



Traffic Safety Center

Setting New Directions in Traffic Safety

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Can Pedestrian-friendly Planning Encourage Us to Walk?

A look at efforts to change walking and biking behavior by focusing on the built environment

A shift has occurred in urban and transportation planning of late—a move toward exploring how the built environment can be altered to make people less dependent on private vehicles. By making cities more compact, streets more connected, mixing residential and commercial uses, and increasing transit services, the theory goes, people will drive less and walk, bike, and use public transportation more often.



However, it is difficult to determine whether altering the built environment by making it more "walkable" prompts people to change their travel habits, especially when it comes to walking. Because pedestrian trips comprise a very small percentage of travel overall, changes in pedestrian behavior are hard to measure. Additionally, ways to measure "walkability" are still being developed.

In this issue of the Traffic Safety Center newsletter, we explore the link between physical activity and changes to the built environment in light of traffic safety concerns.

- ◆ How, and when, does pedestrian activity become "safe?"
- ◆ Does the goal of making communities more "walkable" necessarily imply

making them safer?

- ◆ Are the safety needs of walkers and cyclists given proper consideration among transportation planners and engineers?
- ◆ What is being done at the infrastructure level to make walking and biking appealing and safe alternatives to driving?

While increased walking and biking has a positive impact on the environment and on people's health, it is imperative that safety be an integral part of any plan to minimize dependence on private vehicles and potentially increase people's exposure to the dangers that such activities can pose.

The Importance of "Smart" or "Sustainable" Growth

Making it easier, and more appealing, for people to walk or bike is one of the major tenets of Smart Growth, a relatively new approach that has as one of its goals reducing people's use of private vehicles by promoting compact urban design and "walkable" neighborhoods. Unlike more specific programmatic attempts to get people out walking and biking, such as "Walk to Work" and "Bike to Work" days, Smart Growth is a flexible growth model whose principles can be implemented in varying ways.

While there is no single, universally accepted definition of the term, the proponents of models like Smart Growth generally agree that the most effective approach is to minimize sprawl and to maximize the use of space in existing urban developments through housing infill, mixed land use, and other projects that increase population density. Such plans can also include transit-oriented development, where an easily-accessible transit center links residents to an urban core. The promised benefits of this new growth model are less traffic congestion, reduced pollution, aesthetically pleasing neighborhoods to those nostalgic for traditional dense cities, and a strong sense of place.

More recently, Smart Growth has been seen as a possible aid to various programs to improve public health in the context of the much-publicized national "epidemic of obesity" and its association with increased risks for a number of ailments, including heart disease, high blood pressure, diabetes, arthritis-related disabilities, and some cancers.

A 1999 National Health and Nutrition Examination Survey indicates that an estimated 61 percent of U.S. adults are either overweight or obese, and a 2003 Centers for Disease Control and Prevention report says that 15 percent of all young people between the ages of 6 and 19 are considered overweight.

These concerns have recently become the backdrop for a wider discussion of how the built environment can make it more appealing and convenient for individuals to

be physically active to counteract less salutary changes in living patterns, such as larger portions of food, higher calorie foods and reduced everyday routine physical activity. Recent studies show that incorporating exercise into everyday routines seems the most beneficial path. Findings indicate that people in walkable neighborhoods with high street connectivity, mixed use, and so on, did appreciably more walking than people in less walkable neighborhoods. The 1996 Surgeon General's report indicates that moderate but consistent exercise—such as 30 minutes of brisk walking or bicycling on most days of the week—will yield significant health gains. In another, 1998 study, researchers found that individuals who engaged in this level of physical activity "ranked in the highest two quintiles for cardio-respiratory fitness."

In "The Built Environment and Human Activity Patterns: Exploring the Impacts of Urban Form on Public Health," Lawrence D. Frank and Peter O. Engelke report that people of varying ages are more willing to incorporate moderate forms of activity into their daily routine, as compared with "high-intensity and program-centered activities." Not only are people more likely to adopt moderate forms of exercise, the authors write, they are more likely to maintain them over a period of time.

While studies show that people living in certain types of neighborhoods are healthier, no connection to the neighborhoods' overall design has yet been made. An attractive hypothesis is that if the principals of Smart Growth are applied to communities, residents may walk more, drive less, and, as a result, be in better health. The creation of communities that minimize the need for automobiles and invite walking and biking would seem like a positive step toward solving the obesity problem.

Where Traffic Safety Fits In

The connection between health and physical activity is clear. The connection between physical activity and the built environment isn't as obvious, but available data, combined with common sense, suggests that more compact, mixed land use areas that are easily traversable on foot could make it easier for people to incorporate physical activity into their routines.

However, in approaching pedestrian activity from a public health standpoint, it is important to consider not just the health benefits of pedestrian activity, but also the risks involved. Pedestrians are vulnerable to air pollution and crime, and expose themselves to greater risks than if they were to ride in vehicles.

Furthermore, while compact communities may be easy to navigate on foot or by bike, crime and aggressive drivers may discourage people from walking. For instance, in mixed land use areas where bars and restaurants are in close proximity to housing, people might feel less safe walking after nightfall than in quieter residential communities. Furthermore, gridded streets, though they increase connectivity and allow for shorter, more direct walking trips, may attract more

fast-moving through traffic than curved streets and cul-de-sacs, especially if those streets are wide.

Just as altering the built environment to make pedestrian activity more appealing does not necessarily make neighborhoods safer, programs and campaigns that promote non-motorized forms of travel, while they may stress the environmental and health benefits of physical activity, rarely have built-in mechanisms for promoting safety.

A significant exception is Safe Routes to School, which is now a nationwide program to promote non-motorized school trips. It incorporates safety as an integral component of pedestrian activity and employs a variety of strategies to get children walking and biking to school. Strategies include educating them about traffic safety, encouraging parents to accompany children to school in "walking school buses," and getting local governments to make repairs and changes to the built environment, such as fixing broken stoplights and installing new sidewalks. The first Safe Routes to School program began in the U.S. in 1997 in New York, and communities nationwide have since adopted their own versions of the program. In California, Safe Routes to School programs have been organized on both statewide and local levels. **(See related story)** The approach is being expanded and adapted to the needs of older pedestrians and transit users. **(See related story)**

Are Pedestrians Safer in Groups?

User perception—the ways in which residents and commuters view their neighborhoods and the areas through which they travel—is an important factor in transportation research and urban design. What will get people out walking? When do people feel safe? As Frank and Engelke note, "streets with ample sidewalks, bike lanes, and crosswalks on which pedestrians and cyclists can travel will be perceived as safer." While determining the impact of perception on pedestrian activity is difficult, recent studies have brought researchers closer to understanding the ways in which pedestrians and motorists view each other.

Two such studies published in 2003, one by P.L. Jacobsen, and one by the Traffic Safety Center at UC Berkeley, suggest that pedestrian activity and pedestrian safety may be inherently connected. While conventional wisdom might suggest that increased pedestrian activity at any given intersection would lead to a rise in the number of pedestrian injuries, data from these studies suggest a different correlation between pedestrian volume and risk. Jacobsen examined the relationship between pedestrian activity and the numbers of collisions in 68 California cities and multiple European countries to find that the risk of collision *per pedestrian* dropped with a rise in the numbers of people bicycling or walking. The Traffic Safety Center, in a study that analyzed pedestrian volumes and collision rates in Oakland, Calif., obtained similar data: as pedestrian volumes go up, risk per pedestrian drops. **(See related story)**.

"What's really important is that when we get more pedestrians out there, we may not actually increase the number of pedestrian injuries and death proportionate to the increased number of pedestrians. We are actually decreasing the level of risk for individual pedestrians," said TSC Director David Ragland, author of the TSC study.

The report by Ragland and TSC researcher Noah Raford suggests that the decrease in individual risk is so large that it may preclude increases in absolute numbers of injuries and deaths, or at least hold down such increases.

Another important aspect of these findings is that they suggest that driver behavior, rather than pedestrian behavior, is primarily responsible for the trend. Jacobson conjectures that drivers, when they see more pedestrians out and about, drive more slowly and attentively. While more research needs to be done on how to change drivers' behavior, the findings suggest that changes in roadway design and signage could have a beneficial effect.

In an interview with the Traffic Safety Center, Elizabeth Macdonald, Assistant Professor of Urban Design at UC Berkeley's Department of City and Regional Planning and co-author of *The Boulevard Book: History, Evolution, Design of Multiway Boulevards*, talks about the challenges of creating a safe, walkable built environment. ([See related story](#))

Macdonald has done extensive research on the multiway boulevard, a street model designed to meet the needs of fast-moving through traffic and slow-moving local traffic simultaneously while also creating a safe, attractive environment for pedestrians through the implementation of tree- and bench-lined medians and relatively narrow, easily crossable streets.

Just as mixed land use is an alternative to rigid zoning rules that discourage people from living, working and shopping in the same area, multiway boulevards, Macdonald says, are an alternative to existing street standards that tend to prohibit the blending of local, residential uses with arterial uses. By using elements such as trees to clearly define the pedestrian area, she adds, pedestrians are more at home in their "realm" and motorists become more aware that they share the area with pedestrians.

However, introducing these elements into the built environment has proven difficult. Existing street standards pose the biggest challenge, Macdonald says.

"Standards have been adopted by cities for very well-intentioned reasons, but have frankly gotten out of hand," Macdonald says. "There are standards having to do with tree spacing and sometimes they're based on crazy things. For instance, you can't have [trees] closer than five feet to a parking meter. So you let parking meter spacing dictate tree spacing, which from an urban design point of view is really crazy. Put the trees in first, then put in the parking meters, but don't do it the other way around, because you end up eliminating a tree here, a tree there and pretty

soon you have nothing."

One of Macdonald's recent projects was a redesign of a section of International Boulevard in Oakland, Calif., where a transit village, a Bay Area Rapid Transit station and a retail shopping area are located within close proximity. By closing off part of a cross street and introducing a tree-lined central median, what had been an arterial street was "tamed" into "a neighborhood shopping street," Macdonald says.

Macdonald's philosophy is that even major, arterial streets should be designed in such a way that the needs of pedestrians and the needs of motorists are given equal attention.

"My bias is to say that ... local needs and activities take precedence over through travel, or should at least be balanced with through travel needs on any street," she says. "So you simply shouldn't accept the fact that some streets should be mostly for through movement. Now that might seem like a radical approach, but I think that that's appropriate for urban areas and cities. We shouldn't set up urban environments where we need to travel such distances [but instead have] more density, more transit options. Why should we sacrifice [public] spaces?"

Photos: Dan Burden, <http://www.pedbikeimages.org>
