



Increasing Physical Activity

THROUGH COMMUNITY DESIGN

A Guide for Public Health Practitioners
and Livable Community Advocates

NATIONAL CENTER FOR BICYCLING & WALKING | June 2010



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The report may be downloaded at www.bikewalk.org.



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“Ultimately it is the right people who make change possible; we either have to be them or find them.”



**Sharon Z. Roerty, AICP/PP/MCRP
Executive Director, National Center for
Bicycling & Walking**

Walk With Me

A letter from Sharon Z. Roerty, Executive Director of the National Center for Bicycling & Walking

Picture a place with short, connected blocks, a variety of building types and destinations proximate to each other. Then picture a place with four or more lanes of traffic, double left turn lanes, limited through streets, large gaps between buildings and deep property setbacks. It is probably easy to include people walking or biking in the first mental picture; and less so in the second.

About a year ago I was facilitating a workshop for a group of advocates in southern Alabama who had a vision of a region with a continuous network of sidewalks, paths, trails, and complete streets spanning two counties, and crossing a major body of water. In the audience were two college students, who were leaders in a campus sustainability group. As part of the workshop each person was asked to think of and then describe a place where they like to walk or bike. When it came to be the students' turn, they both retreated, before confessing that they never had lived in such a place. They couldn't picture this place.

In 2002 when we published, *Increasing Physical Activity through Community Design*, we did it as a guide to engage public health practitioners and encourage them to become more involved in community design issues. The current adaptation of the IPA guidebook is still aimed at public health practitioners, however it recognizes that a more deeply rooted trans-disciplinary approach is necessary for creating the public will and support for change and sustaining it. Public health practitioners can't do it alone; planners can't do it alone; elected officials need a reason to do it; environmentalists, social workers, educators, housing developers and advocates—they all need to be part of it.

Not long after I met the college students from Alabama, I participated in a bike rodeo in Newark, NJ. On a steamy Saturday in July, 125 children, ages 3-12, showed up to learn to ride. Thanks to the generosity of many, each and every child was outfitted with a refurbished bike, a new helmet, and received instruction from a trained professional on the rules of the road—all at no cost. They negotiated the cones and the chalk lines of the parking lot obstacle course, learning how to start, stop, and handle their new bicycles. I can still picture the happy faces as the children left the courtyard with their “new” bikes and new confidence. Newark is struggling to become a bicycle friendly city. If everyone continues to work together it will happen.

This guidebook is about implementation. For over a decade, the National Center for Bicycling & Walking has been leading the fight to make our communities healthy by design. Fortunately in 2010 our efforts are bolstered by national leaders and national programs. First Lady Michelle Obama has initiated “Let's Move” a program that promotes physical activity. USDOT Secretary Ray LaHood has been making public statements about community design that supports walking and biking; and he is backing up his statements with policy directives. Also in 2010 there is a better understanding of the built environment and its impact positively and negatively on our mobility and health. We still have a lot of work to do but we are on the right road.



INCREASING PHYSICAL ACTIVITY THROUGH COMMUNITY DESIGN

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NATIONAL CENTER FOR BICYCLING & WALKING

Chapter Two

HOW TO IMPROVE CONDITIONS FOR WALKING AND BICYCLING

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Simple Ways for Public Health Practitioners to Encourage Active Community Environments

- Stress to your patients and the public the importance of daily physical activity and encourage them to walk and bike.
- Encourage your patients, colleagues, and local organizations to help make their communities friendly to walking and bicycling.
- Incorporate community design issues into patient wellness and lifestyle classes.
- Start a commuting program at your workplace that promotes walking and bicycling.
- Encourage community leaders and government staff to solicit the advice of medical professionals about the design of an active community.
- Make presentations on active living through community design to local schools, senior centers, civic groups (Chamber, Rotary, etc.), and committees (transportation, budget, etc.).
- Write a guest editorial about physical activity, health and community design for your local paper.
- Ask people running for elected office to commit to making healthy community design a priority.

What's Your Role?

Many local projects and actions can support walking and bicycling. Some of these already may be in place in your neighborhood or community, but you'll no doubt find opportunities to encourage more physical activity through better community design. In the face of so much that needs to be done, you may feel overwhelmed. What can you do?

The good news is that communities are always changing. You are likely to find many plans, projects and other opportunities to make conditions better for walking and bicycling. Perhaps the most difficult decision you will make is where to start and whether you will serve as an expert, advocate, change agent, monitor or a combination of these roles. Recognize from the outset that you can't do it all. To make the changes that will be required, many different people representing diverse disciplines must participate. As a public health practitioner, you will need to partner with local planners, engineers, citizen groups and decision-makers to foster change in your community.

Public health professionals are uniquely positioned to help lead a credible campaign to promote active living through community design.

First, as an **expert**, you can:

- establish that we have serious national health problems, including obesity and diabetes, related to physical inactivity;
- confirm that the most effective countermeasures to these problems include physical activity;
- state that we will not be active unless the design of our communities accommodates and encourages physical activity as a regular, routine part of our daily lives; and
- attest that walking and bicycling are among the most accessible and affordable opportunities for physical activity.

Second, as an **advocate**, you can:

- serve as a good role model for a physically active lifestyle;
- help develop the understanding and support needed to define new goals and objectives for the planning, design, and management of physically active communities; and
- inspire, empower, and encourage other community groups to work together to achieve these goals and objectives.

Third, as a **change agent**, you can:

- help identify and implement actions needed to create environments that promote physical activity;
- suggest using existing resources in new areas and on new priorities to achieve the desired outcomes;



- direct the concern of professional medical organizations toward supporting active community design; and
- collaborate with change agents in the housing and environmental sector.

Fourth, as a **monitor**, you can:

- be vigilant for opportunities to exert influence;
- marshal resources to effect change;
- provide continuity to the process of change;
- assess and report on progress made; and
- seek opportunities to dialogue with other professionals at regional/national meetings.

Perhaps the most important job a public health professional can do is to make public health concerns and their connections to physically active communities prominent. This is your justification for being interested, for being involved, and for insisting that changes must be made. This is what lends legitimacy to your questions, your presentations, your proposals and your agenda. When community leaders, officials and decision-makers understand that communities friendly to walking and bicycling are key to a healthy population and act accordingly, you will have succeeded in your mission.

Let's Complete Our Streets

There are many projects a community can undertake to make their roadways more accommodating for bicyclists and pedestrians. Since most communities have already established roadway systems, it is necessary to work within the confines of what already exists. That's where the concept of "complete streets" comes into play.

Complete streets are roadways that are designed to accommodate not only automobiles, but also transit users, pedestrians and bicyclists. Complete streets allow people of all ages and abilities to feel safe while using the public way. Complete streets include all aspects of "model" communities as discussed in Chapter One including:

- transportation facilities and services;
- land-use planning and development;
- schools;
- recreation, parks and trails;
- safety, security and crime prevention;
- environmental protection; and
- the needs of all residents (social equity/environmental justice).

As a public health practitioner, your overall concern is the health of members of the community. In addition to America's obesity epidemic, we face poor air quality

"Public health has got to participate in the planning process. It's vital if we are going to have safer and healthier communities."

Richard J. Jackson, MD, MPH, National Center for Environmental Health, CDC



Bainbridge, WA, complete street

“People in other aspects of community planning are very happy to have people from the health arena at the table. They’re thinking that it’s not just them who are out there arguing for a bicycle lane—there are actually people who think that it’s important from a health perspective. It gives them added ammunition to advocate for a healthier community... . Stepping out of our realm, which tends to be disease-focused and individual risk factor-focused, we actually have something to offer the broader community. And people do listen to us. They like having us at the table.”

Katrina Hedberg, MD, MPH, Deputy State Epidemiologist, State of Oregon Health Division

and environmental pollution, which contribute to an increase in rates of asthma and other illnesses, especially among our children and elderly. While complete streets can have a positive effect on pollution in our neighborhoods, there are several other advantages. They include:

- increased safety for all users. Redesigning intersections, installing raised medians and providing sidewalk connections significantly reduces pedestrian risk.
- an increase in walking and bicycling. Providing sidewalks, bike lanes and safe crossings encourages people to walk and bicycle for local neighborhood trips.
- a decrease in traffic congestion. Designing for public transit use including bus lanes, bus shelters and bicycle racks supports multi-modal trip making.
- encouraging transportation options that are environmentally friendly. A trip made on foot or bicycle instead of by automobile cuts carbon dioxide emissions and volatile organic compounds.
- a more cost effective approach for communities. Considering the needs of all transportation users when designing roadway improvements can eliminate costly retrofits after a project is complete.

Complete streets come in many shapes and sizes. Whether your community is rural, suburban, or urban, complete streets can greatly improve accessibility for all users. Some basic elements of complete streets may include:

- sidewalks;
- bike lanes, paved shoulders, or adjacent multi use trails;
- bus lanes;
- crosswalks; and
- medians.

In the remainder of this chapter we will highlight several projects and options useful in creating complete streets and accounting for the needs of vulnerable users.



SOURCE: WWW.PEDBIKEIMAGES.ORG/DAN BURDEN



What Needs Doing?

As a public health practitioner, the concept of complete streets may sound ideal. But you probably won't be designing intersections, pouring concrete for new sidewalks or striping bicycle lanes. Still, it is useful to know what transportation engineers and public works departments can do to make conditions better for pedestrians and bicyclists.

This chapter describes actions these professionals can take—and those you can ask for—that will help get more people walking and bicycling. To make your task easier, you may want to present your local transportation engineer and public works director with a copy of this guide.

There are hundreds of projects that can encourage people to walk and bike more. Undertaking just a few projects can truly create complete streets in your neighborhood. Here's a list of seven such projects being implemented in communities across the country:

1. **Conduct a Community Audit**
2. **Slowing Motor Vehicle Traffic**
3. **Create Safe and Convenient Crossings**
4. **Developing Safe Routes to School**
5. **Build More, Better Sidewalks**
6. **Make Streets More Bicycle Friendly**
7. **Build More Trails**

If you can tackle some of these items, you will have a good foundation from which to create a community friendly to bicycling and walking. In the process, you will gain insight into the processes of community design, planning and funding.

Conduct a Community Audit

Problem

How walkable and bicycle-friendly is your community? You know that walking and bicycling conditions need improving, but you have difficulty gauging the extent of the problem, much less recommending where specific improvements are needed.

Transportation departments thrive on data, especially when it comes to planning future projects. Unfortunately, they often lack a complete, current inventory of walking and bicycling facilities. Road maintenance departments are more apt to respond to specific requests, but they may not be paying close attention to every sidewalk and bikeway. Public officials may sympathize with goals to increase walking and bicycling, but they need information on what needs to be done and who supports these actions. The residents of a neighborhood may not know what to ask for.

Standard Sidewalk Dimensions

Width (varies by type of street, larger number preferred):

Local = 5 to 6 ft

Commercial area outside downtown = 8 to 10 ft

Downtown = 10 to 12 ft

Horizontal Clear Space = 3 to 5 ft

Vertical Clear Space = 7 to 8 ft

Planting Strip (buffer zone between sidewalk and street) = 4 to 8 ft

Surface Vertical Change (abrupt, such as sidewalk cracks) = 1/4 in. maximum

Surface Gap = 1/2 in. maximum

Slope in Direction of Travel = 5 percent maximum (1:20)

Cross-Slope Across Direction of Travel = 2 percent maximum (1:50)

Standard Bikeway Width

(One-way travel; recommended width depends on motor vehicle speed and volume)

Bike Lane = 4 to 6 ft

Paved Shoulder = 4 to 6 ft

Wide Curb Lane (shared by cars and bikes) ≥ 14 to 16 ft



Pedestrian Audit

- Are sidewalks continuous along the entire route? If not, where are the gaps?
- Are the sidewalks in good repair, or are there broken sections that would impede travel when using a wheelchair, walker or baby stroller?
- Are there marked crosswalks and pedestrian signals to help people cross busy streets and intersections?
- Can slow-moving pedestrians get across the street in the time allotted by the signal?
- Do drivers yield to pedestrians at driveways and crosswalks?
- Are there utility poles, signs, vending machines, dumpsters, shrubbery, or overhead obstacles blocking the sidewalk?
- Are there trees along the street to provide shade and separation from traffic?
- Do the street, adjacent buildings, and landscaping provide a pleasant visual environment?
- Are there frequent benches or other places to sit and rest?
- Are storefronts attractive and inviting? Are the windows lit at night?
- Are there other people walking along the way?
- Was the walk enjoyable? Why or why not?
- Are there areas where you were concerned for your personal safety? Why? (This might capture concerns about street lighting if the audit is done at night.)
- Would you repeat this walking trip again? Why or why not?

Solution

The first step in fixing something that is broken is to identify the problem. If few people are bicycling in your community, find out why. If pedestrians have trouble crossing at an intersection, look for causes. Review and assess as many of the streets and highways in your community as possible to identify where there are barriers to walking or bicycling.

Start with the downtown and schools. As time allows, expand to commercial centers, areas around parks, residential subdivisions, and other places where people are likely to walk and bike.

Look at both existing data, if any, and the facilities themselves. Your transportation department may already have some kind of inventory of sidewalks, bike lanes and perhaps even curb ramps. The police or a safety committee may have crash locations listed. But remember: crash data show where people got hit but not necessarily where they can't cross the street.

A good way to discover what people experience while walking or bicycling, and what might prevent them from doing so, is to conduct an informal inventory or "audit" of existing conditions throughout your community—not by car, but on foot, wheelchair or bicycle. The immediate physical environment has a profound effect on the level of comfort pedestrians and bicyclists experience. Many of the problems you will discover are small, subtle and not discernible from a motor vehicle.

For a quick test audit, try a route that has a purpose for you. Walk or bicycle from your home to the nearest school, shopping center, office building, or local park.

Before your audit, visit the Active Living Resource Center for checklists to bring with you on your pedestrian audit. See www.activelivingresources.org/assets/audits_alrc_v09.pdf for more information.

Carry a camera and photograph things that impede your progress or interfere with reaching your destination. Photos will come in handy later for presentations.

During your pedestrian and bicycle audits, ask yourself the questions on the list and make note of your findings.

Organize and summarize your findings to highlight problems for transportation planners, public works officials, budget committees, and the public.

The League of American Bicyclists offers many resources on its website for cyclists of all types and level of experience. See their website at www.bikeleague.org/resources/better for additional information before conducting a bicycle audit.



Considerations

Think of a pedestrian or bicycle trip as a chain of many small but essential links. For pedestrians, it may be a segment of sidewalk here, a curb ramp there, and a multitude of driveway and street crossings. Each link needs to be in place and functional to provide pedestrians and bicyclists with an easy, safe travel route.

Small, local improvements are usually much easier to implement than changes to an entire network. Because spot improvements tend to be finite, discrete and limited in scope, it may be easier initially to get support for them than it would be for larger projects.

Collecting, organizing and communicating data takes time but requires few material costs. City staff, especially seasonal interns, may be of help. A citizen bicycle and pedestrian advisory committee, social justice outreach group or neighborhood association also may want to participate, or a local school might want to take on the work as a class project.

For example, the Fitness Council in Jackson, MI, promotes its local Safe Routes to School program in a variety of ways. A walking audit held in the Frost Elementary School neighborhood identified a few hazards impeding the children's walking path to school. Following the audit, the school community has been able to install 12 new crosswalks, post new "No Turn on Red" signs at key intersections, and make changes to the school's parking lot entrance to enhance safety conditions.¹

Slowing Motor Vehicle Traffic

Problem

Speeding motor vehicles are probably the most common concern of walkers and cyclists on both local and major streets. Widening neighborhood streets can encourage speeding. As streets get wider and come to resemble interstate highways in design and width, drivers respond by driving faster. As speeds go up, the risks to pedestrians and cyclists increase dramatically.

"Speeding affects both the probability of a crash and the severity of injuries produced by a crash. Over 100 studies, summarized in Elvik (2005) and Aarts and van Schagen (2006), document three effects of speed on crashes and injuries. First, the probability of a crash is approximately proportional to the square of the travel speed. Second, in a crash, injury risk is approximately proportional to the impact forces on a person, which in turn are proportional to the square of the impact speed. These two effects can be summarized in a general rule of thumb:

"When travel speed increases by 1%, the injury crash rate increases by about 2%, the serious injury crash rate increases by about 3%, and the fatal crash rate increases by about 4%."

Bicycle Audit

- Are you able to find a comfortable route to your destination?
- Is secure bicycle parking available at your destination?
- Is there sufficient operating width along the route? (Refer to standards on page 15.)
- Are alternate, quieter routes to your destination available?
- Is the roadway surface in good repair?
- Do traffic signals detect your presence?
- Are drivers friendly and tolerant toward bicyclists?
- Is there a place to clean up and change clothes at work or school?
- Did you enjoy your bicycling experience? Why or why not?
- Would you repeat this bicycle trip again? Why or why not?



SOURCE: WWW.PEDBIKEIMAGES.ORG/DAN BURDEN



SOURCE: WWW.PEDBIKEIMAGES.ORG/DAN BURDEN

Top: Bicycle Audit; Bottom: Pedestrian Audit

National Highway Traffic Safety Administration's Fatality Analysis Reporting System (FARS) database reveals that most pedestrians are killed on the wider, higher capacity and higher speed roads called arterials. More than 50 percent of the 9,091 pedestrians killed (for whom roadway classification data was recorded) in 2007 and 2008 died on principal or minor arterials. One-third of pedestrian deaths occurred on smaller collector and local roads, while 16 percent of deadly crashes were on interstates or freeways.

Ernst M, et al. Dangerous by Design: Solving the Epidemic of Preventable Pedestrian Deaths (And Making Great Neighborhoods). Washington: Transportation for America, 2009.



SOURCE: WWW.PEDBIKEIMAGES.ORG/DAN BURDEN



SOURCE: WWW.PEDBIKEIMAGES.ORG/DAN BURDEN

“The same relation holds in reverse: a 1% decrease in travel speed reduces injury crashes by about 2%, serious injury crashes by about 3%, and fatal crashes by about 4%. Consider the effect on a street with a speed limit of 35 mph and average travel speed of 40 mph. A reduction of just 2 mph, to 38 mph, is a 5% decrease, so crashes would be reduced by about 10%, serious injury crashes by about 14%, and fatal crashes by about 19%.”²

On major streets (arterials and collectors) an emphasis on mobility has resulted in speeds higher than appropriate for some of the areas the streets pass through (e.g., school zones, residential areas and shopping districts).

Solution

Encourage transportation agencies to limit motor vehicle speeds on streets in urban and suburban areas to levels compatible with adjacent land uses and with bicycling and walking (i.e., 35 mph or less on major streets and 20 mph or less on neighborhood or residential streets).

Push for reduced design speeds and roadway widths in neighborhood and residential areas. In other words, change the design so motorists are more inclined to obey the posted speed limit.

Traffic-calming measures help control driver behavior and motor vehicle speeds, especially in residential, school, park and shopping areas. Although traffic calming is often a retrofit to manage identified problems, it is also an important aspect of new construction to prevent problems from occurring. Your community may already have a traffic-calming program. If so, ask about its effectiveness and what can be done to improve it.

Considerations

Traffic speed and volume can be reduced through a variety of measures, including:

- changing the horizontal alignment of the roadway: chicanes (short jogs in the street), roundabouts, traffic circles, etc.; and
- changing the vertical alignment of the roadway (raised intersection, speed hump, speed table, raised crosswalk, etc.).

Travel lanes and roadways can be narrowed in either real or perceived ways (curb extensions, reductions in curb radius, on-street parking, pedestrian refuge islands, landscaping, etc.). These changes can help:

- regulate and enforce movements (signed turning restrictions, truck restrictions, photo radar, etc.); and
- reduce the need to travel (smart growth land-use planning, traditional neighborhood development, travel demand management).

Traffic calming can yield some significant safety benefits. Researchers at Ryerson Polytechnic University, the Insurance Institute for Highway Safety and the University of Maine studied crashes and injuries at 24 intersections before and after construction of roundabouts. The study found a 39 percent overall decrease in crashes and a 76 percent decrease in injury-producing crashes. Collisions causing fatal or incapacitating injuries fell as much as 90 percent at some intersections.



Successful traffic-calming projects:

- employ a combination of measures that will have a much greater effect than just one or two measures;
- look at an entire neighborhood or area rather than one location;
- include public involvement to determine neighborhood goals, identify concerns and generate support; and
- include a complete package of design and landscaping features that improve neighborhood aesthetics and livability.

Create Safe and Convenient Crossings

Problem

Most people begin their walks or bicycle rides in a residential area with lower traffic volumes and speeds. But if their walk or ride is of any appreciable duration, they soon will reach a busier street. Major streets may be over 100 feet wide, and automobile speeds may reach or exceed 45 to 50 mph (even where lower limits are posted). Highly visible, marked crosswalks are often absent or they may be too few and far between.

Crossing such a busy street may be too great a challenge for many children, seniors or people with disabilities. For them, the trip may be impossible—they “can’t get there from here.” Intersections with wide, highway-style streets often have high pedestrian crash rates.

Even when pedestrians are walking parallel to a major street, they can be at risk when crossing side streets and driveways. A common crash type at intersections involves pedestrians struck by right-turning vehicles. The wide curb radius often used in street design encourages motorists to take corners at higher speeds.

Intersection signals can work for or against the pedestrian and the bicyclist. First, many signals only detect motor vehicles. If forced to wait a long time for a green light or a walk signal, some cyclists and pedestrians will ignore the signals and start across when a gap in traffic occurs. Second, the signals may be visible only to drivers in the travel lanes, and not to pedestrians or cyclists. Finally, the signal time for crossing may be too short to allow pedestrians and even some bicyclists to get to the other side.

Solution

Traffic engineers have many techniques to design and operate intersections that provide for easy, safe movement by pedestrians and bicyclists. Ask them to:

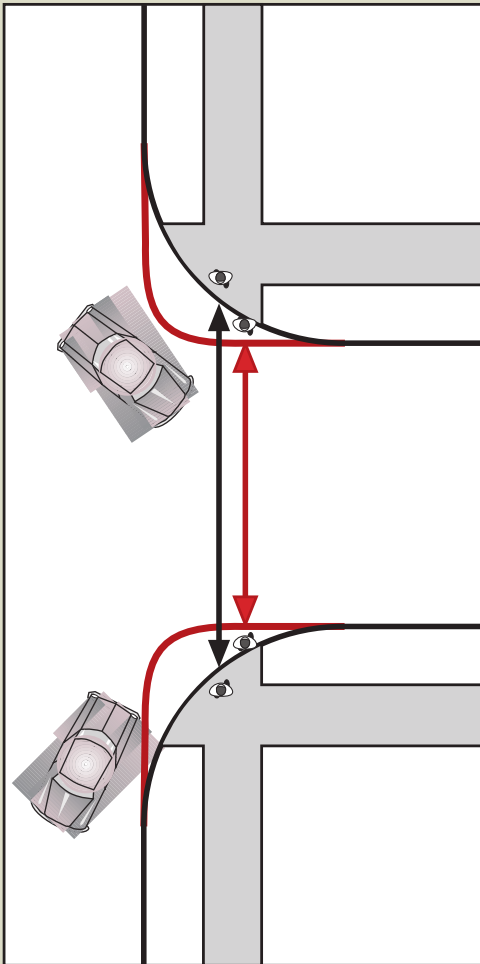
- shorten crossing distances by using small corner radii where truck traffic is not a concern (see diagram on next page), install curb extensions where parking is allowed on local streets, and pedestrian refuges or median islands in the center of multi-lane roadways;
- provide curb (wheelchair) ramps at all locations where pedestrians must change grade between a sidewalk or pathway and the street;

“Marked crosswalks have some benefits for pedestrians, in that they delineate a space for pedestrians, and could be considered to encourage walkers. However, to the extent that they send a message that walkers should only cross at crosswalks, they are discouraging. Unfortunately our crosswalks do not effectively slow cars, or convey a strong enough message that walkers are important. If crosswalks were routinely installed as raised crosswalks or speed tables, they would present a much stronger message to motorists that pedestrians are the dominant mode.”

Peggy da Silva, M.P.H., et al. Beyond Safety: Pedestrian Advocacy for Public Health. Paper presented at Walk21-IV, 2005.



A smaller corner radius shortens crossing distance and slows down turning cars.



- restrict curb parking at specific crossing points to provide greater visibility for pedestrians and drivers;
- employ traffic-calming measures to slow motor vehicles (see section on Slowing Motor Vehicle Traffic);
- increase the length of time for pedestrians to cross at signals;
- use highly visible, marked crosswalks at all intersections where sidewalks or paved shoulders are provided;
- in areas where there are mixed land uses or transit service that generate pedestrian activity, provide improved crossing opportunities on multi-lane roadways every 400 feet. In other areas, provide improved crossing opportunities at least every 1000 feet;
- require drivers to STOP, not just YIELD, for pedestrians in a crosswalk;
- use supplemental identification devices (signs, beacons) to draw drivers' attention to the presence of a marked crosswalk; and
- use a traffic detector that is sensitive to bicycles at signals.

Considerations

At intersections where you expect more pedestrians, consider reconstructing the curb to require a tighter turn (top car in diagram at left). This has multiple advantages: It slows motorists who are turning, improves the sight distance between the approaching motorist and the pedestrian, reduces the distance a pedestrian must travel across the street, increases the waiting area available to pedestrians, and simplifies curb ramp design.

Shorter signal cycle lengths and longer pedestrian crossing intervals will encourage pedestrians and cyclists to view crossings of busy arterials not as barriers, but as part of a system that allows them great mobility.

In 2009, the City of Galesburg, IL, was awarded almost \$200,000 under the state's Safe Routes to School program. This city will use the funding to not only install new sidewalks that are needed, but to upgrade existing crosswalks by installing blinking LED lighting at six local school intersections. The grant will also fund the installation of three new LED radar feedback signs (to tell motorists how fast they are going), within the local school zones.³

Developing Safe Routes to School

Problem

Fewer and fewer children walk or bicycle to school. Even children who live within a mile of school—easy walking distance—are often transported by bus, SUV, or car. In some cases, children are discouraged from walking or bicycling because parents fear they will be endangered by traffic or crime.

Ironically, these actions can increase the danger to children living in the vicinity of a school because of the increase in motor vehicle traffic. Harried parents may, at times, forget the health and safety of the neighborhood children in their rush to get everyone to work and school on time.



Solution

In 2005, the federal government formally identified the Safe Routes to School Program and provided a funding mechanism under the existing SAFETEA-LU transportation legislation. While many communities had already been developing and investing in their own programs, the federal program provided funding well beyond that previously available.

The National Center for Safe Routes to School is funded by the U.S. Department of Transportation and provides Safe Routes to School program knowledge and technical information on the school travel program. In addition, the Safe Routes to School National Partnership has established a network of hundreds of organizations, government agencies and professional groups working to set goals, share best practices, secure funding, and provide agencies with educational materials to implement Safe Routes to School programs.

According to the National Center for Safe Routes to School, as of December 2009, all 50 states had active local or statewide SRTS programs and approximately 6,489 schools were participating in state or federally funded SRTS programs.⁴

Commonly in a Safe Routes to School program, walking routes with high safety rankings are identified using a list of criteria, including:

- availability of sidewalks;
- traffic speeds and volumes;
- the number of street crossings required;
- the area through which the route passes (residential, commercial, industrial);
- availability of pedestrian walk signals at intersections; and
- availability of crossing guards at busy intersections in the school zone.

When planning or assessing the neighborhoods or routes that lead to a school, it is good practice to work with the local police, public works department, district engineers and planners. Some communities have established safe routes to school as a priority and fix problems that have been identified by:

- connecting school sites to the neighborhoods they serve with sidewalks, safe street crossings, bicycle-friendly streets, and trails;
- making all school entrances directly accessible by pedestrians;
- providing good bicycle parking at all schools in a safe, secure and convenient location;
- planning school bus routes, and pick-up and drop-off points, to minimize conflicts with pedestrians and bicyclists;
- reducing parking facilities at schools for personnel and students and locating parking to minimize conflicts with pedestrians and bicyclists;



The basic elements of Safe Routes to School can be summarized as the 5 E's:

- Education
- Encouragement
- Enforcement
- Engineering
- Evaluation

The preferred sidewalk width in a downtown or other activity area is 12 feet, at least 6 feet of which should be clear of obstructions. This width allows two pedestrians to walk side by side, or to pass each other comfortably. It generally provides enough width for window shopping, some street furniture (benches, lamps, etc.) and places for people to stop. More width is desirable to accommodate bus shelters, sidewalk cafés and other outdoor retail. In a pinch, 8 feet is acceptable. Outside of the downtown, sidewalks should be at least 5 feet wide.

- using traffic-calming techniques and other forms of street design to limit motor vehicle speeds and volumes near school sites;
- street closures around the school during arrival and dismissal of students; and
- implementing aggressive traffic enforcement to control motor vehicle speeds on school routes.

Considerations

One way to address parents' fears of traffic and crime is the walking school bus. An adult—often a parent of a neighborhood child—begins walking the established route to school at a specified time each day, collecting children along the way. The adult's primary responsibility is to watch for cars at intersections and other crossings. Another adult meets the group at a location near the school each afternoon and repeats the process in reverse.

In 2005, Van Derveer Elementary School in Somerville, NJ, lost funding for its courtesy bus program. In response, the principal of the school reached out to community partners to initiate a walking school bus program. The concept was embraced with open arms, and, on selected "Walking Wednesdays," the school has more than 300 students and parent participate.⁵

Build More, Better Sidewalks

Problem

Your audit may have revealed missing or inadequate sections of sidewalk. Additionally, some or all of the following problems may have been noted: narrow or obstructed travelways, broken pavement, low overhanging signs or branches, lack of accessible ramps, puddles, debris, and lack of a buffer between the sidewalk and traffic.

Solution

A continuous network of good sidewalks is vital for encouraging more people to walk. The Americans with Disabilities Act (ADA) requires an accessible pedestrian route along all public rights-of-way. Transportation projects that use federal funds must consider bicycle and pedestrian needs. The U.S. Department of Transportation (DOT) established the following policy statement on bicycle and pedestrian accommodation:

"The DOT policy is to incorporate safe and convenient walking and bicycling facilities into transportation projects. Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems. Because of the numerous individual and community benefits that walking and bicycling provide—including health, safety, environmental, transportation, and quality of life—transportation agencies are encouraged to go beyond minimum standards to provide safe and convenient facilities for these modes."⁶



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Encourage local officials to add sidewalks where they are missing on both sides of major streets, in downtowns, and on at least one side (preferably both sides) of local streets. Push for paved shoulders on rural roads. Where sidewalks are in poor condition or littered with debris, find out who is responsible for maintenance and ask them to fix the problems.

Look for opportunities to connect building entrances with sidewalks. When retrofitting places that do not have a continuous sidewalk system, streets near schools, parks, public buildings and transit stops should have the highest priority.

The preferred dimensions for pedestrian facilities are listed under *Community Audit*. Use ADA requirements as the minimum design specifications on all streets and highways.

Considerations

Width: The Institute of Traffic Engineers (ITE) recommends a minimum width of 5 feet for a sidewalk or walkway. This allows two people to walk comfortably side by side, or to pass one another. Where higher pedestrian concentrations are expected (downtown areas, schools, transit stops) the sidewalks should be wider.

Maintenance: Encourage state and local transportation agencies to adopt sidewalk maintenance practices modeled on maintenance of the adjacent street or highway. Work to get sidewalk snow removal priorities equal to or greater than those for streets, and get the work assigned to the same public agency or organization responsible for snow removal on the adjacent roadway.

Buffer: A buffer zone between the street and sidewalk further separates pedestrians from the street and provides a more comfortable walking environment. A buffer zone might be a grass strip between 4 and 8 feet in width, preferably with trees. It also could be a paved extension of the sidewalk or parking bays. Wider sidewalks should be installed around schools, transit stops, downtown areas or anywhere high concentrations of pedestrians are found.

Land Use: A good pedestrian environment is much more than a clear sidewalk and separation from traffic, although those things are important. Without attractive buildings and a mix of connected uses, even the best street and sidewalk design will not attract pedestrians.

A continuous row of buildings with windows and entrances facing the street creates an interesting and secure walking environment. Blank walls and empty lots are boring and unfriendly. People will often walk longer distances if their route takes them by attractive buildings. Beyond the buildings, land use determines walkability. The most active walking areas allow and encourage a rich mix of land uses: shops, restaurants, offices, residences, public buildings (post office, library, city hall), entertainment centers, public spaces (parks and plazas), and even some light industry.



SOURCE: WWW.PEDBIKEMAGES.ORG/DAN BURDEN

Some land uses pedestrians like:

- Storefronts
- Porches
- Walls with windows
- Landscaped yards

Some land uses pedestrians don't like:

- Garage doors
- Blank walls
- Open parking lots
- Unbuffered parking structures
- Too many driveways
- Open service areas



SOURCE: WWW.PEDESTRIANIMAGES.ORG/DAN BURDEN

Shoulders Have Many Benefits

(they also double as bike lanes)

- Greater separation from traffic for bicycles.
- A place for pedestrians and wheelchairs in places with no sidewalks.
- Space for normal and evasive vehicle maneuvers.
- Recovery area to regain control of a vehicle.
- Space for disabled vehicles and emergency equipment.
- Better sight distance for drivers.
- Reduced passing conflicts between motor vehicles and bicyclists and pedestrians.
- Pedestrians more visible to motorists.
- Storm water discharge farther from travel lanes, reducing hydroplaning, splash and spray.
- Less dust and debris kicked up by vehicles.
- Structural support to the pavement.

After realizing that dangerous conditions existed around Forest Park Elementary School in Little Rock, AR, the PTA established a Traffic Safety Committee in 2006. Partnering with the Little Rock School District and the City of Little Rock, the school worked to develop its “Stride with Pride on Neighborhood Streets” project to help improve mobility conditions in the local neighborhood. The PTA was awarded over \$300,000 in 2007 to address many of the unsafe conditions they identified. Over the summer of 2008, new sidewalks, curbs and gutters, painted crosswalks and safety signage for both drivers and pedestrians were completed prior to the first day of the new school year.⁷

Make Streets More Bicycle Friendly

Problem

Surveys indicate more people would bicycle more often if they had safer places to ride. But many of today’s streets are so crowded with fast motor vehicle traffic that there is little room for the slower cyclist. A lack of adequate operating space along a roadway can make bicyclists and motorists feel uncomfortable or even unsafe when they encounter each other.

Solution

Encourage transportation agencies to provide adequate operating space for bicyclists and other appropriate on-road facilities, including:

- bike lanes and wide curb lanes in urban and suburban locations;
- paved shoulders along rural highways;
- bicycle access to/from transit stops;
- secure bicycle parking; and
- proper maintenance, with regular sweeping and repairs.

Considerations

On fast or busy streets, striped bike lanes or paved shoulders are desired. On major streets with slow traffic, such as downtown main streets, both bicycles and motor vehicles may be accommodated in a wide outside lane (14 to 16 feet). On low speed, residential streets, cyclists can comfortably share a travel lane (12 feet) with motorists.

Bike Lanes: Bike lanes are a popular way of providing bicycle riders with a designated place to ride. As an added benefit, the installation of bike lanes can make streets more pedestrian-friendly by providing more of a buffer from passing motor vehicles.

Each potential route should be examined for available space to add bicycle lanes. Striping lanes will require 4 to 5 feet of lane width in each direction, or between 8 and 10 feet total. This can be accomplished in several ways:

- narrowing the motor vehicle travel lanes;
- eliminating through lanes or turn lanes;
- eliminating a parking lane; or
- widening the pavement.



Installing bike lanes along busy streets is a good way to increase bicycling among casual cyclists. They should be a standard feature for new roads and a required component when appropriate roadways are resurfaced or otherwise upgraded.

Paved Shoulders: Paved shoulders on rural roads have many safety benefits for all users and reduce roadway maintenance costs. If intended for bicycle use, they should be at least 4 feet wide, and 6 feet is ideal.

Rural highways and county roads provide good opportunities for long-distance touring and shorter recreational rides. Closer to cities, these roads serve as commuter routes into the urban area from outlying residential areas.

Bicycle Parking: Secure bicycle parking can help encourage more cycling. Many bicycle journeys end somewhere other than at the bicyclist's home, which may mean leaning bicycles against store windows or trees or locking them to sign posts or parking meters.

Bicycle parking can be provided using three basic approaches. For short-term parking, bicycle racks to which a bike can be locked with a cable or U-lock are usually the choice. At sites that require long-term parking, such as at a transit station, lockers (stand-alone enclosures designed to hold one bicycle per unit) are often the preferred choice of cyclists. For long-term parking for a number of regular users, secure enclosures called bicycle lock-ups (site-built secure enclosures that hold one or more bicycles) may be the answer. Several major cities have built bike stations in central locations or near transit hubs that provide secure parking and basic mechanical services.

The City of Oakland, CA, adopted a Bicycle Master Plan in December 2007. The vision of the plan established that "Oakland will be a city where bicycling is fully integrated into daily life, providing transportation and recreation that are both safe and convenient." While the plan was developed to install a network of 500 miles of bikeways over the next 15 years, as of 2009 almost 290 miles have been completed, and over 19 miles of the planned Bay Trail (totaling 33 miles) have been completed.⁸

Similarly, New York City has a Bicycle Network Development (BND) Program which encompasses several City departments as a joint project. Since 1994, the BND Program has secured funding to develop and maintain a citywide bicycling map, create and implement a bicycle master plan, and has utilized CMAQ (Congestion Mitigation and Air Quality Improvement) funding to build an extensive network of bicycle friendly streets and pathways.⁹

What are bike lanes?

- Intended for preferential or exclusive use of bicyclists.
- Designated by signing, striping and pavement markings.
- One-way in the direction of traffic flow.
- On the roadway.
- Provide for more predictable movements of motorists and bicyclists.



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Build More Trails

Problem

Many communities lack paths that are separate from the roads and free from motorized traffic. This type of facility is very popular with users of all ages and abilities. The Burke-Gilman Trail in Seattle, the Eliza Furnace Trail in Pittsburgh, PA, the Riverfront Trail in Missoula, MT, and the Tennessee Riverpark in Chattanooga, TN, are four examples of the hundreds of off-road, urban paths that are often jammed with users.

Solution

Develop trail facilities along natural corridors (such as river and stream valleys), utility easements, canals and parkways, abandoned rail lines and wherever else

they fit in. Provide shorter connections between trails and neighborhoods, parks, recreation facilities, libraries and commercial and work sites.

Expanding a trail system can bring exercise and self-powered transportation opportunities to a greater number of potential users. It can also help spread use over a larger system, which may help reduce the growing congestion on existing shared-use trails.

Considerations

Off-road paths or trails can be an important part of a network of bicycle and pedestrian facilities. They complement rather than substitute for a good system of on-street facilities. Some users will walk or cycle on the trails for exercise; others will use them for errands, or to travel to school or work. These more utilitarian uses succeed only if the trails are part of a network and take people to desired destinations.

While abandoned rail corridors seem to capture most of the attention these days, do not overlook

other potential corridors, such as utility easements and waterway corridors. In addition to uses for recreation and utilitarian travel, these trails can create linear parks and preserve transportation corridors. An example is the Capital Crescent Trail, which runs through suburban Maryland and the District of Columbia. This trail has preserved a corridor for potential future light-rail use that could never be pieced together again if it had been lost to development.



SOURCE: WWW.PEDBIKIMAGES.ORG/LAURA SANDT



The American Association of State Highway and Transportation Officials (AASHTO) recommends that shared-use paths be at least 10 feet wide to accommodate multiple users traveling in both directions. Trails with heavier use, or those attracting large numbers of in-line skaters, may need to be wider. In addition to the width of the surfaced portion of the path, at least two feet of clear space to either side of the trail is recommended so that users can avoid obstacles such as signs, shrubs and walls.

Successful paths have:

- continuous separation from traffic, such as along a river or greenbelt;
- few street or driveway crossings that would cause conflicts. Paths adjacent to roadways are generally not recommended;
- convenient and safe access to the local road network;
- connection to land uses, such as shopping malls, downtown, schools and other community destinations;
- well-designed street crossings, with measures such as bike- and pedestrian-activated signals, median refuges, and warning signs for both motor vehicles and path users;
- shorter trip lengths than the road network, with connections between dead-end streets or cul-de-sacs, or as shortcuts through open spaces;
- scenic qualities, offering an aesthetic experience that attracts cyclists and pedestrians;
- visibility from nearby buildings and streets for safety;
- good design, including adequate width and sight distance, good drainage and moderate slopes;
- proper maintenance, with regular sweeping and repairs; and
- clear destination and directional signing.

There are many benefits of trails and greenways that planners, funders, and the public need to know about: they make our communities more livable; improve the economy through tourism and civic improvement; preserve and restore open space; and provide opportunities for physical activity to improve fitness and mental health.

Source: AmericanTrails.org (www.americantrails.org/resources/benefits/index.html)

The Baldwin County Trail in Alabama was established through the efforts of the Baldwin County Trailblazers. It connects State Routes 42/98 and Interstate 10.



SOURCE: NATIONAL CENTER FOR BICYCLING & WALKING/MARK PLOTZ

“In its broadest sense, environmental health comprises those aspects of human health, disease, and injury that are determined or influenced by factors in the environment. This includes not only the study of the direct pathological effects of various chemical, physical, and biological agents, but also the effects on health of the broad physical and social environment, which includes housing, urban development, land use and transportation, industry, and agriculture.”

Healthy People 2010

Endnotes

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Transit ADA accessible

The **National Center for Bicycling & Walking** is a national nonprofit organization with offices in Washington, DC, and New Jersey. NCBW developed the award winning Walkable Community Workshop program, which brings together planners, engineers, public health professionals, citizen advocates, youth and others to develop community transportation systems that work for all users. We have facilitated hundreds of community workshops and walking audits, and we count numerous state departments of transportation, metropolitan planning organizations, and local governments as our clients.

The **Active Living Resource Center** is a program of the National Center for Bicycling & Walking. The ALRC is dedicated to reducing health disparities by helping communities remove barriers to everyday physical activity—like walking and bicycling. We have a specific interest in reducing childhood obesity by increasing opportunities for children to regularly and safely walk and bicycle to school and other destinations.

The Active Living Resource Center was initiated with funding support from the Robert Wood Johnson Foundation.

For more information on NCBW and/or ALRC visit us at www.bikewalk.org.

For copies of this report, please visit www.bikewalk.org.

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