

Mental Health in the City

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Mental Health: Global and Local Burden

Mental and behavioral disorders affect more than 25% of people during their lifetime and are estimated to be present in 10% of the adult population at any time.¹ The Global Burden of Disease report for 2000² estimates that mental health problems account for 12% of the total disability adjusted life years (DALYs) lost worldwide and for 31% of the years of life lived with a disability. The most common mental disorder, unipolar major depression, is the fourth leading cause of DALYs among all ages and both sexes, accounting for 4.4% of the total DALYs worldwide. In specific age and gender groups, mental health problems account for an even higher proportion of DALYs. For example, among women aged 15 to 44, unipolar major depression is the second leading cause of DALYs worldwide, accounting for 10.6% of DALYs. Beyond their impact on the individual, mental health and behavioral problems are frequently accompanied by social and economic impact on families and society. Mental health problems impose a substantial burden on health services, particularly primary health care. Anxiety and depression have been shown to be the most common presenting complaint in primary care settings in multiple studies conducted worldwide; it is estimated that anxiety and depression account for up to a third of all presentations in primary care settings.^{3,4,5}

Despite the persuasiveness of the evidence on the high prevalence of mental health problems worldwide, public health attention on mental health disorders has long lagged behind public health attention paid to physical disorders. For example, the World Bank's 1993 World Development Report^{6,7} focused on health but barely mentioned mental health problems in the text of the report, although mental health did feature in tables in the report appendices. The suffering caused by

mental illness and the relative neglect the topic has received makes it particularly important to consider how cities and urban living—rapidly becoming the norm for populations worldwide—may affect mental health.

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

City Living and Mental Health

Cities have long been the subject of literary and academic interest as a powerful force shaping the health of populations. Writers from several eras in Western European history considered cities as places that were detrimental to health, and in many ways, for much of history, cities were characterized by features that were unquestionably linked to poor health. Literary figures, commentators, and social theorists observed the problems endemic to these growing cities and suggested that they had a role in shaping individual well-being. The 19th-century English romantic poet Percy Bysshe Shelley⁸ observed, “Hell is a city much like London.” Indeed, a full collection of the writings that have denounced cities or deplored living conditions in cities would fill several volumes.⁹

It is worth considering why historically so many leading thinkers have considered that cities could be detrimental to health. Most of the early thought about cities and how they may unfavorably influence human health arose from the growing role played by cities in European life over much of the past millennium. As cities grew, particularly as the Industrial Revolution accelerated, population density, numbers of marginalized populations, pollution, and crime frequently increased, resulting in health in cities being worse than it was outside of cities in many countries. Literary observers and social commentators, reflecting on these observations, ascribed to city living an etiologic role in shaping health.^{10–13}

In many ways, it was the process of rapid urbanization itself during the 18th and 19th centuries that prompted developments in public health.^{14–17} For example, in France, rapidly changing demographics and the economic situation in urban areas contributed to *hygiene publique*, or public health, becoming formally constituted as a science.¹⁴ During the first half of the nineteenth century, Louis René Villermé and other *hygienistes* recognized the contribution that inadequate water supplies, overcrowding, and poor housing were making to poor health in France’s burgeoning cities and implemented programs aimed at improving urban living

conditions. Indeed, the urban environment in many Western cities improved dramatically at the turn of the 20th century, and coincident with this improvement, health of urban populations also improved.¹⁸ In many parts of the world, however, the conditions that were prevalent in Western cities during the 18th and 19th centuries remain prevalent today at the beginning of the 21st century.

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

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

Social Disorganization or Strain

One of the primary explanations for the relation between urban living and health that has been posited in different guises in several disciplines can be conceptualized within the rubric of social disorganization or social strain theories. Social disorganization theory was first developed in studies of urban crime by sociologists in Chicago in the 1920s and 1930s. In brief, social order, stability, and integration are conducive to conformity, while disorder is conducive to crime and poor integration into social structures.¹⁹ More recent theoretical and empirical refinements to social disorganization theory have held that social control is the hallmark of social disorganization theory and affects the likelihood of crime in cities.²⁰ A parallel theory, frequently referred to as anomie or strain theory while arising from a separate disciplinary focus, similarly suggests explanations for the relations between social structure and behavior. Emile Durkheim¹² used the term *anomie* to refer to the state of a lack of social regulation in modern society as one of the conditions

that makes for higher rates of suicide; drawing on this work, Robert Merton²¹ suggested that anomie is the lack of societal integration that arises from the tension between aspirations of industrialized persons and the means available to them to achieve those aspirations. In the United States in particular, the exposure of persons of all social classes to high aspirations that are practically unachievable produces strain or pressure on these groups to take advantage of whatever effective means to income and success they can find, even if these means are illegitimate or illegal. Hence, Merton argues that social strain can be associated with crime.

Contemporary anomie or strain theories, such as general strain theory, expand on the connection between sources of strain, strain-induced negative emotion, and individual criminal behavior. Agnew²² suggests that there are other sources of strain in modern living, including confrontation with unpleasant stimuli. In a recent modification of general strain theory, Agnew²³ more clearly specifies that the types of strain most likely to lead to criminal or delinquent coping are strains that are seen as unjust and high in magnitude and that emanate from situations in which social control is undermined and pressure the individual into criminal or delinquent associations.

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

Urban areas also potentially include a substantial number of daily stressors (e.g., noise, pollution) that can result in greater social strain. A few studies have supported these theories and documented a relation between social disorganization, social strain, and mental health. For example, a study assessing the relationships between perceptions of one's neighborhood and depressive symptoms found that perceptions of neighborhood characteristics (vandalism, litter or trash, vacant housing, teenagers hanging out, burglary, drug selling, and robbery) predicted depressive symptoms at a nine-month follow-up interview. These results suggest that social disorganization and social strain are determinants of depressive symptoms.³² Several studies have shown that social strain is associated with poorer overall men-

tal health,^{33,34} depression,³⁵ and substance use,³⁶ though few of these studies have specifically assessed the relations among the urban environment, social strain, and mental health. Urban areas characterized by more deviant behavior also may have a higher likelihood of traumatic-event experiences for their residents (e.g., rape, interpersonal violence), which are consistently linked to poorer mental health, including anxiety and mood disorders.^{37,38}

Social Resources

Further refinements on social strain theory in urban areas include an appreciation of the fact that in urban areas persons with different socioeconomic status both may be faced with stressors and have disparate access to resources that may help them cope with stressors. In particular, formal local resources can complement or substitute for individual or family resources for highly transient urban populations. Therefore, the relation between urban stressors and mental disorders is likely buffered by salutary resources (e.g., health care, social services) that are frequently more prevalent in urban compared with nonurban areas. Although these resources may be available to urban residents, socioeconomic disparities in cities are linked to differential access to these resources, suggesting that persons at different ends of the socioeconomic spectrum may have different opportunity to benefit from the resources available in cities. This discrepant exposure to stressors and access to resources has been called the “differential vulnerability” hypothesis, positing that persons with lower socioeconomic status are exposed to more stressors and also have fewer resources to help cope with them.³⁹ This hypothesis may be particularly important in urban areas characterized by socioeconomic disparities.

Individual social experiences also may be important determinants of mental disorders in cities. For example, limited social support may predispose persons to poorer coping and adverse health.⁴⁰ In one national forensic autopsy of suicides, it was shown that urban suicides were more likely to be preceded by a recent separation from a partner than were rural suicides,⁴¹ suggesting that social connectedness may play a different role in determining mental disorders in urban versus rural areas. More important, there is scant evidence that social connectedness in cities is better or worse than in nonurban areas. It is more likely that the nature of individual connections vary in different contexts, and it is the interrelation between urban social and physical environmental stressors, availability and access to material resources, and psychosocial resources that ultimately would explain any relation between urban living and mental disorders.

Several other forms of social resource have been shown to affect health in cities. Informal social ties are an important feature of city living that affects social support, networks, and cohesion.⁴² Social capital effects, including manifestations at the contextual level (e.g., at the level of the whole city or of urban neighborhoods) and the social network level, are thought to help offer general, ongoing economic and social support and also make specific resources available at times of stress.⁴³ Social capital is often defined in terms of features of social organization, and as such, it has been hypothesized that social capital is associated with lower levels of criminal activity through the enforcement of social norms as dis-

cussed earlier. However, the relation between social capital and crime is likely reciprocal: While social capital is associated with lower crime rates through the suppression of deviant behavior, high crime rates erode bonds in communities and weaken protective institutions, allowing for further criminal activity.⁴⁴ In the context of cities, the greater spatial proximity of one's immediate network may well accentuate the role of networks in shaping health. Social networks have been shown to be associated with a range of health behaviors, including misuse of substances.⁴⁵

Social Contagion

Other theories that explain how urban living may affect mental disorder emphasize the role of group influence on individual health and behavior. Social learning theory emphasizes the importance of observing and modeling the behaviors and attitudes of others,⁴⁶ especially in densely populated areas where there are several persons on whom behavior can be modeled. In diverse urban settings, social learning can both set social norms and set norms for social network behaviors. Similarly, theories of collective socialization emphasize the influence of group membership on the individual.^{47,48} These theories suggest that persons who are in positions of authority or influence in specific areas can affect norms and behavior of others in direct and indirect ways. Institutional socialization theory has been closely linked to the allocation of social resources within city neighborhoods,⁴⁹ which in turn has implications for health in cities as discussed earlier.

One of the concepts that is linked to social learning and may have substantial implications for public health is "contagiousness." Models of biological contagion, particularly in the context of infectious disease, are well established. However, newer theories include the possibility of contagiousness of ideas and social examples. Contagion theory is employed by sociologists as one explanation for crowd behavior. In epidemiology it is understood that—all things being equal—urban populations, characterized by high population density, are at higher risk of transmission of biological organisms. Also, because concentrated urban populations share common resources (e.g., water) the practices of one group can affect the health of others. These observations may be extended to behavior and to mental disorder. A classic example has been referred to as the Werther effect.⁵⁰ The Werther effect suggests that media representations of suicide may have some influence on the actions of those exposed to them such that suicide becomes more likely. Several studies have provided both theoretical and empirical reasons to suggest that media representations of suicide could have some influence on a person's suicidality.⁵¹

In the urban context, the concentrated proximity of both persons and sources of information may be a "crucible" for the exacerbation of this effect.⁵² One obvious such example would be the consequences of an urban disaster. A disaster in a densely populated urban area may well have substantial implications for mental health and behavior that would not be true in a disaster in a less densely populated urban area. Taking for example the case of the September 11, 2001 terrorist attacks, the North Tower of the World Trade Center (WTC) in Manhattan, New

York City, was hit by an American Airlines Boeing 767 passenger plane at 8:45 A.M. on Tuesday, September 11, 2001. New York City residents learned of the crash in near real-time through the Internet, or all-news channels or by looking up to see the WTC burning on the morning commute to work. New Yorkers were watching early reports of the first attack when a second plane struck the WTC South Tower. In the hours that followed, two other airplanes crashed elsewhere, the WTC towers collapsed, and thousands of persons were evacuating from lower Manhattan, searching for missing family and friends, or assisting in the rescue efforts. In New York City, the days and weeks after September 11 were characterized by a growing awareness of the magnitude of the loss of life and fear of other potential terrorist attacks. Therefore, the attacks on the WTC were experienced by a substantial proportion of New Yorkers in real time, either by seeing these events firsthand or hearing about them by word of mouth. Subsequent research after the attacks has shown that up to one-fifth of persons interviewed in a representative sample of residents of New York City report seeing some of the events in person, and there was a substantial proportion of the population not directly affected by the attacks who reported symptoms consistent with posttraumatic stress disorder related to the September 11 attacks.^{53,54} Intriguingly, the persons who were not directly affected by the attacks (those who did not see the attacks or lose possessions or relatives) would not be considered as “exposed” to the traumatic event by classic criterion definitions proposed by the American Psychiatric Association’s Diagnostic and Statistical Manual, Fourth Edition (DSM-IV). It can be argued that the urban context in general was instrumental for the contagion of both exposure to the event in New York City and the subsequent development of mental health symptoms.

Spatial Segregation

Spatial segregation of different racial or ethnic and socioeconomic groups may also be an important determinant of mental health in cities. Many cities worldwide are highly segregated with multiple historical, logistical, and practical barriers to mixing of social groups. In their seminal work on mental disorder in urban areas, Faris and Dunham⁵⁵ describe in detail a Chicago that had concentric circles wherein dwelled distinct groups whose social status was relatively unchanged even with gradual migration of populations. Spatial segregation can have multiple effects, including the enforcing of homogeneity in resources and social network ties, which suppresses diversity that may benefit persons of lower socioeconomic status. Considering the role of spatial segregation in conjunction with concepts of social learning, spatial proximity to beneficial role models may be critical for socioeconomically disadvantaged persons to identify avenues to improve their social status. Perhaps more important, spatial proximity to persons of higher socioeconomic status could permit the formation of social networks that are critical for obtaining employment and opportunity for social mobility. Spatial heterogeneity also permits persons of higher socioeconomic status to appreciate the issues faced by others and to use their power, money, and prestige to influence the development of better-distributed salutary resources.

Conversely, it is worth noting that spatial segregation may minimize social strain by keeping persons who are different apart from one another. It has been shown in some studies that minorities living in highly segregated areas who come into contact with other racial or ethnic groups only infrequently experience discrimination less than do minorities who regularly come into contact with persons of other racial or ethnic groups.⁵⁶ Discrimination in turn has been associated with poor mental health.⁵⁷ However, it is important to note that segregation of minority groups into urban or peri-urban slum areas in many developing-world countries represents a substantial threat to these populations' physical health and—as increasingly suggested by empiric research—mental health.⁵⁸

The Urban Physical Environment

Urban areas typically feature a heavily built environment, reliance on human-made systems of water and food provision, and reliance on housing that is frequently substandard. It has been argued that the primary feature distinguishing the 20th century from previous centuries and cities from nonurban areas is the degree to which humans have become the primary influence on the physical environment.⁵⁹ The urban physical environment interacts with the other domains discussed earlier to shape health in cities. As cities grow, the features of the physical environment that can affect health also grow. Highways and streets can destroy green space, influence motor vehicle use and accident rates, increase urban noise, and heighten the daily hassles of urban living. Green space has been associated with overall health and better mental-health functioning in several studies.^{60, 61} Automobile use of unleaded gasoline can increase lead levels in the environment. In turn, higher lead levels may be teratogenic in utero; prenatal exposure to teratogens has been associated with adult onset of mental illness.⁶² Noise exposure in turn may contribute to hearing impairment, psychological distress, and hypertension.⁶³ The urban infrastructure is also part of the physical environment. As the expensive urban infrastructure ages in a period of declining municipal resources, breakdowns may increase, not only causing physical health problems related to water, sewage, or disposal of waste but also limiting municipalities' ability to adequately provide salutary resources. Ultimately, urban design may also influence crime and violence rates, demonstrating the close interactions among urban physical and social environments.⁶⁴ Additionally, as we discuss later in the chapter, differential exposure to environmental toxins may contribute to the incidence of psychiatric disorders in urban areas. Recent empiric research that has assessed how characteristics of intra-urban environments are associated with health has improved our understanding of the relation between the urban physical environment and mental health.^{60, 65}

In summary, there are several mechanisms that may explain how cities affect mental health, with different mechanisms being potentially important for different mental disorders. Indeed, a “big picture” perspective on the relation between characteristics of city living and mental health would suggest that any such relations are undoubtedly complicated. While specific features of cities may affect certain conditions adversely, other features may offer protection. Interrelationships be-

tween features of the urban environment (e.g., between spatial segregation and potential social strain) complicates attempts at generalization. Similarly, the empiric work that has explicitly assessed how urban living affects mental disorder has only begun to “scratch the surface” of the topic. In the following section we summarize the key research in the area in three distinct eras.

The Evidence

Before DSM-III (1980)

The past century has seen a flourishing of empiricism in health research, and in hand with that, several epidemiologic studies have sought to understand the potential relations between urban living and mental disorders. Empiric work produced conflicting results at the beginning of the 20th century. For example, in a U.S. study, White⁶⁶ found mental disorders to be higher in urban areas, while in a study of four regions of Scotland, Sutherland⁶⁷ found higher rates of insanity in rural areas. Sorokin and Zimmerman⁶⁸ reviewed data from a number of sources and concluded that psychiatric morbidity was higher in urban areas in the United States overall. These early studies were limited by a number of methodologic difficulties, primarily the use of crude definitions of outcomes and issues of sampling. Still, they acknowledged and established that place of residence and characteristics of the urban (and rural) environments may play a role in shaping individual mental health. In landmark research that laid the groundwork for much of the thinking behind the relation between urban living and mental health, Faris and Dunham⁵⁵ conducted an ecological study in Chicago neighborhoods and found a high degree of association between different types of psychosis and certain community conditions. As we discuss further in subsequent sections, although recent work suggests that the association between urban living and psychotic disorders is likely complex, in many ways Faris and Dunham’s work presaged thinking about identifying the characteristics of urban neighborhoods that may be associated with mental health.

During this period, a seminal study⁶⁹ provided a basis for comparison between urban and rural areas and had a marked influence on subsequent research. The fundamental postulate of the 1962 Midtown Manhattan study was that “sociocultural conditions . . . have measurable consequences reflected in . . . mental health differences” and built explicitly on some of the earlier theoretical work that suggested that sociocultural features of urban living (such as disorganization) may shape mental health. This study was a cross-sectional, in-person survey study, sampling residents (including hospitalized or institutionalized persons) of midtown Manhattan between 20 and 59 years old ($n = 1,660$). Among the principal findings from this study, it was shown that there was particularly high prevalence of mental pathology among single men, and low parental and adult socioeconomic status was associated with a greater likelihood of psychological impairment. The authors suggest that economic factors, potentially linked through pathways of discrimination, shape psychological factors that may affect adult mental health. Subsequently, other work compared the prevalence of psychiatric disorders in less

urban areas to data obtained in the Midtown Manhattan study using comparable assessment methods. Using records from Minnesota, Laird⁷⁰ estimated that the prevalence of severe psychiatric disorders in rural areas in Minnesota was one-tenth that reported by the Midtown Manhattan Study. In contrast, in a comparison of psychiatric morbidity from the Stirling County Study (a study of the prevalence of psychiatric morbidity in rural Nova Scotia), Srole⁷¹ concluded that the prevalence of psychiatric disorders was lower in Midtown Manhattan than it was in rural Nova Scotia.

Some of the most interesting research in this era that considered potential relations between urban living and mental disorder was concerned with psychiatric disorders in children. In a small study of 175 five- to six-year-old preschool children, Kastrup⁷² did not find differences in the prevalence of psychiatric disorders between children recruited from the urban municipality of Århus and Samsø County, Denmark. This study was limited by a relatively small sample size and by crude assessment of psychiatric disorders. In contrast, a contemporaneous study of adolescents,⁷³ using personal psychiatric interviews, questionnaires, and school information to assess total psychiatric disorder among 483 adolescents in Norway, found that the prevalence of psychiatric disorders was 16.9% in Oslo compared with 7.9% in a rural area in South-East Norway.

In the mid 1970s, an influential series of studies, collectively referred to as the Isle of Wight Studies, rigorously and systematically assessed psychiatric disorders in nine- to eleven-year-old children and provided some of the most compelling data relevant to questions of interest here.⁷⁴ In a comparison between 10-year-olds in the Isle of Wight and 10-year-olds attending school in an inner-city London district, it was shown that the prevalence of psychiatric disorder was twice as high in London as it was in the Isle of Wight, and this discrepancy was more pronounced in girls (26.2% vs. 10.8% comparing London to the Isle of Wight) than it was in boys (18.3% vs. 13.0%).⁷⁵ Reading retardation was nearly three times higher in London than in Isle of Wight children (9.9% and 3.9%, respectively).⁷⁶ These studies were notable in their efforts to take into account the possible confounding effects of migration and social selection and in considering the principal reasons that might explain these differences. The authors suggest that the higher proportion of children with psychiatric disorders in London was linked to a relatively higher proportion of family discord and social disadvantage in London than in the Isle of Wight.⁷⁷ In some ways these observations foreshadow more recent studies, some of which are discussed in the next section, that have begun to consider how characteristics of urban neighborhoods contribute to intra- and interurban differences in the incidence and prevalence of both adult and child psychiatric disorders.⁷⁸

Dohrenwend and Dohrenwend⁷⁹ summarized the principal epidemiologic work in the area during most of the 20th century review that considered the best empiric evidence in an attempt to determine whether there was substantiation that urban settings were associated with a greater prevalence of psychiatric disorders than rural settings. Having limited their observations to nine epidemiologic studies that reported prevalence of adult psychiatric disorders in both urban and rural sites conducted from 1942 to 1969 (in multiple cities including Tokyo, Japan, Reykja-

vik, Iceland, and Abeokuta, Nigeria), the authors suggest that a consistent pattern emerged from these disparate studies and that "there appears to be a tendency for total rates of psychiatric disorders to be higher in urban than in rural areas." A substantial portion of the difference in the urban-rural prevalence of mental disorders was influenced by higher prevalences of neurosis and personality disorders in urban communities. The authors note, however, that many of the studies they reviewed were limited by substantial methodologic difficulties, making comparisons across studies challenging. Dohrenwend and Dohrenwend's conclusions have been challenged by authors who note that the samples that were the subject of this review were small and that the urban-rural differences reported were also small.⁸⁰ In addition, several of the "urban" areas in the studies reviewed by Dohrenwend and Dohrenwend were atypically small urban communities and not usefully representative of modern urban areas.

Community Prevalence Studies

The past two decades have witnessed a dramatic systematization of the study of psychiatric epidemiology in general, and more than a dozen community surveys have been published that have described the urban versus rural epidemiology of different mental disorders. In the United States, the Epidemiologic Catchment Area (ECA) project, a multi-stage probability sample of U.S. residents using in-person interviews, was the first community survey to assess psychiatric disorders using standardized instruments based on the DSM-III.^{81,82} Analyses using ECA data have specifically assessed urban-rural differences in the prevalence of psychiatric disorders in the United States, finding a two-fold higher prevalence of major depression in persons living in urban areas compared with those living in rural areas but no difference between small metropolitan areas and rural areas.⁸¹ The prevalence of drug abuse or dependence was also higher in large metropolitan areas assessed in the ECA. The question of urban-rural differences was reconsidered using data from the National Comorbidity Survey (NCS), a community survey carried out in five sites across the United States. Using similar large and small metropolitan- and rural-area definitions as the ECA did, two NCS analyses found no difference in the prevalence of major depressive episodes, affective disorders, substance-use disorders, antisocial personality disorder, or psychological disorders overall between persons living in different size metropolitan or rural areas.^{83,84} A Canadian study⁸⁵ using similar methodology also failed to document an urban-rural difference for a range of psychiatric disorders. It is worth noting that all of these studies used lay administration of structured instruments, leaving open the possibility of nondifferential misclassification. Although this observation has several implications for inference that can be drawn from these studies, it is unlikely to affect the validity of the urban-rural comparisons of interest here.

In Europe, population-based surveys (two U.K. and one Dutch) have assessed the prevalence of mental disorders and examined urban-rural differences. In the first of these studies, the U.K. Health and Lifestyle Survey, an association was found between urban residence and the prevalence of psychiatric morbidity; this study used interviewers' subjective assessment of respondents' homes to deter-

mine urban versus rural living.⁸⁶ Subsequently, the Household Survey of National Morbidity of Great Britain, a multistage community sample using in-person interviews, also used interviewer-rating to determine urban versus rural residence and found that urban residents had higher prevalence of psychiatric morbidity in general as well as alcohol and drug dependence.⁸⁷ The Netherlands Mental Health Survey and Incidence Study, a multistage, stratified, random study in the Netherlands, documented higher likelihood of mood, substance use, and psychotic disorders in urban versus rural residents.⁸⁸⁻⁹⁰ The same study did not find urban-rural differences in anxiety disorders.⁸⁹ Other European studies that have focused on the relation between urban living and schizophrenia are discussed later in this chapter.

Four studies have assessed urban-rural differences using population-based surveys in Asian countries. The first of these was a multistage random sampling of households using in-person interviews (administered as part of the Clinical Interview Schedule) in Taiwan.⁹¹ This study found no significant differences in the prevalence of total psychological morbidity, anxiety states, or depression between the urban and rural areas; no differences were observed in symptom profile between the areas, either. A contemporaneous larger multistage random community sample, using in-person interviews based on the DSM-III, assessed persons in metropolitan Taipei, small towns, and rural villages in Taiwan.⁹² In contrast to the findings of Hwu et al.,⁹² this study found that the small-town samples had higher lifetime prevalence of eight disorders, including major depressive disorders, dysthymic disorder, panic disorder, generalized anxiety disorder, alcohol abuse or dependence, and drug dependence. A comparable study,⁹³ carried out in Korea, found a higher lifetime prevalence of many psychiatric disorders in less urban areas compared with Seoul, including alcohol abuse or dependence, agoraphobia, panic disorder, and cognitive impairment. This study found a higher prevalence of antisocial personality disorder in Seoul compared with the rest of the country and no differences in schizophreniform disorders or affective disorders (including depression). A smaller study⁹⁴ of persons over age 65 in Korea also failed to find urban-rural differences in depression. One study⁹⁵ in New Zealand that used a cross-sectional random community mail survey found no rural-urban differences in measures of psychiatric morbidity.

In sum, the studies in the past 20 years that have documented urban-rural comparisons in the prevalence of psychiatric disorders do not suggest that there is a consistent urban-rural difference in mental morbidity in general or for specific mental disorders with the possible exceptions of psychosis and child behavior disorders. The published data do hint that certain morbidities, particularly alcohol abuse or dependence may be more likely in rural versus urban areas, although the inconsistency in the assessment of alcohol abuse or dependence across these studies suggests the need for further work to clarify this suggestion. It is important to note that none of these community surveys has been carried out in developing-world countries; emerging work from South Africa may provide an invaluable contribution to our understanding of the role of urban living and psychiatric disorders in Africa and in the developing world.⁹⁶

Studies That Consider Characteristics of Urban Areas and Mental Health

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

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

A recent systematic review of neighborhood characteristics and health outcomes identified only one study (out of 25 reviewed) that considered mental disorders.⁹⁷ That study with a random sample of adult residents in Amsterdam failed to observe a relation between living in socioeconomically disadvantaged urban neighborhoods and mental disorders.⁹⁸ A study discussed earlier showed that neighborhood social disorganization was associated with depressive symptoms.³² Another study looking at the association between features of the urban built environment and mental health assessed the relation between the quality of one's living environment and the likelihood of depression using a cross-sectional survey.⁹⁹ The study found that persons living in poor quality physical environments were more likely to report symptoms consistent with depression after accounting for individual characteristics. Other work has shown that living in more deprived neighborhoods is associated with higher levels of child problem behavior¹⁰⁰ and a higher incidence of nonpsychotic disorders.¹⁰¹ A recent study corroborating these observations made use of a randomized controlled trial in which families were

moved from public housing in high-poverty neighborhoods to private housing in nonpoor neighborhoods in New York City.¹⁰² This experimental study showed that both parents and children who were moved to the better housing and better neighborhoods reported fewer psychological distress symptoms than did control families who were not moved (although the difference in mental health was noted in boys but not in girls).

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

The Example of Schizophrenia

To date, the psychiatric disorder that has been most thoroughly investigated with respect to urban rural differences is schizophrenia. The notion that urbanization may be linked to severe mental disorder emerged in 19th-century debates over apparent increases in insanity in Europe and the United States. Dramatic increases in asylum populations during the 19th century were a fact, but whether these increases represented an increase in the occurrence of mental illness was disputed. Many believed, however, that the societal transformations of the era had been handmaiden not only to advancing “civilization” but to insanity.¹⁰³ Urbanization was a significant feature of these transformations. By the end of the century, evidence that “the proportion of insane is highest where we find the greatest congestion of population” had taken shape.^{66, 104} For most of the 19th century, however, we do not have direct evidence bearing on schizophrenia.

Early studies in social psychiatry brought the urban detail of schizophrenia into sharp focus. We again refer to the landmark study by Faris and Dunham.⁵⁵ What is notable is that these early researchers conceived of the urban environment as causal, hypothesizing that neighborhood characteristics produced social isolation, thereby encouraging the development of key features of schizophrenia. For most of the last half of the 20th century, however, higher rates of schizophrenia in urban centers were seen as an artifact of selective migration. Accordingly, urban risk was thought to be explained by individuals with schizophrenia selectively migrating or drifting into urban environments in response to the illness or its prodrome. The evidence for social or geographic drift was limited; however, the alternative theory—that urban environments somehow contribute to the occur-

rence of schizophrenia—was difficult to prove and appeared less consistent with the growing domination of genetic theories of the disease.

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

The first in the series is the Swedish conscript study.¹⁰⁵ Data was obtained from 49,191 military inductees (1969–70); those who reported “mostly growing up” in urban environments were at 1.65 times increased risk of subsequently developing schizophrenia (1970–83) compared with those growing up in rural environments. The risk of schizophrenia increased stepwise from rural areas to small towns, to larger towns, to cities. The association was not explained by family economic circumstances, family history of mental disorder, or other potential confounding factors, including cannabis use. More recent work from Sweden has shown that the incidence rates of hospitalization for psychosis increased with increasing urbanization; those living in the most densely populated urban areas had 68% to 77% more risk of developing psychosis compared with those living in the least densely populated areas.¹⁰⁶

This Swedish conscript study was followed by a second group of studies based in the Netherlands. Following the 1942 to 1978 Dutch birth cohorts for psychiatric admissions from 1970 to 1992, Marcelis and colleagues¹⁰⁷ reported a significant association between urban birth and subsequent risk of schizophrenia. Although the effect was strongest for schizophrenia, increased risk was also observed for affective and other psychoses. At the highest level of urban exposure, the risk of schizophrenia narrowly defined was double that at the lowest exposure. A subsequent analysis focused on sorting out the timing of the urban effect. Because urban birth, upbringing, and adult residence are highly correlated, Marcelis and colleagues¹⁰⁸ sought to establish whether the risk-increasing effect was related to residence at the time of onset, earlier in life, or both. Cases with onset occurring before 1995 were identified among all live births, 1972 to 1978, and the effect of urbanicity at birth and residence at onset were assessed simultaneously. The main effect of urbanicity was related to residence at birth rather than residence at the time of onset.

A third series of studies issued from Denmark. Based on 1.75 million individuals identified in the population registry, Mortensen and colleagues¹⁰⁹ found that risk of schizophrenia was associated with the degree of urbanization of place of birth, increasing by dose response. Those born in the capital city were at 2.4

times greater risk compared with those born in rural areas, an effect that remained after controlling for family history of disorder. These findings were subsequently replicated using cases of schizophrenia diagnosed using the *International Classification of Diseases* (10th ed.) and identified in registry records, including inpatient and outpatient treatments and using broader control of family history and refined definitions of urbanicity.¹¹⁰ Addressing the issue of exposure timing, Pedersen and Mortensen¹¹¹ established a large population-based cohort; information on residence during upbringing was available for 807,000 cohort members. Examining residence in one-year intervals from birth to age 15, they reported that there was no most-vulnerable age during childhood, and the effects of urbanicity appeared to be cumulative. Also emerging from this study was the finding that change of municipality of residence in childhood, a move that would trigger a change in school, was associated with increased risk of schizophrenia, particularly in adolescence.

Taken together, these studies provide strong evidence for a relation between urban living and schizophrenia. The relationship is probably at least in part dependent on factors acting early in life. These studies also provide strong evidence against selective migration within or across generations as the main explanation for the association. It is also unlikely that differences in case detection based on differences in the likelihood of treatment and diagnosis between urban and rural settings fully account for the findings. The severity of the illness argues against the possibility of differential presentation for treatment: Historically, even in remote areas of Sweden it was found that affected individuals were known to health care providers.¹¹² With respect to availability of treatment, there is evidence of comparability across urban and rural settings in the Netherlands and Denmark,^{108, 110, 111} and access is ensured because treatment is free. Significant urban/rural differences in diagnostic practices are possible but unlikely, particularly in small countries such as the Netherlands and Denmark. Furthermore, conservative diagnostic practices in rural settings would need to include underdiagnosis of all nonaffective psychosis to account for the full range of findings reported.^{108, 113, 114} Yet many investigators remain skeptical of a valid association between urbanicity and schizophrenia, since there is no known mechanism or defined mediator,¹¹³⁻¹⁶ and it is still possible that the finding could be the result of some unknown bias.

Several hypotheses have been advanced to explain the association. First, environmental toxins such as lead, noise, and air pollution are all more prevalent in urban settings. Lead is known to affect neurodevelopment and behavior in children, and prenatal exposure may increase risk of schizophrenia in adulthood.¹¹⁷ Related evidence that exposure to noisome occupations increases risk for schizophrenia¹¹⁸ may be relevant to the overall hypothesis with respect to noise and air pollution. Air pollution has been shown to affect fetal development and neurodevelopment in young children;^{119, 120} suggestive findings relating specific component pollutants to the risk of schizophrenia have been reported.¹²¹

Second, the spread of contagion in an urban environment is more effective. Evidence relating pre- and perinatal exposure to infection (influenza, rubella, HSV-2, encephalitis) and risk of schizophrenia is accumulating.¹²²⁻²⁵ Behavioral contagion is a potential feature of the urban environment affecting risk of schizophrenia, and cannabis use in adolescence has been linked to increased risk of

schizophrenia.¹²⁶⁻²⁸ Although it was not found to fully account for the urban effect reported in the Swedish conscript study,¹⁰⁵ cannabis and other substance use have not been thoroughly investigated in the context of urban risk.

Third, the social context of urban environments and neighborhoods, although little explored, potentially is a determinant of schizophrenia. Evidence indicates that neighborhoods matter in determining adult psychiatric outcomes and child behavior problems.^{100, 101, 129} Early ecologic studies reported higher rates of schizophrenia in areas characterized by social isolation as defined by the proportion of single-person households.^{55, 130} More recently, multilevel studies have produced results consistent with and elaborating on the social isolation hypothesis. In a small city in the Netherlands, neighborhoods with a higher proportion of single and divorced persons were found to have higher rates of schizophrenia; however, single individuals were at highest risk of schizophrenia when living in a neighborhood of predominantly married individuals.¹²⁹ Similarly, a study conducted in London found that ethnic minorities living in neighborhoods of predominantly majority ethnicity were reported to be at higher risk of schizophrenia compared with ethnic minorities living in minority neighborhoods.¹³¹ Whether these circumstances taken to indicate social isolation closely track with the continuum of urbanicity has not been established. Furthermore, these and other studies of neighborhood characteristics related to isolation and discrimination were conducted in adult populations; it is not known whether these represent the environments of their childhood. A specific mechanism for translating a social context affecting all members of the population to individual risk has not been established. One possibility is that those vulnerable to developing schizophrenia may also be particularly vulnerable to the impact of these environments.¹³²

The notion that the urban environment plays a role in the occurrence of schizophrenia, a condition known to have a strong genetic basis, may be counterintuitive to some schizophrenia researchers. Indeed, the magnitude of relative risk conferred by urban living is far less than that conferred by family history of disease. In the Danish population study described above, having a mother or father or sibling with schizophrenia was associated with a 7- to 9-fold increased risk of developing the disease, whereas the highest level of exposure to urbanicity was associated with a 2.4-fold increase in risk.¹⁰⁹ The population-attributable fraction, however, reverses the importance of these factors. A family history of schizophrenia accounted for 5.5% of cases, whereas urban place of birth accounted for 34.6% because few individuals have a family history of schizophrenia, whereas many people are born and raised in cities.

Schizophrenia is among the most disabling and costly of major mental illnesses; therefore, it is of major importance that a common exposure such as urbanicity may contribute to this disorder. The fact that urbanicity has been associated with psychotic symptoms among the nondiseased as well as those with psychotic disorders indicates an even broader scope of impact.⁹⁰ This series of findings also suggests that in seeking to determine the impact of urban environments on mental health, we should not restrict attention to those disorders that are conceptualized as stress-related diseases. The global impact of urban environments on mental disorders may be far less intuitive.

A Research Agenda: What Are the Features of Urban Living That Affect Mental Health?

In 1991, the World Health Organization identified mental illness as one of the diseases that deserved special attention in the light of trends (including urbanization) that could have an impact on mental health.^{133, 134} However, mental health continues to be an underfunded area of research, considering its relative importance for the global burden of disease and because significant questions concerning the impact of urbanicity and urbanization on mental health remain unanswered. The recent resurgence of interest in urban health¹³⁵ provides an opportunity to frame and consider questions about mental health and urbanicity. There are four primary areas of research that urgently need exploration as we seek to improve our understanding of the relation between cities and health.

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

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

Second, while assessing the urban determinants of mental health is an important first step, elucidating the mechanisms through which risk factors are associated with mental health is equally important and particularly germane to the de-

velopment of effective interventions. As discussed in this chapter, a diverse set of mechanisms including stress processes, the availability of resources, varying degrees of social connectedness, and exposure to infectious agents and environmental toxins may explain how characteristics of cities affect urban health. Clearer elucidation of the pathways between urban determinants and mental health involving empiric tests to determine which mechanisms may be more important in particular contexts can guide interventions and the development of cities that promote health. For example, if the relation between the urban built environment and depression⁹⁹ is mediated by how the built environment facilitates (or discourages) social ties, different solutions are indicated than if stress processes mediate the relation between the built environment and mental health. If the former pathway is correct, one could easily conceive of efforts to promote social connectedness as a way of minimizing depression in lieu of ambitious and expensive renovation of dilapidated built environments. However, if the latter pathway is correct, successful interventions must improve the quality of the built environment itself to plausibly affect depression in the urban context.

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

Third, as the pace of urbanization in less wealthy countries far exceeds urbanization in wealthier countries, consideration of the urban determinants of mental health in different country settings acquires increasing importance. Although mental health in developing countries has historically received less attention than other causes of morbidity, particularly communicable disease, mental health is an increasingly important issue in developing countries. For example, for women in less wealthy countries, neuro-psychiatric diseases account for the second largest burden of disease after cardiovascular disease among all noncommunicable diseases.¹³⁴ However, most of the research in the area has been conducted in wealthier countries, to the detriment of our understanding of how urban living in other contexts may shape mental health. A research agenda for urban mental health must include work that identifies the unique urban determinants of mental health in different national contexts and how urbanization, a process that is much more prevalent in developing countries than it is in developed countries, is itself a determinant of mental health. It is likely that differences in baseline vulnerability, social resources, the physical environment, social connectedness, and conceptions of health and illness all may contribute to differences in the role that cities play in shaping mental health in different parts of the world. Research in developing countries and comparative multisite research can help elucidate these differences and direct creative solutions.

Fourth, it is worth noting that the role of HIV infection in shaping the prevalence and incidence of mental disorders, particularly in sub-Saharan Africa, is only beginning to be understood. HIV is the public health challenge of our time, and its impact on all aspects of health in many countries remains incalculable. For example, in South Africa it has been estimated that one-sixth of the country's population will be infected with HIV by 2010.¹³⁷ The distribution of HIV infection is associated with multiple social and economic factors, and in many countries migrant workers bridging urban and rural communities have contributed to the transmission of HIV.¹³⁸ In the coming decades we can expect disproportionate numbers of children orphaned as their parents die of AIDS, massive bereavement, and changes in the social environment—all of which may have a powerful impact on the distribution of mental health globally. Future empiric research with modeling of the associations between HIV incidence and the consequences of this disease may hold promise for future understanding of how HIV/AIDS may broadly affect population mental health and specifically affect mental health in urban areas.

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

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