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Methodological Considerations in the Study of Urban Health

How Do We Best Assess How Cities Affect Health?

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Introduction

In this chapter we discuss research methods that may be applicable to the study of urban health and consider some methodological challenges that arise in urban health research. Several research questions may be considered pertinent to the study of urban health, and as the discipline continues to evolve, it is inevitable that the range of questions considered important will expand and become more complex. For example, there are important methodological concerns in the definition of "urban," the specification of urban limits, and the establishment of meaningful boundaries between urban communities. There are separate, equally important issues that pertain to the evaluation of public health interventions in urban areas.[1] The focus of this chapter is on methodological issues pertaining to etiologic research, that is, research aimed at understanding how urban living may affect health. Our discussion of these methods is organized into broad quantitative and qualitative categories and concludes with a discussion of the potential contributions a combination of methods can make to an understanding of health in urban contexts. We consider issues that pertain to study design, analysis, and interpretation, all relevant when discussing methodological considerations in this context. We hope that some of the observations made here can be generalized to other questions that may pertain to the field.

Studying Urban Health: Complex Questions, Methodological Challenges

Forging urban health into a coherent discipline and advancing empiric studies of how urban living may affect health requires a consideration of the complexities in

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

All etiologic research must begin with clear specification of a research question; this is often one of the hardest steps. Indeed, we suggest that the greatest challenge in the study of urban health is in adequate specification of research questions that address how and why urban living may affect health. There are three primary reasons why this task may be particularly challenging in urban health. First, much of what may be considered urban health research in the literature thus far has arisen from diverse disciplines using different theoretical frameworks and applying various disciplinary orientations and terminologies. For example, in demography and epidemiology, research into the role of urbanization in shaping health may focus on how population change in cities, resulting from migration and population growth, may influence the distribution of diseases.[2,3] In contrast, the study of urbanization in sociology may focus on social activities and social organization in cities and their association with changing behaviors and their consequences. Thus, in a study about how urban living may affect health, it is important to look at change in urban population size and individual adoption of different urban lifestyles. Useful research should help us understand the role of each in influencing health and behavior; however, few researchers have posed questions that enable them to consider both of these perspectives.

Second, many questions in urban health research are not meaningful in isolation. Understanding how urban living affects health requires consideration of multiple—often competing—influences. For example, while social capital associated with group membership may be salutary,[4] identification with tightly knit homogenous ethnic communities may result in spatial racial segregation that has been associated with poor health.[5] Different disciplines might study various aspects of urbanization that coexist and potentially exert varying effects on population health. This interdependence of research questions complicates the empiric task of assessing how cities may affect health. Specification of relevant research questions must at least acknowledge, if not take into account, the interrelated processes that ultimately determine health in cities.

Third, as in all research, clear specification of a research question rests, at least implicitly, on the acknowledgment of a theoretical framework that suggests how and why the characteristics of interest may affect health. The absence of such a framework in the study of urban health complicates the specification of research questions in the field as well as the interpretation of research findings. In recent years several investigators have proposed more comprehensive models that may help to unify these different strands of urban research.[6,7]

As several chapters in this book point out, cities are complex communities of heterogeneous individuals, and multiple factors may be important determinants of population health in cities. For example, understanding the role that racial and

ethnic heterogeneity plays in shaping the health of urban populations requires an understanding of the role of segregation in restricting access to resources in urban neighborhoods[5] and of the potential for greater tolerance of racial and ethnic differences in cities compared with nonurban areas. Assessing how urban living may affect health raises issues often not easily addressed through the application of simple analytic methods.

Empiric inquiry in health presupposes that there are identifiable factors that influence health and that these factors can usefully be identified (and potentially intervened upon). For example, a typical public health study might imply that we can generalize about how different foods will affect health across individuals, at least within the confines of effect modification across groups (e.g., age groups) or under different circumstances (e.g., at different levels of caloric intake). However, cities are characterized by multiple factors (e.g., population density, heterogeneity, etc.) that in some respects may make each city unique. Although certain aspects of city living may be universal (e.g., population density) and relevant for the health of populations in different cities, other urban characteristics that are important in one city (e.g., local transportation patterns and air pollution) may not be important in others, limiting the generalizations that can be drawn about how urban living influences health. Further complicating this task is that cities change, a fact that has implications for the relative contribution of different factors in determining health in cities. For example, municipal taxation of alcohol and cigarettes may be an important determinant of alcohol and cigarette consumption in a particular city at a particular time.[8] However, changing social norms around smoking and alcohol use may either obviate or reinforce the influence of taxation. Therefore, when considering urban characteristics that affect health, it is important to note both the prevailing context within which such characteristics operate and that the role of these characteristics may change.

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

Different Perspectives on the Empiric Study of Urban Health

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

Studies of Differences between Rural and Urban Communities within Countries

Until recently, studies that compare rates and prevalence of morbidity and mortality in urban and rural areas were the most common form of urban research. These studies typically contrast several urban areas with rural areas in the same country or consider morbidity and mortality in urban versus nonurban areas, the latter frequently being defined as all areas that do not meet "urban" criteria. While we acknowledge the methodological difficulties inherent in such definitions, their full discussion is beyond the scope of this chapter; further discussion of these issues can be found in Chapter 1 of this book or in other publications.[9] Essentially, these studies ask, "How is the burden of morbidity and mortality different in urban areas than in nonurban areas?"

Though urban-rural or urban-nonurban comparisons are useful in drawing attention to particular features of urban areas that may be associated with health and merit investigation, these studies are limited in their ability to shed light on what these features may be and on the pathways through which they affect the health of urban residents. Because conditions within cities change and there are differences in living conditions, it is unsurprising that different urban-rural comparisons have provided conflicting evidence about the relative burden of disease in urban and nonurban areas. At best, these studies provide a crude snapshot of how the mass of urban living conditions at one time may be affecting population health. Studies taking a rural versus urban perspective may be most relevant in areas where urbanization is still proceeding rapidly (e.g., China or India), helping public health officials to anticipate changing national health profiles as the proportion of the population living in urban areas increases.[10, 11]

Studies of Differences across Cities within or between Countries

The second type of research perspective on urban health involves comparisons of health between cities, either within a country or between countries. Using the city itself as the key unit of analysis, such studies compare different cities to address questions about which features of cities may promote or harm population health; they may suggest practices at the city level that are amenable to intervention that can improve population health. For example, Rodwin and Gusmano[12] have compared health systems in New York City, London, Paris, and Tokyo, providing insights into how mega-cities in wealthy countries can better organize health services. However, by considering the city as the unit of analytic interest, these studies implicitly assume that aggregate behaviors or characteristics at the city level are equally important for all residents of those cities. Looking at health system organization and function across four large cities does not permit analysis of differential access to health care services within cities because of location of residence, intraurban variability in barriers to care, or variations in quality of services provided to different urban residents. This approach then limits our understanding of the differential impact of urban characteristics on the health of urban residents. More important, urban-urban comparisons, such as the work of Rodman and Gus-

mano, may be critically important for municipal and state policy makers who can use insights from such work to guide choices about service provision throughout a city.

Studies of Intra-urban Differences

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

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

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

Quantitative Methods

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

CORRELATIONS AND ASSOCIATIONS IN ECOLOGIC ANALYSES

Ecologic analyses consider associations between factors at the group or aggregate level. For example, this method can be used to consider the association between average income and all-cause mortality rates across cities. Simple correlations can suggest features of cities that co-vary with measures of population health at the city level, and more sophisticated techniques, such as regression analyses, can consider how particular factors co-vary with others while accounting for the contribution of other potentially important variables. Historically the primary method used in interurban comparisons discussed above has been ecologic analysis. Currently, ecologic-level research in the study of urban health is principally used for generating hypotheses about features of cities that may affect health. For example, ecologic studies demonstrating that income distribution within cities was associated with mortality in U.S. cities[19] generated theories about the role of relative income as a determinant of psychosocial stress in cities and as a determinant of social capital and the attendant availability of human and social resources within cities.[20]

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

CONTEXTUAL ANALYSES

Contextual analyses assess how urban living as an individual characteristic is associated with health, and these analyses have been most commonly employed in the studies of urban versus rural (or nonurban) health discussed earlier. Thus, contextual analyses attribute the individual a variable that represents whether or not one lives in an urban versus rural context; analytic methods ranging from contingency tables to regression analyses are applied to determine whether an individual's likelihood of having a particular health status (including the presence or absence of disease or morbidity from a particular disease) is higher or lower in urban individuals compared with nonurban individuals. Contextual analyses consider urban as a variable with a fixed effect on individuals, meaning that the urban variable has the same effect on all individuals in an analysis. Simple methods consider the association of the urban variable with health status without controlling for the role

of other potentially confounding or modifying variables. More sophisticated methods (e.g., Mantel-Haenzel adjustment, multiple regression) can assess the role of the urban variable while taking into account conceivably important variables (e.g., gender). While contextual analyses have been applied to considering urban living itself as the variable of interest, they can also be used in intra-urban studies, for example, comparing living in a densely populated urban neighborhood with living in a less densely populated neighborhood.

Although contextual studies are relatively common in urban health research, the inferences that can be drawn from these analyses have limitations. As mentioned, studies comparing health in urban and rural settings have produced conflicting results, with comparable studies frequently disagreeing about whether urban living matters for particular health outcomes.[21,22] This conflict is likely a reflection of the complexity of urban living. Also, considering urban as a single variable can at best produce only a summary of how the city as a whole may shape overall health.

MULTILEVEL METHODS THAT CONSIDER THE ROLES OF MULTIPLE LEVELS OF INFLUENCE

Relatively new to the study of urban health, multilevel analyses allow researchers to consider how characteristics of cities or of units within cities contribute to individual health independent of the contribution of other individual and contextual variables. For a full review of the methods behind multilevel analyses we refer the reader to other published work.[23] In brief, multilevel analyses consider the contribution of variables at multiple levels to the variability in a particular individual-level dependent variable. In its simplest application to urban health, a multilevel analysis uses data from individuals in multiple cities to consider whether city living independently explains inter-individual variability in health status after controlling for other relevant individual characteristics.

More useful to the study of urban health, however, is the consideration of how different characteristics of urban living at multiple levels may be associated with health. For example, multilevel analysis can test whether social capital at the city level is associated with individual mental health while controlling for social ties at the neighborhood level and for individual characteristics. Multilevel analyses also allow the investigator to consider the possibility that urban living has a different effect on individuals in different urban communities by introducing random slopes that allow for varying strengths of the associations between urban characteristics and health. For example, multilevel analyses may show that the salutary effect of green space is different in different areas of a particular city.[24,25] Therefore, multilevel methods allow for the analysis of how characteristics of urban living may affect health and how these associations may differ in different urban communities, taking into account factors at other levels that may be important determinants of health. If applied to inter-urban datasets, multilevel methods can assess the role of city-level variables as well as of variables at different levels within cities. These methods hold much promise in urban health research.

CONSIDERATIONS IN THE USE OF QUANTITATIVE METHODS TO STUDY URBAN HEALTH

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

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

While cross-sectional investigations can document associations between characteristics of urban living and health, they cannot provide information about the temporal relations between characteristics of urban areas and the onset of disease, an essential step in causal inference. For example, a cross-sectional multilevel study can establish that living in urban neighborhoods characterized by a deteriorating built environment is associated with greater sexual risk behavior[26] but cannot confirm that the urban built environment causes riskier behavior. It is equally plausible that persons who engage in risky sexual behavior migrate to neighborhoods where deteriorating buildings are the norm (and are potentially cheaper to live in). Longitudinal studies (or well-designed case-control studies that mimic longitudinal studies through careful control selection) are needed to advance thinking about how urban characteristics may cause different health behaviors and outcomes and ultimately to suggest which urban characteristics can fruitfully be subject to intervention. New research suggests that longitudinal research that takes into consideration life course perspectives, that is, how exposures in one's early life may affect subsequent health,[27] may have a particular contribution to make in considering the role of urban living in shaping population health.

More challenging—but potentially even more useful—experimental studies that manipulate characteristics of the urban environment can help establish how features of the urban environment may affect health. Although experimental studies in urban health are uncommon, a few have shown promising results. For example, in a natural experiment in Chicago, specific housing projects were landscaped while others were not, and investigators were able to show that persons living in the upgraded housing projects had improved functioning, fewer episodes of interpersonal violence, and better concentration than persons in the control group.[28] Such studies can convincingly demonstrate the role that particular aspects of the urban environment play in shaping health and, perhaps more important, identify avenues for intervention.

Limitations regarding sample size and the statistical power available for multilevel or inter-urban analyses are an important consideration in selecting a study design. The size of the analytic sample at both the individual level and the group level becomes a relevant concern for multilevel designs. Power calculations for multilevel analyses remain limited, but it is clear that in comparisons of the role of group-level variables, sufficient numbers of groups must be included for a particular study, requiring larger study samples and more complex study designs.[29]

Issues of variable specification. Quantitative analyses frequently rest on the reduction of constructs of interest to simple variables that can then be analyzed using some of the methods discussed here. Although such reduction is appropriate in all quantitative analyses, it may be particularly important in urban health studies, where variables need to be specified to represent complicated constructs often with varying meaning in different contexts. *Urban*, a term that is referred to throughout this chapter as a potential variable of interest, is nonetheless challenging to define, and definitions vary between countries and between studies,[30] limiting interstudy comparisons and generalizations. Clear and reproducible definitions of *urban* may facilitate such comparisons.

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

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

fication across levels need to have larger sample sizes than conventional studies aimed strictly at detecting associations.

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

Qualitative Methods

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

In the following paragraphs, we describe four commonly used methods for gathering qualitative data: participant observation, in-depth interviews, focus groups, and document review. There are other methods that may be of use in studying questions of interest to urban health, but as with quantitative methods, a comprehensive review is beyond the scope of this chapter and we refer interested readers elsewhere.[32–36] Following our description of specific data collection methods, we briefly discuss ethnographic and case study approaches as well as sampling considerations in the application of qualitative methods to understanding urban environments and health.

GATHERING DATA

Participant observation involves systematic observation of a phenomenon of interest while engaging as a participant in that setting. Participant observation offers opportunities for the researcher to develop an in-depth understanding of a particular social context through his or her experience as an actor within that context. Some of the classic studies of urban life were developed using participant observation, including Stack's[37] *All Our Kin* and Whyte's[38] *Street Corner Society*. A more recent example of participant observation in an urban community is Hartigan's[39] study of negotiations of whiteness within the context of three Detroit neighborhoods. This study highlights the unstable, contingent, and constantly negotiated nature of whiteness within the context of a city whose political structure and demographic composition are predominantly African American. Participant observation has also been used to understand strategies employed by health movement activists as well as the strategies of corporate health actors within urban contexts.[40,41] This application is particularly useful for examining dynamic processes and contexts and for gaining insights into the ways that individuals or collective actors negotiate those dynamics.

In-depth interviews are designed to elicit—in the respondents' own words—information about their experience, interpretations, understandings, and reactions to a particular phenomenon. Unlike quantitative interviews, which generally offer respondents a set of predetermined response categories from which to choose, qualitative interviews are generally open-ended and invite respondents to discuss the topic of interest in their own words. The structure of in-depth interviews ranges from a set of predetermined questions presented in a predetermined order to a set of topics to be covered in no particular order within the span of the interview. Similarly, in-depth interviews can be analyzed by methods that range from the application of predetermined categories to more inductive approaches in which the goal is to identify constructs and their relationships based on their presentation in the interviews.[33,35,36]

Within urban contexts, in-depth interviews can be used productively to elicit residents' understandings of their environments and perceptions of the ways that those environments influence residents' health.[42,43] Correspondingly, they can be used productively with urban residents, health providers, and key decision makers to develop mechanisms to improve social contexts and address health issues within urban environments.[42,44,45] Sampling decisions should be shaped by the question of interest and may range from random sampling to specific selection of key informants (e.g., decision makers, long time neighborhood residents).

Focus groups generally include between six and 12 people who are brought together to discuss in detail a topic or process of interest. Focus groups are often used when the topic is not highly sensitive and when a goal is to enable participants to interact with one another around the topic. Focus-group interviews often rely on interactions among group members on a topic provided by the researcher (who may take the role of facilitator). Participants discuss ideas, issues, insights, and experiences among themselves, commenting, criticizing, or elaborating on the views expressed by previous speakers.[34] As with in-depth interviews, focus groups

can be relatively structured or unstructured: A facilitator knowledgeable about the topic of interest, skilled in group facilitation, and able to develop rapport with the focus group participants is essential. Analysis of focus-group interviews may proceed using a deductive approach with predetermined categories or with an inductive approach that seeks to develop themes and categories out of the focus group material itself. For example, in a study examining aspects of the community that influence physical activity, Kieffer and colleagues[42] identified themes inductively based on focus-group interviews with women residing in urban communities.

Document review involves systematic analysis of themes in documents relevant to the phenomenon of interest. Maantay[45] used document review combined with in-depth interviews with key informants to understand zoning decisions and their implications for land use in New York City. For a study like Maantay's, minutes from public hearings or meetings in which zoning regulations were discussed can provide important insights into the perspectives of residents and officials who make decisions on these regulations. Documents can also reveal areas of conflict, involving, for example, the siting of incinerators in urban areas or the placement of trucking routes or bus stations. Additional insights may be obtained from newspaper articles and newsletters of local groups that mobilize around a particular issue.

CONSIDERATIONS IN THE USE OF QUALITATIVE METHODS TO STUDY URBAN HEALTH

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

Sampling. A wide range of sampling strategies may be employed when using qualitative methods. Snowball sampling methods, for example, are particularly useful in identifying rare cases or identifying people who may be willing to participate because they are referred by a known and trusted member of their social network. Grounded-theory methods of qualitative analysis emphasize the use of theoretical sampling, developed iteratively through the analytic process, to generate and flesh out the emergent theory developed through this process.[36]

The choice of sampling strategy depends on whether the units of analysis are individuals, organizations, or communities; the key is to identify the relevant conceptual categories to vary across cases. For example, if the primary research questions involve how individual socioeconomic conditions shape health within the context of an urban environment, one might hold the environment itself constant (e.g., focus within a geographically defined urban area) and conduct observations, focus groups, or in-depth interviews with individuals sampled to reflect varying socioeconomic strata. In contrast, if the main study questions are focused on contextual effects, one might sample communities based on variations in socio-

economic status or racial composition and compare across those community contexts. Pardo,[46] in her study of women's movements to address environmental health threats, compared groups in East Los Angeles, a racially segregated community with limited economic resources, with those in a neighboring middle-class, ethnically diverse suburban area to identify similarities and differences in environmental health challenges and mobilization strategies.

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

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

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

Case studies can also be undertaken across multiple contexts, in an effort to compare social phenomena as they unfold under differing social conditions. Such efforts can be useful to develop a more complete understanding of the ways that social phenomena may be influenced by a variety of contextual factors, such as

historical relationships between racial or ethnic groups within an urban area or the history of economic patterns in an area. Such approaches may combine a variety of data-collection methods or may focus on use of a single data-collection method. In a recent study of race and class in urban contexts, Fine and Weiss[49] relied predominantly on focus-group interviews to examine the experiences of young, poor, and working-class men and women in Buffalo, New York, and Jersey City, New Jersey. Their comparisons across racial and ethnic groups, gender, and urban contexts provide a nuanced analysis of young adults' experience of the urban communities in which they live.

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

Conclusion

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

Second, the choice of an appropriate urban health framework may dictate, at least implicitly, both the choice of question asked and of methods used in addressing the question. For example, a comprehensive framework that includes national-level policies that shape municipal financing may suggest that inquiry into and intervention with national policies may be of primary importance to urban health. In contrast, a framework that considers primarily physical characteristics of cities

will focus questions on how features of the built environment at the local level can affect resident health. Relatively little has been written about the processes through which urban living may affect health; efforts such as this book may better guide our thinking about cities and health in the future.

Third, the application of any individual method to the study of urban health is likely to be insufficient in providing a clear answer about how urban characteristics shape health. In a study of deaths related to the 1995 heat wave in Chicago, Klinenberg[50] analyzed patterns of mortality by race and neighborhood, reviewed public documents such as autopsies and service records of municipal agencies, analyzed newspaper coverage of the heat wave, and interviewed public officials, survivors, and family members of heat-wave victims. Each of these methods offered unique insights into how and why Chicago experienced more than 800 deaths in the heat wave and suggested avenues for neighborhood-level and policy interventions.

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

References

1. Freudenberg N, Silver D, Carmona JM, Kass D, Lancaster B, Speers M. Health promotion in the city: A structured review of the literature on interventions to prevent heart disease, substance abuse, violence, and HIV infection in U.S. metropolitan areas, 1980–1995. *J Urban Health.* 2000; 77:443–57.
2. Yusuf S, Reddy S, Ounpuu S, Anand S. Global burden of cardiovascular diseases. Part 1: General considerations, the epidemiologic transition, risk factors, and impact of urbanization. *Circulation.* 2001; 104:2746–53.
3. Peters J. Urbanism and health in industrialized Asia. In Schell LM, Ulijaszek SJ, eds., *Urbanism, health, and human biology in industrialised countries.* Cambridge: Cambridge University Press; 1999.
4. Kawachi I. Social capital and community effects on population and individual health. *Ann N Y Acad Sci.*1999; 896:120–30.
5. Acevedo-Garcia D, Lochner KA, Osypuk TL, Subramanian SV. Future directions in residential segregation and health research: A multilevel approach. *Am J Public Health.* 2003; 93:215–21.
6. Northridge ME, Sclar ED, Biswas P. Sorting out the connections between the built environment and health: A conceptual framework for navigating pathways and planning healthy cities. *J Urban Health.* 2003; 80:556–68.
7. Galea S, Freudenberg N, Vlahov D. Cities and population health. *Soc Sci Med.* 2005; 60:1017–33.

8. Grossman M. Health benefits of increases in alcohol and cigarette taxes. *Br J Addiction.* 1989; 84:1193–204.
9. Galea S, Vlahov D. Urban health: Evidence, challenges, and directions. *Annu Rev Public Health.* 2005; 26:341–65.
10. Lee L. The current state of public health in China. *Annu Rev Public Health.* 2004; 25:327–39.
11. Mohan B, Kumar N, Aslam N, et al. Prevalence of sustained hypertension and obesity in urban and rural school going children in Ludhiana. *Indian Heart J.* 2004; 56:310–14.
12. Rodwin VG, Gusmano MK. The World Cities Project: Rationale, organization, and design for comparison of megacity health systems. *J Urban Health.* 2002; 79:445–63.
13. Sampson RJ, Raudenbush SW, Earls F. Neighborhoods and violent crime: A multilevel study of collective efficacy. *Science.* 1997; 277:918–24.
14. Bruce ML, Smith W, Miranda J, Hoagwood K, Wells KB. Community-based interventions. *Ment Health Serv Res.* 2002; 4:205–14.
15. Pantoja E. *Exploring the concept of social capital and its relevance for community-based development: The case of coal mining areas in Orissa, India.* Social Capital Working Paper series. World Bank; 1999. www.worldbank.org/poverty/scapital/wkrppr/sciwp18.pdf.
16. Sharpe PA, Granner ML, Hutto B, Ainsworth BE. Association of environmental factors to meeting physical activity recommendations in two South Carolina counties. *Am J Health Promot.* 2004; 18:251–57.
17. De Bourdeaudhuij I, Sallis JF, Saelens BE. Environmental correlates of physical activity in a sample of Belgian adults. *Am J Health Promot.* 2003; 18:83–92.
18. Bond KC, Valente TW, Kendall C. Social network influences on reproductive health behaviors in urban northern Thailand. *Soc Sci Med.* 1999; 49:1599–614.
19. Lynch JW, Kaplan GA, Pamuk ER, et al. Income inequality and mortality in metropolitan areas of the United States. *Am J Public Health.* 1998; 88:1074–80.
20. Lynch J, Smith GD, Harper S, et al. Is income inequality a determinant of population health? Part 1: A systematic review. *Milbank Q.* 2004; 82:5–99.
21. Paykel ES, Abbott R, Jenkins R, Brugha TS, Meltzer H. Urban-rural mental health differences in Great Britain: Findings from the National Morbidity Survey. *Psychol Med.* 2000; 30:269–80.
22. Kessler RC, McGonagle KA, Zhao S, et al. Lifetime and 12-month prevalence of DSM-III-R psychiatric disorders in the United States. *Arch Gen Psychiatry.* 1994; 51:8–19.
23. Diez-Roux AV. Investigating neighborhood and area effects on health. *Am J Public Health.* 2001; 91:1783–89.
24. Takano T, Nakamura K, Watanabe M. Urban residential environments and senior citizens' longevity in mega-city areas: The importance of walkable greenspaces. *J Epidemiol Community Health.* 2002; 56:913–18.
25. Tanaka A, Takano T, Nakamura K, Takeuchi S. 1996. Health levels influenced by urban residential conditions in a megacity-Tokyo. *Urban Stud.* 1996; 33:879–94.
26. Cohen D, Spear S, Scribner R, Kissinger P, Mason K, Wildgen J. "Broken windows" and the risk of gonorrhea. *Am J Public Health.* 2000; 90:230–36.
27. Lawlor DA, Davey Smith G, Ebrahim S. Life course influences on insulin resistance: Findings from the British Women's Heart and Health Study. *Diabetes Care.* 2003; 26:97–103.

28. Kuo F. Why urban health research matters: A view from inner-city Chicago. Second International Conference on Urban Health, New York City; October 15–18, 2003.
29. Hoover DR. Power for T-test comparisons of unbalanced cluster exposure studies. *J Urban Health*. 2002; 79:278–94.
30. Vlahov D, Galea S. Urbanization, urbanicity, and health. *J Urban Health*. 2002; 79: S1–12.
31. Sampson RJ. The neighborhood context of well-being. *Perspect Biol Med*. 2003; 46: S53–64.
32. Emerson RM. *Contemporary field research*. Prospect Heights, IL: Waveland Press; 1988.
33. Lofland J, Lofland L. *Analyzing social settings*. 3rd ed. Belmont, CA: Wadsworth; 1995.
34. Krueger RA. *Focus groups*. Thousand Oaks, CA: Sage; 1994.
35. Patton MQ. *Qualitative research and evaluation methods*. Newbury Park, CA: Sage; 2001.
36. Strauss A, Corbin J. *Basics of qualitative research*. Newbury Park, CA: Sage; 1990.
37. Stack C. *All our kin: Strategies for survival in a black community*. New York: Harper and Row; 1977.
38. Whyte WF. *Street Corner society: The social structure of an Italian slum*. Chicago: University of Chicago Press; 1943.
39. Hartigan Jr J. *Racial situations: Class predicaments of whiteness in Detroit*. Princeton, NJ: Princeton University Press; 1999.
40. Morgen, S. "It's the whole power of the city against us": The development of political consciousness in a women's health care coalition. In Bookman A, Morgen S, eds., *Women and the politics of empowerment*. Philadelphia: Temple University Press; 1988.
41. Morgen S. *Into our own hands: The women's health movement in the United States, 1969–1990*. New Brunswick, NJ: Rutgers University Press; 2002.
42. Kieffer E, Willis S, Arellano N, Guzman R. Perspectives of pregnant and postpartum Latino women on diabetes, physical activity, and health. *Health Ed Behav*. 2002; 29:542–56.
43. Schulz AJ, Lempert LB. Being part of the world: Detroit women's perceptions of health and the social environment. *J Contemporary Ethnography*. 2004; 33: 437–65.
44. Bayer R., Oppenheimer G. *AIDS doctors: Voices from the epidemic*. Oxford: Oxford University Press; 2000.
45. Maantay J. Zoning, equity, and public health. *Am J Public Health*. 2001; 91:1033–41.
46. Pardo MS. *Mexican American women as activists: Identity and resistance in two Los Angeles communities*. Philadelphia: Temple University Press; 1998.
47. Yin RK. Designing single- and multiple-case studies. In *Case study research: Design and methods*. Newbury Park, CA: Sage; 1989.
48. Mullings L, Wali A. *Stress and resilience: The social context of reproduction in Central Harlem*. New York: Plenum/Kluwer; 2001.
49. Fine M, Weiss L. *The unknown city: The lives of poor and working class young adults*. Boston: Beacon Press; 1998.
50. Klinenberg E. *Heat wave: A social autopsy of disaster in Chicago*. Chicago: University of Chicago Press; 2002.