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12

Exploring Opportunities to Prevent Injury and Violence Through Zoning

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Injury and violence are societal problems. The U.S. Centers for Disease Control and Prevention (CDC) consider them together to be a “high priority health issue,” “a leading indicator of public health,” and a leading contributor to “disparities in long-term mental and physical health (CDC 2019a; CDC 2019b; Sheats et al. 2018). Though unintentional injuries and acts of violence are the leading cause of death for all Americans aged one to 44, risk of injury and violence is clearly elevated for historically disadvantaged groups including children, the elderly, African Americans, Asian and Pacific Islander Americans, Indigenous Americans, Latino Americans, other social-ethnic minorities, people with lower incomes, and developmentally disabled persons.

This edition of *Zoning Practice* is intended to help planners and other zoning practitioners draft zoning laws and land-use policies (hereafter, zoning practices) that can prevent injury and violence. The following sections introduce a theoretical framework to enhance understanding of the social determinants of health and how zoning practices influence and are influenced by larger historical, social, and political factors; provide an overview of injury and violence in the United States; review empirical evidence supporting the use of zoning practices to prevent injury and violence; and present evidence-based recommendations for zoning practitioners.

THE SOCIAL DETERMINANTS OF HEALTH AND ENVIRONMENTAL HEALTH

While zoning laws and land-use policies serve as contributing factors, the determinants of injury and violence are deeply rooted in the broader U.S. context. Within this context, African Americans, Latino Americans, and Indigenous Americans are disproportionately exposed to conditions such as concentrated poverty, racism, limited educational and occupational opportunities, and other aspects of social and economic disadvantage contributing to disparate levels of injury and violence.

The Social Determinants of Health and Environmental Health Promotion framework (hereafter, SDH) is a theoretical framework used to enhance understanding of how larger societal factors known as the social determinants of health influence injury and violence and related health disparities (Rossen and Pollack 2012). SDH can help illuminate the connections between zoning practices and population health (e.g., injury and violence). SDH highlights characteristics of the social, built, and policy environment that contribute broadly to public health.

Within the tri-level SDH framework, inequitable health outcomes (e.g., injuries and violence) and resulting health disparities (e.g., differential rates of injury and violence by socioeconomic, race and ethnicity, gender, etc.) are partially attributable to societal factors. At the macro level, political factors; economic conditions; institutional racism and patterns of historical discrimination, legal codes, and Jim Crow laws; accumulated disadvantages in material wealth, employment, educational, and housing opportunities; and political influence have been theoretically associated with poor health outcomes including disproportionate exposure to injury and violence. At the meso level there is the policy context, the social context, and the built environment (WHO 2019a). At the micro level, environmental stressors, insecurity, and community-level health behaviors affect community-level rates of injury and violence.

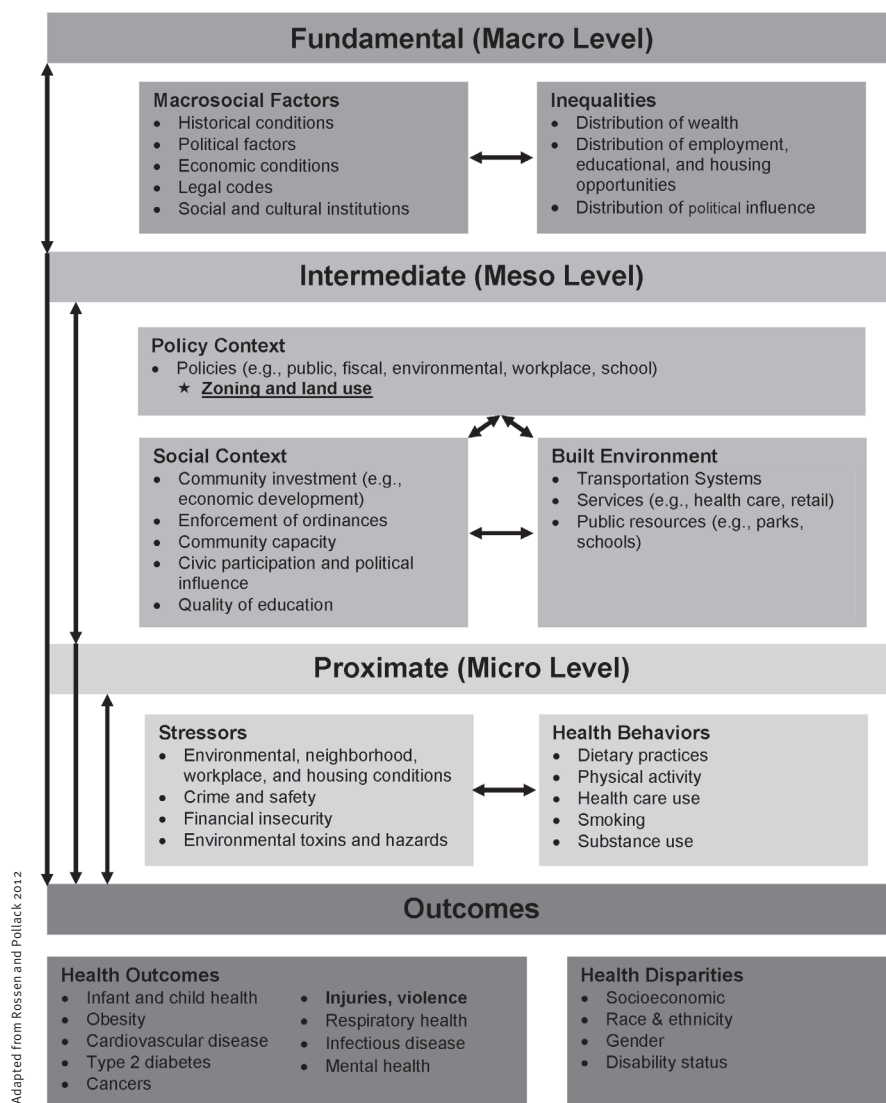
INJURY AND VIOLENCE: SOCIETAL PROBLEMS

Injury and violence are widespread problems that impact all U.S. population groups. Injury and violence are the leading cause of premature death, years of potential life lost, disability-adjusted life years, poor mental health, high medical costs, and lost productivity for all Americans aged one to 44 regardless of sex, race, ethnicity, or socioeconomic status (ODPHP 2019). Annually, injuries account for 59 percent of all deaths among people aged one to 44—more deaths

than all noncommunicable diseases and infectious diseases combined (CDC 2016). In 2013, the total lifetime medical and work-loss costs of injuries and violence in the U.S. was \$671 billion; costs associated with fatal injuries was \$214 billion; and nonfatal injuries accounted for more than \$457 billion (CDC 2016; CDC 2019e). Motor vehicle crash-related injuries are the leading cause of injury death and the leading contributor to years of life lost due to injury for Americans aged one to 65 (CDC 2019e; USBDC 2013). Injury risks associated with walking, cycling, and motorcycling remain very high. Vulnerable road users (e.g., pedestrians, pedal cyclists, and motorcyclists) are disproportionately burdened (WHO 2019c). In Los Angeles County, for example, between 2013 and 2017 pedestrians were involved in 20 percent of fatal and severe collisions (Los Angeles County 2019).

In the U.S., alcohol and firearms are significant factors determining the incidence, prevalence, and severity of injury and violence. Annually, just under 60,000 males and 30,000 females die from alcohol-related causes annually (NIAAA 2018). While there are numerous problems associated with long-term chronic drinking, binge drinking substantially increases the risk of injury and violence, including motor vehicle crashes, falls, drownings, burns, homicides, suicides, sexual assaults, and incidents of intimate partner violence (CDC 2018). Firearms are problematic. For example, firearm-related homicides are the fourth leading cause for those between the ages of one and nine; the third leading cause of death for ages 10 to 24; and, the fifth leading cause for ages 25 to 44. Moreover, firearm-related suicides are the second leading cause of death for people between the ages of 10 and 24 and 25 to 44 and the eighth leading cause for ages of 45 to 64 (Heron 2019).

Although rates of injury and violence have generally decreased over the past two decades for all population groups, the accumulated public health benefits have



➡ **Figure 1.** The Social Determinants of Health and Environmental Health Promotion Framework illustrates how various features of the built and social environments contribute to health and health disparities.

not been equitably distributed. The burden of injury-related morbidity and mortality is borne by racial and ethnic groups, especially African Americans (Sheats et al. 2018). African Americans have the highest homicide rates among racial/ethnic sub-groups; the homicide rate for blacks aged 10 to 34 years was 13 times the rate for whites (Sheats et al. 2018). Despite representing just 13 percent of the U.S. population, African Americans “accounted for 51 percent of all homicide victims” (Violence Policy Center 2018).

KEY FINDINGS

There is substantial theoretical evidence linking modifications in zoning laws and land-use policies with changes in health behaviors and health outcomes, including increasing physical activity, improving air quality, decreasing auto dependence, and improving access to parks and open spaces (Rossen and Pollack 2012; Shulz and Northridge 2004). There is evidence to support the use of zoning practices to improve health in African American communities (Casagrande et al. 2009). And, with the notable exceptions

of traffic-calming measures and alcohol outlet density, there are few empirically based examples indicating that modifications in zoning laws and land-use policies can modify rates of injury and violence at the community level. Taken as a whole, however, these findings suggest that zoning practices can be used to influence rates of injury and violence (Anderson et al. 2013). The key findings are summarized below.

Zoning Practices Influence the Built Environment and Public Health

There is theoretical and empirical evidence suggesting that zoning practices can (1) facilitate or obstruct the creation and maintenance of healthy communities; (2) affect levels of physical activity; (3) increase social integration; (4) reduce transmission of communicable disease; (5) decrease exposure to environmental hazards; (6) reduce crime; (7) lessen the fear of crime; (8) lessen rates of injuries and violence; and (9) diminish health disparities (Dannenberg et al. 2003; Rossen et al. 2012; Thrun et al. 2012). Zoning practices exert influence on the built environment and multiple social determinants of injury and violence—including the existence and location of public facilities and infrastructure like libraries, parks, open space, bike lanes, and sidewalks; American Disabilities Act (ADA) compliance, including equal access to safe streets and sidewalks; code enforcement; alcohol outlet density, location, hours of operation, sales, and service; and regulations that impact the physical environment like planting and lighting, for example. (ADA 2010; Thrun et al. 2012).

Zoning Practices Impact Health Status

Zoning practices and the built environment have a significant impact on African Americans’ health status. For example, environmental factors (e.g., zoning practices) and health behaviors and outcomes among African Americans are clearly associated. Residential density, land-use mix, intersection density, walkability, park availability, presence of supermarkets versus convenience stores, and lack of physical activity resources and community infrastructure in African American neighborhoods is associated with poor diets, a lack of physical activity, and chronic disease (Casagrande et al. 2009).

Traffic Calming Reduces Injuries

There is evidence that “area-wide traffic calming has the potential to prevent road traffic injuries” and “is associated with absolute reductions in child pedestrian injury rates and reductions in relative inequalities in child pedestrian injury rates” (Bunn et al. 2003; Jones et al. 2005). Furthermore, traffic-calming measures and other improved road and trail designs that take into account potential conflicts between pedestrians, bicyclists, and motorists lead to reductions in motor vehicle collisions and injuries (Dannenberg et al. 2003). And there is evidence that speed humps, specifically, are associated with lower odds of children being injured near their homes (Tester et al. 2004).

Policies That Increase Alcohol Outlet Density Increase Injury and Violence

There is evidence that permissive alcohol licensing laws that increase the number of alcohol outlets result in an accompanying increase in alcohol consumption, alcohol related-harms, and alcohol-related motor vehicle crashes; changes in violence rates; and increased binge and underage alcohol use, medical harm, injury, and violence (Campbell et al. 2009; Gruenewald et al. 2006; Zhu et al. 2004). In Los Angeles, most census tracts exceed the guidelines established by the California Department of Alcohol and Beverage Control (ABC) (see figure 2).

Further, “the effects of excessive alcohol use include higher morbidity and mortality rates related to accidents and injuries, alcohol poisoning, birth defects and miscarriages, and domestic violence” (Wooten et al. 2013). In terms of alcohol-related harms and outlet density, one study found that each one-unit increase in the number of alcohol outlets was associated with a 2.2 percent increase in the count of violent crimes, adjusting for neighborhood disadvantage, percent minority, percent occupancy, drug arrests, and spatial dependence (Jennings et al. 2014). Another study found that places with more off-premise establishments and more bars exhibited greater rates of assaults than places with more restaurants (Gruenewald et al. 2006).

RECOMMENDATIONS

Based on the evidence, zoning practitioners should consider (1) assessing the potential impact of zoning laws and land-use policies

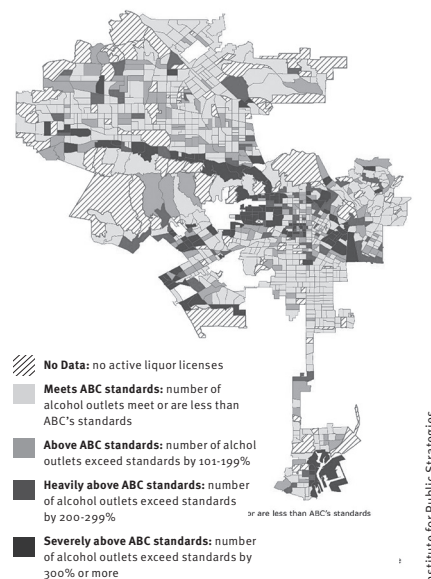
on public health, mental health, and community well-being; (2) assessing the impact of alcohol outlet density on public health and safety; (3) adopting traffic-calming measures to reduce motor vehicle, bicycle, and pedestrian injuries; and (4) updating zoning codes to reflect current public health challenges. Recommendations are summarized below.

Assess Potential Impact of Zoning Decisions on Public Health

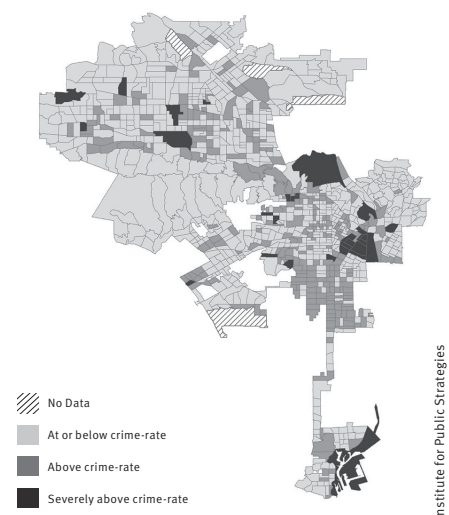
Several studies suggest that planners should develop, adapt, and utilize tools for forecasting the impact of zoning laws and land-use decisions on public health (Farhang et al. 2008; Wier et al. 2009). This review identified two promising tools and one policy approach: health impact assessment (HIA); the Healthy Development Measurement Tool (HDMT); and the Health in All Policies (HIAP) approach. Planners and other zoning practitioners can use HIA, HDMT, and HIAP to assess the extent to which urban development projects and plans can promote public health and provide a range of zoning policies and land-use strategies that can prevent injuries and violence.

HIAs can be used to identify how zoning laws and land-use policies impact public health and to develop recommendations that will protect health and reduce health inequities (CDC 2019f.). Although HIAs have primarily been used by public health professionals, zoning practitioners can use HIAs to support social policy development, provide information for decision makers, and examine the health impacts of policies for zoning, public housing, community redevelopment, traffic calming, and public transit (WHO 2019b). HIAs can help illuminate potential positive and negative consequences of land-use policies and zoning decisions on public health (CDC 2019f.; LaViest et al. 2011; Rossen and Pollack 2012; Thornton et al. 2013). HIAs are a central component of the HDMT process.

The goal of HDMT is to achieve a higher quality social and physical environment and advance public health (Mithun 2010). First developed by the San Francisco Department of Public Health for evaluating the impact of zoning, land-use planning, and urban development on public health, HDMT moves the HIA beyond the policy impact identification



➡ **Figure 2.** Eighty percent of all census tracts in Los Angeles have a total number of alcohol outlets that exceed ABC guidelines. Of these, 34 percent exceed the recommended number by 300 percent or more.



➡ **Figure 3.** Forty-four percent of census tracts in Los Angeles that exceed ABC guidelines for the number of alcohol outlets also have above-average crime rates, while 76 percent of census tracts that meet ABC guidelines have crime rates that are at or below average.

TABLE 1. FIVE KEY VARIABLES THAT AFFECT THE NATURE AND EXTENT OF ALCOHOL PROBLEMS ASSOCIATED WITH ALCOHOL RETAIL OUTLETS

Variable	Effect
Number of alcohol outlets	High numbers of outlets are associated with increased alcohol problems.
Types of alcohol outlets	Outlets such as bars and nightclubs, which have alcohol as their primary business, create increased risks of problems.
Concentration of outlets	Over concentration is associated with increased incidence of alcohol problems.
Locations of outlets	Retail outlets next to sensitive areas such as schools, playgrounds, or other locations where youth congregate can contribute to underage drinking problems.
Retail practices	Responsible sales and service practices are particularly important variables.

stage by determining how a proposed zoning law or land-use decision impacts the health of the community and informing the zoning process as it moves forward into land-use approvals and implementation. HDMT combines quantitative analysis of health indicators with a qualitative assessment of land-use plans and identifies measurable and actionable ways to improve public health through zoning, planning, and urban development to assess the opportunity to advance health in six domains:

1. Adequate and healthy housing
2. Environmental stewardship
3. Safe and affordable transportation
4. Social cohesion
5. Public infrastructure
6. Healthy economy

HDMT focuses on broadening the range of social, economic, and environmental resources needed for health on a population level by recognizing a range of resources needed for optimal health at the societal level and identifying measurable and actionable ways to meet those needs through urban development. While HIA recommendations are often generalized to a region, HDMT recommendations are specifically tailored to the needs of a particular neighborhood or zone (Mithun 2010).

Like HIA and HDMT, HIAP encourages policy makers to consider factors outside the strict confines of zoning practices (LaViest et al. 2011). HIAP includes five key elements: (1) promoting health, equity, and sustainability; (2) supporting intersectoral collaboration; (3) creating co-benefits for multiple partners;

(4) engaging stakeholders; and (5) creating structural or procedural change (Rudolph et al. 2013). Land-use professionals can use HIAP to address the social determinants of health outcomes (i.e., rates of injury and violence) and health inequities (i.e., differences in injury and violence rates between disparate groups), encourage collaboration between groups, and incorporate injury and violence considerations into policy discussions and municipal decision making.

Reduce Alcohol Outlet Density to Decrease Injury and Violence

Reducing alcohol outlet density can be an effective means of controlling excessive alcohol consumption and harms (Campbell et al. 2009). Alcohol outlet density is a significant predictor of injury and violence including motor vehicle crashes, homicides, assault, and battery (CDC 2018). Therefore, addressing access and availability of alcohol is “fundamental to the prevention of alcohol-related problems” (Zhu et al. 2004).

Adopt Traffic-Calming Measures

Planners and other zoning practitioners should require new land developments to incorporate traffic-calming measures to reduce traffic-related injuries. “Modifying traffic patterns is a passive and sustainable public health intervention that may make children’s living environments safer” (Tester et al. 2004). Distinct from speed limit signs or stop signs, traffic calming measures such as speed humps, street closures, median barriers, and traffic circles are successful in providing long-term safety for pedestrians and motorists because they are physical

structures with designs that are self-enforcing rather than requiring police enforcement (Tester et al. 2004). Traffic-calming measures reduce all types of collisions and reduce associated injuries; therefore, planners should promote traffic calming measures and separation of bikes and pedestrians from other forms of traffic (Dannenberg et al. 2003; WHO 2019c).

Update Outdated Zoning Codes

While supported theoretically and not by empirical evidence, zoning code rewrites have been identified as having significant potential to impact public health. Zoning codes that reflect outmoded design standards, have inconsistent amendments, or favor suburban development over transit-oriented urban development may serve as impediments to injury and violence prevention, particularly in low-income or disadvantaged neighborhoods (Rossen and Pollack 2012). Eliminating, adapting, or modifying outdated and outmoded zoning codes and land-use policies could improve population health, including decreasing injury and violence (Thornton et al. 2013). For zoning code rewrites to be effective, zoning practices and land-use policies must be adapted and updated to reflect and respond to the public health challenges of today (Thornton et al. 2013).

CONCLUSION

Zoning practices can have a critical positive impact on reducing the cost, frequency, and severity of injury and violence. There is substantial theoretical evidence linking zoning practices to public health outcomes and health disparities including the incidence and prevalence of injury and violence (Rossen and Pollack 2012; Shulz and Northridge 2004).

Land-use regulation can be an important tool for addressing injury and violence, but existing research generally has not identified specific modifications to the built environment that effectively reduce violence and injury (Anderson et al. 2013). “While no shortage of plausible hypotheses exist about the relationship between land use, the built environment, and community well-being, there is little high quality empirical research investigating many of these relationships” (Anderson et al. 2013). Despite the lack of empirical evidence, reducing injury and violence remains an important consideration

for planning professionals and others involved in developing and enforcing zoning ordinances and land-use policies—and for people impacted by zoning laws and land-use policies.

Zoning laws and land-use policies alone cannot reduce injury and violence, dissipate health disparities, or erase historical discrimination. In the U.S. financial resources often translate into greater power to influence public, fiscal, environmental, and workplace policies regarding infrastructure investments and economic development, and these, in turn, influence features of the built environment, including where to site services such as waste transfer stations, highways, and affordable housing (Shulz and Northridge 2004).

To improve health and reduce exposure to injuries and violence, zoning practitioners should (1) rely on HIAP and conduct HIAs and HDMT to identify potential negative impacts of zoning decisions; (2) update zoning laws and land-use policies to develop, cultivate, and maintain healthy built environments and favorable social contexts that reflect the public health challenges of the 21st century; (3) develop economic opportunities that attract community participation and economic investment; (4) strive for equitable enforcement of laws and ordinances; (5) invest in safe streets; (5) increase access to retail goods and services and health care; and (6) improve access to public resources like open spaces, parks, and schools (Rossen and Pollack 2012; Shulz and Northridge 2004).

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Randal Henry is the founder and chief intelligence officer of Community Intelligence, a social justice-oriented research and evaluation consulting firm committed to uplifting men and boys and women and girls of color and increasing the capacity of communities, nonprofit organizations, foundations, health care organizations, and government agencies to identify and ameliorate conditions that impact public health, mental health, and community well-being. Henry earned his doctor of public health and master of public health degrees from the University of California, Los Angeles, School of Public Health.

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HOW CAN ZONING PREVENT INJURY AND VIOLENCE?

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