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Health Through the Urban Lens

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ABSTRACT *Cities are now the major sites of human habitation worldwide, a trend that will continue for the foreseeable future, not only in the developed world but in developing countries. Urban residence impacts health and health prospects both positively and negatively through a complex mix of exposures and mechanisms. In addition, cities concentrate population subsets of various demographic, economic, and social characteristics, some with particular health risks and vulnerabilities. Looking at health through the urban lens allows increased understanding of disparate risks and emphasizes the essentiality of collaborative efforts in protecting and enhancing the health of populations, especially those living in cities.*

KEYWORDS *Urban health, Urban populations, Health risks, Physical environment, Social environment, Health and social services, Poverty, Racial minorities, Ethnic minorities, Homelessness, Aged, Children, Illicit drug use, Immigrants, Sexual minorities*

As humankind has moved progressively over the centuries from nomadic lifestyles toward fixed living sites and complex social structures, cities have emerged as the predominant life context for most of the world's people. By the start of the twentieth century, nearly half the global population was living in cities and, in the US at present, some 80% of the population live in or immediately adjacent to cities.[1] Globally, urban development is projected to continue, especially in the developing world, largely through growth of cities of small or intermediate size.[2] The effects of these large-scale trends have translated readily to the individual level; progressive urbanization has meant not only increasing environmental complexity but increasing physical, social, and psychologic proximity, resulting in a kind of chronic and insistent Brownian movement of individuals with relation to each other and the emergence of population subsets that generate ecosystem characteristics and dynamics with important implications for personal and community health.

The health implications of urban life have emerged in parallel with these developments, and urban health as a field of inquiry is producing a steadily broadening basis for activities not only in medicine and public health but in related areas in the social and environmental sciences and health policy. Urban health has emerged in recent years as a framing paradigm that serves to unite and focus the variety of forces determining the health of urban dwellers.

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The urban core, the historic center from which U.S. metropolitan populations have grown, is characterized by high population density, an economy based on services and information closely tied to national and international transactions, and concentration of cultural activities, media, government, and international organizations.[3] But urban cores are also characterized by wide income inequality as well as concentrations of populations at heightened risk with regard to health, including single parent families, racial and ethnic minorities, immigrants, the poor, the homeless, and the elderly. Each of these groups presents its own health-relevant vulnerabilities and disease patterns.

The urban core in the US has not been demographically static. In the years immediately after World War II, as many younger white, middle-income residents moved to the suburbs, large numbers of southern African-Americans and native Puerto Ricans moved into northeastern and midwestern cities.[4] Recent decades have witnessed a continuing and broader immigrant stream. By the year 2000, for example, New York's white population made up 45% of the total, a drop from 90% 50 years earlier; at this point, 26% of the city's population was African-American, 27% Latino, and 10% Asian; 50 years earlier only 1% of New Yorkers were of Asian descent.[5] The health implications of these shifts have been expressed in part in disparate patterns of health risks, disease prevalence, and health care access and quality.

In addition, as urban areas have developed and spread outward, resources and businesses have moved centrifugally as well, eroding the tax base and job opportunities in the urban core. This has been followed by the emergence of epicenters of economic decline characterized by increased class and racial residential segregation, decaying physical environments, differential quality of education, targeted alcohol and tobacco advertising, and high rates of crime and violence. The gloominess of some aspects of the urban landscape has led to the concept of an urban health penalty,[6] the idea that cities not only concentrate poor people and unhealthy environments, but present a disproportionate burden of poor health, including high rates of HIV infection, substance abuse, mental illness, infant mortality, asthma, and other morbidities. Although this image reflects the health conditions in many inner cities, it has been suggested by Freudenberg and others[7] that it has significant limitations, especially the identification of urban health primarily with conditions among the minority poor of inner cities. In addition, the concept undervalues the assets of urban environments, including those present in poor neighborhoods, and takes insufficient account of the fact that some urban characteristics may impact health positively, for example, opportunities for walking that exceed those in suburban areas, and furthermore, that cities also affect the health of middle- and upper-income people.

An alternative, parallel formulation, framed as a putative urban health advantage,[8] takes note of the readier availability in cities of a variety of social, environmental, cultural, and clinical supports as well as municipal, state, federal, and private sector programs potentially advantageous to health. With regard to health status and risk factors, rates of trauma and of depression and suicide are lower in cities than in rural areas,[9] and urban dwellers are more likely to display positive health-related behaviors such as exercise and attention to the composition of diets. Cigarette smoking and birth rates among adolescents are lower in urban settings than in rural areas and there is some evidence that black adolescents in cities are less likely to smoke than whites.[10,11] Furthermore, despite roughly equivalent urban/rural poverty and health insurance rates, 28% of rural dwellers rate their health as fair or poor, compared with 21% of urban residents, and death rates for ages 1 to 24 are 20% to 25% lower in cities than in rural areas.[10]

Comparisons like these make it clear that urban health is more complex than an unrelieved vista of enhanced risks and bad outcomes, even though numbers of these are hyperendemic in our cities. In addition, urban/rural comparisons aside, the urban concentration of social, demographic, and economic forces with clear health relevance makes urban health a useful construct for the examination of determinants of health and disease more generally.

Vlahov and Galea have identified the physical environment, the social environment, and access to health and social services as three main vectors to be considered[12] in explaining how city living can affect health negatively.

With regard to the urban *physical environment*, there is abundant evidence that, beyond the characteristics of the people who live in specific areas, the nature of the areas themselves appears to be independently related to morbidity and mortality. The reputation of the neighborhood, the availability of social support networks, the quality of the housing stock, and the extent of deteriorated or abandoned buildings have all been correlated with crime, violence, health-adverse behaviors, and increased levels of distrust and alienation.[13] In addition, the density of development, mix of land uses, availability of green space, and esthetic qualities affect physical activity, and in turn the risk of depression, obesity, and cardiovascular disease, as well as all-cause mortality.[14] Other features of the urban physical infrastructure, including the quality of the water supply, adequacy of garbage disposal, presence of hazardous waste landfills, and air pollution, especially from vehicular traffic and from manufacturing, are all associated with health risks.[15] Poor air quality, for example, is tightly related to death rates from respiratory diseases,[15] probably to the epidemics of pediatric asthma that characterize almost all cities in this country and throughout the developed world, and possibly to acceleration of atherosclerosis.[16]

An additional concern is the urban "heat island" effect; cities tend to be warmer than surrounding countrysides, under some circumstances as much as 11°C warmer, due to the absorption of heat by dark surfaces and the limited ability of deforested urban areas to cool the air through transpiration. Heat and high ambient air temperatures have been shown to be associated with numbers of hospitalizations and deaths each year, especially among socioeconomically disadvantaged and socially isolated urban elderly[17] and those with cardiovascular or pulmonary disease, psychiatric illness, or reduced capacity for self-care.[18]

The urban *social environment* also impacts health powerfully. Populations living at the extremes of the economic scale are frequently closely juxtaposed, as in Manhattan where the Upper East Side, one of the wealthiest areas in the country with an overwhelmingly white population, abuts Harlem where more than 77% of the inhabitants are black and some 42% live below the federal poverty line.[19] Such contrasts form part of a social matrix in our cities that also includes racial and ethnic segregation, variation in attained educational levels, marked differences in the quality of the physical environment, and striking disparities in health status across the lifespan and in life expectancy.

Some sense of the dimensions of these differences may be gained from Cooper's 2001 study,[20] which demonstrated that, among those younger than age 65 living in 267 U.S. metropolitan areas, age-adjusted premature mortality was 81% higher in blacks than in whites and median household income was 40% lower. Both residential segregation and income inequality were significantly related to premature mortality among blacks. Segregation by residence and occupation is among the hallmarks of institutionalized racism in the United States.[21] Among blacks, there is a linear relationship between the extent of the segregation experience and survival,[20]

and black infant mortality rates in American cities tend to track with the degree of segregation. The health impacts of racism, however, are not confined to black populations. White infant mortality rates in two highly segregated cities, Harrisburg, PA and East St. Louis, IL, were twice as high as the rate for white infants in any other city in Laviest's 1989 study,[22] and higher mortality rates for both black and white adults were found in a study of American cities as a correlate of residential segregation, considering only deaths due to conditions amenable to medical intervention.[23] In addition, there is a strong association between white mortality rates and the proportion of the urban population that is black, a poorly understood phenomenon that may reflect broad impacts of policies that restrict social resources.[24] Stratification of neighborhoods by socioeconomic status and segregation along racial and ethnic lines results in social isolation of individuals and groups as well as heightened perceptions of ambient hazards and high rates of adolescent depression, anxiety, and conduct disorder, which may persist into adult life.[25]

Link and others[26] have viewed social conditions as fundamental causes of disease. In this formulation, individual risk factors, including health-related behaviors, are viewed as proximate risks in the development of which social determinants, particularly socioeconomic status and social support, appear to be key, operating especially through disparate levels of knowledge of health-related matters and of potential protective or modifying interventions that individuals can adopt. Education, social connectedness, and economic status appear to be major determinants of such awareness and action. As Link points out, even though life expectancy and health status generally have improved markedly across the population over past decades, the gap between those with greater and lesser access to such resources has remained or even widened. Some circumstances of urban life, especially segregation and poverty,[27] contribute to and reinforce these discrepancies by imposing disproportionate exposure to health-adverse and socially undesirable patterns of response to economic and social deprivation.

In this regard, there is increasing clarity about the effects of social influences on contagion. Infections constitute the standard model of communicability, the level of risk varying with individual vulnerability, virulence of the causative agent, and likelihood of exposure. Ideas, social models, and perceptions of environmental risk, safety, and support are also contagious.[28] For example, health-adverse behaviors, which are to a significant degree socially determined, are in a real sense communicable, not only through the ubiquity and what might be called the virulence of exposures, but by virtue also of individual and group variations in vulnerability and hierarchical forces within groups. At the same time, there is wide variation within social groups in what might be characterized as social immunity. Even at similar levels of socioeconomic stress and within inner city neighborhoods with high prevalence of, for example, HIV infection or substance abuse, most individuals are uninfected by HIV and most are not illicit drug users. The nuances of social environments and biological vulnerability that would explain such differences require further exploration.

The *provision of health and social services* in cities, especially for the disadvantaged, turns largely on municipal policy, in turn tightly linked to state and federal priorities, particularly as reflected in the availability of health-related infrastructures and health insurance coverage. Uninsured status is a major barrier to entering and remaining in the health care system and is related to patterns of stochastic, poorly organized care, excessive and inappropriate use of emergency facilities, and high rates of hospitalization for disorders sensitive to ambulatory

management. For disadvantaged populations generally, access to medical care, the adequacy and appropriateness of clinical settings, and the availability of other health workers and support services reflect a complex mix of competing funding needs, the convergence of public sector funding streams, private sector capacity, and traditional attitudes concerning the poor and minorities. These gradients are concentrated in our cities and are aggravated by language barriers, immigrant status, and other characteristics of the potential patient population. As a result, striking disparities exist in the prevalence and treatment of a wide variety of disorders[29] and in health outcomes.[30–32] In addition, significant disparities have also been demonstrated in access to state-of-the-art high-technology interventions. For example, although percutaneous cardiac intervention rates, primarily angioplasty, increased from 1994 to 2002 among all racial and ethnic groups in New York City, the rates observed in whites in 1994 were not obtained by Hispanics until 4 years later and among blacks not until 8 years later. In addition, rates of coronary artery bypass grafting (CABG) among blacks and Hispanics remained essentially unchanged over that interval with no fall as percutaneous coronary intervention rates increased, in contrast to whites, among whom CABG rates fell progressively (Francis et al., unpublished manuscript). Such differences are aggravated not only by the vagaries of health insurance coverage among people of lower socioeconomic status, but by the characteristics of hospitals in which the disadvantaged seek care, for example, as regards the availability of subspecialty expertise and volume of experience with high-technology interventions.

As indicated above, urban populations in the US are demographically inhomogeneous and concentrate high-risk groups. The following categorization follows that of Galea and Vlahov[12]:

- Those living in *poverty* constituted more than 12% of the U.S. population in 2006, some 37 million people; while the poverty rate for those living in metropolitan statistical areas (MSAs) was 11.8%, somewhat lower than the rate for those living outside MSAs (15.2%), the poor are concentrated in our cities, especially larger metropolitan centers.[33] Of all people in MSAs in 2006, 38.2% lived in principal cities but 52.4% of those in poverty in MSAs lived in principal cities. The poverty rate for children was highest, 17.4%; for 18- to 64-year-olds, it was 10.8%; and for those age 65 or older, it was 9.4%. Poverty is a lethal condition: adjusted hazard ratios for all-cause mortality are more than 2 1/2 times higher among those with incomes less than $10,000 than among those earning $30,000 or more,[34] and a quarter or more of premature deaths before age 75 in one study of the urban poor would not have occurred had these individuals died at the same age-specific mortality rates as their affluent neighbors.[35] In addition, lack of health insurance is common among the urban poor, affecting an estimated 20% in 2002 in New York for example.[36] Being uninsured is associated with delays in care, lack of stable clinical relationships, foregone treatment, excessive use of emergency facilities, and high case fatality rates.[37,38] Health issues relating to poverty are compounded among racial and ethnic minorities and immigrants, among whom the prevalence of poverty is particularly high.[39] Under circumstances in which the urban poor are too frequently subjected to differential availability of employment opportunities, adequate housing, education, child care, and safe recreation and in the face of unequal development and maintenance of urban environments, people live under conditions of high allostatic load, their health tied to a significant degree to policy and social environments.

- The health of *racial and ethnic minorities* has continued to lag over recent years, even as the health of Americans has generally improved. Overall, blacks exhibit a 32% higher age-adjusted all-cause mortality risk when compared with whites, suffer 26% to 28% higher age-adjusted mortality rates for heart disease and cancer, and are more than five times more likely to die of diabetes.[40] Although infant mortality rates declined between 1950 and 2003 for blacks as well as for whites, the differences have not narrowed; in fact, the relative risk for black infants has been increasing since 1950, rising from 1.6 to 2.4 in 2003.[41] The differentials are not confined to mortality. For example, adult blacks and Hispanics have higher prevalence rates than non-Hispanic whites for diabetes, hypertension, and obesity,[42] and low socioeconomic status has been linked to elevated blood pressure levels in childhood that track into adult life,[43] to survival after acute myocardial infarction,[44] to cancer screening rates,[45] and to life expectancy.[46] The intersection of race, ethnicity, and poverty is complex. While each contributes powerfully to health disparities, the differentials in health status associated with poverty are greater than the associations with either race or ethnicity considered independently.[47]
- *Homelessness* is endemic in the US. More than 800,000 Americans are homeless in any given week and 3 1/2 million over the course of a year, some 10% of whom are chronically homeless. Almost three-quarters live in urban areas. About 60% are single men, 16% single women, 9% runaway adolescents, and 15% consist of families with young children.[48] The homeless carry a high burden of health risk, including alcohol and drug abuse, sexually transmitted diseases and serious mental illness,[48] especially psychotic and affective disorders, and tuberculosis, community-acquired pneumonia, HIV infection, and viral hepatitis are hyperendemic in this population. Among homeless adolescents, physical and/or sexual victimization is extremely common, 83% in one study.[48] The pregnancy rate among homeless adolescent females is 10% to 12%,[49] and the risk of low birth weight is 17%, nearly three times the national average.[50] Chronic disease is also common among the homeless, especially hypertension and other cardiovascular disease, diabetes, chronic obstructive pulmonary disease, seizures, and musculoskeletal disorders, all frequently undiagnosed or inadequately treated.[51] Homelessness is associated with shortened life expectancy: men in homeless shelters are two to eight times more likely to die than comparison groups and homeless women have mortality rates up to 31 times higher than women in the general population.[52] Common causes of death are injury, often due to victimization, drug overdose, AIDS, suicide, and homicide. Most homeless individuals seek health care, although episodically. Emergency room use is high, and admission to inpatient units is five times as common as among the general population.[51] Improvement in health status did not follow the acquisition of housing in one study.[48]
- The *aged* are increasingly concentrated in cities, and pari passu, urban populations are feminizing. More than three-quarters of the elderly live in metropolitan areas, and by 1990 in New York City, there were 60 men to 100 women over the age of 65; among those over 85, the ratio was 40 men to every 100 women.[5] The urban elderly are twice as likely to be poor as those in the suburbs,[53] and are more likely to be from minority and foreign-born populations. Most have Medicare coverage; about 8% have Medicaid coverage in addition. The burden of disease is substantial. All the leading causes of death among elderly Americans except for pneumonia and influenza are chronic disorders. Forty-eight

percent of community-dwelling elderly have three or more chronic diseases, notably arthritis, heart disease, cancer, diabetes, stroke, and dementia.[54] The prevalence and lethality of chronic disease among the elderly vary with race and ethnicity. Thus, elderly blacks have higher rates than whites of hypertension, diabetes, and obesity[55] and higher mortality rates from cancer and cardiovascular disease.[56] HIV/AIDS, primarily an urban health issue, is increasingly a disease of older adults from minority groups: 11% of those currently infected are at least 50 years of age, and of those with AIDS over age 50, half the men and nearly three-quarters of the women are black or Latino.[57] In terms of a putative urban health advantage, and perhaps of particular importance to the elderly, cities offer wide arrays of social and clinical services, and the urban physical environment affords substantial opportunities to be physically active, especially by walking. In addition, cities also offer important opportunities for the elderly to continue to do paid work, to have caregiving responsibilities, to maintain social engagement, and to be socially useful with positive impacts on health status.[58]

- In the 2000 census, nearly 73 million *children* under the age of 18 lived in the US, one-fourth of the total population. About a third lived in central cities.[59] Urban childhood, particularly among disadvantaged groups, is likely to be associated with high allostatic load. For example, urban children are more likely than others to be living in a family with an income below the poverty line, to be living with a parent who does not have a high school education, and to be living in a single parent home[60] and in socioeconomic circumstances related to school delinquency, increased teen pregnancy rates, and higher frequency of child abuse. Despite such risks, child survival rates are on average better in urban centers than in rural areas. The great epidemic currently affecting urban children is obesity, and in its trail type II diabetes mellitus, especially among racial and ethnic minority groups.[61] A survey of public school children in New York City in 2003 found that 43% were overweight or obese and 24% of children in kindergarten and first grade were already obese![62] Pediatric obesity is a final common pathway for multiple determinants, including reduced physical activity related in part to hours spent daily in television viewing, intensive television food marketing directed at children, the ubiquitous availability of high-calorie fast foods, ethnically determined food choices that may be calorie-rich, and the limited availability of fresh fruits and vegetables in disadvantaged areas in the urban core.[63] A number of other important health issues relate to urban childhood, especially among disadvantaged populations, including high infant mortality rates, teen or single motherhood, and low birth weight deliveries, reflecting in many instances inadequate or delayed prenatal care and maternal health-adverse behaviors during pregnancy. High rates of childhood asthma have been characteristic of cities worldwide in recent years, related to a significant degree to a variety of environmental inhalants, including vermin allergens, mites, and tobacco smoke in households and particulate matter, ozone, and diesel exhaust in the external environment. Prevalence rates are inversely related to family income. Lack of proper medical management increases the impact of asthma and of acute and chronic disease generally among urban children, for whom health insurance coverage is the major determinant of access to health care with employers of parents the largest source of such coverage. Nearly 10% of American children, about 7 million, were uninsured in 2006.[64] Even among working families, children are less well-insured than their parents because employers increasingly do not offer insurance benefits for dependents and many employees are unable to

purchase coverage. In addition, Medicaid-eligible children may not be enrolled for a number of reasons, including lack of awareness of eligibility, procedural barriers to enrollment, or immigration status; SCHIP coverage, which varies in scope from state to state, covers some 4.2 million children, but recent efforts to widen the eligible pool have failed on political grounds. Violence, observed or personally experienced, is a fact of life for many urban children, and for some, a learned behavior. Firearm homicide and suicide are concentrated in urban centers, and adolescents are at increased risk for both.[65] One survey of inner city high school students showed that 15% carried a firearm episodically and 5% persistently, and other surveys have indicated a prevalence of carried firearms of 10% to 12% among high school students generally.[66] There is clearly a concentration of mental health risk factors in the inner city environment, including racial/ethnic segregation, poverty, and threatening aspects of neighborhood context. Exposure to drugs, alcohol, and firearms exists as both cause and effect with regard to the mental health consequences of urban childhood, particularly in the inner city.

- *Illicit drug use* is largely an urban issue in this country. Prevalence rates have fallen over recent decades with regard to marijuana and cocaine, but hallucinogen use has been increasing since 1990. The 2002 National Survey on Drug Use and Health found that 108 million Americans over the age of 12 had used an illicit drug during their lifetimes, 35 million within the prior year. Although marijuana use was most frequent (40.4% lifetime rates), cocaine and hallucinogen lifetime use were also prevalent (14% each); heroin use was reported by 1.6%.[67] Polydrug use is common. In general, lifetime use rates have been found to be higher among adults living in large cities than among comparable populations in smaller cities or rural areas,[68] and consistent associations have been observed between drug use and neighborhood disadvantage.[69] Racial and ethnic differences are poorly drawn as among the various patterns of drug use, although initiation at younger ages is more common in white compared to black injection drug users. In general, age at initiation varies with the drug; it is lowest for nicotine (cigarettes), followed by alcohol, marijuana, and harder drugs. Linkages to HIV and hepatitis B and C are well-established among injection drug users. In one study of new initiates in Baltimore, within a year of injection drug use, seropositivity rates were 65% for hepatitis C, 50% for hepatitis B and 14% for HIV.[70]
- *Immigrants* currently make up some 8% to 12% of the U.S. population. They are largely urban dwellers: during the 1980s and 1990s, ten metropolitan areas in the US containing 17% of the nation's population attracted 55% of all legal immigrants and probably an even larger percentage of those who entered the country illegally.[71] Immigrant groups in recent years have generally been healthier than prior cohorts and in some respects healthier than the native U.S. population.[72] Health concerns in this group largely revolve around infectious diseases, particularly viral hepatitis, HIV, and especially tuberculosis: tuberculosis rates in 2007 were 9.7 times higher in foreign-born individuals than in US-born individuals.[73] Parasitic infestations may be seen in immigrants from hyperendemic areas. Delays in seeking health care are common, largely due to language problems, lack of acquaintance with the American system, and fear of exposure of illegal immigrant status. Immigrant children may be at higher risk of some childhood diseases than the native-born because of not having been immunized against, for example, rubella[74] and *H. influenzae* infection.[75] With regard to chronic diseases, the prevalence of cardiovascular risk factors increases progressively with length of residence in the US, especially obesity, hyperlipidemia, and

cigarette smoking.[76] In addition, breast, colorectal, and stomach cancers appear to increase in incidence with duration of residence in the US, rising toward U.S. rates within the first generation after arrival.[77,78] Cancer screening rates, including mammography, pap smears, fecal occult blood testing, sigmoidoscopy, and colonoscopy, tend to be low in immigrant populations,[79,80] reflecting language barriers, inadequate insurance coverage, and lack of a usual source of care. Overall, the health care of immigrant populations is frequently compromised by language barriers, illegal status, ethnic and culturally determined formulations of illness and treatment expectations at variance with U.S. norms.

- *Sexual minorities* tend to cluster in large urban centers. One study reported that 81% of same sex couples resided in cities with populations over 700,000 compared with 52% of the U.S. population.[81] While peer networks and support groups are of importance in a positive sense for these populations, gay bars, clubs, and bathhouses may reinforce high-risk habits, including drug use, excessive use of alcohol, and dangerous sexual practices. HIV infection and hepatitis B and C are hyperendemic in this population, and stratify along racial and ethnic lines: in one study of men who have sex with men, HIV prevalence was 7% in whites, 14% in Latinos, and 32% among blacks.[82] Higher rates in blacks may in part be due to higher prevalence of sexually transmitted diseases that facilitate HIV transmission rather than higher frequencies of risky sexual behavior or use of alcohol or illicit substances.[83] Lesbians appear to have a higher incidence of breast cancer than heterosexual women, possibly related to higher prevalence of obesity, nulliparity, and smoking and higher alcohol consumption, as well as lower rates of breast cancer screening and gynecologic care. Lesbian, gay, bisexual, and transgender (LGBT) individuals make up a disproportionate percentage of the homeless youth population. Their health risks may be disproportionate as well: they are more likely to use tobacco, alcohol, and cocaine, to share syringes, to have multiple sex partners, and to report attempted suicide.[84] With regard to health care access, LGBT people are more likely to be uninsured or underinsured,[85] in part because of lack of domestic partner health care coverage through employer-based arrangements. An additional barrier to health care is antipathy in the health care system. Strategies for improving the health care of urban sexual minorities have included special provisions for clinical care of patients with AIDS, especially under Medicaid.

Efforts to deal with urban health issues, particularly among those at higher risk, have focused largely on health policy and on clinical and social services, and clearly such programs should be expanded through broadened strategies focused on earlier and better treatment of extant disease, and more vigorous programs in health protection, both at the individual level and at the level of the deeper social determinants of the rate at which health erodes over the life course, many of them of particular importance to urban populations. Access to clinical care, for example, is a major problem for many, largely due to insurance issues, a problem that includes children to an important degree. This is a significant policy issue, but is also a question of making the urban uninsured more clearly aware of the insurance options available to them, particularly in the Medicaid program, and of simplifying enrollment and reenrollment procedures. At the same time, important additional impacts are to be derived from more intensive preventive interventions, in light of the emergent hyperendemicity of chronic diseases, which now account for some 80% of deaths in the US.[86] Application of available knowledge must be adapted to

the special needs and vulnerabilities of disadvantaged populations. Enhanced screening for early disease and disease precursors, a vigorous focus on health-adverse behaviors,[87] and a long-term effort focused on health literacy using the most sophisticated techniques at our disposal are all required. Much of what needs to be done to protect against the health risks incurred through smoking, overeating, and sedentary lifestyles, for example, is clear, but promoting and supporting the idea of individual responsibility for health over the long-term will be key and will require the concerted efforts of the clinical and public health communities, community-based organizations, schools, and employers, tied to inventive collaborations with the marketing community.

An important example of the need for concerted efforts to impact both near-term health risks and the later emergence of chronic disease is low birth weight and its links to inadequate prenatal care, both concentrated in disadvantaged urban populations. Low birth weight has emerged in recent years as a risk factor for childhood obesity and for the appearance of coronary heart disease and the metabolic syndrome in adult life.[88] Commingled clinical, policy, and public health efforts are needed. Proper prenatal care and reduction in the prevalence of low birth weight would enhance the health of neonates and likely provide very substantial returns over time, not only in the reduction of the prevalence of important chronic disease in adult life, but in reduced health care costs and enhanced productivity.

Such efforts must be joined by vigorous programs focused yet further upstream on the more fundamental determinants of hyperendemic diseases in cities, especially poverty and narrowed employment opportunities, abbreviated educations, racial and ethnic segregation, and decaying neighborhoods. Addressing urban health across this broader base will require making the policy case as powerful as possible. One substantial issue in enhancing the health of urban dwellers is the opportunity costs incurred. These costs are measured in human terms, in terms of lost children or parents, frayed social networks, and unrealized promise. In addition, however, opportunity costs deriving from shorter, sicker lives are to be measured in hard fiscal terms. Quantifying more clearly the cumulative impact of lost productivity, lost wages, lost taxes, and other potential contributions of lost work input is a central task in light of the fact that the policy apparatus is key to effective interventions. Both kinds of opportunity costs are hidden by the gross numbers offered by health statistics. They emphasize the need to mobilize people concerned about urban health from a broad spectrum of expertise.

A number of highly productive research avenues have been marked out, and plainly should be developed further. Many of these studies derive from characteristics of urban residence as the exposures of interest. Refined studies of mechanisms that act in the translation of economic, social, and other stressors into risky behaviors and disease are needed, and related investigations of social contagion and associated immunizing forces should be pursued. In addition, controlled studies of interventions at the neighborhood or other small area level are needed; as we learn better to characterize neighborhoods with regard to features of epidemiologic interest, such studies are becoming increasingly feasible. An expanding and progressively more sophisticated information base will lead to more effective interventions at the clinical level and in public health practice, and should provide the basis for more focused and effective health policy.

Further development of the concept of urban health as a framing paradigm can help to clarify the complexity of the forces that determine health and life expectancy generally, and can point the way, through better understanding of the determinants

of health disparities, to the kinds of alliances and collaborations that are needed, especially effective partnerships between the health enterprise and the policy community. Ultimately, a continuing, evolving response will be required. Neither the challenges nor the settings are static, and the response will have to be comprehensive, flexible, and beyond all things, persistent over time.

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REFERENCES

1. Alig RJ, Kline JD, Lichtenstein M. Urbanization on the US landscape: looking ahead in the 21st century. *Landsc Urban Plan*. 2004;69:219–234 doi:10.1016/j.landurbplan.2003.07.004.
2. Montgomery MR. The urban transformation of the developing world. *Science*. 2008;319:761–764 doi:10.1126/science.1153012.
3. Gusmano MK, Rodwin VG. Health services research and the city. In: Galea S, Vlahov D, eds. *Handbook of Urban Health: Populations, Methods, and Practice*. New York: Springer; 2005:295.
4. Frey WH. Central city white flight: racial and non-racial causes. *Am Sociol Rev*. 1979;44:425–448 doi:10.2307/2094885.
5. Tobier E. Growing old in the city that never sleeps: aging in New York. In: Rodwin VG, Gusmano MK, eds. *Growing Older in World Cities*. Nashville: Vanderbilt University Press; 2006:27.
6. Andrulis DP. The urban health penalty: new dimensions and directions in inner-city health care. *Ann Intern Med*. 1997;126:485–490.
7. Freudenberg N, Galea S, Vlahov D. Beyond urban penalty and urban sprawl: back to living conditions as the focus of urban health. *J Commun Health*. 2005;30:1–11 doi:10.1007/s10900-004-6091-4.
8. Vlahov D, Galea S, Freudenberg N. The urban health "advantage". *J Urban Health*. 2005;82:1–4 doi:10.1093/jurban/jti001.
9. Rost K, Zhang M, Fortney J, Smith J, Smith GR Jr. Rural-urban differences in depression treatment and suicidality. *Med Care*. 1998;36:1098–1107 doi:10.1097/00005650-199807000-00015.
10. Eberhardt MS, Ingram DD, Makue DM, et al. *Health, United States, 2001. Urban and Rural Health Chartbook*. Hyattsville, MD: National Center for Health Statistics; 2001.
11. Nelson DE, Giovino GA, Shopland DR, et al. Trends in cigarette smoking among US adolescents, 1974 through 1991. *Am J Public Health*. 1995;85:34–40.
12. Galea S, Vlahov D. Urban health: population, methods, and practice. In: Galea S, Vlahov D, eds. *Handbook of Urban Health: Populations, Methods, and Practice*. New York: Springer; 2005:1.
13. Cohen DA, Mason K, Bedimo A, Scribner R, Basolo V, Farley TA. Neighborhood physical conditions and health. *Am J Public Health*. 2003;93:467–471.
14. Bulwer BE. Sedentary lifestyles, physical activity, and cardiovascular disease: from research to practice. *Crit Pathw Cardiol*. 2004;3:184–193.
15. American Thoracic Society. Health effects of outdoor air pollution. Committee of the Environmental and Occupational Health Assembly of the American Thoracic Society. *Am J Respir Crit Care Med*. 1996;153:3–50.
16. Hoffman B, Moebus S, Mohlenkamp S, et al. Residential exposure to traffic is associated with coronary atherosclerosis. *Circulation*. 2007;116:489–496 doi:10.1161/CIRCULATIONAHA.107.693622.

17. Basu R, Samet JM. Relation between elevated ambient temperature and mortality. a review of the epidemiologic evidence. *Epidemiol Rev*. 2002;24:190–202 doi:10.1093/epirev/mxf007.
18. Bouchama A, Dehbi M, Mohamed G, Matthies F, Shoukri M, Menne B. Prognostic factors in heat wave related deaths: a meta-analysis. *Arch Intern Med*. 2007;16:2170–2176 doi:10.1001/archinte.167.20.ira70009.
19. New York City Department of City Planning. 2007. Manhattan CD 10. Accessed on May 1, 2008. http://home2.nyc.gov/html/dcp/html/lucds/cdstart.shtml.
20. Cooper RS, Kennelly JF, Durazo-Arvizu R, Oh HJ, Kaplan G, Lynch J. Relationship between premature mortality and socioeconomic factors in black and white populations of US metropolitan areas. *Public Health Rep*. 2001;116:464–473.
21. Williams DR, Collins C. Racial residential segregation: a fundamental cause of racial disparities in health. *Public Health Rep*. 2001;116:404–416.
22. LaVeist TA. Linking residential segregation to the infant-mortality race disparity in US cities. *Sociol Soc Res*. 1989;73:90–94.
23. Collins CA. Racism and health: segregation and causes of death amenable to medical intervention in major US cities. *Ann N Y Acad Sci*. 1999;896:396–398 doi:10.1111/j.1749-6632.1999.tb08152.x.
24. Deaton A, Lubotsky D. Mortality, inequality and race in American cities and states. *Soc Sci Med*. 2003;56:1139–1153 doi:10.1016/S0277-9536(02)00115-6.
25. Aneshensel CS, Sucoff CA. The neighborhood context of adolescent mental health. *J Health Soc Behav*. 1996;37:293–310 doi:10.2307/2137258.
26. Link BG, Phelan JC. Fundamental sources of health inequalities. In: Mechanic D, Rogut L, Colby D, Knickman J, eds. *Policy Challenges in Modern Health Care*. New Brunswick, NJ: Rutgers University Press; 2005.
27. Schulz AJ, Williams DR, Israel BA, Lempert LB. Racial and spatial relations as fundamental determinants of health in Detroit. *Milbank Q*. 2002;80:677–707 doi:10.1111/1468–0009.00028.
28. Scherer CW, Cho H. A social network contagion theory of risk perception. *Risk Anal*. 2003;23:261–267 doi:10.1111/1539-6924.00306.
29. Fiscella K, Williams DR. Health disparities based on socioeconomic inequities. Implications for urban health care. *Acad Med*. 2004;79:1139–1147 doi:10.1097/00001888-200412000-00004.
30. Du XL, Meyer TE, Franzini L. Meta-analysis of racial disparities in survival in association with socioeconomic status among men and women with colon cancer. *Cancer*. 2007;109:2161–2170 doi:10.1002/cncr.22664.
31. Singh GK, Siahpush M. Widening socioeconomic inequalities in US life expectancy, 1980–2000. *Int J Epidemiol*. 2006;35:969–979 doi:10.1093/ije/dyl083.
32. Adler NE, Rehkopf DH. US disparities in health: descriptions, causes, and mechanisms. *Annu Rev Public Health*. 2008;29:235–252.
33. DeNavas-Walt C, Proctor BD, Smith J. *Income, Poverty and Health Insurance Coverage in the United States: 2006. US Census Bureau, Current Population Reports*. Washington DC: US Government Printing Office; 2007:60–233.
34. House JS, Lepkowski JM, Williams DR, et al. Excess mortality among urban residents: how much, for whom, and why? *Am J Public Health*. 2000;90:1898–1904.
35. Chen JT, Rehkopf D, Waterman P, et al. Mapping and measuring social disparities in premature mortality: the impact of census tract poverty within and across Boston neighborhoods. *J Urban Health*. 2006;83:1063–1084 doi:10.1007/s11524-006-9089-7.
36. Levitan M. Poverty in New York, 2002: one-fifth of the city lives below the federal poverty line. New York, *Community Service Society*, Sept. 30, 2003.
37. Ayanian JZ, Weissman JS, Schneider EC, Ginsburg JA, Zaslavsky AM. Unmet health needs of uninsured adults in the United States. *JAMA*. 2001;284:2061–2069 doi:10.1001/jama.284.16.2061.
38. Franks P, Clancy CM, Gold MR. 1993 Health insurance and mortality. Evidence from a national cohort. *JAMA*. 1993;270:737–741 doi:10.1001/jama.270.6.737.

39. Flaskerud JH, Kim S. Health problems of Asian and Latino immigrants. *Nurs Clin North Am*. 1999;34:359–380.
40. Freid VM, Prager K, MacKay AP, Xia H. *Chartbook on Trends in the Health of Americans. Health, United States*. Hyattsville, MD: National Center for Health Statistics; 2003.
41. Singh GK, Yu SM. Infant mortality in the United States: trends, differentials, and projections, 1950 through 2010. *Am J Public Health*. 1995;85:957–964.
42. Delva J, Johnston LD, O'Malley PM. The epidemiology of overweight and related lifestyle behaviors racial/ethnic and socioeconomic status differences among American youth. *Am J Prev Med*. 2007;33:S178–S186 doi:10.1016/j.amepre.2007.07.008.
43. Dekkers JC, Snieder H, Vanden Oord EJ, Treiber FA. Moderators of blood pressure development from childhood to adulthood: a 10-year longitudinal study. *J Pediatr*. 2002;141:770–779 doi:10.1067/mpd.2002.128113.
44. Bernheim SM, Spertus JA, Reid KJ, et al. Socioeconomic disparities in outcomes after acute myocardial infarction. *Am Heart J*. 2007;153:313–319 doi:10.1016/j.ahj.2006.10.037.
45. McAlearney AS, Reeves KW, Dickinson SL, et al. Racial differences in colorectal cancer screening practices and knowledge within a low-income population. *Cancer*. 2008;112:391–398 doi:10.1002/cncr.23156.
46. Feinglass J, Lin S, Thompson J, et al. Baseline health, socioeconomic status, and 10-year mortality among older middle-aged Americans: findings from the Health and Retirement Study, 1992–2002. *J Gerontol B Psychol Sci Soc Sci*. 2007;62:S209–S217.
47. Borrell LN, Hatch SL. Racial/ethnic minorities and health. The role of the urban environment. In: Galea S, Vlahov D, eds. *Handbook of Urban Health: Populations, Methods, and Practice*. New York: Springer; 2005:63.
48. Hwang SW, Dunn JR. Homeless people. In: Galea S, Vlahov D, eds. *Handbook of Urban Health: Populations, Methods, and Practice*. New York: Springer; 2005:19.
49. Greene JM, Ringwalt CL. Pregnancy among three national samples of runaway and homeless youth. *J Adolesc Health*. 1998;23:370–377 doi:10.1016/S1054-139X(98)00071-8.
50. Stein JA, Lu MC, Gelberg L. Severity of homelessness and adverse birth outcomes. *Health Psychol*. 2000;19:524–534 doi:10.1037/0278-6133.19.6.524.
51. Schanzer B, Dominquez B, Shrout PE, Caton CL. Homelessness, health status, and health care use. *Am J Public Health*. 2007;97:464–469 doi:10.2105/AJPH.2005.076190.
52. Barrow SM, Herman DB, Cordova P, Struening EL. Mortality among homeless shelter residents in New York City. *Am J Public Health*. 1999;89:529–534.
53. Frey WH. *Beyond Social Security: the Local Aspects of an Aging America*. Washington, DC: Brookings Institution; 1999.
54. Joyce GF, Keeler EB, Shang B, Goldman DP. The lifetime burden of chronic disease among the elderly. *Health Aff (Millwood)*. 2005;24(Suppl 2):W5R18–W5R29.
55. Hall WD, Clark LT, Wenger NK, et al. The metabolic syndrome in African-Americans: a review. *Ethn Dis*. 2003;13:414–428.
56. Malmstrom TK, Andresen EM, Wolinsky FD, Miller JP, Stamps K, Miller DK. Mortality risk in older inner-city African Americans. *J Am Geriatr Soc*. 2007;55:1049–1055 doi:10.1111/j.1532-5415.2007.01204.x.
57. Paul SM, Martin RM, Lu SE, Lin Y. Changing trends in human immunodeficiency virus and acquired immunodeficiency syndrome in the population aged 50 and older. *J Am Geriatr Soc*. 2007;55:1393–1397 doi:10.1111/j.1532-5415.2007.01295.x.
58. Fried LP, Carlson MC, Freedman M, et al. A social model for health promotion for an aging population: initial evidence in the Experience Corps Model. *J Urban Health*. 2004;81:64–78 doi:10.1093/jurban/jth094.
59. Sawhill I, Chadwick L. *Children in Cities: Uncertain Futures, 1999*. Washington, DC: Brookings Institution; 1999.
60. Gibbons MC, Singh V, Braithwaite K, Guyer B. The health of children in cities. In: Galea S, Vlahov D, eds. *Handbook of Urban Health: Population, Methods, and Practice*. New York: Springer; 2005:155.

61. Hannon TS, Rao G, Arslanian SA. Childhood obesity and type 2 diabetes mellitus. *Pediatrics*. 2005;116:473–480 doi:10.1542/peds.2004-2536.
62. Thorpe LE, List DG, Marx T, May L, Helgerson SD, Frieden TR. Childhood obesity in New York City elementary school students. *Am J Public Health*. 2004;94:1496–1500.
63. Diez-Roux AV, Nieto FJ, Caulfield L, Tyroler HA, Watson RL, Szklo M. Neighbourhood differences in diet: the atherosclerosis risk in communities (ARIC) study. *J Epidemiol Community Health*. 1999;53:55–63.
64. Gresenz CR, Rogowski J, Escarce JJ. Dimensions of the local health care environment and use of care by uninsured children in rural and urban areas. *Pediatrics*. 2006;117(3):e509–e517 doi:10.1542/peds.2005-0733.
65. McGonigal MD, Cole J, Schwab CW, Kauder DR, Rotondo MF, Angood PB. Urban firearm deaths: a five-year perspective. *J Trauma*. 1993;35:532–6 doi:10.1097/00005373-199310000-00006.
66. Smith MD. Source of firearm acquisition among a sample of inner-city youths: research results and policy implications. *J Crim Justice*. 1996;24:361–367 doi:10.1016/0047-2352(96)00019-0.
67. Substance Abuse and Mental Health Services Administration, Office of Applied Studies. *Results from the 2002 National Survey on Drug Use and Health: National Findings*. NHSDA Series H-22, DHHS Publication No. SMA 03-3836. Rockville, MD: Office of Applied Studies; 2003.
68. Ompad D, Fuller C. The urban environment, drug use, and health. In: Galea S, Vlahov D, eds. *Handbook of Urban Health: Population, Methods, and Practice*. New York: Springer; 2005:127.
69. Crum RM, Lillie-Blanton M, Anthony JC. Neighborhood environment and opportunity to use cocaine and other drugs in late childhood and early adolescence. *Drug Alcohol Depend*. 1996;43:155–161 doi:10.1016/S0376-8716(96)01298-7.
70. Garfein RS, Vlahov D, Galai N, Doherty MC, Nelson KE. Viral infections in short-term injection drug users: the prevalence of the hepatitis C, hepatitis B, human immunodeficiency, and human T-lymphotropic viruses. *Am J Public Health*. 1996;86:655–661.
71. Enchautegui ME. Immigration impact on local employment and ethnic minorities. In: Carmon N, ed. *Immigrants: Liability or Asset? Innovative Research and Policy Implications*. Haifa: Neaman Books; 1993.
72. Stephen EH, Foote K, Hendershot GE, Schoenborn CA. Health of the foreign-born population: United States, 1989–90. *Adv Data*. 1994;241:1–12.
73. CDC. Trends in tuberculosis, United States, 2007. *MMWR*. 2008;57(11):281–285.
74. Rangel MC, Sales RM, Valeriano EN. Rubella outbreaks among Hispanics in North Carolina: lessons learned from a field investigation. *Ethn Dis*. 1999;9:230–236.
75. Findley SE, Irigoyen M, Schulman A. Children on the move and vaccination coverage in a low-income, urban Latino population. *Am J Public Health*. 1999;89:1728–1731.
76. Koya DL, Egede LE. Association between length of residence and cardiovascular disease risk factors among an ethnically diverse group of United States immigrants. *J Gen Intern Med*. 2007;22:841–846 doi:10.1007/s11606-007-0163-y.
77. Ziegler RG, Hoover RN, Pike MC, et al. Migration patterns and breast cancer risk in Asian-American women. *J Natl Cancer Inst*. 1993;85:1819–1827 doi:10.1093/jnci/85.22.1819.
78. Polednak AP. Cancer incidence in the Puerto Rican-born population of Connecticut. *Cancer*. 1992;70:1172–1176 doi:10.1002/1097-0142(19920901)70:5<1172::AID-CNCR2820700524>3.0.CO;2-Y.
79. Echeverria SE, Carrasquillo O. The roles of citizenship status, acculturation, and health insurance in breast and cervical cancer screening among immigrant women. *Med Care*. 2006;44:788–792 doi:10.1097/01.mlr.0000215863.24214.41.
80. Wong ST, Gildengorin G, Nguyen T, Mock J. Disparities in colorectal cancer screening rates among Asian Americans and non-Latino whites. *Cancer*. 2005;104(Suppl 12):2940–2947 doi:10.1002/cncr.21521.

81. Black D, Gates G, Sanders S, Taylor L. Why do gay men live in San Francisco? *J Urban Econ*. 2002;51:54–76 doi:10.1006/juec.2001.2237.
82. CDC. HIV incidence among young men who have sex with men—seven US cities, 1994–2000. *MMWR*. 2001;50:440–444.
83. Millett GA, Peterson JL, Molitski RJ, Stall R. Greater risk for HIV infection of black men who have sex with men: a critical literature review. *Am J Public Health*. 2006;96:1007–1019 doi:10.2105/AJPH.2005.066720.
84. Lindley LL, Nicholson TJ, Kerby MB, Lu N. HIV/STI associated risk behaviors among self-identified lesbian, gay bisexual, and transgender college students in the United States. *AIDS Educ Prev*. 2003;15:413–429 doi:10.1521/aeap.15.6.413.24039.
85. Dean L, Meyer IH, Robinson K, et al. Lesbian, gay, bisexual, and transgender health: findings and concerns. *J Gay Lesbian Med Assoc*. 2000;4:101–151 doi:10.1023/A:1009573800168.
86. Mokdad AH, Marks JS, Stroup DF, Gerberding JL. Actual causes of death in the United States, 2000. *JAMA*. 2004;291:1238–1245 doi:10.1001/jama.291.10.1238.
87. Barondess JA. Toward healthy aging: the preservation of health. *J Am Geriatr Soc*. 2008;56:145–148.
88. Singhal A, Lucas A. Early origins of cardiovascular disease: is there a unifying hypothesis? *Lancet*. 2004;363:1642–1645 doi:10.1016/S0140-6736(04)16210-7.