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# Public Health and the Built Environment: Historical, Empirical, and Theoretical Foundations for an Expanded Role

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# Public Health and the Built Environment: Historical, Empirical, and Theoretical Foundations for an Expanded Role

Wendy C. Perdue, Lawrence O. Gostin,  
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In 2000, the Center for Disease Control and Prevention's National Center for Environmental Health issued a report that explored some of the ways in which "sprawl" impacts public health.<sup>1</sup> The report has generated great interest, and state health officials are beginning to discuss the relationship between land use and public health.<sup>2</sup> The CDC report has also produced a backlash. For example, the Southern California Building Industry Association labeled the report "a ludicrous sham" and argued that the CDC should stick to "fighting physical diseases, not defending political ones."<sup>3</sup>

In retrospect, it is probably unfortunate that this report was funded by an organization called "Sprawl Watch." "Sprawl" is a word that has no clear meaning<sup>4</sup> but is applied to a huge range of issues involving suburban development. It can encompass everything that anyone finds objectionable in suburbia: big box retail, "cookie-cutter" houses, banal commercial architecture, low density developments, auto dependency, single-use zoning, large lawns and cul-de-sacs, leap-frog development, and privatized public spaces.<sup>5</sup> The attack on "sprawl" has been interpreted by some as part of a broader cultural attack on middle class values, and it has generated its own cultural response. There is plenty of hyperbole on both sides. An example of the anti-sprawl rhetoric:

for the past fifty years, we Americans have been building a national landscape that is largely devoid of places worth caring about. Soulless subdivisions, residential "communities" utterly lacking in communal life; strip shopping centers, "big box" chain stores, and artificially festive malls

set within barren seas of parking; antiseptic office parks, ghost towns after 6 p.m.; and mile upon mile of clogged collector roads, the only fabric tying our disassociated lives together . . .<sup>6</sup>

The response:

The anti-sprawl campaign is about telling Americans how they should live and work, about sacrificing individuals' values to the values of their politically powerful betters. It is as coercive, moralistic, and nostalgic as anything Bill Bennett, Robert Bork, or Gary Bauer ever proposed. It is just a lot less honest.<sup>7</sup>

In this environment, it is understandable if the CDC looks to some as simply the latest partisan recruit to a political debate. But critics of the CDC's efforts in this area may substantially overstate their case in the other direction. There is now and has long been a demonstrated connection between health, including "physical disease," and the built environment. Moreover, government has intervened in the past in response to this connection and it continues to do so. While neither past practice nor current evidence make government intervention inevitable, this paper argues that such intervention is appropriate and supported by theory as well as history and empirical evidence.

## **HISTORICAL CONNECTIONS BETWEEN THE BUILT ENVIRONMENT AND PUBLIC HEALTH**

Historically, concerns about public health have strongly influenced urban planning. In some ways, sanitary engineers were the first urban planners in America.<sup>8</sup> Up until the mid-nineteenth century, American cities were almost

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completely unplanned with streets and land use patterns determined entirely by the market and virtually all services provided privately.<sup>9</sup> The first efforts at more comprehensive city planning were spearheaded by sanitarians and doctors and were particularly focused on sanitation and infectious disease. The 1850 Shattuck Report of the Sanitary Commission of the State of Massachusetts — one of the ground-breaking public health reports — offers among its comprehensive recommendations specific suggestions concerning the layout of towns and villages.

The attention on sanitation and urban infrastructure as issues of public health was well founded. Nineteenth century urban America was characterized by terrible sanitation and frequent epidemics.<sup>10</sup> Each house or business had an on-site privy or cesspool.<sup>11</sup> In that pre-automobile age, horse manure was ubiquitous. Both surface run-off and subsurface water were frequently contaminated. The unhealthy aspects of cities were a major selling point for suburban homes. One 1873 advertisement touted the suburban home as having an atmosphere that was “delightful, cool, bracing, invigorating. No malaria, coal soot, smoke, dust or factories.”<sup>12</sup>

Those concerned about public health began to urge comprehensive solutions for the cities’ unsanitary conditions. With technological innovations in sewer pipe design, it was possible to envision a city-wide sewer system that would remove sewage and safely transport it outside city limits.<sup>13</sup> However, a city-wide sewer system required not only installation of the pipe, it also required careful consideration of the grading of roadbeds and housing drainage.<sup>14</sup> Thus, successful implementation could not rely on random private action but required a more comprehensive approach. As a result, sanitary engineers began to see cities as integrated systems rather than random assemblages of private property. By the 1870s, numerous cities around the country had begun to plan and implement comprehensive sewage systems and thus laid the foundation for a more systematic approach to urban planning.

Interest in a comprehensive approach to sanitation continued to grow. In 1879, following a massive outbreak of yellow fever, Congress created a National Board of Health to assist local governments in addressing health and sanitation issues; cities such as Memphis asked the Board to create a “thoroughly systematized and comprehensive plan” to improve health and sanitation in the city.<sup>15</sup> One of the tools employed was the sanitary survey, a house-by-house inventory of every structure and plot of land in the city. Though the focus was on disease and sanitation and did not include the full range of urban issues, the careful maps and extensive data collection was a forerunner to modern planning research.

The concerns about public health not only produced the first serious efforts at urban planning, they also established the dominant view about health and cities. By the early 20<sup>th</sup> century, it was established orthodoxy that cities and urban concentration were unhealthy.<sup>16</sup> This view was

reflected in the aesthetics of the “City Beautiful” movement<sup>17</sup> as well as in the social agenda of many in the housing reform movement.<sup>18</sup> It is also reflected in the zoning ordinances that took hold in the 1920s. The ordinances separated neighborhoods for residential, business, and industrial uses and specified building heights, set backs, and density of use.<sup>19</sup> These ordinances were justified because, as the Supreme Court explained in *Village of Euclid*, population deconcentration and separation of uses was thought to improve “public health, safety, morals, [and] general welfare.”<sup>20</sup>

By the middle third of the 20<sup>th</sup> century, the problems of adequate sanitation and infectious disease had been brought under control and were no longer the primary drivers of urban planning. In more rural areas, concentration of population was not a problem, but there was still a need for adequate sewer and water facilities. One of the significant public health initiatives of the New Deal was the investment of federal money in the construction of water and sewer systems.<sup>21</sup> By the late 1930s and early 1940s, the public health focus began to shift away from the construction of public infrastructure (other than hospitals) and toward issues such as dairy and meat sanitation,<sup>22</sup> controlling venereal disease,<sup>23</sup> prenatal care,<sup>24</sup> and childhood vaccinations.<sup>25</sup>

Though public health officials may have been the first urban planners, by the 1930s, others had taken over the field, creating new areas of expertise — environmental science, traffic engineering, building safety, and urban planning. At the same time, government became even more involved in the planning and construction of the built environment. The federal government assisted in the drafting and distribution of model zoning legislation,<sup>26</sup> and the Standard City Planning Enabling Act of 1927.<sup>27</sup> It created the Federal Housing Authority (FHA) in 1934 in order to increase the availability of financing to purchase and improve homes. The FHA encouraged home construction and renovation but it also created incentives that favored socially homogeneous suburban housing developments and contributed to deterioration of existing urban neighborhoods.<sup>28</sup> The construction of the interstate highway system<sup>29</sup> and urban renewal efforts<sup>30</sup> in the 1950s and 1960s remade the face of America’s urban and suburban landscape.

This brief history demonstrates the strong and well-documented connections between the built environment and health along with the important role government has played in altering the built environment. Government boards and commissions conducted important studies that illuminated the causal connection between the built environment and health. In response, government has both altered its own activities with respect to matters such as road and sewer design, and intervened with laws and regulations that affect private behavior with respect to land use and buildings. Today, the institutional voice of public health officials has largely disappeared from discussions about urban design and land use patterns. For example, the 1995

edition of *Urban Land Use Planning*, a standard text, does not even contain an index entry for "health and safety."<sup>31</sup> While the institutional voice of public health may be missing from decision making in these areas, the built environment continues to affect public health, and government continues to take health and safety into account in its planning, regulations, and other interventions into the built environment. These ongoing government interventions are outlined below.

### **THE CONNECTION TODAY BETWEEN THE BUILT ENVIRONMENT AND HEALTH**

A century ago in many urban areas, infectious disease was the major public health problem. This problem was closely connected with land use and the built environment. Improvement in sanitation, hygiene, and overcrowding ameliorated the burden of infectious diseases. Today, the prevalence of infectious disease has declined and we have entered a new era marked by a sharp increase in chronic diseases, together with continuing problems related to toxic exposures, injuries, and violence. The causes of these problems are complex and bound up with individual behavior and lifestyle choice. Nonetheless, as discussed below, there are demonstrable connections between the built environment and these areas of public health concern. Moreover, as to most of these areas, government has not only recognized the connection, it already intervenes for health and safety reasons.

### **Injury Prevention**

There is strong evidence to suggest that injury rates can be dramatically affected by the built environment. Within buildings, matters such as stair and banister design, lighting, adequate structural support of balconies and decks, use of less flammable materials, and installation of smoke detectors can all reduce injuries.<sup>32</sup> Injury rates are also affected by the design of infrastructure such as roads, sidewalks, and playgrounds.<sup>33</sup> Road safety is a major focus of traffic engineers and it is becoming increasingly clear that the design of pedestrian facilities can significantly affect injuries.<sup>34</sup> For example, a report on pedestrian safety in California concludes that "the physical design of the street or intersection is often a significant contributing factor" to pedestrian injuries.<sup>35</sup> The presence of crosswalks, the locations of bus stops, lighting, and medians — all determined by state and local government — can affect pedestrian injuries.<sup>36</sup>

Government is extensively involved in injury prevention. It regulates building design and construction through building codes and safety inspections. It further reviews and regulates street layouts in order to assure safe roads, sight distances and intersections, and adequate turning radii for emergency vehicles.<sup>37</sup> Moreover, government is a major provider of roads and other transportation infrastruc-

ture. In this capacity, it designs roads, sidewalks, and bus stops. Government decisions about design specifications, locations, materials, lighting, and signage are all affected by concerns about safety.

### **Exposure to Environmental Toxins**

Exposure to environmental toxins can also have a significant effect on public health.<sup>38</sup> The public health impact of lead paint within buildings is well documented.<sup>39</sup> On a broader scale, toxic conditions contribute to the leading causes of morbidity and mortality, especially chronic respiratory diseases and cancer. While direct causal links are difficult to establish, there is evidence suggesting strong correlations between environmental toxins and poor health. For example, asthma, a chronic respiratory disease, can be triggered by ground-level ozone and respirable particulate matter produced by cars and factories.<sup>40</sup> One area of the South Bronx section of New York City that had the largest wastewater sludge pelletization plant in the Northeast and the region's largest medical waste incinerator (which was forced to close) also had a childhood asthma rate 1000% higher than the rest of New York State.<sup>41</sup> When traffic was reduced in Atlanta for the Olympic Games, peak ozone concentrations decreased 27.9% and the number of youth asthma emergency medical events simultaneously fell dramatically.<sup>42</sup> Clearly, environmental toxins impact public health.

There is an extensive array of federal, state, and local laws that regulate the built environment so as to protect the natural environment and prevent human exposure to environmental toxins. For example, local zoning regulations typically separate industrial land uses from residential areas and may require more extensive review for uses involving toxic materials. Federal, state, and local storm water management and wetlands requirements help protect the water supply from toxins.<sup>43</sup> Regulation of lead paint<sup>44</sup> and asbestos helps protect against exposure to these dangerous materials. Finally, the federal government has explicitly linked air pollution with road building. Regions where the air quality does not achieve specified standards by 2005 will not be eligible for federal transportation dollars.<sup>45</sup>

### **Violence and Crime Reduction**

Violence and crime are recognized as serious public health problems.<sup>46</sup> Homicide claimed the lives of 16,899 Americans in 1999<sup>47</sup> and is the second leading cause of death among youth aged 15 to 24.<sup>48</sup> The physical, mental, and social costs of murder, assault, rape, and domestic abuse are enormous. There is a growing literature on the connection between architectural design and violent crime.<sup>49</sup> Studies of urban housing projects and college dormitories have shown that building design and layout can have significant impact on crime.<sup>50</sup> Bryant Park in New York was successfully redesigned from a

notorious and dangerous "Needle Park" to a lively and safe park.<sup>51</sup> Careful design can decrease dark and hidden spaces, increase the "eyes on the streets,"<sup>52</sup> and impact social norms and sense of community,<sup>53</sup> all of which can reduce the incidence of at least some crimes.

With respect to crime prevention and the built environment, government is also involved. Public infrastructure may be created with crime prevention in mind. For example, the Washington D.C. metro system was designed without public restrooms, winding passageways, dark corners, and excessive seating, all to reduce crime.<sup>54</sup> Some municipalities have experimented with street closings as a way to prevent crime,<sup>55</sup> a strategy that was recently upheld by the Supreme Court.<sup>56</sup> Finally, as a provider of public housing and other public buildings, governments can and do make structural changes to their buildings to reduce crime in and around those buildings.<sup>57</sup>

### **Exercise**

Today, many of the most significant public health issues are chronic conditions such as diabetes and heart disease that are linked to behaviors such as a sedentary lifestyle.<sup>58</sup> There is an extensive literature on the relationship between the built environment and physical activity. Much of this literature related to land use patterns and transportation systems has been collected and reviewed by Laurence Frank and Peter Engelke.<sup>59</sup> Their review concludes that "on balance the literature supports the hypothesis that urban form variables influence levels of walking and bicycling" and that some targeted interventions may increase levels of physical activity.<sup>60</sup> The authors are careful not to overstate the results and they note in particular the ongoing debate about whether demographic, economic, and socioeconomic influences are more significant than urban form in influencing behavior.<sup>61</sup> Nonetheless, their conclusions about the effect of urban form and transportation systems on behavior is consistent with research indicating that other aspects of the built environment affect behavior. For example, there is research that suggests that the attractiveness of stairways within buildings can cause more people to choose the stairs over the elevator and there is an extensive literature on how the built environment affects criminal behavior.<sup>62</sup> It is also consistent with one very recent study that finds a correlation between excess weight and hypertension on the one hand and living in a county characterized as "sprawl."<sup>63</sup>

Government is also involved in encouraging exercise. Governments routinely provide parks and recreation facilities, along with sidewalks and bike paths. In addition to providing such facilities directly, local governments may require developers to construct sidewalks and pedestrian facilities<sup>64</sup> and may further require that these meet minimum standards with respect to paving materials, benches, landscaping, and other amenities.<sup>65</sup> Similarly, large residential developments may be required to provide onsite recreation facilities.<sup>66</sup>

### **Nutrition**

Today's chronic conditions are also exacerbated by obesity and the percentages of overweight or obese American adults and children are growing. In 1999-2000, 64.5% of Americans over twenty years old were overweight, and 30.5% were obese.<sup>67</sup> These figures are up about 8% from 1988-94 figures. About 15% of children ages 6-19 are overweight, a 4% increase from 1988-94 data.<sup>68</sup> A built environment that has options for purchasing nutritious foods is more conducive to maintaining a healthy weight than one in which the only easily accessible options are high calorie, high fat, fast food establishments. In low-income neighborhoods, fast food may be more available than fresh produce.<sup>69</sup> In fact, one study found that neighborhoods with the poorest socioeconomic indicators had 2.5 times as many fast food outlets as those neighborhoods in the wealthiest category.<sup>70</sup> While food consumption is a complex behavior, the built environment can make it more or less difficult to make healthy choices.

Government has long been involved in regulating food safety as well as directly providing adequate nutrition through initiatives such as food stamps and school lunch programs. With respect to land use and food, the location of restaurants may be controlled by zoning and regulations.<sup>71</sup> For the most part, however, these zoning and other land use limitations on food establishments are focused on issues such as traffic safety, road and parking adequacy, and compatibility with surrounding uses. Thus, government has not generally used land use or building regulation as a mechanism to impact nutrition or food consumption.

### **THEORETICAL JUSTIFICATIONS FOR GOVERNMENT INTERVENTION INTO THE BUILT ENVIRONMENT**

We have argued above that there is both an historical connection between the built environment and public health and evidence of a continued connection, despite the epidemiological transition away from infectious diseases. Moreover, government intervention into the built environment for purposes of improving public health is well established historically and continues today. In this section we consider whether government ought to continue to intervene on these grounds.

Human health is an important component of well being, and protecting and promoting human well being is a core purpose of government.<sup>72</sup> Obviously, human dignity involves more than physical and mental health,<sup>73</sup> but we ought not undervalue the role that health plays in facilitating people's ability to lead full and meaningful lives. Health is vital to obtaining a livelihood, engaging in recreation and social interaction, as well as in participating in the political process. Public health should not trump all other public goods, but government decisions that affect health

should be undertaken knowingly.

As suggested by the quote at the beginning of the article, not everyone agrees that government should vigorously intervene in the built environment. They argue that individual behavior, particularly with respect to diet, physical activity, and lifestyle, is a personal choice. Intervention for the purpose of altering this behavior raises the specter of government interference with personal autonomy. Although questions about the role of government in influencing human decisions are difficult, many of the hardest decisions do not exist with respect to the built environment. Government is already highly involved in the built environment through direct intervention and regulation.<sup>74</sup> Thus, the political choice is not *whether* to plan the built environment, but *how* to plan it under optimal conditions that benefit the population. And this choice ought to be influenced by evidence about the associations between land use and health.

Government intervention, moreover, helps provide solutions to the coordination, free rider, and externality problems that are common in this arena. The private sector has a direct economic incentive to build in ways that benefit potential customers, but not necessarily in ways that benefit the neighborhood or local population. For example, a private developer has little incentive to build a sidewalk unless it will connect to sidewalks elsewhere that lead where people want to go. Similarly, a poorly lighted or graffiti covered building may encourage crime elsewhere in the community. Consequently, government's role is to ensure that private development at least takes into account the benefits and burdens placed on the surrounding population. One clear benefit or burden is the affect on the public's health and safety.

So long as government continues to be involved in the built environment, it will impact behavior because the built environment is the backdrop against which a large array of behavioral decisions are made, and some of these behavioral effects may have health implications. Our contention is that government should be cognizant of these effects and should take them into account as it structures its interventions into the built environment.

#### **OPPORTUNITIES FROM AN INCREASED PUBLIC HEALTH VOICE IN THE BUILT ENVIRONMENT**

The foregoing discussion highlights two points: that there continues to be a significant connection between the built environment and public health and that government currently intervenes in many aspects of the built environment to prevent injury and promote health. We have also argued that such government intervention is normatively justifiable. Below we briefly elaborate on the ways in which greater involvement of public health officials in decisions affecting land use and the built environment offers real opportunities to improve public health.

#### **More systematically including human health as a factor in governmental decisions**

Although health and safety are certainly factors in a number of current government decisions, these may not be systematically considered and other factors may routinely be given priority without a careful analysis of whether that priority is appropriate. For example, traffic engineers are concerned with safety, but they are also concerned about moving large numbers of cars quickly. Similarly, some parks officials may focus more on environmental stewardship and view features that promote exercise (such as bike paths) primarily as detrimental impervious surface that interrupts natural habitat. The potential benefits to human health may be viewed as relatively less important. Public health officials can highlight the impact of design decisions along with the tradeoffs that are being made.

#### **Considering a broader range of health impacts**

To the extent that government is currently considering public health, it may be considering only a relatively narrow range of health effects. In particular, current regulations may not adequately consider the health benefits of encouraging physical activity. Road design is a classic example. Obviously, government is significantly involved in road design and construction and road engineers currently take safety into account. However, to the extent pedestrian safety is considered, it may be addressed by simply discouraging pedestrian activity near roadways,<sup>75</sup> an approach that does not consider the health benefits of encouraging people to walk. Worse yet, pedestrian safety may not be considered at all. It is estimated that pedestrians make up 12% of traffic fatalities, but spending on pedestrian safety is less than 1% of transportation spending.<sup>76</sup> A similarly narrow focus is evident with respect to building codes. Building codes are designed to reduce injuries, but tend not to focus on whether building features such as stairs can be designed to make them more accessible and inviting, thereby encouraging physical activity. The overall result of this narrow focus is that “[e]ach legal requirement – building codes, subdivision regulations, safety standards, environmental regulations – is looked at independently without regard to the whole picture or to common sense.”<sup>77</sup> Public health officials can help keep the focus on the “whole picture” of human health and help regulators see how decisions with respect to one matter can have health impacts that were not the focus of the original decision.

It is important, however, for public health officials to be careful not to fall into their own trap of looking too narrowly. In the exploration of the benefits of changes to the built environment, public health must be willing to also consider the benefits of the existing environment. For example, much has been written about the advantages to

pedestrians of an interconnected street grid.<sup>78</sup> On the other hand, when planners propose to eliminate cul-de-sacs and provide through traffic, those who live on the cul-de-sac almost invariably complain that their neighborhood will be less safe and their children will be able to play outside less freely. Thus, the cul-de-sac may offer its own health benefits. It may be that the benefits to physical activity of the street grid pattern outweigh the benefits of a cul-de-sac pattern, but health officials need to take health benefits seriously wherever they are found.

### **Tradeoffs with other goals are not always required**

Interestingly, sometimes by systematically considering a broader range of health impacts, officials discover that some tradeoffs are not as significant as they thought. For example, some road codes discourage trees in the median or along streets because of the assumption that the presence of trees presents a collision risk to drivers. On the other hand, streetscapes without trees are less welcoming to pedestrians. The choice seems to be between pedestrian comfort and driver safety. However, one recent study suggests that there are in fact fewer accidents on streets with trees than along those without trees.<sup>79</sup> The study was prompted by people interested in encouraging pedestrian accessibility, but it demonstrated that the assumption by traffic engineers that trees were a significant safety hazard was unfounded.

### **Finding new solutions to health issues**

Another beneficial impact of this new public health focus on the built environment is that it invites exploration of new solutions to some of the leading public health problems of today. Relatively modest changes in the attractiveness of stairways may increase the number of people who walk rather than take the elevator.<sup>80</sup> Similarly, some changes in the physical environment when combined with thoughtful programmatic innovations can produce beneficial effects.<sup>81</sup> The San Diego Naval Air Station was able to increase levels of physical activity through a combination of improved facilities such as bike paths and exercise equipment, along with institutional and programmatic changes to encourage and support physical activity.<sup>82</sup> Similarly, Marin County was able to increase by 64% the number of children walking to school through a combination of changes in facilities, education, and programs.<sup>83</sup>

Of course, the most effective approaches will not necessarily entail direct government mandates. Consider, for example, the fact that there is a connection between obesity and the type of nearby food establishments. One might conclude from this that the way to solve the obesity problem is to mandate grocery stores in every neighborhood and severely restrict fast food restaurants. This approach would have significant problems. Unless the government is planning to go

into the grocery store business, mandating grocery stores in every neighborhood would be pointless.

Prohibiting or severely restricting "fast food" restaurants could also be problematic. First, it may be difficult to distinguish purveyors of unhealthy food from healthy ones. Increasingly, local convenience stores and even grocery stores offer their own versions of high fat fast foods. Should these stores be prohibited as well? What about "white tablecloth" restaurants that serve high fat cream sauces? Will they be allowed on the grounds that expensive high fat food is more acceptable than cheap high fat food? Second, such restrictions can have unintended consequences. A fast food restaurant may be preferable to a boarded up building or a liquor store. Would a restriction on such restaurants take into account the current or likely alternative use of the property? Moreover, neighborhoods that are under-served with stores and services may perceive efforts to restrict popular fast food restaurants as restricting freedom of choice and access to amenities enjoyed in other neighborhoods. Finally, such new forms of intervention present institutional issues. Where would one turn to enforce such new regulations? Would land use agencies be expected to supplement their staffs of traffic engineers and environmental scientists with nutritionists to review the menus of proposed new restaurants, or would public health agencies become land use regulators?

Notwithstanding these limitations, changes in our approach to the built environment also present opportunities to favorably impact public health. Some of the most promising strategies do not involve new areas of government intervention but simply require reassessing the ways in which government currently intervenes. Many current government actions may be, at best, missed opportunities to have a positive impact on health behavior. At worst, they may affirmatively discourage healthy behavior. We currently have rules that regulate design features such as road and street design, lot sizes, parking requirements, and housing set backs. These regulations may *discourage* physical activity. In reexamining these areas, the issue is not whether government should have rules that impact behavior, but what behavior it should encourage or discourage. By more consistently and systematically considering the impact on health and healthy behavior of our current interventions, government may be able to have a positive impact without creating new bureaucracies or fundamentally different forms of intervention. For example, agencies that currently regulate road and sidewalk design, subdivision layout, and zoning requirements may be able to encourage pedestrian activity through adjustments to the current codes and criteria. Moreover, where public health concerns simply redirect our current interventions, the risks of inappropriate interference with autonomy are far less.

Similarly, with respect to food and nutrition, it may be possible to reexamine existing interventions to identify

adjustments that could have a positive impact. For example, one might reexamine zoning requirements to see if they discourage full service grocery stores, particularly in neighborhoods that are under served by such stores. In addition, cities engaged in significant redevelopment projects in under-served neighborhoods could include a grocery store as an element of the desired project or consider tax or other incentives to encourage their locating where needed. Finally, cities can encourage the creation of farmers' markets in areas where there is less access to fresh fruits and vegetables.

### Bringing special expertise

Public health officials have important skills and perspectives to add to the discussions about the built environment. First, public health officials bring an empirical and epidemiological expertise that may be extremely useful in understanding the scope of these issues. Second, they bring an expertise in behavioral interventions. Public health officials have studied the interplay among social and environmental factors as they affect human behavior. This may be extremely valuable to policy makers who try to shape effective interventions. Finally, and perhaps most importantly, public health officials can be an institutional voice whose primary focus is human health. This is not true of any of the other institutional players involved in land use decisions. Highway departments tend to view cars (and not even necessarily the drivers of those cars) as their primary focus. They will build sidewalks but tend to view them as an "amenity," not central to their mission. Likewise school officials tend to view pedestrian and fitness facilities as add-ons and not sufficiently central to warrant fighting for when funds get tight. Environmental groups may worry more about preserving animal habitat than finding healthy activities for the humans. Public health officials can provide an institutional voice that consistently asks the question — "will this encourage or discourage healthy behavior?" Consistently asking this question does not mean that encouraging healthy behavior will become the only, or necessarily even the primary, consideration in all decisions. But it can become a factor that is systematically considered.

Many of the chronic health problems of today turn on a complex set of environmental and behavioral factors. It is therefore important that public health officials not overstate what we know in this area.<sup>84</sup> The interaction between humans and their environment is complicated and our intuitions are sometimes wrong. In the 1970s, urban planners thought that a way to encourage pedestrian activity along streets with stores and restaurants was to close the streets completely to traffic. By the 1990s they had learned that in some cases the absence of cars actually had the opposite effect, making areas feel abandoned, which in turn discouraged pedestrian activity. Thus, it is important that public health officials not overstate the results that can be achieved through changes in this area.<sup>85</sup> Nonetheless, we

believe that there are opportunities to improve public health through the more systematic involvement of public health officials in decisions concerning the built environment.

### CONCLUSION

In the debate over "sprawl," many of the arguments that have been offered for changing our land use patterns have focused on reasons other than health.<sup>86</sup> As a result, the new focus on health concerns has been viewed with suspicion by some who see this new attention as a trumped up effort to justify interference with private decisions about how and where we should live and work. However, the connection between public health and the built environment is real and longstanding. Moreover, the reality of this connection has been the basis for much ongoing government intervention into the built environment and continuing involvement is normatively justifiable. We do not argue that history, theory, or empirical evidence make it inevitable that government will or always should prefer "health-producing" policies. History, in itself, does not require current policymakers to follow the traditional path. Moreover, government may in some situations prefer other public goods over health. Finally, the evidence may not always unequivocally support a causal relationship between an aspect of the built environment and health. However, we do suggest that government has an obligation carefully to consider the populations's health in its policies and that public health should have an important role in the development of policies about land use and the built environment.

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9. See Peterson, *supra* note 8, at 15; M. Garb, "Health, Morality, and Housing: The 'Tenement Problem' in Chicago," *American Journal of Public Health*, 93 (2003): 1420-30.
10. See G. Rosen, *A History of Public Health* (Baltimore: Johns Hopkins Univ. Press, 1993), at 177-178, 212-213, 314-316.
11. See Peterson, *supra* note 8, at 15-17.
12. Quoted in K. Jackson, *Crabgrass Frontier: The Suburbanization of the United States* (New York: Oxford Univ. Press, 1985): at 70.
13. See Peterson, *supra* note 8, at 18-19.
14. See *id.* at 21.
15. *Id.* at 25.
16. The view that urban concentration is unhealthy is not a new one. Thomas Jefferson had expressed this view, exclaiming: "I view large cities as pestilential to the morals, the health and the liberties of man." Quoted in K. Jackson, *supra* note 12, at 68. Henry Ford later declared, "We shall solve the city problem by leaving the city." Quoted in M. Gordon, *Sick Cities* (New York: Macmillan, 1963): at 13.
17. See M. Scott, *American City Planning Since 1890* (Berkeley: Univ. of California Press, 1971): at 184-187. Indeed, it is noteworthy that Frederick Law Olmstead, the great American landscape architect who designed Central Park in New York and who is so closely associated with the early 20<sup>th</sup> Century "City Beautiful" movement, served during the Civil War as director of the U.S. Sanitary Commission. Peterson, *supra* note 8, at 29. His theories of urban progress were rooted in public health concerns and he had a long-standing interest in the "sanitary value" of parks and trees. *Id.* at 28.
18. See Scott, *supra* note 17 at 152-163. For example, in 1907 a group of housing reformers formed a "Committee on Congestion of Population" and organized a traveling exhibit intended to highlight the health and other ill effects of urban congestion. The exhibit included extensive displays and charts showing population densities in Manhattan along with death and disease rates there. The social agenda of the Congestion Committee included industrial deconcentration and the establishment of low-density housing areas at the city rim. See D. Rogers, *Atlantic Crossings: Social Politics in a Progressive Era* (Cambridge, MA: Belknap Press of Harvard Univ. Press, 1998), at 182-183. The Committee succeeded in persuading the New York Governor to create a temporary state organization called the "Commission on Distribution of Population" to study ways to disburse the population. See Scott, *supra* note 17, at 88.
19. See Scott, *supra* note 17, at 152-163.
20. *Village of Euclid v. Amber Realty Co.*, 272 U.S. 365-397 (1926).
21. See J. Duffy, *The Sanitarian: A History of American Public Health* (Urbana: Univ. of Illinois Press, 1992): at 258.
22. *Id.* at 261, 264.
23. *Id.* at 266, 281.
24. *Id.* at 262, 270.
25. *Id.* at 282-283.
26. W. Wilson, "Moles and Skylarks," in D. Krueckeberg, ed., *Introduction to Planning History in the United States*, (New Brunswick, N.J.: Center for Urban Policy Research, 1983): 95.
27. *Id.* at 97.
28. See J. Farrell, "The FHA's Origins: How Its Valuation Method Fostered Racial Segregation and Suburban Sprawl," *Journal of Affordable Housing & Community Development* 11 (2002): 374-389; K. Jackson, *supra* note 12, at 190-218.
29. See A. Alshuler, "The Intercity Freeway," in D. Krueckeberg, ed., *Introduction to Planning History in the United States* (New Brunswick, N.J.: Center for Urban Policy Research, 1983): 190-234.
30. See S. Greer, *Urban Renewal and American Cities* (Indianapolis: The Bobbs-Merrill Co., 1965); J.R. Saunders & R.N. Shackelford, *Urban Renewal and the End of Black Culture in Charlottesville, Virginia* (Jefferson, N.C.: McFarland & Co., 1998); K. Jackson, *supra* note 12, at 219-230.
31. E. Kaiser, D. Godshchalk & F.S. Chapin, *Urban Land Use Planning* (Urbana: Univ. of Illinois Press, 1995, 4<sup>th</sup> ed.). In contrast, the 1979 edition of the same book includes "Health and Safety" as a major category under "Elements of the Public Interest." F.S. Chapin & E. Kaiser, *Urban Land Use Planning* (Urbana: Univ. of Illinois Press, 1979 3d ed.): at 48.
32. J. Krieger & D.L. Higgins, "Housing and Health: Time Again for Public Health Action," *American Journal of Public Health*, 92 (2002): 758-68.
33. See S.K. Cummins & R.J. Jackson, "The Built Environment and Children's Health," *Pediatric Clinics of North America*, 48, no. 5 (2001): 1241-1252.
34. See, e.g., W.A. Bronrott, *Montgomery County Blue Ribbon Panel on Pedestrian and Traffic Safety*, Final Report (January 2002): at 26 ("Over the past half-century, roadways have been designed and constructed primarily to accommodate vehicular traffic rather than pedestrians. Outdated design standards still reflect this emphasis. A result is that the transportation infrastructure leaves pedestrians at great risk, which in turn discourages walking and encourages people to overly rely on single-occupancy vehicles.")
35. G. Ohland, T. Nguyen & J. Corless, *Dangerous by Design: Pedestrian Safety in California*, Surface Transportation Policy Project, September 2000: 29.
36. See M. Ernst & B. McCann, *Mean Streets 2002*,

Surface Transportation Policy Project, 2002, 1-12, available at <<http://www.transact.org/pdfs/ms2002/meanstreets2002.pdf>>.

37. See, e.g., Montgomery County Code (Maryland) §§ 50-26; 50-30; 59-D-2.43; 59-D-3.4.

38. While the focus here is on preventing exposure to environmental toxins, there is also a growing body of data on how changes in the building or road design can enhance health by reducing stress. See e.g. R. Parsons, L.G. Tassinary, R.S. Ulrich, M.R. Hebl & M. Grossman-Alexander, "The View from the Road: Implications for Stress Recovery and Immunization," *Journal of Environmental Psychology*, 18 (1998): 113-139; C. Tidwell, & J. Sowman, "The Healing Space," *Managed Care Executive*, May 2002, at 35-36.; H. Frumkin, "Healthy Places: Exploring the Evidence," *American Journal of Public Health*, 93 (2003): 1451-56.

39. D. Ryan, B. Levy, S. Pollack, et al., "Protecting Children from Lead Poisoning and Building Healthy Communities," *American Journal of Public Health*, 89 (1999):1690-5.

40. S.K. Cummins & R.J. Jackson, *supra* note 33, at 1242.

41. Maantay, J. Zoning, Equity, and Public Health. *Am J Public Health*. 2001;91:1033-1041.

42. M.S. Friedman, K.E. Powell, L. Hutwagner, et al., "Impact of Changes in Transportation and Commuting Behaviors During the 1996 Summer Olympic Games in Atlanta on Air Quality and Childhood Asthma," *Journal of the American Medical Association*, 285 (2001): 897-905.

43. See, e.g. Clean Water Act § 404; Montgomery County Code (Maryland) § 50-32; S.J. Gaffield, R.L. Goo, L.A. Richards & R.J. Jackson, "Public Health Effects of Inadequate Managed Stormwater Runoff," *American Journal of Public Health*, 93 (2003): 152-233.

44. See J. Shumway, "HUD Enforcement of Lead-Based Paint Rules and Other Lead-Based Paint Activities," *Journal of Affordable Housing & Community Development*, 12 (2003): 366-377; R. Mares, "Enforcement of the Massachusetts Lead Laws and Its Effect on Rental Prices and Abandonment," *Journal of Affordable Housing & Community Development*, 12 (2003):343-361.

45. Transportation Equity Act for the 21st Century (TEA 21), Pub. L. No. 105-178.

46. W.H. Foege, *Violence and Public Health*, Surgeon General's Workshop on Violence and Public Health (October 1985): 19-23; R.H.Potter & J.E.Krider, "Teaching About Violence Prevention: A Bridge Between Public Health and Criminal Justice Educators," *Journal of Criminal Justice Education*, 11 (2000):339-351.

47. U.S. Dept. of Justice, Bureau of Justice Statistics, available at <[www.ojp.usdoj.gov/bjs/dtdata.htm](http://www.ojp.usdoj.gov/bjs/dtdata.htm)>.

48. L. Sweatt, C.G. Harding, L. Knight-Lynn, et al., "Talking about the Silent Fear: Adolescents' Experiences of Violence in an Urban High-Rise Community," *Adolescence*, 37 (2002):109-20.

49. See, e.g., N. Katyal, "Architecture as Crime Con-

trol," *Yale Law Journal* 111 (2002): 1039-1125; O. Newman, *Defensible Space: Crime Prevention Through Urban Design* (New York: Macmillan,1972); S. Mair & M. Mair, "Violence Prevention and Control Through Environmental Modifications," *Annual Review of Public Health*, 24 (2003): 209-25, at 215; Tim Hope, "School Design and Burglary," in K. Heal & G. Laycock, eds., *Situational Crime Prevention: From Theory Into Practice* (London: H.M.S.O., 1986); S.P. Carter, S.L. Carter & A.L. Dannenberg, "Zoning Out Crime and Improving Community Health in Sarasota, Florida: 'Crime Prevention Through Environmental Design,'" *American Journal of Public Health*, 93 (2003): 1442-45.

50. See Newman, *supra* note 49, at 22-50, 74-76, 83-86.

51. See Katyal, *supra* note 49, at 1097.

52. J. Jacobs, *The Death and Life of Great American Cities* (New York: Random House, 1961): 35-42.

53. See Katyal, *supra* note 49, at 1506.

54. S. Mair & M. Mair, *supra* note 49, at 215. Similarly, it is reported that "[t]he 2000 Sydney Olympics self-consciously employed architecture to reduce crime by modifying landscapes, restricting access to sites, changing parking patterns, and creating visibility around stadiums." Katyal, *supra* note 49, at 1047.

55. See Katyal, *supra* note 49, at 1069-70.

56. See *Virginia v. Hicks*, 123 S.Ct. 2191 (2003).

57. See Katyal, *supra* note 49, at 1094.

58. M.V. Chakravarthy, JM. Joyner & F.W. Booth, "An Obligation for Primary Care Physicians to Prescribe Physical Activity to Sedentary Patients to Reduce the Risk of Chronic Health Conditions," *Mayo Clinic Proceedings*, 77 (February 2002):165-73.

59. L. Frank & P. Engelke, *How Land Use and Transportation Systems Impact Public Health: A Literature Review of the Relationship Between Physical Activity and Built Form*, Active Community Environments (ACEs) Working Paper #1 (2000), available at <<http://www.cdc.gov/nccdphp/dnpa/pdf/accessworkingpaper1.pdf>>.

60. Id. at 16. See also D. Berrigan. & R. Troiano, "The Association Between Urban Form and Physical Activity in U.S. Adults," *American Journal of Preventative Medicine*, 23, no. 2 (2002): 74-79; S.L. Handy, M.G. Boarnet, R. Ewing & R.E. Killingsworth, "How the Built Environment Affects Physical Activity," *American Journal of Preventative Medicine*, 23, no. 2 (2002):64-73; B. Podobnik, *The Social and Environmental Achievements of New Urbanism: Evidence from Orenco Station*, at <<http://www.lclark.edu/~podobnik/orenco02>> (last visited November 7, 2002).

61. Frank & Engelke, *supra* note 59, at 17. One recent study of the San Francisco area found that although characteristics of the built environment such as the street grid and proximity to retail induced walking and biking, other factors such as topography, weather, and demographic characteristics were stronger predictors. See R. Cervero & M. Duncan, "Walking, Bicycling, and Urban Landscapes:

Evidence from the San Francisco Bay Area," *American Journal of Public Health*, 93 (2003): 1473-83, at 1483.

62. One who doubts the relationship between the built environment and behavior might want to consult those in the commercial arena. Retailers have long experimented with store layouts to encourage patrons to walk through more of their stores. The traditional shopping center design has an anchor store at each end of the mall, with small stores in between. The small stores pay a disproportionately large share of the total rent but are willing to do so because of the "foot traffic" of shoppers walking between the anchors. Much money and effort is spent on the physical layout and design of retail spaces in the belief that the physical space affects behavior of store visitors.

63. R. Ewing, T. Schimd, R. Killingsworth, A. Zlot. & S. Raudenbush, "Relationship Between Urban Sprawl and Physical Activity, Obesity, and Morbidity," *American J. Health Promotion*, 18, no.1 (2003): 47-57.

64. See, e.g., Montgomery County Code (Maryland) § 59-D-2.12.

65. See, e.g., Maryland National Capital Park & Planning Commission, Urban Design Division, "Silver Spring Streetscape Plan: Technical Manual, Draft Report (April 1992).

66. See, e.g., Maryland National Capital Park & Planning Commission, *Recreation Guidelines: Guidelines for Recreation Amenities in Residential Developments* (September 1992); Montgomery County Code (Maryland) § 59-D-2.43.

67. Institute of Medicine. *The Future of the Public's Health in the Twenty First Century* (Washington, DC: National Academy Press, 2002): 76-79.

68. See *id.*

69. "America's Epidemic of Youth Obesity," *NYTimes*, Nov. 29, 2002, at A38.

70. D.D. Reidpath, C. Burns, J. Garrard, M. Mahoney & M. Townsend, "An Ecological Study of the Relationship Between Social and Environmental Determinants of Obesity." *Health Place*, 8 (2002):141-5.

71. See, e.g., Montgomery County Code (Maryland) § 59-G-2.16.

72. See L. Gostin, *Public Health Law: Power, Duty, Restraint* (Berkeley: U.Cal. Press, 2000): at 3-22.

73. See D. Buchanan, *An Ethic for Health Promotion: Rethinking the Sources of Human Well-Being* (Oxford: Oxford Press 2000): at 1-22.

74. W.C. Perdue, L.A. Stone & L.O. Gostin, "The Built Environment and Its Relationship to the Public's Health; The Legal Framework," *American Journal Public Health*, 93 (2003): 1390-94, at 1392-93.

75. See, e.g., Ohland, *supra* note 35, at 21-22 (discussing California's policy of removing pedestrian crosswalks so that pedestrians will not have a "false sense of security").

76. See Ernst, *supra* note 36, at 17.

77. E. McMahon, "Building Codes Get Smarter," *Planning Commissioner Journal*, 43, (Summer 2001): at 4.

78. See Frank, C.D. & Engelke, P.O., The Built Environment and Human Activity Patterns: Exploring the Impacts of Urban Form on Public Health, *Journal of Planning Literature*, 16, no. 2 (2000): 202-218.

79. See "California Calculating," *New Urban News*, 8, no. 5 (July/August 2003): at 11.

80. See K.N. Boutelle, R.W. Jeffery, D.M. Murray & M.K.H. Schmitz, "Using Signs, Artwork, and Music to Promote Stair Use in Public Building," *American Journal of Public Health*, 91 (2001): 2004-06, at 2004.

81. See J.F. Sallis, A. Bauman & M. Pratt, "Environmental and Policy Interventions to Promote Physical Activity," *American Journal of Preventative Medicine*, 15 (1998): 379-97.

82. See J.M. Linengar, C. Chesson & D. Nice, "Physical Fitness Gains Following Simple Environmental Change," *American Journal of Preventive Medicine*, 7, no. 5 (1991): 298-310.

83. C.E. Staunton, D. Hubsmith & W. Kallins, "Promoting Safe Walking and Biking to School: The Marin County Success Story," *American Journal of Public Health*, 93 (2003): 1431-34.

84. For example, there are significant disputes about the extent to which changes in land use patterns — including densities, mixed-use zoning — and grid street networks, change travel behavior. See Frank & Engelke, *supra* note 59, at Chapters V, VI. Compare P. Gordon, "Are Compact Cities a Desirable Planning Goal?" *Journal of the American Planning Association*, 63 (1997): at 95-106, with Ewing, *supra* note 4.

85. Moreover, some of the most effective steps may combine environmental changes with other educational and programmatic interventions. For example, the National Recreation and Parks Association has partnered with the National Heart, Lung, and Blood Institute of the National Institutes of Health to create a "Hearts N' Parks" program. See "Hearts N' Parks, Year 2," *Parks & Recreation*, July 2003, at 47. The program assists park and recreation agencies in incorporating "heart-healthy" information and activities using existing facilities. Similar combined programs have been used to encourage children to walk or ride their bikes to school. See Staunton, *supra* note 83.

86. See, e.g., R. Freilich, *From Sprawl to Smart Growth* (Chicago: American Bar Association, 1999): at 16 (author lists the costs of sprawl as: community, housing, employment, fiscal, political, transportation, and agricultural and open space; health is not on the list).