

ZONING FOR OBESITY: INCORPORATING CONTEXT-BASED STRATEGIES FOR IMPROVED HEALTH IN MUNICIPAL ZONING CODES

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CLASS OF 2015

SUBMITTED IN PARTIAL FULFILLMENT FOR THE MASTER OF CITY AND REGIONAL PLANNING
SCHOOL OF CITY AND REGIONAL PLANNING
COLLEGE OF ARCHITECTURE
GEORGIA INSTITUTE OF TECHNOLOGY
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AUTHOR'S NOTE

During my studies at Clemson University, I developed a curiosity about the relationships between design and health. During the spring of 2012, I embarked on a study abroad semester in Barcelona, Spain: an experience that I attribute as one that changed the trajectory of my career as a designer and as a planner. Not only was I inspired by the beautiful architecture and the well-executed urban planning that is Barcelona, but I was inspired by the lifestyle of the residents. The lifestyle of the city's residents, which became the one I adopted during my time there, piqued my curiosity about the connections between design and health even further. Many of my classmates and peers at Clemson went on study abroad excursions similar to mine. However, there was one distinct difference in our experiences that set us all apart: how much weight we had gained or (in my case) lost. It brought about a debate of if our lifestyles had changed so much to provoke profound changes in our health as a result. In my mind, my habits had not changed drastically. So, how did I weigh less and have a better sense of wellness in Barcelona than I did in the United States? After some reflection, I concluded that my habits indeed changed but without intention. How is this possible?

Three words: **good urban form.**

It is this realization that renewed my interests of design and health. The city was designed in a way that forced me to walk more in one day than I would have in several days or weeks in the United States, ergo increasing my likelihood of getting my recommended amount of daily exercise. My grocery store was two blocks away, my classes were four blocks away, and my favorite restaurants were not too far away either. When a destination would take more than fifteen minutes to walk, the nearest metro was hardly ever more than a three to five minute walk away. I was forced to keep moving all the time, especially since I did not have a car. The city's infrastructure made it possible to walk, bike, or take transit everywhere. The mix of land uses made my everyday chores much less of a hassle to complete, and more enjoyable. The high level accessibility to the city's large number of parks made leisurely recreation more possible.

While this lifestyle may not be ideal or possible for everyone in the United States, it is those observations that I believe hold the key for a healthier lifestyle for all. With the obesity crisis growing worse every year in the United States and in other developed countries, a change is needed. We can work towards changing our diets and getting more exercise, but why stop there? Why not start with improving how planners plan and design our cities?

ABSTRACT

The practice of land regulation in the United States began as a measure of preventing the spread of infectious disease in urban settlements, increasing safety, and preventing fraudulent real estate transactions. However, the regulations that have been developed since have not favored health as they once did. The post-World War II era not only brought forth an era of economic boom, but it was around this time that increased levels of car ownership occurred, the new interstate system was created, and suburban living became the new ideals. Land regulations in the form of zoning ordinances and subdivision regulations have favored those ideals, which has directly led to urban sprawl and poor urban form in select metropolitan areas. It is also no surprise that from the 1950s and onward, physical health in the United States has been on a decline. Now that the number of people who die from infectious diseases has been significantly reduced, the focus of public health officials has now shifted to decreasing the prevalence of chronic diseases. These chronic diseases include, but are not limited to, heart disease, cancer, diabetes, and obesity. All of these diseases are on the upswing, especially obesity. Obesity is linked to the aforementioned chronic diseases and other negative health outcomes. The most basic causes of obesity are well known: poor diet, lack of physical activity, et cetera, yet we have not been able to slow its progression. There is an invisible force at play that has contributed to this phenomenon: poor urban planning. Part I of this report will focus on how present literature and research shows the link between the design of the built environment and the physical health of the people who inhabit them, and will review those findings in how they address the relationships between obesity, urban sprawl, and urban form. Part II will explore the current conditions of land regulation, specifically zoning, focusing on their weaknesses in prioritizing health. Case studies of how local governments have prioritized health in their zoning ordinances and comprehensive planning will provide concrete examples of how obesity rates could be reduced as a result of implementing better guidelines of land use. Part III will conclude on these findings and present some general recommendations directed at planners.

Keywords: planning, built environment, land use, land regulations, obesity, health, urban design, sprawl

PART I | ESTABLISHING THE CONNECTIONS

CHAPTER 1 | EXECUTIVE SUMMARY

*“We must integrate our concepts of ‘public health issues’ with ‘urban planning issues’”
(Jackson and Kochtitzky 2001, 15).*

Safety and health were two main concerns in pre-modern civilizations. Cities were designed to keep enemies away. Shelter was built to protect one from the elements. Remnants of sanitary systems have been uncovered where the ancient civilizations of Rome and Greece once stood. As modern civilization moved into the Industrial Revolution during the nineteenth century, the population densified, the air quality in cities worsened, waste littered the streets, natural sunlight disappeared, and as a result, people became more vulnerable to infectious disease. The planning profession originated as those diseases, notably cholera and diphtheria, spread rampant in those newly industrialized cities. The solutions that were reached, such as public sanitation statutes and laws that sought to improve housing standards, were instrumental in controlling them. Now that these diseases are no longer major problems in developed nations, the new epidemic that society faces is chronic disease (Brisbon et al. 2005, Frumkin et al. 2011, Hall 2014).

Although safety and health are still two large concerns facing modern cities, much has changed since the planning and public health professions' early days. The two fields that were once closely associated are now two distinct professions. Planning is no longer a health-based field, but it is one that is concerned with managing growth and responding to market demands. However, the ways in which growth is managed have had large impacts on health. One way this has occurred is through zoning. Zoning's early days in the turn of the twentieth century was explicitly concerned with public health in how it aimed to keep incompatible land uses away from each and encourage building types that would prevent the spread of fire (Frumkin et al. 2011).

Over time, the popularity of single-use zoning (grouping similar land uses together in districts, and placing them away from incompatible uses), combined with increasing levels of automobile ownership, has led to negative externalities: the most notable being urban sprawl. Urban sprawl is the culmination of inefficient patterns of land use and transportation, development, and social and economic policies. The land use and development patterns that our zoning policies have encouraged have led to an increased level of automobile dependency, which has led to more sedentary lifestyles. People tend to get less exercise as they locate themselves further from walkable, urban cores because of the increases in distance between homes, places of employment, schools, and other places that are frequently visited. The lack of physical activity is universal across all cohorts and is a

risk factor of becoming overweight, obese, or developing type II diabetes and heart disease (Frumkin 2004).

Sprawl is not the only culprit; the design and planning of new communities reflects the often correct assumption that people will drive to most of their daily destinations (Jackson and Kochtitzky 2001). It is important to note that planners in every capacity have a responsibility to understand the implications of their decisions on health. The growing obesity rate in the United States, along with increased incidence of related diseases, is an indicator of declining overall physical health of Americans and reflects an unforeseen consequence of urban sprawl. Another culprit is urban form. Poor urban form is a by-product of sprawl, but it is mainly determined by density, diversity of land uses, local design standards, and transportation networks, all which are driven by policy.

Because use, form, and location can affect health behaviors and outcomes, there is growing interest among planners, scholars, and public health experts in exploring how planning, especially zoning, can be used to facilitate the development of healthy communities, by encouraging better community design principles and controlling more for unhealthier land uses. The current practices of land regulation in the United States have contributed to, amongst other major factors, obesogenic environments that have provided the perfect breeding conditions for the growing obesity epidemic. The implementation of alternative zoning policies that encourage healthy habits and more efficient development patterns can aid with the mitigation of the epidemic and its associated issues.

CHAPTER 2 | LITERATURE REVIEW

Researchers in the planning and public health fields have published studies and other literature that suggests that there is a relationship between traditional planning techniques, sprawl, urban form, and physical health. In order to build a compelling case that supports the assumptions that poor land regulation practices are a contributor to obesity, the following questions must be answered:

1. How prevalent is obesity in the United States, and what are the trends?
2. What are the burdens of obesity, and how do they affect the general public?
3. What types of relationships exist between urban sprawl and urban form as related to physical health and obesity?

The literature reviews attempts to answer these questions, while paving the way for new questions and future research to be conducted. The literature has been broken down into three main groups: information about the causes, prevalence, and costs of obesity; the prevalence of urban sprawl and its impact on health; and the intersections between urban form and obesity rates, specifically how land use and transportation policy may be partially responsible for the present epidemic.

SECTION 2.1 | OBESITY

OBESITY PREVALENCE AND TRENDS

Obesity is clinically defined by the World Health Organization (WHO) as having a body mass index (BMI) equal to or greater than 30¹. BMI is calculated based on one's height and weight. It is not the most reliable indicator of obesity since it does not account for an individual's body frame or actual fat composition. However, in many studies, BMI is the easiest numeric metric to use to measure obesity. Table 1 shows a breakdown of down weight classifications.

¹ Some professionals (e.g. insurance companies) use the 85th percentile values as a standard to define overweight and the 95th to define obesity. This often corresponds closely enough with the values that the WHO uses to define overweight and obesity.

Table 1| BMI classifications (World Health Organization)

Classification	BMI(kg/m²)
Underweight	<18.50
<i>Severe thinness</i>	<16.00
<i>Moderate thinness</i>	16.00 - 16.99
<i>Mild thinness</i>	17.00 - 18.49
Normal range	18.50 - 24.99
Overweight	25.00 - 29.99
Obese	≥30.00
<i>Obese class I</i>	30.00 - 34.99
<i>Obese class II</i>	35.00 - 39.99
<i>Obese class III</i>	≥40.00

According to the National Health and Nutrition Examination Survey (NHANES), the rate of adults experiencing obesity in 2012 is 2.7 times higher than it was in 1960 (from 12.8% to 35.1%). Between 1960 and 1994, the prevalence of American adults classified as overweight (BMI between 25 and 29.99) showed relatively little change, but the prevalence of obesity showed large increases across all age, gender, and racial/ethnic groups. Between 1991 and 1998, it is estimated that obesity increased from 12% to 17.9%. From 1998 to 2008, overweight remained fairly consistent with 1994 levels, but obesity increased by over 11%. The prevalence of adults reaching class II and class III obesity contributed to this rise. Between 2008 and 2012, overweight and obesity rates have leveled off. (Flegal et al. 1998, Mokdad et al. 1999, Flegal et al. 2010, Ogden et al. 2014). Table 2 summarizes the increases in adult obesity in the United States between 1960 and 2012.

Table 2 | Overweight and obesity prevalence, 1960 – 2012 (multiple authors)

Years	Estimated % overweight or obese	Estimated % overweight	Estimated % obese	Obese class I	Obese class II	Obese class III
1960-1962	43.3	30.5	12.8	9.6	2.4	0.8
1971-1974	46.2	32.0	14.2	10.1	2.8	1.3
1976-1980	46.0	31.5	14.5	10.1	3.1	1.3
1988-1994	54.5	32.0	22.5	14.4	5.2	2.9
1999-2008	68.0	34.2	33.8	19.5	8.6	5.7
2011-2012	69.0	33.9	35.1	20.6	8.1	6.4

Not only is obesity increasing across all cohorts, it is increasing in each state. Between 1991 and 1998, each state and each region in the United States observed a marked increase in their obesity rates. In 1991, only four states had an obesity rate of 15% or higher (Louisiana, Michigan, Mississippi, and West Virginia). By 1998, 37 states had an obesity rate of 15% or higher. The magnitude of these increases varied from state to state, and region to region. The South Atlantic region had the largest amount of variance. For instance, the state of Delaware saw an 11.3% increase while Georgia saw a 101.8% increase² (Mokdad et al. 1999).

² Delaware and Georgia also happen to represent the most extreme numbers out of Mokdad et al.'s study.

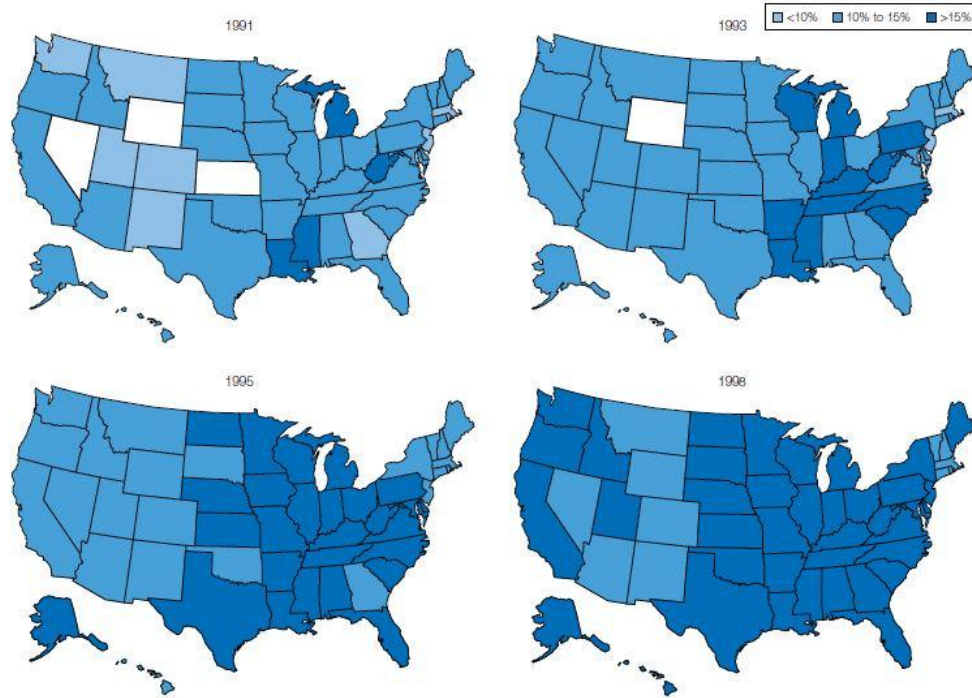


Figure 1 | State-by-state analysis of obesity rates between 1991 and 1998 (Mokdad et al. 1999)

The Centers for Disease Control and Prevention (CDC) found through their analyses that in the year 2000, no state had a rate of obesity less than 10%, 23 states had rates between 20–24%, and no state had a rate equal to or greater than 25%. In 2010, no state had a rate of obesity *less than* 20%. Thirty-six states had a rate equal to or greater than 25%; 12 of these states (Alabama, Arkansas, Kentucky, Louisiana, Michigan, Mississippi, Missouri, Oklahoma, South Carolina, Tennessee, Texas, and West Virginia) had a rate equal to or greater than 30% (“Obesity Prevalence Maps” 2014).

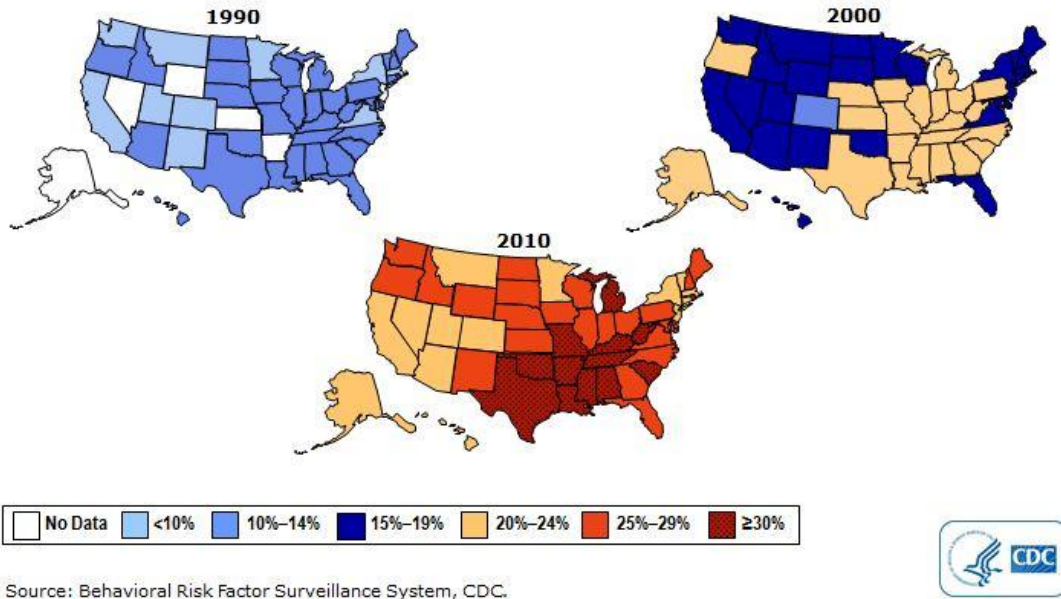


Figure 2 | Obesity trends among U.S. adults in 1990, 2000, and 2010 (Centers for Disease Control and Prevention)

In 2013, Mississippi and West Virginia became the first states to pass the 35% mark for prevalence of obesity (“Obesity Prevalence Maps” 2014).

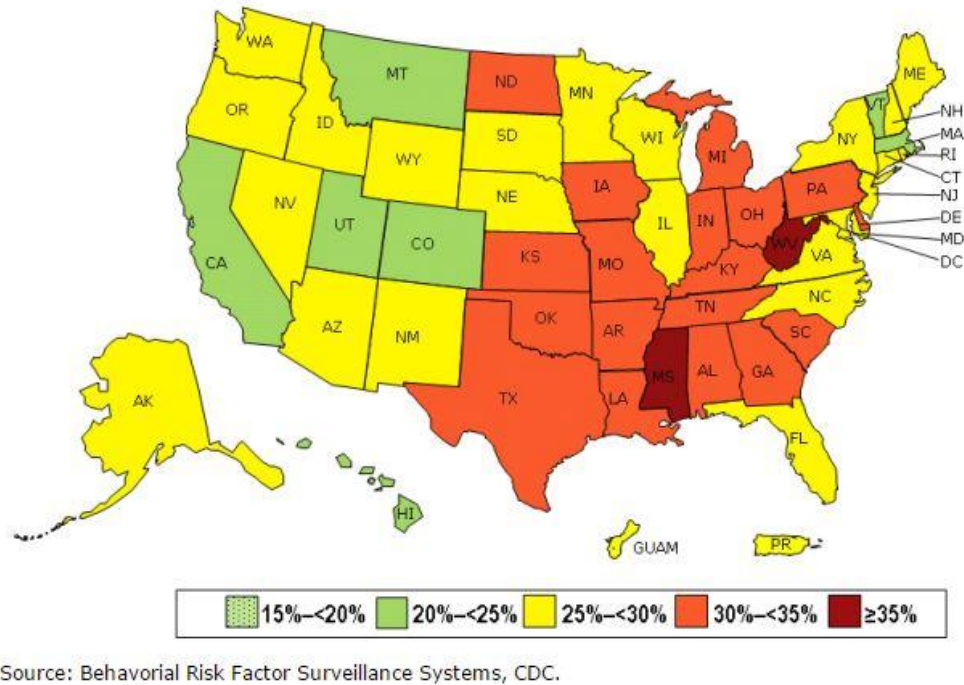


Figure 3 | Prevalence of obesity in 2013 (Centers for Disease Control and Prevention)

If obesity rates have increased as much as they have in the last fifty years, what can be expected in the future? Finkelstein et al. (2012) conducted a study to predict obesity rates using trend data in explanatory variables expected to influence obesity rates, such as income level, education, and historical obesity data. Two methods were used: linear trend modeling and logistic modeling. Table 3 shows those predictions.

Table 3 | Projected prevalence of obesity and class III obesity (Finkelstein et al. 2012)

Year	Linear trend for total % obese	Logistic model for total % obese	Linear trend for % class III obese	Logistic model for % class III obese
2010	31.7	30.9	4.8	4.9
2015	36.4	34.5	5.8	6.4
2020	41.2	37.4	6.8	7.9
2025	46.0	39.9	7.8	9.5
2030	50.7	42.2	8.8	11.1

If obesity continues at the steady trend it has exhibited since the 1990s, half of American adults will be obese in 2030. This figure does not account for the prevalence of overweight. Under this model, class III obesity will continue at a rate of 1% every five years. The logistic model provides a more modest prediction for the year 2030: 42.2% of American adults will be obese. However, under that model, the incidence of class III obesity will increase to 11.1% of the population. In total, obesity will increase by a third and the rate of severe obesity will increase by 130% in the next twenty years (Finkelstein et al. 2012). The numbers provided by the CDC, Flegal et al. (1998, 2010), Mokdad et al. (1999), Ogden et al. (2014), and Finkelstein et al. (2012) do not account for childhood and adolescent obesity, a trend that is also on the rise.

CAUSES OF OBESITY

“Obesity results from a complex interaction between diet, physical activity, and the environment. The built environment encompasses a range of physical and social elements that make up the structure of a community and may influence obesity” (Papas et al. 2007, 129).

The causes of obesity are debated among experts and professionals in various health-related fields. Although it is clear that diet and level of physical activity have a strong association with the likelihood of becoming overweight or obese, there may be other factors that have a connection with obesity. The causes of obesity are not singular, nor do they behave in a singular fashion.

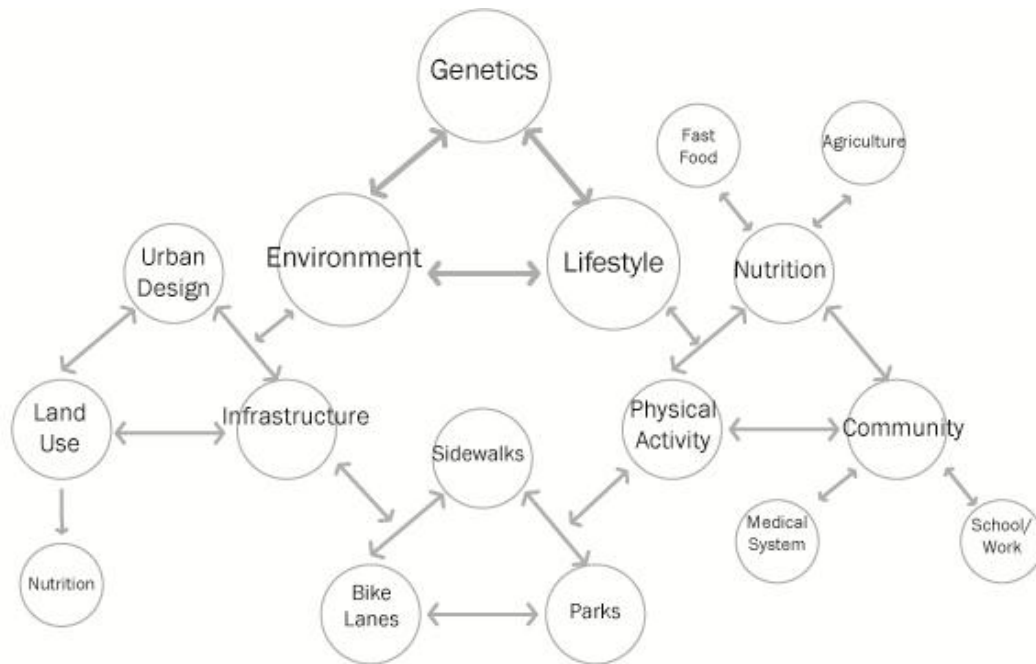


Figure 4 | Social ecological model explaining causes of obesity (Allison Bustin)

Figure 4 is an iteration of a social ecological model. This type of model gives researchers an approach on how to study issues relating to health by showing how human behavior is influenced by, and interconnected between, individuals, social and cultural norms, community, institutional, environmental, and policy factors. Using this kind of model shows where interventions could occur; *the most successful of interventions will transcend multiple levels* (Sallis, Bauman, and Pratt 1998, Schneider 2011). This particular social ecological model not only shows that there are three major contributors to obesity: genetics, environment, and lifestyle, but that there are interconnected relationships between the factors listed under each contribution.

Genetics is the only factor that cannot be controlled since no one can control what genes that they will ultimately inherit. The other two factors, lifestyle and environment, have much to do with the likelihood of becoming overweight or obese, especially since they can activate genes that may cause someone to become overweight and obesity. These two factors combined are where interventions are most likely to be successful. Lifestyle factors include nutrition, physical activity, local community services, and personal relationships. Nutrition is obvious: the more healthy food that one has access to and consumes, the more likely they are to not develop adverse health problems. In some communities, there are barriers to accessing fresh, nutritious foods. Areas without adequate access to those foods are called “food deserts,” and places that have an abundance of unhealthy food outlets, such as fast food restaurants, are called “food swamps.” It is

no surprise that those who live in food swamps or food deserts have a higher likelihood of becoming obese and that the presence of healthier food options has the opposite effect. Physical activity is another obvious factor: getting our recommended amounts of physical activity reduces our chances of gaining weight, which may result in obesity and associated illnesses. Our local community is a less obvious factor: living in a community with a strong medical system may be conducive to encouraging, and incorporating, healthy habits into our daily lives. Associating ourselves with others with good lifestyle habits will increase our chances of successfully reinforcing our own good habits and vice versa. Schools and workplaces can serve as areas where good habits thrive or die.

Environmental factors have a lot to do with what is physically around us. Local land use regulations, urban design standards, and infrastructure type are the primary three factors. All three have an interdependent relationship with each other. Land use regulations include zoning ordinances and subdivision regulations and are influenced by zoning type (traditional versus performance-based versus form-based). In some communities, there are ordinances that regulate urban design. Urban design is also heavily influenced by the presence of certain land use regulations, like form-based codes. Types of infrastructure available in a community (sidewalks, bike lanes, parks, et cetera) are also influenced by land use regulations and urban design regulations, and may also influence how such regulations are written. Having diverse infrastructure types may influence the level of physical activity that a person may receive and how often they utilize active transportation modes. Land use also affects the types of businesses that can locate within a city or community (like food markets and medical facilities), which may affect health.

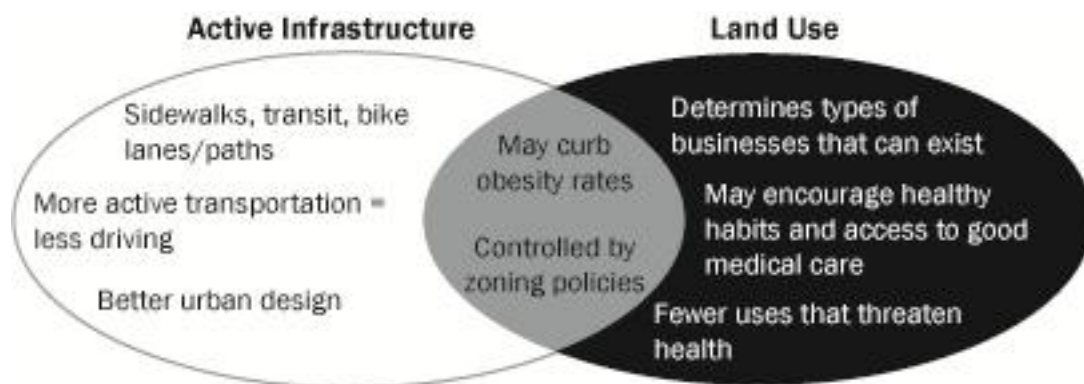


Figure 5 | Intersections of active transportation and land use relating to obesity (Allison Bustin)

It is this connection that shows that land use regulations, especially zoning, may be a way to mitigate this specific cause of obesity. This relationship will be explored the most throughout the course of this report.

COSTS OF OBESITY

Not only does obesity present burdens in one's physical, social, and mental health, it can be a costly disease. The incidence of obesity raises the costs of treating nearly all medical conditions. A study conducted in 2008 found that medical spending for obese Americans is \$1,429 more per capita than medical spending for Americans who are at a healthier weight. In 1998, when the percentage of obese Americans was around 18%, the medical costs related to obesity was nearly \$80 billion, with half of that financed through government-funded medical assistance programs like Medicare and Medicaid (Finkelstein et al. 2009, w822, w825). In 2002, the U.S. Department of Health and Human Services estimated that the costs related to obesity were over \$117 billion (Brisbon et al. 2005, 1025). Between 1998 and 2006, the obesity rate increased to 25% of the population³ and the annual medical spending of obesity increased by \$40 billion⁴. In 2006, obesity alone was responsible for nearly 10% of total healthcare spending. Finkelstein et al. (2009) analyzed obesity-related medical spending in the United States and had concluded that in 2008, obesity-related medical spending came to about \$147 billion, a \$27 billion increase in only two years. Most of the increase was attributed to prescription drugs (Finkelstein et al. 2009, w828). Between 2006 and 2008, the obesity rate increased to just over a third of the U.S. population (Flegal et al. 2010). However, some health economists have estimated even higher numbers for obesity-related medical spending. A study conducted in 2010 predicted that obesity accounts for 20% of total healthcare spending and the per capita spending of obese patients is over \$2,500 more than patients at a healthier weight (Cawley and Meyerhoefer 2012). Finkelstein et al. (2012) estimate that if their obesity forecasts prove accurate, medical expenditures from 2010 to 2030 related to obesity will increase by a combined total of \$550 billion (Finkelstein et al. 2012, 568). Regardless of the correct answer, there is a strong, positive association between obesity rates and medical spending. The medical cost burdens associated with obesity will only be alleviated as obesity rates decline. If half of the costs are really being spent by government-funded medical assistance programs, then lowering obesity rates will most definitely be of the public interest because of the potential reallocation of those funds to be used for other needs.

³ A 37% increase in incidence between 1998 and 2006.

⁴ A 50% increase in spending between 1998 and 2006.

SECTION 2.2 | URBAN SPRAWL

“While sprawl is principally considered to be an American phenomena, global urbanization and rapid population growth have made sprawl an international development form.” (Hamidi and Ewing 2014).

The timing of the aforementioned central causes of sprawl inadvertently led to the United States’ flight to the rapidly growing suburbs during the post-World War II era, especially those relating to the popularization of the automobile and the growth of the federal interstate system (Jackson 2003, Burchell et al. 2005). Since 1980, suburban populations have grown over ten times faster than their central city populations in some of the country’s largest metro areas, and in those of other developed countries. In 1990, the suburbs were home to around 60% of the country’s metropolitan population (around 80% of the U.S. population). Because this sector of the population has grown so quickly in such a short period of time, land consumption has reached an all-time high. In some cases, the amount of land consumed has grown faster than the actual population. This has led to an overall decrease in population density and increase in car, parking lot, and commercial density (Benfield 1999, 6). The incidence of sprawl and a poorly designed built environment may encourage unhealthy behaviors that lead to adverse health outcomes (Schneider 2011).

CHARACTERISTICS

Urban sprawl may be one of the largest components of the obesity epidemic. It has led to many problems that correlate with the rise in obesity rates in the last fifty years. It is suggested that areas with a high level of sprawl have less walkable infrastructure along with fewer reported minutes of physical activity, fewer mixed use developments, chaotic land use patterns, lack of open space, accessibility issues within cities, and less population density (Benfield 1999, Ewing et al. 2003, Burchell et al. 2005, Ewing et al. 2014).



Figure 6 | Urban sprawl, Las Vegas, Nevada (Creative Commons)

Urban sprawl is primarily characterized as low density, automobile dependent developments that consume excessive amounts of land. It is commonly attributed to the invention and popularization of the automobile, lack of quality urban planning in the form of traditional single-use zoning policies, easy access to large amounts of land, and the economic attractiveness and ease of obtaining home mortgages. Primarily a suburban morphology, sprawl is defined as being made up of leapfrog development, commercial strip mall developments, low density residential development complete with detached single-family homes, and large areas of single-use zoning (Hamidi and Ewing 2014). In many of his studies, Reid Ewing analyzed sprawl using a four-factor model that looked at development density, land use mix, activity centering, and street accessibility, all factors that are important when discussing the causes and consequences of sprawl (Ewing et al. 2003, Ewing et al. 2014, Ewing and Hamidi 2014). The figure below (Figure 7) shows how population density (resulting from sprawl) compares between metropolitan Atlanta, Georgia and the city of Barcelona, Spain and postulates how uncontrolled growth can impact many variables such as transportation, transit, land use patterns, and health.

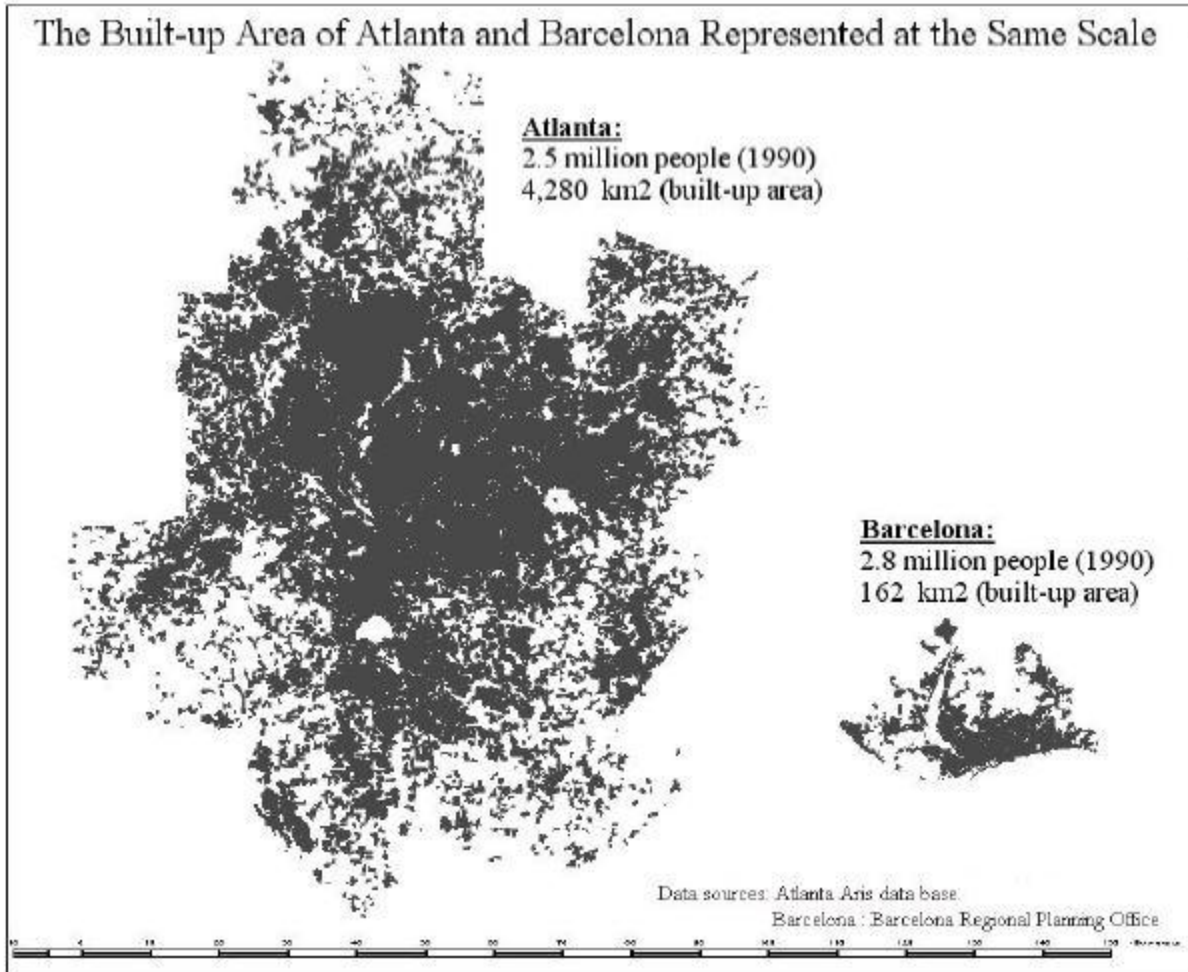


Figure 7 | Population density of metropolitan Atlanta versus Barcelona in 1990 (Bertaud 2003)

EFFECTS ON PHYSICAL HEALTH

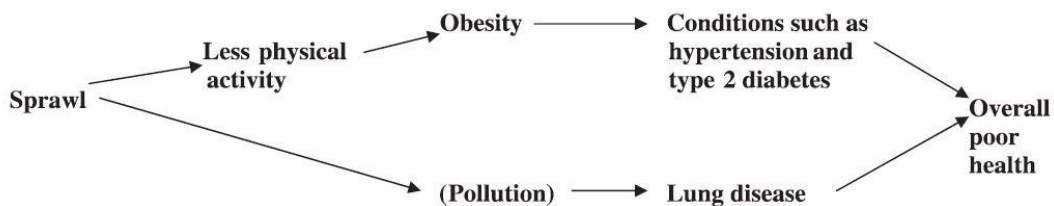


Figure 8 | The sprawl-health relationship (Kelly-Schwartz et al. 2014)

Scholars and researchers have proposed a variety of negative impacts relating to sprawl including, but not limited to, open space preservation, air quality, traffic congestion, affordability of housing, and quality of life (Hamidi and Ewing 2014). There is existing literature and studies

conducted in recent years that conclude that a correlation between sprawl and the amount of daily physical activity receive does exist (Frank and Engelke 2001, Ewing et al. 2003, Frank, Andresen, and Schmid 2004, Frumkin 2004, Lopez 2004, Plantinga and Bernell 2007, Ewing et al. 2014, Ewing and Hamidi 2014). One major feature of sprawl, as aforementioned, is automobile dependence. This dependence has spawned an increase of people with sedentary lifestyles. This has been caused by a lack of: density, diverse land use mixes, good design strategies, and walkable/bikeable infrastructure (Frank and Engelke 2001, Frumkin 2002, Frumkin 2004, Kelly-Schwartz et al. 2004, Plantinga and Bernell 2007, Dannenberg, Frumkin, and Jackson 2011), and demographic shifts, a demand for convenience, and the lack of emphasis on athleticism in modern American culture. In the United States, the primary mode split is an overwhelmingly automobile-majority: only 1% of trips generated are on bicycle, while 9% are on foot. Among metropolitan areas, driving is especially prevalent. For example, drivers in the metropolitan Atlanta region, one of the nation's leading examples of urban sprawl, travel an average of 34.1 miles a day by car. This number includes both drivers *and* non-drivers. More dense populations have much lower driving averages, such as Philadelphia (16.9 miles) and Chicago (19.9 miles) (Frumkin 2002, 2002). The increase in vehicle mileage per day means more time spent in the car, which puts a person at risk for not getting the daily recommended amount of physical exercise. As a result, the lack of physical activity places one at risk for becoming overweight or obese. It is estimated that Americans will spend roughly one-eighth of their waking hours in their cars (Benfield 1999, 13).

Ewing's studies have shown that low sprawl index is associated with higher average BMIs using his four-factor model for determining level of sprawl (Ewing et al. 2003, Ewing et al. 2014, Ewing and Hamidi 2014). In the 2014 report, "Measuring Sprawl 2014," Ewing notes sprawl's impact on health by stating that "people in compact, connected metro areas tend to be safer, healthier and live longer than their peers in more sprawling metro areas" (Ewing and Hamidi 2014, 9). His recent report builds off of the data collected in his previous studies of the connections between urban sprawl and health. His studies have compared sprawl index to BMI at both the county level and metropolitan statistical area (MSA) level. A low sprawl index score indicates a high degree of sprawl within an area. Ewing concluded that people in compact, connected counties are expected to live longer. For every doubling in an index score, life expectancy can increase by about four percent. For example, if the average American life expectancy is 78 years, this would mean that people who live in compact areas could expect to live up to three years longer than someone who

lives in an area with a higher degree of sprawl. BMI plays a role in this. It is strongly and positively related to index scores. For example, “a 5’10” man living in Arlington County, VA⁵ is likely to weigh four pounds less than the same man living in Charles County, MD⁶. Similarly, the likelihood of obesity increases. People in less sprawling counties also have significantly lower blood pressure and rates of diabetes” (Ewing and Hamidi 2014, 11). A similar study to Ewing’s numerous studies supports these findings by suggesting that on a 0-100 point urban sprawl index (0 = no sprawl, 100 = most sprawled), for every 1 point increase on the index will increase one’s risk of becoming overweight or obese by 0.2% and 0.5%, respectively; this, along with Ewing and other researchers, that there is an association between urban sprawl and obesity (Lopez 2004, 1576).

This issue of sprawl as it relates to obesity is particularly strong in the phenomenon of “school sprawl.” Leapfrog patterns in development have led to school campuses being placed farther from residential neighborhoods, which had resulted in children getting less regular physical activity in the form of walking or biking to school. As late as the 1970s, a majority of children were not driven to or bused to school, and childhood obesity was only at 7% among those who lived within a mile of their school (Botchwey, Trowbridge, and Fisher 2014, 115). However, because of the growing incidence of sprawl, the rate of children who can walk or ride a bicycle to school has sharply decreased to less than 15% nationwide (Benfield 2013). It is also no coincidence that childhood obesity has doubled in children and tripled in adolescents. 17% of children and adolescents between the ages of 2 and 19 are classified as obese (Guettabi and Munasib 2014, 378). Not surprisingly, only 31% of children living within one mile from their school walk there regularly, explaining how 17% of children are obese (Botchwey, Trowbridge, and Fisher 2014, 115). Additional studies on sprawl’s effect on child weight shows that keeping other variables constant, the degree of sprawl in which children live contributes to their risk of becoming obese. Living in a more compact and walkable area bodes well for children both physically and mentally, and can help reduce their risk of becoming obese adults. Increasing the number of children and adolescents who are able to commute to school via active modes may decrease their chances of becoming overweight or obese. However, the problem of students not being able to walk to school is not because of poor land use policies; it is due to the policies set by the governing school districts themselves. A 2014 study on school siting practices within the state of Georgia identified school sprawl as a top problem within the state, and

⁵ 163.28 sprawl index score

⁶ 93.17 sprawl index score

made recommendations on school siting concerning actual school design, location, and how to increase active transportation. Some of those recommendations include:

- construct multi-use pedestrian and bicycle infrastructure to improve accessibility;
- construct infrastructure that improves quality of walking and biking experience;
- create a SRTS program at all eligible schools to promote walking and biking;
- prioritize proximity to already existing housing and commercial developments; and
- departments of education should eliminate minimum acreage requirements and replace them with maximum acreage requirements to better increase the chances of selecting a site near existing developments (Anderson et al. 2014).

Such policies can promote more active transportation options and connections to nearby homes and amenities, encouraging more physical activity in children and adolescents and combatting obesity.

SECTION 2.3 | URBAN FORM

“...a combination of urban design, land use patterns, and transportation systems that promotes walking and bicycling will help create active healthier, and more livable communities” (Handy et al. 2002).

A chapter on transportation, land use, and health in *Making Healthy Places: Designing and Building for Health, Well-being, and Sustainability* simplifies the concept of urban form into five “D’s”: density, diversity, destination, degree of accessibility, and distance to transit. These 5 D’s affect urban form, which in turn affect the physical, social, and mental health of the residents living and working there (Ewing et al. 2011, 149). There is a lot of literature and studies that suggest that like sprawl, there is a close correlation with compact urban form with health, especially as it relates to the level of physical activity that is received daily. The aforementioned 5 D’s, for example, are factors that support the health benefits associated with the ability to utilize active transportation. Other factors include urban design, scale, and activity options. “The built environment can both facilitate and hinder physical activity and healthful eating” (Booth, Pinkston, and Poston 2005, S110). While there are many factors that determine urban form, researchers in both the planning and urban design fields agree that urban form is primarily dictated by diversity of land use and transportation. Figure 9 is an example of a social ecological model that shows how transportation and land use fits into the issue. The literature reviewed in this section discusses how these factors both negatively and positively influence physical health with respect to obesity.

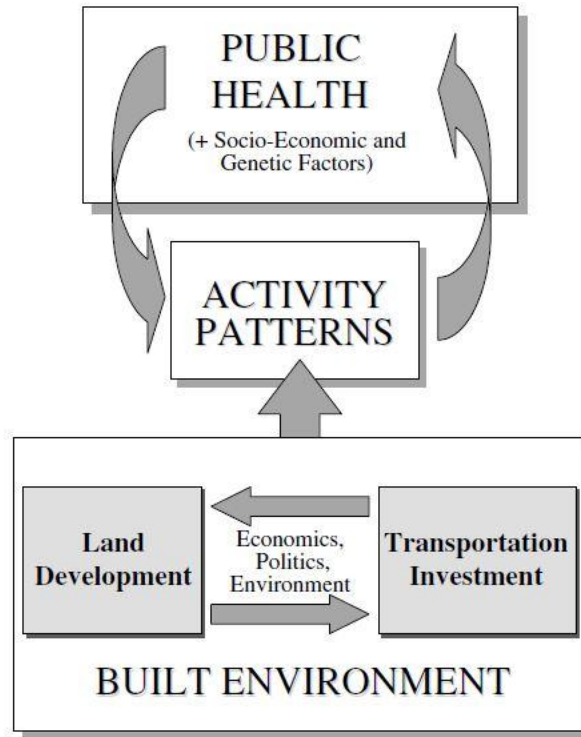


Figure 9 | Linkages between land use, transportation, and public health (Frank and Engelke 2001)

DIVERSITY OF LAND USE

Determining how land is used is one of the principal jobs that planners have. Typically, this is done through ordinances that determine base zoning classifications and regulations that control for use and form. As discussed earlier, areas that are afflicted with urban sprawl (primarily suburban areas) are characterized by large sections of single-use zoning, or what may be called a poor land use mix. Land use mix is defined as “the relative proximity of different land uses within a given area” (Handy et al. 2002, 66). A place with a high level of land use mix is, in layman’s terms, called a mixed-use development. These developments not only include residential space; they also have commercial space, offices, and recreational areas all within a short distance. The diversity of land use is important it affects how people move and operate in their communities. A poor mix of land uses is marked by lower population and development densities, and low levels of both leisurely physical activity and utilitarian active transportation (Booth, Pinkston, and Poston 2005, Sallis, Millstein, and Carlson 2011, Ewing et al. 2011), which will be discussed in more detail in the next section. Poor land use mix is the direct result of the implementation of auto-dependent land use and development regulations, including but not limited to, density maximums, parking minimums, lack of sidewalk provisions, and single-use zoning (Frank 2000).

There have been studies conducted that have concluded that land use mix does have an impact on daily physical activity and the likelihood of becoming overweight or obese. Frank, Andresen, and Schmid (2004) found in their Atlanta study that after ranking each of the city's neighborhoods by land use mix, each quartile increase (25%) in land use mix equated to a 12.2% reduction in one's odds of becoming obese. They also found that higher BMI and obesity rates correlated with neighborhoods with a low degree of land use mix (Frank, Andresen, and Schmid 2004, 90-91). Ewing and Kreutzer's report for the LEED-ND Core Committee (2006) builds on this research and states that increasing an area's land use mix by two-fold can result in vehicle trips being reduced by 3% (Ewing and Kreutzer 2006). 3% does not seem like a large decrease, but the aggregated effects cannot be ignored.

Frank identified that the choice to walk is positively associated with areas with a high degree of land use mix and connectivity. Proximity of destination is a factor in that choice, as well how accessible the destination is perceived to be. He noted that older neighborhoods established before World War II have a higher level of density, a higher mix of residential and commercial land uses, and more street connectivity. In two of his studies, he concluded that people who reside in those kinds of neighborhoods and post-World War II neighborhoods that embody "neo-traditional design" are more likely to be physically active, and demonstrated that these people report an average of 30 minutes more utilitarian active transportation per week and more overall physical activity compared to those in less walkable suburban areas (Frank 2000, Frank et al. 2005, 122). These higher density neighborhoods with their higher levels of land use mix are, unsurprisingly, associated with reduced trip lengths and reduced levels of vehicle ownership (Frank and Engelke 2001). Overall, the research shows that urban forms with higher levels of land use mixes can increase walking, biking, and transit use, as well as reduce vehicle trips, therefore increasing levels of physical activity and decreasing the likelihood of becoming overweight or obese.

TRANSPORTATION NETWORKS

Human settlements are dependent on transportation networks. The layout of these networks and the spatial distribution of different travel modes impact our ability to walk and bike for leisure and utilitarian purposes, as well as our quality of travel (Frank and Engelke 2001). The success of these networks manifest in their level of street connectivity (density of intersections and block sizes), continuity of networks (accessibility and trip length), and availability of transit. The formation of these networks is ultimately influenced by travel demand and policy.

Before cars became the primary mode of transportation in the United States, people relied on walking, biking, and taking transit, all of which are classified as active transportation. There is a seemingly infinite loop that occurs: although the ease of owning a car spurred low-density development patterns, it is those same development patterns that have made car ownership mandatory and have discouraged active modes of transportation. The dilemma that has arisen is how to stop the cycle. As previously stated, more time spent in cars means fewer opportunities for active transportation (Frank and Engelke 2001, Jackson 2003, Frumkin 2004, Frank, Andresen, and Schmid 2004, Dannenberg, Frumkin, and Jackson 2011). Frank, Andresen, and Schmid (2004) conclude that measures of urban form and the travel patterns of an area are crucial predictors of the level of obesity that exists. In other words, where one lives and works affects their travel choices and how much they utilize utilitarian active transportation modes. They found that for every additional sixty minutes spent in a car per day, the risk of becoming obese increases by 6% (Frank, Andresen, and Schmid 2004, 90).

Connected street networks are a common metric of how to measure the success of the built environment. It is measured by intersections per square mile or the block length/area in any given space. A highly connected street network is one that gives the traveler many routes to choose from between destinations in order to minimize travel time and provide the most direct route (Handy et al. 2002, Ewing and Kreutzer 2006). A poorly connected network may impact urban form and inadvertently discourage active modes of transportation. Subdivision regulations often favor disconnected cul-de-sac street designs over finely gridded systems, resulting in greater distances between where people live, work, and play that force them to drive, instead of using active modes (Frank et al. 2006).

A continuous transportation network is measured by trip length and accessibility. Accessibility itself is measured by the availability of alternative transportation infrastructure such as sidewalks, bike lanes, and transit stops. A perfectly continuous transportation network has no breaks in infrastructure: every street would be accompanied by well-designed sidewalks and bike lanes; every intersection would have crosswalks or pedestrian bridges; and major road systems would be connected to transit systems via rail stations and bus stops. The absence of infrastructure continuity may also discourage active transportation, especially in areas where sidewalks, bike lanes, and connections to transit do not exist (Ewing and Kreutzer 2006). Some land use regulations do not explicitly mandate certain zoning classifications to build sidewalks, leaving that up to chance, and some transportation plans determine to what extent bike lanes are designed if they are even included in such plans.

Land use and transportation policies are two crucial areas that need work if planners and public health officials wish to mitigate the obesity crisis. Such policies that dictate how to regulate land and transportation need to better address health. Some of the literature reviewed gives guidance as to what such policy improvements would target. Since many communities have not updated their regulations and policies relating to land use since the 1950s or 1960s, updates desperately need to be made. Ewing et al. (2011) suggest that land-use and transportation policies that would promote health should include changing the policies to favor smart growth, adopt pedestrian-friendly site and building design regulations and standards, adopt complete-streets policies, promote safer routes to schools, and prioritizing bicycle, pedestrian, and transit facilities over automobile facilities (Ewing et al. 2011, 160). If current land use and transportation policies do not change, the resulting developments and investments will exacerbate these issues (Frank 2000).

CHAPTER 3 | CONTERARGUMENTS

While studies and literature have established the potential connections between the built environment, the regulatory framework of land use, and the rise in obesity rates, some will argue that there is more to the story. There are experts in health and public policy who would argue that how we design our cities and policies regulating land use are not the problem as much as our changing cultural values. The human body is a wonderful machine that is designed to put out as much energy as it takes in, up to a certain point. What the body does not use, it converts that excess to fat to be used in times when food is scarce. Our human ancestors often dealt with food scarcity. The ingrained instinct to consume as much calorie-rich food as possible was developed because of food scarcity. As food scarcity has become less of a problem in developed nations, this instinct has not gone away. But as calorie-rich foods with higher energy content have become more available thanks to the growth of the fast food industry and the popularization of sugar-laced “snack foods,” the human race as a whole has not gained the unconscious ability to control excessive sugar and saturated fat consumption. Aside from the increased availability of these foods, our opportunities to burn energy have decreased: we watch more television than before (sitting down, of course), spend more time in our cars commuting back and forth to our jobs, labor-intensive jobs have been replaced by machines, and children spend less time being active, since many schools have cut recess out of their daily schedules and have reduced the amount of physical education taught each week. It is no wonder that Americans are becoming fatter with each passing year. Others will argue that there are environmental factors out there that have triggered certain genes that have led us to gain more weight and develop related illnesses (Koplan and Dietz 1999).

While some experts are quick to blame poor planning strategies and public policy for the increasing rates of obesity, some are more willing to argue against the idea that sprawl and urban form affect health. “Sprawl critics make a leap that goes like this: People live in houses with garages. Because these houses sit on small open-air parks (yards), people are less inclined to walk to a transit stop and take a bus to work. So, they climb in their cars and drive. Because they drive, they do not exercise. Since they do not exercise, they have more health problems, get sick, and die sooner. Simply stated, it is your house's fault”. In other words, the assumption that sprawl “kills” is a terrible one, according to a 2004 blog post by Samuel Staley for the Reason Foundation. Staley asserts that while we cannot ignore the increasing rate in which people are becoming obese, afflicted with heart disease, cancer, or type II diabetes, it cannot all be attributed to living in a sprawled area. While having ill health is definitely related to lifestyle choice, there are other lifestyle choices that have a larger impact than just living in an area that has a high level of sprawl. The

choice of where to live is most likely unrelated to physical health. It may be possible that one who makes the choice to move to the suburbs (or other comparatively sprawling community) may have a “healthier” lifestyle than one who makes the choice to live downtown. In short, it is all about personal choice: some choose an unhealthy, sedentary lifestyle filled with fast food and lots of television, and some choose the exact opposite lifestyle regardless of where they live. Staley ends his arguments by stating that the debate over land use and health is a good one because of the evidence that “land development patterns might create barriers to increased physical activity,” but it does not mean that urban living is the only way to overcome it (Staley 2004).

The smart growth movement, among other similar movements, advocate that improved urban design can increase active transportation in communities where it does not exist can also improve physical health. But, some will argue that the advocates of smart growth “figure if everyone is crammed into downtown areas of Orange County cities or Los Angeles, we will walk everywhere and be in better shape. Never mind that we are all free to walk and exercise as much as we choose now, or that many suburbs feature walking trails and bike paths. Let's also ignore the health and fitness clubs on almost every corner” (Fiscelli 2003). Fiscelli’s blog post for the Reason Foundation makes a good point that perhaps physical activity is a conscious, personal choice rather than it being unconscious and predetermined by infrastructure availability. Fiscelli further asserts that access to exercise is not the problem, but that the problem is motivation. Some people will not utilize active modes of transportation even if they live in an area that has a high availability of it. If given the choice to walk, drive, or take transit, given that one has equal opportunities to utilize any of those three modes, most will choose to drive even if the destination is a short distance away. That decision has nothing to do with where one lives, but it is made out of convenience and personal preference.

These counterarguments provide some interesting points about how the obesity crisis is not related to land use and built environment, but to more conscious, lifestyle factors. However, it cannot be ignored that community design still has a large, invisible connection to our health and well-being. It is not enough to consciously change our behaviors, but we must change the way we plan and design the places we visit every day.

PART II | CURRENT PLANNING STRATEGIES

When examined separately, public health policies and land use policies often do not adequately address the health/land use connection. It is through the schism of planning and public health as separate professions and entities that this has occurred. Because of this, as concluded in Part I, the current state of land regulation and public health policy, and its lack of coordination, has partially contributed the obesity epidemic.

The first issue at hand is land use policy. Land use policy is managed by city, county, regional, and state governments in some combination. Regulating land is a complex issue that takes many forms. On a local and regional level, this is done through long-range, comprehensive planning. The most common land use regulatory practice, as discussed briefly in the previous section, is zoning. Zoning impacts how the community's built environment is designed and affects how it functions. The function of our built environment affects our daily activities and personal behavioral habits. In other words, bad zoning practices can negatively impact our daily lives and habits in regards to physical health. In the United States, the implementation of zoning ordinances and subdivision regulations is the dominant strategy in the physical planning of our cities and metropolitan regions. There are many ways to regulate land and design our communities through zoning. The dominant zoning practice has been traditional, single-use (also called Euclidean) zoning. The practice of traditional zoning is best described as being "an imperative, yet controversial, aspect of planning practice, often...fragmented, arbitrary and contentious" (Faga 2014, 1). However, in recent years, form-based zoning practices (commonly known as form-based codes) have been implemented in neighborhood developments, towns, and large cities in order to improve how the public realm is designed.

The other issue is public health policy, and how it fails to address land use. Interventions must be made to connect these two realms and in recent years, policy reforms have attempted to do that. Newer policies adopted in various places across the country are now addressing problems of respiratory health, limited availability of greenspaces, barriers to walkability, and healthy eating. The most impressive changes have been done by improving regulatory practices at both the local and state levels, mandating necessary legislative change, and introducing newer planning frameworks aimed at improving physical health. This is not a widespread phenomenon, but such examples can provide insights on how improving the physical health of the public can start with changing how we build and design our cities.

In this part of the report, the role of the comprehensive plan will be explored, as well as to the extent that long-range planning has adequately handled the obesity crisis. The current state of zoning policy will be explored by examining how traditional zoning operates within its regulatory framework, and the health implications it has had and will continue to have. After that, traditional zoning practices will be contrasted with form-based zoning practices in how land is regulated, how land use is treated, and how human health is impacted. Finally, a few case studies will be discussed to show how some local governments and other organizations have best addressed public health in their regulatory land use practices. The objective of this section of this report is to assess the current condition of such issues in order to demonstrate how obesity rates in the United States can be reduced by adjusting zoning regulations.

CHAPTER 4 | THE ROLE OF THE COMPREHENSIVE PLAN

“The comprehensive plan is the place where urban designers and citizen activists must press for the inclusion and articulation of standards for the quality and functionality of the civic environment. Such provisions should spell out how streets, sidewalks, and parks define the framework in which urban development occurs, and how development, controlled through zoning and subdivision policy, should engage that framework” (Dobbins 2009, 250).

Comprehensive planning is a type of long-range planning that guides location, design, density, rate, and development patterns within a community over a twenty year period or longer. Comprehensive plans often rely on a community vision so that it can offer appropriate facts, goals and objectives, and incorporate long-range considerations into short term actions related to needs and opportunities, community work programs, capital improvement, economic development, land use, transportation, housing, and natural environment (Berke 2006, 24, Georgia Department of Community Affairs 2014a).

Federal funds for many programs including housing, urban development, and transportation are “passed through” state governments to local governments. States are then required to designate a statewide agency and empower it with the authority to establish standards and procedures for appropriate and timely comprehensive planning by the local governments. State agencies require that local governments prepare, adopt, maintain, and implement a comprehensive development plan, and review those plans to ensure that they meet federal and state imposed standards. Upon review and acceptance of their comprehensive development plan, local governments become eligible for federal funds as well as many sources of state funding. Each state mandates the exact elements that need to be planned for. For example, cities and counties within the state of Georgia have a framework that the Department of Community Affairs has created when determining what is to be included in a comprehensive plan. Table 4 explains that framework.

Table 4 | Required and optional plan elements for local governments in the State of Georgia (Georgia Department of Affairs 2014a, 3-4)

Plan Element	Required for:	Optional for:
Community goals	All local governments	N/A
Needs and opportunities	All local governments	N/A
Community work program	All local governments	N/A
Capital improvement	Governments that charge impact fees	N/A
Economic development	Communities included in Georgia Job Tax Credit Tier 1	Communities seeking improved economic opportunities for their citizens
Land use	Communities with zoning or equivalent land development regulations that are subject to the Zoning Procedures Law	Communities that: <ul style="list-style-type: none"> • Are considering new land development regulations • Include Target Areas in their comprehensive plan • Wish to improve aesthetics of specific areas or protect the character of specific parts of their community

(continued on next page)

Transportation	Portions of a local government's jurisdiction that are included in a Metropolitan Planning Organization	<p>Communities:</p> <ul style="list-style-type: none"> • With automobile congestion problems in selected areas • Interested in adding alternative transportation facilities for bicyclists, pedestrians, public transportation users • That may have too much or too little parking in specific areas
Housing	HUD CDBG Entitlement Communities	<p>Communities with:</p> <ul style="list-style-type: none"> • Concentrations of low-quality or dilapidated housing • Relatively high housing costs compared to individual/family incomes • A jobs-housing imbalance

The formula set forth by the State of Georgia does not mandate that local governments consider health. It can be addressed as a stand-alone element if a community feels as if it is necessary. Perhaps, this is an intervention that should happen on the state level.

Comprehensive plans create goals for a local government to aspire to within a short and long term timeframe by suggesting policy reforms to enact, which may or may not include zoning as a strategy for implementation. These long-range planning documents have much power in influencing change within a municipality, including influencing better health outcomes. The first step in modifying zoning, whether its comprehensive or parcel-based, is the comprehensive plan (Dobbins 2009, 294). Chapter 9 will discuss a local health-based comprehensive planning framework that can incorporate health as a goal through the prioritization of health-based zoning.

CHAPTER 5 | TRADITIONAL ZONING REGULATIONS

Zoning was established as a police power via the Standard State Zoning Enabling Act (SZEA) in 1926 through the United States Department of Commerce’s Advisory Committee on City Planning and Zoning (ACCPZ), which every state thereafter adopted. The SSZEA was popular at the time because it offered a “federally supported, standardized template for single-use zoning” (Yellin 2013, 91). The term “Euclidean zoning” gets its name from the landmark 1926 Supreme Court case *Village of Euclid v. Ambler Realty Company* (272 U.S. 365) which validated the constitutionality of zoning according to land use. While the Cleveland, Ohio suburb was not the first municipality to have a zoning code, this case became the precedent that allowed for municipalities across the United States to develop similar zoning policies. During this time, multi-family/attached housing began to develop a stigma of being “substandard”; therefore, single-family/detached housing became more desirable. As a consequence, single-family residential zones began to become the norm in planning and zoning. The rationale was that placing housing next to properties with more noxious uses would negatively affect property values. This practice has greatly contributed to the negative externalities of traditional zoning (Parolek, Parolek, and Crawford 2008, 7). The result of traditional zoning can be summed by asserting that “sprawl-inducing zoning and subdivision rules create localized effects that, in aggregate, present a significant barrier to compact walkable urban form” (Talen 2013, 188). Many policies also originated from the Standard City Planning Enabling Act (SCPEA) of 1928. The SCPEA covered six subjects:

- the organization and power of the planning commission in preparing and adopting a master plan;
- the content of the master plan for the physical development of land;
- provision for adoption of a master street plan by the local government;
- provision for approval of all public improvements by the planning commission;
- the control of private subdivision of land; and
- provision for the establishment of a regional planning commission and a regional plan (Knack, Meck, and Stollman 1996, 6).

In 1936, the ACCPZ released model subdivision regulations, which would prove influential in traditional zoning practice. Both the SZEA and SCPEA shaped how land use is dealt with in the United States, although in the 1920s, American cities and towns looked and operated differently than they do today. While these policies worked well in post-industrial America and in the advent of the interstate highway system, they are not as effective now (Knack, Meck, and Stollman 1996). Instead

of using zoning to solve localized urban problems and prevent unfavorable development as it was intended to do, it has been a victim of its own success by creating places that have exacerbated local issues and encouraged unfavorable developments. The problem now is that these models set forth by the ACCPZ do not address current issues, and many cities haven't updated their zoning ordinances since the enactment of the SZE and SCPEA to reflect those issues.

Throughout the life of traditional zoning, there have been many similar criticisms focusing on the negative externalities of this method of regulation. The rigid separation of use by district has made it difficult to meet contemporary market demands for compact, walkable environments. One negative externality is segregation and the (perhaps accidental) social engineering of the suburban environment. Suburban jurisdictions have used traditional zoning practices as a way to exclude lower-income families and would-be apartment-dwellers out of their neighborhoods. As a result, "residential districts have been carved up into increasingly more-specific zones based on uniform lot and house sizes, meaning not only that one type of housing is separated from another, but also that middle class and affluent families are segregated by home price" (Fallon and Neistadt 2006, 13). Jane Jacobs wrote in her famous work, *The Death and Life of Great American Cities* (1961), what is likely to be the strongest of such criticisms. Jacobs believed in a more libertarian form of city building, by not taking a hands-off approach to city planning and only intervening whenever it is absolutely necessary. Jacobs was especially critical about how modern planning policy translated into poor urban design strategies using larger block sizes and the spreading out of human density, and advocated for mixed uses and shorter block lengths for the sake of human scale (Jacobs 1961). These arguments have provided a basis of which many have used to advocate for a revolution of land regulation.

This chapter will discuss the different aspects of traditional zoning, how its current regulatory framework operates, and how different components of that framework have negatively affected human health.

SECTION 5.1 | REGULATORY FRAMEWORK COMPONENTS

Traditional zoning in local governments operate under proscriptive ordinances set forth by local decision makers. If one was to locate their city's current zoning code, they would likely find a document hundreds of pages long of individually passed ordinances that may either cancel out or contradict other ordinances. The typical format of these codes often divide land by use (residential, commercial, industrial, civic/institutional, et cetera), and then subdivide these uses by density (light,

medium, heavy). This is best known as “base zoning.” The base zoning regulations usually proscribe, among other provisions:

- permitted and unpermitted uses of land, such as particular types of businesses, housing, and civic uses;
- accessory uses;
- building setbacks;
- whether or not sidewalks have to be built;
- minimums on lot size;
- open space requirements;
- restrictions on building height
- how much parking must be provided per development;
- land coverage; and
- floor-to-area ratios (FARs).

In addition to base zoning, which is may be complicated to begin with, there are other regulations that may lie on top of base zoning to proscribe additional requirements, called “overlays.” Overlays may be form-based design ordinances, ban more types of businesses or housing from being permitted, and/or be performance-based for environmental or economic reasons. Some cities may pass ordinances that implement “special-use districts.” These special-use districts may take the form of base zoning, or can be implemented as another overlay. Most special-use districts are mixed-use districts or planned-unit developments, or could be a vehicle for the implementation of form-based zoning. In the event that a proposed development does not meet certain requirements of the zoning, the property owner or developer can apply for a variance under the local board of zoning adjustment department. A variance allows for exceptions to the zoning code in the event that the baseline criteria prove to be a “hardship” caused by the provisions of the zoning classification. The zoning format described may vary between different municipalities, but in many cases, there may be up to a hundred or more permutations of base zoning, subdivision regulations, overlays, and special use districts.

Residential base zoning often controls for building density, and to a lesser extent, use. Zoning will dictate what kinds of housing can exist under a particular classification. Some residential zoning classifications may explicitly state if high-rise residences or multi-family housing is allowed, but in cases it does not, permitted housing types can be inferred after examining allowed density. If there is a maximum density of 4 housing units per acre, then it is likely that the only housing type

that can occur is detached single-family housing. A higher maximum density of 20 units per acre might be conducive to townhouses, duplexes, and other multi-family housing types, but even under a higher maximum density can detached single-family housing developments be permitted. Residential base zoning controls for use in two ways: first, by controlling accessory uses of land and/or banning home-based businesses, and second, by allowing certain kinds of small businesses to exist within residential developments, as well as tax-exempt uses like schools and places of worship.

All other base zoning codes may control for use, and to a lesser extent, density. Density is usually described as “light, medium, or heavy,” or as “neighborhood or general.” For example, land zoned as neighborhood commercial might allow for smaller businesses, banks, farmer’s markets, and convenience stores. As commercial activity becomes heavier, denser uses like shopping centers, malls, hotels, and potentially nuisance producing uses become permitted. In some cases, a use that is not expressly permitted under a particular zoning classification may be permitted conditionally. This is called a conditional use. Often, this requires a special permit and/or something extra on the part of the person applying for the permit. Overall, commercial, industrial, and other base zoning classifications are more concerned with making sure that certain types of businesses are not permitted in certain zoning classifications. These are known in the planning community as locally unwanted land uses (LULUs). These include retail outlets that sell alcohol and adult entertainment destinations. Figure 10 shows an example of permitted and conditional uses under Gwinnett County, Georgia’s zoning ordinance.

Table 230.4

Uses	Suppl/Reg	RA-200	RLL	R-100	R-75	OSC	R-10	HH	TND	R-6R	R-7H	RH-13	RH-24	HR	OR	O-1	C-1	C-2	C-3	MU-N	MU-C	MUR	M-1	M-2	
Agricultural and Rural Recreational Uses																									
Agricultural Uses (crop or animal production)	Y	P																							
Beekeeping		P																							
Community Garden	Y	P	P	P	P	P	P	P	P	P	P	P	P	P							P	P	P		
Country Clubs and Golf Courses	Y	P	S	S	S	S																			
Equestrian Facility Riding Stables or Academy	Y	P																							
Fishing Club or Fishing Pond		P																							
Forestry and Logging		P																							
Golf Driving Range		S																S	P		S	S	S	S	
Greenhouse or Plant Nursery (wholesale)		P																						P	P
Kennel or Pet Boarding	Y	P							S									P	P				S	S	
Livestock Sales Pavilion or Auction Facility	Y	P																							
Livestock, keeping of (for personal utility)	Y	P	P	P	P																				
Shooting and Archery Ranges and similar outdoor recreation facilities	Y	S																S	S				S	S	
Wild Animals, keeping of	Y	P																							
Winery		P																							
Commercial and Retail Uses																									
Adult Entertainment Establishment	Y																			P	P				
Antique Shop									P				P				P	P	P	P	P	P			
Appliance Repair Shop																		P	P				P	P	
Art and School Supply Store									P				P				P	P	P	P	P	P			
Automatic Teller Machine									P				P		P	P	P	P	P	P	P	P	P	P	P
Automobile Accessories Sales and Installation																			P	P				S	P
Automobile Body Repair and Painting																			S	P				S	P
Automobile Brokerage	Y																P	P	P	P			P	P	
Automobile Customization, Modification and Rebuilding																			S	P				S	P
Automobile Parts Store (with installation)																			S	P					
Automobile Parts Store (without installation)																			P	P					

Figure 10 | Example of permitted and conditional uses (Gwinnett County County 2014, 56)

SECTION 5.2 | HEALTH IMPLICATIONS

The *ideas* behind traditional zoning are not inherently bad or explicitly promote unhealthy lifestyles. The allowing and banning of certain businesses or uses is essential in decreasing the incidence of nuisance developments and preventing undesirable land use combinations. However, from the narrow standpoint of the spatial arrangement of land use that traditional zoning encourages, the lumping of zoning classifications/land uses into separate districts poses problems. The zoning map of Newton, Ohio in Figure 11 depicts a typical arrangement of land uses within a city. This demonstrates that by placing residential developments into their own districts away from commercially zoned areas can decrease walkability and other opportunities for physical activity within cities and neighborhoods, increasing the risk of obesity. The lumping together of certain uses within cities is not uncommon, nor is it something that will ever be completely reversed, but there is some provision and promise of change. Mixed use developments are becoming more popular, and encourage the mixing of housing, office development, and retail development on singular sites. Most importantly, these developments increase density within an area, making walking more of a common occurrence than driving. However, this is usually done in areas that are appropriately zoned to house mixed-use developments. This is not to say that the spatial arrangement is solely to blame; restricting how land is regulated with respect to minimum parking requirements and minimum lot sizes has impacts on health, and there are certain land uses that can also encourage unhealthy behaviors.

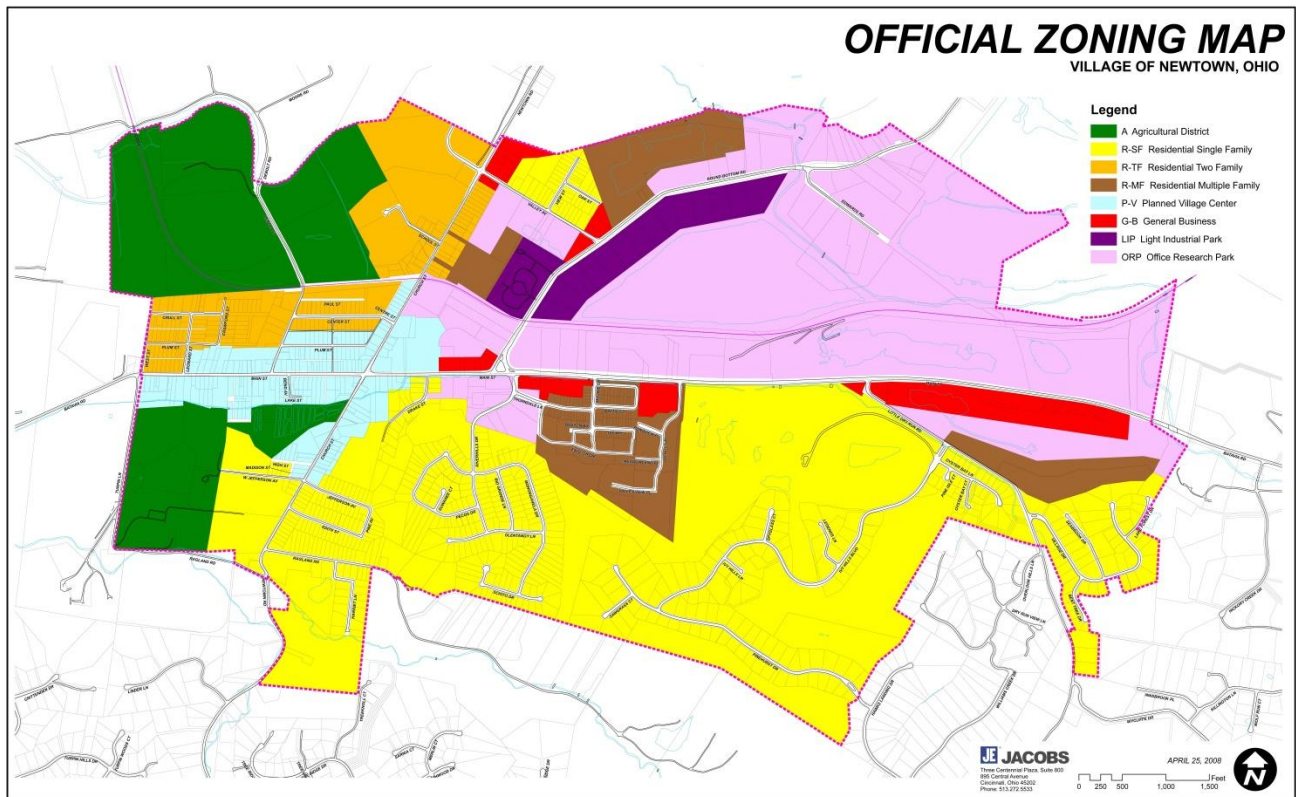


Figure 11 | Example of poor spatial arrangement of zoning (www.newtownohio.gov)

MINIMUM PARKING REQUIREMENTS

As previously mentioned, transportation systems are vital to cities in how they provide a way to get from Point A to Point B in a safe and efficient way. However, traditional zoning has not always made traveling safe, or efficient in regards to cost or time. Because cars are the unofficial mode of transportation in many cities, parking becomes an issue, especially off-street parking. Off-street parking is defined exactly as it sounds: it is parking that is located away from the public domain in the form of surface lots or parking structures like garages and multi-story decks. Cities have had to deal with where to put the influx of cars after they arrive at their destination, and they do this with mandating parking requirements for certain land uses.

Columbus, Ohio was the first city in the United States to implement such a requirement in 1923 when the city's zoning ordinance mandated that off-street parking be provided for apartment houses. In 1939, Fresno, California became the first city to establish parking requirements for off-street parking for non-residential land uses, specifically hotels and hospitals (Shoup 2011, 607). Over time, parking requirements have been expanded to all conceivable land uses by embedding

minimum parking requirements into zoning ordinances. These parking requirements often require developers to implement a *minimum* number of off-street spaces for new developments, be they residential, commercial, or industrial, but do not cap them. This is done through calculations set forth in the zoning ordinance that may consider space, number of units, and/or designed occupancy.

Developers of residentially zoned land typically have to provide a set number of spaces per housing unit. Commonly, it is around 1.5 spaces per unit. If a developer plans to build and lease out 100 units, then he or she must provide 150 off-street parking spaces. Commercial developments typically rely on square footage for their minimum parking requirement. In Atlanta, Georgia, the Midtown Special Public Interest Area #16 (SPI-16) code prescribes parking minimums *and* maximums for commercially zoned land based on square footage. Retail stores and restaurants in SPI-16 must have 1 parking space per 600 square feet of leased/owned space at the minimum and 2.5 spaces per 600 square feet at the maximum. So, if a restaurant leases 1,200 square feet of space, it must provide its patrons with *at least* 2 parking spaces, but *at most* 5. Residential buildings in SPI-16 must follow guidelines set forth by the City's Land Intensity Ratios table that prescribes parking spaces per dwelling unit based on the FAR of that parcel⁷ (Midtown Alliance 2013, 15). Because Midtown Atlanta is so dense and there is mass transit available, it would make sense for that portion of the city to have a maximum parking requirement, but this is not the norm across all cities in the United States. The presence of minimum off-street parking requirements implicitly encourages driving and discourages walkability; this is further aggravated when parking is made free of charge to the driver. In other words, the choice of driving, rather than utilizing active modes of transportation becomes more popular in places where there are large amounts of free (or low cost), off-street parking.

MINIMUM LOT SIZE

One other aspect of zoning that negatively impacts health is minimum lot size. Having a large minimum lot size or minimum lot width embedded in a zoning ordinance can inhibit denser developments where they would otherwise occur. As Part I concluded, less density correlates with less walkability. This usually goes along with requirements on dwelling size and FAR. If a zoning classification mandates that housing units have to be of a certain square footage, along with the prescribed FAR, it will affect how much land is needed to meet that requirement. For example, if a lot

⁷ *Land Use Intensity Ratios*. City of Atlanta, §16-08.010.

has a base zoning of single-family residential, has a maximum FAR of 0.3 (the total square footage equates to 30% of the land's area), a *minimum* dwelling size of 1,500 square feet, and the architectural design standards ban housing of more than 1 story, then the minimum size that that lot can be is 5,000 square feet, or about a tenth of an acre. This is similar to how a form-based code will dictate urban form within a suburban or urban fringe area (see Chapter 6). However, many subdivision regulations set forth under a residential zoning classification require a minimum lot size of twice that size, effectively decreasing the density of the neighborhood. While this may not be a large problem in rural areas that are supposed to be characterized by low density, this becomes an issue in urban and suburban areas that are less walkable because of these low-density zoning requirements.

LAND USE

A final example of how traditional zoning can negatively impact health is the land uses that local governments permit within their zoning classifications. Permitted and conditional uses often do not account for the health implications of certain businesses near certain land uses. One good example is the growing presence of fast food outlets in many cities. Local governments usually outright permit fast food establishments under commercial base zoning without regard to location and how it may affect the health of those living or working nearby. Even more dangerous is locating fast food outlets near schools where children can have easy access to the calorie rich, nutrient-lacking food that such stores sell. Another example of an unhealthy land use is the lack of permitted farmer's markets or grocery stores that sell fresh produce in areas that lack them. Proper planning should ensure that fresh food access be equitable across a municipality. This could be done in a variety of ways (see Chapter 7), but the point being that food deserts and food scarcity are growing problems in some urban and suburban neighborhoods, contributing to the declining health of many who live and work in these areas. As indicated by the aforementioned examples, land regulations under the traditional zoning model do not often create an urban form that is conducive to good health, nor do they consider how some land uses may contribute to unhealthy habits. In order to build communities that implicitly encourage healthy behaviors, we must design and plan our cities in a way that creates more choices with regards active transportation, creates density that can support walkability, and bans developments that can promote unhealthy habits.

CHAPTER 6 | FORM-BASED ZONING REGULATIONS

The importance of form has been prevalent in the last several decades. This emphasis on form has been amended into existing land development regulations (i.e. zoning) with good results. Cities such as San Francisco, Chicago, and New York City began with this as early as the 1960s as a reaction to the criticisms of the traditional zoning model by Jane Jacobs. In the late twentieth century, a movement to implement more “form-based” zoning codes has given rise to a new zoning model. Form-based codes are the brainchild of urban designers and “smart growth” proponents concerned with the problems that traditional zoning has caused. Parolek, Parolek, and Crawford (2008) give one of the most concise definitions of form-based codes:

“Form-based codes create a predictable public realm primarily by controlling physical form, with a lesser focus on land use, through city or county regulations” (Parolek, Parolek, and Crawford 2008, 4).

The first form-based code to be implemented was in Seaside, Florida by the firm Duany Plater-Zyberk and Company (commonly referred to as DPZ). The late 1990s and early 2000s saw more regulatory form-based codes adopted in several other cities including Leander, Texas, Petaluma, California, and Ventura, California. Most of these codes only applied to specific neighborhoods and districts. Since the creation of form-based codes, there have been many models and templates of form-based codes created, such as Andres Duany’s SmartCode. In 2010, Miami, Florida was the first major American city to implement a city-wide form-based code called Miami 21. Other major cities, such as Denver, Colorado and Nashville, Tennessee, have made the first steps towards a city-wide form-based code, while others are beginning to make that attempt (Parolek, Parolek, and Crawford 2008). Form-based zoning is not necessarily better than traditional zoning per se, but it does incorporate design-based elements into zoning that traditional zoning does not always consider.

SECTION 6.1 | REGULATORY FRAMEWORK COMPONENTS

Form-based zoning and its related codes are implemented through a single ordinance, while traditional zoning codes are comprised of hundreds of separate ordinances that have been adopted over a span of decades. Additionally, form-based zoning is very visual: instead of pages of words that do not convey an image of what the place should look like, there are graphics that show every iteration under that zoning policy. It creates ease in regulating from the perspective of planners, as well as ease for designers and developers in their interpretation of local codes. The regulating plans that form-based codes and regulations enforce usually “zone” based on locational intensity ranging

from more rural to more urban via a transect-based regulating plan. The focus is on land use *and* form, and to lesser extent, transportation, economic markets, environmental concerns, and health.

The transect-based regulating plan, developed by DPZ, is an excellent example of how to address a sustainable spatial logic while prescribing appropriate patterns of development. A concept drawn from ecology, it shows the progression from the undisturbed, natural environment to the completely urbanized, built environment. It describes how each section behaves and what kind of systems it is able to support. The transect plan is divided into six sections: the natural zone, rural zone, suburban zone, general urban zone, urban center zone, and urban core zone.

Table 5 | DPZ's transect-based regulatory plan (Parolek, Parolek, and Crawford 2008, 20)

Transect	Development Patterns
T1 Natural Zone	Consists of lands approximating or reverting to a wilderness condition, including lands unsuitable for settlement due to topology, hydrology, or vegetation.
T2 Rural Zone	Consists of lands in open or cultivated state or sparsely settled. These include woodland, agricultural lands, grasslands, and irrigable deserts.
T3 Suburban Zone	Consists of low density residential areas, differing by allowing home occupations. Planting is naturalistic with setbacks relatively deep. Blocks may be large and the roads irregular to accommodate natural conditions.
T4 General Urban Zone	Consists of mixed-use but primarily residential urban fabric. It has a wide range of building types: single, sideyard, and rowhouses. Setbacks and landscaping are variable. Streets typically define medium-sized blocks.

(continued on next page)

T5 Urban Center Zone	Consists of higher density mixed-use building types that accommodate retail, offices, rowhouses, and apartments. It has a tight network of streets, with wide sidewalks, steady street tree planting and buildings set close to frontages.
T6 Urban Core Zone	Consists of the highest density, with the greatest variety of uses, and civic buildings of regional importance. It may have larger blocks; streets have steady street tree planting and buildings set close to the frontages.

The transect-based regulating plan demonstrates the ability to create and enforce regulations suitable for rural, suburban, and urban environments. There are ways to apply this concept to traditional zoning via a parallel zoning model, but more on that subject will be discussed later in Chapter 10.

SECTION 6.2 | TREATMENT OF LAND USE

While form-based zoning is not based on land use, land use is still regulated. Form-based codes can be thought of as an improved version of traditional zoning or an evolution of how to approach land use. There are three ways that use is regulated under a form-based zoning code:

- Each “zone” (transect) will list the types of land uses that are allowed. If a specific use is not explicitly listed and cannot reasonably be interpreted as an equivalent to a listed use, then it is not permitted;
- Limiting certain land use types to certain transect;
- Identifying land uses allowed as “permitted” or “conditional” (similar to traditional zoning), but *not* as “prohibited;” if using SmartCode, “open,” “limited,” or “restricted,” and “by right” or “by warrant” are the terminology used (Parolek, Parolek, and Crawford 2008, 55).

These methods are flexible, and allow planners to contain certain uses where they will be most responsive to both residents and market demands. So, if land use is still regulated under form-based zoning, how is it any different than traditional, sprawl-inducing, single-use zoning?

Form-based codes provide more flexibility in the number and type of land uses permitted by listing them *less* specifically. For example, “ice cream parlor,” “restaurant,” and “café” may be

grouped together and listed as General Commercial, and “bookstores,” “toy stores,” and “clothing stores” may be grouped as General Retail. Other use types may include:

- Assembly, Recreation, and Education;
- Industry;
- Residential;
- Professional Services;
- General Services; and
- Transportation and Infrastructure.

Form-based codes also “differentiate the allowable locations and permit requirements for various land uses according to potentially bothersome operational characteristics.” This means that parcels listed as General Retail may have “subtypes” that may be subject to review or outright prohibited in the transect as dictated by the zoning ordinance. An example of this would be businesses that sold alcohol, operated outside of traditional business hours, or adult entertainment. For even more clarity, the code may illustrate where certain use types exist within a mixed-use building. Putting this list in the form of an easy-to-read table makes it easy to determine what is allowed or conditional within each transect. There are some best practices that have already arisen with respect to this topic, like using performance-based parameters to classify uses (such as operational hours), incorporating “transitional zones,” and keeping heavier industrial uses away from dense, urban cores (Parolek, Parolek, and Crawford 2008, 56-58).

Cities that are retrofitting their zoning ordinance into something more form-based may elect to enact a hybrid, or “parallel” code in which land uses/permitted uses/conditional uses are limited to certain transects. Others will leave their current, and often more conventional zoning policies, in certain neighborhoods where walkability is not a large priority. This was done in Flagstaff, Arizona in 2011. The city’s code rewrite embodies both form-based components and traditional Euclidean elements. Unlike many rewrites, the city’s approach was differentiating between what areas are or could become walkable urban areas, and which ones are drivable suburban areas. Making this distinction allowed Flagstaff to apply the form-based code in the walkable urban areas, and only make necessary modifications to the zoning in the drivable suburban areas. The result was a code that defaults to walkable urbanism, but can seamlessly incorporate more suburban ideals within it and allow development opportunities that are consistent with the city’s general plan. The transect plan is utilized with T1 being the most rural and least developed, and T6 as the most urban and densely developed, but the T3 (general suburban) and T4 (general urban) transects were further

broken down into T3N.1, T3N.2, T4N.1, and T4N.2. N.1 refers to existing areas and N.2 refers to brand-new and future developments. This was done to mitigate the complexities of applying the transect to both existing developed areas and future greenfield developments. This was also appropriate in the establishment of transitional zones between T3 and T4.

SECTION 6.3 | HEALTH IMPLICATIONS

The ways in which form-based zoning regulations have positively and negatively influenced health are widely unknown, although we can infer that it does have positive (and coincidental) effects. Form-based codes, aside from being a form of land regulation and zoning, are a set of prescriptive criteria. They prescribe how a place should be designed by placing regulations on building form, streets, the urban fabric, and landscaping. As it has been established through research, urban form affects physical health. There are five types of prescriptive criteria within a form-based code that can be utilized to maximize health benefits by encouraging physical activity and reducing obesity rates: pattern, dimension, heterogeneity, separation, and enclosure⁸.

A good form-based code that is designed to combat sprawl (and improve physical health) will address present issues of pattern. Improving foundations of pattern can be useful in developing a more appropriate spatial logic. As discussed before, traditional zoning has unknowingly promoted disorganized and inefficient patterns of land use, leading to disorganized road patterns and the utilization of inefficient modes of transportation such as driving. If one looks at a land-use map of a city that employs traditional zoning, one can see the complex chaos that occurs. Figure 12 shows a land use map of Phoenix, Arizona: a city that contains 246 different zoning permutations.

⁸ Prescriptive criteria are not limited to these five types.

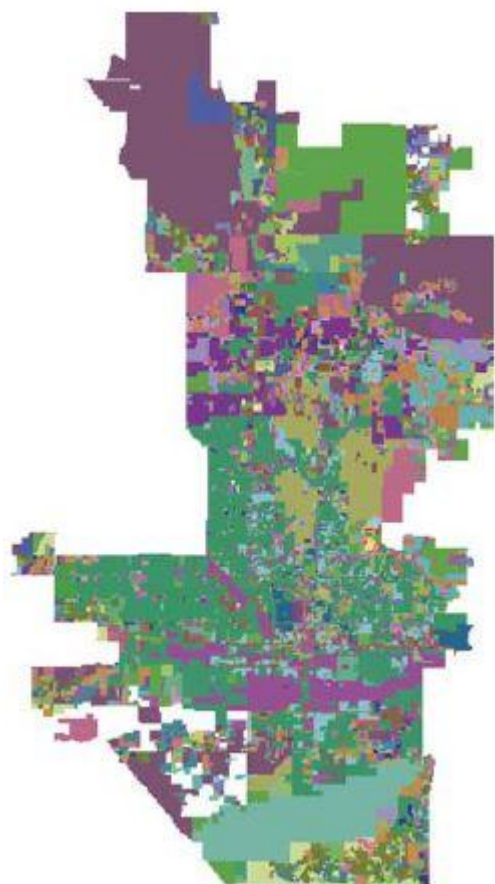


Figure 12 | Different zoning permutations, Phoenix, Arizona (Talen 2013, 180)

Patterns of land use under traditional zoning often do not follow a significant arrangement in how density, building types, and amenities are arranged, nor do they address what types of urban form are appropriate for the area they occupy (Talen 2013, 179-180). The next criterion of prescription is dimension. Dimension refers to scale and form-based codes typically prescribe development that is at a human scale. Often, traditional zoning will prescribe minimum lot and block sizes, and maximum levels of building density. Size minimums are a cause in the spreading out of cities (sprawl), encouraging low-density development, and increasing car dependency and simultaneously decreasing the likelihood of walking from place to place, which negatively affects physical health and increases one's likelihood of obesity. Alternatively, form-based codes may prescribe maximum lot and block sizes and minimum levels of building density in order to control for more walkability and bikability. One may not believe that controlling for lot size or building density is important, but it is a very significant part of creating sustainable and active communities. Talen (2013) does the math:

“Manifestations of lot sizes can be significant: in one quarter-mile square area, the permitting of 25-foot wide lots can yield 480 dwellings, while a requirement for 75-foot wide lots will yield only about 70 dwellings” (Talen 2013, 182).

While having maximum lot sizes will increase the likelihood of healthier outcomes, they can also benefit developers economically in the real estate market by increasing the likelihood of gaining a profit. This is indicative of how form-based codes can be used to respond to market demands of higher density developments. Having smaller lots in an area means more building square footage, which means more money for the developer. As a result, communities that are more walkable often see higher returns on investment of their real estate. Ultimately, the real value lies in the improvement on health via a denser and more walkable community.

As established previously, traditional zoning is infamous for promoting homogeneous single-use zones. If we were to look at the typical American neighborhood or subdivision, we would see homogeneity in not just the way uses are arranged, but also in the lack of variation in form and density from unit to unit. Traditional zoning typically provides little backing for the successful mixing of land use. Mixed-use areas typically do not exist except in areas that have a mixed-use zoning classification, or where an overlay exists that expressly permit this type of development. Form-based codes address this issue by promoting heterogeneity among building uses. Homogeneity should still be promoted, but only by grouping similar building *forms* together. This can be achieved by applying frontage setbacks, form-related rules to integrate multiple kinds of residences (townhomes, apartments, and single-family), and provisions that effectively allow for residential, commercial, and civic uses to be within a cluster of parcels and/or blocks (Talen 2013, 182-183). This particular criterion does not explicitly address health, but having diverse and heterogeneous development is crucial in the development of walkable communities: having more building and land uses within a smaller footprint can contribute to a decrease in automobile dependence.

The criterion of separation has been referenced a few times already. Separation is defined as being “the absence of connectivity.” It is a by-product of both zoning and subdivision regulations, which tend to prioritize travel via automobile than via foot or bicycle. Subdivisions are often not efficiently arranged⁹ and often utilize cul-de-sacs to control “excessive” car traffic, which can limit accessibility. One example of how this occurs is the lack of connections between schools and their nearby residential developments. If one was to look at a map of a school’s location to housing developments, one will see that there is no direct path between them. As a result, the students who live in those developments and could (realistically) walk to school, are then forced to be driven or bussed a few miles out of the way to reach the school. While there are many other implications to this problem, the primary one is that students lose an opportunity for healthy, physical activity (Anderson et al. 2014). While street configuration (especially cul-de-sacs) is also a major cause of why connectivity does not occur as it should between different developments, zoning policies that affect how lots and buildings are oriented to the street and how blocks are arranged in an area are also a major contributor to this phenomenon. If a community wishes to operate under a form-based code, these issues should be addressed. Lots and buildings should face the street directly to encourage interaction with the public realm, and blocks should be arranged in a way that provides

⁹ The grid-system that many downtown districts utilize has proven time after time to be the most efficient way to organize streets and blocks as opposed to a more organic pattern.

for multiple access points¹⁰ that will cater to drivers, pedestrians and cyclists. Separating developments inefficiently consumes valuable open space that could be used for other opportunities. Such regulations should take care as to not undercut connectivity between urbanized areas (Talen 2013, 184-185).

Enclosure is defined as to the ability in creating and delineating open space. Enclosures are an essential aspect of compact urban form. Traditional zoning has played a role in limiting the way open space can be spatially defined, therefore limiting the capability of planners and urban designers to create natural enclosures. It is common practice among planners operating under traditional zoning regulations to treat building forms as objects within space, but not as part of space. As a result, open space is not created in a way that is efficient or enjoyable. The most common form of open-space regulations under traditional zoning is land buffers between busy streets, curbs, and buildings. Landscaping is used to hide and block, but not to enhance. This is one way that traditional zoning policies can cause the strain on enclosure. Form-based codes should address enclosure by prescribing build-to lines, requiring building permeability on all sides, prescribing narrower street widths and tighter turn radii, and regulating frontage. The physical health of citizens can be better addressed via enclosure if caution is taken to the creation of regulations in that they do not challenge principles of walkable and compact urban form (Talen 2013, 186-188).

By creating spaces that are:

- more walkable and give preference to pedestrians and bicyclists;
- have well-integrated open space;
- have a have a high degree of accessibility;
- have sensible, mixed land use patterns; and
- are built at a comfortable, human scale,

through a zoning model, like form-based zoning, we can maximize health benefits through form-based zoning strategies. However, this is not the panacea to all health and zoning-related problems within a place. Some places will benefit more from passing more health-based land use ordinances than they will from a new ordinance that is purely form-based. It should also be noted that zoning operates on a continuum from the strictly traditional to the strictly form-based. Regardless of its

¹⁰ Excluding driveways

branding, it regulates land development in the interest of balancing the priorities and goals of the affected communities with the interests of land owners.

CHAPTER 7 | CASE STUDIES

Planning for the sake of improving public health has been making a comeback in recent years. There are many examples that demonstrate ways to better zone and design our communities for health. Philadelphia, Baltimore, and New York, are among a few of the cities that have made successful strides in this movement. There are many other planning initiatives taking place across the United States that can potentially serve as examples for how we can continue to develop planning strategies that aim to reduce obesity rates and improve overall health. This chapter will explore the *TransForm Baltimore* initiative, the *Philadelphia2035* plan, and New York City's *Active Design Guidelines*, the practice of banning fast food outlets and encouraging healthy eating within a zoning code, and the lessons that planners and public health officials can learn from these successful case studies.

SECTION 7.1 | ZONING FOR A HEALTHY BALTIMORE

In 2000, Baltimore, Maryland had 20% of its residents living at or below the poverty line, making it the 8th poorest out of the 54 largest U.S. cities. During that time, the average life expectancy of the city was 6 years below the national average, and there was a 20 year life expectancy gap between city neighborhoods (63 years → 83 years, see Figure 13). According to the Behavioral Risk Factor Surveillance System, in 2007, 35% of adults in Baltimore were classified as obese, and another 33% were overweight, for a total of nearly 70% of the population not at an ideal body weight. It was estimated that 18.5% of Baltimore high school students are obese, which was 40% higher than the rate for the entire state of Maryland. These numbers indicate localized issues of health, especially obesity. The rising rate of overweight and obesity in Baltimore was likely related to a lack of physical activity among residents. In 2007, only a third of residents reported engaging in recommended amounts of physical activity and around 20% reported engaging in no physical activity at all. The low levels of activity were likely due to barriers to pedestrian activity. Many residents reported reluctance to walk to school, work, or run errands because of either poor infrastructure or perceived danger.

ZONING REWRITE

Realizing that zoning plays a part in shaping these outcomes, in 2007, the city began a three year process to revise and modernize its zoning code, which had not been updated since 1971. This reform was mandated by the city's latest comprehensive plan, completed in 2006 (Johnson Thornton

et al. 2010). When the city of Baltimore began their rewrite entitled *TransForm Baltimore*, they had several goals in mind for a more context-based zoning code:

- Simplification and standardization of the code;
- Preservation of neighborhood character;
- Addressing changing land needs;
- Create more flexible base zoning; and
- Incorporating transit-oriented development (TOD), sustainability, and walkability.

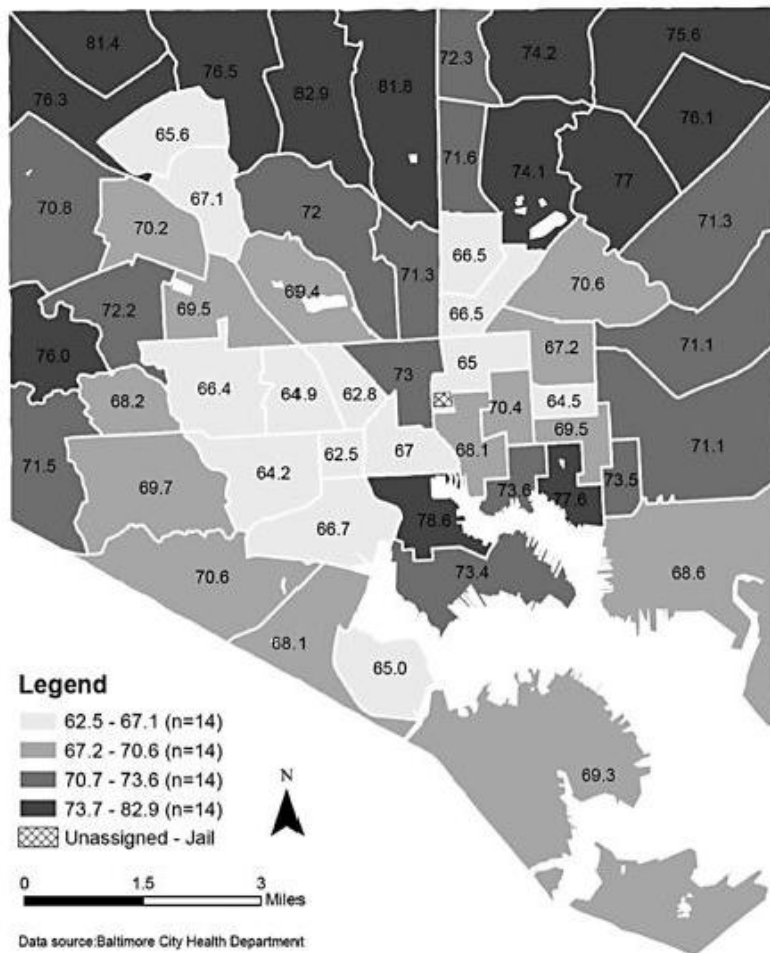


Figure 13 | Estimated life expectancy in years by community (Johnson Thornton et al. 2013, 91)

In this new, context-based code, there was emphasis on rewriting the Open Space classification codes and the codes that dealt with multi-family construction and neighborhood-level and downtown commercial development in order to increase walkability. For new development on designated “primary streets” (e.g. Pratt, Charles, Howard), much more attention was given to form-based design

standards, especially standards for first floor transparency. Mixed use was also greatly expanded in the new code. This was done by introducing the Rowhouse Mixed Use Overlay, an Industrial Mixed-Use zoning classification, and a high-density TOD district and a lower-density TOD district. Allowable uses were expanded in the Office/Residential zoning classification and light industrial districts. Farmers markets are now considered temporary use, community gardens are now permitted by right, and urban agriculture is a conditional use in all residential districts including single-family detached residential zoning classifications. Neighborhood commercial establishments are a conditional use in multi-family residential zoning classifications, which now include art galleries, art studios, daycare facilities, offices, restaurants, and retail (no alcohol sales). Medical and dental clinics are allowed as part of an overlay in all of the multi-family residential zoning classifications, which was only permitted in the higher density residential zoning classifications before the rewrite. Regarding transit-oriented development, the new code allows for the aforementioned TOD zoning classifications. These classifications would be applied in a quarter to half-mile radius around local transit stations. Both classifications permit a wide range of uses including residential, retail (no alcohol sales), medical/dental clinics, restaurants, taverns, and personal services establishments. Parking lots, outdoor dining and live entertainment outlets would be allowed conditionally. Food access was another major component to the rewrite. Grocery stores are no longer a separate use category on their own and would fall under the more general use of “retail-no alcohol.” Because retail is now allowed in more zoning classifications, this greatly expands opportunities for more healthy food outlets. (Johnson Thornton et al. 2010).

HEALTH IMPACT ASSESSMENT

A team of public health officials, epidemiologists, planners, zoning law experts, and criminology researchers conducted a health impact assessment (HIA) of the first draft of *TransForm Baltimore*. The HIA evaluated multiple health outcomes, including physical activity and obesity (Johnson Thornton et al. 2013). Health impacts identified included walkability and healthy communities. For Baltimore residents, it was estimated that by improving the zoning code, the percentage of people living in districts allowing mixed-use would nearly triple with up to 18% living in areas with transit-oriented development. The improved code would also control for landscaping and lighting standards to improve perceived safety, which would also increase walkability in some neighborhoods.

A health impact assessment is defined by the Committee on Health Impact Assessment as “a tool that can help decision-makers identify the public-health consequences of proposals that potentially affect health” (Assessment 2011, ix). HIA has been used throughout the world to evaluate

the potential health consequences of various projects, programs, plans, and policies, notably in the United States, Canada, European countries, and Australia. In the United States, HIA has been divided into six steps:

1. **Screening** determines whether a proposal is likely to have health effects and whether the HIA will provide information useful to the stakeholders and decision-makers.
2. **Scoping** establishes the scope of health effects that will be included in the HIA, the populations affected, the HIA team, sources of data, methods to be used, and alternatives to be considered.
3. **Assessment** involves a two-step process that first describes the baseline health status of the affected population and then assesses potential impacts.
4. **Recommendations** suggest design alternatives that could be implemented to improve health or actions that could be taken to manage the health effects, if any, that are identified.
5. **Reporting** documents and presents the findings and recommendations to stakeholders and decision-makers.
6. **Monitoring and evaluation** variably grouped and described. Monitoring can include monitoring of the adoption and implementation of HIA recommendations or monitoring of changes in health or health determinants. Evaluation can address the process, impact, or outcomes of an HIA (Assessment 2011).

HIAs are not to be used in the assessment of needs and goal formulation. They should be made clear before the process begins. HIAs are most useful if they are conducted in tandem to the planning process, and not after the fact. It's expected that as time goes on, this process described above will see some changes as some steps become less important and new ones are added. While HIAs are beneficial in that they bring both planners and public health officials and experts together, they may not be pertinent for local governments that are already incorporating health into their planning endeavors.

The HIA conducted for *TransForm Baltimore* had two primary objectives:

1. Inform stakeholders and decision-makers about the new zoning code's potential to create healthy communities and decrease negative health outcomes, with an emphasis on preventing obesity through literature and quantitative assessment of impacts; and
2. Provide recommendations as to how to increase the health-promoting potential of the new code and solve any unanticipated negative health consequences.

The assessment focused on the first draft of the zoning code rewrite in order to develop more recommendations for the next draft. The very first step of the process was interviewing key stakeholders, such as elected officials, the city and county planning departments, and local developers. The second step comprised of gathering information on zoning, the built environment, and obesity, healthy eating, violent crime, and physical activity in Baltimore. Then, baseline health conditions were assessed, such as life expectancy in different city neighborhoods, mortality rate of cardiovascular disease, and obesity rates and trends. Afterwards, the current and draft zoning codes were analyzed and compared. The final step was developing recommendations based on all of the gathered information and consultations with zoning and health experts were developed to guide the next draft of the zoning code rewrite.

Four of the many subjects that were explored in the HIA regarding health were pedestrian-oriented design, mixed use, transit-oriented development, and healthy food access. Each impact assessment yielded changes that were supported by the HIA, as well as recommendations to improve the rewrite. Table 6 shows the results of the HIA with respect to those subject areas.

Table 6 | Results of HIA performed on TransForm Baltimore (Johnson Thornton et al. 2010)

Subject	Results	Recommended
Pedestrian-oriented design	<p>Increased percentage of city residents living in neighborhoods with zoning regulations that mention pedestrian oriented design from 1% to 24%.</p> <p>Residents of high poverty communities would be <i>almost twice as likely</i> to live in neighborhoods with zoning regulations that reference pedestrian oriented design compared to residents in low poverty neighborhoods (31% vs. 17%).</p>	<p>Improve the uniformity of the standards required across several zoning districts to increase potential health benefits related to pedestrian safety.</p> <p>Apply “pedestrian oriented” goals to Office/Residential, Office Industrial Park, Industrial Mixed-Use classifications, and special purpose zones, given the mix of uses contained within them could easily encourage walking.</p>

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<p>Mixed use</p>	<p>Estimated that the percentage of people living in districts that allow both residential and commercial uses in the same district will nearly triple under the draft new code, increasing from 32% to 80%.</p> <p>Estimated that the percentage of the population living in districts that allow mixed use would go from 46% to 91% in low poverty neighborhoods, and from 18% to 70% in high poverty neighborhoods.</p>	<p>Disperse alcohol sales among commercial uses that allow them.</p> <p>Establish a program of incentives to bring healthy food options to currently underserved neighborhoods where such options are currently lacking.</p>
<p>Transit-oriented development</p>	<p>Estimated that approximately 18% of Baltimore residents would live in neighborhoods designated as TOD zones. This percentage would be approximately twice as high in high as compared to low poverty communities (23% vs. 12%).</p>	<p>Disperse alcohol sales among commercial uses that allow them.</p> <p>Establish a program of incentives to bring healthy food options to currently underserved neighborhoods where such options are currently lacking.</p>

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<p>Healthy food access</p>	<p>Estimated that the percentage of residents living in districts that permit supermarkets and grocery stores by right or conditionally would increase from 10% to 27%. This percentage would increase in both high and low poverty neighborhoods.</p> <p>Estimated that 89% of residents would live in districts that permit community gardens by right or conditionally, 77% in districts that permit urban gardens, and 98% in districts that permit farmer’s markets as temporary uses.</p> <p>Estimated that the percentage of residents living in neighborhoods that permit corner stores uses by right or conditionally will double, from 23% to 53%.</p> <p>Estimated that the percentage of residents living in neighborhoods that permit all restaurant models by right or conditionally would increase from 10% to 27%. Residents of high poverty communities would be 50% more likely to live in districts that permit fast food.</p>	<p>Create Healthy Food Store use, definition, and certification to create a framework for bringing healthier items to new and existing retail.</p> <p>Develop and include zoning incentives for Healthy Food Stores, such as waiving certain development fees or reducing parking requirements.</p> <p>Include a Fast Food use definition and mark as a distinct use.</p> <p>Consider changing the use definition for urban agriculture to better distinguish from community gardens.</p> <p>When considering conditional uses and evaluating site plan proposals, include criteria on the impact on access to healthy foods, active transportation, and impact on neighborhood-level health disparities.</p>
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SECTION 7.2 | PHILADELPHIA2035

In December 2010, the Philadelphia City Planning Commission (PCPC), in partnership with the Department of Health and Human Services and the Department of Public Health’s “Get Healthy Philly” initiative, released a component of their long-range comprehensive plan entitled

Philadelphia2035: Planning and Zoning for a Healthier City. The report focuses on the city's plan for addressing the improvement of public health in its planning endeavors.

Like many other American cities of its kind, Philadelphia faced significant public health challenges that “signal[ed] a need for upstream interventions in the physical environment,” particularly their high rates of overweight and obesity (Philadelphia 2010, 10). Philadelphia County had the highest rates of obesity (35.1%) among counties containing the ten largest cities in the United States. Data from 2008 showed that two-thirds of adults and half of children within the county had a body mass index (BMI) that indicated overweight or obesity. Around 12% of the county population was living with diabetes, most comorbid with being overweight or obese. The most at-risk populations were shown to be minority populations living in poverty. Initial research showed that the largest barriers to developing healthy behaviors were inadequate opportunities for physical activity and poor accessibility to healthy foods (i.e. living in either a food desert or swamp). These barriers often were the result of poor decisions in planning and development.

Philadelphia2035 represented the city's first comprehensive plan update in nearly 50 years. With the new challenges facing planners and the need to update planning policy, the update gave the PCPC an opportunity to move in tandem with the city's overhaul of their current zoning code, which was also well overdue for an update. The new zoning code would be implemented via a citywide plan and 18 district master plans, and would describe all zoning changes up to five years into the future. The district master plans would allow PCPC staff to undertake finer analyses and work more effectively with community organizations throughout the life of each plan. Within each district master plan, the city elected to utilize a HIA to determine the effectiveness of certain policies and zoning updates. While each master plan had a strategy of linking built environment to health, the HIA would specifically measure:

- The effects of those strategies;
- Inform local planning commissioners on best practices;
- Evaluate proposed development projects;
- Raise awareness of the impacts of certain land use and development choices;
- Explain the health consequences that are implicit in zoning decisions;
- Promote important public projects and investments; and
- Be a useful tool to promoting policies that support healthy lifestyles (Philadelphia 2010, 32).

Overall, the primary goal of *Philadelphia2035* was to provide a blueprint for decisions concerning the built environment including, but not limited to, policies, development, and

infrastructure. The citywide comprehensive plan provides “an evidence-based policy framework for creating healthier communities,” and improving and expanding upon “health-supportive land use and infrastructure concepts” such as neighborhood centers, transit-oriented developments (TODs), expanded transit services, healthy food access, access to open space, and infrastructure that supports active transportation (Philadelphia 2010, 15). More information on those policy frameworks can be found in Table 7.

Table 7 | Policy frameworks in Philadelphia2035 (Philadelphia 2010, 16-27)

Policy Framework	How this policy works	Objectives
Neighborhood centers	“The Plan promotes the growth and preservation of neighborhood centers characterized by compact development clustered around public facilities and commercial corridors.”	<p>Strengthen neighborhood centers by clustering community-serving capital facilities.</p> <p>Strengthen neighborhood centers by developing viable commercial corridors.</p> <p>Promote new housing developments to strengthen existing neighborhood assets.</p>
Transit-oriented developments	“Philadelphia2035 lays out a contextual framework for directing higher intensity growth to select station areas, outside of the existing metropolitan center of Center City and University City, to create additional nodes of highly walkable mixed-use development.”	<p>Strengthen neighborhood centers by promoting transit-oriented development around identified stations.</p> <p>Control automobile congestion through traffic management and planning.</p>

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<p>Expanded transit services</p>	<p>“Rapid transit extensions to Northeast Philadelphia, the Navy Yard, the Delaware River waterfront, and Fairmount Park combine with service enhancements on existing rail lines to lay the framework necessary for a less auto-oriented, more pedestrian-friendly Philadelphia.”</p>	<p>Invest in existing infrastructure to improve service and attract riders.</p> <p>Extend transit network to serve new markets.</p>
<p>Access to healthy food</p>	<p>“Philadelphia2035 expands on <i>Greenworks Philadelphia</i>, the City’s sustainability plan, to comprehensively address the physical aspects of food systems planning, identifying ways to site new farmers’ markets, grocery stores, urban farms, and community gardens in neighborhood centers.”</p>	<p>Provide convenient access to healthy food for all residents.</p>

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<p>Access to open space</p>	<p>“Philadelphia2035 calls for the provision of recreation centers and neighborhood parks within a 10 minute walk of all residents. The Plan also recommends an interconnected citywide trail system and improved and expanded waterfront access. These longer term goals build on the Green2015 initiative, an action plan to add 500 acres of publicly accessible green space to the areas that need it most by 2015.”</p>	<p>Complete independent and park-based trail systems.</p> <p>Create a corridor network that connects parks, neighborhoods, and trails citywide.</p> <p>Improve and increase waterfront recreational opportunities.</p> <p>Ensure that all Philadelphians live within a 10 minute walk of a neighborhood park or recreation center.</p> <p>Connect neighborhood parks and trails to neighborhood centers and major public facilities.</p> <p>Rehabilitate abandoned industrial infrastructure for new uses.</p>
<p>Active transportation infrastructure</p>	<p>“Expanded bicycle and pedestrian infrastructure will encourage non-motorized commuting and provide increased opportunities for physical activity.”</p>	<p>Implement a Complete Streets Policy for the city to ensure that the right of way will provide safe access for all users.</p> <p>Improve safety for pedestrians and bicyclists and reduce pedestrian and bicycle crashes.</p> <p>Expand on- and off-street networks serving pedestrians and bicyclists.</p> <p>Improve pedestrian connections across major rights-of-way.</p> <p>Preserve the walkable scale of the city.</p>

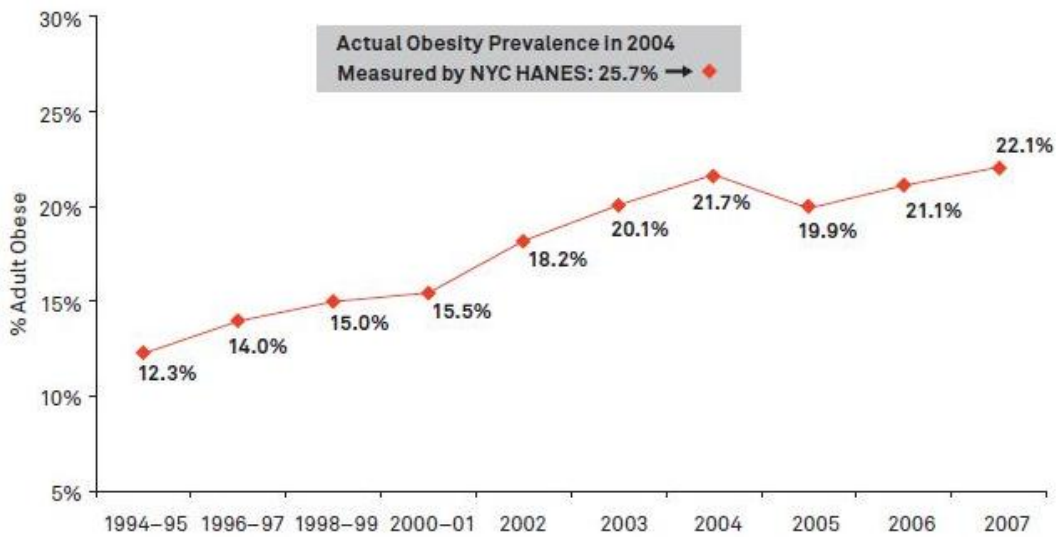
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The new zoning code¹¹ implemented along with the policies set forth in *Philadelphia2035* aim to direct growth and encourage land use patterns that result in well-connected and accessible neighborhoods. The new zoning code incorporates form and health proactively into a framework that encompasses both traditional zoning principles and form-based zoning principles with its highly descriptive and simplified base zoning classifications to encourage density and mixed uses. The new ‘Neighborhood Commercial Mixed-Use’ and ‘Industrial Residential Mixed-Use’ districts enable working-class people to live closer to their jobs, minimizing automobile dependency and improving walkability. Walkability is also promoted with the implementation of maximum parking requirements in certain districts. This was done also to promote efficient use of land and reduce vehicle congestion. Bicycle parking is now required in all new public parking lots, multi-family buildings with more than 12 units, and any developments that have a floor area of more than 7,500 square feet. The new code also requires active ground floor uses and bans auto-centric uses near existing and future transit systems to create a pleasant pedestrian environment that advances TOD principles. In the City Center district, where there are three major regional rail stations, the permitted density of the base zoning is the highest. Before the new code, urban agriculture in the form of community gardens was not permitted and required a variance. Under the new code, it is permitted in areas with residential and commercial base zoning, and animal husbandry is now permitted in industrial districts. (Philadelphia 2010, 28-29).

SECTION 7.3 | NEW YORK CITY’S ACTIVE DESIGN GUIDELINES

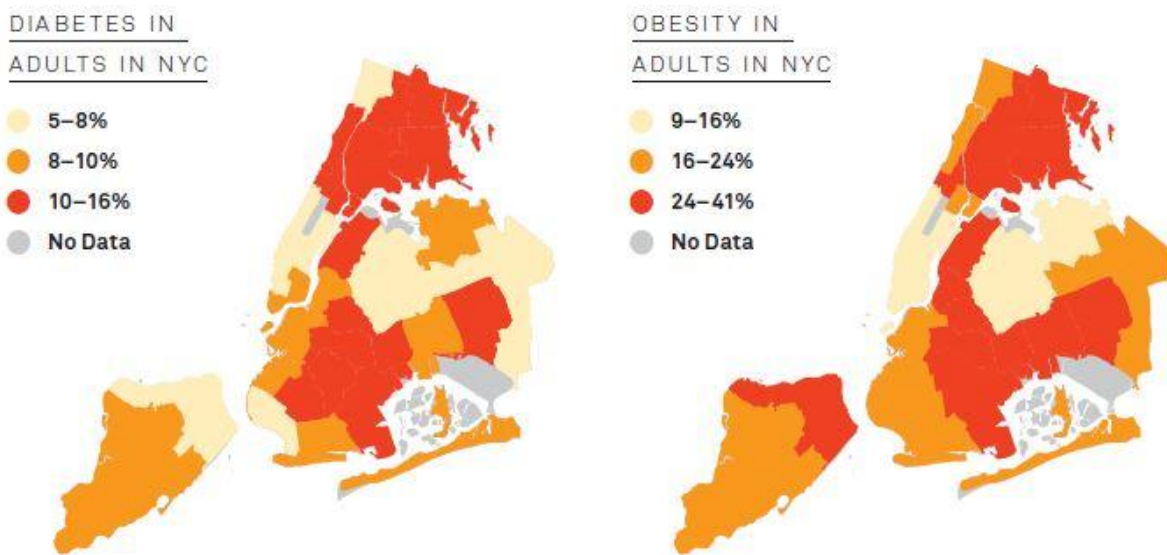
Although New York City is one of the most urbanized areas of the United States, the city is not untouched by the obesity epidemic and its associated causes and outcomes. The majority of adults and around 43% of elementary school children in all five boroughs are classified as overweight or obese. The increase of obesity has also led to more cases of type II diabetes, especially in younger children and minorities. Even more disturbing is that in 2007, less than half of adults in New York (42%) reported meeting the minimum daily recommendations for physical activity (City of New York 2010).

¹¹ Philadelphia’s new zoning code was formally passed on August 22, 2012.



Sources: NYC Department of Health and Mental Hygiene, Community Health Survey, 1994–2007; NYC Department of Health and Mental Hygiene, NYC Health and Nutrition Examination Survey, 2004

Figure 14 | Self-reported obesity rates from 1994-2007, New York City (City of New York 2010, 15)



Source: NYC Department of Health and Mental Hygiene, Community Health Survey, 2006

Figure 15 | Diabetes and obesity rates by neighborhood, New York City (City of New York 2010, 15)

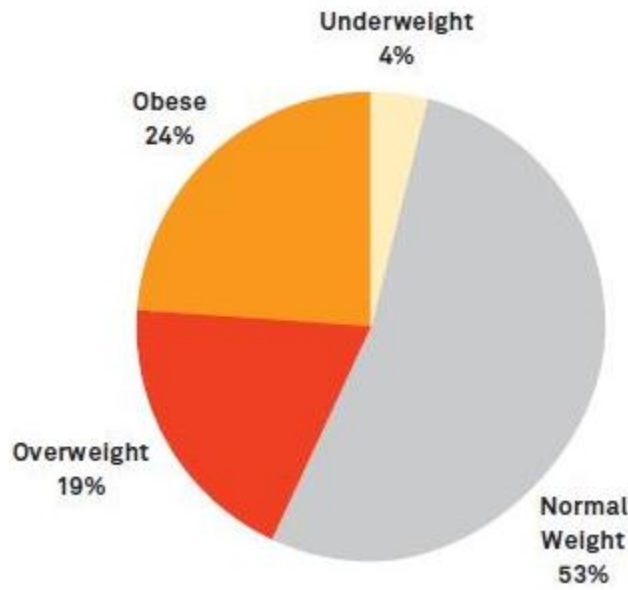


Figure 16 | Weight status of elementary school children, New York City (City of New York 2010, 15)

While not a healthy zoning initiative per se, the *Active Design Guidelines* were created as a tool to guide architects, planners, and urban designers in New York City in creating environments that promoted the concept of “active design,” or design that encourages physical activity for the purpose of reducing obesity rates within the city. The *Guidelines* were also part of the vision of a more “livable and hospitable” city as promoted in Mayor Bloomberg’s Design and Construction Excellence Initiative. The initiative by the Department of Design and Construction (DDC) was launched in the early 2000s to encourage

city-wide agencies to strive for the same level of excellence in design for all public works projects, and establish new ways of securing the most creative and quality designers for city-funded projects. Building off of the series of guidelines that the DDC had created to promote Design and Construction Excellence for a range of issues, the *Active Design Guidelines* would be the next step to promote designing and constructing for active living in public and private sector projects throughout New York City. The *Guidelines* were the result of a partnership between representatives from the DDC, the Department of Health and Mental Hygiene (DOHMH), the Department of Transportation (DOT), the Department of City Planning (DCP), and the Mayor’s Office of Management and Budget, with funding from the Robert Wood Johnson Foundation’s Active Living Research Program (Lee 2012).

Conducting research and gathering literature on architecture, planning, and health served as the basis for most of the strategies described in the *Active Design Guidelines*. Over the course of one year, the draft *Guidelines* were written and then reviewed by agencies outside of those the team represented, such as the Departments of Parks and Recreation, Buildings, Housing Preservation and Development, Mayor’s Office for People with Disabilities, Aging, School Construction, and the Mayor’s Office of Long-Term Planning and Sustainability. A workshop was held in January 2009 for architectural and planning practitioners to test the feasibility of use of the *Guidelines* through design exercises. Some of the feedback from that workshop included adding ideas not originally in the draft *Guidelines* due to lack of research evidence, indicating a need for certain types of design policies

from the community. This led to indicating which prescribed measures were strongly backed by research, those that were backed by new and emerging research, and what was considered a best practice in the design and planning fields. The final draft of the *Active Design Guidelines* was released on January 27, 2010. Preliminary results from evaluation studies conducted five months after the launch of the *Guidelines* demonstrated the presence of confidence in incorporating active design principles among architects, planners, and designers (Lee 2012).

The primary strategies from the *Guidelines* were aimed at prescribing urban design improvements at both the macro scale (planning) and the micro scale (building level). On the macro scale, these strategies involved the planning and designing of neighborhoods, streets, and outdoor spaces that encourage active transportation and recreation, including walking and bicycling. Some of the most important recommended measures included:

- Developing and maintaining mixed land use in city neighborhoods;
- Improving access to transit and transit facilities;
- Designing plazas, parks, open spaces, and recreational facilities to maximize their active use where appropriate, as well as improving access to these facilities;
- Improving access to full-service grocery stores and fresh produce;
- Designing accessible, pedestrian-friendly streets with high connectivity, traffic calming features, landscaping, lighting, benches, and water fountains;
- Facilitating bicycling for recreation *and* transportation by developing continuous bicycle networks and incorporating both indoor and outdoor bicycle parking and storage.

On the micro scale, it was recommended to include opportunities for incorporating regular physical activity into buildings by implementing measures that sought to:

- Increase stair use among the able-bodied by providing a centrally located stair for everyday use, posting motivational signage to encourage stair use, and designing visible, appealing and comfortable stairs;
- Locate building functions to encourage brief bouts of walking to shared spaces (e.g. break rooms and conference rooms) and provide appealing, supportive walking routes within buildings;
- Provide facilities that support exercise, such as showers, locker rooms, and secure bicycle storage for active commuters;

- Design building exteriors and massing that engage with the street (transparency, multiple entries, stoops, et cetera), and as a result, contribute to a pedestrian-friendly urban environment (City of New York 2010).

Implementing the *Guidelines* was done by the city government in three ways: policy efforts to integrate the *Guidelines* in all city building and street construction projects; outreach to building managers, schools and community groups to encourage elements of the *Guidelines* such as the adoption of stair prompts; and trainings of city-based architects and planners. The DOT, DCP, and DDC worked to increase bicycle infrastructure¹² and to further pedestrianize city streets through the creation and rehabilitation of pedestrian plazas (Lee 2012).

The *Active Design Guidelines* have resulted in many marked improvements in the health and activity of New York City residents. Childhood obesity decreased 5.5% between 2007 and 2011. Due to various transportation-related initiatives undertaken because of these guidelines, commuter cycling has increased by 262%, and bus and subway ridership has increased by 10%. Programs have created “play streets” for twenty New York City public schools and nearby neighborhoods, and supported the development of nearly twenty supermarkets with fresh produce in high-need, low-income neighborhoods. At last count, there were nearly 30,000 stair prompt signs distributed amongst New York City buildings, which has likely increased stair usage in many places. Not only have the *Guidelines* been successful in New York, but the influence has spread. Since 2010, 15,000 copies of the *Active Design Guidelines* have been distributed, over 3,000 built environment professionals in the U.S. (including New York City) have been trained, and 14 cities in the U.S. have been mentored by the team in implementing these principles (Hutton, Burney, and Bell 2014).

SECTION 7.4 | FAST FOOD BANS AND FRESH FOOD PROGRAMS

Studies conducted in the United States have found positive associations between proximity to grocery stores and diet quality. As many studies will show, improving diet has the potential to greatly reduce negative health outcomes, especially obesity. Research also shows that there are disparities in healthy foods in neighborhoods that primarily house minorities and those of a lower income. Because zoning can be used as a tool to exclude certain individuals from living in otherwise healthier areas, this causes a geographical barrier to access fresh food. It is also a well-known fact

¹² Citi Bike, New York City’s bike share system, was launched in spring 2013 to improve accessibility to active modes of transportation.

that locating a store in these areas pose an economic risk for some large chain grocers that carry fresh food. A number of states and local communities have started to experiment with different types of policy initiatives aimed at eliminating all geographical disparities in fresh food access. Recent policy proposals include the use of zoning regulations as a tool to create a healthier food environment. Zoning laws can effectively restrict land use by limiting (or banning) the prevalence of fast food outlets and promoting the development of healthier alternatives. Alternative policy proposals that have been implemented often include monetary incentives. These incentives range from subsidizing existing food stores to stock healthier food items like produce, to programs that financially support and subsidize farmers' markets (Chen and Florax 2010).

Access to healthy eating is a major barrier in many communities across the United States. There are lots of programs and incentives designed to improve access to supermarkets, farmer's markets, and other fresh food outlets. The aforementioned case study of *Philadelphia2035* demonstrates one example of such a program. The PDPH and PCPC are partnered in the 2-year, \$25 million initiative "Get Healthy Philly," which is funded by the city's Department of Health and Human Services. Through the program, PDPH and its partners implemented interrelated policy (see section 7.2) and systems reforms that improve accessibility to fresh food and physical activity environments in communities, schools, after school programs, and worksites. Many "Get Healthy Philly" projects, including the opening of 10 new farmers' markets in low-income neighborhoods, were expected to be fully operational by 2012. The planning and zoning aspects of the initiative aim to create a framework for healthier land use practices moving forward. For example, to promote access to healthy foods, the new zoning code will allow for fresh food markets incorporated into developments to *not* count against the prescribed maximum buildable area of a zoning classification. This will benefit developers and residents equally (City of Philadelphia 2010). Programs and incentives similar to this that aim to encourage the development of fresh food outlets in areas that otherwise have poor access or have a severe need can be useful in creating healthier communities. Zoning could also provide for urban agriculture to be allowed in virtually any residential or commercial base zoning classification. It should be noted that the zoning provisions discussed in this section are directly related to health and are not reflective of form-based zoning.

In light of the obesity epidemic and diet being such a large contributor, some local governments have taken to banning fast food either entirely or in certain areas within their borders. Fast food is an issue in some municipalities because of:

- The easy access to these businesses via car;
- Their service of calorie-rich and nutrient-poor foods in large portions;

- There are often more fast food restaurants than supermarkets; and
- Their relatively even distribution within a city or neighborhood's borders.

Mair et al. (2005) examined how local governments have approached this ban, stating that there are three ways to curtail the development of fast food. The first approach is to ban them altogether by including a specific provision in the zoning code that prohibits the permitting of fast food outlets anywhere within its limits. A second approach would be to simply not include fast food outlets in the list of permitted uses within applicable zoning classifications (indirect ban). Local governments could also permit fast food outlets in only select areas of the municipality or permit them conditionally across the municipality. Each approach is dependent on many variables, such as the goals that the municipality hopes to accomplish with a ban, what is politically feasible, and the ease/difficulty of the process in obtaining special permits. Mair et al. also suggest that outright banning only restaurants with drive-through service may have the same effect, because the majority of fast food business is derived from drive-through service. Not having a drive-through feature is unprofitable, and such establishments may not be worth running from the perspective of those corporations (Mair, Pierce, and Teret 2005). Table 8 shows a few of the case studies described in Mair et al.'s report.

Table 8 | Examples of fast food bans via zoning (Mair, Pierce, and Teret 2005)

Municipality	Type of ban	Description
Concord, Mass.	Outright	<p>Drive-in or fast food restaurants are expressly prohibited.</p> <p>While the purpose section of the ordinance does not specifically mention fast food outlets as some zoning codes do, it does include the objectives to “to lessen congestion in the streets” and “to preserve and enhance the development of the natural, scenic and aesthetic qualities of the community,” which are two general purposes have historically been used to justify restrictions on fast food outlets.</p>
Carlsbad, California	Outright	Ordinance bans <i>only</i> new drive-through restaurants in its thirty-five zoning classifications. It does not mention any other kinds of restaurants.
Newport, Rhode Island	Conditional	Standard restaurants are permitted “by right” in all five commercial districts, and fast-food restaurants are permitted with a special use permit in four of the five commercial districts. Both drive-in and carry-out restaurants are specifically prohibited in any district in the city.

SECTION 7.5 | LESSONS LEARNED FROM THESE CASE STUDIES

There are some takeaways from studying Baltimore, Philadelphia, and New York. Each initiative incorporated partnerships that included different combinations of public health officials, planners, representatives from other public agencies, consultants, academics, and the community. These collaborations illustrate an excellent example of how health, policy, and government should come together to plan communities that prioritize the creation of healthy habits. These partnerships often crossed sectors and industries.

The HIA for *TransForm Baltimore* is likely the first demonstration of using an HIA on a zoning code. The assessment provided an opportunity to highlight some health-relevant aspects of zoning that would otherwise not be considered by policy makers. By identifying, and quantifying, how zoning can influence lifestyle and health, there is a basis for evidence-based policy advocacy aimed at improving safe pedestrian access in neighborhoods and other drivers that influence physical activity and obesity risk (Johnson Thornton et al. 2013). The HIA also gives an opportunity to provide a new, health-based framework of not only zoning, but also comprehensive planning. Introducing specific, concrete goals such as more mixed-use and TOD developments are helpful when creating new zoning policies. *Philadelphia2035*'s strategies to incorporate health into comprehensive planning are notable. By creating both a city-wide plan that addressed policy frameworks surrounding health and the built environment *and* individual district master plans that worked to solve specific neighborhood problems by improving city zoning codes. The plan demonstrated how issues can be solved at both the macro and micro level. The incorporation of an HIA as a checks-and-balance system not only illustrates a best practice of maintaining plans (something that the city had not done in five decades), but the HIA itself is an ideal way to manage the objectives set forth by each district master plan. Overall, Baltimore and Philadelphia are useful examples in that they aimed to incorporate health into their comprehensive plan updates, those of which will have to be updated again within this decade and consider newer issues. There were several key lessons learned in New York City about how to successfully create and implement evidence-based built environment policy and practice initiatives to increase physical activity. Academic research played a major role in providing the evidence base for the initiatives with the implementation and later evaluation. New York's *Active Design Guidelines* also shows how architects and planners can utilize active design and planning principles on a smaller scale, and specifically names methods and strategies that are backed by research, are a product of emerging research, and what are industry-wide best practices. This is an approach that could be implemented as zoning codes are adapted or overhauled. New York City demonstrates how to better design for health in the public realm.

Banning fast food outlets may have an impact on improving food choices in areas where none otherwise exist. Municipalities could either outright ban fast food as a permitted use, make conditional, or not include fast food as an option in their zoning codes. Zoning will be an operative control on that front. Allowing urban agriculture as a use in residential or commercial base zoning classifications, and incentivizing the creation of fresh food outlets through zoning are other ways that local governments can use zoning as a way to create better food environments. Local governments

could also fund and/or subsidize outlets like farmers markets in areas that are disadvantaged in their access to fresh food.

PART III | FORMULATING SOLUTIONS

“Health-oriented design and planning needs to become a central part of standard practice, seamlessly integrated with other longer-standing planning objectives and constraints” (Botchwey, Trowbridge, and Fisher 2014, 113).

After reviewing the literature on the connections between the built environment and obesity, the lack of focus on public health in land use policy, examining how traditional zoning has hurt health and how alternative zoning regulations may improve other health outcomes, reviewing multiple case studies that have implemented health into their zoning and design codes, I have developed a set of recommendations that local governments could utilize to lower obesity rates and to improve health within their municipalities. These recommendations are broken down into three main classes:

1. Incorporating smart growth strategies into policies
2. Creating health-based planning frameworks
3. Updating zoning policies

The proposed solutions are not singular and have some interaction with each other. This section will also discuss the rationale behind each recommendation, potential barriers of change if applicable, and a possible implementation strategy.

CHAPTER 8 | INCORPORATING SMART GROWTH STRATEGIES INTO POLICIES

Smart growth strategies and policies should inform zoning and other land use decisions to improve health and reduce obesity rates within a community.

SECTION 8.1 | RATIONALE

“Smart growth” has many definitions, but it can be best described as a collection of ideas, policies, and strategies that aim to fix the social, economic, environmental, and physiological issues that are direct outcomes of the traditional zoning policies that have shaped our communities since the post-World War II era, namely sprawl (Duany, Speck, and Lydon 2010, xii). Smart growth takes many forms, like the aforementioned form-based codes (see Chapter 6), green building, and low-impact development. The implementation of smart growth policies within a comprehensive plan and/or zoning ordinance can guide better decision making on growth management, infrastructure improvements, energy consumption, and urban design and form.

SECTION 8.2 | BARRIERS TO CHANGE

Community support is needed for any kind of planning endeavor. Without it, projects can, and will, fail. While community pushback is possible and, as always, can be mitigated with transparent public participation, there exist legal blocks to implementing smart growth principles. In some cities, most of the existing zoning codes and standards outlaw the construction of compact and walkable communities. Another good example is urban agriculture. The arrival of the twentieth century brought with it the “Euclidean” zoning policies that has unknowingly discouraged urban agriculture from the public realm (Yellin 2013). Updating or changing the zoning that creates these barriers would make smart growth strategies easier to implement.

SECTION 8.3 | IMPLEMENTATION STRATEGIES

The Smart Growth Manual, written by Andres Duany, Jeff Speck, and Mike Lydon, lists and describes the many strategies that could be incorporated into policies that could influence the design and function of cities. The manual addresses strategies from the regional level all the way down to the building level. Table 9 lists and describes all of the smart growth strategies described in the manual that could be the basis of zoning policies aimed at improving health and lowering obesity rates.

Table 9 | Smart growth strategies that can improve physical health (Duany, Speck, and Lydon 2010)

Strategy	Level	Description
Plan according to the logic of a rural-to-urban transect	Regional	The transect plan classifies human habitats of increasing density and complexity. Denser neighborhoods will require a different set of zoning classifications than less dense, more suburban neighborhoods.
Allocate locally undesirable land uses fairly and logically	Regional	Preventing the occurrence of locally unwanted land uses (LULUs) is how zoning was started. However, they seem to be dumped in disadvantaged communities where there is less opposition. Zoning should ensure that the placement of LULUs are evenly distributed and do not hinder neighborhood health.
Incentivize smart growth principles	Regional	Development pattern is just as important as its location and costs. Zoning could be used as an incentivizer. For example, new developments that follow a prescribed list of standards could receive a density bonus, expedited permitting, or a tax break as a reward.
Coordinate transportation and land use planning	Regional	The connection between transportation systems and their nearby land uses is often overlooked or underestimated. Decisions regarding both elements should be made simultaneously. Planners should ensure that land near major arterials and interstates is zoned in such a way to minimize the health disparities that may occur.
Plan for proximity and movement	Regional	Mixed use zoning is a strategy that can be used to create finer-grained neighborhoods that have both strong levels of walkability, but where everyday services are placed near housing.

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Make all significant destinations accessible by bike	Regional	Important and frequently visited destinations within a city should not only be accessible by bike, but also have adequate bicycle parking. Zoning policies should require the zoning classifications of those destinations to provide such facilities.
Create neighborhoods that enable diverse activity	Neighborhood	Neighborhoods should strive to include a balanced mix of housing, retail, offices, recreation, and civic uses. Mixed use zoning classifications could aid with this, as well as ensuring that only certain land uses/zoning classifications are allowed within a neighborhood that desires such a balance.
Include a full range of housing in each neighborhood	Neighborhood	Having many types of housing units within a neighborhood proves to be efficient and have a lot of physical and social health benefits. Residential base zoning classifications should either not prescribe specific housing types or densities that only support one housing type, or individual neighborhoods should aim to include a variety of residential base zoning classifications for the purpose of housing diversity.
Satisfy daily shopping needs within each neighborhood	Neighborhood	In order to be successful, all neighborhoods should include retail/commercial space. A good rule of thumb is that for every 300 housing units and/or jobs that a neighborhood holds, there should be at least 1 viable retail outlet. This should be taken into consideration under planned unit development/mixed use zoning classifications.

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Grow and sell food at the neighborhood level	Neighborhood	The term “urban agriculture” is an oxy-moron. However, in cities with food deserts or swamps, this should be a viable option. Zoning should allow by right urban agriculture and community gardens in select zoning classifications for the purpose of selling fresh food to neighborhoods that they belong to.
Plan neighborhoods and corridors to support transit	Neighborhood	Because transit trips begin and end with walking, pedestrian infrastructure should be available in the areas immediately surrounding transit stops and stations. Zoning classifications that support transit oriented development should include such infrastructure and higher density housing units and commercial development.
Do not allow dead-end streets	Street	Subdivision regulations within areas with a residential base zoning classification should ban cul-de-sacs and other disconnected street patterns. Disconnected street patterns are not only unpleasant for pedestrians and decrease the likelihood of active transportation, they are also socially unhealthy.
Keep block sizes small, especially in downtown neighborhoods	Street	The most walkable neighborhoods are those with smaller blocks and more street intersections per square mile. While this may not be addressed directly by zoning, smaller lot sizes are one way to mitigate this.
Provide proper sidewalks along all thoroughfares	Street	Zoning should not only control for the presence of sidewalks, but they should also prescribe width. They should be at least 5 feet wide in less walkable areas, at least 10 feet wide in more urban areas, and between 15-25 feet wide on busier retail corridors.

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Adjust parking requirements to reduce car dependence	Street	American cities are notorious for prioritizing parking instead of more active modes of transportation. Zoning classifications within areas well supported by transit should seek to implement caps on parking instead of requiring a minimum number of spaces. The same should be true for well-connected and walkable residential areas.
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These are examples of ways zoning can be used to incorporate the ideas of smart growth within a community. It is recommended that these ideas only be implemented as seen fit by local governments and not without some public input. This approach can be done either holistically or incrementally (see Chapter 10).

CHAPTER 9 | CREATING HEALTH-BASED FRAMEWORK FOR PLANNING

State and local governments should introduce and incorporate physical health into their comprehensive planning processes, and prioritize mitigating local public health crises including obesity.

SECTION 9.1 | RATIONALE

Chapter 4 demonstrated that goals related to health are not often reflected in city and county comprehensive plans. By incorporating health-based strategies in comprehensive planning updates, more consideration will be given to creating context-based and health-based solutions. This seems to be the case in nearly every state planning authority. This does not mean that because a state does not require it that local governments within that state cannot adopt a stand-alone health element in their plans. The National Association of Local Boards of Health stressed in a 2006 report on the role of public health in planning that health measures be included in the evaluation of transportation and land use plans, and recommends that “local boards of health may want to attend or designate a representative to study the zoning processes and attend critical land use planning meetings” (Fallon and Neistadt 2006, 22-24).

Explicitly incorporating health into a comprehensive plan is the first step in creating healthier communities. As mentioned in Chapter 4, the comprehensive plan is instrumental in guiding new initiatives, like updating a zoning ordinance, implementing new programs designed to increase health, and budgeting for necessary infrastructure upgrades.

SECTION 9.2 | IMPLEMENTATION STRATEGIES

One key problem with comprehensive planning is that it typically follows a top-down process: county plans will influence city plans, which influence neighborhood-level plans. The influence of county policies on subsequent city-wide policies, plans, and programs is part of the problem when it comes to planning for health. A health-based planning framework for a city should include cooperation from both planners and public health officials within the city government in a bottom-up manner. The end goal should be a citywide plan that guides policy development and formation, and incorporates the needs and wants reflected in the master plans of individual neighborhoods within the city. District master plans should reflect individual issues and needs of the people who live within them; no two district master plans will be alike. The following is an example of how to incorporate a health-centered process into comprehensive planning efforts, and suggested factors to examine

during the process. The suggested roles of where to involve public health officials are marked with an asterisk (*).

1. Divide the municipality into districts as defined by Census blockgroup or tract boundaries.
2. *Assess the following health conditions on both a macro level (city) and micro level (districts):
 - a. Adult overweight/obesity rates
 - b. Childhood overweight/obesity rates
 - c. Proportion of residents with type II diabetes
 - d. Incidence of heart disease
 - e. Life expectancy
3. *Compare rates of health conditions:
 - a. City as compared to county/state/nation
 - b. District as compared to city
4. Evaluate both city and districts on:
 - a. Population (current and projected)
 - i. Density
 - ii. Household income
 - b. Economy (current and projected)
 - i. Employment rate
 - ii. Number of jobs
 - iii. Industries
 - iv. Economic development opportunities
 - c. Transportation
 - i. Street pattern (grid versus curvilinear networks)
 - ii. Street types (arterial, carrier, and local roads)
 - iii. Percentage of road corridors without sidewalks
 - iv. Percentage of road corridors without bike lanes
 - v. Number of transit stops (if applicable)
 - vi. Number of off-street surface parking spaces
 - vii. Number of on-street parking spaces
 - d. Land use
 - i. Zoning classifications and overlays included in each district, and related land use policies

- ii. Permitted land uses (aggregate)
 - iii. Number of fresh food outlets as compared to fast food outlets
 - iv. Calculate level of land use mix (entropy)¹³
 - v. Equity (identify where exclusionary zoning occurs)
 - e. Housing
 - i. Number of single-family housing units (primarily detached, single-family units)
 - ii. Number of multi-family housing units (primarily duplex, townhouse, apartment, and condominium units)
 - f. Schools
 - i. Number of schools (elementary, middle, and high)
 - ii. Location of schools with respect to walkable infrastructure
 - iii. Location of schools with respect to residential developments
 - iv. Mode split among students
 - g. Environment
 - i. Natural resources
 - ii. Greenspace system (parks, recreational areas, et cetera)
 - iii. Opportunities and threats related to the environment
5. *After gathering information on both the neighborhoods and the city as a whole, layering the information via mapping is crucial to determining the level in which each neighborhood requires a health emphasis in its individual master plan.
 6. *Hold meetings with the collective residents of the city and determine goals that are rooted in improving neighborhood design, health, and future growth.
 - a. Determine strengths/weaknesses of the city as a whole
 - b. Determine opportunities/threats of the city as a whole
 - c. It is recommended that numeric metrics be established in the formulated goals. For example, a goal relating to lowering the rate of diabetes among residents should read, "Lower the rate of diabetes by 20%," instead of "lower the rate of diabetes."
 7. *Hold meetings with members of each district and determine goals that are rooted in improving neighborhood design, health, and future growth.
 - a. Determine strengths/weaknesses of each district

¹³ Land use mix (entropy) = $-\sum p_i \cdot \ln(p_i) / \ln(n)$, where n = number of land uses, and p_i = the proportion of estimated square footage attributed to land use i .

- b. Determine opportunities/threats in each district
 - c. Determine any locally unwanted land uses (LULUs) in each district
 - d. It is recommended that numeric metrics be established in the formulated goals. For example, a goal relating to lowering the rate of diabetes among residents should read, “Lower the rate of diabetes by 20%,” instead of “lower the rate of diabetes.”
8. *Create a comprehensive plan for the city that addresses how health-related goals will be reached with policy and programs. Suggestions include:
- a. Adjusting zoning policies accordingly to reflect an awareness of health by identifying uses that hinder health
 - b. Implementing programs/incentives designed to bring fresh food in food deserts/swamps
 - c. Requiring the use of active design principles in the construction and planning of new developments
 - d. Form-based district regulations/overlays
 - e. Expanding upon and improving the efficiencies of transit systems (if applicable)
9. *Create a master plan for each district that addresses how health-related goals will be reached with programs and projects. Suggestions include:
- a. Determining which zoning classifications are most desirable within the district
 - b. Creating more complete streets
 - c. Improving/building sidewalks and active infrastructure
 - d. Building fresh food outlets in areas that are not already within a certain distance from one
10. Incorporate proposed outcomes into the city’s capital improvement element/short term work projects list
11. *Within the comprehensive planning process, an HIA framework should be implemented to measure the impacts of plans and resulting projects.
12. Continuously maintain and update district master plans and citywide plan as often as necessary to gauge the success of plans, reflect market changes, and examine new issues.

This framework can easily be adjusted in scale for county and regional planning initiatives. The purpose of this framework is to provide a way for planners to think about health and obesity, and to show where local boards of health can be included in the process. For example, an unusually high rate of obesity in one district as compared to the others may indicate a problem that can be fixed with planning in that area. Using HIAs as a monitor for success and failure can be informative about

results. Many of these steps can be used both within the state-mandated comprehensive planning process, and in tandem with other planning initiatives.

CHAPTER 10 | UPDATING ZONING POLICIES

Zoning regulations, particularly those concerning residential and commercial/industrial uses, should be rewritten in ways that encourage physical health and can help in reducing obesity rates.

Maintaining and updating your zoning code is needed to keep land use patterns relevant so that they reflect changing local issues. The zoning codes that many cities use today have not been updated since their initial adoption decades ago. It is highly recommended that local governments that wish to take a more health-based approach to planning to take inventory of their zoning codes and evaluate on how well they address health and livability. In instances where they do not, updating zoning policies is something that will have to be done to ensure a happy, healthy, and livable community. There are three ways that it can be done: overhauling the existing traditional zoning model in favor of a form-based code, adopt a parallel zoning model, or make incremental changes to the existing traditional model. Overhauling current zoning in favor of a completely different model is not only difficult, but it can be timely and costly. This section will focus on the two latter recommendations, which are more feasible (and perhaps more desirable) than adopting a strict form-based code.

SECTION 10.1 | PARALLEL ZONING

Create a hybrid of traditional zoning and form-based zoning that will strive to consider both present context and future needs regarding health in the rewriting of the zoning ordinance.

RATIONALE

Parallel zoning looks to bridge the gaps of communities that may desire both highly urban, walkable areas *and* wish to retain more suburban, drivable areas. Parallel codes add special design and form-based districts “either in permissive floating zones or in mapped, mandatory districts, to operate in parallel with use-based zoning regulations” (Berke 2006, 453). Moreover, they regulate both use *and* design, are proscriptive *and* prescriptive, have linkages with a land use plan *and* regulating plan, and can use the Transect *and* base zoning classifications (Berke 2006, 454t).

BARRIERS TO CHANGE

As with any zoning policy, there is the potential that legal issue that could arise, especially with policies that do not have as much legal precedence as cities look to implement form-based standards. “Not surprisingly, there was initial concern about the consistency of form-based codes, as public, regulatory enactments, with the standard state zoning, planning, and subdivision enabling

acts that have formed the state law basis for land regulation over the last seventy-five years” (Lawlor 2011). This particular recommendation, if implemented, requires heavy public participation. Changing a zoning code is not an easy process on both the planning side or on the community side. Methods of participation should be creative and get people to express their desires and goals for their community. Once the community is won over, this will ensure success in changing the zoning.

IMPLEMENTATION STRATEGIES

The state of Georgia, while it has no examples of parallel zoning known as of the writing of this report, communities are encouraged by the Department of Community Affairs (DCA) to create districts for the purposes of small area planning. The DCA has set recommendations that address how to plan for these “character areas.” The state recognizes that cities and counties are made up of small areas that have specific characteristics that should be preserved. A character area is defined as “having unique or special characteristics, the potential to evolve into a unique area when provided specific and intentional guidance, or requiring special attention due to unique development issues.” This is the only element of Georgia land use planning that addresses area context in some way, as form-based and context-based standards can be set forth within a jurisdiction’s character area plan (Georgia Department of Community Affairs 2014b). The connection between urban design and land use planning is that “a successful character area plan will serve as a guide for land use, zoning, [and] public improvements... The result can be a richly detailed plan that addresses the area’s unique issues with tailored solutions” (Lake and Townshend 2006). Georgia’s option to implement character area planning is unique compared to the overall importance that context has had once had in land use planning, as well as encouraging.

Another useful strategy for adopting parallel zoning is the use of the SmartCode in areas that wish to become more walkable. The SmartCode was developed by Duany Plater-Zyberk & Company (DPZ), and is a “model integrated development code that incorporates Smart Growth and New Urbanist principles” (Duany et al. 2004). The SmartCode is a prescription for cities with zoning that is currently less-than-desirable in that it gives a baseline standard that can be easily recalibrated depending on the individual city’s contextual needs and objectives. It integrates methods of environmental protection and land conservation, subdivision standards, and protocols for the preparation and processing of plans that establish a parity of process for existing areas and future developing areas. It is similar to form-based codes in that it uses the transect plan as a regulating framework, and incorporates form-based standards. What sets SmartCode apart from form-based zoning is that SmartCode is more context-based and understands that not every “district” within a

city is going to fall neatly into every transect type, and considerations must be given to those areas, as well as those that are experiencing higher rates of growth. It also gives a lot of attention to the design of public right-of-ways, which is important in the development of active transportation infrastructure. The adoption of SmartCode is dependent on community involvement and support from local authorities and planning agencies. After its adoption, it must be maintained as new issues arise in communities (Duany et al. 2004).

Overall, communities would need to divide themselves into “character areas” or other subdivided districts for the sake of context-based, small area planning, and then create a form-based code or implement a version of SmartCode in the more walkable areas, and take full advantage of the opportunity to tweak the individual codes of areas that will continue to be regulated under a traditional zoning model. The case study of Flagstaff, Arizona presented in Chapter 6 provides an excellent example of such a framework.

SECTION 10.2 | INCREMENTAL CHANGES

For areas that cannot overhaul their entire zoning ordinance at one time due to financial or community-level restraints, small changes can be made to the current zoning ordinance that aim to reduce obesity within a target area.

RATIONALE

While many communities are willing to invest years and a lot of capital to hire consultants for the purpose of upgrading their zoning ordinances, it is not always the best solution nor is it always possible. By implementing incremental changes to a zoning ordinance that aim to improve health, they can serve as a way to test particular planning and zoning strategies for the future.

BARRIERS TO CHANGE

As with the proposed passage of ordinances that may threaten or weaken community values, there may be pushback from local residents. A way to circumvent any pushback is to make public participation and community engagement a priority, and keep all processes transparent.

IMPLEMENTATION STRATEGIES

There is no real strategy to implement an incremental change per se, but there are many examples of ordinances that can be eliminated or altered.

Land uses

- Residential base zonings should prescribe a minimum density, rather than capping it.
- Do not permit fast food establishments, establishments with drive-through service, and/or other establishments that would sell unhealthy foods within a certain distance from schools and public parks.
- Create and define character areas either via zoning overlays that ban unwanted land uses on a neighborhood level, or include specific zoning classifications within a district master plan.
- Pass ordinances supporting the creation of urban agriculture.
- Pass ordinances that require at least one fresh food outlet that sells fresh produce for residents within a half-mile.
- Incentivize the creation of fresh food outlets for developers.

Minimum lot sizes

- Employ maximum lot sizes as an alternative to increase density in single-family residential districts.
- Base minimum lot sizes on minimum dwelling size and lot coverage instead of a flat size or density requirement. If minimum dwelling size is 2,000 square feet (per story), and lot coverage cannot exceed 40%, then the minimum lot size must be 5,000 square feet, or a tenth of an acre. This will be particularly useful for planned unit developments where housing units are around the same size.

Parking requirements

- Only allow minimum parking requirements in residential base zonings that are geared towards single-family units.
- Employ maximum parking requirements in multi-family residential and commercial developments that have close proximity to transit. For example, commercial developments within 500 feet of a bus stop and/or a quarter-mile from a passenger rail stop could cap parking at 2 spaces per 5,000 square feet of space to promote walkability and transit use.
- Require that off-street parking lots be behind buildings and out of view.
- Require bicycle parking in all new developments. The number of spaces will be based on the floor area of buildings.

Urban design requirements

- Incorporate form-based standards either throughout a city, or within neighborhoods that seek more walkability.
- All new developments should incorporate sidewalks, the width of which should be kept consistent with the designed density of area. For example, areas that are low density by design should have narrower sidewalks and vice versa.
- Ban cul-de-sacs, disconnected street patterns, excessively winding roads, and “calming curves” from residential subdivisions to optimize traffic flow and promote pedestrian activity.
- Place a maximum block length requirement for new developments; smaller blocks increase comfort level and will encourage walking.
- Require buildings have public ingress/egress facing the street.
- The width of setbacks should be consistent with building height. Higher buildings should be accompanied by wider setbacks.

PART IV | CONCLUDING REMARKS

In a 2013 editorial to the *American Journal of Public Health*, Richard Jackson, Andrew Dannenberg, and Howard Frumkin asserted that in order to solve the obesity crisis, we must look for opportunities from which to reap health benefits from our built environment and advocate for the importance of health in building and development decisions (Jackson, Dannenberg, and Frumkin 2013). The body of literature reviewed in Part I showed that there are many complex relationships between urban sprawl and urban form regarding the obesity epidemic. Urban sprawl is a direct product of social issues, traditional and single-use zoning policies, land availability, economic markets, and federal mortgage programs, which has resulted in automobile dependency as people chose to move farther away from cities and into the suburbs. The sedentary lifestyles that have resulted from increased automobile dependence have increased the risk and prevalence of obesity in the United States. Urban sprawl has led to an urban form that is low density, dominated by singular land use districts, and has poorly designed public right-of-way that implicitly discourages the use of active transportation modes. While these factors only make up a small part of the overall problem, they have aggravated the core problem of sedentary behavior and lifestyles among Americans, especially those who live outside more urbanized areas. The obesity epidemic is on the rise and will continue to rise unless creative solutions that go beyond fixing our behaviors are formulated. Obesity is costly for society, both in terms of health and economics. The healthcare dollars spent annually treating obesity and related conditions could be better spent on other issues facing our cities and nation. We can conclude that urban sprawl and poor urban form and design are the result of poor land use planning, which is determined by the land use regulations that cities, counties, and states mandate. Not only are these regulations a cause for the current public health crisis, but they are the same regulations that effectively block high-density, mixed use developments (Jackson 2003).

There are some counterarguments against the theory that poor land use decisions have led to a decline in health in Americans. Experts in health and public policy who would argue that how we design our cities and our current policy framework's regulation of land use are not the problem as much as our changing cultural values are. Other health experts assert that an increase of the presence of environmental factors have triggered certain genes that have led us to gain more weight and develop associated illnesses. Some critics are more willing to argue against the idea that sprawl and urban form affect health by stating that the assumption that sprawl is directly related to health is not valid, and there are other lifestyle choices that have a larger impact than just living in an area that has a high level of sprawl. These same critics also believe that physical activity is a conscious

choice, rather than it being unconscious and predetermined by infrastructure availability as the research suggests. However, while these counterarguments do shed light on the effects of lifestyle choices on the obesity crises, it is believed to be only a fraction of the problem, just like land use regulation is only a fraction.

In Part II, the impact of comprehensive planning on long-range planning objectives and how it fails to address health was discussed, using the State of Georgia as an example. The comprehensive plan has the power to influence all levels of the planning process, especially zoning, and modifying it is the first step in modifying any of those levels. It was discovered in the research that traditional zoning implicitly promotes unhealthy lifestyles. The practice of allowing and banning certain businesses or uses is essential in decreasing the incidence of nuisance developments and preventing undesirable land use combinations, especially considering how this is the primary motivation behind zoning. However, the spatial arrangement of land use that traditional zoning encourages and the lumping of zoning classifications/land uses into separate districts poses problems in that they do not promote density and they promote more auto-oriented development patterns. On the other hand, form-based zoning promotes density and more walkability by prescribing how a place should function by placing regulations on building form, streets, the urban fabric, and landscaping. Form-based codes can be utilized to maximize health benefits by improving issues of pattern, dimension, heterogeneity, separation, and enclosure. The case studies examined show how large cities like Baltimore, Philadelphia, and New York City have updated their comprehensive plans, zoning codes, and developed guidelines for active design for the purpose of improving physical health outcomes, and how the strategies employed can be duplicated in other communities with the same issues. Other case studies examined focused on using zoning to eliminate fast food outlets, and using zoning to create incentives for developers who place fresh food outlets within local food deserts. Philadelphia's "Get Healthy Philly" initiative and their program for funding farmer's markets for disadvantaged communities was discussed, and there are many other similar programs across the United States that strive to place healthier food options in areas where there are none. Overall, these case studies show how zoning can become tools in creating healthier communities and reducing local obesity rates.

Part III discusses the recommendations developed as a result of the findings of Part I and II to demonstrate how local governments could utilize to lower obesity rates and improve health within their municipalities. These recommendations were to (1) incorporate smart growth strategies into land use and zoning policies, (2) create health-based planning frameworks, and (3) update zoning policies via an overhaul or making incremental changes. The proposed solutions are not singular and

they interact with each other. The rationale behind each recommendation was discussed, as well as potential barriers of change and implementation strategies.

The main takeaway from this report is that while improving zoning and incorporating strategies that consider local context into those changes can improve obesity rates and other health disparities, it is *not* a panacea. There is personal responsibility to be had as society continues to move towards mitigating the obesity crisis, but because planners have a duty to plan for public welfare there is much responsibility to be had in creating environments that encourage healthy living by providing healthier food options in areas that do not have them, providing infrastructure that promotes active transportation, and creating places that embody the principles of active design. Context-based zoning has the potential to give more weight to the planning process while better incorporating the voice of the affected community to shape better and healthier developments in a way that is not as top-down as both “traditional” and “form-based” codes tend to be.

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