Circulation

AHA POLICY STATEMENT

# Creating Built Environments That Expand Active Transportation and Active Living Across the United States

## A Policy Statement From the American Heart Association

**ABSTRACT:** Physical activity is vital for the health and well-being of youth and adults, although the prevalence of physical activity continues to be low. Promoting active transportation or human-powered transportation through policy, systems, and environmental change is one of the leading evidence-based strategies to increase physical activity regardless of age, income, racial/ethnic background, ability, or disability. Initiatives often require coordination across federal, state, and local agencies. To maximize the effectiveness of all types of interventions, it is imperative to establish strong and broad partnerships across professional disciplines, community members, and advocacy groups. Health organizations can play important roles in facilitating these partnerships. This policy statement provides recommendations and resources that can improve transportation systems, enhance land use design, and provide education to support policies and environments to promote active travel. The American Heart Association supports safe, equitable active transportation policies in communities across the country that incorporate consistent implementation evaluation. Ultimately, to promote large increases in active transportation, policies need to be created, enforced, and funded across multiple sectors in a coordinated and equitable fashion. Active transportation policies should operate at 3 levels: the macroscale of land use, the mesoscale of pedestrian and bicycle networks and infrastructure such as Complete Streets policies and Safe Routes to School initiatives, and the microscale of design interventions and placemaking such as building orientation and access, street furnishings, and safety and traffic calming measures. Health professionals and organizations are encouraged to become involved in advocating for active transportation policies at all levels of government.

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Physical activity, or bodily movement produced by skeletal muscles that requires energy expenditure, provides numerous disease prevention and physical and mental well-being benefits and is vital for the optimal health of everyone in the United States.[1] Too many US adults and children do not benefit from physical activity; only 26% of men, 19% of women, and 20% of adolescents meet the relevant aerobic and muscle-strengthening recommendations in the *Physical Activity Guidelines for Americans*,[1] and some reports suggest that even smaller fractions of the population meet these recommendations.[2] Racial/ethnic minorities and those from socioeconomically disadvantaged communities are less likely to be physically active, especially for leisure purposes, compared with Whites and those with higher socioeconomic status.[1] The World Health Organization has identified physical inactivity as the fourth leading risk factor for global mortality, causing 6% of deaths worldwide.[3] With its current prevalence and global reach, physical inactivity has been described as a pandemic with far-reaching health, economic, and social consequences.[4]

Promoting active transportation through policy, systems, and environmental change is one of the leading evidence-based strategies to increase physical activity regardless of age, racial/ethnic background, or socioeconomic status.[5] Active transportation is defined as human-powered modes of transportation such as walking, biking, skating, using mobility assistive devices such as wheelchairs and walkers, and accessing public transit.[6] Unfortunately, most residents of the United States, particularly individuals living in underresourced communities, do not live in areas amenable to active transport. This can limit access to jobs and other economic and social opportunities.[7,8] To provide opportunities for active transport, there is a need for policy, environmental, and systems interventions to connect important destinations with safe, convenient, and appealing public and private infrastructure for active transportation.[9]

Interventions for active transportation must occur at 3 scales: the macroscale, mesoscale, and microscale. The macroscale refers to the density and mix of land uses that place different types of destinations within walk, bicycle, and transit distance. Macroscale interventions include planning processes and zoning ordinances that intentionally intermingle places where people live, work, shop, play, learn, and pray. The mesoscale, or middle scale, includes quality, comprehensive, and connected networks of facilities for active transport. For example, programs and policies can create opportunities for active travel, and better transit funding can build sidewalks in neighborhoods, create protected bicycle lanes for safe cycling separated from traffic, or provide higher-frequency bus service. The microscale level entails functional and inviting design details that reward travelers for arriving on foot or by bicycle, wheelchair, or transit. Microscale improvements can include bicycle racks at schools and businesses, benches, lighting, and street trees, as well as safety measures such as increasing pedestrian crossing times on signal lights to accommodate slower walkers. At all scales of intervention, it is paramount that consideration be given to ensuring that policies are equitable and consider the needs of the more disenfranchised members of the community.[10]

This policy statement accompanies an article providing the scientific rationale for promoting active transportation and activity-supporting built environments.[11] More than 75% of US adults do not engage in any form of active transportation.[12] Here, we summarize the important policy, systems, environmental approaches, and funding opportunities for prioritizing increases in active transportation and transforming the way communities are engineered, thus creating environments that expand opportunities for active transportation across the United States. Throughout the document, the importance of an equitable, inclusive active transportation system is emphasized. Historical inequities in US transportation and land use policies continue, with limited public investments in low-income communities to improve roads, sidewalks, lighting, and other transportation infrastructure.[13] Equitable transportation policies are those that (1) support the development of accessible, efficient, affordable, and safe alternatives to car travel; (2) encourage high-density, mixed-use, mixed-income development and affordable housing with good access to transportation options, especially in low-income and underserved communities; (3) connect all people to employment and other opportunities that can improve quality of life; and (4) recognize that all segments of communities should be represented in planning processes, with an emphasis on engaging those who have historically been most disenfranchised.[10]

## SUMMARY OF POLICY, SYSTEMS, AND ENVIRONMENTAL CHANGE INTERVENTIONS

Policy, systems, and environmental interventions can provide the opportunities and supports to facilitate active transportation. These interventions can have broad and sustainable impact on transportation choice, given that all people exposed to the changes can benefit. The approaches are generally more permanent than programs focused on individual behavior change.[14]

Effective interventions to increase active transportation are likely to require the following:

1. Broad partnerships. Initiatives intersect across federal, state, and local governments. Stakeholders representing a variety of professional disciplines, community perspectives, and advocacy groups can help address differing priorities and improve





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accountability.[15] Because transportation and land use decisions affect health, health professionals and organizations should be engaged in these partnerships and are often well situated to act as conveners of these interdisciplinary work groups.[16]

2. Funding sources. Funding for improvements in transportation, infrastructure, and site designs that support active transportation can come from a variety of public agencies and private businesses. Projecting costs of the interventions from the planning through implementation and maintenance stages is essential. In addition, identifying relevant savings that may result and benefits gained by the community, including health benefits, can help garner support for funding outlays.[17–19]
3. Changes in routine practices and procedures. Many current development policies and practices, such as focusing on single-use zoning and designing roadways to maximize motor vehicle level of service (ie, keeping vehicles moving), create environments that discourage routine active transportation. Creating walk-, bicycle-, and transit-friendly settings will require fundamental changes in how residential and business developments are planned and permitted, how roads are designed, and how performance and safety are measured.
4. Ongoing communication. Building awareness and maintaining support until active transportation project completion are critical because vocal opposition to changing priorities is very common. Media or other relevant communication channels can be used to build public support and to keep stakeholders informed and involved in the process of ensuring that the policies, systems, and environmental changes are compatible with local needs, supported by the community, and completed as planned.

The following sections summarize policy, systems, and environmental interventions recommended in this statement. Resources to implement specific interventions are listed in Table 1.

## PEDESTRIAN AND BICYCLE INFRASTRUCTURE

Leading authorities recommend approaches that combine improved transportation systems with enhanced land use designs to create environments that promote physical activity.[46] Improvements to transportation systems can include street layout and design, improvements to public transit infrastructure, and creation of bicycle and pedestrian facilities. Documents are available to provide transportation planning officials with pedestrian design assessments to identify where improvements are needed[47] and to determine real-world costs of many pedestrian and bicycle infrastructure elements[48] that also accommodate people with disabilities.

The term *bicycle and pedestrian facilities* refers to infrastructure and furnishings that make it easier to accommodate, encourage, or enhance opportunities for active transportation. Pedestrian facilities include pedestrian access routes, sidewalks, street crossings, and street furnishings such as benches, lighting, and traffic control devices. Bicycle facilities are improvements that include road space for bicycles, bicycle parking or storage facilities, and bicycle sharing systems and should accommodate those who use wheelchairs or other mobility assistive devices.[49,50] Bicycle facilities that protect or separate bicyclists from automobiles are particularly important.[51] Appropriate infrastructure can create or enhance the convenience and social acceptability of bicycle and pedestrian modes,[20] reduce the risk of crashes,[52] and improve safety.[53] Documents exist that identify specific types of infrastructure that can facilitate the use of active transportation in a variety of settings (eg, Federal Highway Administration guidance page).[49,51,54–60]

Policies and appropriations for bicycle and pedestrian infrastructure can be used to improve the quality, quantity, and equity of such active transportation facilities.[61,62] Federal funding investments for bicycle and pedestrian facilities and programs have increased over time, but in 2018, <2% of all federal transportation funding was reserved for active transportation facilities,[63] whereas 11.5% of all trips are on foot or on bicycle.[64] Although not mandated, policies and funding opportunities at the federal, state, and local levels can support the creation or enhancement of pedestrian and bicycle facilities. Regardless of the level of a given policy, care needs to be taken that its implementation is equitable, with specific guidance provided to ensure that implementation takes into consideration the social and cultural uniqueness of communities.

At the federal level, macroscale opportunities to support bicycle and pedestrian facilities are funded through the surface transportation authorization act (currently titled the Fixing America's Surface Transportation Act).[65] The Federal Highway Administration distributes funds authorized for various constituent programs, some of which can support investments in bicycle and pedestrian facilities according to rules established for each program.[66] This funding is often apportioned to states by a statutory formula. In particular, the Surface Transportation Block Grant program provides funding for bicycle and pedestrian facilities.[65]

State legislatures and Departments of Transportation also play essential roles in transportation governance and oversight, including funding and overseeing improvements in bicycle and pedestrian facilities.[67] However, Departments of Transportation across states differ in their roles and authority. In some states, Departments of Transportation have authority to allocate federal or state funding for programs used to implement bicycle or pedestrian facilities; in others, this authority lies with the state

**Table 1. Resources for Implementation of Active Transportation Initiatives**

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| Pedestrian and bicycle infrastructure |
| Getting the Wheels Rolling: A Guide to Using Policy to Create Bicycle Friendly Communities<br>https://www.changelabsolutions.org/product/getting-wheels-rolling[20] |
| How Communities are Paying for Innovative On-Street Bicycle Infrastructure<br>https://bikeleague.org/sites/default/files/PayingForInnovativeInfrastructure.pdf[21] |
| Paying for Local Infrastructure in a New Era of Federalism: A State-by-State Analysis<br>https://www.nlc.org/sites/default/files/2016-12/NLC_2016_Infrastructure_Report.pdf[22] |
| National Association of City Transportation Officials: Urban Street Design Guide; Urban Bikeway Design Guide, and Transit Street Design Guide<br>https://nacto.org/publications/design-guides/[23] |
| Costs for Pedestrian and Bicyclist Infrastructure Improvements: A Resource for Researchers, Engineers, Planners, and the General Public<br>https://www.activelivingresearch.org/costs-pedestrian-and-bicyclist-infrastructure-improvements-resource-researchers-engineers-planners[24] |
| Complete Streets |
| A Guide to Building Healthy Streets: How Public Health Can Help Implement Complete Streets<br>https://www.changelabsolutions.org/product/guide-building-healthy-streets[25] |
| National Complete Streets Coalition<br>https://smartgrowthamerica.org/program/national-complete-streets-coalition/[26] |
| Complete Streets: Best Policy and Implementation Practices<br>https://www.planning.org/research/streets/[27] |
| Complete Streets Policies and Bicycle and Pedestrian Plans: Key Tools for Supporting Healthy Active Communities<br>https://www.saferoutespartnership.org/sites/default/files/resource_files/completestreets-bicyclepedplans.pdf[28] |
| Small Town and Rural Multimodal Networks, Federal Highway Administration<br>https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/small_towns/fhwahep17024_lg.pdf[29] |
| Safe Routes to School |
| Resources on starting and running Safe Routes to School program<br>https://www.saferoutespartnership.org/safe-routes-school[30] |
| Building Blocks: A Guide to Starting and Growing a Strong Safe Routes to School Program<br>https://www.saferoutespartnership.org/sites/default/files/resource_files/buildingblocks_final.pdf[31] |
| At the Intersection of Active Transportation and Equity<br>https://www.saferoutespartnership.org/resources/report/intersection-active-transportation-equity[32] |
| Taking Back the Streets and Sidewalks: How Safe Routes to School and Community Safety Initiatives Can Overcome Violence and Crime<br>https://www.saferoutespartnership.org/resources/report/taking-back-streets-and-sidewalks[33] |
| School District Policies: Promoting Safe Routes to School through Policy<br>https://www.saferoutespartnership.org/sites/default/files/resource_files/school_district_policy_1.pdf[34] |
| Safe Routes to School Local Policy Guide<br>http://www.saferoutespartnership.org/sites/default/files/pdf/Local_Policy_Guide_2011.pdf[35] |
| Safe Routes to School: Approaches to Support Children Walking and Bicycling to School<br>https://www.changelabsolutions.org/sites/default/files/SRTS-Brochure-FINAL-20130918.pdf[36] |
| Vision Zero |
| Vision Zero Network Resource Library<br>https://visionzeronetwork.org/resources/[37] |
| Vision Zero and Safe Routes to School: Partners in Safety<br>https://www.saferoutespartnership.org/sites/default/files/resource_files/042417-sr2s-visionzero-final.pdf[38] |
| Street-Scale Design and Placemaking |
| Active Design Supplement: Shaping the Sidewalk Experience<br>https://centerforactivedesign.org/sidewalks[39] |
| Developing Safety Plans: A Manual for Local Rural Road Owners<br>https://safety.fhwa.dot.gov/local_rural/training/fhwasa12017/[40] |
| Small Town and Rural Design Guide<br>http://ruraldesignguide.com/[41] |
| The Case for Healthy Places Project for Public Places<br>https://www.pps.org/article/pps-releases-new-report-the-case-for-healthy-places-how-to-improve-health-through-placemaking[42] |
| Slow Your Streets: A How-To Guide for Pop-Up Traffic Calming<br>http://www.onestl.org/resources/reports/bicycle-and-pedestrian-planning/445-slow-street[43] |
| Better Block Foundation<br>http://betterblock.org/[44] |
| Tactical Urbanist's Guide to Getting It Done<br>http://tacticalurbanismguide.com[45] |

legislature. State policy (statutory or regulatory) can determine the types of financing mechanisms that support transportation projects or authorize how and whether local revenue sources can be used to support active transportation projects. In some cases, existing state policy may limit or prevent funding for bicycle and pedestrian infrastructure, including limiting or prohibiting the use of certain state funding sources (eg, state fuel tax revenue).[67] States have the authority to adopt and implement local design guidelines for bicycle and pedestrian facilities that are not part of the National Highway System.

Local policies can influence the allocation of funding for active transportation projects, how revenue for such infrastructure is raised, and how projects are financed or provide guidelines for how and where bicycle and pedestrian facilities are installed.[20,67] Local policies typically occur at the macroscale and mesoscale levels. One cost-effective approach is the inclusion of on-street bicycle facilities during routine resurfacing, painting, and other roadway maintenance,[68] a circumstance in which the marginal cost of a protected bicycle lane is low or negligible. Local jurisdictions can create zoning codes or licensing requirements for bicycle parking to be included in new developments, near transit, in community spaces, or adjacent to businesses.[20] For instance, the Austin (TX) Transportation Department includes an Active Transportation and Street Design division with the goal of helping "everyone walk and bicycle around Austin safely, comfortably, and conveniently as they travel to work, school, run errands, exercise and have fun."[69] The initiatives of the division involve multiple city departments, local advocacy groups, and community input, and activities are grounded in comprehensive city-wide plans and policies.

## COMPLETE STREETS

Complete Streets policies require street design to address the needs of vehicle and nonvehicle users to allow all residents to travel safely and can occur at the macroscale and mesoscale levels. They integrate all modes of transportation, accounting for the needs of people in an equitable way in planning, design, operation, and maintenance of transportation networks.[70] Complete Streets policies are an alternative to designing streets primarily or exclusively to move motorized vehicles, which has been standard practice for decades in the United States. The specific features that contribute to a complete street have been well described.[71,72] Fundamentally, a Complete Streets approach requires that users of all ages, incomes, and abilities be considered in all roadway construction, repair, and even routine maintenance (such as paving and painting) and reconstruction after roadway disturbance (such as utility work). According to the National Complete Streets Coalition, the following 10 elements are included in comprehensive Complete Streets policies[73]:

- Vision and intent: Provides an equitable vision for how and why the community wants to complete its streets. Policies specify at least 4 transportation modes, which must include bicycling and walking.
- Diverse users: Specifies that the policy will benefit all people equitably, particularly those in the most underserved and underinvested communities
- Commitment in all projects and phases: Applies to new and retrofit, maintenance, and ongoing projects
- Clear, accountable expectations: Sets a clear procedure for exceptions and requires high-level approval and public notice before exceptions are granted
- Jurisdiction: Requires interagency coordination between government departments and partner agencies
- Design: Directs the use of the best design criteria and guidelines and sets a time frame for their implementation
- Land use and context sensitivity: Considers current and expected land use and transportation needs
- Performance measures: Establishes performance standards that are specific, equitable, and available to the public
- Project selection criteria: Provides specific criteria to encourage funding priorities for implementation
- Implementation steps: Includes next steps for policy implementation

As of 2019, >1400 Complete Streets policies were passed in the United States, including those adopted by 33 states, Puerto Rico, and Washington, DC.[74] These macroscale policies are associated with fewer collisions and injuries between vehicles and bicyclists or pedestrians, averting $18.1 million in annual collision and injury costs.[75] Streets designed to facilitate walking and bicycling appear to attract more active transportation.[47] National organizations have created resources that can support local governments in Complete Streets implementation.[25,76] To optimally implement Complete Streets policies, it is critical to foster cooperation across local government agencies during all project phases and to provide planners and engineers with the tools to measure the performance of roadways using criteria other than motor vehicle level of service (ie, measuring traffic flow and delay). Increasingly, transportation engineers are seeking measures to reduce total vehicle miles traveled and are considering pedestrians, bicyclists, and transit riders and their safety; access to jobs and services; health benefits; and even overall economic impacts in roadway designs.[77,78]

## SAFE ROUTES TO SCHOOL

Safe Routes to School[79–81] is a federal- and state-funded transportation program that facilitates active, safe commuting to and from school with street scale improvements and other supports.[82] The federal Fixing America's Surface Transportation Act and other highway programs provide optional funding for Safe Routes to School initiatives, for which states and regional governments can compete. The most effective Safe Routes to School initiatives are at the mesoscale and microscale levels, combine engineering improvements with education and encouragement programs, and sustain them over multiple years.[83] Schools located in low-income communities can particularly benefit from Safe Routes to School programs, given that these communities have less safe infrastructure for active transportation and children living in these communities have a higher risk of traffic-related injuries and mortality.[84]

Effective Safe Routes to School initiatives include these "Six Es"[81]:

- Education: Teach children how to safely walk, bicycle, and roll.
- Engineering: Create physical improvements to streets and neighborhoods that make active transportation safer.
- Encouragement: Hold events, activities, and programs that generate increased rates of active transportation to school.
- Enforcement: Deter unsafe traffic behaviors such as speeding along school routes.
- Evaluation: Assess which approaches are the most effective and lead to equitable outcomes.
- Equity: Ensure that Safe Routes to School initiatives benefit groups that are socially or economically underresourced.

Cities and communities can include Safe Routes to School in their planning documents and policies. A Safe Routes to School plan is a comprehensive, multischool assessment of Safe Routes to School needs. These plans often include goals for improving active transportation opportunities, lists of infrastructure improvements to enhance active transportation, maps of routes, recommendations for programming, and a prioritization of schools where improvements are most needed. Advocates can seek to include language that prioritizes active transportation improvements around schools and lower vehicle speeds near schools, ensuring that transportation projects address active transportation. New neighborhoods should be planned to be within walking distance of the assigned schools.

School district policies can be used to articulate the district's support for Safe Routes to School.[85] Strong school district policies detail specific activities and commitments such as creating a district Safe Routes to School task force, setting crossing guard policies, ensuring that school transportation departments include active transportation as part of their travel plans, and ensuring that school facility design is supportive of active transportation. Communities and school districts can site schools in proximity to locations where children live. School wellness policies are another avenue for including Safe Routes to School–specific commitments and interventions. Schools can designate satellite drop-off/pickup locations; walking school buses, in which an adult walks a group of children to school; and procedures to ensure that arrivals and dismissals are safe for children walking, bicycling, or using mobility assistive devices. A 5-minute safety delay in the vehicle lane at dismissal can allow children walking or bicycling to clear school intersections and minimize conflicts between vehicles and students using active transportation.

Safe Routes to School programs can address equity by tailoring the interventions to the local school population. For example, efforts can be made to ensure that Safe Routes to School materials are available in the languages spoken by the student body and families. Programs may also use approaches to addressing crime and violence on the trip to school that are sensitive to local mistrust of police. Cities and communities should take a data-driven approach to prioritize Safe Routes to School interventions where the needs are the greatest by examining poverty levels and collision data.

## PUBLIC TRANSIT USE AND THE FIRST/LAST MILE CHALLENGE

Use of public transportation may lead to more physical activity, given that active travel usually is required to get to transit stops and final destinations.[86–89] The first/last mile challenge describes the problem of getting people from their original location to a public transportation hub or from a transit stop to a final destination. First mile/last mile is considerably difficult in many areas of the United States because of land use patterns in which people live in lower-density areas distant from public transportation or where there are inadequate pedestrian and bicycle facilities between transit stops and trip origin or termination points.[90] Regional policies to support greater use and availability of feeder buses and the development of pedestrian and bicycle facilities near public transportation are necessary to reduce first/last mile challenges.[91,92] Regional plans that support high-density housing and mixed-use transit–oriented development near transit stops can also mitigate the issue.[93–95] Transit integration, or combining several forms of transit into a linked system, is an important way to alleviate the first/last mile issue and to increase the catchment area of public transit.[96] Public bicycle sharing programs, an increasingly common enhancement in many cities, can increase active transport independently and support public transportation use.[97,98]

An important trend that supports increased transit use is the decline in the number of 16- to 44-year-old

individuals who obtain a driver's license.[99] Transit agencies face competition from ride-sharing services and other travel options to transport these individuals. The American Public Transportation Association identified promising approaches to increase transit use and the associated physical activity benefits.[100] These include service improvements such as increased peak hour frequency on high-demand routes and evening and weekend service to benefit shift workers. Infrastructure such as dedicated bus lanes, bus stop curb extensions, and signal priority at intersections can reduce delays. Accurate real-time service and wait-time information through signs or mobile phone applications can improve efficiency and appeal for riders.

## TRAFFIC SAFETY/VISION ZERO

Monitoring the incidence and locations of crashes, injuries, and fatalities during active transport is needed to develop the appropriate infrastructure, education, and safety measures to support active transportation. During the 10-year period between 2008 and 2017, the number of pedestrian fatalities increased by 35%.[101] Pedestrian and bicyclist fatality rates in the United States are significantly higher than in other countries. For instance, pedestrian fatality rates in 2008 to 2009 in the United States were 9.7 per 100 million km walked compared with 1.9 per 100 million km walked in Germany, a disparity of 5-fold magnitude.[102] Bicyclist fatality rates were >3.5 times greater in the United States than in Germany. Among other differences, European countries have more extensive and higher-quality walking and cycling infrastructure, traffic education, and enforcement of traffic regulations.[102] There is a critical need to ensure that individuals who choose active transportation can do so without fear of injury or death.

Vision Zero is a multinational movement that originated in Sweden in 1997 to achieve a transportation system with no fatalities.[103] In 2015, the US Department of Transportation announced that the official target of the federal government transportation safety policy was zero deaths.[104] Many US cities have formally adopted Vision Zero. An important first step in Vision Zero is a data-driven examination of the locations and characteristics of crashes involving serious injuries and fatalities and the creation of a series of strategies that specifically target those crashes. The 2018 to 2019 Highway Safety Improvement Targets are summarized on the Federal Highway Administration webpage.[105]

Examples of improvements to support Vision Zero strategies include mesoscale and microscale strategies such as reducing speed limits; providing posted feedback when drivers are exceeding the speed limit[106]; enforcing bicycle helmet laws; promoting stronger regulation for safe driving, distracted driving, and driving under the influence[107,108]; improving infrastructure for active transport; improving roadway design; creating awareness campaigns; encouraging use of bicycle helmets[109]; improving signage and road markings; and ensuring appropriations for greater enforcement of traffic laws. These improvements enhance the infrastructure for active transportation and for vehicular travel. Public support for Vision Zero goals has not been consistent, however, because enforcement of these improvements often requires increased surveillance and law enforcement presence, which may not be welcomed in all communities.[110,111] Ultimately, if the outcome of Vision Zero is to be achieved, such initiatives should use culturally relevant and targeted education, effective engineering, and data-driven enforcement and purposefully integrate social justice and health equity into its implementation.[112–114]

**Table 2. Street-Scale Indicators of Pedestrian Design and Bicycling Design**

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| Walking features | Presence and coverage of sidewalks*†‡<br>Absence of trip hazards on sidewalks†<br>Buffer between sidewalks and traffic (eg, planting strip or parked cars)†<br>Streetlights*†‡<br>Quality of street crossings*†‡<br>Curb cuts†<br>Traffic calming to slow traffic*‡<br>Public art*<br>Street furniture such as benches*†<br>Variety of building designs*<br>Destinations*‡ |
| Bicycling features | Bicycle lanes*‡<br>Protected bicycle paths and multiuse trails*‡<br>Streetlights*‡<br>Bicycle racks*‡ |

*Supported by American Planning Association review.[116]
†Supported by Sallis et al.[117]
‡Supported by Centers for Disease Control and Prevention document.[118]

## STREET-SCALE DESIGN AND PLACEMAKING

Community design, often called walkability, includes microscale strategies such as street-scale design and placemaking that can affect the quality of the experience of pedestrians, bicyclists, and transit users across the spectrum of ability and disability. The experience is expected to influence the user's likelihood of being active in a particular place again. Street-scale attributes are important to understand because features such as sidewalks, street crossings, bicycle facilities, traffic calming, and landscaping are much easier and less costly to change than the macroscale attributes of a neighborhood such as the road network. In fact, street-scale features are continually being modified as a regular part of street maintenance and upkeep.

Street-scale quality varies across regions, types of streets, and streetscape elements.[115] Economically disadvantaged neighborhoods tend to have poorer aesthetics and more indicators of social disorder (graffiti,

boarded-up buildings), although there are instances in which streetscape quality was found to be better in these neighborhoods.[115] Identifying local patterns of inequity in streetscape quality requires local assessment and remediation. Policies that require local street-scale evaluations as part of Complete Streets or Safe Routes to School Programs could be justified so that these programs can be targeted to enhance equity of access.

Table 2 lists the street-scale elements that are positively associated with active transport. Higher quality and greater quantity of elements are associated with more active transportation.[47] Policies can be designed and implemented that include these elements and enhance the pedestrian-friendliness of streets.

Placemaking is a broader concept focused on optimizing the design of public spaces for people's benefit.[119] Placemaking capitalizes on a local community's assets, inspiration, and potential, with the intention of creating public spaces that promote people's health, happiness, and well-being. Placemaking is usually devoted to improving the experience of people on foot, on bicycle, using assistive devices, and using transit rather than those in vehicles. Design principles can be applied to public plazas, streets, and entire neighborhoods to make them distinctive, appealing, comfortable, and safe. There are geographic information systems and observational measures of urban design principles, and these scores have been related to health outcomes.[120]

Promising practices of placemaking include constructing pop-up, demonstration, or other forms of tactical urbanism projects. Tactical urbanism projects are typically short-term, low-cost, reversible installations or redesigns of an area providing the attributes that evidence and practice suggest can encourage walking, bicycling, and transit use, ranging from a day- or week-long festival to an entire season.[121] Such interventions show particular promise in low-income and underresourced communities because of both the relatively low cost and the active community engagement central to this approach. Approaches include but are not limited to the following[122]:

- Create pop-up retail or services. Empty storefronts or temporary structures (eg, tents or sheds) can host a business in areas in which people tend to congregate such as open air shopping locales. These types of businesses can include locally made products, locally grown produce, or needed services such as child care or tax preparation.
- Reactivate open space or an empty lot. Empty spaces can be configured to provide public seating and social space, or the space can become a park, playground, outdoor food court with food trucks, art display, or a festival space with a stage and dance floor.
- Create parklets. Miniparks can be created in 1 or 2 on-street parking spaces. They are sometimes functional, sometimes imaginative, including bicycle parking, public or café seating, food vendor or performance spaces, and climbable art for children.
- Improve pedestrian, bicycle, and transit facilities. Providing high-visibility crosswalks; widening sidewalks; creating buffered or protected bicycle, scooter, wheelchair, and skateboard lanes; and creating functional and inviting transit stops and shelters are common treatments.
- Install traffic calming features. Traffic speeds can be reduced through temporary versions of proven design features such as curb extensions, median islands, lane narrowing (eg, adding a bicycle lane), mini–traffic circles and roundabouts, high-visibility paint treatments, temporary speed tables (eg, raised crosswalk), and myriad combinations of these approaches.

## MIXED LAND USE AND ZONING

A number of features of land use patterns are associated with higher levels of walking and active transportation. They include the following[123–125]:

- Overall density of development
- Density of residential development
- Mix of land use types (ie, housing, businesses, and retail, educational, civic, recreational, and other types of buildings and spaces are intermingled)
- Park density, or the availability of open space and parks
- Transit density, or the availability of transit stops and frequent service
- Intersection density, or shorter blocks
- Continuity and connectivity of the bicycle and pedestrian network
- Building orientation, furnishings, and functional design details that benefit pedestrians and bicyclists, such as buildings that open directly onto sidewalks rather than parking lots

An overview of this list shows that the built environment can exist across a range of settings, from rural to urban. It can describe the "main street" businesses and surrounding homes in a small rural community; the downtown and neighborhoods of a medium-sized town or city; or the dense urban fabric of a metropolis, particularly areas developed before the automobile became dominant. These features are not common in much of American suburbia that was developed after World War II. This landscape was based largely on single-use, or euclidian, zoning ordinances, which are typically characterized by housing tracts (or subdivisions) that are separate from strip retail and shopping malls and office and industrial parks, consolidated school campuses rather than neighborhood schools, and concentrated sports complexes rather than neighborhood and pocket parks. Many of these zones require large parking areas because many users must arrive by car

**Table 3. Zoning Ordinance Elements to Support Active Transportation**

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|---|
| Mixed-use districts with housing, shopping, employment opportunities, and green space intermingled. Form- vs use-based codes to allow market flexibility. |
| Concentrated areas of development, especially centered on transit hubs and mixed-use employment centers, surrounded by areas of open, agricultural, and undeveloped land. |
| Required pedestrian/bicycle accommodations. Sidewalks on both sides of all roadways, 5-ft minimum width. Bicycle facilities on streets appropriate to the speed and volume of traffic, including shared-use arrows, bicycle lanes, cycle tracks, and separated bicycle pathways. |
| Measures to ensure a range of housing affordability such as inclusionary zoning (requiring a certain percentage of affordable units) and density bonuses; varied size allowances or requirements (eg, microunits); accessory dwellings units (eg, "granny flats" and over-garage apartments); and supportive tax and permitting policies. |
| Human-scale design requirements such as buildings fronting the sidewalk, with parking on street or beside or behind buildings, and street furnishings such as bicycle parking, quality covered transit stops, benches, street trees and planting, pedestrian scale lighting, and public art. |
| Decoupling of parking and land use such as set parking maximums rather than minimums to eliminate oversized surface parking lots. |

because of the separation created by single-use zoning. The flight of middle-class wealth from urban centers to these newer suburbs left many cities in decline with failing infrastructure, underfunded transit systems, and struggling schools and business districts.[126–129]

There are 3 primary ways communities can work to fight these trends, improve land use patterns, and support more routine active transportation: during comprehensive planning processes; through zoning ordinances and development requirements; and in the actual review, negotiation, and permitting of development and redevelopment.

## Comprehensive Planning

Most municipalities are required by state ordinances to develop plans for future development, often called comprehensive, master, or growth plans, to be eligible for particular programs and funds. These typically convey a broad community vision and specific land use, transportation, economic, open space, infrastructure, and other goals to attain that vision. Communities also often develop specific plans such as trail and greenway plans, Safe Routes to School plans, and economic development plans that can further prioritize active transportation attributes.

## Zoning Ordinances and Development Requirements

The zoning ordinance of a community dictates the types of land uses allowed in each part of the community; for example, farming or open space, housing, retail, industry, or a mix. Zoning dictates building sizes and density and myriad details such as roadways, parking, drainage, and landscaping requirements. It is an opportunity to include specific requirements that support active transportation such as the development of compact, mixed-use areas with a variety of housing types and sizes near services, shopping, employment, and recreational opportunities. Form-based zoning codes[130] focus more on size and density of structures (their form) but less on dictating specific land uses. The market can determine where the businesses will be located and the type (rent versus own) and size (eg, single family or multifamily) of housing that is constructed. Form-based codes are more compatible with mixed-use, activity-supportive environments. Table 3 provides examples of zoning elements that support active transportation.

## Development Review and Permitting

It is not uncommon for developers to request waivers for zoning requirements that they view as unnecessary or costly such as sidewalks on both sides of the street in a housing subdivision, a park, or provision of a connecting trail to a regional bicycle path. However, it is critical that planning boards and city councils adhere to the vision laid out in their planning documents and to the requirements of the zoning ordinance to create settings that will support active transportation.

# COMBINATIONS OF INTERVENTIONS ARE NEEDED TO INCREASE ACTIVE TRANSPORTATION

There is no single policy or environmental driver of active transportation.[117,131–133] Rather, evidence is building that combinations or patterns of attributes are needed. They should operate on the macroscale of land use patterns, the mesoscale of connecting networks, and the microscale of accessible, safe, functional site designs for active transportation and transit use. The tools, techniques, and decision processes of transportation planning, design, and construction in the United States evolved over decades to achieve the primary performance goal of improving motor vehicle level of service (ie, keeping vehicles moving). Local, state, and federal laws, including land use, criminal, tort, insurance, and vehicle safety regulations, reward the current dominant transport mode: vehicular travel.[134] Thus, to increase active transportation, many of the decisions and policies will need to be reconsidered and likely substantially modified. However, most decisions are made by local jurisdictions. Local governments and regional transportation planning organizations can set goals for increasing active transportation modes and then prioritize resource allocations to achieve these goals. They can make decisions to ensure that transportation and land use policies and practices produce equitable outcomes. Local jurisdictions can collect data on transportation preferences of their populations, identify local areas of greatest need, conduct community engagement

activities, take steps to ensure that community needs are met, and levy taxes if needed to meet active transportation goals in an equitable manner. New tools such as those measuring the performance of a roadway corridor based on adjoining land uses and pedestrian, wheelchair, and bicycle accommodation[77] can be used to identify local travel preferences. Thus, policy changes at the local/regional, state, and federal levels are possible and can be effective in increasing active transportation. If combined with policies that disincentivize driving such as reducing or eliminating parking subsidies, increasing the cost of parking, and implementing congestion pricing, it is possible to make a noticeable impact.[135]

Policies should be written to reflect the growing evidence that combinations of interventions should be pursued in comprehensive planning processes and be conducted to ensure equity across all socioeconomic and cultural areas of communities. Well-designed Complete Streets with state-of-the art protected bicycle facilities may have no impact on bicycling unless they are part of a network of bicycling facilities throughout a city that connects common destinations with the neighborhoods where people live.[136] Safe Routes to School, Complete Streets, and Vision Zero efforts can be combined for planning and funding initiatives. Many Vision Zero plans give priority to infrastructure improvements near schools, fund Safe Routes to School coordinators, provide bicycle/pedestrian education to children, and reduce speed limits near schools. Combining transportation and land use planning can ensure coordination of policy and practice in these interconnected government functions.[137] Assessments of disparities in access to and quality of active transportation infrastructure, as well as walkable neighborhood design, should inform planning. To address risk of displacement or gentrification after investment, policies must require implementation of meaningful community engagement and involvement of housing authorities, starting in the planning process. This can ensure inclusion of policies from rental assistance and tax abatement to inclusionary zoning, density bonuses, and many others that can over time ensure more equitable access to active transportation settings.[138,139]

National leadership is needed to mobilize the advocacy required to accelerate the adoption and implementation of equitable active transportation policies. Health organizations such as the American Heart Association are well placed to take leadership roles. The growing evidence of the health impacts of transportation and land use practices[137] makes it clear that health organizations are critical stakeholders that should be assertive advocates for active transportation. With advocacy infrastructure at the federal, state, and local levels, health organizations can educate policy makers, help pass policy, and mobilize their professional membership. Health professionals are respected advocates who can engage with their local governments, school boards, zoning officers, or other municipal entities to talk about the benefits of physical movement for overall health. They can also write op-eds, talk to their city councilors and members of Congress, or participate in grassroots alerts to underscore the important connection between active transport and overall health and well-being.

**Table 4. Nashville Metropolitan Planning Organization Model 2040 Regional Transportation Plan: Increased Policy for Health**

| |
|---|
| The Metropolitan Planning Organization is committed to helping local communities grow in a healthy and sustainable way by: |
| Aligning transportation decisions with economic development initiatives, land use planning, and open space conservation efforts. |
| Integrating healthy community design strategies and promoting active transportation to improve the public health outcomes of the built environment. |
| Encouraging the deployment of context-sensitive solutions to ensure that community values are considered in mobility improvements. |
| Incorporating the arts and creative placemaking into planning and public works projects to foster innovative solutions and to enhance the sense of place and belonging. |
| Pursuing solutions that promote social equity and contain costs for transportation and housing. |
| Minimizing the vulnerability of transportation assets to extreme weather events. |
| The 3 major strategies to achieve these outcomes are: |
| 1. Fund and implement the Regional Vision for Mass Transit. |
| 2. Develop active transportation options for walkable communities. |
| 3. Reinvest in strategic roadway corridors. |

Data derived from the Greater Nashville Regional Council.[141]

Modeling studies indicate that replacing motorized travel with active transportation would benefit people with chronic diseases such as heart disease and diabetes mellitus, reduce air pollution, and avoid fatalities from traffic crashes.[140] More than 90% of the overall health benefit from more active transportation would come from preventing chronic diseases.[140] Concerted efforts to develop collaborations among public health, transportation, planning, parks and recreation, economic development, housing, transit, and bicycle and pedestrian advocates are essential to achieve policy change leading to sustainable population-wide health improvements.[16] The Nashville Metropolitan Planning Organization, one of the few local jurisdictions to do so, has increased its commitment to prioritize transportation projects that improve health through its 2040 regional transportation plan. Specifics of the initiative are given in Table 4.

## FUNDING ACTIVE TRANSPORTATION

The federal government has made funds available for active transportation in several successive federal transportation laws, with funds increasing significantly since the 1970s; however, there is competition with other multimodal transportation projects. Federal transportation funding, historically called the Surface Transportation

**Table 5. Potential Sources of Revenue for State and Local Active Transportation Projects**

| | |
|---|---|
| Traditional revenue sources | General revenues<br>Sales taxes<br>Gas taxes<br>Property taxes<br>Lease revenues<br>Vehicle registration fees<br>Advertising revenue<br>Concessions revenue |
| Business- and activity-related funding | Employer payroll taxes for specific service areas<br>Rental car fees<br>Parking fees<br>Realty transfer taxes and fees<br>Room occupancy taxes |
| Revenue streams from projects | Transit-oriented development revenues dedicated to specific improvements<br>Special assessment districts<br>Business improvement districts<br>Impact fees<br>Tax increment financing districts<br>Right-of-way leasing revenues |
| User- or market-based fees | Fees for vehicle use on a vehicle miles-traveled basis<br>Tolling<br>Congestion pricing<br>Traffic fines |
| Financing | General obligation bonds<br>Private activity bonds<br>Tax credit bonds<br>Grant anticipation notes<br>State infrastructure bank loans |

Data derived from William.[143]

Program, may be used for pedestrian, bicycle, and transit infrastructure. One of the most promising ways to increase that infrastructure is to include it routinely as part of all surface transportation projects. Indeed, routine accommodation of all transportation modes (not just motor vehicles but pedestrians, bicyclists, and transit users of all ages, abilities, and disabilities) in all transportation projects and even routine maintenance and paving programs is perhaps the most systematic approach to increasing active transportation infrastructure. When specific infrastructure funding is required, state and local governments will increasingly have to augment federal funding.[142]

There are several potential funding sources for active transportation projects at the state and local levels (Table 5).

These include county sales tax measures, transportation impact fees, gas taxes, a congestion road tax, user fees for vehicle and recreational vehicles, tolls, and congestion pricing.[17–19,144] The state of Washington has authorized local jurisdictions to impose an impact fee to mitigate the impact of housing and industry development on the transportation system.[144] From this authorizing legislation, Seattle created multimodal development impact mitigation programs, which can serve as models for other jurisdictions, generating needed funds for street-scale design projects, nonmotorized facilities, and active transport infrastructure. Portland, OR, has developed and used similar programs.[145] More and more, local governments are implementing taxes, issuing bonds, providing general fund allocations, seeking private/public partnerships, or levying impact fees on developers to shift financial burden from taxpayers to pay for the infrastructure that supports development.[146–148]

**Table 6. Resources for Financing Active Transportation Initiatives**

| |
|---|
| Investing in Walking, Biking, and Safe Routes to School: A Win for the Bottom Line<br>https://www.saferoutespartnership.org/sites/default/files/resource_files/121117-sr2s-investing_report-final.pdf[149] |
| Investing in Health: Robust Local Active Transportation Financing for Healthy Communities<br>https://www.saferoutespartnership.org/sites/default/files/resource_files/011119-srs-kp2report-at-final.pdf[150] |
| The Basics of Active Transportation Financing<br>https://www.saferoutespartnership.org/sites/default/files/resource_files/011119-srs-kp2report-at-final.pdf[150] |
| Finding the Money: How Local Governments Generate Active Transportation Funding<br>https://www.saferoutespartnership.org/sites/default/files/resource_files/local_at_financing_approaches_final_0.pdf[151] |
| Paying for Local Infrastructure in a New Era of Federalism: A State-by-State Analysis<br>https://www.nlc.org/sites/default/files/2016-12/NLC_2016_Infrastructure_Report.pdf[22] |
| How Communities are Paying for Innovative On-Street Bicycle Infrastructure<br>https://bikeleague.org/sites/default/files/PayingForInnovativeInfrastructure.pdf[21] |
| Securing Funding for Safe Routes to School, Bicycling and Walking: Coalitions, Connections, and Creativity<br>https://www.saferoutespartnership.org/sites/default/files/resource_files/ds-11789_vfhk_case_studies_campaigns.pdf[152] |

To ensure that active transportation funding is directed to vulnerable communities and that it will not exacerbate disparities in transportation access, funding streams should ensure that funding decisions are based on need. Factors such as poverty level, bicycle and pedestrian death and injury rates, and percentage of households without access to cars can identify locations where active transportation investments are most needed. Robust community engagement ensuring diverse viewpoints is an essential component of selecting projects for funding that are valued by and needed by residents.

Table 6 provides a list of online resources that provide details on how to procure funding for active transportation initiatives.

## INTERSECTION BETWEEN ACTIVE TRANSPORTATION AND OTHER MAJOR POLICY AREAS

There are opportunities to insert community design, built environment, and active transportation into other major policy areas where there is synergy. These include policy efforts to address air quality and climate change, rural health, healthcare access, infrastructure investment, and economic revitalization. Moving people

around with safer and sustainable transportation infrastructure that integrates walking, bicycling, and wheelchair use, connecting routes to important destinations in all geographic areas, can affect community development, foster economic revitalization, link people to the healthcare system and jobs, improve air quality, and help address climate change.[153,154] Providing easy access to green spaces and recreational areas not only encourages physical activity but also contributes to a healthier planet, promotes social interactions within communities, and enhances overall health and well-being.[155–157]

The construction of higher-density, affordable housing along major transit corridors can provide access to public and active transportation options, retail outlets, parks, and job opportunities.[158] Considering the low rates of active transportation opportunities in low-income and racial/ethnic neighborhoods, it is important to ensure that affordable housing is provided in areas of population growth where there is purposeful planning for connected, walkable communities, protected bicycling networks, and access to public transit.[159,160] Unfortunately, the number of communities considered affordable drops dramatically in most regions of the country when transportation and housing costs are considered together.[161]

Families often have to live farther out from municipal centers to find affordable housing and then have to absorb significant transportation costs associated with owning a vehicle.[95,162] Longer distances between housing and municipal centers are associated with sprawl, more traffic congestion, higher greenhouse gas emissions, less leisure time that could be spent in active recreation, and more sedentary time in vehicles.[95] Major metropolitan centers could save billions of dollars by creating more location-efficient places as they accommodate population growth.[95] There is a need to consistently apply performance measures in community economic development and transportation planning that assess the balance of growth with the provision of affordable housing, access to public and active transport, recreational spaces, and access to health care and jobs.[95,158,160–163]

## SUMMARY

Transforming the way that communities are designed to create built environments that expand active transportation and active living across the United States is an important means of increasing physical activity and improving health across the entire population. Regular physical activity is an essential health behavior that reduces the risk of numerous chronic conditions and promotes mental and physical well-being.[1] Beyond physical activity, environments that support active transportation promote mobility, healthy lifestyles, reduced traffic congestion, and positive environmental impacts and generate economic benefit.[137] The American Heart Association supports safe, equitable active transportation policies in communities across the country that incorporate consistent implementation evaluation. These policies are consistent with the American Heart Association's Life's Simple 7, in which "get active" is a feature of ideal cardiovascular health.[164] Ideally, active transportation policies should operate at 3 levels: the macroscale of mixed and compact land use, the mesoscale of safe pedestrian and bicycle networks and infrastructure such as Complete Streets policies and Safe Routes to School initiatives, and the microscale of design interventions and placemaking such as building orientation and access, street furnishings, and safety and traffic calming measures. Community development and active transportation projects should provide connectivity to public transportation, affordable housing, education, jobs, schools, services, retail environments, recreation, and other critical destinations. Community engagement and specific policy elements to ensure equity of access to active transportation opportunities are essential. Although the benefits of designing communities for active transportation are many, challenges and opposition are powerful. The health sector has a large stake in making progress in creating healthier communities, so health advocacy organizations are natural leaders for these multisector initiatives. The American Heart Association is committed to providing leadership in advocating for adoption and implementation of equitable active transportation policies and encourages other health organizations to also provide leadership in this important effort.

## ARTICLE INFORMATION

The American Heart Association makes every effort to avoid any actual or potential conflicts of interest that may arise as a result of an outside relationship or a personal, professional, or business interest of a member of the writing panel. Specifically, all members of the writing group are required to complete and submit a Disclosure Questionnaire showing all such relationships that might be perceived as real or potential conflicts of interest.

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*Modest.

†Significant.

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