

**URBANIZATION**

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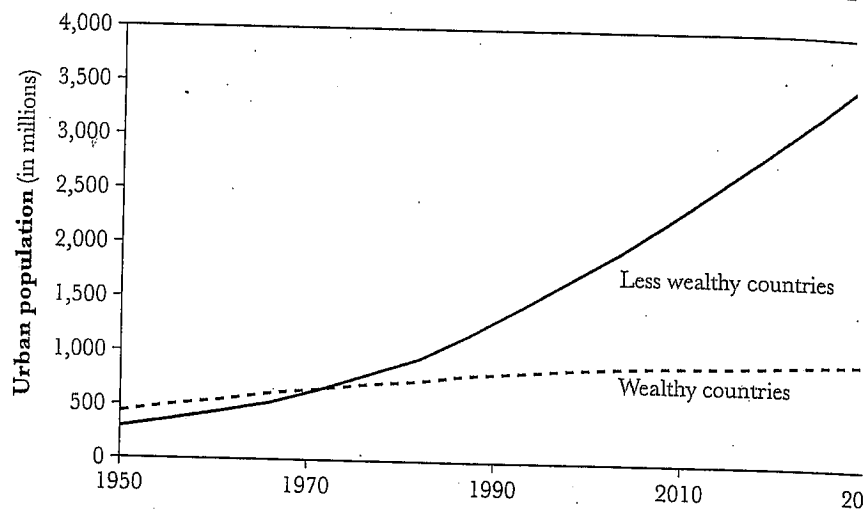
Sandro Galea  
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The world is an increasingly urban place. At the beginning of the nineteenth century only 5 percent of the world's population lived in urban areas. By the end of the twentieth century that proportion had risen to about 46 percent. Current projections suggest that more than half the world's population will be living in urban areas by 2007 and that nearly two-thirds of the world's population will live in cities by 2030. Overall global population growth in coming decades will be primarily in cities.

The pace of increase in urban areas is projected to differ by region of the world and by initial city size. In particular, most global population growth will occur in the less wealthy regions of the world, with the most rapid growth expected in Asia and Africa. Even though North America and Europe are currently the most urbanized regions, the number of urban dwellers in the least urbanized region, Asia, was in 2000 already greater than the urban populations in North America and Europe combined.

Some of the most dramatic examples of this growth have been in megacities (cities with populations greater than 10 million, such as New York and Los Angeles; Mexico City, São Paulo, and Buenos Aires; Calcutta, Delhi, Mumbai, Dhaka, and Karachi; Jakarta and Manila; Lagos, London, Paris, and Tokyo). The proportion of people living in megacities is expected to rise from 4.3 percent of the global population in 2000 to 5.2 percent in 2015, with considerably faster growth in the developing world. For example, Calcutta's population is projected

**FIGURE 16.1. GLOBAL URBAN POPULATION GROWTH IN WEALTHY VERSUS LESS WEALTHY COUNTRIES.**



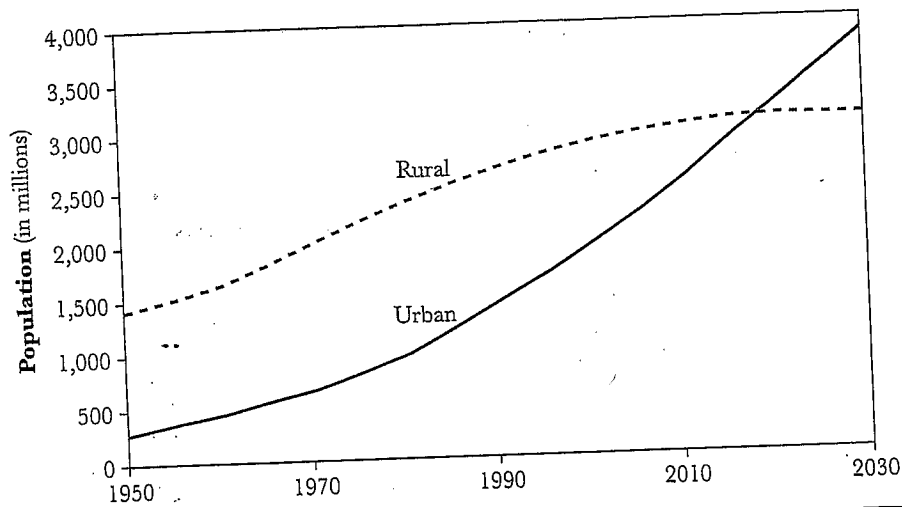
Source: United Nations Department of Economic and Social Affairs, Population Division. 20

to grow by 1.9 percent per year between 2000 and 2015, compared to 0.4 percent for New York City.

Although megacities attract much attention, most of the world's population growth will occur in smaller cities. Large cities in developing countries will account for approximately a fifth of the world's population growth, but small cities will account for almost half the growth. Therefore a growing number of relatively small cities throughout the world will contain most of the world's population in the twenty-first century. Figure 16.1 shows trends in the global urban population, comparing urban populations in the wealthy and less wealthy countries of the world. Figure 16.2 focuses on the less wealthy countries, showing their changing urban and rural populations. The references at the end of this chapter provide sources of further information on global urbanization demographic trends.

Urbanization is probably the most important contemporary global demographic trend. It also represents a shift in the human environment—a profound alteration of thousands of years of human ecology. It is therefore important to consider the implications of urbanization for population health. This chapter offers a primer on urbanization and its role in shaping population health. We first discuss some methodological issues, primarily problems with defining and measuring cities and urbanization itself. Next we discuss why urbanization matters for human health on the global level, focusing on four mechanisms: population factors

**FIGURE 16.2. URBAN VERSUS RURAL POPULATIONS  
IN LESS WEALTHY COUNTRIES.**



Source: United Nations Department of Economic and Social Affairs, Population Division. 2002.

service provision, the social environment, and the physical environment. We then offer a historical overview of thinking about cities and health and discuss ways to consider the evidence linking urbanization, city living, and health. We conclude with comments about building healthy cities and about the ways in which urban planning and environmental design may contribute to improved population health.

### What Is a City?

It is likely that each of us has a different working definition of *city*, derived from our background and experience, and that each of us carries a different image of city. We are in good company. Novelist and Nobel laureate Saul Bellow (1970) suggested that asking how Americans view New York City "is perhaps like asking how Scotsmen feel about the Loch Ness monster. It is our legendary phenomenon, our great thing, our world-famous impossibility. New York is stirring, insupportable, agitated, ungovernable, demonic. No single individual can judge it adequately." Indeed, cities can defy definition and challenge the imagination. Cities are elegant, sophisticated places—think of Fifth Avenue, the Champs Elysée, Copacabana. Cities are also dense, teeming, and dangerous places—think of the squatter colonies of Rio de Janeiro and Lagos and the abandoned streets of the South

Bronx. Cities can be distinctive (there is only one Paris) or can look monotonous and interchangeable (think of most North American midsize cities). Cities can be small, compact areas that are easily navigated on foot, and they can be vast, sprawling, automobile-dependent metropolises that are pedestrian hostile. In short, and by extension urban experiences, represent profoundly diverse human habitats, a fact that highlights some of the challenges inherent in considering how cities may affect health.

It therefore comes as no surprise that there are multiple and inconsistent definitions of both *urban* and *urbanization* (Goldstein, 1994). An appreciation of this complexity is essential in seeking an understanding of how cities and urbanization may affect human health.

No definition of urban places has been universally adopted by national governments, and the working definition of *urban* varies widely among countries. Among the 228 countries on which the United Nations has data, about 40 use administrative definitions of *urban* (for example, living in the capital city), 39 use size and density, 39 use functional characteristics (for example, economic activity), 22 have no definition of *urban*, and 8 define all (for example, Singapore) or most (for example, Polynesian countries) of their population as *urban*. Official statistics of bodies such as governmental agencies and the United Nations rely on country-specific designations and do not use a uniform definition of *urban*. In some instances, definitions of *urban* in adjacent countries vary tremendously. For example, *urban* places in Bolivia include localities with 2,000 or more inhabitants. In neighboring Peru, populated centers with 100 or more dwellings grouped contiguous and administrative centers of districts are designated *urban*. Global statistics on urbanization therefore embody international definitional differences, the result of statistical or historical precedent, and in some cases, political expedience.

Compounding these difficulties, definitions of *urban* have changed over time and in different ways in different countries (Box 16.1 discusses the U.S. Census Bureau definition), and these differences are frequently embedded in calculations about changing urban proportions. For example, Box 16.2 highlights some changing definitions of *urban* in China over the past century.

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### Box 16.1. The Census Bureau Definition of *Urban*

The U.S. Bureau of the Census (2002) defines an urbanized area as "a place and the adjacent densely settled surrounding territory that together comprise a minimum population of 50,000 people. . . . The 'densely settled surrounding territory' adjacent to a 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." But this definition raises another question; places outside the specific size and density parameters are design-

nonurban. But is the issue that simple? Although it is tempting to classify urban versus nonurban dichotomously, a more nuanced appreciation of gradations of urbanicity may also be helpful. There are relatively few cities like Las Vegas, isolated from other urban areas by vast underpopulated spaces. Most cities (think, for example, of New York City) are part of a far-reaching, densely populated area that continues uninterrupted for miles beyond the city center, transitioning gradually into *suburban* and *exurban* areas. Thus a dichotomous definition of *urban* fails to recognize the periurban areas that may share some characteristics of cities and may have "typically urban" health conditions.

The Census definition also raises questions about absolute size and density parameters. Although defining a *threshold* population size facilitates demographic analyses, it is conceivable that areas with fewer than 50,000 people, particularly in sparsely populated areas, may also share many characteristics of cities. For example, fewer than 30,000 people live in Whitehorse, the capital of Canada's Yukon Territory. However, Whitehorse has the greatest density of people for hundreds of miles and as such functions like a city for the surrounding area, sharing with cities issues of population density and heterogeneity.

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## x 16.2. Changing Definitions of *Urban* in China

China's definitions of *urban* have changed substantially during the last two decades, reflecting changes in urbanization policy, political ideology, and stage of economic development. Currently, the urban population size depends on four factors: the criteria for designating a settlement as urban, the boundaries of designated places, the household registration system, and urban status among the unregistered population. The definition of *city* in China is relatively straightforward, because cities are established with the approval of the federal government. However, official urban statistics also include some people living in towns, the definitions for which have changed substantially over the years. In 1964 and 1984, revisions in urban classification effectively increased the number of Chinese cities and the size of the urban population. Prior to 1964, a *town* was an area with more than 2,000 permanent residents of whom 50 percent or more were nonagricultural. After the 1964 revision, a *town* was a place with more than 3,000 permanent residents of whom at least 70 percent were nonagricultural or a place with between 2,500 and 3,000 permanent residents of whom 85 percent or more were nonagricultural. After the 1984 revision, a *town* was the location of a county-level government agency; a place with fewer than 20,000 people of whom at least 2,000 were nonagricultural; a place with more than 20,000 people of whom at least 10 percent were nonagricultural; or a remote area, mountainous area, small-sized mining area, small harbor, tourism area, or border area with a nonagricultural population less than 2,000. Therefore, the size of the urban population in China, as it appears in official statistics, depends on how nonagricultural population is defined. Because this distinction is made by local residents and village committees, there is substantial uncertainty about the usefulness of some of these statistics.

Source: International Institute for Applied Systems Analysis, 1999.

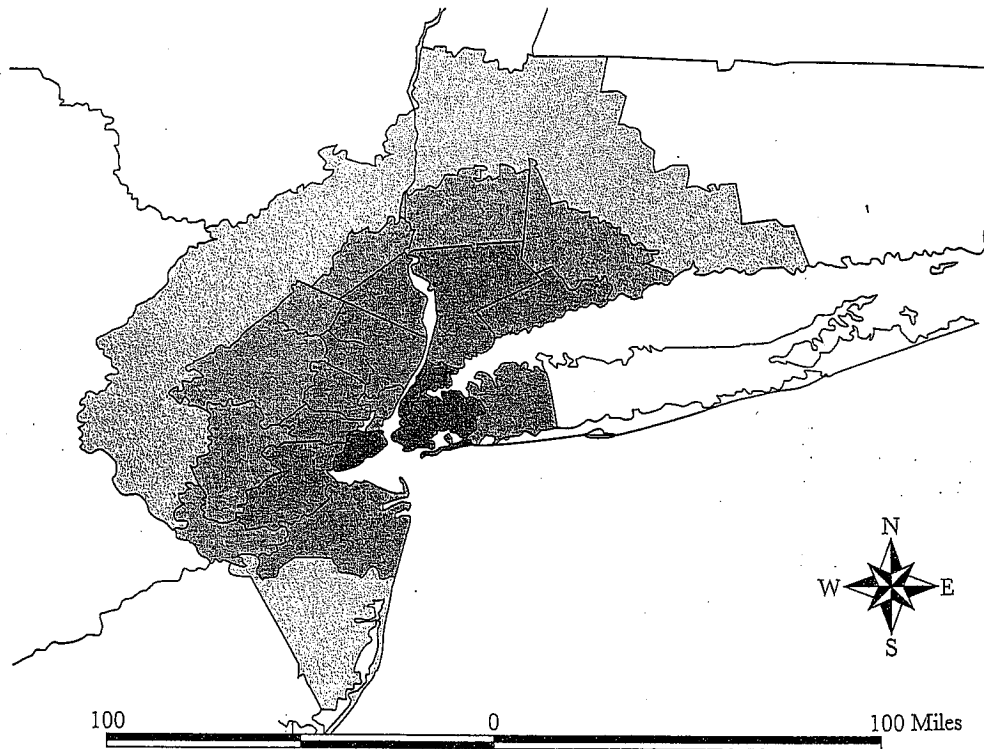
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Another change in urban form, especially in wealthy countries where automobile travel has become the norm, is the expansion of cities into periurban, or fringe areas—the phenomenon known as suburban sprawl. Box 16.3 describes this process.

### Box 16.3. Urban Sprawl

A prominent feature of urbanization in recent decades, especially in North America, has been *urban sprawl*. Changes in both *land use* and *transportation* have combined to produce this shift in the traditional form of cities, in which cities expand over large geographic distances and farmland and forest are converted to residential use (Figure 6.3). Land is used at a low density, in the range of one household per acre, instead of the traditional urban densities of five or ten households per acre. Land-use mix

FIGURE 16.3. URBAN SPRAWL IN THE NEW YORK METROPOLITAN AREA.



Note: New York City is home to about 8 million people, and the concentric areas, indicated by shaded bands, contain 7.6 million, 3.3 million, and 2.4 million, for a total metropolitan population of approximately 21 million.

also low; instead of residential, commercial, office, recreational, educational, and other uses being contiguous, each is separated from the other, a separation often enforced by zoning laws.

As a result of the low density and the separation of land uses, the distances between destinations—say, from home to school, home to work, or home to the store—are typically long, well beyond walking or bicycling distance. Moreover, mass transit is impractical in low-density development, where not enough people are clustered near trip origins and trip destinations to enable siting of transit stations. As a result the predominant form of travel is driving. Extensive road networks are built, running from the *loop and lollipop* networks of residential subdivisions (which replace the gridlike arrangements of traditional cities and towns) to secondary *feeder* roads to massive highway systems (Figure 16.4). Nevertheless, connectivity is often low; a trip from home to school of half a mile as the crow flies may take two miles on surface roads that meander their way out of residential subdivisions and onto feeder roads. By the early twenty-first century, about half the U.S. population—a majority of those in metropolitan areas—lived in the suburbs.

In recent years researchers have studied the possible effects of sprawl on health. One effect became apparent early in central cities, where poverty concentrated upon the migration of more affluent residents, jobs, and economic activity to the suburbs (Wilson, 1996; Jargowsky, 2002). This concentrated poverty has disastrous consequences for health (Adler, Marmot, McEwen, and Stewart, 1999). Other effects manifest in the suburbs. As people drive more, they walk less and are less physically active overall; these sedentary lifestyles contribute to overweight, cardiovascular disease, cancers, and other conditions (see Chapter Seventeen). The reliance on driving also adds to air pollution and increases the risk of motor vehicle crashes. The land-use patterns of sprawling metropolitan areas can threaten water supplies and contribute to the urban heat island effect. And the social aspects of sprawl may threaten mental health in various ways (think of road rage) and undermine social capital (Frumkin, Frank, and Jackson, 2004).

To study the effects of sprawl researchers need to measure it. The most common approach has been to use the Sprawl Index, developed by planner Reid Ewing and colleagues (Ewing, Pendall, and Chen, 2002). These researchers focused on both land use and transportation and identified four categories for measurement: the strength or vibrancy of activity centers and downtown areas (a measure of sense of place and consolidation of commercial and recreational activities); accessibility of the street network (reflecting connectivity); residential density; and land-use mix (the mix of homes, jobs, and services at the neighborhood level). The Sprawl Index combines twenty-two specific measures grouped under these four categories. It has shown the most sprawling U.S. metropolitan areas to be in the South and Southeast, with a few in California as well. The least sprawling areas are in the Northeast, in California (San Francisco), and in Hawaii (Honolulu).

Using the Sprawl Index, researchers have studied the effects of sprawl on physical activity levels, injury levels, and markers of cardiovascular health such as blood pressure, among other outcomes (Ewing, Schieber, and Zegeer, 2003; Ewing and others,

FIGURE 16.4. URBAN SPRAWL: IN THE TOP PHOTO DENVER SPREADS TO THE FOOT OF THE ROCKY MOUNTAINS; IN THE BOTTOM PHOTO A SUBURBAN RESIDENTIAL SUBDIVISION ADOPTS A TYPICAL LOOP AND LOLLIPOP PATTERN.



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2003; Sturm and Cohen, 2004; Lopez, 2004; Vandegrift and Yoked, 2004; Kelly-Schwartz, Stockard, Doyle, and Schlossberg, 2004). Although the results are not entirely consistent, they generally support the hypotheses that sprawl is associated with less physical activity, more injuries, more weight gain, and perhaps higher blood pressure, after controlling for other important variables.

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But cities are not static. They form and change over time, in a process called *urbanization*, and this process of change may also affect health. Most authorities identify urbanization with population growth, through natural population increase or migration, or both. However, population growth in cities is a complex idea. Metrics of urbanization may include the absolute annual increase in urban population size, the rate of urban population growth, the level of urbanization, and the rate of urbanization. Other elements of urbanization include changing urban age and gender structures, among others. Box 16.4 discusses the implications of these different measures of urbanization.

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### **Box 16.4. Measuring Urbanization: An International Example**

Tanzania and Bhutan were two of the most rapidly urbanizing countries during the 1990s. However, the population of Tanzania is four times larger than that of Bhutan (Tanzania had 25.5 million people in 1990 and 33.7 million in 2000; Bhutan had 6 million people in 1990 and 8 million in 2000), and the percentage of the Tanzanian population that was living in urban areas (21.7 percent in 1990 and 32.3 percent in 2000) was also four times larger than Bhutan's (5.2 percent in 1990 and 7.1 percent in 2000). Therefore, by the end of 2000, although the two countries had had comparable percentage increases in population size, the urban population growth was approximately six times larger in Tanzania than it was in Bhutan (64.9 percent and 13 percent, respectively). In addition to these considerations, mathematical representations of urbanization are, of course, fundamentally simplifications of overall urban population dynamics.

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### **Why Cities Matter**

Why concern ourselves with cities in a textbook on environmental health? If cities are the predominant human environment of the twenty-first century, then it is difficult to consider any aspect of environmental health without thinking of the role of cities. Urban issues are embedded in many academic disciplines, although sometimes so deeply that they are barely acknowledged. For example,

epidemiological research into the health of homeless populations rarely dwells on urban conditions as a determinant of either homelessness or of the health of the homeless, but urbanism and urbanization are undoubtedly primary determinants both of homelessness and of the conditions of homeless persons in different cities. Research that treats urban conditions simply as background and fails to consider them as determinants of health can shed little light on how cities may affect health. In order to understand better the relationships among features of the urban environment and health we must identify the features of cities that may have implications for health. The diversity of cities worldwide means, naturally, that there is no single form of *urban living* but rather a range of conditions with some shared features. By considering these shared features we can understand the role that urbanization may play in shaping population health.

### Population Factors

Fundamentally, cities are places where large numbers of people live in close proximity. For these city dwellers, urban contexts shape the resources available to them, their interpersonal contacts, and their lifestyle choices. Accordingly, population factors are among the principal factors that shape urban population health. City dwellers routinely come into close contact with people of disparate socioeconomic status and with racially and ethnically diverse groups. Several considerations arise from this observation. First, although interacting with socioeconomically and ethnically diverse groups may be enlightening, it may also introduce significant stress. Stress, in turn, can shape health in general and mental health in particular (see, for example, Pearlman, Lieberman, Menaghan, and Mullan, 1981; Scheck, Kinicki, and Davy, 1995). Although much research in this area has considered individual-level stressors, contextual factors are increasingly recognized as sources of stressors and as mediators of the impact of stressors on individual health (Elliott, 2000). An important additional factor is that persons of different socioeconomic status may confront stressors such as violence or pollution differently and have unequal access to resources for coping with stressors. Second, the close proximity of large numbers of people introduces the risk of contagion, both of infectious diseases but also of ideas and behaviors. Although contagion is well recognized with respect to communicable disease, contagion of ideas, behaviors, and social examples is a relatively new concept. In epidemiology it is understood that all things being equal, the risk of disease transmission is higher among people in close proximity than in dispersed groups. Social learning theory suggests that the same may hold for ideas and behavior; such

phenomena as unhealthy behaviors or panic in the context of a disaster may be more likely to spread in dense urban areas. Because of these factors urban populations may start from a disadvantaged position compared to nonurban populations.

### Services and Resources

The role of urban areas in shaping health is tied to the availability of services and resources for urban populations. In the wealthier countries, cities offer a rich array of health and social services and even the poorest urban neighborhood often has dozens of social service agencies, each with a distinct mission and portfolio. Even in less wealthy countries, cities are more likely than are nonurban areas to offer social and health services. These services may complement and enhance positive health behaviors or provide health care to the ill. However, services are frequently available only in limited ways to low-income urban residents. In the United States, for example, low-income people and people of color, who are overrepresented in urban areas, are those most likely to lack health insurance coverage (Williams and Rucker, 2000). Uninsured people face barriers to care, receive poorer quality care, and are more likely to rely on emergency systems (Merzel, 2000). Recent immigrants, homeless people, and inmates released from jail or prison, all of whom are also disproportionately represented in urban areas, also face specific obstacles in obtaining health care. These groups then put a burden on health systems not adequately funded or prepared to care for them. Many cities display a substantial disparity in the quality of care provided to persons living in wealthier neighborhoods and to persons in less wealthy neighborhoods (Andrulis, 2000). The well-equipped, lucrative medical practice opportunities in a city draw service providers from the lower-paid public service clinics, particularly when these latter facilities face limited resources and wavering political commitment.

### Social Environments

The population density in cities and the unique living conditions that frequently arise are important shapers of cities' social environments that may also have substantial implications for health. The social environment is described by the structure and characteristics of relationships among people in a community. Components of the social environment include social networks, social capital, segregation, and the social support that interpersonal interactions provide. (Comprehensive definitions of many of these factors are

given elsewhere; see, for example, Berkman and Kawachi, 2000.) Social environments can both support and damage health through a variety of pathways. For example, social norms in densely populated urban areas can support health-related behaviors involving smoking, diet, exercise, and sexual behavior (King and others, 2003). Social supports can buffer the impact of daily stressors and provide access to goods and services that promote health (for example, housing, food, informal health care) (Berkman, Glass, Brissette, and Seeman, 2000). Social segregation, commonly along racial or ethnic and socioeconomic lines, has been shown to be associated with poorer health in cities. Numerous theories explain the reciprocal relationship between the urban social environment and health. For example, social learning theory suggests that people look to their social networks, peer groups, and role models to help them set behavior and make personal choices (see, for example, Montgomery and Casterline, 1993). This has substantial implications in the urban context, where social networks can be dense and either beneficial or detrimental to health. Also, residents of cities share in multiple *common goods*, ranging from physical assets such as parks to social assets such as collective efficacy and social capital. *Social capital* refers to resources that support collective action, enforce norms, and generate reciprocity. It provides a structure for individual social networks and assumes substantial importance in densely populated urban areas, where the behavior of others may affect the norms of daily life far more than in sparsely populated areas. Empirical studies (for example, Kawachi, Kennedy, Lochner, and Prothrow-Stith, 1997) have shown that social capital is associated with health; in the dense social environments of cities this may be especially salient.

Social comparison theory, which describes how people routinely measure themselves against others (Festinger, 1954), is also relevant to urban life. This comparison might lead people to strive to emulate others, to abandon the "competition" altogether, or to other responses. In cities, comparison with other reference groups is relatively easy. Jencks and Mayer (1990) have suggested that in the urban context, adolescents who perform social comparisons and recognize limited opportunities may respond by forming gangs that perpetuate violence.

### Physical Environments

Cities also are characterized by distinct physical environmental features that may affect health (Box 16.5). These features resonate with the traditional concerns of environmental health.

## Box 16.5. Features of the Urban Physical Environment and Their Health Implications

Features of the Physical Environment	Potential Health and Social Problems
Inadequate water and sanitation	Infectious diseases (for example, malaria, dengue, tuberculosis)
Crowding	Infectious diseases, stress, mental health problems, intentional and unintentional injuries
Inadequate land to grow food	Costly and/or scarce fresh foods
Inadequate garbage disposal	Infectious disease, demoralization
Noise pollution	Hearing problems, stress
Air pollution	Respiratory and cardiovascular disease, early mortality
Traffic	Injuries
Inadequate housing	Homelessness

Urban areas typically feature a heavily built environment, reliance on human-made systems for water and food provision, and reliance on housing that, not infrequently in less wealthy countries, is substandard. McNeill (2000) has argued that the primary feature distinguishing the twentieth century from previous centuries and cities from nonurban areas is the degree to which humans have become the primary influence on the physical environment. As cities grow, the features of the physical environment that can affect health also grow. Highways and streets can pollute water through runoff, destroy green space, influence motor vehicle use and injury rates, and contribute to the urban heat island effect (see Chapter Eleven). The urban infrastructure is also part of the physical environment and determines how a city provides water, disposes of garbage, and provides energy. 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 such as bridges and skyscrapers may be vulnerable to natural or human-made disasters, as the September 11, 2001, terrorist attacks on New York City demonstrated. Other threats to health include hazardous waste landfills, often located in or near urban areas, which may be associated with risks of low birthweight, birth defects, and cancers. Noise

exposure, a common urban problem, may contribute to hearing impairment, hypertension, and ischemic heart disease. Ultimately, urban design may also influence crime and violence rates, demonstrating the close interactions among urban physical and social environments (Sampson, Raudenbush, and Earls, 1997).

This potential of the urban physical environment to shape health may differ fundamentally from city to city. In a city in a less wealthy country the key features of the physical environment relevant to health are likely to be water and sanitation. In the most recent global burden of disease assessment, unsafe water and poor sanitation and hygiene were shown to account for almost 6 percent of the burden of disease in high-mortality developing regions (primarily via infectious diseases), exceeding all but two other risk factors (Ezzati and others, 2002). In light of this finding, developing effective water and sanitation systems in cities in less wealthy countries is the clear public health priority that if implemented effectively could save millions of lives annually. However, developing effective water and sanitation systems takes time and resources. In addition, motor vehicle mortality is generally much higher in low-income than in high-income regions, usually as a direct reflection of rapidly growing vehicular transportation, poor road conditions, and lax driving standards (Nantulya and Reich, 2003; see also Chapters Thirteen and Twenty-Five). Investment in road infrastructure is then critical in low-income urban areas, but it is an investment that frequently does not take place in cities already under substantial financial strain.

In cities in wealthy countries the urban physical environment may affect health via air quality, noise pollution, or inadequate housing. In many densely populated, relatively small cities, issues of inadequate housing are paramount. Inadequate housing may be associated with exposure to lead paint, molds, or hazardous structural defects. Housing shortages are frequently associated with homelessness, which implies a range of health problems, including substantial early mortality. In contrast, in cities (or parts of cities) characterized by suburban sprawl, such features of the physical environment as inadequate public transportation, absent opportunities for physical activity, and scarce common green space may be important health risks. Inadequate public transportation can significantly limit the mobility and health behaviors of the elderly, absent sidewalks and a lack of nearby destinations can preclude walking, and limited park space can contribute to an erosion of social capital, all with adverse effects on health (see Box 16.3). Understanding the impact of the physical environment requires an understanding of each city's particular circumstances. (Figures 16.5 and 16.6 display diverse urban scenes.)

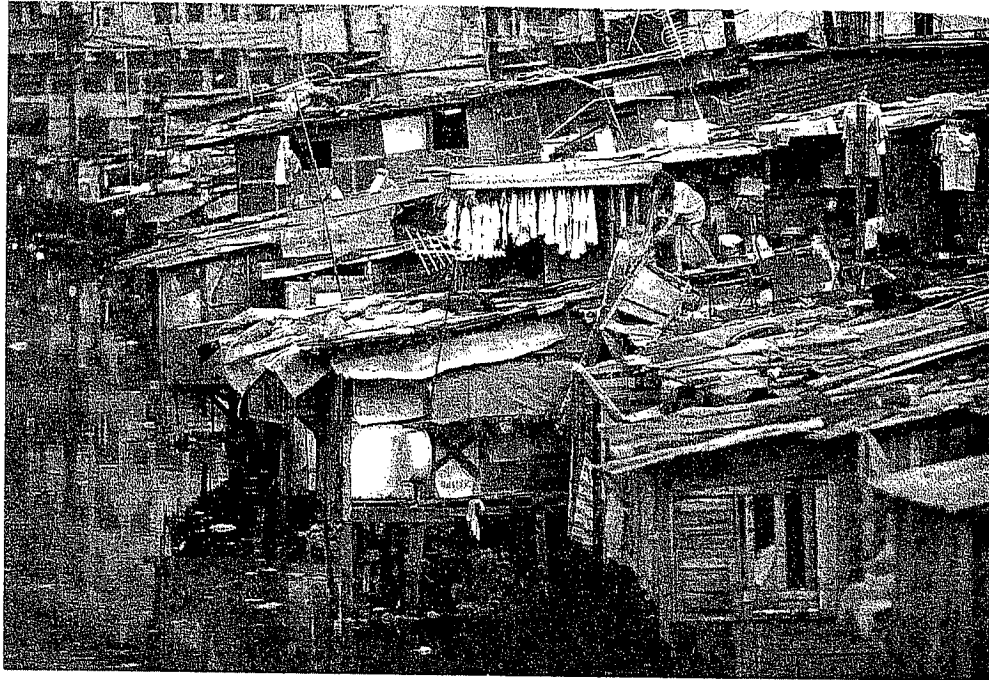
**FIGURE 16.5. CARACAS: A GLITTERING MODERN BUSINESS DISTRICT IN THE BACKGROUND AND SUBSTANDARD HOUSING IN THE FOREGROUND REFLECT RAPID RURAL-URBAN MIGRATION THAT STRAINS URBAN SERVICES.**



© Michael Freeman/CORBIS.

The effect of cities on health is not all negative; cities also represent tremendous opportunities to enhance health. For example, the urban physical environment offers economies of scale in implementing effective safe water and sanitation systems, improving transportation, reducing the risks from disasters, and siting medical services. Satterthwaite (2000) has argued that the fundamental problem in many world cities is not the rapid pace of urbanization but the failure of urban government to take creative advantage of opportunities to improve public health. In addition, as discussed earlier, cities can afford to develop a wealth of social resources (for example, schools) that far surpass what is possible in smaller communities.

FIGURE 16.6. MANILA: SUBSTANDARD HOUSING NEAR CONTAMINATED WATER IS EVIDENT BUT SO ARE SIGNS OF ELECTRICITY AND TELEVISIONS IN HOMES.



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### Physical Environment and Health: Are Cities Good (or Bad) for Our Health?

Now that we have established that cities *may* be important determinants of health, what does the evidence show? Interest in urban health is not new; it has been a focus of research and discussion for centuries. Writers from several eras in Western European and North American history considered cities unwholesome and unhealthy, and in many ways they were correct. Early urbanization in Europe featured extremely high population densities and concentrations of marginalized populations, pollution, and crime, and rural populations enjoyed better health than urban populations. Observations during the seventeenth, eighteenth, and nineteenth centuries fed a growing recognition of the role of physical and social environments in



shaping health and well-being. Chief among these, Jean-Jacques Rousseau's work was influential in introducing to Western thought an appreciation of the role of place and institutions in shaping well-being. Subsequent writers and social theorists specifically postulated that urban living was detrimental to health. Notably, Émile Durkheim provided seminal insights about the role of norms and societal disintegration, and several theorists adapted many of these concepts in considering how the etiology and distribution of pathology unfold in cities.

Poets and novelists provide some of the most eloquent historical testaments to the impact of nineteenth-century cities on health. The English romantic poet Percy Bysshe Shelley observed in 1819 that

Hell is a city much like London—  
A populous and a smoky city;  
There are all sorts of people undone,  
And there is little or no fun done;  
Small justice shown, and still less pity.

Charles Dickens's novels recount the tribulations of nineteenth-century city life. It is worth noting, however, that other literary figures, notably Walt Whitman, expressed equally adamant appreciation of cities, with Whitman considering visits to Manhattan in particular to be "the best and most effective medicine" for his soul. Indeed, the urban environment in many Western cities improved dramatically at the turn of the twentieth century, and coincident with this improvement the health of urban populations also improved. For example, one analysis at the time showed that although for much of the nineteenth century infant mortality rates were higher in urban areas in Imperial Germany than they were in nonurban areas, a dramatic reduction in urban infant mortality started in the 1870s, in advance of a comparable decline in the rest of the country (Vogele, 1994). This analysis suggested that urban environmental improvements led to the rapid improvement in infant health in Imperial Germany and that a similar pattern was typical of many European industrialized societies.

Modern research methods have allowed more careful empirical study of the effects of city living on health. These studies have differed, with some showing health benefits and others suggesting the opposite. For example, studies have shown both a higher prevalence and lower prevalence of mental health problems in cities compared to nonurban areas (Dohrenwend and Dohrenwend, 1974; Kessler and others, 1994; Paykel and others, 2000). Such comparisons, however, suffer from the oversimplification of what likely is a complicated relationship. Cities may affect health, but the net relationship between cities and health is likely to reflect the

range of factors—population factors and features of the social and environment—discussed earlier. Living in a particular city may entail e and experiences that threaten health—say, violence and air pollution—also offer important health benefits such as better social supports ar services. Clearly, then, asking how a “city” affects overall “health” is approach to a larger, more complicated question.

In order to analyze how cities affect health, we propose three key q

1. Are specific features of urban living causally related to health?
2. Are these features differentially distributed between urban and nonurb and within urban areas (for example, between urban neighborhoods)
3. To what extent are these features unique to a particular city or differen cities?

Two health issues, injuries and infectious diseases, illustrate the application questions to urban health.

### Injuries

Injuries are a major worldwide cause of lost years of healthy life; also see ters Thirteen and Twenty-Five). Globally, intentional injuries (including homicide, and war) account for the same number of lost DALYs as does tuberculosis; whereas unintentional injuries result in more lost DALYs than cardiovascular disease or cancer. In developing countries, in 1990, injuries account for over one-third of all DALYs lost among men aged fifteen to forty-four (M and Lopez, 1996).

Many features of urban environments may affect injury morbidity and mortality. With respect to intentional injury, violence is one of the major cause in most parts of the world violence is more prevalent in large cities than in nonurban areas. In cities, violence is concentrated among young men in low-income neighborhoods. In São Paulo, for example, among men aged fifty to twenty-four, those in low-income areas are over five times more likely than in high-income areas to be homicide victims (Grant and others, 1999). In New York City, homicide rates for young men have for several decades been higher in neighborhoods with low socioeconomic status (Karpati and others, 2003). Social theorists have proposed explanations for the higher prevalence of violence in urban areas. Social disorganization theory has suggested that signs of physical disorder in cities (“broken windows”) encourage acts of violence and unsafe sex (Cohen and others, 2000, 2003). Although empirical research in the area is scarce, new work has shown that collective eff-

capacity and inclination to act to limit deviant behavior, protects against neighborhood violence (Sampson, Raudenbush, and Earls, 1997). This suggests that neighborhood-level social factors may account for some of the observed differences in homicide rates among different cities and between cities and nonurban areas.

To understand the possible association between urban living and intentional violence, then, we must consider many aspects of the city. Population factors, including population density and racial or ethnic segregation, may affect the likelihood of intergroup tensions and related violence. The social environment, including collective efficacy, and the physical environment, including building and street design, the presence or absence of settings for safe recreation, and the availability of social services including medical treatment for victims of violence, may all be important. The relative balance of these factors likely differs from city to city, and public health professionals must identify the aspects of urban living that influence intentional injury risk in each setting.

With respect to unintentional injury, urban residents may be at higher risk than rural residents, although the evidence in this regard is conflicting (Odero, Garner, and Zwi, 1997). The factors that operate here may differ from those important to intentional injuries. Worldwide, the vast majority of unintentional injuries and about half of all trauma-related hospital admissions result from motor vehicle crashes. Many factors play a role in these injuries, including the presence and quality of roads, the enforcement of driving regulations, and the use of alcohol when driving, all of which may differ from city to city and between urban and nonurban areas. In addition, the morbidity from unintentional injury may well differ by gender and racial or ethnic group, depending on the social norms that influence driving in each region.

Another example of unintentional injury is fatal drug overdose. Evidence from New York City suggests that characteristics of urban neighborhoods are associated with the risk of overdose in cities (Galea and others, 2003). Once again, multiple features of the urban environment may be associated with risk. These may include population factors such as the spread of drug use through social networks, which may make available the means to injure oneself; social norms affecting drug use; and physical environments such as boarded up buildings and empty lots that present opportunities for illicit drug use.

The urban conditions that affect injury risk are not static. The process of becoming urban may in and of itself be an important determinant of injury. For example, rapid urbanization may bring a dramatic increase in road traffic as workers travel back and forth from suburbs to city centers. If the existing road network cannot accommodate the traffic volume, it is the rapid urban growth (and the resulting demands on infrastructure) that is itself a key factor in urban motor

In summary, in considering the relation between city living and health outcomes such as injury and infectious disease, we need to identify the network of urban features that may play a role, including population factors, service delivery, the social environment, and the built environment, understand their interrelationships, and consider the extent to which interventions that address these factors may improve population health.

### Building Healthy Cities in an Urban Future

The scale of current urbanization suggests that the world of the twenty-first century will emerge as substantially different from the world we know today. By 2025, more than 5.5 billion people, out of a world population of 8.5 billion, will live in urban places; this can be compared to a total world population of about 6 billion at the dawn of this century. Some 4.4 billion people will be living in towns and cities in developing countries, including some 1 billion in China's and 750 million in India's urban areas. In most of the Americas, more than 80 percent of the population will live in urban areas, whereas in Africa and Asia, levels of urbanism will vary considerably among countries. Although there will probably be more than fifty megacities by 2025, most of the world's urban population will live in smaller cities, with a growing number of small (having fewer than a million people) urban centers, particularly in Africa and Asia. As the world becomes more urban the challenge will be to ensure sustainability of population health in cities and perhaps even to take advantage of urbanization to improve health.

Cities are not static, and urban change is frequently associated with changes in urban health. The challenge is to understand the features of cities that affect health, and to improve upon cities to protect the health of their residents.

Undoubtedly, the greatest potential for impact lies in cities in less wealthy countries. In many African and Asian cities, given current resource scarcity and projected urban growth, substantial social, ecological, or economic problems may be inevitable (Haughton and Hunter, 1994; Johnson, 1993). Service provision, including the provision of drinking water, is a pressing issue in almost all less wealthy countries (Hardoy, Mitlin, and Satterthwaite, 1990). For example, in cities such as Bangkok, Dar es Salaam, and Kinshasa, fewer than half of all households have access to piped water, and most rely on water from private water connections and vendors. Garbage collection and sewage disposal are plagued by similar problems; most cities in Africa have no sewers at all, and the existing sewage systems serve only the rich in these cities. However, these problems do not necessarily suggest that the future urbanized world is headed for a catastrophe. There is a long history of doomsaying in the academic literature, most of it tied to population

vehicle crashes. Therefore, both the features of the city at various points and the characteristics of urbanization can determine population health.

### Infectious Disease Transmission

Each category of potential urban health determinant may affect the transmission of infectious disease. First, population density is unequivocally associated with the likelihood of infectious disease; higher density increases the risk of disease transmission, whether by sexual contact, fecal-oral spread, or respiratory spread. Therefore, dense cities may well be expected to have higher transmission of infectious disease. Second, available health and social resources may play a role in the control of infectious disease morbidity and mortality. For example, widely available antiretroviral therapy has resulted in a dramatic decline in HIV-related mortality in North America. Less dramatically, widely available coinfection testing and treatment for sexually transmitted disease has the potential to reduce complications and transmission. Third, many aspects of the urban social environment facilitate, or hinder, the transmission of infectious disease. Sociology theory, discussed earlier, provides a framework for considering how individuals in social networks influence their health risk behaviors. For example, the density of one's social networks and the norms in those networks are associated with sexual behavior and with use of injected drugs, both of which increase the risk of infectious disease transmission (Latkin, Hua, and Forman, 2003). Finally, physical features of the physical environment, such as the degree of disrepair, may facilitate transmission of infectious disease (Cohen and others, 2000). Neighborhoods with markedly deprived built environments may facilitate or even encourage high-risk behavior. Conversely, water and sanitation infrastructures are key components of a city's built environment that reduce morbidity and mortality, particularly in children in less wealthy countries (Cutler and Miller, 2005). Perhaps less obvious features of the urban built environment that may facilitate infectious disease transmission include building ventilation systems, which may harbor infectious diseases such as Legionnaires' disease.

Again, urbanization—the process of change—may play an important role. Population density may increase precipitously during rapid urbanization, outpacing the public health infrastructure. The influx of mobile populations may be accompanied by new infectious agents, rapidly changing social network structures, and degradation of the built environment, all of which may elevate infectious disease transmission above baseline. However, as with injuries, urbanization also presents opportunities to reduce infectious disease. For example, in low-income countries of the world, urbanization is frequently associated with improved education and potentially with greater health awareness and less health risk behavior.

growth, and by and large social, economic, and technological innovations have averted the predicted disasters (Meadows, Meadows, Randers, and Behrens, 1972; Meadows, Meadows, and Randers, 1993). Most cities in both wealthy and less wealthy countries are cleaner today and the residents in general have a better quality of life and more amenities than was the case a quarter of a century ago (McMichael, 1993). This suggests that with appropriate intervention we can exploit trends in urbanization to effect vast improvements in the health of populations.

What are the best strategies for improving cities and protecting the health of urban populations? The standard public health approach—identifying risk factors based on data, intervening to interrupt the risk factors, evaluating the results, and correcting course as necessary—can be illustrated by two examples: Moving to Opportunity for Fair Housing, a project in the United States, and the World Health Organization's worldwide Healthy Cities program.

Moving to Opportunity for Fair Housing (MTO) is a ten-year research demonstration project in five U.S. cities (Baltimore, Boston, Chicago, Los Angeles, and New York City), sponsored by the U.S. Department of Housing and Urban Development (1999). Its goals are to develop more effective strategies to improve housing for recipients of housing assistance in urban areas and to assess whether changes in families' physical environments, specifically in their housing, will improve family members' health (among other outcomes). This program combines tenant-based rental assistance with housing counseling to help very low income families move from poverty-stricken urban areas to low-poverty neighborhoods. In each of the cities, low-income households are randomly selected to receive housing vouchers that must be used in areas with less than 10 percent poverty. These families receive assistance that helps pay their rent as well as housing counseling to help them find and successfully use housing in low-poverty areas. In order to evaluate the efficacy of moving families to housing in better neighborhoods, control families are also selected and monitored in the same cities. Early results from the MTO program have been encouraging. At the three-year follow-up of the New York site, parents who moved to low-poverty neighborhoods reported significantly less distress than parents who remained in high-poverty neighborhoods. Boys who moved to less poor neighborhoods reported significantly fewer anxiety or depression and dependency problems than did boys who stayed in public housing, suggesting that improving housing could have substantially beneficial health effects (Leventhal and Brooks-Gunn, 2003). Although this program design is clearly unique and impossible to replicate on a large scale, it provides convincing evidence of the value of improving housing as a means of improving health, even in cities in wealthy countries.

The Healthy Cities movement is an international project sponsored by the World Health Organization (n.d.) that works directly with local government to

promote health in cities. The program is intended to provide national and local governments with ways of dealing with the urban determinants of health discussed in this chapter, including pollution, housing, transportation, and other aspects of the physical environment; social support and features of the social environment; and improved health and social resources. As part of its work with local governments, the Healthy Cities movement measures the local urban health burden and makes health issues relevant and understandable to local agencies through analysis and policy advocacy. A Municipal Health Plan is developed as a template for improving awareness of environmental and health problems in schools, workplaces, and marketplaces, and among health services and other organizations, and this encourages local governments to act to improve these determinants of health. Most of the work of the Healthy Cities movement thus far has been in higher-income countries, although from 1995 to 1999, the WHO supported Healthy City Projects (HCPs) in Cox's Bazar (Bangladesh), Dar es Salaam (Tanzania), Fayoum (Egypt), Managua (Nicaragua), and Quetta (Pakistan). In the first evaluation of these projects, there was evidence that key stakeholders had an improved understanding of the role of the urban environment in shaping health but limited political will to act on this awareness (Harpham, Burton, and Blue, 2001). Although the success of the Healthy Cities movement remains difficult to assess, it represents a worldwide effort to raise awareness among key decision makers about the role of cities in shaping health, potentially setting the stage for local interventions such as the MTO program described previously. In addition, this program exemplifies the potential for a synergy among multiple sectors, including public health agencies, environmental movements, and municipal governments, that will ultimately be essential to improving health in complex urban areas.

In an increasingly urbanizing world, the features of cities that affect health may, even when their role is limited, have a tremendous aggregate impact on large numbers of people. It is therefore very much a public health mandate to identify urban characteristics at multiple levels—features of population, the physical environment, the social environment, and urban service provision—and to determine how these characteristics interact to affect health and disease. Building healthier cities has the potential to improve population health dramatically in the coming century.

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### Thought Questions

1. Select a common health problem. How might characteristics of urban living affect population distribution of this disease? How might these relationships be different in wealthy and less wealthy countries?

2. How might differences within cities affect population distribution ticular disease? What are the characteristics of urban communities t be consistently associated with particular health outcomes in differ
3. Given limitless resources, what intervention would you impleme prove the health of urban populations in wealthy countries? In les countries?
4. What might the implications of our increasing technological cap: for the world's cities? For population health?

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## For Further Information

Numerous books provide good introductions to urban history and urban form. Two sweeping overviews are

- Hall, P. *Cities in Civilization*. New York: Pantheon Books, 1998.  
Mumford, L. *The City in History: Its Origins, Its Transformations, and Its Prospects*. Orlando: Harcourt Brace, 1961.

A third introduction to this topic focuses on U.S. cities:

- Glaab, C. N., and Brown, A. T. *A History of Urban America*. (3rd ed.) New York: Macmillan, 1983.

Excellent sources on cities in the developing world are

- Hardoy, J. E., Mitlin, D., and Satterthwaite, D. *Environmental Problems in an Urbanizing World: Finding Solutions in Africa, Asia, and Latin America*. London: Earthscan, 2001.  
Panel on Urban Population Dynamics, Committee on Population, and National Research Council of the National Academies. *Cities Transformed: Demographic Change and Its Implications in the Developing World*. Washington, D.C.: National Academies Press, 2003.

For a focus on urban health in the developing world, see

- Harpham, T., and Tanner, M. (eds.). *Urban Health in Developing Countries: Progress and Prospects*. New York: St. Martin's Press, 1995.

Academic journals have increasingly turned their attention to urban health topics. Special issues on the built environment, including much that is relevant to urban health, have been published by the *American Journal of Public Health*, 2003, 93(9), and the *Journal of Urban Health*, 2003, 80(4).

For additional urban health information and bibliographies, literature reviews, and Internet links see

International Society for Urban Health [<http://www.isuh.org>].