

A Framework for the Study of Urban Health

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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.”¹ 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.²

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

Figure 1.1. Growing Metropolitan Areas in the United States

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

Population size category	Population, April 1, 2000	Percentage change, 1990 to 2000	2000 share of U.S. total
United States	281,421,906	13.2	100.0
Total for all metropolitan areas	225,981,679	13.9	80.3
5,000,000 or more	84,064,274	10.8	29.9
2,000,000–4,999,999	40,398,283	19.8	14.4
1,000,000–1,999,999	37,055,342	17.7	13.2
250,000–999,999	45,076,105	13.1	16.0
Less than 250,000	19,387,675	11.1	6.9
Total nonmetropolitan	55,440,227	10.2	19.7

Source: U.S. Department of Commerce, Bureau of the Census, *1990 Census: Population and housing unit counts* (Washington, DC: Bureau of the Census; 1990).

than 20,000 people; however, Whitehorse is the only large density of people for hundreds of miles. As such, it functions very much like a city for the surrounding area, sharing with larger cities issues of population density, higher priced real-estate than surrounding areas, and to an extent, suburban sprawl.

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-

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 Division¹ 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.

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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

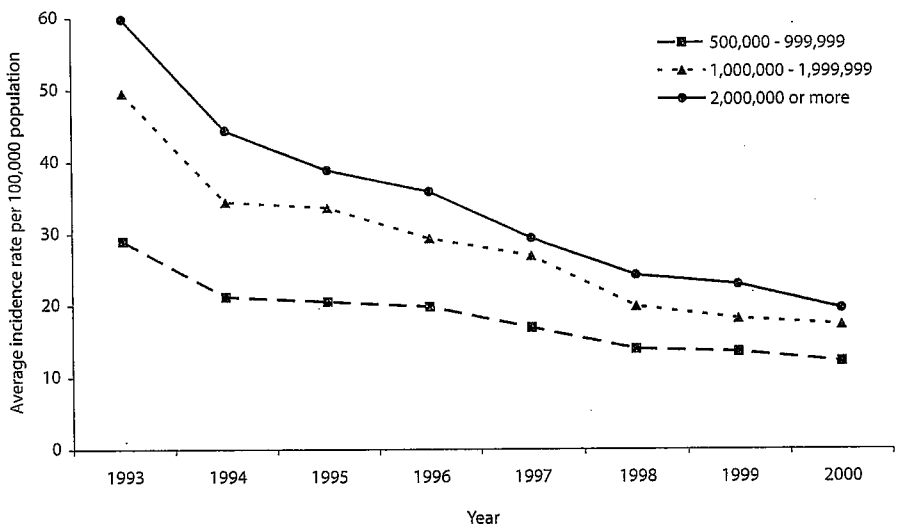
Recent research on urban health has in general taken two different approaches: *urban health penalty* and *urban sprawl*;¹⁶ both are descriptive of different phenomena that have characterized cities in the United States. Urban health penalty grows out of earlier work on the impact of industrialization 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

Figure 1.3. AIDS in U.S. Metropolitan Areas

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.²³ 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 0.056.²⁴ 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.²³

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 neighborhoods²⁵ 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.

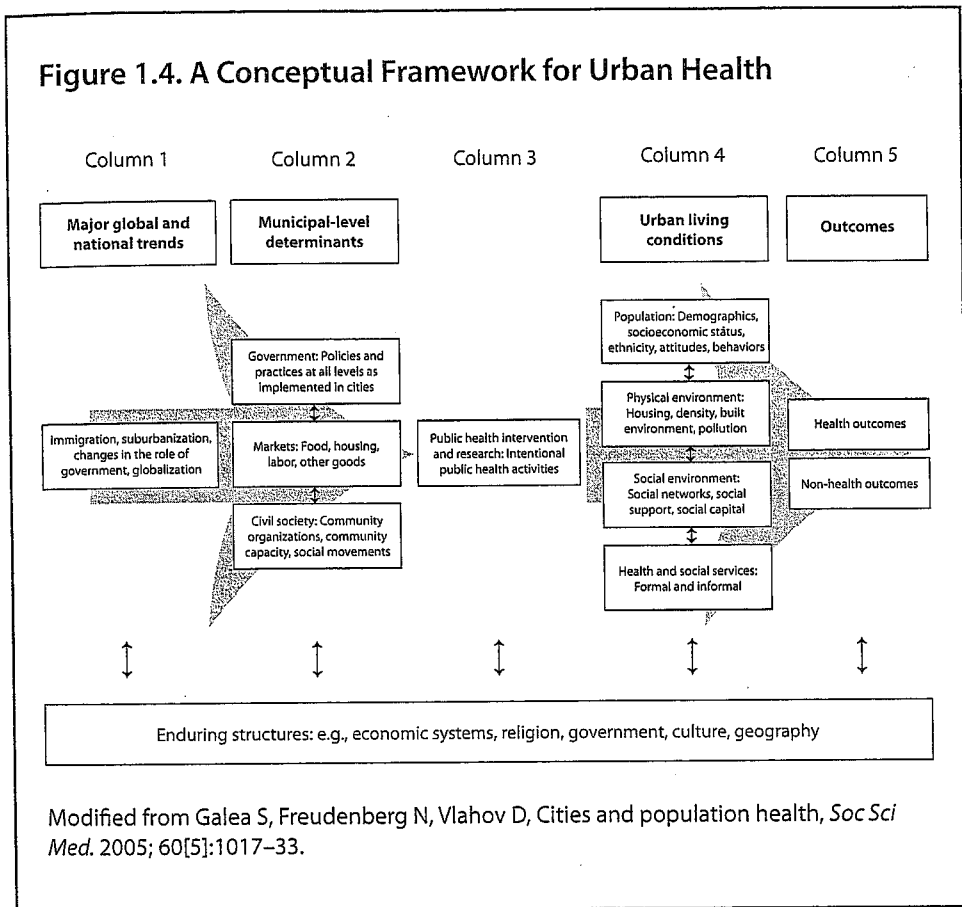
The framework, illustrated in Figure 1.4, shows that the health of urban populations is a function of urban living conditions, municipal-level determinants, and global and national social, economic, and political trends.²⁶ Because urban living conditions are postulated as the primary modifiable determinant 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’s²⁷ 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

Figure 1.4. A Conceptual Framework for Urban Health



Modified from Galea S, Freudenberg N, Vlahov D, Cities and population health, *Soc Sci Med.* 2005; 60[5]:1017-33.

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 the 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,²⁸ the concentration of social pathologies in some urban populations,^{19, 29} their dispersion to suburban areas,³⁰ the growing realization that urban sprawl poses threats to both urban and suburban regions,²¹ and the persistence of a health care system that cannot provide insurance coverage for millions of Americans,¹ 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,³ 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.³¹ 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 Perrow³² 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.^{33,34} 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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