

Literature review for Readings and Research:

The built environment and public health

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Introduction: The built environment and public health

There is perhaps a bit of imagination required to initially see the connection between the “built environment” of sidewalks, streets, and buildings, and, public *health*. It is necessary that we begin to make these linkages, as research shows that many of our health outcomes are indeed a product of our environment. But, what *is* the “built environment?” Northridge et al. define this concept as “that part of the physical environment made by people for people, including buildings, transportation systems, and open spaces (2003, p.558). Any other element of the environment we see can then be considered the “natural” environment. Our space has been altered by the choices of planners, engineers, developers, and the like. Choices which have been made to alter physical space are not often done with a more general comprehension of how spaces fit together. Development which ignores the community as a whole often creates disjointed patterns of sidewalks, bike paths, absences of fresh food markets in certain radiuses (and heavy concentrations of them in other locations), neighborhood streets which are secluded by cul-de-sacs, a dearth of healthy and equitable housing stock – and the list goes on. The community is thus designed to promote the use of the automobile – even if just to get to the supermarket around the corner.

A framework for understanding variations between the individual and natural environment

Before we are to consider the implications of the “built environment,” we should first take a look at the variations of levels of society and health. In review of a model of social determinants of health as written by Schultz and Northridge, there are at least four

levels for consideration: fundamental (macro), intermediate (meso/community), proximate (micro/interpersonal), and health and well-being (individual level or population level) (Northridge et al., 2003). The macro level includes the natural environment, macro social factors such as history, political culture, laws and policies, and social and cultural institutions, and inequalities, which are mediated by those macrosocial factors. Down a stage, within the meso/community level, exists the built environment, and the social context (including education quality, community capacity, and civic participation). On the interpersonal level, are stressors created by the environment, neighborhood, workplace, housing, crime levels, financial security, and environmental toxins. Additionally, on the interpersonal level, are health behaviors such as dietary practices, health screening activity, and physical exercise. Lastly, on the most basic level, concerning the health and well-being of the individual or population, are health outcomes and indicators of well-being, such as obesity, cardiovascular disease, diabetes, cancers, injuries, infectious disease, asthma, mental health, all-cause mortality, hope or despair, psychosocial distress, and disability (Northridge et al., 2003). When taking these varying levels into consideration, we can place into context how our environment and institutions can perhaps mediate our behaviors. A more classic “ecological” model, by Sallis and Owen, includes six categories: demographic and biological factors; psychological, cognitive, and emotional factors; behavioral attributes and skills; social and cultural factors; physical environment factors; and physical activity characteristics Frumkin, 2004). This ecological model has predicted that the categories of factors interact in various ways. *(An adaptation of these frameworks has been included in Appendix 1.)*

Reform movements designed to improve our built environments

The changing makeup of our human physical environment does represent a piece of our nation's modern social history which is worthy of thought. Within the transitional times of U.S. history, the growth of populations, new technologies, changes in economic structure, changing cultural norms, and more necessitated or promoted new configurations (Peterson, 1979). To serve as an example, within the late 1800s, the conversion of public transit systems to electricity expanded residential growth to areas where industry did not exist – meaning that the wealthy were able to afford a suburban estate, and the transportation services which would get them from town to country residences (NCDC, 2005).

Reforms of the construction of our nation's built environments were first aimed at the understanding of how to prevent infectious disease within urban areas. This first set of improvements, known then as sanitary reform, began just before the Civil War, and peaked after the conflict, in the 1880s (Peterson, 1979). Sanitary reform was based upon the “filth theory,” which blamed filth (“putrefactive odors arising from decomposing organic wastes”), stagnant water, saturated ground, the absence of sunlight, and vitiated air as prime causes of diseases such as yellow fever, Asiatic cholera, typhoid, typhus, scarlet fever, and diphtheria (Peterson, 1979). Local governments in our nation did little to control the development of private interests at the time – meaning that these private interests were responsible for the shape and form of urban environments: with buildings, new modes of transportation and communications, and new suburban limits. The patterns were uncoordinated, and thus, haphazard (Peterson, 1979). As sanitary reformers set out to discover improvements necessary to reduce the impacts of pestilence and disease, they

ultimately began the demand for systematic and large-scale reshaping of cities – they were predecessors to city planners (Peterson, 1979). The results of this reform movement were in the implementation of water-carriage sewer systems, sanitary survey planning, and a heightened sensitivity to the health consequences of the built environment.

One can see similarities between this movement, and the movement growing in the United States currently. This current movement is concerned particularly with “Smart Growth” principles. Public health officials and urban planners are now claiming that the phenomenon known as sprawl is somewhat responsible for many of our societal problems, including: obesity, traffic injuries, and environmental destruction (Geller, 2003). Sprawl can be understood as low-density suburban growth, with several dimensions – a widely dispersed population in low-density development; separate development of spaces such as homes, shops, and workplaces; networks of roads which are characterized with huge blocks and poor street access; sparse and ill-defined and utilized activity centers (as in downtown areas); few transportation choices; dependence of cars; difficulty of walking; and more (Geller, 2003). Public health professionals are now making connections between sprawl and sedentary lifestyles, traffic injuries, and air quality issues. The Smart Growth movement is gaining momentum with strong advocates within the Environmental Protection Agency, the Urban Land Institute, the Robert Wood Johnson Foundation, and many professionals nationwide with the capacity to shape our urban structure (Geller, 2003). The ten Smart Growth principles are as follows, to: create a range of housing opportunities and choices; create walkable neighborhoods, encourage community and stakeholder collaboration; foster distinctive, attractive communities with a strong sense of place; make development decisions

predictable, fair and cost effective; mix land uses; preserve open space, farmland, natural beauty and critical environmental areas; provide a variety of transportation choices; strengthen and direct development towards existing communities; and, finally, take advantage of compact building design (Smart Growth, 2009). These principles have been created primarily community planners for substantial consideration of the issues of quality of life, economics, the environment, transportation, housing, and design (Smart Growth, 2009).

Those behind the Smart Growth movement are not alone in their push for improved public health measures. The Centers for Disease Control has recognized that “healthy community design” can have positive health outcomes: increasing physical activity, reducing injury, increasing access to healthy food, improve air and water quality, decrease mental health stresses, strengthen the social fabric of a community, and provide fair access to livelihood, education, and resources (2010).

Dannenberg et al. (2003) have explored neighborhood factors and community level factors which may be relevant to health. Neighborhood-level examples may include front porches, sidewalks, traffic calming measures and green space; Community-level examples may include residential density, housing features, land use mix, quantity and quality of space, connectivity, and transportation systems. Other community-level characteristics of relevant variables related to public health may also include proximity of recreational facilities, street design, housing density, and the accommodations made for safe pedestrian, bicycle, and wheelchair use (Dannenberg et al., 2003).

Urban form, access to “active transportation” and the mediation of obesity levels

Research has shown that the urban form created by transportation planners and city engineers has a great deal to do with the connectivity of streets and the accessibility of walking to local businesses and community organizations. The choices created by planners influence the behavior of the individual. Safety, from car traffic beside an arterial highway, or the regularity of walking traffic are considered as factors in the decision to commute by foot or car (Miles, Panton, Jang, & Haymes, 2008). Net residential density and mixed use zoning also come into play: those that can walk to a grocery store or to church will perhaps be more likely to make the choice of walking (Frank, Andresen, & Schmid, 2004). Dannenberg et al. (2003) have written that data shows that the proximity of recreational facilities, street design, housing density, and accommodation for safe pedestrian, bicycle, and wheelchair use play a significant role in promoting or discouraging physical activity. As many studies have explored, there is a growing list of factors which are being evaluated to assess the impact of the built environment on physical activity and other “active” healthy behaviors. Active transportation, which incorporates any combination of options like walking, biking, or, mass transit, can increase the amount of daily exercise of individuals and lower the risk of obesity.

If our transportation infrastructure is increasingly planned for cars rather than pedestrians, the result is a car-dependent, sedentary population. Sedentary lifestyles have serious implications for serious consequences for individual health outcomes (Frumkin et al., 2004, p.90). It has been assumed that the time spent in a car is directly related to the likelihood of being obese (PolicyLink, 2009, p.24). Obesity rates and other chronic

disease indicators have reached epidemic proportions within the United States. The CDC judged that every year, 300,000 Americans die from conditions related to obesity (Moczulski, McMahan, Weiss, Beam, & Chandler, 2007). Substantial potential exists in the conceptualization of ‘healthy’ transportation design and urban design.

According to Librett et al (2003), the CDC has identified six specific domains of the built environment which relate to the cultivation of “Active Community Environments” (ACEs). These domains are: sidewalks, bicycle lanes, shared-use paths, greenways, recreational facilities (which include neighborhood, school, and community parks and connector trails), and work sites. ACEs are understood to be best created by creating communities with favorable conditions in regard to the proximity of community centers and businesses, street design, density of housing, public transit, and existence of pedestrian and bicycle facilities (Librett et al., 2003).

Community design and food environments

Healthy community design should also keep an eye on the food environments it fosters. Land use patterns sometimes create low-income neighborhoods with few grocery stores, plentiful convenience stores, and an array of fast-food restaurants (McCann, 2006). A 2005 study of metropolitan U.S. areas showed that the square footage within grocery stores in low-income zip codes is approximately half of the square footage in grocery stores within higher-income zip codes (Pothukuchi, 2005). Though somewhat limited, some research has shown that lower-income areas tend to host more fast food restaurants and convenience stores (Policy Link, 2004) – and, the foods offered here are often low-cost, high-calorie foods of limited nutritional value (Mikkelsen, 2004). Zoning changes

which would limit the number of fast-food restaurants, and initiatives which either encourage subsidization of grocery stores or the construction of community gardens have been recommended to improve the presence of healthy foods within low-income communities. In addition to the presence or absence of healthy food stores, it is important to consider that an insufficient transit network will limit accessibility to food outlets particularly among individuals who do not own a car. A high-quality public transit infrastructure can facilitate food access (McCann, 2006). Transit-Oriented Development (TOD) initiatives (as proposed by the Nashville MPO within the Northeast Corridor) have begun to show capability of increasing the number of healthy food outlets. In certain instances, local government and transit agencies have partnered with developers in order to create housing, shops, and offices which are near transit stations (McCann, 2006). Additional agencies to partner with transit and government professionals have included organizations which bring farmers' markets into TOD settings. City planners and government officials should be involved in learning the way the built environment affects dietary decisions, and applying this knowledge to design cities and neighborhoods which promote the access to healthy foods.

Health implications of unhealthy housing

Housing options also influence health outcomes in our communities. Saegert et al (2003) have evaluated dozens of interventions which were related to housing within the timeframe of 1990 to 2001. These interventions most commonly were one-time interventions created for the purpose of improving the environment; or changing behavior, attitudes, or knowledge; or a combination of the two. The heart of Saegert et al's work is

within the reasoning for why the housing interventions were necessary – poor housing can contribute to infectious disease transmission, injuries, symptoms of asthma, lead poisoning, and mental health problems – in ways that are direct (e.g. environmental hazards) and indirect (e.g, contributing to psychological stress).

Few of the interventions which Saegert et al. reviewed incorporated an ecological paradigm – which connects behavior, the physical and social environment, and health to individuals, households, buildings, and communities (2003, p.1475). The ecological approach of intervention creation is recommended by many contemporary researchers – as opposed to interventions which seek to improve a single health condition by changing environmental conditions or changing individual knowledge or behavior.

Social capital and the built environment

The level of social capital of a community is strongly affected by the design of the environment, also. Social capital in this case can refer to a person's network of relationships, trust in others, a shared emotional connection and feeling of membership among people within the community. How might social capital be increased or reduced by the man-made elements which encapsulate a community? “Activity-friendly” communities reduce social isolation by providing opportunities to leave the seclusion of the home in order to interact with other people in informal and formal ways (ICMA, 2003, p.5). Certain physical characteristics enhance this probability for social engagement: Close proximity of residential units (especially when facing another unit), living on a busy street, or having a residence directly connected to major pedestrian paths or meeting areas (Evans, 2003, p.544). Sprawl influences social capital by reducing the opportunity

for residents to engage in informal social interaction, restricts the time and energy people have for civic involvement, and segregates groups of ethnicities and incomes into separate and unequal neighborhoods (Frumkin et al., 2004, p.171-173). Research has shown that social capital prolongs life; and, that loneliness and isolation are toxic, and social relationships are health (Frumkin et al., 2004, p.166, p.29).

The amount of social capital perceived by an individual affects mental health, as do other factors pertinent to this study. Housing and neighborhood qualities have an inverse relationship with psychological distress in both adults and children (Evans, 2003, p.537-538). Moreover, people seem to feel better and have improved mental health when they perceive control related to their physical surroundings. Elements such as the presence of tall structures, absence of group meeting spaces, and poor visual surveillance capability influence feelings of territorial control and ownership – and, these elements also have been associated with both the fear of crime and higher levels of actual crime (Evans, 2003, p.544).

Vulnerable populations and the distribution of health outcomes resulting from design implications

According to Northridge et al. (2003), it is also important to consider the *distribution* of health determinants within and across social groups defined by age, gender, race and ethnicity, class, and sexuality (p.566). There is much literature which explores the effect of the built environment on the health impacts many vulnerable groups. For example, it is likely that low-income and minority children stand to benefit more than their peers from interventions directed at Safe Routes to School and other

interventions aimed at encouraging a safer built environment (by more connected sidewalks, traffic calming measures, reduced speed limits in areas of high pedestrian traffic, and more). In areas with high air pollution, asthma is highly prevalent among children especially – as children (particularly with low body weight) have narrower airways and breathe more rapidly than their adult counterparts (Frumkin et al, 2004). The ability to enjoy a healthy environment plays a large hand in the obesity epidemic which has “fallen heavily” upon children – more so among African American and Hispanic children than their peers. Overweight children are said to face an increased risk of diabetes, and hyperlipidemia, and perhaps sleep apnea, polycystic ovaries and orthopedic ailments – and are much more likely to become overweight adults (Frumkin et al., 2004). On the other end of the age spectrum, the elderly have a high need for having pedestrian-friendly and safe areas. A younger adult may not consider the implication of having a crosswalk timed for individuals who are brisk walkers (Frumkin et al., 2004, p.195). The International City/County Management Association suggests that promoting active aging relies on a community’s ability to provide safe and walkable streets, a range of transportation options, and land use patterns that permit easy access to services and amenities (2003). Independence among older adults is greatly influenced by being able to engage in “active living,” which can be defined as a way of life that integrates physical activity into daily routines” (ICMA, 2003). Older adults sometimes do not walk due to the distance between destinations, difficulty walking, poor sidewalks, a lack of places to rest, or a fear of crime. Therefore, “smart growth” for older adults would include improving and maintaining sidewalks, ensuring safe street crossings, including

streetscape amenities such as benches and resting places, signage which is legible, and appropriate lighting for all times of day (ICMA, 2003, p.11).

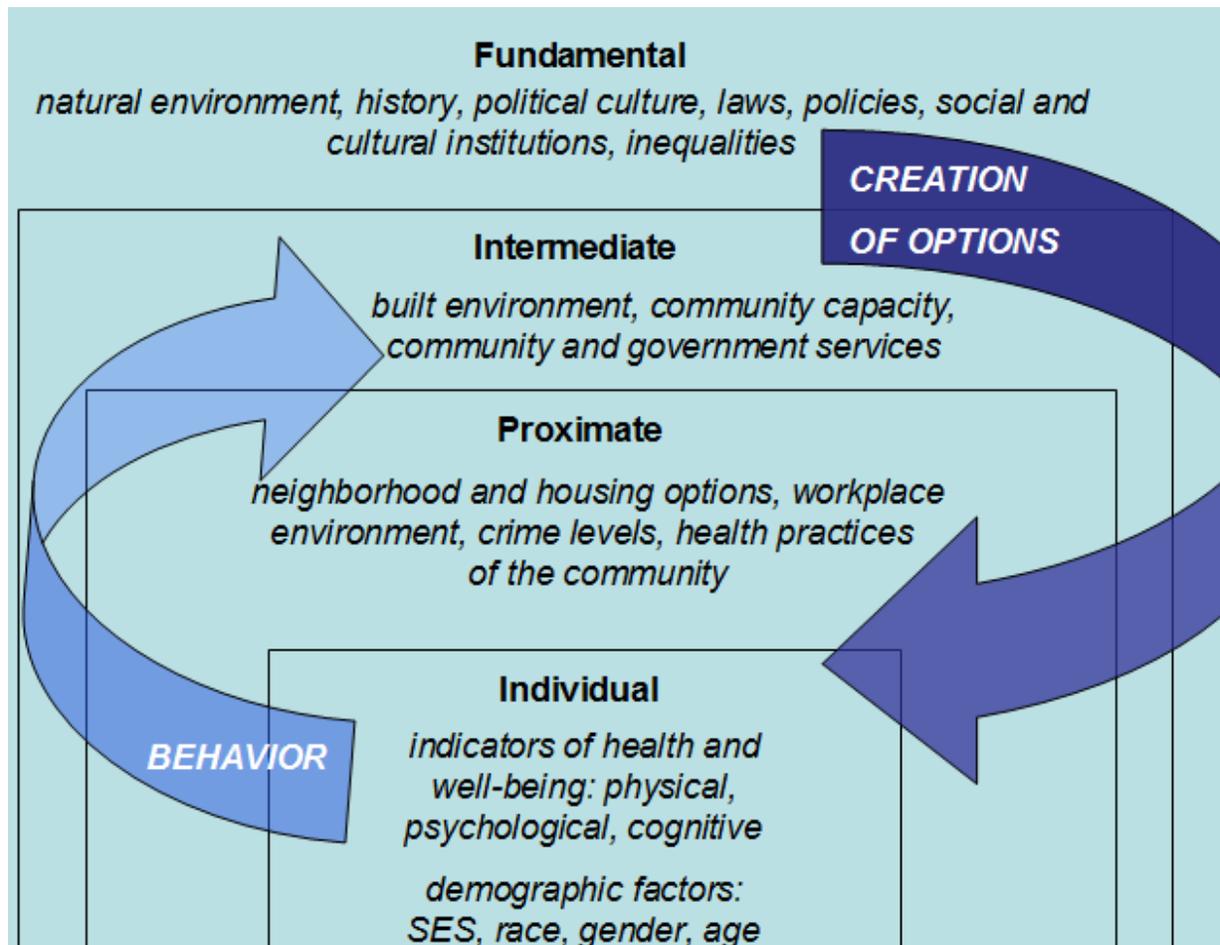
Health Impact Assessment as a means of policy intervention

A Health Impact Assessment (HIA) can be a useful tool for developers and planners, to be true to the genuine needs and concerns of the people living in an area – with consideration of the following question: “development for whom?” It has long been suggested that experts and academics alike should work “in partnership with low-income families as equal partners contributing different strengths to the comprehensive process of reshaping the city” (Jackson, 2008, p.233).

Government officials and planners must include community voice in the research which directs development. According to the Practice Standards for Health Impact Assessments from the North American HIA Practice Standards Working Group, there are five principles which one must keep in mind when considering development of a transitional nature. The first of these principles is democracy – that people have the right to participate in the creation and decisions which affect their lives – and the HIA must “involve and engage” the public as a result (WHO, 2011). Equity must also be a core value among developers and writers of HIAs. In paying equity its due, planners must give mind to how an array of health impacts will be distributed among different demographics, with specific focus on vulnerable groups. The HIA must take a “comprehensive approach to health,” with consideration to the influence that wider determinants of health have on the physical, mental, and social well-being of the residents of an area. The development of an area must be sustainable – and the HIA must

evaluate the short and long term impacts of development. Finally, methods used must be ethical in that research “should not set out to support or refute any proposal, and it should be rigorous and transparent” (North American HIA Practice Standards Working Group, 2009).

Appendix 1: Framework for understanding the individual within social and environmental context



This model has been adapted from categories adapted from that of Northridge et al. (2003); with the major revision of including the categories of behavior and the creation of options. I believe that action is a key component of the model which was missing. Without action, there is no change in environment and, without action, changes in the environment will have no influence on individual behavior.

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