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Interactions between public health and urban design

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Interest in the links between urban design and public health has exploded in recent years (e.g. Jackson 2003; Corburn 2004; Srinivasan *et al.* 2003). In this chapter, we review the historical interaction between public health and urban design and we summarize insights from the past decade's burst of research that seeks to build bridges between the two fields. We note that public health has typically conceptualized the urban design field in limited ways. We call for urban designers to take an active role in moving toward a more holistic view of what urban design is and can offer to the study and practice of public health, and we close with some observations on how a more sophisticated and robust urban design–public health link can be built.

There are two ways in which public health's interaction with urban design has been limited. First, we differentiate between urban design and the built environment. Urban design reflects human agency in managing, organizing, and ordering the physical environment with specific human purposes, while the built environment tends to be more of a descriptive framework of built form elements and their relationships. Urban design is the process

and activity that leads to deliberate change in the built environment; the built environment is the outcome of human intervention. Public health research and practice has largely been directed toward the built environment, with comparatively little attention to the process of how the built environment is produced and how urban design and the built environment interact in an iterative process. While this focus on the built environment (the outcome of urban design) has not been exclusive, it is strong enough to reduce the focus of public health's attention to a relatively static view of the existing built form, abstracting from process and human agency and hence from urban design's long tradition of inquiry into the goals and methods for city building.

Second, we note that urban design has both an aesthetic and a functional tradition, and those two influences and goals have been evident, in varying degrees, throughout the modern history of the field. Public health, though, has allied more easily with the functional view of urban design, and so highlights part but not all of the urban design endeavor. We develop this idea further by reference to some history.

The birth of urban planning and the interaction of urban design and public health

In the late 1800s, both the planning and public health professions were concerned with the perceived (and very real) pathologies of urban dwelling in industrializing economies. Cities were viewed as congested, unsanitary breeding grounds for disease, filth, and (reflecting attitudes of the time) social decay. Epidemics of contagious illness were common, and were typically viewed as spreading out of slum neighborhoods and threatening the whole city. As a response, the sanitary movement of the post Civil War period in the US focused on cleaning cities, developing water and sewer infrastructure, and deconcentrating city populations by encouraging the development of lower density settlements (Peterson 1983; Sloane 2006). The task was to use infrastructure – primarily common sewer systems – and (to a lesser extent) land development to combat urban contagions (Corburn 2007; Peterson 1983).

This functional view was soon supplanted for a brief period by the City Beautiful movement. The City Beautiful movement elevated the role of aesthetics, reflecting the grand traditions of city building on a broader scale. Daniel Burnham's Chicago Plan of 1909 epitomized the peak of the aesthetic tradition reflected in the City Beautiful movement (Legates and Stout 1998), and also was one of the markers for the birth of planning as a field in the United States (Hall 1989). Sloane (2006, 12) cites Peter Hall's (1988) assessment of Burnham's Chicago plan, saying that in the plan beauty "clearly stood supreme," with health "almost nowhere."

In short order, the young field of urban planning had been influenced by both a modernist view of city building that was grounded in the use of scientific and technological advances intended to solve urban

ills and a grand city-building strategy that reflected the long-standing tendency to link urban design to inspirational and even utopian visions of the city (e.g. Legates and Stout 1998). Those two viewpoints – the aspirational and aesthetically-focused "City Beautiful" and the narrower and instrumental "City Functional" (Hall 1989) – have long been evident in urban design thinking and practice. Public health, with its basis in scientific measurement and problem solving, allied more easily with the "City Functional." The issue was not so much that public health and planning were joined only in the early sanitary movement, but that the functional approach to urban design provided a more ready link for the public health community throughout the twentieth century. As a later example of links between public health and urban design, in 1948 the American Public Health Association's Committee on the Hygiene of Housing used the neighborhood unit as the basis for healthy neighborhoods (Corburn 2007), a focus with roots in the ideas of Clarence Perry (e.g. Banerjee and Baer 1984; Lawhon 2009).

In sum, public health's focus has been one of measurement of the built environment, linking more easily to the outcome of urban design than to the design process itself and incorporating a bias toward a functional rather than a more holistic view of city building. In the extreme, the built environment in this view is not the whole of a neighborhood or the context for communal interaction and inspiration, but instead a set of characteristics to be narrowly measured and manipulated toward specific health goals. A discussion of recent public health – urban design research illustrates these biases, starting with research on physical activity, which is possibly the most narrowly functional of the current body of public health research that incorporates concepts from urban design.

The modalities of urban design and health research

Physical activity

Research on physical activity and the built environment was almost nonexistent ten years ago. Since then, special issues on the topic have appeared in the *American Journal of Preventive Medicine* (2002), the *American Journal of Public Health* (2003), the *American Journal of Health Promotion* (2003), and the *Journal of the American Planning Association* (2006), among others. The major scholarly conference for planners in the United States added a “planning and human health” track in 2004, and popular ranking schemes for planning departments include “planning and health” or similar categories. In 2007 there were over 200 articles published on the topic “Built Environment and Policy – Physical Activity” (Active Living Research web site 2009).

This body of research is grounded in two motivating literatures. Public health scholars had for years focused on behavioral change, encouraging persons to lead less sedentary (more physically active) lives. The health benefits of physical activity had been well established by the late 1990s (e.g. US Department of Health and Human Services 1996; Paffenbarger *et al.* 1986; Leon *et al.* 1987; Ekelund *et al.* 1988; Blair *et al.* 1989; Morris *et al.* 1990; Sandvik *et al.* 1993). Yet behavioral change alone had proven insufficient to increase physical activity rates, and by the late 1990s, public health scholars were turning their attention to the built environment (Owen *et al.* 2004). Some of the popular reports from that time hinted at a certain naïve environmental determinism, suggesting in the extreme that environmental changes through urban design would be the fix for an increasingly sedentary society. The scholarship, especially as the research moved forward, adopted a more nuanced tone, viewing the built environment as the context within

which behavior occurs, such that design interventions in the built environment might facilitate or hinder individual physical activity (e.g. Transportation Research Board/Institute of Medicine 2005). A second motivating literature, research on travel behavior, had moved to aggressively pursue individual level data on travel, paired with data from geographic information systems (GIS). These data innovations allowed detailed analyses that avoided ecological fallacies inherent in the use of aggregated data. (Previous examples of research on individual travel and urban design existed, but were more episodic and constituted precursors to the large explosion in such studies that occurred in the 1990s. For early work, see, e.g. Hanson and Hanson 1981; Vickerman 1972; and Kain and Fauth 1977).

After an initial period of somewhat separate research, the public health field added a greater focus on objective (as opposed to self-reported) measurement of walking and physical activity to the transportation data sources, which were typically travel surveys at that time, and planners brought enhanced methods to measure the built environment using GIS, which was less familiar to public health researchers (Boarnet 2004). After roughly a decade of research, the following conclusions can be drawn.

There is a clear association between built environment elements and walking (e.g. Frank 2000, Greenwald and Boarnet 2002; Handy *et al.* 1998; Handy *et al.* 2006; Rodriguez *et al.* 2006; Krizek and Johnson 2006; Boarnet *et al.* 2005; Boarnet *et al.* 2008; Ewing *et al.* 2003; Doyle *et al.* 2006), and public health researchers and policy makers have energetically embraced planning’s condemnation of sprawl (Frumkin 2002). Inferring causality is more difficult, largely because of a lingering debate about whether persons who are predisposed to walk choose to live in walking oriented neighborhoods, or whether built environment elements directly influence walking

propensity and the amount of walking. Recent studies, which focus more broadly on all travel behavior, suggest that it is some of both, but that the presence of built environment elements does exert some independent effect on travel behavior (Mokhtarian and Cao 2008).

Urban design in this literature is relatively absent. There is an implicit assumption that identifying built environment elements related to walking will then result in urban design interventions that support these research conclusions. Hence, to clarify urban design as the process and the built environment as the outcome, the public health focus has been on the built environment. Much of this research focuses explicitly on developing quantified measurements, or audit instruments, of built environment characteristics (e.g. Boarnet *et al.* 2006; Clifton *et al.* 2007; Cunningham *et al.* 2005; Day *et al.* 2006; Ewing *et al.* 2006; Hoehner *et al.* 2005; Hoehner *et al.* 2007; Lee and Moudon 2006; Saelens *et al.* 2006; Williams *et al.* 2005). The built environment is something to be measured, possibly on a block-by-block scale, dissected into its elements, and manipulated for purposes of human health.

The sanitary engineers of the late 1800s would find clear kinship in this viewpoint. An exceptionally ambitious sanitary survey in Memphis in 1879–1980 included an exhaustive house-by-house assessment of living conditions that filled 96 folio volumes (Peterson 1983: 25). That effort was motivated by a yellow fever epidemic that killed approximately one in ten residents of the city (Peterson 1983: 25). Today, urban design audit instruments (e.g. Clifton *et al.* 2007; Day *et al.* 2006) are similarly exhaustive, block-by-block inventories often used in areas with the highest obesity levels.

There is little if any room for concepts of aesthetics, inspiration, or grand city-building in the public health approach to physical activity and the built environment. The focus on measurement is due in

part to the strong influence of social scientific, quantitative, and (in the form of transportation researchers) engineering traditions that are at the heart of much of the existing research on physical activity and urban design. The challenge, which urban designers are well positioned to address, is that the existing physical activity – urban design discussion and synergy must be broadened to include not just the built environment, but the human agency that creates that built environment, and to make room for urban design not simply as a functional practice in the service of health outcomes (important though that may be), but also as an inspirational endeavor that includes the grander traditions of city building. Some clues as to a more holistic view can be gleaned from reviewing the interaction between health and urban design in other contexts.

Accessibility and disability – regulating urban design for access

Access to health and social services is a fundamental concept for research on health disparities, inequities, and social determinants of health. Research since the 1990s has tended to focus on existing social conditions (socio-economic status, lack of available services), institutional settings, individual behavior, and logistical challenges (such as lack of transportation), arguing that low service use can be traced to particular combinations of these characteristics or factors for distinct populations (Crane and Takahashi 2008). Yet, in conceptualizing service use and access, little mention is made of specific built environment elements.

Despite the dearth of either public health or urban design research, one direct link between health and urban design has been forged by the disability rights movement (Johnson 1999). The Americans with Disabilities Act of 1990 (or ADA, most recently amended in 2008) highlights various

obstacles to mobility, employment, housing, and civic engagement. This federal legislation explicitly identifies “architectural” barriers as a form of discrimination that excludes persons with disabilities from employment, housing, and services that able bodied individuals enjoy (Americans with Disabilities Act of 1990). Disability in the ADA is defined as having any mental or physical impairment that reduces people’s abilities to care for themselves, and interferes with basic functioning (e.g. walking, eating, hearing, etc.). Examples of research that highlights legal implications of ADA for urban design include Mazumdar and Geis (2001; 2002).

Today ADA requires public agencies and private businesses to accommodate persons with disabilities in the use of public transportation (e.g. wheelchair accessibility on buses), and access to hotel rooms, restaurants, movie theaters, grocery stores, schools, and museums, in ways that are integrative (meaning that the accommodation should not be separate or different from other existing services or facilities). Specifically, the Act considers the lack of accommodation a form of discrimination (see ADA 1990: 11). Though implementation of the ADA has created more accessible built environments for persons with disabilities, the National Council on Disability (2004) indicated that physical obstacles still remain in many places.

Health disparities at the neighborhood level

As in the physical activity literature, public health researchers studying broad health issues such as health disparities (or concentrations of illness/morbidity or death/mortality in specific racial/ethnic, age, gender, or other social groups or medically underserved places) or the social-environmental factors that influence or cause illness or death (e.g. social determinants of health

and disease) have increasingly seen the role of the built environment as an important factor needing clarification. In some ways, this body of research remains tied to the creation and testing of built environment inventories (as with the physical activity literature), but in other ways, public health researchers have begun to view the built environment as representative of more complex dynamics, that is, reflective of human action, but also constraining and enabling human agency (Corburn 2004; also see for example the *Journal of Urban Health* and the *International Society for Urban Health* – <http://www.isuh.org/>).

Robert Sampson and his colleagues have been especially influential in exploring local neighborhood attributes and health outcomes, albeit drawing from Chicago School of Human Ecology and social capital debates rather than urban design approaches per se (Sampson *et al.* 2002; Sampson *et al.* 1997). From a public health perspective, the focus on neighborhoods is a departure from the typical public health approach, which has tended to emphasize large population studies (to establish epidemiological trends), with neighborhood level analyses focusing instead on local factors affecting individual behavior (rather than socio-demographic, attitudinal, or knowledge factors alone). What this literature has highlighted is the important role of community-level factors, including the built environment, in creating and reinforcing structural, institutional, community, and individual barriers to health care and resources (leading to disadvantage and inequality), and how such factors might best be measured and assessed (Sampson *et al.* 2005). Of particular concern is the structural differentiation that leads to or causes health inequalities and inequities. Though sociological measures of neighborhood, such as residential stability and racial segregation, tend to predominate, the role of the built

environment remains relatively unclear. Relatively few health researchers have assessed the role of the built environment and urban design on health behaviors (an exception is Grusky and Swanson 2004).

Housing and asthma

Public health researchers have argued for over a decade that low quality housing, especially the presence of mold, is associated with heightened risk and prevalence of asthma in children. Strachan (1988), for example, found that after controlling for housing tenure, household size, presence of smokers in the household, and cooking with gas appliances, the presence of mold made asthma three times more likely. Though housing design is more the purview of architecture than urban design, this body of research makes clear that there is a need for design and designers to understand how aging structures and poor materials directly influence health and well-being.

Heat islands and health

Poor quality housing and urbanization have led to illness and death for specific segments that are likely to become worse with the extreme weather patterns associated with climate change. Heat waves tend to have the highest impact in central cities because temperatures are higher and night cooling is lower than in less paved, and less built up areas (McMichael 2000). Such climate related impacts on health tend to be concentrated in less mobile (e.g. elderly persons) and lower-income populations. Public health and planning have begun to focus on such issues, but have not provided clear ways forward in terms of urban design interventions.

Searching for a synthesis

The gap between urban design and health is twofold: first, the difference between viewing the city as a set of functional instruments and seeing the city as an integrated whole with aspirational dimensions, and second, the difference between focusing on the built environment without attention to the process that produced that outcome versus examining both the design process and its outcome. Can these gaps be bridged? There are encouraging signs. Here we discuss two possible contributions of public health to urban design – one small, and one large.

In an instrumental, measurement-oriented way, the literature on physical activity has increased attention to sidewalk infrastructure, the street environment, parks and open spaces, and the physical elements of the non-motorized travel experience. Similarly, the research and practice on the ADA has raised the visibility of design treatments that increase accessibility for persons living with disabilities. Both efforts are important, and both have increased awareness of the critical importance of urban design as remediation. All in all, these design elements of urban living are important pieces of the whole, but can the field of public health do more than draw attention to the occasional overlooked design treatment? We suggest a possible path toward such a larger view.

Bridging the functional and the aesthetic/aspirational might begin with a shared focus on the neighborhood not as a collection of parts to be manipulated, but as a place for human living. The role of urban design as process and human agency must be restored – the built environment cannot be the whole of the focus. The recent attempts in the health disparities literature to examine neighborhoods in a more comprehensive way, to articulate the social determinants of health, and to link broadly to human health and society, are a

start as they focus on the structural obstacles to addressing inequity and inequality. There are also methodological necessities for bridging this divide. Upscaling the unit of analysis to a meso scale – neighborhoods large enough to capture the lived-in built environment, but somewhat smaller than cities or metropolitan areas – is one possibility. This meso scale is still typically under-researched in the physical activity literature, though is being considered in research on heat islands. Physical activity researchers, drawing on their link to transportation planning, might broaden their focus beyond the block-level streetscape and aggregations thereof, to neighborhoods large enough to be centers of activity, living, shopping, and working, and shift the focus from dissected elements to these spaces of activity. Major metropolitan areas are pursuing growth visioning plans that seek to focus infill development in urban nodes. Examples, often called “blueprint planning”, include the Sacramento Region Blueprint Plan (2009) and the Southern California Association of Governments (2009) COMPASS plan. Those plans inherently view neighborhoods as the lynchpin of metropolitan planning, yet theory and practice that can inform the details of urban neighborhood building lack specifics. Neighborhood building, both its functions and its aesthetics and aspirations, should be a vital core element of public health and urban design efforts.

The involvement of public health, if the focus is on the links between the built, natural, and social environment and impacts on human well being, can provide a framework for moving beyond seeing the city as a simple set of tools to be manipulated. Instead, public health can contribute to viewing cities as a place to live. Explicit links to modern blueprint planning efforts and more holistic concepts drawn from the New Urbanism and Smart Growth movements (which have

embraced both aspiration and function, and both urban design process and outcome) can help build a knowledge base that moves beyond a purely functional approach to urban design and health. Such links will require that the city and its neighborhoods become the center of analysis – a shift that would be large for the physical activity literature, but somewhat smaller for researchers examining neighborhood effects on health disparities, housing, and climate impacts on health. We suggest that both health and design researchers examine ways to reconceptualize built environment elements not as a variable set to be manipulated, but as the fabric of communities that are the central object of thought and practice. Having said that, the focus should not be strictly on the aesthetics of the city, but on the role of neighborhoods in human well being and aspiration. Such a focus can combine public health and urban design in ways that can be deeper and longer lasting than the episodic and, at times, limited alliances of those two fields in years past.

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