MEAN STREETS 2000

A TRANSPORTATION AND QUALITY OF LIFE CAMPAIGN REPORT

SURFACE TRANSPORTATION POLICY PROJECT

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Pedestrian Safety, Health and Federal Transportation Spending

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Executive Summary

Walking in the United States is a dangerous business. Per mile traveled, pedestrians are 36 times more likely to die in a collision than drivers. In this report STPP examines the pedestrian safety problem through analysis of federal safety, health, and spending statistics. This report identifies the cities where pedestrians are most at risk, finding that sprawling communities that fail to create safe places to walk are the most dangerous. It documents how the dangers of walking in automobile-dominated areas is driving pedestrians off the street. People are taking far fewer trips by foot, because walking has become unsafe and inconvenient in so many places. This means a growing number of people are facing another type of danger: the health conditions and diseases associated with a sedentary lifestyle. This report also shows that only minimal federal transportation resources have been devoted to making walking safe and convenient. The final chapter outlines solutions that can make walking not only safe, but attractive and convenient.

Sprawling communities that fail to create safe places to walk are the most dangerous for pedestrians.

The Most Dangerous Places for Pedestrians

Data collected by the federal government shows that in 1997 and 1998, thirteen percent of all traffic fatalities were pedestrians: a toll of 10,696 people. But the risk of dying as a pedestrian varies depending upon where you live. STPP analyzed both the amount of walking in a community and the number of pedestrian deaths in the years 1997 and 1998 (the most recent years for which localized data are available) to compare the risks faced by the average walker in different areas. According to this Pedestrian Danger Index, the most dangerous metro area for walking is Tampa, Florida, followed by Atlanta, Miami, Orlando, Jacksonville, Phoenix, West Palm Beach, Memphis, Dallas, and New Orleans. These results show that the most dangerous places for walking tend to be the newer Southern and Western metro areas.

These are places where sprawling development has often left pedestrians stranded. Wide roads have been built without sidewalks or frequent crosswalks, and high-

Ten Most Dangerous Large Metro Areas

Rank	Metro Area	Total Pedestrian Deaths (1997-1998)	Percentage of Commuters Walking to Work	1997-1998 Pedestrian Danger Index
1	Tampa-St. Petersburg-Clearwater, FL	192	2.27%	**91**
2	Atlanta, GA	185	1.45%	**83**
3	Miami-Fort Lauderdale, FL	274	2.25%	**81**
4	Orlando, FL	139	3.46%	**65**
5	Jacksonville, FL	71	2.57%	**64**
6	Phoenix, AZ	190	2.65%	**60**
7	West Palm Beach-Boca Raton, FL	49	1.99%	**58**
8	Memphis, TN-AR-MS	70	2.96%	**52**
9	Dallas-Fort Worth, TX	192	1.86%	**52**
10	New Orleans, LA	88	3.09%	**52**

speed traffic makes these roadways particularly deadly. In many areas, intersections with crosswalks may be as much as a half-mile apart, leaving pedestrians with no safe way to cross the street. Of the pedestrian deaths for which information is recorded, almost 60 percent (59.1%) occurred in places where no crosswalk was available.

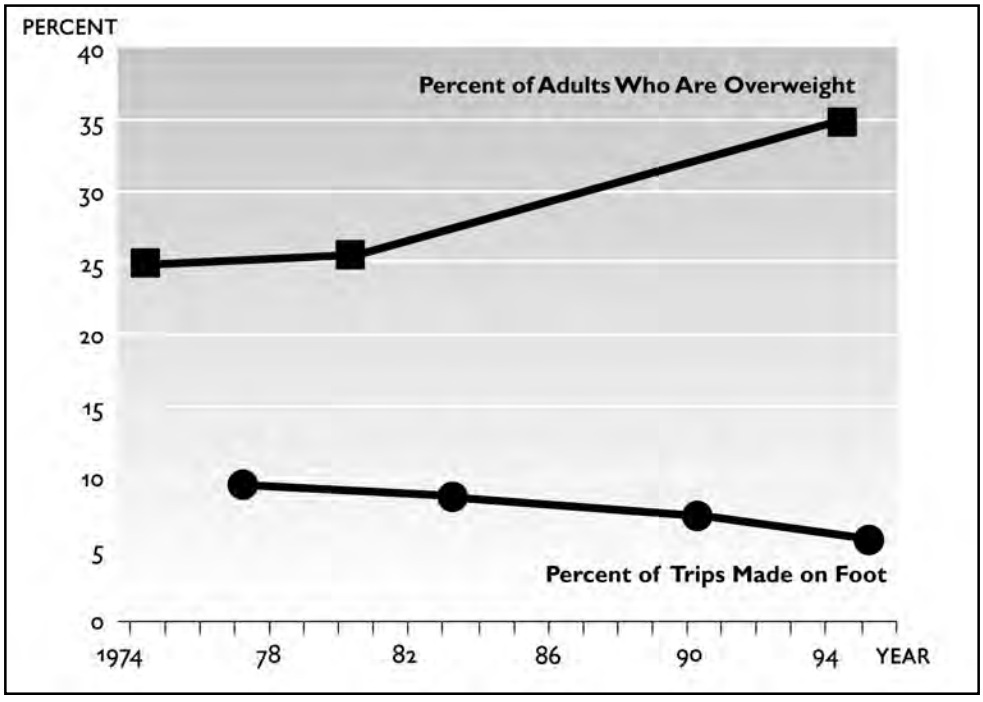
As with automobile fatalities, the total number of pedestrian deaths has dropped slightly over the last few years. However, while the amount of driving is increasing, the amount of walking is decreasing. This may mean that driving is getting safer per mile while walking is not.

Some groups of people appear to be at particular risk as pedestrians, including children, the elderly, and Latinos. Senior citizens and Latinos have high death rates compared to other populations; Latinos tend to walk more than other groups even though they often live and go to school in areas where walking is difficult and dangerous. Children also rely more heavily on walking to go places. The states with the highest death rates for children in 1997-1998 were South Carolina, Mississippi, Utah, North Carolina, Alabama, Arizona, Florida, Alaska, and Louisiana.

Walking Less: A Threat to Health

Poor conditions for walking are contributing to a steep drop in how much Americans walk. According to the Nationwide Personal Transportation Survey, the number of trips taken on foot dropped by 42 percent in the last 20 years. Among children, walking trips dropped by 37 percent in the same timeframe, and now almost 70 percent of children's trips take place in the back seat of a car. And walking is not getting any easier. Studies in Seattle and South Carolina both show that the newer a school or housing development, the less likely that students or residents will go anywhere on foot. Many other studies have established that community design can make a big difference in whether people choose to walk.

The Percentage of Overweight Adults has Grown as Walking has Declined



The decline in walking contributes to a different type of mortality: death from diseases associated with physical inactivity. The Centers for Disease Control and Prevention estimates that 300,000 Americans die each year from such conditions, including coronary heart disease, high blood pressure, and colon cancer. The decrease in walking, the most

basic form of exercise, has recently been recognized as one contributing factor in the epidemic of obesity in the United States. Health officials are calling for a return to more walkable communities to improve American health by integrating walking into everyday life.

A comparison of transportation and health statistics reflects this trend. As walking has declined, the percentage of overweight adults and children has increased. In addition, metropolitan areas where people walk less tend to be places where a higher percentage of people are overweight.

On average, the states spent just 55 cents per person of their federal dollars on pedestrian projects.

The Neglect of Pedestrian Safety

Despite the clear safety and public health problems outlined above, pedestrian convenience and safety are generally neglected by state and regional transportation officials. While Americans take less than six percent of their trips on foot, thirteen percent of all traffic deaths are pedestrians. Yet the states use less than one percent (0.6 percent) of all federal transportation dollars to provide pedestrians with better facilities. Engineers traditionally design roads from the 'centerline out,' focusing almost exclusively on providing travel lanes for automobiles. Sidewalks are at best an afterthought, often considered "amenities" that can be left out. On average, the states spent just 55 cents per person of their federal dollars on pedestrian projects, compared to 72 dollars per person on highway projects. In some states, the disparity was even greater. A table with figures for each state can be found in Chapter 3.

In addition, pedestrian safety is neglected by law enforcement and safety officials who put full responsibility for avoiding a collision on the pedestrian, ignoring driver behavior. A study of police reports in New York City found that drivers were at fault in 74 percent of cases studied, yet only 16 percent of them were cited. In addition, many safety programs focus almost exclusively on keeping pedestrians out of the way of cars, rather than providing safe facilities for walking or promoting responsible behavior by drivers.

The Path to Safer Streets

The path to safer streets is clear. Communities need to invest their transportation dollars in pedestrian safety, retrofit streets to make walking safer, and design new streets and neighborhoods to encourage walking. Transportation officials should:

Spend on pedestrian safety in proportion to pedestrian deaths.
If thirteen percent of all traffic fatalities are pedestrians, it stands to reason that a similar amount of safety funds should be devoted to pedestrian safety. In addition, federal transportation dollars no longer restricted to highway use should be directed toward providing a variety of safe and convenient pedestrian facilities.

Retrofit streets with traffic calming.
With so many streets designed only for automobiles, it will take more than a few sidewalks and crosswalks to make them safe and inviting for pedestrians. Traffic calming techniques, such as curb bulb-outs and traffic circles, slow down automobiles in key places and reclaim streets for children, residents, and others on foot or bicycle.

Design new streets and neighborhoods for walking.
More people will walk in neighborhoods where there is somewhere to walk to. The best neighborhoods for walking put residents within a reasonable distance of shops, offices, schools, and transit stops, and provide a street and path network that allows direct routes between them.

Collect more information on pedestrian safety.
Federal databases provide little information about the risks associated with walking, the effectiveness of pedestrian safety measures, or even how much is spent on pedestrian safety. The National Transportation Safety Board (NTSB) and the US Bureau of Transportation Statistics should design research programs to learn more about how to improve pedestrian safety. On the local level, citizens are already performing "walkability audits" that assess the dangers to pedestrians, block by block.

Chapter One
AMERICA'S DANGEROUS STREETS

Each year, thousands of Americans are killed and tens of thousands are injured walking down the street. In 1997 and 1998, 10,696 pedestrians in the U.S. were killed in traffic accidents (5,406 in 1997 and 5,291 in 1998). More than 1,500 of these victims were children under the age of eighteen.

Photo by Dan Burden.

In comparison with other ways of getting around, walking is particularly risky. While Americans took less than six percent of their trips on foot, almost thirteen percent of all traffic deaths were pedestrians. And walking is far more dangerous than driving or flying, per mile traveled. The fatality rate per 100 million miles traveled was 1.4 deaths among automobile users, and 0.16 deaths among people aboard airplanes. But almost 50 pedestrians died for every 100 million miles walked in 1997[1]. This means that for each mile traveled, walking is 36 times more dangerous than driving, and over 300 times more dangerous than flying.

About thirteen percent of all the people who died in traffic accidents during 1997-1998 were pedestrians. But this only begins to describe the scope of the problem. Pedestrians also pay a heavy toll in injuries. Data from the National Highway Traffic Safety Administration (NHTSA) reveal that in 1997 and 1998, for every pedestrian killed by a car, approximately fourteen more were injured. Government estimates show that in 1998 alone, 69,000 pedestrians were hit by cars and injured. However, this number may be low because of under-reporting.

Fatality Rate per 100 Million Miles Traveled:

Driving:	*1.4*
Flying:	*0.2*
Walking:	***49.9***

The Most Dangerous Metro Areas for Pedestrians

Some places in the United States are more deadly for pedestrians than others. To measure that danger, we ranked the country's largest metro areas, taking into account both the rate of pedestrian deaths as measured by the National Highway Traffic Safety Administration, and the amount of pedestrian activity in the community as measured by the U.S. Census Bureau. For this study we used the average number of deaths during 1997 and 1998 (the years for which most recent localized data are available) to even out unusually safe or deadly years and present an accurate picture.

By dividing the number of fatalities in a given metro area by a measure of how much walking is occurring in that area, we arrive at a "Pedestrian Danger Index," which allows us to compare the risk faced by the average walker in different metro areas.[2] The resulting ranking shows that among large metro areas in

Table 1. The Most Dangerous Large Metro Areas for Pedestrians

Rank	Metro Area	Total Pedestrian Deaths (1997-1998)	Percentage of Commuters Walking to Work	1997-1998 Pedestrian Danger Index	1995-1996 Ranking
1	Tampa-St. Petersburg-Clearwater, FL	192	2.27%	**91**	1
2	Atlanta, GA	185	1.45%	**83**	4
3	Miami-Fort Lauderdale, FL	274	2.25%	**81**	2
4	Orlando, FL	139	3.46%	**65**	7
5	Jacksonville, FL	71	2.57%	**64**	11
6	Phoenix, AZ	190	2.65%	**60**	5
7	West Palm Beach-Boca Raton, FL	49	1.99%	**58**	3
8	Memphis, TN-AR-MS	70	2.96%	**52**	15
9	Dallas-Fort Worth, TX	192	1.86%	**52**	8
10	New Orleans, LA	88	3.09%	**52**	12
11	Houston-Galveston-Brazoria, TX	205	2.26%	**50**	9
12	Salt Lake City-Ogden, UT	60	2.32%	**49**	17
13	Charlotte-Gastonia-Rock Hill, NC-SC	56	2.07%	**48**	18
14	Greensboro-Winston-Salem, NC	51	2.29%	**46**	13
15	Nashville, TN	42	1.94%	**45**	14
16	Las Vegas, NV	86	3.67%	**44**	6
17	St. Louis, MO-IL	98	2.15%	**43**	25
18	Oklahoma City, OK	36	2.11%	**40**	10
19	Los Angeles-Riverside-Orange County, CA	737	2.94%	**39**	16
20	Kansas City, MO-KS	52	1.89%	**38**	19
21	Detroit-Ann Arbor-Flint, MI	209	2.41%	**38**	20
22	Sacramento-Yolo, CA	71	2.68%	**38**	21
23	Raleigh-Durham-Chapel Hill, NC	52	3.12%	**38**	28
24	San Antonio, TX	81	3.58%	**36**	26
25	Austin-San Marcos, TX	46	2.86%	**36**	23
26	Denver-Boulder-Greeley, CO	94	3.28%	**29**	29
27	Portland-Salem, OR-WA	79	3.27%	**27**	24
28	San Francisco-Oakland-San Jose, CA	268	3.63%	**26**	31
29	San Diego, CA	134	4.53%	**26**	35
30	Indianapolis, IN	35	2.17%	**26**	22
31	Washington-Baltimore, DC-MD-VA-WV	279	3.87%	**24**	30
32	Grand Rapids-Muskegon-Holland, MI	28	2.76%	**24**	27
33	Chicago-Gary-Kenosha, IL-IN-WI	333	4.01%	**23**	33
34	Hartford, CT	34	3.40%	**22**	34
35	Seattle-Tacoma-Bremerton, WA	104	3.53%	**21**	36
36	Norfolk-Virginia Beach-Newport News, VA	46	3.67%	**20**	37
37	Cincinnati-Hamilton, OH-KY-IN	47	2.99%	**19**	45
38	Minneapolis-St. Paul, MN-WI	70	3.22%	**19**	40
39	Columbus, OH	34	3.25%	**17**	42
40	New-York-No. New Jersey-Long Island, NY-NJ-CT-PA	869	6.31%	**17**	41
41	Cleveland-Akron, OH	58	2.98%	**16**	43
42	Buffalo-Niagara Falls, NY	32	4.38%	**15**	32
43	Philadelphia-Wilmington-Atlantic City, PA-NJ-DE-MD	197	5.26%	**15**	38
44	Milwaukee-Racine, WI	38	3.95%	**14**	39
45	Rochester, NY	24	4.34%	**12**	44
46	Boston, MA-NH	147	5.12%	**12**	47
47	Pittsburgh, PA	52	5.08%	**10**	46

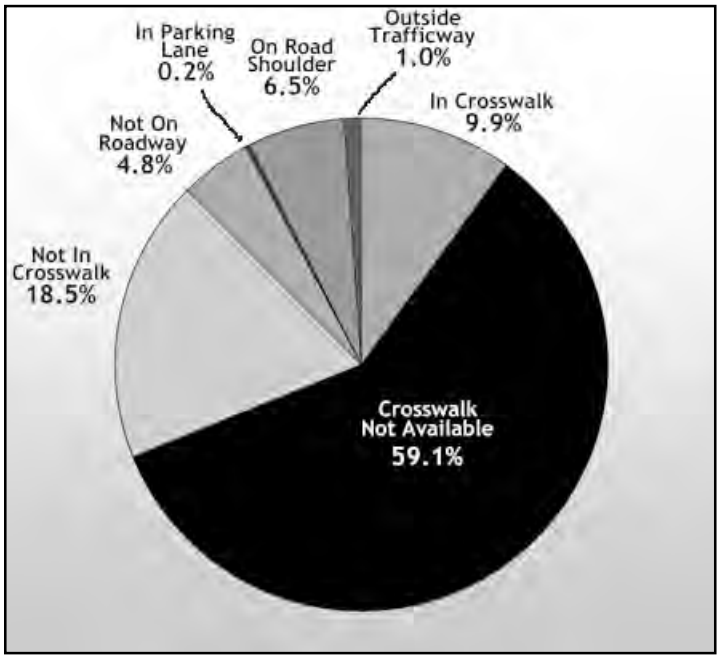
1997 and 1998, Tampa was the most dangerous for pedestrians, followed by Atlanta, Miami, Orlando, Jacksonville, Phoenix, West Palm Beach, Memphis, Dallas, and New Orleans. (See Table 1, page 10.)

Sprawl Makes Walking More Dangerous

These results show that walking tends to be most dangerous in newer Southern and Western metro areas. Most of these places have been built-up since the 1950s and are dominated by subdivisions, office parks, and high-speed roads that are designed for fast automobile travel. This means that pedestrians may be forced to walk alongside high-speed roads without any sidewalks, and often must contend with crossing wide, busy streets with no median and few safe crossing- points. Intersections are often designed with wide, sweeping curves that allow cars to keep moving at high speed, but increase the crossing distance and danger for pedestrians. Zoning codes typically require businesses to be fronted by a large parking lot, forcing pedestrians to thread their way through a maze of parked cars to reach their destination.

In such sprawling environments, the combination of wide roads without pedestrian facilities and high-speed traffic can prove deadly. The national data show that walking is most dangerous in places without a basic network of pedestrian facilities – in other words, sidewalks and crosswalks. In many areas developed for automobiles, intersections with crosswalks may be as much as a half-mile apart, leaving pedestrians little choice but to cross these wide streets unprotected. Of the deaths for which location information was recorded, 59 percent occurred in places where pedestrians had no access to a crosswalk. While jaywalking is often given as a cause of pedestrian accidents, less than 20 percent of these fatalities occurred where a pedestrian was crossing outside of an available crosswalk.

Figure 1. Where Pedestrians Are Killed



Speed is also a major factor in whether a pedestrian accident proves to be fatal. A ten-mile per hour increase in speed, from 20 mph to 30 mph, increases the risk of death for a pedestrian in a collision nine-fold. If a car going 20 mph hits a person, there is a 95 percent chance that the person will survive. If that same car is traveling 30 mph, the person has slightly better than a 50/50 chance of survival. At 40 mph, the picture is bleaker still – only fifteen percent of people struck at this speed can be expected to survive.[3]

Unfortunately, for many years traffic engineers failed to address these problems. Although painted crosswalks and walk signals can help, they do little to improve pedestrian safety when placed in a haphazard fashion or spaced too far apart. One respected safety expert has described the kind of ad-hoc placement of pedestrian facilities as being like "trying to mend a severely broken leg using

Table 2. Child Pedestrian Death Rates

State	1997-1998 Child Pedestrian Deaths	Percentage of All Pedestrian Fatalities Under 18 Years of Age	Average Annual Pedestrian Fatality Rate (per 100,000 children)
South Carolina	37	17%	1.91
Mississippi	26	23%	1.71
Utah	24	29%	1.70
North Carolina	61	16%	1.63
Alabama	32	19%	1.46
Arizona	35	11%	1.46
Florida	101	9%	1.43
Alaska	5	28%	1.34
Louisiana	33	13%	1.33
Kentucky	25	20%	1.28
Arkansas	17	18%	1.28
Tennessee	34	18%	1.26
Michigan	65	19%	1.26
Georgia	47	13%	1.17
Maryland	30	14%	1.16
Texas	127	14%	1.14
Missouri	32	16%	1.13
Wyoming	3	23%	1.13
Delaware	4	14%	1.11
New Mexico	11	9%	1.08
West Virginia	9	16%	1.08
California	191	13%	1.06
Minnesota	26	23%	1.03
Indiana	31	22%	1.02
Pennsylvania	59	17%	1.02
Vermont	3	13%	1.02
Illinois	63	16%	0.98
Ohio	56	21%	0.98
New Jersey	38	13%	0.95
Connecticut	15	15%	0.94
Nevada	8	8%	0.91
Oregon	15	12%	0.91
Oklahoma	16	14%	0.90
New York	78	10%	0.86
Idaho	6	23%	0.84
Iowa	11	21%	0.76
South Dakota	3	23%	0.74
Kansas	10	16%	0.71
Nebraska	6	15%	0.67
New Hampshire	4	18%	0.67
Washington	19	13%	0.65
Hawaii	4	9%	0.65
Rhode Island	3	17%	0.64
Colorado	13	10%	0.63
Massachusetts	17	10%	0.60
Wisconsin	16	13%	0.59
Virginia	18	9%	0.54
Montana	2	9%	0.43
North Dakota	1	11%	0.30
Maine	1	3%	0.17
Nationwide	**1496**	**14%**	**1.07**
Total Deaths 1997	*803*		
Total Deaths 1998	*693*		

only a small bandage."[4] In many cases this is a byproduct of the attitudes toward traffic safety in the minds of many traffic engineers. They see their top priority as making roads safer to drive at higher and higher speeds, with little consideration of the effect this might have on those not driving – pedestrians, bicyclists, neighbors, children and others. In pursuit of these goals, lanes are widened, curves are straightened, and traffic signals are retimed, all to accommodate the journey by car. Unfortunately, each of these actions makes the roadway less safe for pedestrians.

Who Is at Risk?

Children deserve particular attention when considering pedestrian safety, because they rely more heavily than adults on walking to get where they need to go. In 1997 - 1998, sixteen percent of pedestrian deaths were people under 18 years old. Challenging street crossings that involve high speeds and many lanes of traffic can be particularly hard for young children.

For children, the states with the highest death rate[5] were South Carolina, Mississippi, Utah, North Carolina, Alabama, Arizona, Florida, Alaska, and Louisiana. Most of these states are in the South and West, where automobile-centered development has been the strongest.

In addition, elderly people face a higher risk of death as pedestrians. Twenty-two percent of all pedestrians killed were over 65, even though only 13 percent of the population is elderly. Many pedestrian facilities, particularly walk signals, are timed for use by young adults in good health, and don't give elderly people enough time to cross in safety.

Some ethnic groups may also be at higher risk. While national statistics are not

available, several local studies point to a problem. An STPP study of California pedestrian safety found that a high proportion of pedestrian deaths and injuries in those under 20 years old were young Latinos or African Americans. In 1996, Latino children represented 38.5 percent of the total population of children in California, but they were involved in 47.9 percent of all child pedestrian incidents (fatalities and injuries). In 1996, African American children comprised 7.8 percent of the total population of children in California, but were involved in 14.2 percent of all child-related pedestrian incidents.[6] The Latino Issues Forum attributed the discrepancy to the higher level of walking among Latinos, even though they often live and go to school in areas where walking is difficult and dangerous.[7] The Centers for Disease Control reported recently that in Atlanta, Latinos had pedestrian fatality rates six times that of whites.[8] Latino groups in Atlanta are pushing for better pedestrian facilities along a major seven-lane road where many pedestrians have died.[9] A survey in suburban Washington, DC also found that Latinos were disproportionately represented in pedestrian deaths.[10]

Dangerous Trends for Pedestrians

The deadly environment for pedestrians in the United States is not just an inevitable consequence of modern life. Pedestrian fatality rates in the United States are far higher than in other industrialized countries. A recent study compared pedestrian fatalities in terms of the total distance walked. In both Germany and the Netherlands the rate was 26 deaths per billion kilometers walked, while in the United States the rate was 364 deaths per billion kilometers walked — or fourteen times greater.[11] This indicates that much more can be done to make walking safer.

Metro Areas with the Highest Proportion of Pedestrian Deaths

In some communities, pedestrian deaths represent a high portion of all traffic deaths and so deserve proportional public safety attention. Below are listed the large metro areas where 20 percent or more of traffic fatalities are pedestrians.

Rank	Metro Area	Number of Ped Fatalities (1997)	Number of Ped Fatalities (1998)	Percent of Traffic Deaths that Were Pedestrians
1	New-York-No. New Jersey-Long Island, NY-NJ-CT-PA	447	422	29%
2	San Diego, CA	62	72	28%
3	San Francisco-Oakland-San Jose, CA	137	131	27%
4	Miami-Fort Lauderdale, FL	136	138	27%
5	Los Angeles-Riverside-Orange County, CA	401	336	25%
6	Salt Lake City-Ogden, UT	30	30	25%
7	Orlando, FL	62	77	25%
8	Tampa-St. Petersburg-Clearwater, FL	106	86	24%
9	San Antonio, TX	39	42	22%
10	New Orleans, LA	47	41	21%
11	Jacksonville, FL	28	43	21%
12	Chicago-Gary-Kenosha, IL-IN-WI	176	157	20%
13	Phoenix, AZ	95	95	20%
	Nationwide	**5,406**	**5,293**	**13%**

Photo provided by South Carolina Coastal Conservation League (SCCCL).

The absolute number of pedestrian deaths has dropped slightly, part of an overall decline in traffic deaths. However, the decline in deaths among pedestrians tells a different story than the decline in deaths among motorists. For motorists, deaths are falling as driving increases, while for pedestrians, deaths are falling as walking decreases. In other words, it looks as if driving is getting safer per mile while walking is not.

It looks as if driving is getting safer per mile while walking is not.

There are several possible explanations for this, including the increasingly sprawling and pedestrian unfriendly nature of much new development, and the disproportionately low expenditure of federal transportation funds on projects that lessen the risks to pedestrians. These topics will be explored in greater detail in Chapter Three. And as the next chapter demonstrates, the trend toward less walking has effects on human health that reach beyond death and injury rates.

Chapter Two
THE DANGERS OF WALKING LESS

Chapter One documents the dangers faced by those who choose walking as a form of transportation. But while roads are not as safe for walking as they should be, walking less is not the answer. In fact, the sedentary lifestyle that has become the habit of so many Americans is proving to be dangerous to health. In this chapter, we explore how the decrease in walking may be increasing health risks for millions of Americans. We explore the danger faced by those who do not walk, often because they have been literally driven off the road by our car-oriented transportation system. The health care community has recognized the problem and is calling for an effort to design communities that invite walking and promote better physical health.

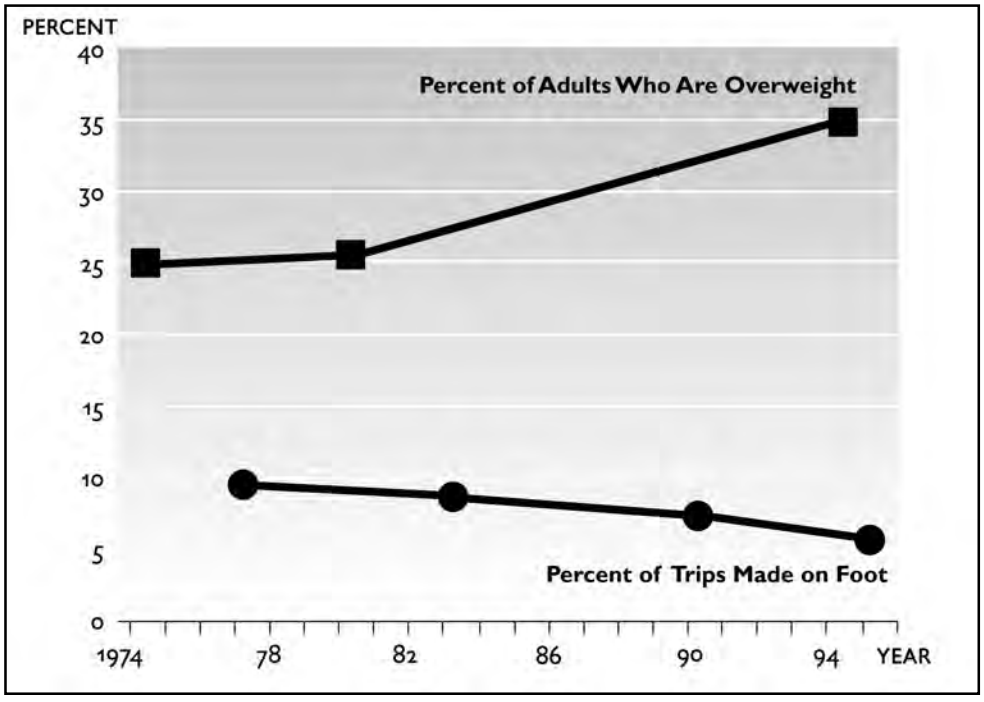
The number of trips people take on foot has dropped by 42 percent in the last 20 years.

The Decline in Walking

Americans are walking much less than they used to. The number of trips people take on foot has dropped by 42 percent in the last 20 years. The Nationwide Personal Transportation Survey, conducted by the U.S. Department of Transportation, documents the decline in the amount Americans walk. Walking dropped from 9.3 percent of all trips in 1977 to just 5.4 percent in 1995. Yet more than one-quarter of all trips are still one mile or less, and by one calculation at least 123 million car trips made each day in the United States were short enough to have been made on foot.[1]

Much of the decline in walking can be attributed to the increase in neighborhoods designed so that it is not safe or convenient to travel by foot. Residential areas with no sidewalks and wide streets have been built with high-speed car travel in mind. The nearest store, school, or workplace is often far beyond the quarter- to half-mile radius that is most convenient for foot travel. Workplaces are often located in office parks accessible only by car, and isolated from any other services.

Figure 2. The Percentage of Overweight Adults has Grown as Walking has Declined

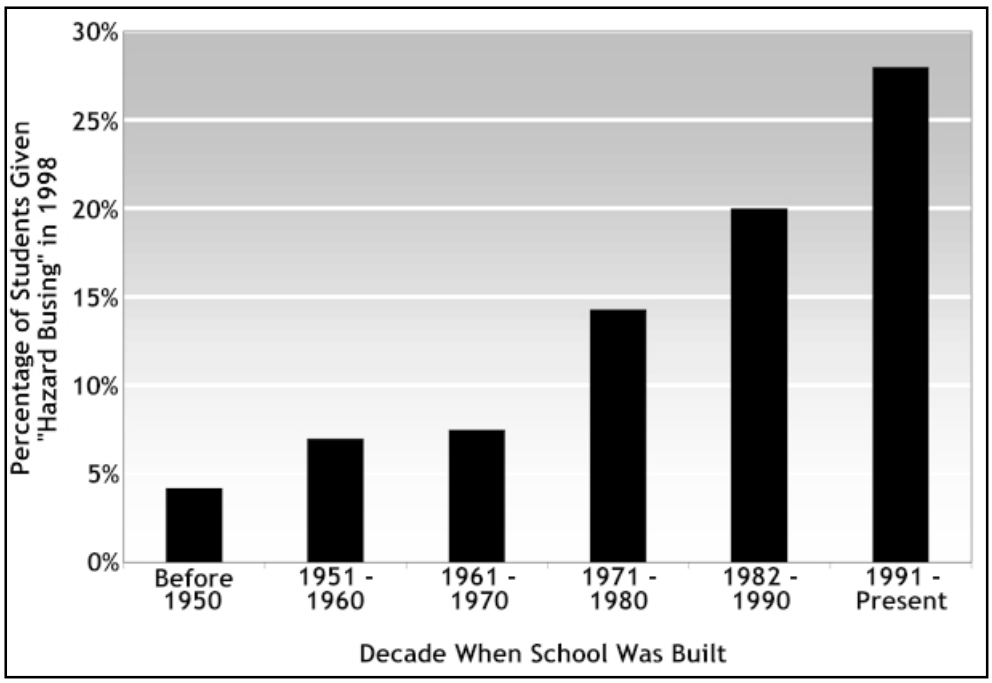


There is ample evidence from dozens of studies that compact communities that mix housing, workplaces, and shopping are places where people take more trips on foot.[2] But such "traditional" neighborhoods are often in the older part of town, and newer developments tend to be more automobile oriented. One recent study of Seattle neighborhoods found that the newer the development, the less likely it is that residents will walk, bicycle, or take transit.[3]

The decline in walking has been steep among children as well, and is also influenced by community design. In 1977, children aged five to fifteen walked or biked for 15.8 percent of all their trips. By 1995, children made only 9.9 percent of their trips by foot or bicycle, a 37 percent decline. Children now make a majority – almost 70 percent — of their trips in the back seat of a car.

The influence of community design on the decision of whether or not to walk is made clear by looking at the trend in the number of children who walk to school. Schools are increasingly isolated from the communities they serve. New schools may be placed on the edge of communities, and wide, busy thoroughfares prevent children from biking or walking to school. Even schools that back up on subdivisions are often inaccessible by foot because there is no path to them: the only link is a circuitous street network. Many communities experience traffic jams around schools as parents deliver children to the door. Increasingly, mothers (and some fathers) are becoming the bus drivers of the new millennium. Women with school-aged children now make more car trips each day than any other population group, and on average spend more than an hour a day in the car.[4]

Figure 3. Hazard Force More Students onto Buses at Recently Built Schools



From the South Carolina Coastal Conservation League, "Wait for the Bus: How Lowcountry School Site Selection and Design Deter Walking to School," 1999.

A study in South Carolina found that students are four times more likely to walk to schools built before 1983 than to those built more recently. Hazards such as busy streets are forcing more children who live within walking distance to board a bus instead. The same study found that students are more than three times likely to get such "hazard busing" if they attend a school built after 1971.[5]

Walking Less: A Threat to Health

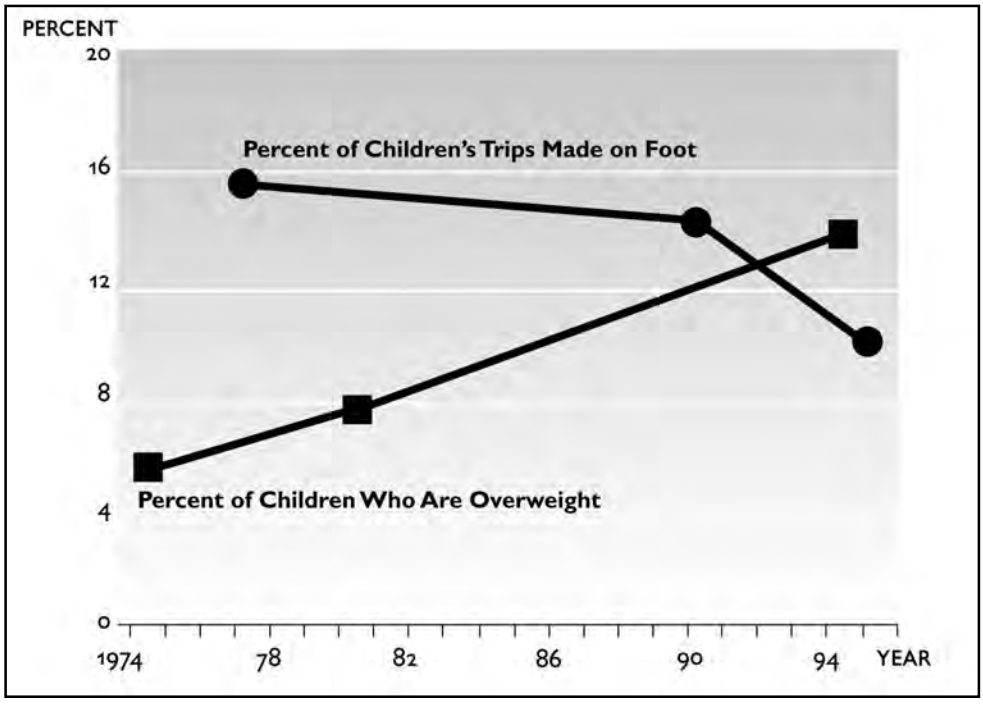
While the decline in walking has meant slightly fewer pedestrian deaths, it is contributing to a growing health threat: health problems caused by a sedentary lifestyle. The decline in walking trips has come at the same time that more Americans have become overweight (see Figure 2, pg. 15). The National Health and Nutrition Examination Surveys found that in the late 1970s (1976 to 1980) 25 percent of the population was overweight; by the early 1990s (1988 to 1994) that number had grown to almost 35 percent. Since then, the trend has apparently continued: another national health survey, the Behavioral Risk Factor Surveillance System, shows that the number of Americans defined as obese grew from twelve percent in 1991 to almost eighteen percent in 1998.[6] Today more than half of American adults are overweight or obese.

The American Medical Association (AMA) recently declared obesity an epidemic and a major public health concern. The AMA blames the epidemic on people eating more, and on the fact that "opportunities in daily life to burn energy have diminished."[7] In an editorial in its journal, the AMA noted that car trips have replaced trips that used to be made on foot or by bicycle, and says helping people get back to walking or bicycling should be a first target in combating the obesity epidemic. But it also noted, "Reliance on physical activity as an alternative to car use is less likely to occur in many cities and towns unless they are designed or retro-fitted to permit walking or bicycling."[8]

Obesity is just one of the health problems associated with a sedentary lifestyle. The Centers for Disease Control estimates that 300,000 Americans die each year from diseases associated with physical inactivity. Even modest physical activity, such as walking, can decrease the risk of coronary heart disease, high blood pressure, colon cancer, diabetes, and even depression.[9]

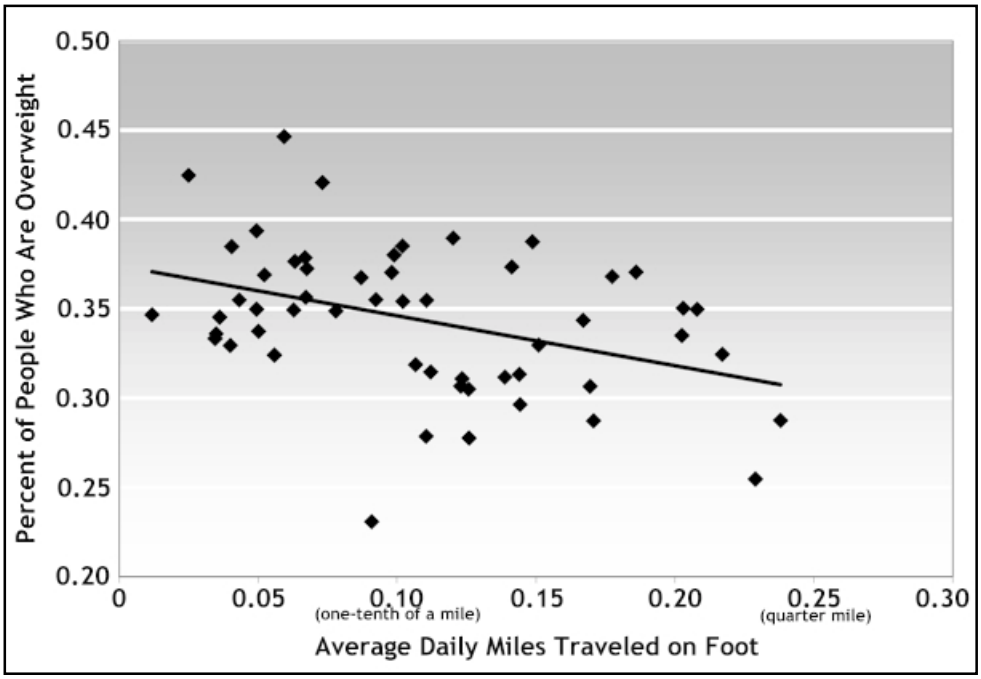
The health effects of not walking show up among children as well as adults. As children take fewer trips on foot, more of them are becoming overweight (see chart). Between the early 1970s (1971 to 1974) and the early 1990s (1988 to 1994), the portion of children who were overweight grew from 5.5 percent to 13.6 percent. Obesity among children is at an all-time high, and re-

Figure 4. Children Are Walking Less and More Are Becoming Overweight



ports bemoaning the sedentary lives of children have become commonplace. About 60 percent of obese children have risk factors that will probably translate into chronic diseases as adults.[10] One study in Britain even found that children who are driven to school have an elevated risk of growing up with heart disease and brittle bones.[11]

Figure 5. Fewer People Are Overweight in Places Where People Walk More



In comparing health research to transportation data, STPP found that metro areas where people walk less tend to be places where more people are overweight. Places where people walk further each day tend to have fewer people who are at risk of health problems due to obesity. This relationship remained when we controlled for age, race, and income. Obviously many factors contribute to this pattern, and a more detailed, controlling study of this question is needed. But our simple comparison suggests that where you live, and whether you can walk in your neighborhood, may be related to your likelihood of suffering from obesity or the other dangers associated with a sedentary lifestyle.

Numerous national and local health organizations have begun promoting more walkable communities as a fundamental way to improve basic human health. The Centers for Disease Control is working to promote *Active Community Environments*: places where people can easily walk and bicycle. The California Department of Health Services has decided that better health will require a better transportation environment, stating, "Our vision is a state where doctors prescribe walking and biking to their patients, employers subsidize bike facilities and community trails, and transit services accommodate cyclists by making intermodal travel safe and seamless."

When walking to a destination is possible, a British Medical Association study shows it is well worth the extra time it may take. The study found that the extra time spent walking or cycling to a destination is more than offset by the health benefits of the cardiovascular exercise, because it extends life expectancy by more than the extra time it takes to walk or cycle.[12]

Chapter Three
THE NEGLECT OF PEDESTRIAN SAFETY

Despite the clear public health and safety problems presented by pedestrians being hit by cars, pedestrian safety is still neglected in the United States. Little federal spending goes to protect the most vulnerable road users. Most traffic safety programs are aimed at ensuring the safety of motorists, and too often pedestrians are considered at fault in accidents.

Photo by Dan Burden.

Low Spending on Pedestrian Projects

Providing basic facilities is the first step toward improved pedestrian safety. Building sidewalks, paths and other accommodations is fundamental to providing a safe walking environment. Unfortunately, the states are doing little with their federal dollars to make it safer and easier to walk. Nationwide, 5.4 percent of all trips are made on foot, and 13 percent of all traffic fatalities are pedestrians. Yet federal spending on pedestrian facilities came to less than one percent (0.6 percent) of federal transportation spending in the years studied. On average, the states spent just 55 cents per person of their federal funds on pedestrian projects, compared to 72 dollars per person on highway projects. In California, 21 percent of all traffic fatalities are pedestrians, yet the state reported spending just over four cents per person on bicycle and pedestrian facilities, far below the national average. Table 3 shows how much each state has spent on pedestrian facilities.

Nationwide, 5.4 percent of all trips are made on foot, and 13 percent of all traffic fatalities are pedestrians. Yet the states spent less than one percent of their federal funds on pedestrian safety.

Some federal transportation dollars are designated for use on safety projects, but poor reporting by the states to the federal government prevents an accurate assessment of the use of these funds. New language was added to the federal transportation law TEA-21 in 1998 to specifically encourage safety spending on projects that would enhance pedestrian and bicycle safety, but few states have modified their spending criteria to use the funds in this way.

Part of the problem is that pedestrian safety has always been a secondary traffic engineering issue. The overriding goal of traffic engineering has been to improve roadway "level of service" (LOS), so that more vehicles may travel at higher speeds. That often means designing roads with wide lanes and shoulders, large turning radii at intersections, and plenty of passing and turning lanes. Few efforts have focused on ensuring that streets are safe and convenient for all road users, including pedestrians. Even the most fundamental pedestrian safety tool, the walk signal, shows this bias because in most places it allows cars to make right- and left-hand turns across the crosswalk during the walk sequence. Engineering measures to facilitate pedestrian street crossings, such as curb extensions at corners, refuge islands, and raised crosswalks have only recently been introduced in the U.S., years after they became commonplace in Europe.

Table 3. Federal Funding of Pedestrian Projects

State	Average Spending on Pedestrian Projects per Capita (1997-1998)	Average Spending on Highway Projects per Capita (1997-1998)	Average Percent of Spending to Peds (1997-1998)	Percent of Traffic Deaths that Were Pedestrians
California	$0.04	$40	0.1%	21%
Texas	$0.07	$57	0.1%	13%
New Jersey	$0.08	$52	0.2%	20%
Arkansas	$0.12	$91	0.1%	8%
Hawaii	$0.14	$95	0.3%	18%
Rhode Island	$0.15	$86	0.1%	12%
Indiana	$0.15	$75	0.3%	8%
Michigan	$0.16	$58	0.2%	12%
Kentucky	$0.16	$97	0.1%	8%
Minnesota	$0.18	$48	0.3%	9%
West Virginia	$0.19	$161	0.1%	8%
Iowa	$0.21	$83	0.2%	6%
Louisiana	$0.21	$66	0.3%	14%
District of Columbia	$0.21	$164	0.1%	35%
Pennsylvania	$0.22	$58	0.3%	11%
Wisconsin	$0.23	$60	0.3%	9%
South Carolina	$0.27	$87	0.3%	12%
North Carolina	$0.28	$74	0.3%	12%
Maryland	$0.29	$57	0.3%	18%
Utah	$0.30	$34	0.4%	12%
Arizona	$0.34	$52	0.5%	16%
Missouri	$0.42	$82	0.4%	9%
Virginia	$0.43	$54	0.6%	10%
Ohio	$0.49	$52	0.7%	9%
Alabama	$0.52	$65	0.7%	8%
Mississippi	$0.53	$83	0.6%	6%
Illinois	$0.59	$46	0.8%	14%
Tennessee	$0.67	$75	0.8%	8%
Florida	$0.71	$52	1.0%	19%
Nevada	$0.75	$70	0.9%	15%
New Mexico	$0.78	$88	0.7%	14%
Georgia	$0.79	$67	0.9%	11%
Wyoming	$0.79	$214	0.6%	5%
Maine	$0.88	$71	0.9%	9%
Colorado	$0.90	$45	1.4%	11%
Oklahoma	$0.95	$91	0.9%	7%
Kansas	$0.98	$73	1.2%	7%
Washington	$1.05	$52	1.2%	11%
New York	$1.22	$47	1.2%	24%
South Dakota	$1.23	$189	0.6%	4%
Nebraska	$1.43	$106	1.2%	6%
Oregon	$1.63	$68	1.3%	12%
Idaho	$1.74	$90	1.6%	5%
North Dakota	$1.88	$228	0.8%	5%
Connecticut	$1.91	$66	1.8%	15%
Massachusetts	$2.05	$61	2.1%	20%
New Hampshire	$2.09	$72	2.6%	9%
Montana	$2.14	$177	1.0%	4%
Vermont	$2.61	$122	1.4%	12%
Delaware	$2.86	$142	1.8%	11%
Alaska	$10.73	$242	3.6%	12%
Nationwide	**$0.55**	**$72**	**0.6%**	**13%**

Blaming the Victim

A study of New York City police reports found that in 74 percent of the deadly pedestrian crashes drivers were culpable in the death.

Pedestrians are often considered at fault in crashes, obscuring the real issue of safe pedestrian facilities. Police reports are often designed to describe vehicle-pedestrian collisions in terms of what the pedestrian did wrong.[1] Seldom do reports of pedestrian fatalities, particularly in the media, record the actions of the driver, describe how fast the car was traveling, or note whether the motorist was paying attention. Yet research has concluded that the fault of pedestrian-vehicle collisions frequently rests with drivers. When investigating child pedestrian injury cases, a recent study found that "drivers leave most of the responsibility for avoiding collisions to the [child] pedestrian."[2]

The police also may be ignoring illegal driver behavior. A study of police reports from deadly pedestrian crashes in New York City found that in 74 percent of the cases, drivers were speeding, had illegally turned into a crosswalk, had run a stop light, or were otherwise culpable in the death. Yet only sixteen percent of drivers were cited, and less than one percent were cited for violating laws specific to pedestrian safety.[3]

Many pedestrian safety projects are aimed at pedestrians rather than at drivers. Many cities have responded to pedestrian deaths with crackdowns on jaywalking. In some areas, the response to high pedestrian accidents has been to actively discourage walking. In Santa Ana, California, the solution to high death rates was to prohibit pedestrians from using medians as refuges from speeding traffic.[4] Other communities have removed crosswalks or put up signs prohibiting pedestrian crossing. These actions will do little to discourage people who must walk to get where they are going, and may result in more pedestrian deaths and injuries, not less.

Many safety programs for children focus on training them to be extremely cautious in crossing the street. But evaluations of these programs show their effectiveness to be mixed at best, and some studies show children under seven simply do not have the necessary developmental skills to determine when cars are a danger.[5] More and more health and safety researchers are recognizing that making the environment safer is of crucial importance, especially for children.

Chapter Four
SOLUTIONS FOR SAFER STREETS

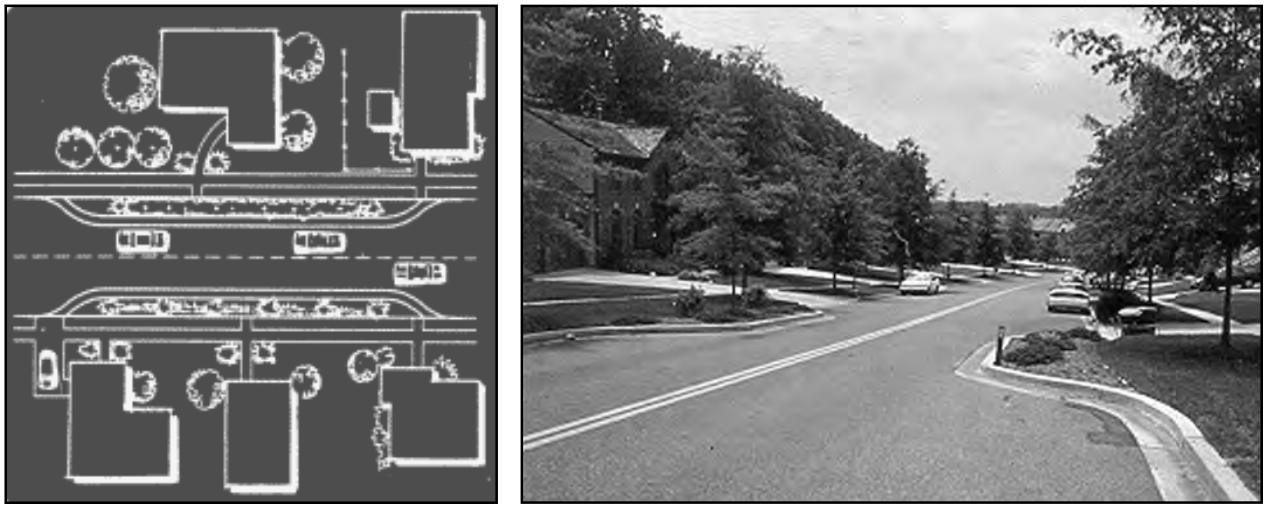
Improving pedestrian safety while simultaneously increasing the opportunity to walk presents a challenge for many communities used to designing roadways only for the automobile. But the need is clear, as stated by a recent Federal Highway Administration policy paper on designing for pedestrians and cyclists:

> "There is no question that conditions for bicycling and walking need to be improved in every community in the United States; it is no longer acceptable that 6,000 bicyclists and pedestrians are killed in traffic every year, that people with disabilities cannot travel without encountering barriers, and that two desirable and efficient modes of travel have been made difficult and uncomfortable."[1]

While we've outlined the many barriers to pedestrian safety, there is a clear path to safer streets. It includes retrofitting streets to make walking safer, designing communities to encourage walking, investing in pedestrian safety, and studying the pedestrian safety problem.

Retrofitting Streets: More than Crosswalks

Since so many of our streets have been designed exclusively with automobiles in mind, it takes more than a crosswalk and a walk signal to make them safe and inviting for pedestrians. Many communities across the country are making streets safer with traffic calming techniques.[2] Traffic calming redesigns streets to reduce vehicle speeds and give more space and priority to cyclists and pedestrians. Traffic calming includes a variety of changes that slow or divert vehicle traffic, separate pedestrian pathways from vehicle traffic, and make the road corridor more pleasant. Common traffic calming measures include landscaped



The "choker" as depicted above slows down traffic by decreasing street widths. The image on the right shows this type of traffic calming device in practice in Montgomery County, Maryland. Photos from Fehr and Peers Associates.

traffic circles, medians or extended sidewalks that narrow the roadway, and partial closures to divert through traffic. Many communities are slowing traffic with speed humps, but the most successful projects integrate a variety of techniques that make the street more attractive and inviting for people on foot and bicycle. The Institute of Traffic Engineers has published a manual on traffic calming; to see it visit http://www.ite.org/traffic/index.htm.

An international study of traffic circles found they reduced collisions by an average of 82 percent.

Studies have shown that traffic calming is very effective in reducing vehicle speeds and reducing collisions. One study found that traffic calming reduced speeds by four to twelve miles per hour. Officials in Seattle, Washington, estimate that their traffic circle program prevented 273 accidents over four years, saving $1.7 billion in property and casualty losses. An international study of traffic circles found they reduced collisions by an average of 82 percent.[3]

Designing for Pedestrians

Traffic calming is but one part of a broader attempt to fundamentally refocus the design of both streets and communities so that walking is safe and convenient.

Encouraging pedestrian travel means designing communities so that people have somewhere to walk to. That means developing neighborhoods where residents are within a reasonable walking distance of shops, offices, schools, libraries, and transit stops. According to the American Planning Association's *Best Development Practices*, the best neighborhoods for walking are developed in small clusters, with well-defined centers and edges, and compact commercial centers.[4] The street network in these neighborhoods should include multiple connections and direct routes that allow pedestrians to choose the shortest distance to a destination. Schools should also be placed so children can walk and bicycle without having to cross high-speed streets.

In a typical suburban strip mall, the streets are wide, encouraging cars to travel at high speeds. Sidewalks end abruptly or lack pedestrian amenities such as trees. Pedestrians have no safe place to cross the street, and few close destinations. Provided by Calthorpe Associates and Urban Advantage.

A computer-enhanced image shows how curb bulbouts, crosswalks, trees and more compact development can make this area more pleasant and walkable. Calthorpe and Associates and Urban Advantage.

When it comes to designing roads, engineers traditionally begin at the centerline and by the time they reach the road edge, they have often "run out" of room for pedestrian "amenities." New design policy guidelines issued by the Federal Highway Administration (FHWA) recommend that state and local planners and road builders drop that approach, and design all facilities from the start with pedestrians and cyclists in mind. The new guidance calls for re-writing highway design manuals so they reflect this new, more balanced approach. One effort is underway in Delaware, where the state Department of Transportation, with STPP's help, is writing a traffic calming design manual, the first of its kind in the U.S. The manual covers street design, signing and marking, and other planning and engineering issues.

This is part of a wider movement toward designing highways in context, to make sure they respect the cultural, environmental, and scenic assets in a community. A number of states are revamping the process they use for designing roads, but only one state has completely rewritten its standards. Vermont rewrote its standards in the mid-1990s to allow lower design speeds, and narrower roadways. The standards have also been codified under state law, essentially removing the fear of lawsuits.

Investing In Pedestrian Safety

Making pedestrian safety a priority means investing transportation funds in pedestrian facilities and safer streets. Each state should attempt to align pedestrian safety funding to pedestrian safety needs, as indicated by rates of fatalities and injuries: if 25 percent of a state's traffic deaths are pedestrians, it should con-

sider allocating a similr share of safety funding to making walking safer. State Departments of Transportation should target such funding by using a systematic approach for identifying problem areas for pedestrians, similar to the systems now used to identify high accident areas for vehicles. When it comes to funding, dangerous pedestrian areas should be considered on an equal footing with dangerous locations for motor vehicles.

One way to begin to direct money into pedestrian safety is to focus on one of the most critical needs, creating safe routes to school. The state of California recently passed a law that reserves one-third of the state's TEA-21 federal safety set-aside for a program that will fund traffic calming, crosswalks, sidewalks, bike lanes and paths in and around California schools. The law was deemed necessary because the California Department of Transportation (Caltrans) hadn't taken any action to update its safety set-aside program to reflect the changes TEA-21 made with regard to bicyclists and pedestrians. School districts will assess the need for improvements around their schools, and apply for grants from the state. For a copy of this model legislation, visit http://www.baypeds.org/saferoutes.html.

FARS records the entire 17-digit vehicle identification number for every vehicle involved in a crash, but often fails to note a pedestrian's location when they were hit.

Promoting Walking: Walk A Child to School Day

A "Safe Routes to School" movement is spreading across the United States as parents and school and health officials see a need to help give children a more independent and healthier way to get around. "Walk to School Day" is an event held each fall to call attention for the need for a safe walking environment. (In 2000, the "International Walk to School Day" is being held on October 4th.) Thousands of schools organize groups of parents, teachers, and students to walk school, often inviting local officials to highlight the need for safe routes to schools. For more information, visit http://www.iwalktoschool.org.

Studying Pedestrian Safety

Another fundamental step in improving pedestrian safety is to collect more information about pedestrian fatalities and injuries, the amount of walking and the risks associated with walking, the effectiveness of pedestrian safety measures, and even how much is spent on pedestrian facilities. Federal databases concentrate on collecting information about motor vehicles and the data collected about pedestrians are incomplete and often inaccurate, crippling attempts to improve pedestrian safety.

While the Federal Highway Administration is able to forecast the amount of driving annually, no attempt is made to determine the amount of walking each year. The FHWA database that records all federal transportation spending, the Fiscal Management Information System (FMIS), includes hundreds of categories aimed at collecting many details on highway construction, but only allows the most rudimentary assessment of how much is being spent to make walking safe and convenient. The Fatality Analysis Reporting System (FARS) records the entire 17 digit vehicle identification number for every vehicle involved in a fatal accident, but it often doesn't record where a pedestrian was when they were hit (for 22 percent of pedestrian deaths, FARS could not identify whether

the pedestrian was inside or outside of a crosswalk, or even whether there was a crosswalk in the vicinity of the accident). The US Bureau of Transportation Statistics and the National Transportation Safety Board should design research programs specifically aimed at capturing new information about this important travel mode and the risks associated with it.

Local officials and citizens also have a role to play, by identifying unsafe walking environments. The Partnership For A Walkable America and other groups offer "walkability audits" that individuals and community groups can use to assess problems in their neighborhood. In many places, citizens have invited local officials on such walks to show them the dangers pedestrians face. For more information, visit http://www.nsc.org/walk/wkcheck.htm.

Recommendations:

Spend on pedestrian safety in proportion to pedestrian deaths.
If thirteen percent of all traffic fatalities are pedestrians, it stands to reason that a similar amount of safety funds should be devoted to pedestrian safety. In addition, federal transportation dollars no longer restricted to highway use should be directed toward providing a variety of safe and convenient pedestrian facilities.

Retrofit streets with traffic calming.
With so many streets designed only for automobiles, it will take more than a few sidewalks and crosswalks to make them safe and inviting for pedestrians. Traffic calming techniques, such as curb bulb-outs and traffic circles, slow down automobiles in key places and reclaim streets for children, residents, and others on foot or bicycle.

Design new streets and neighborhoods for walking.
More people will walk in neighborhoods where there is somewhere to walk to. The best neighborhoods for walking put residents within a reasonable distance of shops, offices, schools, and transit stops, and provide a street and path network that allows direct routes between them.

Collect more information on pedestrian safety.
Federal databases provide little information about the risks associated with walking, the effectiveness of pedestrian safety measures, or even how much is spent on pedestrian safety. The National Transportation Safety Board (NTSB) and the US Bureau of Transportation Statistics should design research programs to learn more about how to improve pedestrian safety. On the local level, citizens are already performing "walkability audits" that assess the dangers to pedestrians, block by block.

Methodology

Pedestrian Fatalities

The National Highway Traffic Safety Administration collects data on every traffic fatality (pedestrian or otherwise) occurring on U.S. roadways. To determine how many pedestrians were killed in a given year and county, STPP queried the Fatality Analysis Reporting System (FARS) for pedestrians who suffered fatal injuries. We then aggregated the county-level data to the state, Metropolitan Statistical Area (MSA) or New England County Metropolitan Area (NECMA) for some 330 metro areas across the U.S. Dividing this figure by the appropriate population estimate from the U.S. Census Bureau, and multiplying by 100,000 gave us a yearly fatality rate per 100,000 persons. (See the U.S. Census Bureau for definitions of MSA and NECMA, http://www.census.gov/population/www/estimates/aboutmetro.html.)

FARS also collects data on the age of the pedestrian killed, allowing STPP to calculate the number of children or elderly pedestrians killed by automobiles. Dividing this number by the total number of pedestrian fatalities gives the proportion of pedestrians killed in a given age group. At the state level, STPP divided the number of child pedestrian fatalities by the population under age 18 to arrive at a state-by-state fatality rate for children.

STPP created the "Pedestrian Danger Index" to allow for a truer comparison of metro areas that takes into account the exposure that pedestrians face in a given metro area. For example, while slightly more pedestrians are killed per capita in the New York metropolitan area than are killed in the Dallas-Fort Worth metro area, more than three times as many people walk in New York than in Dallas. So, the portion of New York residents exposed to the risk of being killed as a pedestrian is three times higher than in Dallas. We calculated the Pedestrian Danger Index by dividing the average yearly fatality rate for a metro area by the percentage of commuters walking to work in that metro area, and then normalizing that figure to 100. Our exposure measure, the percentage of commuters walking to work is provided by the U.S. Census Bureau's 1990 Decennial Census.

Health

STPP performed a simple analysis of health and transportation data at the metro level to determine if there was a relationship between walking and health. While there is an large body of literature supporting the theory that daily exercise helps maintain health, little research has been done on the benefits of walking to work or to run daily errands.

Using data from the Centers for Disease Control's 1998 Behavioral Risk Factor Surveillance System (BRFSS), we determined the percentage of residents in metro areas who are at risk for health problems because of being overweight. We compared this to the number of miles walked daily for residents in forty

large metro areas across the U.S. This was derived using the 1995 Nationwide Personal Transportation Survey (the most recent available) and multiplying the average walk trip length by the average number of daily trips per person. Running a bivariate correlation of the two variables shows a relationship significant at the 0.001 level. The relationship between walking and weight proved enduring, even when other possible influences on obesity were considered. The percent of the population who were overweight continued to decline significantly as daily miles walked per capita increased, controlling for differences in age (percent of population over 45 years), race (percent of population who were minorities), and income (percent of population under the poverty level). Plotting the two variables on a scatter plot also shows evidence of a relationship – there is a slight, but noticeable downward trend in the metro areas, indicating that as the distance walked increases, the percentage of overweight residents in a metro area decreases. Our comparison, while certainly not a rigorous analysis, shows that there may indeed be a relationship, and that this merits further study by professionals in the health field.

Safety Spending

STPP calculated spending figures from the Federal Highway Administration's Fiscal Management Information System – a huge database containing details on every surface (and some waterborne) transportation project receiving federal funds. For the purposes of this report, we queried the database for projects with a work type related to specifically pedestrian programs and facilities, or bicycle and pedestrian programs and facilities. Projects that were specific to bicycles were omitted. Dividing this figure by the appropriate population estimate from the U.S. Census Bureau gives us the amount spent on pedestrian projects per capita. For a point of reference, we also performed this analysis for highway projects. See STPP's "Changing Direction: Federal Transportation Spending in the 1990s" (http://www.transact.org) for a more comprehensive analysis as well as more information about this data source.

The percentage of federal funds spent on pedestrian projects was determined by dividing the amount derived above by the total federal funds spent (including funds devoted to transit). At the national level, STPP compared this number to the percent of trips taken by foot, from the 1995 Nationwide Personal Transportation Survey.

Endnotes

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1. Values given are for million vehicle miles traveled.
2. Unfortunately, comprehensive injury data is not available by state or metropolitan area and so is not included as a part of the Pedestrian Danger Index.
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7. Ibid.
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11. Institute of Child Health, "The School Run: Blessing or Blight?" London, England, 1999. This report is available from the Pedestrian's Association, 126 Aldersgate Street, London, England EC1A 4JQ.
12. John Pucher, "Transportation Paradise: Realm of the Nearly Perfect Automobile?" *Transportation Quarterly*, Summer 1999. British Medial Association, *Cycling Toward Health and Safety*. Oxford, England: Oxford University Press, 1992.

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2. Lightstone, Peek-Asa and Kraus, "Relationship between driver's record and automobile versus child pedestrian collisions," *Injury Prevention* 3, no. 4 (Dec. 1997): 262-266.

Chapter Three cont'd

3. Right of Way, "Killed by Automobile," New York, N.Y., March 1999. See http://www.rightofway.org or contact (212) 260-5237.
4. Richard Marosi, "Where Pedestrians See Refuge in Medians, Officials See Danger," *The Los Angeles Times*, 7 September 1999: B1.
5. James Thomson & Andrea Gielen, "The Role of Elementary and Adult Education in Childhood Pedestrian Injuries." Paper Presented to the Centers for Disease Control, Proceedings to Prevent Pedestrian Injuries, Atlanta, Georgia, September 1998.

Chapter Four

1. Federal Highway Administration (1999). Accomodating Bicycle and Pedestrian Travel, A Recommended Approach. <http://www.fhwa.dot.gov/environment/bikeped/Design.htm>
2. To learn more about traffic calming techniques, visit the Institute of Traffic Engineer's Traffic Calming website, at http://www.ite.org/traffic/index.htm
3. Reid Ewing, *Traffic Calming: State of the Practice*. Washington, D.C.: American Planning Association, 1999.
4. Reid Ewing, *Best Development Practices*. Washington, D.C.: American Planning Association, 1996

Resources

General Information

Pedestrian and Bicycle Information Center
http://www.walkinginfo.org

National Safety Council Partnership for a Walkable America
http://nsc.org/walkable.htm

Walkable America Checklist
http://nsc.org/walk/wkcheck.htm

The Federal Highway Administration Bicycle and Pedestrian Program
http://www.fhwa.dot.gov/environment/bikeped/index.htm

The Federal Highway Administration's Pedestrian Safety Roadshow
http://www.ota.fhwa.dot.gov/walk/

The Federal Highway Administration Pedestrian and Bicycle Safety Research Page
http://www.tfhrc.gov/safety/pedbike/pedbike.htm

The Federal Highway Administration's Design Guidance for Accommodating Bicycle and Pedestrian Travel
http://www.fhwa.dot.gov/environment/bikeped/Design.htm

The National Highway Traffic Safety Administration (NHTSA)
http://www.nhtsa.dot.gov

The National Highway Traffic Safety Administration's Pedestrians, Bicycles and Motorcycles Page
http://www.nhtsa.dot.gov/people/injury/pedbimot/

Fehr and Peers Associates, Inc. Traffic Calming website
http://www.trafficcalming.org

Institute of Transportation Engineers' Traffic Calming for Communities
http://www.ite.org/traffic/index.htm

Advocacy Groups

America WALKs
http://americawalks.org/

The National Center for Bicycling and Walking
http://www.bikefed.org

Walkable Communities, Inc.
http://www.walkable.org

Congress for the New Urbanism
http://www.cnu.org

Photo by Dan Burden.

Right of Way
http://www.rightofway.org

Urban Ecology
http://www.urbanecology.org

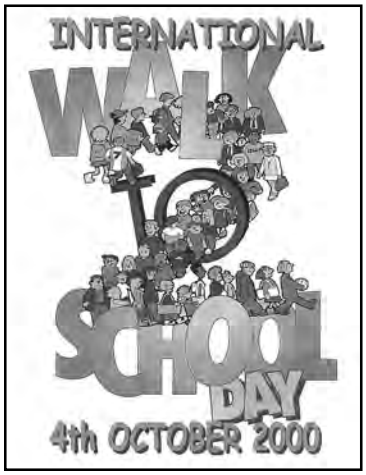
Transportation Alternatives
http://www.transalt.org/

Professional Organizations

Association of Bicycle and Pedestrian Professionals
http://www.apbp.org

The Human Powered Transportation Committee of the Society for Civil Engineers
http://ourworld.compuserve.com/homepages/kbarrett/asce-hpt.htm

The Institute for Transportation Engineers
http://www.ite.org



Other

International Walk to School Day
http://www.iwalktoschool.org

California's Safe Routes to School Bill
http://www.baypeds.org/saferoutes.html

Transportation Alternatives in New York City, Safe Routes to School Program
http://www.transalt.org/campaigns/school/index.html

See Also

Scenic America, *Getting It Right In the Right of Way: Citizen Participation in Context-Sensitive Highway Design*, 2000. <http://www.scenic.org>

Todd Litman, Robin Blair, Bill Demopoulos, Nils Eddy, Anne Fritzel, Danelle Laidlaw, Heath Maddox and Katherine Forster. Pedestrian and Bicycle Planning: A Guide to Best Practices. This report is available from the Victoria Transport Policy Institute at http://www.vtpi.org.

John Pucher and Lewis Dijkstra, "Making Walking and Cycling Safer: Lessons from Europe." This forthcoming report will be published in *Transportation Quarterly*, vol. 54, no. 3, Summer 2000.

Appendix

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