest priority for urban health professionals is to plan and implement interventions to improve the health of people living in cities. As discussed in previous chapters, such interventions occur within a particular social, economic, and political context and operate at multiple levels of social organization.

In this chapter, I identify the unique characteristics of urban settings that influence public health interventions; describe various approaches to improving the health of urban populations, with an emphasis on strategies used in United States in the past two decades; use the model for the study of urban health presented in Chapter 1 to classify current urban intervention strategies; and examine the roles of health professionals in these efforts. I conclude by suggesting promising directions for interventions to promote urban health. Public health interventions are here defined as organized activities designed to improve the health or well-being of a defined population. Participants can include health professionals, public officials, advocates, community residents, and others.

Unique Characteristics of Urban Environment

A key theme of this volume is that cities are different from nonurban areas. Effective interventions must address these defining urban characteristics. How are cities different in ways that influence public health interventions? First, urban areas are characterized by population density and diversity. Density enables public health programs to reach large sectors of the population efficiently, while diversity necessitates tailoring interventions to meet the needs of different subpopulations.
Finding the right balance between these competing pressures is a constant challenge for planners of urban health interventions.\textsuperscript{2, 3}

Second, compared with other areas, cities have a rich array of social and human resources, from dense social networks and myriad community-based organizations to multiple formal and informal service providers. These human resources and the social capital inherent within them constitute key assets for urban health promotion. Effective public health programs use them both to root interventions in a specific urban context and to reduce the need for external resources.\textsuperscript{4–6} Finding the right assets, mobilizing them, and ensuring their sustainability are important tasks for urban health interventionists.

Third, cities are complex. Multiple systems interact; pluralistic political structures create competing stakeholders; cities are inextricably linked to other sociopolitical levels, such as neighborhoods, metropolitan regions, and nation-states, each of which makes demands and offers resources to the other levels; and local political and social forces create wide variations in the contexts in which programs are delivered. As a result, simple interventions are rarely sufficient to solve problems, many programs have unintended as well as intended outcomes, and generalization from one setting to another can be problematic. This contextual complexity requires a similar level of intervention complexity.

Fourth, because most cities are characterized by high levels of inequality, interventions—even beneficial ones—run the risk of reinforcing or even widening disparities in health. Helping everyone get more of the necessities of life often further advantages the better off.\textsuperscript{7} To avoid this unintended effect, urban public health planners need to define disparity reduction as an explicit goal.

Finally, because city governments and urban populations have limited resources to face multiple problems (e.g., in education, employment, crime prevention, environmental protection, and sanitation), it is difficult for health interventions to attract and retain the attention and support of policy makers and residents. Politics rather than need often drives resource allocation and few public health problems can be solved within the time span of the election or budget cycles in which policy makers operate. Thus, health interventions always compete for support with other interventions and only when public health planners operate effectively in scientific, economic, and political arenas will they win the means to implement the policies and programs they advocate.

In summary, urban health interventions differ from interventions in other settings both because urban populations present a different health profile and because the urban environment is markedly different from suburban or rural ones. To be successful, public health interventionists must address both types of differences. Effective public health programs must use available scientific evidence to meet the unique needs of urban populations and a thorough understanding of the relevant social and political contexts in order to manage the process of program implementation and institutionalization. It is hardly surprising that many interventions founder in one or the other of these shoals.
Classifying Urban Interventions

What characterizes public health as a profession is the ability to derive generalizations from a body of scientific literature, then to use these insights to guide practice. To make use of the sprawling literature on public health interventions in urban areas requires a system for organizing the disparate findings across multiple characteristics. Investigators have proposed various schema for such a classification, reviewing interventions by a variety of criteria: health or behavioral outcome, target population, level of social organization in which the intervention operates, intervention setting, intervention strategy, or the underlying causes of the health condition. Table 15.1 summarizes information on these approaches as they relate to urban health. Each schema offers public health planners different insights into the planning and implementation process. Often, planners use several categories to identify a mix of interventions that they can consider to address a defined problem. In the following discussion, I use the model for the study of urban health presented in Chapter 1 (Figure 1.4) to consider different approaches to intervention, linking these approaches to the theoretical frameworks presented in other chapters in order to test the utility of the model to guide intervention choices.

In the past two decades, interventions to improve the health of urban populations in the United States have sought to bring about changes in each of the three domains represented in the model in Chapter 1. Public health interventions occasionally seek to bring about changes at higher levels of social organization (global and national, and municipal) but more frequently make changes directly in urban living conditions, defined as the characteristics of urban populations, the physical and social environments in which they live, and the available health and social services. Intervention activities often operate in more than one domain. After a brief review of interventions in higher-level domains, the focus here is on interventions to change urban living conditions.

Interventions at Higher Levels of Social Organization

The political and economic systems that provide the context in which social conditions that affect health can change are identified in Figure 1.4 as enduring structures. In the United States, market capitalism and representative democracy are examples of such structures. Although public health professionals rarely target these systems for change, most health researchers agree that these structures are fundamental determinants of health and their transformation over time explains a significant proportion of public health progress in the past two centuries.\textsuperscript{8,9} The founders of modern public health, Virchow in Germany, Villerme in France, Griscom in England,\textsuperscript{10} advocated basic changes in economic and political systems in order to improve health.

More recently, international gatherings, such as the World Social Forum, have begun to envision the social and political systems that could better support global health and to mobilize diverse constituencies to bring about these fundamental changes.\textsuperscript{11} On a different scale, Farmer\textsuperscript{12} has argued for local public health interventions that provide an explicit critique of enduring social structures and offer
Interventions to Improve Urban Health

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a vision of economic, political, and social systems that affirm health and human rights. In many cases, public health workers support rather than initiate efforts to change more fundamental social structures.

Major global and national trends, such as immigration, suburbanization, changes in the role of government, and globalization (column 1 in Figure 1.4), also influence health profoundly and have occasionally been targeted for public health intervention. Recent campaigns by AIDS activists to force pharmaceutical companies to reduce the prices and increase availability of antiretroviral medications illustrate this approach. Research on the health impact of the built environment has suggested national and regional interventions to slow suburban sprawl—identified as a contributor to obesity and other health problems—by changing zoning rules, providing federal support for mass transit, and using tax laws to encourage sustainable development.

Interventions to Change Municipal Determinants of Health

In addition, public health professionals have worked to improve health by seeking to change municipal determinants of health (column 2 in Figure 1.4), defined as government, markets, and civil society. These interventions seek to change urban living conditions by making changes in government policies, market practices, or civil society activities. In this type of intervention, the level of change is the municipality itself. These municipal-level changes influence health by facilitating changes in urban living conditions (column 4). For example, strict local air-pollution regulations and enforcement improve the physical environment and thus contribute to reductions in asthma and other respiratory morbidity and mortality.

Changes in Government

Policy development is a core public health function, and in the past decade, the public health community has given greater attention to the effects of public policy on health.13–16 National debates on health care, tobacco, illicit drugs, the environment, reproductive health, and other policies have attracted media and popular attention. Public health officials and researchers have offered a theoretical rationale for devoting more attention to creating public policies that promote health and prevent disease.16–18 National policies on taxes, transportation, housing, and criminal justice, among others, have a major impact on the social environment within cities; in addition, national and local policies on such issues as welfare, Medicaid, food stamps and immigration disproportionately affect urban populations. Thus, developing public policies that promote health has the potential to improve the health of city dwellers.

Municipal campaigns to ban smoking in public places, mandate insurance coverage for preventive health services, increase the minimum wage, or impose an excise tax on junk foods are examples of public health interventions designed to improve health by changing government policies or programs. Federal, state, and municipal policies all have an impact on urban health; our focus here is on interventions that operate and seek to bring about change at the municipal level, even if these policies are based on federal or state laws.
Table 15.1. Selected Approaches to Classification of Urban Health Interventions

<table>
<thead>
<tr>
<th>Classification schema</th>
<th>Illustrative categories</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health or behavioral outcome&lt;sup&gt;1–3&lt;/sup&gt;</td>
<td>Asthma, diet, lead poisoning, HIV infection, birth outcomes, smoking</td>
<td>Allows comparison of efficacy and efficiency of various strategies for single outcome</td>
<td>May overlook interventions with modest impact on multiple outcomes</td>
</tr>
<tr>
<td>Population&lt;sup&gt;4–6&lt;/sup&gt;</td>
<td>Homeless people, women, recent immigrants, people in the criminal justice system</td>
<td>Can guide interventions to reach vulnerable populations; encourages focus on social context in which population lives</td>
<td>May direct attention at population characteristics rather than social forces that create vulnerability</td>
</tr>
<tr>
<td>Level of social organization&lt;sup&gt;7–8&lt;/sup&gt;</td>
<td>Individual, social network, neighborhood, jurisdiction</td>
<td>Can highlight relative contributions of interventions at different levels</td>
<td>Does not easily accommodate multilevel studies</td>
</tr>
<tr>
<td>Setting&lt;sup&gt;9–11&lt;/sup&gt;</td>
<td>Schools, community organizations, workplaces, youth centers, grocery stores</td>
<td>Can guide choice of setting to achieve specified objectives</td>
<td>Setting and population interact, leading to misattribution of common findings</td>
</tr>
<tr>
<td>Intervention strategy&lt;sup&gt;12, 13&lt;/sup&gt;</td>
<td>Peer education, community outreach, media advocacy, case management</td>
<td>Can assist in selecting intervention strategies appropriate to objectives</td>
<td>Wide variation in implementation of strategies, making generalizations difficult</td>
</tr>
<tr>
<td>Underlying cause&lt;sup&gt;14, 15&lt;/sup&gt;</td>
<td>Tobacco use, poverty, social stress, gender roles</td>
<td>Can help to identify interventions that can address multiple outcomes</td>
<td>Common cause may operate through different pathways, making common intervention difficult</td>
</tr>
</tbody>
</table>
References
Public health strategies for policy change include legislative or electoral advocacy, lawsuits, and media campaigns. Recent examples include campaigns to expand health insurance coverage for low-income children and families, encouraging action to reduce gun violence, discouraging drunk driving, and improving access to foods that prevent cancer, heart disease, and other chronic conditions.

Developing community capacity for health promotion is another potential role for government, although civil society organizations may also take on this role. While many urban communities need additional, external resources to improve health, they must also be able to use these resources effectively. Interventions to strengthen community capacity to promote health seek to achieve this objective. Designating capacity building as a public function may help to increase government support for action to reduce the disparities in health associated with poverty and disadvantage.

In a review of this concept, Goodman and colleagues propose two complementary definitions of community capacity: “the characteristics of communities that affect their ability to identify, mobilize and address social and public health problems” and “the cultivation and use of transferable knowledge, skills, systems and resources that affect community- and individual-level changes consistent with public health-related goals and objectives” (p. 259). The first definition emphasizes community capacity as an outcome or a characteristic of a community; the second focuses on the process by which capacity is created. The first also suggests the possibility of measuring capacity to compare different communities along a uniform yardstick, while the second definition may help to guide interventions designed to increase capacity.

Goodman and colleagues identify several dimensions of community capacity, including leadership, participation, skills, resources, social and organizational networks, community power, community values, and critical reflection. These provide a theoretical framework for measuring capacity, a need identified by Goodman and colleagues and others, and for developing interventions to strengthen capacity. Interventions to build community capacity have addressed environmental health hazards, child-care services, and health-related coalitions.

The Healthy Cities movement, an intersectoral approach developed by the World Health Organization (WHO), offers another approach to building capacity for health at the municipal level. In Europe, Australia, and Latin America, WHO has supported the creation of local councils to plan improvements in health within cities. Healthy Cities projects seek to achieve the goal of health for all by reducing inequalities, strengthening health gains, and reducing morbidity and mortality in cities around the world. In the late 1990s, Healthy Cities focused on advocating healthy public policies and strengthening city planning for health. In the United States, most Healthy Cities programs have operated within local government; in other countries, the programs have operated through community organizations and universities. Advocates of Healthy Cities believe that the model has “proved to be a very effective and versatile vehicle for bringing Health for All to the local level.” However, evaluation studies have focused on process rather than outcome measures, and so the impact of Healthy Cities activities on the health of urban residents or the broader urban environment has yet to be ascertained.
Markets distribute goods and services essential to health, including food, housing, health care, and employment. Like government, markets exist on several interconnected levels, including neighborhoods, municipalities, regions, and nations. Our primary interest here is interventions designed to change municipal markets that influence health. Such interventions use regulation, taxation, subsidies, or other methods to make health-enhancing goods and services more available and health-damaging ones less available.

Medicaid, food stamps, the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), and the Section 8 housing programs are all examples of federally supported programs that allow low-income and disadvantaged populations to enter the health care, food, and housing markets by providing a subsidy to individuals. These “safety net” programs have contributed to a variety of improvements in the well-being of low-income urban populations and demonstrate the potential of public interventions in markets to achieve health objectives. It should be noted that these programs benefit not only the recipients of services but also the providers. Physicians, nutritionists, grocery stores, and landlords, to name a few, have all gained income from these public subsidies.

Some market interventions to improve health originate outside of government. In recent years, for example, commercial fitness centers for women have opened in urban neighborhoods, including in low-income areas. These centers have expanded opportunities for urban women to engage in vigorous physical activity and perhaps to find social support for exercise. Similarly, market forces have made it feasible to import a wide range of fruits and vegetables from around the world to urban markets and to make them available in moderate- as well as upper-income neighborhoods. Many urban consumers have much wider choices of healthy food now than they did 20 years ago and immigrant populations are better able to maintain healthy eating patterns from their home countries. Other market trends, however, such as the growth of high-fat fast-food outlets, compete with these positive developments to affect food choices negatively.

Some market interventions target disease promoters, those who benefit from selling or promoting products that contribute to illness or death. The tobacco industry, gun manufacturers, the alcohol industry, illicit drug dealers, and producers of high-fat, low-nutrient-value foods are examples of industries that profit from their lethal products. Dense markets, the presence of corporate headquarters and political influence, and high levels of media penetration for advertising make cities an attractive venue for disease promoters. In recent years, various advocacy groups, public health officials, and elected officials have used boycotts, lawsuits, legislation, and community organizing campaigns to restrict the ability of these industries to market their wares. For example, more than 20 cities and counties have sued gun manufacturers both to win damages and to impose tighter restrictions on selling firearms.
Changes in Civil Society

Civil society has been described as the space not controlled by government or markets where residents interact to achieve common goals. At the municipal level, civil society shapes opportunities for political participation, connects people to government and nonprofit organizations, and influences the social environment in which people live. Municipal-level interventions to change civil society to promote health include public support for the nonprofit sector, social movements to change public attitudes or public policy, and coalitions or networks of service providers.

In the past two decades, community organizations in the United States have been at the forefront of the struggles against the AIDS epidemic, tuberculosis, infant mortality, and asthma, among others, playing key roles in health education, linking people to services, and encouraging policy change. Their creation of a community infrastructure for health, manifested in experienced community leaders, networks of activists, cumulative wisdom on strategy and tactics, and the trust of their constituents constitute a vital though often unrecognized resource for interventions to improve well-being. To the extent that these local community or neighborhood networks are linked at the municipal level, they have the capacity for citywide advocacy. In many cities, the planning councils of the Ryan White Title I program, which funds services for people with HIV, and the HIV Prevention Planning Groups, which coordinate public funding for HIV prevention, are conveners of such citywide networks.

So far, we have considered interventions that seek to bring about changes in the higher-level determinants of urban living conditions, which have been identified as the primary determinant of the health of urban populations. We now turn to a review of more familiar public health interventions, those that seek to bring about changes in these living conditions at the community or neighborhood level, shown in column 4 in Figure 1.4.

Interventions to Change Characteristics of Individuals or Populations

Interventions designed to change the health-related knowledge, attitudes, and behavior of individuals to improve their health are the most commonly used strategy in public health in the United States today. This approach reflects the individualism that characterizes American ideology and also the perception that this strategy is comparatively easier than “higher-level” interventions. The rationale is that health behavior and “life-style” are the proximate determinants of a substantial portion of morbidity and mortality and that therefore changing the knowledge and attitudes that influence risk behavior—or changing the behavior itself—will lead to improvements in health.

Research suggests that many of these behaviors and their adverse health consequences may be more prevalent in urban areas, especially among low-income urban populations. On one hand, for example, smoking and tobacco-related mortality have been shown to be higher in a low-income area in New York City than in the rest of the state or country; and those in lower-income groups...
Interventions to Improve Urban Health

(concentrated in cities) consume significantly fewer portions of fruits and vegetables than those in higher-income groups. On the other hand, residents of central cities report less physical inactivity than rural or suburban residents, even after adjusting for poverty levels and African American teens smoke less than white teens. Some recent research suggests that urban young people may not be at increased risk of risky behavior, despite media stereotypes to the contrary.

Health education has been defined as “any combination of learning activities designed to facilitate voluntary actions conducive to health.” Recent examples of educational campaigns that provide the general public with knowledge about a health issue include the national media campaigns on HIV infection; the Five-A-Day campaign designed by the U.S. Department of Agriculture to encourage more consumption of fruits and vegetables; and the Back to Sleep campaign to reduce Sudden Infant Death Syndrome by encouraging parents to put their infants down to sleep on their backs. These undertakings have reached millions of Americans and increased knowledge about some health conditions. They have also contributed to changes in diet and sexual and other behaviors that have led to reductions in heart disease, HIV infection, infant mortality, and other conditions.

Health promotion interventions seek to reduce health-damaging behavior by providing information, skills, social support, and referrals to needed services. Some include activities designed to change both individuals and social environments. Most interventions address a single or a few closely related behaviors linked to a few specific adverse health outcomes. Several national demonstration projects have targeted various types of risk behavior in urban settings, including the AIDS Community Demonstration Projects in five U.S. cities: Dallas, Denver, Long Beach, New York, and Seattle, and the Centers for Disease Control and Prevention youth violence prevention projects operating in cities such as Los Angeles, Tucson, Chicago, and New York.

A third category of programs, implemented in both urban and nonurban settings, seek to enhance the capacity of communities to plan, implement, and evaluate more comprehensive, community-based health-promotion activities. These programs operate at both the municipal and neighborhood levels. For example, the Planned Approach to Community Health (PATCH) was developed in the mid-1980s by the U.S. Centers for Disease Control and Prevention in partnership with state and local health departments and community groups. Hundreds of urban, rural, and suburban communities around the United States have used the PATCH model to address issues such as physical inactivity, tobacco use, breast cancer, access to health care, child abuse, and cardiovascular disease. Interventions have included the use of mass media, educational workshops, school-based health education, lay health adviser programs, policy advocacy, physical activity events, and environmental measures. In general, the primary goals have been to reduce risk behavior and most activities have focused on changing individuals. Few evaluations have documented changes in health status resulting from PATCH activities, in part because of the difficulties in designing and carrying out such studies. An assessment of 27 PATCH sites in 13 states found that 72% of all sites were in rural areas and that urban and minority populations were less likely to be targeted.
Several national risk reduction programs have targeted one or more of the multiple behaviors that affect heart disease, including smoking, diet, exercise, and control of hypertension. These include the Child and Adolescent Trial for Cardiovascular Health (CATCH),66, 67 the Community Intervention Trial for Smoking Cessation (COMMIT),68, 69 and various heart health programs,70, 71 which have been carried out in both urban and nonurban settings but have rarely presented data comparing outcomes by setting. In addition, these programs have generally not reached disadvantaged urban populations. In one exception, Shea and colleagues72, 73 report that it is feasible to implement community-based cardiovascular health promotion programs in diverse, low-income urban communities but that ongoing financial and organizational support is necessary if these programs are to be sustained.

In general, the results of large-scale risk reduction programs have been disappointing, perhaps in part because the interventions have been of limited intensity and few have fully involved community residents in designing and tailoring the intervention.70, 71, 74–76 These limitations may be particularly important in diverse, low-income urban communities.77, 78

Public health interventions designed to change individuals living in cities face unique opportunities and limitations. As previously noted, population density makes it efficient to reach significant proportions of the population with health education messages or risk-reduction campaigns. The multiple channels of communication (from segmented mass-market media to billboards, parish bulletins, and graffiti) that characterize urban communities further facilitate getting health messages out. Many urban institutions reach large numbers of people regularly, making schools, mass transit systems, government agencies, health care institutions, and streets effective settings for bringing health messages to many individuals. Population heterogeneity, however, requires public health campaigns to reach out to a variety of subpopulations with different languages, literacy levels, cultural beliefs, and levels of trust in health authorities. Many public health organizations lack the resources and skills for this more sophisticated approach to social marketing, resulting in “one-size-fits-all” campaigns. In the largest cities, mass media are expensive, leading some funders to choose less expensive markets for demonstration projects.

Media campaigns may be less effective in reaching low-income, or stigmatized populations, often those with the most serious health needs.79 Moreover, urban vulnerable populations whose basic needs for shelter, nutrition, and health care are unmet may not benefit from low-intensity informational campaigns that do not otherwise address their difficult living circumstances. Cities also have high proportions of individuals with limited English proficiency or low levels of literacy; to reach this population may require use of multiple languages or nonwritten communication.80

**Interventions to Change Physical Environments**

Improving the physical environment in cities was one of the earliest goals of the modern public health movement. Two dimensions of the urban physical environ-
Interventions to Improve Urban Health

Interventions influence human health (Chapter 4, this volume). First, toxins such as lead, asbestos, various air and water pollutants, and diesel exhausts disproportionately affect urban populations, in some cases because of higher rates of exposure and in others because of higher population concentrations. Second, the physical design of cities can affect public safety, accidents, social interactions, access to exercise, and more intangible esthetic factors that may influence mental health.81–84 Strategies to reduce pollutants include environmental regulation, advocacy for stricter enforcement of existing rules, campaigns to prevent pollution by encouraging reduction of the use of toxic substances, recycling, and encouraging non-polluting forms of transportation. Healthy People 2010,85 the U.S. government’s statement of national health objectives, for example, includes goals for increasing walking, bicycling, and using public transportation to reduce pollution and traffic from automobiles. Strategies to improve urban design to promote health include modification of land-use zoning, creation of more parks and recreational areas, redesign of dangerous traffic intersections, and improved lighting and design to increase safety.82, 83 Other work has focused on improving the quality of housing.86, 87

Interventions to Change Social Environments

The social environment, defined as the people, institutions, and culture that characterize a particular setting, plays a key role in shaping patterns of health and disease.88 The urban social environment reflects the unique dimensions of urban life, including population density and diversity, complexity, and multiple organizations and networks. In recent decades, public health interventions have worked to change several dimensions of the urban social environment. These include providing social support to reduce the adverse effects of social isolation and stigma, to encourage health-promoting social norms, to facilitate access to the resources needed for health, and to help people cope with and social stress,89, 90 advocating for public policies that reallocate social resources to better meet the needs of the disadvantaged and to reduce inequalities,91 and strengthening the capacity of communities to promote health and economic and social development.24 The last two activities are described in the previous section on changing government.

SOCIAL SUPPORT AND SOCIAL NORMS

Stress plays a role in causing or exacerbating a variety of health outcomes, including overall mortality, poor pregnancy outcomes, and heart disease.92–95 Stress is defined as the psychological or physiological response to internal or external events that upset an individual’s homeostasis.96 Some evidence suggests that urban residents, especially low-income populations, may experience higher levels of stress because of poverty, racism, disrespect from mainstream society, poor housing, a deteriorated physical environment, and other factors.84, 93, 97 Both empirical and theoretical work suggests that social support may buffer the effects of stress, reducing its adverse health impact.98–100

Interventions to increase social support in urban communities have used strat-
egies such as peer education, lay health advisers, self-help, community organization, and case management\textsuperscript{101–5} to achieve outcomes such as asthma control, improved maternal and child health, and reduced drug use and HIV risk behavior. Social support interventions may be especially well suited to low-income urban communities because they capitalize on these communities’ principal resource: the knowledge, skills, and commitment of people who live in them.\textsuperscript{77}

Public health interventions also work to change social norms that harm health. Peer education programs on HIV, teen sexuality, and substance abuse, among others, prepare community residents to provide information, support, and referrals to their peers and to model values, beliefs, and behaviors that promote health\textsuperscript{105–7} Lay health advisers play a similar role in maternal child health, chronic disease, and other health programs.\textsuperscript{101}

Cities provide both opportunities and constraints for this type of program. The presence of multiple subpopulations, each with unique values and beliefs that influence health, make peer-education and lay-health-adviser programs especially valuable in reaching those who may be inaccessible to or mistrustful of public health authorities. Ethnic niches and marginalized groups, such as active drug users or homeless people, provide ideal audiences for these approaches.\textsuperscript{108}

The very diversity of urban populations, however, can also be a problem. Each population—Hispanics, Asians, gay and lesbian people, for example—is itself heterogeneous and it is not clear that an Ecuadorian immigrant is better prepared to engage a Mexican American than a non-Hispanic. Moreover, each culture has contradictory elements that influence health. Health interventions that are based wholly or mostly in a single culture may have difficulty sorting through these contradictions and coming up with a message that can support health. Many HIV programs based in African American churches, for example, have had trouble defining messages on sexuality and homosexuality that can reach different sectors of the African American population.\textsuperscript{109}

Another approach to changing social norms that affect health has been to reduce stigma. Cities have become home to a variety of populations often ostracized by mainstream society.\textsuperscript{97, 109, 110} Discrimination leads to poor health by a variety of mechanisms: segregated and inferior housing; reduced employment and educational opportunities;\textsuperscript{111} barriers to health care and other social services;\textsuperscript{112} maladaptive behavioral responses to discrimination, such as drug use and interpersonal violence;\textsuperscript{113} and higher levels of social stress\textsuperscript{97} and overt violence. Reducing stigma, a strategy seldom used by public health professionals, may warrant further attention.

Interventions to reduce stigmatization take the form of advocacy to discourage or punish overt discrimination, empowerment to help individuals or groups to overcome stigmatization, and public campaigns to promote tolerance and respect.\textsuperscript{111, 114, 115} Self-help groups of drug users, gay men, homeless people, and others have organized to reduce barriers to care and to change discriminatory public attitudes.\textsuperscript{116–18} National organizations have worked to pass state and national legislation to increase punishment for hate crimes, ban discrimination against gay and lesbian people, or reduce housing and employment bias or sexual violence and harassment.\textsuperscript{119, 120}
Interventions to Change Health Care and Social Services

While researchers emphasize the limited impact of medical care on health, public health professionals have always defined improving access to and quality of health care, especially primary and preventive care, as an important goal. The health care setting offers important opportunities for health promotion and disease prevention. Improving access to high quality primary health care for low-income urban residents has been a goal of federal policy since at least the 1960s. The single largest effort has been the Medicaid program, which pays for health care for eligible enrolled poor people. In urban areas, the financing provided by Medicaid helped to redistribute health care resources into underserved areas and to improve health for low-income children and their parents.\textsuperscript{19} Publicly funded neighborhood health centers, housing projects, community mental health centers, family planning clinics, shelter-based health services, and school-based health clinics reached some vulnerable urban populations not served by traditional providers\textsuperscript{108, 121} (Chapter 5, this volume).

National initiatives such as those to control high blood pressure and diabetes,\textsuperscript{122–24} increase screening for cancer,\textsuperscript{125} and immunize children and adolescents,\textsuperscript{126, 127} seek to improve the capacity of primary care providers to promote health and prevent disease by counseling, screening, and educating their patients or by providing more culturally appropriate care.\textsuperscript{128} These programs often focus on low-income urban populations.

A third type of effort recruits residents of low-income urban communities to become professional or paraprofessional providers, provides support and loan forgiveness to those who agree to serve in these areas, or trains health providers to communicate more effectively with the diverse populations living in cities.\textsuperscript{128–31} Improving the supply of practitioners in low-income urban areas and the cultural match between patients and providers is believed to improve access and communication, maximizing opportunities for health promotion.\textsuperscript{131–33} In some cases, community residents have been trained to become community health workers who can serve as a bridge between a neighborhood and a health center.\textsuperscript{131} In diverse urban areas, this approach can help to match the characteristics of health care staff and the community.

More recently, managed care organizations (MCOs) have taken on a greater role in providing health care to urban populations.\textsuperscript{134} As more states mandate Medicaid clients to enroll in managed care, MCOs will play an increasingly important role in health promotion. In some cities, the local health department has assumed responsibility for monitoring managed care. In Los Angeles, for example, the County Department of Health Services has developed memoranda of understanding that require Medicaid-funded MCOs to support such services as family planning, prenatal care, tuberculosis control, and HIV counseling and testing.\textsuperscript{135} However, in some cases managed care providers may not be willing or able to provide traditional clinical public health services. In Milwaukee, for example, an outbreak of more than 1,000 cases of measles was attributed primarily to the failure of a health maintenance organization to immunize its Medicaid enrollees.\textsuperscript{135} Recent efforts to cut back Medicaid may further limit its ability to promote health.
Increasing access to high quality primary care can reduce morbidity and prevent hospital admissions for many conditions, including asthma, diabetes, and hypertension. Preventable hospital admissions in most U.S. cities were significantly higher in low-income than in high-income areas.\textsuperscript{136} Local, state, and federal interventions are needed to achieve the goal of making health care more accessible and affordable to urban as well as nonurban Americans.

In summary, public health interventions have worked to promote the health of urban populations by changing individuals, physical and social environments, and health and social services. They have operated directly within urban communities to improve living conditions and at higher levels of social organization to bring new resources and services into these communities. While these interventions have contributed to overall declines in mortality and morbidity, they have not been able to reduce the disparities in health that characterize the United States as a whole and especially its cities. Moreover, in the past two decades, they have not prevented the emergence or resurgence of urban epidemics such as HIV infection, tuberculosis, and Hepatitis C; the manifestation of more insidious forms of chronic disease like asthma and diabetes, especially in cities, or the continuing toll of tobacco, alcohol, and illicit drugs.

**What Role for Public Health Professionals?**

The intervention categories that have been used in the complex environment of U.S. cities suggest several roles for public health professionals with intervention responsibilities.

**Balance Categorical and Comprehensive Interventions**

Since the health of urban populations has multiple determinants, no single actor can have sole responsibility for improving the well-being of city residents. In practice, this truism has created a dilemma for urban health researchers, practitioners, and advocates. On one hand, historical and epidemiological evidence suggests that improvements in housing, working conditions, and access to food are primary determinants of the dramatic improvements in urban health in the late 19th and early 20th centuries.\textsuperscript{137,138} On the other hand, most public health professionals and health providers working in cities focus on much more mundane and categorical tasks: identifying and treating children with lead poisoning, for example, inspecting restaurants, treating people with sexually transmitted infections, or educating the public about the dangers of second-hand smoke.

While almost everyone agrees that these more limited tasks are necessary and worthwhile, many expert observers worry that the vast majority of the resources of the public health enterprise are dedicated to a very small portion of the underlying determinants of health.\textsuperscript{1} To the extent that cities concentrate people in unhealthy environments, urban health practitioners perceive they are particularly trapped in the Sisyphean position of rolling rocks up hills against the push of social determinants.
MUNICIPAL HEALTH DEPARTMENT’S LOCUS OF CONTROL

To negotiate this dilemma, it may be helpful to consider another typology for interventions designed to improve the health of urban populations. This approach defines the variable of interest as the degree of control that health providers, researchers, and advocates play in the planning and implementation of the intervention. Table 15.2 shows three points on a continuum of control, with municipal health departments as the agent of intervention. The table illustrates that at each level, the potential roles for municipal health departments and key policy and resource questions differ.

By combining the intervention typology that describes domains targeted for change (e.g., population knowledge and beliefs, physical and social environments, health and social services) with this locus of control schema, public health officials can create a matrix for the systematic review of the range of interventions currently in place.

<table>
<thead>
<tr>
<th>Level of control</th>
<th>Interventions</th>
<th>Key questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOH has direct control</td>
<td>STI control program, restaurant regulation, child health clinics, contracts</td>
<td>What is the best use of limited resources? Does the intervention address the</td>
</tr>
<tr>
<td></td>
<td>with CBOs for HIV prevention</td>
<td>burden of mortality and morbidity? Can others do it better?</td>
</tr>
<tr>
<td>DOH has influence but not control</td>
<td>Jail health services, local Medicaid rules, school health services, local</td>
<td>How can DOH best use its influence to magnify the public health impact? What</td>
</tr>
<tr>
<td></td>
<td>occupational health standards</td>
<td>opportunities are there for synergy with direct DOH services? What is the</td>
</tr>
<tr>
<td></td>
<td></td>
<td>best way to frame the issue to achieve maximum synergy?</td>
</tr>
<tr>
<td>DOH has limited or no influence</td>
<td>Minimum wage, rent control, school dropout policy</td>
<td>Can DOH become a public voice for health? What evidence can DOH bring to the</td>
</tr>
<tr>
<td></td>
<td></td>
<td>dialogue? How can DOH build constituencies for policy change?</td>
</tr>
</tbody>
</table>

Note: Where an intervention falls in this continuum may differ by jurisdiction. STI = sexually transmitted infection; CBO = community-based organization.
Such a review could include ratings of each intervention on effectiveness (by expert judgment or, where possible, with empirical evidence), appropriateness to local health profile, impact on overall health, impact on disparities, and the likely effect on stated local or national health goals (e.g., Healthy People 2010). This review would guide future decisions on resource allocation and development of new programs to help create a balanced portfolio of interventions, appropriate to local situation.

PORTFOLIO EVALUATION

In recent years, some health economists have developed methods for optimizing a portfolio of health interventions that best use available resources for maximal impact on health. This approach allows officials to consider different levels of risk (e.g., high risk and high payoffs compared with lower risk and lower payoffs) and to use a single numeric, whether dollars, mortality, years of productive life lost, or others to compare the value of different intervention strategies. Just as financial investors seek a portfolio of investments balanced in risk, payoff, sector of the economy, and region of the world, so public health officials may want to review their portfolio of interventions to assess whether they are investing public resources wisely.

While further work is needed before portfolio evaluation can be applied to an assessment of the interventions in a particular municipality, such an exercise might help to clarify assumptions, highlight choices, and diversify the range of public health interventions now offered in most cities.

Set Municipal Health Objectives

Another strategy for setting priorities is to create a limited set of health objectives and concentrate public resources on achieving these objectives. The municipal health departments in New York City and San Francisco have chosen two different approaches (Table 15.3). In New York, the health department itself set 10 objectives focusing on clinical preventive medicine. In San Francisco, a more participatory process yielded a more social perspective on the determinants of health. These models offer health officials and other stakeholders a rationale for allocating resources among competing priorities.

Pursue Other Promising Directions

In this section I suggest some promising directions for practice and research on urban health interventions for the coming decades. These suggestions emerge from the previous review of practice, recent critiques of urban health interventions, and my own experience as a planner and evaluator of community health interventions in urban settings.

Improve Urban Living Conditions

Urban living conditions are the most basic determinant of the health of urban populations. To improve the health of urban populations, public health professionals
### Table 15.3. Two Approaches to Setting Municipal Health Goals

**New York City Department of Health and Mental Hygiene¹**  
*Take Care New York, 2004*

- Have a regular doctor or other health care provider
- Be tobacco free
- Keep your heart healthy
- Know your HIV status
- Get help for depression
- Live free of dependence on alcohol and drugs
- Get checked for cancer
- Get the immunizations you need
- Make your home safe and healthy
- Have a healthy baby

**San Francisco Department of Public Health²**  
*Prevention Strategic Plan, 2004–2008*

Advocate for policies such as:
- Livable wages
- Employment development/full employment
- Results-based employment training
- Adequate supply of high quality child care
- Improved quality and quantity of housing
- Strong social safety net
- Improved public transportation
- Increased public participation in political and social organizations
- Improved availability of respite services
- Equal and fair education policies

**References**


   www.dph.sf.ca.us/Reports/PrevPlan5yr/PrevPlan5YrMain.pdf.
need to identify the specific improvements in living conditions that will most effectively and efficiently lead to reductions in illness and death or improvements in quality of life.

Two dimensions of living conditions have consistently been associated with health: education and income. More years of education protect against almost every adverse health outcome. Education is also strongly correlated with income. While the United States and other developed nations have made great progress in ensuring that education is a right rather than a privilege, much more needs to be done. Disparities in educational achievement, college enrollment, and public spending on education, to pick just three outcomes, closely track disparities in health, with populations with less educational success and lower spending on education having more health problems. In many U.S. cities, public schools fail to provide low-income children, especially blacks, Hispanics, and recent immigrants, with the skills they need to survive in today’s economy, and higher education continues to be out of reach of a substantial portion of low-income families.

Improving education in cities is one of the most important ways to improve health, but what is an appropriate role for health professionals in this task? In most cases, our tasks fall in the third level shown in Table 15.2, areas where our primary role is to support others. Health providers can bring the health benefits of education into the public discussion. On a more direct level, health problems constitute an important cause of school failure, from learning difficulties to drop-out. Health professionals can work with schools to make sure that every child from preschool to college has the health care and health education needed to succeed in school. Lowering school failure and drop-out rates should be a public health objective for which health departments are funded and evaluated. On the policy level, health professionals can advocate for increased spending on health activities designed to improve educational outcomes and against cuts in these areas.

A second dimension of living conditions is income, again strongly associated with many health outcomes. Higher income allows people to purchase more of the necessities of life, such as housing, food, and health care and to exert more control over their living circumstances. Unfortunately, in most developed-world countries and especially in their cities, income disparities have increased in the past decade, and these disparities have made it harder for the poor to meet their basic needs. In the United States, several policies have successfully led to increased income, especially for those at the lower end of the socioeconomic ladder. These include living-wage laws, earned-income tax credits, subsidized job training, health insurance, and child-care programs. Unfortunately, at the same time, other policies, such as tax cuts for the rich and service cuts for the poor, have sometimes overwhelmed these positive trends. Public health researchers can help to document the health benefits of interventions to increase income and the adverse consequences of policies that magnify disparities or increase poverty. Health advocates can join the efforts to support policies and programs to increase income for the poor and reduce disparities. Finally, as Marmot suggests, increasing public provision of basic goods and services like education, health care, and housing...
Interventions to Improve Urban Health

reduces the adverse health effects of income disparities. Thus, defending the role of the public sector is another important task.

In summary, improved living conditions is the surest path to improved health for urban populations. Identifying specific changes in policies and programs that can lead to targeted and measurable improvements in living conditions that will in turn lead to improvements in health should be a public health priority for the coming decade.

Reduce the Size of Vulnerable Populations

Improved living conditions will benefit all sectors of the population but cities also need to focus on the most vulnerable urban populations because their circumstances pose a more immediate threat to their own and the wider community’s health. Among the vulnerable populations in developed world cities are children and older people living in extreme poverty, homeless people, recent immigrants from poor regions, and people returning from jail or prison. In many U.S. cities, these populations have been at the center of the urban epidemics of the 1980s and 1990s. Identifying vulnerable populations and the social processes that push them into vulnerability, then developing interventions that help individuals escape their risky circumstances and reverse the policies that create vulnerability are important strategies for creating healthier cities. Examples of this approach include re-settling homeless and formerly incarcerated people; providing health care for recent immigrants from low income nations, and moving children out of poverty.154–56

Traditional public health surveillance monitors specific health outcomes, acting when incidence exceeds some baseline level. Surveillance is necessary but not sufficient to prevent the rapid declines in health that characterized certain urban populations in the 1980s and 1990s. By developing an ongoing system to monitor vulnerable populations and their living conditions, public health officials can identify problems before epidemics are out of control and take action both to care for individuals at risk and to modify the policies and programs that create vulnerability. A key task is to identify the emerging populations and indicators that constitute 21st-century vulnerability.

Confront Market Forces That Promote Disease

A third public health strategy that can improve our ability to create healthier cities is a more systematic response to market forces that promote disease. In the past two decades, public health advocates have identified a new arena of practice, challenging the policies of industries like tobacco, food, alcohol, pharmaceuticals, guns, and lead paint.38 The products of these sectors play a major role in current patterns of mortality and morbidity, making them an important target for public health scrutiny. Through the use of education, legislation, litigation, and community mobilization, public health workers have confronted industries that promote unhealthy behavior and life-style and worked for changes in policy to reduce these influences.38, 157–59

Corporate disease-promotion harms all sectors of the population—the poor
who are persuaded to smoke cigarettes, purchase high-fat fast food, or buy illegal guns improperly tracked by manufacturers, and the rich who choose polluting sports utility vehicles that are more likely to roll over and kill their own passengers and the pedestrians or motorists in their path. While, on one hand, corporate disease-promotion influences both urban and nonurban people, the concentrated markets and opportunities for profit within cities make urban dwellers especially vulnerable. On the other hand, the dense networks of activists, professionals, researchers, and social movements within cities make them appropriate sites for forging new policies to reduce the harm of disease promotion.38

Specific roles for health personnel include research on the pathways by which specific corporate policies lead to unhealthy behavior or environments; educational campaigns to counter the deceptive advertising of disease promoters, and advocacy for more effective regulation and monitoring of dangerous products. Another important role for public health is to counter the ideological assault on government as a legitimate defender of the public interest against market forces. Many of the public health triumphs of the 20th century—identification of tobacco as a harmful product, safer food, and improvements in automobile safety—are the result of successful government action to control irresponsible special interests.160

Monitor Municipal Policies That Affect Health
Municipal policies on education, criminal justice, welfare, transportation, recreation, and the environment have an important influence on the health of urban populations—perhaps as important as the work of the public health and health care systems. Few health departments or independent health organizations have developed a systematic approach to assessing the impact of proposed policies and programs or evaluating the consequences of previous policies and programs on health and to bringing the health costs and benefits of these policies into the political and decision-making arenas. For example, the decision to increase fares for public transportation can have a variety of consequences, including increased use of motor vehicles and therefore of automobile pollution and accidents, and decreased ability to reach places of employment and to compete in the job market. Unless policymakers and advocates can identify these costs and benefits, they cannot consider them in reaching a decision. Health-impact assessment, a tool being developed in Europe, may help to bring these questions into the policy arena.161 To avoid repeating costly mistakes, municipal health officials and public health researchers should explore ways to monitor the health impact of public policy more systematically and develop new and more effective ways to advocate for the health of the public.162

Develop New Constituencies for Public Health
To implement the previous suggestions, health professionals will need to develop new constituencies to join in advocacy for these changes. Relying only on current partners seems unlikely to bring about the needed momentum for change. Possible allies include political elites and the rich and powerful, communities
and community organizations, social movements, health professionals, and the disenfranchised.

Political elites and the rich and powerful. In the past in the United States, many important public health advances have come about because enlightened members of the wealthiest sector of society saw it in their interest to reduce threats to public health. In the 1830s in New York City, for example, efforts to control infectious-disease outbreaks were led by physician reformers supported by wealthy New Yorkers who saw social stability threatened. In the 21st century, we need to create a common-ground urban public health agenda that will bring the political and financial support of the wealthy to bear on selected goals. These might include reducing pollution, maintaining the public health, sanitation, and physical infrastructures of the city, improving public education, and maintaining reductions in crime and violence. These goals benefit all sectors of the urban population and we need to find new and better ways to bring selected members of elites into urban health coalitions without sacrificing the principles of social justice and the priority of benefiting the neediest.

Communities and community organizations. In the past decade, many municipal health departments have begun to work more closely with communities and community organizations. Health officials have recognized these groups have credibility with diverse populations, a capacity to take on health and social issues, a track record of working with their constituents, and a passion and commitment that are priceless. Perhaps the best illustration of this trend is the active involvement of community organizations in HIV prevention and services. The HIV experience shows the potential but also the limitations of this approach. Community organizations have served tens of thousands of people with HIV infection, demonstrated a model of comprehensive and relatively integrated services, combined service and advocacy, played a critical role in bringing prevention messages to the hardest hit communities, and successfully persuaded government to allocate hundreds of millions of additional dollars to HIV.

Yet community organizations continue to be frustrated with their relationship with health departments, complaining that funding moves too slowly, oversight is cumbersome, and disparities in service levels are not always adequately addressed. Too often community insights into fundamental causes are channeled into health department categorical programs, limiting the value they bring to the process. Keeping community organizations as partners will require health departments to open more of a dialogue, make capacity building a higher priority, and ensure more stable support in exchange for consistent high quality services. Given the rich networks of community organizations in many cities, these groups constitute a critical yet often overlooked asset for urban health.

Health professionals. In the United States, the public health and health care communities have often gone separate ways and have joined forces only on relatively narrow questions. Several trends may create new opportunities for partnerships. First, in most cities both pubic and private hospital systems increasingly depend on public funding just as city governments increasingly depend on private hospitals to serve even the poor.
In addition, both health care providers and public health agencies are threatened by the increasing intrusion of the market and its government supporters. As the insurance, pharmaceutical, and for-profit hospital industries gain power in the health sector, their actions de-skill doctors and other providers, reduce their autonomy and professional judgment, and force them to focus ever more sharply on the bottom line. Many health providers are asking whether this is what they wanted for their professional lives.

In the public health sector, the tax cuts, deregulation, and militarization of public health imposed by conservative elected officials and their supporters have left public agencies with shrinking resources, new federal mandates (e.g., smallpox vaccinations), and ongoing fiscal crises. Cities make an ideal venue for experiments in bringing together health providers and public health organizations to experiment with new approaches to combining services, resisting market intrusions that damage health, and developing a common health agenda.

**Social movements.** Throughout history, social movements have played an important role in improving the living conditions that determine health. In the past decades, the civil rights movement, the environmental movement, the women’s movement, the consumer movement, the labor movement, the gay rights movement, and others have made important contributions to improved health. While these movements operate throughout society, many have their roots and their strongest support in cities.

Municipal health departments have had an uneven history with social movements. Movement tactics are often adversarial, activists’ language can be rude, and their self-righteousness galls harried public health officials. But these movements have played a key role in modifying public opinion, reframing key public health issues, changing regulations, and winning new resources. What are the social movements of this century? How can health authorities open a dialogue, and how can the two develop common strategies that maximize the separate strengths of each? These are key questions for public health researchers, advocates, and practitioners working in cities.

**Vulnerable and disenfranchised populations.** Finally, public health needs to build new alliances with those most hurt by our current health policies. In developed-world cities, these include the poor and very poor, recent immigrants, the homeless and precariously housed, people without health insurance, and, in the United States and elsewhere, people of color. These populations have the least to lose by changing the status quo and the most to gain by creating a more robust, effective, and comprehensive public health system. While a mobilized movement of the disenfranchised may not by itself be a sufficient force to transform our approach to urban health, it is certainly a necessary component. By renewing public health’s historic mission of fighting for improved living conditions, we have the opportunity to forge new ties with those who would benefit from such improvements.

Specific ways public health workers can contribute to building alliances with the disenfranchised include training leaders of disenfranchised communities about health and public health, conducting research that elucidates the pathways by
Interventions to Improve Urban Health

which disenfranchisement leads to poor health and disseminating the findings to relevant parties, educating public health professionals to work more effectively with stigmatized and vulnerable populations, and developing ongoing alliances with the organizations that represent disenfranchised populations.26, 29, 167, 168

Even in the short term, public health officials have much to gain by building these relationships. Today, few municipal health commissioners have a constituency that would make any mayor think twice before firing a health commissioner who, for example, refuses to cut the budget for essential services or endorses needle exchange or condom distribution in opposition to the mayor. As a result, few commissioners even make the threat. Having activated constituencies that understand and will fight for public health will give public health authorities far more clout than they now possess.

Conclusion

The public health community and its partners have a long history of developing interventions to improve the well-being of urban populations. In the past 200 years, such interventions have made important contributions to reductions in urban morbidity and mortality, improving and extending millions of lives and, in some cases, reversing the penalty associated with urban compared with rural living. In the 19th and early 20th centuries, public health reformers often worked to change urban living conditions directly by improving housing, making healthy food more available, regulating workplaces, and improving sanitation.

In the past decades, however, public health in the United States has become more reactive, addressing more proximate causes of ill health, such as unhealthy behavior or lack of access to medical care rather than underlying urban living conditions. In the 1980s and 1990s, U.S. cities faced new and resurgent epidemics of HIV infection, tuberculosis, syphilis, and gonorrhea; increases in the use of illicit drugs; a dramatic increase in homicide; and more insidious forms of chronic disease, such as asthma and diabetes. Long-term disparities in health between rich and poor and whites and people of color persisted, in some cases even widening, especially in cities. Once again, public health interventions played a key role in containing these infectious and social outbreaks, but this time their focus was on the most proximate causes of ill health, rather than the underlying social conditions. Thus, directly observed therapy brought tuberculosis under control, antiretroviral medications brought the AIDS death rate down, and more aggressive medical management of asthma reduced deaths and hospitalizations from this condition. While no one can doubt the value and necessity of these targeted interventions, by themselves they do not reduce disparities in health, realize the goal of health for all, or achieve the potential the wealthiest nation in the world has for creating models of healthy cities in the 21st century.

To realize that vision, public health practitioners and researchers need to change what they do. This does not mean abandoning the categorical interventions that are now the mainstay of the public health enterprise. Rather, we need to expand our practice: to focus more directly on improving the living conditions that
shape the health of urban populations, to reduce the size of the vulnerable urban populations that are at highest risk of ill health, to monitor urban policies outside the health sector that influence health and advocate for healthier alternatives, and to challenge and better control the special interests who profit from selling lethal products. By broadening our portfolio of interventions to focus on these tasks, we have the potential to change the underlying as well as the proximate causes of urban health. Finally, expanding our horizon creates both the necessity and the potential to bring new allies into the struggle for healthier cities. By itself, the health community has a limited impact, but in partnership with selected members of political elites, community organizations and communities, other health professionals, disenfranchised populations, and urban social movements, we can achieve our historic mission of ensuring the conditions of health for all populations.

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Creating Healthier Cities
Where Do We Go from Here?

David Vlahov, Sandro Galea, and Nicholas Freudenberg

A Framework for Urban Health
In this book and in other recent publications, we have proposed an ecological approach to urban health that suggests that the urban environment influences health and behavior at multiple levels. The focus of this approach is on “urban living conditions,” which are viewed as the day-to-day life circumstances of city dwellers that can either promote or damage health. This approach views health in cities as a function of individual factors influenced by local social (e.g., networks) and physical (e.g., built) environments, including health and social services, which in turn are influenced by municipal factors, including local government, civil society, and market forces, national policies, and global trends, such as immigration, the changing role of government, and economic globalization. This approach further considers the connections between cities and their surrounding areas. This formulation seeks to guide the urban health researcher or practitioner to an improved understanding of the determinants of health of urban populations.

Alternative Perspectives in Urban Health
In the past few years, public health researchers have considered the urban environment in its totality, and several frameworks have been proposed that describe how features of urban living may affect population health. While some of these frameworks are tightly focused on a single dimension, such as how features of the built physical environment may affect population health, our framework considers urban health in the larger context. We suggest that the framework we present in Chapter 1, which has guided this volume, illustrates the benefits as well as the limitations of such conceptual approaches. One limitation of our model, however,
is that it does not fully consider the range of perspectives or “lenses” that can be used to examine how urban living influences patterns of health and disease. Here we describe a few approaches that warrant further development: demographic, developmental, psychological, cultural, ethnic and racial, gender, and political.

**Demographic Approach**

Demographic shifts will change the composition of urban communities in the United States in the coming decades, with important implications for health. Declining fertility and high housing costs for young families have already left some cities with relatively few children. In contrast, as the “baby boomers” get older, age distribution in the U.S. population is shifting upward. Cities, where a disproportionate number of the elderly live, will play an increasingly important role in shaping the health of an aging population. Unless health systems plan for this growing population, however, their special needs may not be met. Immigration, expected to increase in many cities in the coming decades, constitutes another demographic shift that will affect the urban social environment, the health and social service delivery systems, and housing and job markets. Key questions for urban health researchers and practitioners planning for these changes include, How do these shifts affect urbanization and urban development? What will urban populations look like in the future? and, What are the implications for the health of the nation?

**Developmental Approach**

The cumulative influence of city living over a lifetime merits more attention. Although cities provide a unique, culturally diverse, and enriching environment for children, for example, urban air pollution and higher concentrations of environmental contaminants challenge their health. In less wealthy nations, the deleterious effects of overcrowding and environmental pollution are exacerbated by undernutrition and greater risk of transmission of infection, particularly respiratory and diarrheal diseases that contribute to childhood mortality. In large urban settings, children are constantly exposed to varying amounts of assorted toxic chemicals inside and outside the home. Many of these contaminants are suspected to be associated with developmental alterations. Exposures in infancy can have long-term risks. In adolescence, urban environments may contribute to injuries, violence, drug abuse, and the spread of sexually transmissible diseases, as well as obesity, cardiovascular disease risk, and other health problems related to lifestyle. Cities can also provide greater educational opportunities, higher levels of social support, and perhaps more tolerance for alternative life-styles, offering urban adolescents some developmental advantages as well as disadvantages.

The risks and benefits of urban environments change in adulthood and in old age. As cities concentrate older people, “naturally occurring retirement communities” emerge, offering unique benefits and opportunities for targeted gerontological services. Urban health researchers who use a developmental perspective recognize that the relationship between urban living and health is different at dif-
ferent stages in a person’s life and in different historical periods. Developing comprehensive frameworks for understanding how city living affects populations at different life stages in different eras can provide valuable insights into urban planning, health services, and health policy.\textsuperscript{11}

**Psychological Approach**

Researchers who use the psychological approach examine how city living influences cognition, emotions, and behavior and how cognition, emotions, and behavior in turn influence health. An examination of how the physical and social environments can influence risk perceptions, attitudes, intentions, and individual behavior change should look beyond the relation between characteristics of the urban environment and mental disorder, discussed in Chapter 13, and consider the extent to which the size, density, diversity, and complexity of cities can stimulate alertness, information processing, and creativity and generate sensory overload, inhibiting attention to the environment. An extensive body of scholarship has examined the role of stress and health.\textsuperscript{12–15} The physiological studies of stress show how mental perceptions can become embodied through hormonal and immunological routes that can then affect health.\textsuperscript{13–15} Several researchers have hypothesized that higher levels of stress in urban areas account in part for the urban health penalty, suggesting that psychological theories will need to inform both individual and community-level approaches to reducing stress or improving coping ability.\textsuperscript{16–18} Creating urban environments that support mental health challenges urban planners, public and mental health professionals, educators and elected officials.\textsuperscript{18}

**Cultural, Ethnic, and Racial Approaches**

Another approach considers urban health through the lenses of culture, ethnicity, and race and racism. There is ample evidence that persons of different cultures, ethnicities, and races interact differently with their environments in ways that may affect health. Recent studies have shown that being foreign-born is associated with a lower likelihood of receiving preventive and treatment services in United States.\textsuperscript{19–21} This lower access to services, however, does not always translate to worse health. There is an evolving literature on the “healthy immigrant effect,” noting that for at least some immigrants, health is better than for long-term residents.\textsuperscript{22} There is also a literature on the impact of acculturation, wherein the culture and habits of the country of origin are shifted to the country where immigration occurred. For Hispanics, the literature is mixed; in certain areas—substance abuse, dietary practices, and birth outcomes—there is evidence that acculturation has a negative effect and that it is associated with worse health outcomes, behaviors, and perceptions. In other areas, for example, health care use and self-perceptions of health, the effect is mostly positive.\textsuperscript{23}

Culture has a profound effect on health, influencing diet, sexual behavior, drug and alcohol use, health care utilization, strategies for coping with stress, and social cohesion.\textsuperscript{24} Some dimensions of the influence of culture on health have been explored. These include wariness of the health care system and government, par-
allel paths to preventive practices and alternatives to care among those of different cultures,26, 27 the perception of discrimination,28 and unintentional health provider practices that discourage appropriate care.29–32 But few health researchers have attempted to define the unique elements of urban culture and examine their impact on health, to document cultural changes that result from new patterns of interactions within cities and examine their associations with health, or to assess the health consequences of cultural conflict within diverse, densely populated cities. These challenges define the scope of a cultural approach to urban health.

In the United States, race has taken on a unique historical meaning and questions of race have dominated the history of public health since the days of slavery.33 Substantial bodies of literature documenting disparities in health and health care between whites and African Americans.30, 34 In addition, researchers have documented the multifaceted impact of racism on the health of African Americans.35–39 To a great extent, racial disparities in health play out in cities, in part because African Americans are concentrated in cities, and so too are inequalities in income. A key challenge is to move beyond describing ethnic, cultural, and racial differences and disparities to reducing them.

**Gender Approach**

A gender approach to urban health examines the different impact of cities on the health of men and women. The experience of city living by gender is understudied.40 Gender is one of the most powerful influences on health, and men and women experience urban living in different ways. For example, men and women experience distinct patterns of violence and crime in cities.41, 42 In many urban communities, young women are more likely to stay at home, care for other family members, and experience depression and social isolation.40 Low-income young men in cities are more likely to work in the informal and illegal economies, significantly increasing their exposure to unsafe working conditions and violence.43 In some immigrant urban communities, women experience their new situation as providing additional educational, employment, and social opportunities, while men may seek to hold onto the traditional roles and respect they may have experienced in their country of origin.44 These different experiences of urban living may well influence physical and mental health. Gender also profoundly shapes HIV risk, and some have argued that changing gender roles and expectations is a necessary condition for HIV prevention.45 Gendered analyses of city living can examine each dimension of social influences—global forces, markets, government, civil society—for their impact on health and inform the development of interventions and policies that promote gender equity and reduce gender disparities in health.

**Political Approach**

Politics shapes the health of urban populations by influencing who receives what share of a city’s resources, as well as who gets to participate and who is excluded from making decisions about the future. Earlier chapters of this volume describe how the movement of the middle class to suburbs reduced the political influences of cities and contributed to reductions in the post New Deal social programs that
have benefited urban areas through the 1960s. Politics influences who moves in and out of cities, and how local and national resources are allocated between cities and other areas and between health and other purposes.\textsuperscript{46} Politics shapes the ability of public health officials to achieve their objectives and can strengthen or weaken the social movements that fight for improved working conditions.\textsuperscript{47, 48} Despite its importance to health, with a few notable exceptions,\textsuperscript{49, 50} health researchers have rarely studied urban politics systematically and urban political scientists have only occasionally studied health. Creating a body of knowledge and a research agenda that examines the influence of politics on the health of cities could make an important contribution.

Studies based on these approaches can contribute unique insights into how city living affects health, and these insights can be used to design interventions to improve the health of urban populations. We hope that our summary will lead to critical examination of the value and limitations of different approaches and contribute to an integration of these approaches that will inform new conceptual models.

**Tensions in Urban Health**

The chapters in the book identify recurrent tensions that inform the consideration of the lenses as introduced here, suggest directions for future research, and illustrate the complexity of developing a science and practice of urban health. These include tensions between fundamental causes and proximate causes, between categorical interventions and comprehensive interventions, between behavioral and medical interventions and social, economic, or political interventions, between developing a universal model applicable to all urban situations and developing a model that emphasizes the uniqueness of each city, between urban health advantage and urban health penalty, between inner city and sprawl, and between determinants of urban health that are inside cities and those that are outside.

**Fundamental Causes versus Proximate Causes**

Our model for urban health considers the conditions of urban living that are affected by municipal, national, and global trends as proximate causes of individual and community health. The social structures that distribute power, money, and prestige, as Link and colleagues\textsuperscript{51, 52} have noted, represent the fundamental causes that underlie the proximate causes. We label these fundamental causes “enduring structures.” In general, social theorists have called attention to fundamental causes, while public health practitioners have taken a more pragmatic, although possibly less effective, approach in attempting to modify the most identifiable proximate cause, for example, individual behavior. While we do acknowledge the importance of fundamental causes in our conceptual framework, future urban health research will need to better integrate investigations of fundamental and proximate causes. By viewing each as discrete concept, we preclude understanding of the pathways and mechanisms by which the fundamental and proximate causes influence each other.
Categorical versus Comprehensive Interventions

Categorical interventions are defined here as discrete activities that are usually focused on a specific disease outcome. In contrast, comprehensive interventions are a combination of activities that seek changes across the levels of influence suggested by the conceptual framework and often seek to affect multiple outcomes. Since categorical interventions more easily fit the current scientific paradigm for generating inferences on effectiveness, they are often easier to evaluate because there is a discrete activity (e.g., a smoking-cessation program) with a specific outcome (rates of smoking, number of cigarettes smoked). As noted in Chapter 14, urban health researchers have developed methods to perform these types of evaluations. In contrast, comprehensive interventions that simultaneously include different levels of activity (behavioral and medical as well as social, economic, and political) and multiple outcomes are more difficult to assess for causal inferences. A key factor for generating inferences in the current scientific paradigm is the ability to isolate replicable components that produce or predict outcomes. Within comprehensive interventions, these components cannot be disentangled easily, and the effects they produce may vary across settings and contexts. Furthermore, it may not be the components themselves but rather the combination that is relevant to producing the desired outcomes. While methods for evaluation and frameworks for generating inferences are evolving for multilevel interventions, basic paradigm differences for what constitutes inference remain.

Many public health practitioners and researchers continue to choose categorical interventions not because they will be more effective but because they are easier to launch and evaluate. Many comprehensive interventions lack supporting evaluation studies not because they are ineffective but because they have not been studied. Resolving these problems through the development of new methods and more appropriate standards for determining effectiveness of different types of interventions will help to advance the practice of urban health.

Behavioral and Medical Interventions versus Social, Economic, and Political Interventions

Another debate among urban health interventionists centers on the relative value and importance of behavioral and medical interventions and social, economic, and political ones. Both approaches, however, are necessary and constitute an important part of the public health armamentarium. The debate centers on the relative importance of each within a portfolio of different interventions.

Campaigns for smoking cessation have used both approaches, emphasizing, on one hand, nicotine-replacement therapy, cognitive behavioral interventions, counseling, and use of antidepressants, and, on the other hand, changing norms with the help of community-wide campaigns, taxation of tobacco products, or new laws to restrict smoking in public places. Clearly, with this combined approach, the proportion of the population who smoke has declined. However, the debate about what constitutes the ideal mix of such approaches, and decisions about which approach to favor are influenced by organizational, political, and financial,
factors. To date, few researchers have proposed systematic approaches to resolving such questions.

To build on a second example, we can consider the epidemic of multidrug-resistant tuberculosis, which was described in previous chapters. The problem was widely attributed to infrastructure issues, where there had been reductions in funding for hiring, retaining, and training staff for tuberculosis clinics, resources for housing the homeless, and care offered in other crowded clinics and jails.\textsuperscript{53} Categorical interventions included directly observed therapy for tuberculosis and the enactment of public health code that enabled the detention of nonadherent infected individuals until the infection had been treated. This example shows that medical and political actions (i.e., a multi-level intervention) were implemented, but only enough to contain the immediate problem; this limited approach could prevent the resurgence of tuberculosis in the future. A more comprehensive approach would include additional municipal and national funding for infrastructure, training, and outreach on tuberculosis, extension of resources and health care for the homeless, better housing for the poor, additional services within correctional facilities, and efforts to link continuity of care from corrections to the community. In this case, however, the immediate outbreak of multidrug-resistant tuberculosis was handled with a more categorical approach. Sustained efforts to maintain control of tuberculosis require a more comprehensive approach.

More recently, public health officials have devoted attention to the rising epidemic of obesity in the United States. Obesity is a risk factor for multiple diseases (e.g., diabetes, hypertension), and its impact has been projected to be so serious as to lead to a reduction in life expectancy in the United States.\textsuperscript{54} While numerous approaches have been developed for individuals, including diet programs\textsuperscript{55} and even surgery,\textsuperscript{56} attention to community-level intervention is being recognized with an emphasis on multi-level approaches.\textsuperscript{57, 58} More “upstream” thinking has progressed to considering policy changes, such as urban redesign, taxes on junk food, or more health-conscious institutional food programs to promote healthier eating and more physical activity.\textsuperscript{59} In contrast to the interventions that were implemented to control tuberculosis, a wider array of sustained efforts will be needed to achieve control of the obesity epidemic.

These three examples illustrate the factors that influence the selection of interventions to achieve the appropriate balance between behavioral and medical interventions and social, economic, and political ones. More systematic attention to a process for making such decisions can help urban health officials to develop an appropriate mix of intervention approaches.

\textit{Universal versus Context-Specific Models for Urban Health Interventions}

Another tension forces urban health researchers to choose between universal models applicable to all or many urban situations and those that emphasize the uniqueness of a city, community or population. On one hand, a single simple model that can guide interventions to manage or avert crises across cities has a strong appeal. On the other hand, because every city has unique characteristics, any uni-
universal formulation can be either too simplistic or too complex. Thus, developing a systematic process for choosing the right place on the continuum of options that separates these polarities can facilitate the development of more effective but also more economical interventions to improve urban health. The discussion in Chapter 10 of water and sanitation issues in developing world cities illustrates such an approach.

**Urban Health Penalty versus Urban Health Advantage**

Our more recent work has focused on considering the salutary effects of urban living or the “urban health advantage,” a view that has not been the focus of research on health in cities. The more historic and commonly held view is that cities are harmful if not toxic environments for health. The term *urban health penalty* posits that cities concentrate poor people and expose residents to unhealthy environments leading to a disproportionate burden of poor health. Another term that has been used to characterize this approach is *inner city health*. The departure of the middle class and jobs to the surrounding suburbs in the past several decades within the United States as well as many other Western countries has led to concentrated urban poverty, increased racial segregation, and diminished capacity among cities to meet the needs of increasingly impoverished populations. By the late 20th century, U.S. and some European cities had higher rates than their respective nonurban areas of HIV infection, substance abuse, mental illness, infant mortality, asthma, and other conditions.

Considering issues related to urban health within an urban health penalty rubric draws specific attention to the poor health conditions that persist in many inner cities. However, this approach tends to equate “urbanness” with issues of disadvantage, and urban health becomes synonymous with conditions among the minority poor of the inner cities. In addition, this approach does not lead us to consider the specific characteristics of cities that may be associated with poor health, nor does it acknowledge that a multitude of factors (including, but not limited to poverty) accounts for urban population health.

Thus, emphasizing only the urban health penalty does not consider emerging evidence that living in cities might also confer an advantage by exposing residents to a salutagenic urban environment. An urban health advantage perspective emphasizes the health benefits of city living. In fact, it may not be useful to think of the urban penalty and the urban advantage approaches as mutually exclusive. All cities have characteristics that both promote and harm health. The health status of a given urban population can be viewed as the sum of the urban advantages minus the sum of the penalties. Research, interventions, and policies that maximize advantages while minimizing penalties can contribute to the goal of healthier cities for all.

**Inner City and Sprawl**

More recently, health researchers have shifted their focus from the health consequences of inner cities to the health consequences of “urban sprawl,” the diffusion
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of urban populations outside central cities. Motivated by the rapid suburbanization of U.S. and European cities in the past decades, this approach highlights the adverse health effects of urban growth into outlying areas. These include increasing automobile pollution and accidents, sedentary life-styles that contribute to the rise in obesity and diabetes, increased social isolation, and the breakdown of social capital.

Although the distinction between cities and suburbs is relevant for considering the impact of different environments, this distinction draws attention away from the relationship and interconnectedness of city and suburbs. For example, many suburbanites commute to the city for work, recreation, and cultural activities, and specialized health care. Conversely, urban health problems such as HIV, substance use, and violence commute to the suburbs, where public officials may initially lack capacity to address these issues. These interconnections between populations and problems suggest that a systems approach applied to metropolitan areas may yield more useful insights. In addition, some observers question whether urban sprawl is a new phenomenon and whether its adverse health consequences outweigh its health benefits.

In sum, these tensions permeate much of the literature on urban health. In our view, defining appropriate syntheses of these dilemmas and developing systematic approaches to resolving such conflicts in particular contexts will help to advance the field of urban health.

Next Steps: Toward a Science and Practice of Urban Health

In the past decade, urban health has received renewed attention as an area for research and intervention. In this volume, we summarize some of this work, especially as it applies to the United States. We believe there is a compelling case for developing a distinct science and practice of urban health. Several trends—the growing urbanization of the world’s population, the dominance of urban forms in both developed and developing nations, and the unique impact of the urban environment on health and disease—create a new urgency for better understanding and more effective efforts to improve the health of people in cities. The history of the past two centuries shows that changes in urban living conditions can lead to rapid and significant changes in health, additional support for our thesis that health interventions to modify living conditions promise improvements in global health.

In our view, urban health does not necessarily require the creation of a new discipline. Instead, a transdisciplinary approach, in which researchers combine the methods and disciplinary perspectives of many fields to develop theories, concepts, and methods uniquely situated to the subject of study, in this case the health of urban populations, may be appropriate. As several authors in this volume suggest, among the recent fields of inquiry that can contribute to the science and practice of urban health are studies on the social determinants of health, on the impact of the built environment on human health, on the causes and remedies for
disparities in health, on the ecological causes and consequences of changes in living conditions, and on methods of community-based participatory research.

In closing, we recommend several actions for readers who support the development of a systematic science and practice of urban health. Such an agenda can help to develop priorities for research and intervention and to coordinate the efforts of the researchers, educators, practitioners, public health officials, advocates, and others working to improve the health of urban populations.

Create Interdisciplinary Training and Research Centers in Urban Health

The complexity of the urban environment and the multiple determinants of urban health problems ensure that no discipline has a monopoly on research and intervention. To build an interdisciplinary science of urban health will require creating institutions that foster such efforts. To date, such centers have emerged in universities, health departments and other research institutions. Recent reviews or case histories have described these experiences. More systematic study of the lessons from these units will help to improve their contributions.

In addition, in recent years, scholars from a variety of disciplines have begun to make the process of inter- or transdisciplinary research a field of investigation. Some have applied transdisciplinary approaches to issues closely related to urban health, such as urban planning, active living, or tobacco control. Urban health researchers should join this dialogue and seek to develop research processes that support integrating findings, methods, theories, and concepts from different disciplines into a unique body of knowledge that can inform the study of city living and health.

Redesign Training Programs for Urban Health Researchers and Practitioners

Improving the health of urban populations requires a work force of practitioners, managers, researchers, and policy makers with the requisite knowledge and skills. Current professional training programs focus more on disease outcomes, populations, and techniques than on the characteristics of the urban environment that contribute to health and disease. To prepare future urban health professionals and researchers, academic programs will need to reexamine admissions policies, curriculum, field placements, faculty promotion and tenure procedures, and affiliations with local health departments, community organizations, and policy makers. Creating networks of urban health professional educators from around the world will help to facilitate this process and ensure that emerging units will learn from each others’ experience.

Integrate New Arenas of Scholarships into the Study of Urban Health

To develop a comprehensive science of urban health, researchers will need to become familiar with a wide variety of scholarship that can inform the multilevel
investigations that are needed. The principle contributions to the study of urban
health have come from epidemiology, environmental health sciences, health ser-
vices research, and other public health disciplines, as well as from sociology,
psychology, anthropology, and urban planning. Many other disciplines and fields
of study offer the promise of new insights into cities and health: neuroscience
and immunology can help to understand how urban environments affect human
biology; women’s and gender studies can contribute new understanding of
how cities differentially affect males and females; cultural studies can inform
research on the impact of dominant urban ideologies and discourses on health
norms and behavior; and transportation sciences can guide investigations of the
health impact of various transportation systems, a key issue for both developed
and developing world cities. Developing systematic strategies for the integration
of relevant bodies of knowledge for urban health is an important priority.

**Focus Research on Interventions and Policies That Promote the Health of Urban Populations**

For too long, urban health researchers have simply described the health of various
urban populations or compared urban and nonurban or intra-urban differences. In
our view, the priority for future research should be on analytic studies that iden-
tify particular characteristics of the urban environment that contribute to health
or disease and on the evaluation of interventions to modify these factors. By en-
couraging students and colleagues to tackle these more difficult questions, by ad-
vocating for funding streams that support this kind of research, and by educating
policy makers on the potential of good research to inform policy and practice,
urban health researchers can help to shift research resources to more productive
activities.

**Use Urban Health to Build New Research and Practice Links Between Clinical, Health Services,
and Public Health Research**

In the past, clinical, health services, epidemiological, and intervention research
studies have often proceeded on separate tracks, with little communication among
the various strands, an approach that has limited progress. Yet the evidence pre-
sented in previous chapters shows that prior health conditions, current living cir-
cumstances, and access to services all affect health outcomes of urban popula-
tions. The complexity of the urban environment as well as the density of urban
researchers may make cities a suitable setting for reweaving these threads into a
single research strand, since each gives necessary but not sufficient insights into
population health.

**Link Urban Health Research with Rural and Suburban Health Research**

In the past few years, rural health has attracted new attention in the United States,
and as more people move into increasingly diverse suburban areas, others have
focused on the health risks and benefits of suburban life. In our view, these developments should be seen as advancing the study of urban health, rather than competing with it, since all three highlight the role of place in health. Moreover, in an increasingly globalized world, many health problems move back and forth across urban, suburban, and rural lines. Future research should focus on this migration of diseases and develop effective methods for reducing such transmission and minimizing its impact.

*Build New Partnerships with Urban Communities*

Urban communities have a key role to play in urban health research and intervention. Community-based participatory research offers principles and methods that can guide partnerships between researchers, community organizations, and community residents. A recent review of the experiences of the Urban Research Centers funded by the Centers for Disease Control and Prevention illustrates the accomplishments and barriers that such partnerships face. By engaging a variety of community stakeholders in all aspects of planning research, framing questions, collecting data, interpreting findings and disseminating results, researchers increase the likelihood of more fully understanding a phenomenon of interest. They also give communities greater ownership of the research process and outcomes and build potential support for translating findings into practice or policy.

*Build Links with Constituencies That Can Help to Move Research Findings into Practice*

More broadly speaking, improving the health of urban populations will require creating alliances with a wide sector of constituencies including policy makers, service providers, nonprofit and advocacy organizations, social movements, and citizens. Such alliances will be needed to win funding for research, achieve policy changes to improve urban health, and implement and sustain interventions at the neighborhood, community, municipal, regional, national, and global levels.

*Conclusion*

In this volume, we argue that urban living conditions—the daily life experiences of people living in cities—are the primary proximate and most remediable determinant of health and disease. These daily life experiences result from individuals interacting within unique physical and social environments with a specific constellation of health and social services. Improving these urban living conditions is the most promising primary target for public health intervention. Thus, training programs must prepare health professionals to take on this task, by emphasizing the content of urban health as exposure to a particular environment and the processes for intervention. Disciplines that could benefit from such an approach include not only medicine, nursing, law, and urban planning but also academic fields such as anthropology, economics, sociology, and political science.

Public health practitioners need to ask how we go from where we are to where
we want to be to improve the health of cities. To do this will require working effectively at both the scientific and political levels. While public health as a discipline has long acknowledged the importance of both politics and science, most researchers, practitioners, and policy makers spend their working lives in one domain or the other. To promote the health of cities in the 21st century, we will need to develop a practice and an agenda that are equally grounded in science and politics.

Cities are more than a daunting list of problems that sum to a portrait of inevitable decay. Urban areas are a collection of diverse, vibrant, and interacting social environments. This volume provides a framework that can guide the development of a comprehensive agenda for urban health research and intervention. We hope that readers will debate the framework, rearrange its components, remedy its limitations, and integrate new perspectives. Most of all, we hope we have provided some starting points for advancing a vision of the interdisciplinary development of a science and practice that can improve the health of urban populations.

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