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State of Practice





Overview

Bicycle facility state of practice in the United States has undergone a significant transformation in the last decade. Much of this may be attributed to bicycling's changing role in the overall transportation system. Once viewed as an “alternative” mode, it is increasingly viewed as a legitimate transportation mode and one that should be actively promoted as a means of achieving environmental, social and economic goals. (Due to a long history of routine accommodation for pedestrians, such as sidewalks, crosswalks, dedicated signals, etc., there are relatively few innovations in pedestrian facilities.)

While connectivity and convenience remain essential bicycle facility quality indicators, recent research indicates the increased acceptance and practice of daily bicycling will require “low-stress” bicycle facilities. Facility types and specific design interventions intended to encourage ridership among the “interested, but concerned” demographic tend to be those that provide separation from high volume and high speed vehicular traffic.

Just as the state of practice has bicycle facilities has evolved, so has technical guidance. While bikeway design guidance in California has traditionally come from the State, especially Caltrans and the California *Manu-*

al on Uniform Traffic Control Devices (CA MUTCD), cities are increasingly turning to national organizations for guidance on best practices. Primary organizations include the American Association of State Highway and Transportation Officials (AASHTO), the National Association of City Transportation Officials (NACTO) and the Federal Highway Administration (FHWA).

Fortunately for California cities, there is increased flexibility in design guidance offered by both Caltrans and the FHWA. In 2014, Caltrans officially endorsed the NACTO *Urban Street Design Guide and Urban Bikeway Design Guide* as valuable toolkits for designing and constructing safe, attractive local streets. California cities may also apply for experimental designation from the FHWA for projects not in conformance with the CA MUTCD.

The guidance provided by these manuals support the creation of more Complete Streets. The guidance is also supported by several pieces of important legislation. The following section provides a review of the state of practice for bicycle facilities, particularly the AASHTO and NACTO guides. It also includes a discussion on Routine Accommodation, as well as summaries of relevant legislation at the local, regional, State and national levels.



Primary Guidance

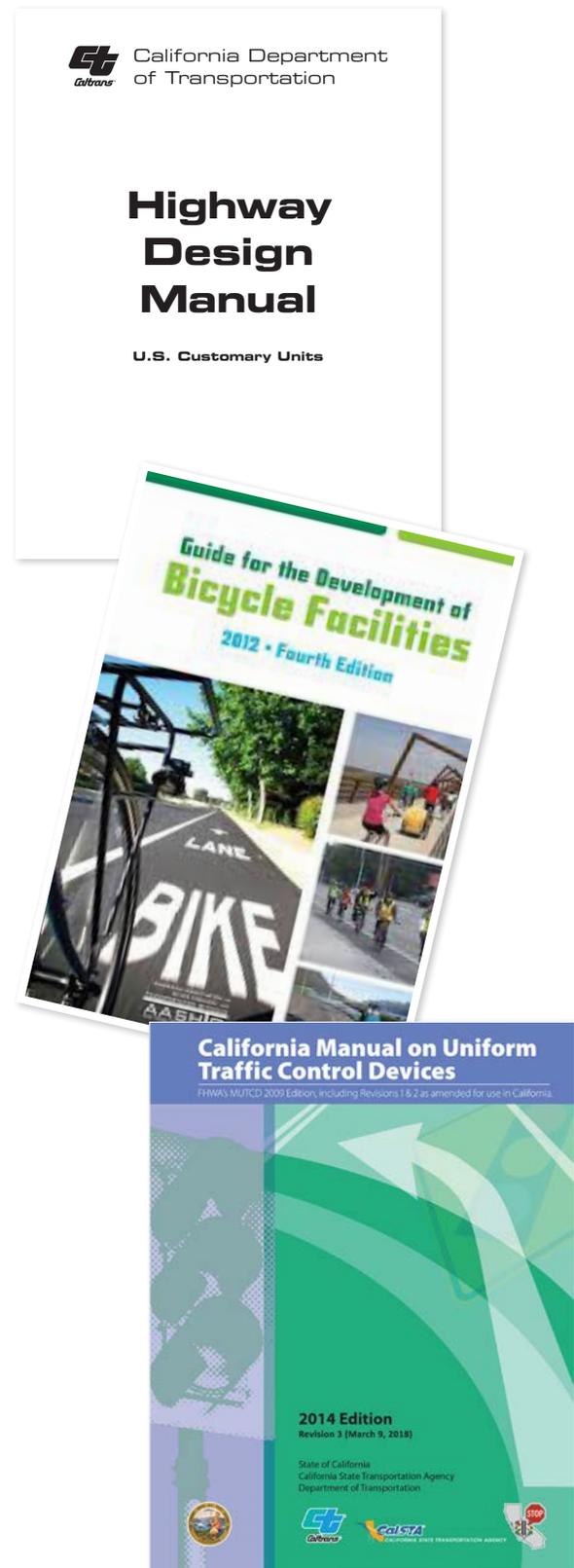
Improvement recommendations facility design described later in this ATP borrow heavily from the American Association of State Highway and Transportation Officials (AASHTO) *Guide to Bicycle Facilities* and the National Association of City Transportation Officials (NACTO) *Urban Bikeway and Urban Street Design Guides*, particularly for guidance on “innovative” facilities. The Federal Highway Administration (FHWA) supports employing these resources to further develop non-motorized transportation networks, particularly in urban areas. Bicycle master plan compliance with applicable guidelines and standards is also required by California *Street and Highways Code Section 891.2* and most grant programs.

Caltrans Highway Design Manual - Chapter 1000 – Bikeway Planning and Design

This reference has long the official resource for bikeway planning and design in California, but now largely represents the minimum standards required for specific bikeway facility types. SB-1 (*Road Repair and Accountability Act*) includes a provision for Caltrans to update the Highway Design Manual to incorporate “Complete Streets” design concepts.

AASHTO Guide to Bikeway Facilities

This memorandum expresses the Federal Highway Administration’s (FHWA) support for a flexible approach to bicycle and pedestrian facility design. The AASHTO bicycle and pedestrian design guides are the primary national resources for planning, designing, and operating bicycle and pedestrian facilities. The NACTO *Urban Bikeway Design Guide* and the Institute of Transportation Engineers (ITE) *Designing Urban Walkable Thoroughfares* guide builds upon the flexibilities provided in the AASHTO guides, which can help communities plan and design safe and convenient walking and bicycling facilities. FHWA supports the use of these resources to further develop non-motorized transportation networks, particularly in urban areas.

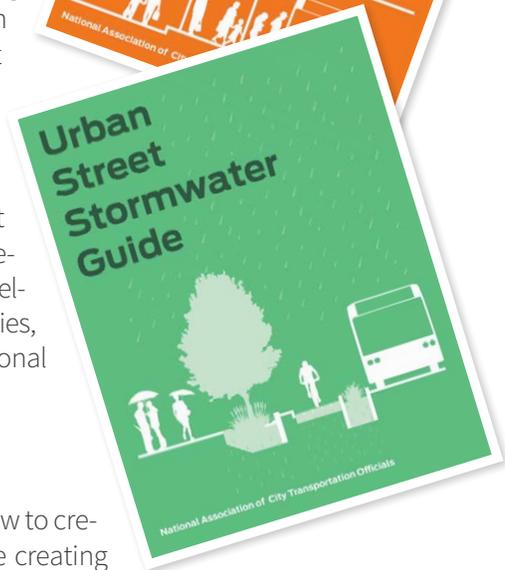
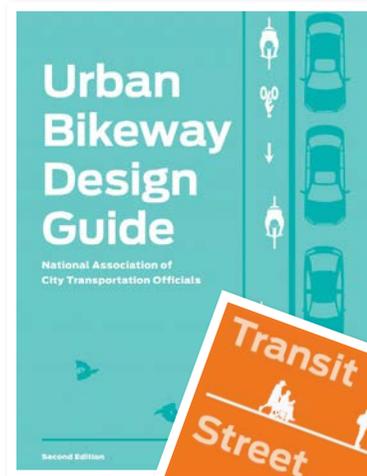




NACTO Urban Bikeway and Urban Street Design Guides

The NACTO guides represent the industry standard for innovative bicycle and streetscape facilities and treatments in the United States. In 2014, Caltrans followed AASHTO and officially endorsed the NACTO *Urban Bikeway Design Guide* and *Urban Street Design Guide* as valuable toolkits for designing and constructing safe, attractive local streets. At the time, Caltrans was only the third State Department of Transportation to officially endorse the Guides.

It is important to note that virtually all of its design treatments (with two exceptions) are permitted under the Federal MUTCD. The NACTO *Urban Street Design Guide* is the more generalized of the two guides and organized into six sections. Each section is further subdivided, depending on topic. The NACTO *Urban Bikeway Design Guide* is also organized into six sections, but its information is bicycle-specific. For each section, it offers three levels of guidance: Required Features, Recommended Features and Optional Features.



NACTO Transit Street Design Guide

As transit gains a more prominent role in cities, more people are using buses, streetcars, and light rail than ever before. As a result, street design is shifting to give transit the space it deserves. The NACTO Transit Street Design Guides provide design guidance for the development of transit facilities on streets, as well as for prioritizing transit, improving its service quality, and to support other related goals.

The majority of design elements included in this guide are consistent with MUTCD standards, including signage, markings, and signal elements that have received interim approval. These guidelines were developed using other design guidance as a basis, along with city case studies, best practices, research and evaluation of existing designs, and professional consensus.

NACTO Urban Street Stormwater Guide

The NACTO Urban Street Stormwater Guide provides guidelines on how to create resilient cities that are better prepared for climate change, while creating public spaces that deliver social and economic value to these cities. This guide focuses on green infrastructure within urban streets, including stormwater management design and engineering practices that support and improve mobility. It also intends to reduce the impacts of runoff and human activity on natural ecological processes.

One of the main goals of this guide is to encourage interdepartmental partnerships around sustainable infrastructure, which includes communicating the benefits of such projects. However, this guide does not address stormwater management strategies on private property, nor it address drainage and infiltration around controlled-access highways.

Applicable Legislation

Several pieces of legislation support increased bicycling and walking in the State of California. Much of the legislation addresses greenhouse gas (GHG) reduction and employs bicycling and walking as means to achieve reduction targets. Other legislation highlights the intrinsic worth of bicycling and walking and treats the safe and convenient accommodation of bicyclists and walkers as a matter of equity. The most relevant legislation concerning bicycle and pedestrian policy, planning, infrastructure and programs are described in the following section.

State Legislation and Policies

AB-32 California Global Warming Solutions

This bill calls for the reduction of greenhouse gas emissions and codifies 2020 emissions reduction goal. This act also directs the California Air Resources Board to develop specific early actions to reduce greenhouse gases while also preparing a scoping plan to identify how best to reach the 2020 limit.

AB-390 Pedestrian Crossing Signals

AB-390 was signed by the governor in October 2017. Under the previous state law, it was illegal to step into a crosswalk if the countdown timer was counting down—even if the person crossing the street had enough time to make it to the other side before the traffic light changed. The new bill authorizes a pedestrian facing a flashing “DON’T WALK” or “WAIT” or approved “Upraised hand” symbol with a “countdown” signal to proceed so long as a pedestrian completes the crossing before the display of the steady “DON’T WALK OR WALK” or “WAIT” or approved “Upraised Hand” symbol.

AB-902 Traffic Violations and Diversion Programs

Existing law provides that a local authority may not allow a person who has committed a traffic violation under the Vehicle Code to participate in a driver awareness or education program as an alternative to the imposition of those penalties and procedures, unless the program is a diversion program for a minor who commits an infraction not involving a motor vehicle and for which no fee is charged.

This bill allows any person of any age who commits an infraction not involving a motor vehicle to participate in a diversion program that is sanctioned by local law enforcement. The bill eliminates the requirement that such a program charge no fee.

AB-1096 Electric Bicycles as Vehicles

This bill clarifies electric bicycle (e-bike) status in California as those with fully operable pedals and an electric motor of less than 750 watts. It establishes three classes of electric bicycles based on their motor speed and level of electric assist:

Class 1 e-bike, or low-speed pedal-assisted electric bicycle, is equipped with a motor that provides assistance only when the rider is pedaling and that stops providing assistance when the bicycle reaches 20 mph.

Class 2 e-bike, or low-speed throttle-assisted electric bicycle, is equipped with a motor that can exclusively propel the bicycle and stops providing assistance when the bicycle reaches 20 mph.

Class 3 e-bike, or high-speed pedal-assisted electric bicycle, is equipped with a motor that provides assistance only when the rider is pedaling and stops providing assistance when the bicycle reaches 28 mph.

E-bike operators do not need a driver’s license, registration or license plate, but must abide by existing traffic laws. While Classes 1 and 2 are considered legal on streets and trails, Class 3 e-bikes are prohibited from paths, lanes and trails unless specifically authorized by a local ordinance. Class 3 e-bikes operators must be 16 or older and wear a helmet.

AB-1193 Bikeways

This bill amends various code sections, all relating to bikeways in general, specifically by recognizing a fourth class of bicycle facility, cycle tracks. However, the following may be even more significant to future bikeway development:

Existing law requires Caltrans, in cooperation with county and city governments, to establish minimum safety design criteria for the planning and construction of bikeways, and requires the department to establish



uniform specifications and symbols regarding bicycle travel and traffic related matters. Existing law also requires all city, county, regional, and other local agencies responsible for the development or operation of bike-ways or roadways to utilize all of those minimum safety design criteria and uniform specifications and symbols.

This bill revised these provisions to require Caltrans to establish minimum safety design criteria for each type of bikeway by January 1, 2016, and also authorized local agencies to utilize different minimum safety criteria if adopted by resolution at a public meeting.

AB-1218 California Environmental Quality Act Exemption: Bicycle Transportation Plans

According to the Civil Code, Section 15262, Feasibility and Planning Studies, *“A project involving only feasibility or planning studies for possible future actions which the agency, board, or commission has not approved, adopted, or funded does not require the preparation of an EIR or Negative Declaration but does require consideration of environmental factors. This section does not apply to the adoption of a plan that will have a legally binding effect on later activities. Association of Environmental Professionals 2014 CEQA Guidelines 229.”*

AB-1218 extends CEQA exemptions for bicycle transportation plans for an urbanized area until January 1, 2021. These exemptions include restriping of streets and highways, bicycle parking and storage, signal timing to improve street and highway intersection operations, and related signage for bicycles, pedestrians, and vehicles under certain conditions. Additionally, CEQA will also exempt from its requirements projects consisting of restriping of streets and highways for bicycle lanes in urbanized areas that are consistent with a bicycle transportation plan under certain conditions.

Planning projects such as this ATP are generally exempt from CEQA analysis because they are planning and conceptual recommendations. As individual recommendations move forward toward further design and implementation, the City will then need to determine if there are impacts for which additional environmental review may be necessary.

AB-1358 Complete Streets

This bill requires the legislative body of a city or county, upon revision of the circulation element of their general plan, to identify how the jurisdiction will provide for the routine accommodation of all users of the roadway including drivers, pedestrians, cyclists, individuals with disabilities, seniors, and public transit users. The bill also directs the OPR to amend guidelines for general plan circulation element development so that the building and operation of local transportation facilities safely and conveniently accommodate everyone, regardless of their travel mode.

AB-1371 Passing Distance/Three Feet for Safety

This statute, widely referred to as the “Three Foot Passing Law,” requires drivers to provide at least three feet of clearance when passing bicyclists. If traffic or roadway conditions prevent drivers from giving bicyclists three feet of clearance, they must **“slow to a speed that is reasonable and prudent”** and wait until they reach a point where passing can occur without endangering the bicyclist. Violations are punishable by a \$35 base fine, but drivers who collide with bicyclists and injure them in violation of the law are subject to a \$220 fine.

AB-1581 Bicycle and Motorcycle Traffic Signal Actuation

This bill defines a traffic control device as a traffic-actuated signal that displays one or more of its indications in response to the presence of traffic detected by mechanical, visual, electrical, or other means. Upon the first placement or replacement of a traffic-actuated signal, the signal would have to be installed and maintained, to the extent feasible and in conformance with professional engineering practices, so as to detect lawful bicycle or motorcycle traffic on the roadway. Caltrans has adopted standards for implementing the legislation.

SB-1 Road Repair and Accountability

This bill was drafted to address California’s significant funding shortfall in maintaining the state’s multi-modal transportation network, which is considered the state’s economic backbone and critical to quality of life. It is specifically intended to direct increased reve-





nue to the state's highest transportation needs, while fairly distributing the economic impact of increased funding across all user types.

SB-1 increases several taxes and fees to raise over \$5 billion annually in new transportation revenues, prioritizing funding towards maintenance and rehabilitation and safety improvements on state highways, local streets and roads, and bridges and to improve the state's trade corridors, transit, and active transportation facilities. Once fully implemented, approximately \$1.5 billion per year in new revenue is earmarked for local streets and roads maintenance and rehabilitation and other eligible uses, including Complete Streets projects.

In addition to augmenting the Active Transportation Program by \$100 million per year, SB 1 requires that Caltrans update the Highway Design Manual to incorporate "Complete Streets" design concepts.

SB-375 Redesigning Communities to Reduce Greenhouse Gases

This bill seeks to reduce vehicle miles traveled through land use and planning incentives. Key provisions require the larger regional transportation planning agencies to develop more sophisticated transportation planning models, and to use them for the purpose of creating "preferred growth scenarios" in their regional plans that reduce greenhouse gas emissions. The bill also provides incentives for local governments to incorporate these preferred growth scenarios into the transportation elements of their general land use plans.

SB-672 Traffic-Actuated Signals: Motorcycles and Bicycles

This bill extends indefinitely the requirement to install traffic-actuated signals to detect lawful bicycle or motorcycle traffic on the roadway. By indefinitely extending requirements regarding traffic-actuated signals applicable to local governments, this bill would impose a state-mandated local program. Existing law requires the state to reimburse local agencies and school districts for certain costs mandated by the state.

SB-743 CEQA Reform

For decades, vehicular congestion has been interpreted as an environmental impact. Projections of degraded Level of Service (LOS) has, at a minimum, driven up project costs and, at a maximum, precluded projects altogether, particularly on-street bicycle projects.

SB-743 removes the requirement of LOS as a measure of vehicle traffic congestion that must be used to analyze environmental impacts under the California Environmental Quality Act (CEQA). This is important because adequately accommodating bicyclists, particularly in built-out environments, often requires reallocation of right-of-way, and the potential for increased vehicular congestion. The reframing of LOS as a matter of driver inconvenience, rather than an environmental impact, forces planners to assess the impacts of transportation projects differently and may help to support active transportation projects that improve mobility for all roadway users. For example, as of November 2017, California state agencies stopped using LOS to measure environmental impacts in lieu of Vehicle Miles Traveled (VMT).

SB-760 Transportation Funding: Active Transportation: Complete Streets

This bill established a Division of Active Transportation within Caltrans to give attention to active transportation program matters to guide progress toward meeting the department's active transportation program goals and objectives. This bill requires the California Transportation Commission (CTC) to give high priority to increasing safety for pedestrians and bicyclists and to the implementation of bicycle and pedestrian facilities. The bill also directs the department to update the Highway Design Manual to incorporate "Complete Streets" design concepts, including guidance for selection of bicycle facilities.

Caltrans' Deputy Directive 64-R1

Deputy Directive 64-R1 is a policy statement affecting Caltrans mobility planning and projects requiring the agency to: "...provide for the needs of travelers of all ages and abilities in all planning, programming, design, construction, operations, and maintenance activities and products on the State highway system. The Department views all transportation improvements as

opportunities to improve safety, access, and mobility for all travelers in California and recognizes bicycle, pedestrian, and transit modes as integral elements of the transportation system.” The directive goes on to mention the environmental, health, and economic benefits of more Complete Streets.

Federal Legislation

Safe Streets Act (S-2004/HR-2468)

HR2468 encourages safer streets through policy adoption at the state and regional levels, mirroring an approach already being used in many local jurisdictions, regional agencies, and states governments. The bill calls upon all states and metropolitan planning organizations (MPOs) to adopt Safe Streets policies for federally funded construction and roadway improvement projects within two years. Federal legislation will ensure consistency and flexibility in road-building processes and standards at all levels of governance.

Complete Streets and Routine Accommodation

A Complete Street is one designed and operated to provide safe access for all users, including pedestrians, bicyclists, vehicle drivers, and transit riders of all ages and abilities. Complete Streets make it easy to cross the street, to walk to shops, and to bicycle to work. They allow buses to run on time and make it safer for people to walk to and from transit locations.

An adopted Active Transportation Master Plan provides a roadmap to support planning and implementing a bicycle and pedestrian network, can help to integrate bicycle and pedestrian planning into broader planning efforts and is required for State funding of bikeway projects.

For many cities, however, a bicycle and pedestrian plan alone is not enough to ensure the implementation of the plan’s goals and projects. A hurdle many cities face is that their various plans are not well integrated. Despite many cities’ attempts to support a “Complete Streets approach,” entrenched and often contradictory policies can make implementation difficult. For instance, an Active Transportation Master

Plan, an ADA transition plan, and a specific plan may address the same area, but ignore each other’s recommendations. One plan may identify a certain project, but it may not be implementable due to prevailing policies and practices that prioritize vehicular flow and parking over other modes.

An adopted Complete Streets policy has the potential to address these shortcomings through the designation of specific important corridors as Complete Streets, accommodating all roadway users, and other corridors as priority corridors for certain modes. A system that assigns priority for different modes to specific corridors, offset from one another, is referred to as a layered network.

Efforts to implement Complete Streets policy often highlight other significant obstacles, chief among them documents defining “significant impacts” to traffic, acceptable vehicular “Level of Service” thresholds and parking requirements. Drafting a Complete Streets policy often means identifying roadblocks like these and ultimately mandating increased flexibility to allow for the creation of a more balanced transportation system. In the case of an Active Transportation Master Plan, the network identified could become the bicycle and pedestrian layers. Identification in such a plan, reiteration within a Complete Streets policy framework and exemption from traditional traffic analyses can make implementation more likely and much more affordable.

Legislative support for Complete Streets can be found at the State level (AB-1358) and at the national level (HR-2468). As explained in further detail in the previous section on applicable legislation, AB-1358 requires cities and counties to incorporate Complete Streets in their general plan updates and directs the State Office of Planning Research (OPR) to include Complete Streets principles in its update of guidelines for general plan circulation elements.

Examples of best practices in Complete Streets policies from around the United States can be found at: <http://www.smartgrowthamerica.org>. (Smart Growth America is developing a new Complete Streets policy framework, slated for completion in late 2017/early 2018.)



Safe Routes to School Guidance

FHWA's Guidance for the Safe Routes to School Program

This document provides SRTS program guidance for State DOTs and other stakeholders involved in implementation and administration of SRTS programs. The FHWA's guidance document allows states to confidently create SRTS programs, as well as spending program funds. Successful implementation of such programs depends on the activities done at the State and local levels. The desired outcomes of the SRTS program include increasing bicycle and pedestrian safety, encouraging more children to walk to and from schools, decreasing traffic congestions, improving child health and reducing child obesity, among others. Additionally, FHWA recommends that all SRTS efforts incorporate the "5 E's": engineering, education, enforcement, encouragement, and evaluation.

The National Highway Traffic Safety Administration's (NHTSA) Safe Routes to School Toolkit

The purpose of this toolkit is to assist schools that are initiating and implementing SRTS programs. This toolkit provides information about activities designed to encourage children to walk and ride to school. Additionally, maps, activities and outreach, and classroom lesson are provided to allow educators and others to promote alternative modes of transportation. The toolkit also includes sample SRTS, press releases, posters, and other resources.

Bicycling and Walking Benefits

Numerous economic, environmental, and health benefits are attributed to bicycling and walking, especially as a substitute for driving a vehicle. This section summarizes benefits from research by the Pedestrian and Bicycle Information Center (PBIC).



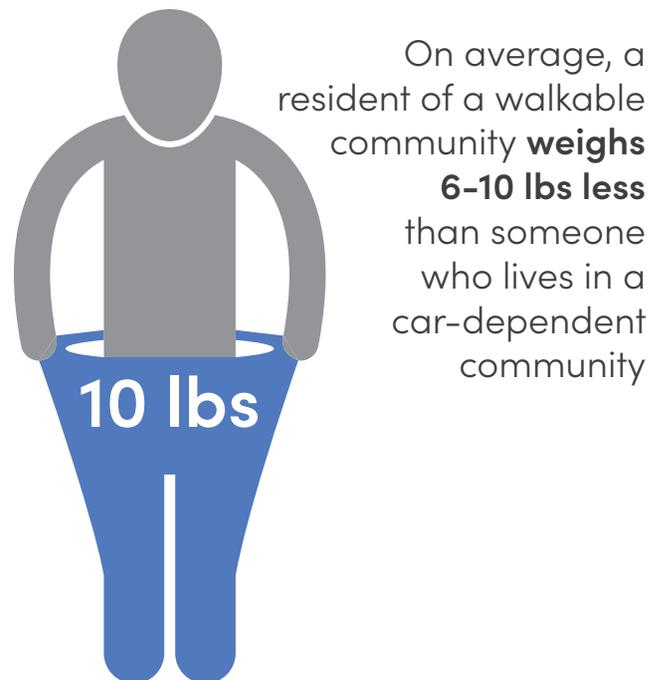
Environmental Benefits

Increased bicycling reduces fossil fuel emissions. In California, 40 percent of carbon dioxide (CO₂) emissions are produced by the transportation sector. While CO₂ is not the most harmful greenhouse gas, it is the most abundant. Even after accounting for the other greenhouse gases' global warming potentials (comparing them in terms of CO₂), 95 to 99 percent of vehicle emissions are CO₂. The Environmental Protection Agency (EPA) found that the average vehicle emits 0.95 pounds of CO₂ per mile, meaning that almost 10 pounds of carbon dioxide emissions could be avoided each day if an individual with a five-mile (each way) commute switched from driving to an active transportation mode like bicycling.

Health Benefits

Despite dramatic strides in recent decades through regulations and technological improvements, vehicle emissions still pose a significant threat to air quality and human health. Vehicle-generated air pollution contains harmful greenhouse gas emissions, including carbon dioxide, carbon monoxide, methane, nitrous oxide, and volatile organic compounds. These pollutants and irritants can cause asthma, bronchitis, pneumonia, and decreased resistance to respiratory infections. Taking steps to reduce these emissions is particularly important in the United States, which leads the world in petroleum consumption. Converting vehicular trips to bicycling trips is an opportunity to help reduce emissions and improve public health.

In addition to the universal public health benefits, such as improved air quality described above, walking and bicycling have the potential to positively impact personal health. A significant percentage of Americans are overweight or obese and recent projections indicate that 42 percent of the population will be obese by 2030. To combat this trend and prevent a variety of diseases and their associated societal costs, the Centers for Disease Control and Prevention (CDC) suggest 30 minutes of moderate intensity physical activity five days per week minimum. Not only does walking and bicycling qualify as "moderate intensity activity," they can also be seamlessly integrated into daily routine, especially for utilitarian purposes like commuting or running errands.





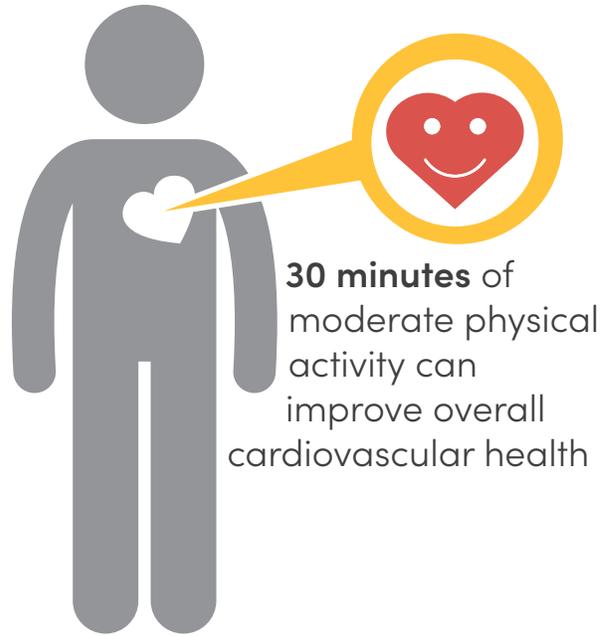
Other health benefits associated with moderate activity, such as walking and bicycling, include improved strength and stamina through better heart and lung function. Regular exercise reduces the risk of high blood pressure, heart attacks and strokes. In addition to heart disease, regular exercise can also help to prevent other health problems such as non-insulin dependent diabetes, osteoarthritis and osteoporosis. Lastly, exercise has been shown to improve mental health by relieving depression, anxiety and stress symptoms.

Economic Benefits

Bicycling infrastructure and programs has increasingly been shown to deliver economic benefit to both individuals and society at large. The benefits of bicycling may, in fact, outweigh its costs. Bicycling, and utilitarian bicycling in particular, offers somewhat obvious cost savings to individuals. Beyond the upfront cost of operating a vehicle are additional maintenance, insurance and often parking costs. According to the American Automobile Association, the annual cost of owning a car and driving 15,000 miles a year is now just over \$9,000.

Converting even a fraction of automobile trips to bicycling or walking trips can create significant transportation-related savings as a result of reduced vehicle traffic congestion. Increased bicycling also translates to health-related savings, for both individuals and taxpayers, in the form of less need for preventative care. More bicycling and walking have also been tied to increases in commercial and residential property values and retail sales. Shoppers who reach their destination by bicycle have been shown to make smaller purchases, but shop more often and spend more money overall. Shoppers who arrive by bicycle or on foot, by virtue of their more limited range, are also more likely to support local businesses, and do not require a vehicle parking spot.

Perhaps more compelling than reducing GHG emissions or combating the obesity epidemic are the benefits walking and bicycling have to offer in terms of quality of life. Bicycling and walking are increasingly seen as fun, low-cost, healthy, and sustainable ways of getting around. How then, can we make it easier for any person to choose to walk or bicycle for his or her daily trips?



In an effort to re-position bicycling as a safe and common mode of transportation and increasing the number of people bicycling, attention needs to be shifted away from creating “cyclists” and toward making it easier for any person to choose bicycling for their everyday trips. Research shows a strong latent interest in bicycling among those who identify as “interested, but concerned.” These individuals do not identify themselves as “cyclists,” but they do not necessarily need to do so to benefit from programs to encourage bicycling. While all segments of the population may be encouraged to ride, it is through the encouragement of this “interested, but concerned” segment of the population the greatest gains in mode share will be made. The field of bicycle planning is being redefined toward this end.

Social Justice

Disadvantaged Communities and Expanded Mobility Choice

Bicycle and pedestrian planning also needs to address social justice issues present throughout the country. Research shows that disadvantaged communities face everyday conditions that are less adequate than affluent communities. Bicycle and pedestrian planning has to be approached from a holistic manner and provide expanded mobility choice for all community members, regardless of their background.

There are numerous reports such as the “Commuting in America 2013” publication by AASHTO that shows that people of color living in disadvantaged communities are less likely to own a personal vehicle. They have no option but to walk, bicycle, or use public transit for work, school, or personal trips. They are more likely to walk or bicycle out of necessity, and less for recreation.

In an effort to equitably address these issues, planning must prioritize disadvantaged neighborhoods whose residents suffer the highest risks of traffic violence and who lack affordable, safe transportation options. This will enable residents of low-income communities of color to benefit the soonest from safe and convenient active transportation infrastructure. Engaging, educating, and encouraging residents in a meaningful manner will result in a bicycle and pedestrian network that benefits all.

