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Terrorism, Transit and Public Safety

Evaluating the Risks

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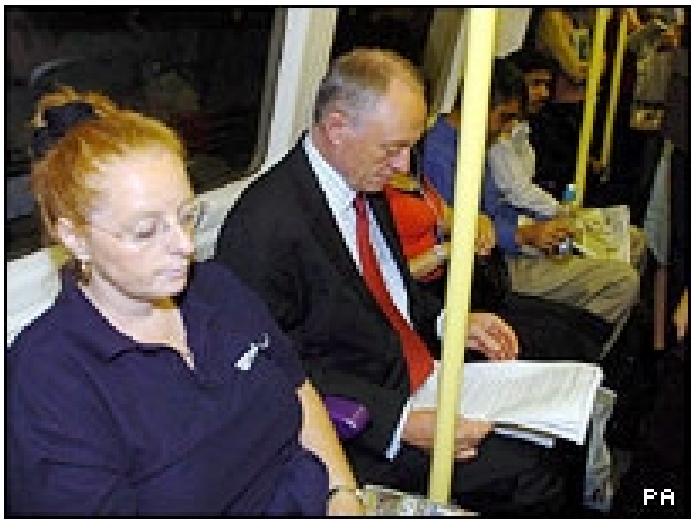

The Monday after the July 7 subway bomb attack Mayor Ken Livingstone encouraged Londoners to return to work and use public transit. He rode the underground himself, as is his usual habit.

Summary

This paper evaluates the overall safety of public transit, taking into account all risks, including recent terrorist attacks. It indicates that transit is an extremely safe mode, with total per passenger-mile fatality rates approximately one-tenth that of automobile travel. It is important for individuals and public officials to avoid overreacting to terrorist threats in ways that increase overall danger. Transit terrorism would cause more total casualties and harm to society if individuals respond to attacks by shifting from public transit to less safe modes, or if decision makers respond by reducing support for public transit.

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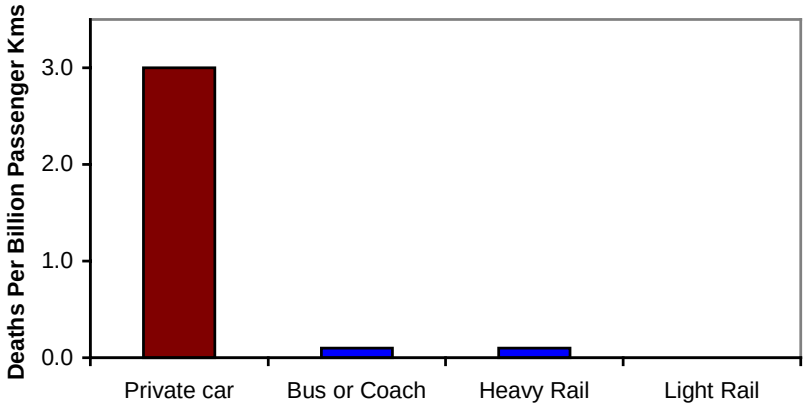
"The only thing we have to fear is fear itself—nameless, unreasoning, unjustified terror which paralyzes needed efforts to convert retreat into advance"
- Franklin D. Roosevelt, 1932 Presidential Inaugural Address

On 7 July 2005 terrorist bombs on London's transit system killed approximately fifty people and injured hundreds. This is not the first terrorist attack on public transit. In 1995 a religious group released sarin gas in Tokyo's subway system, killing 12 and making thousands of people sick. In recent years bombs exploded on buses and trains in Israel, Madrid, Moscow, Paris and other cities.

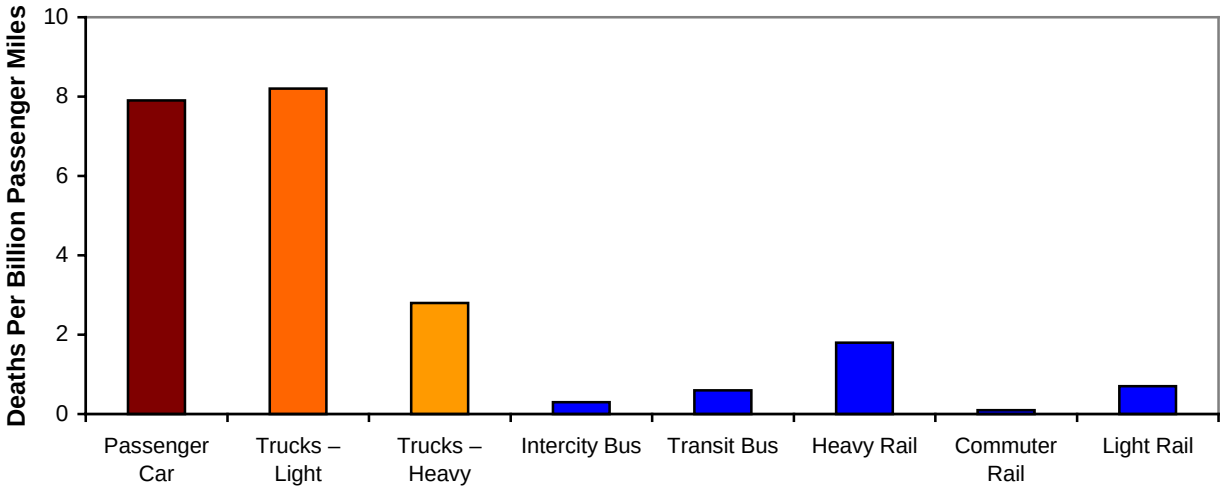
Figure 1 **UK Death Rate By Mode** (Steer Davies Gleave, 2005, Table 7.3)



UK Transit passengers have about one-twentieth the traffic fatality rate as automobile occupants.

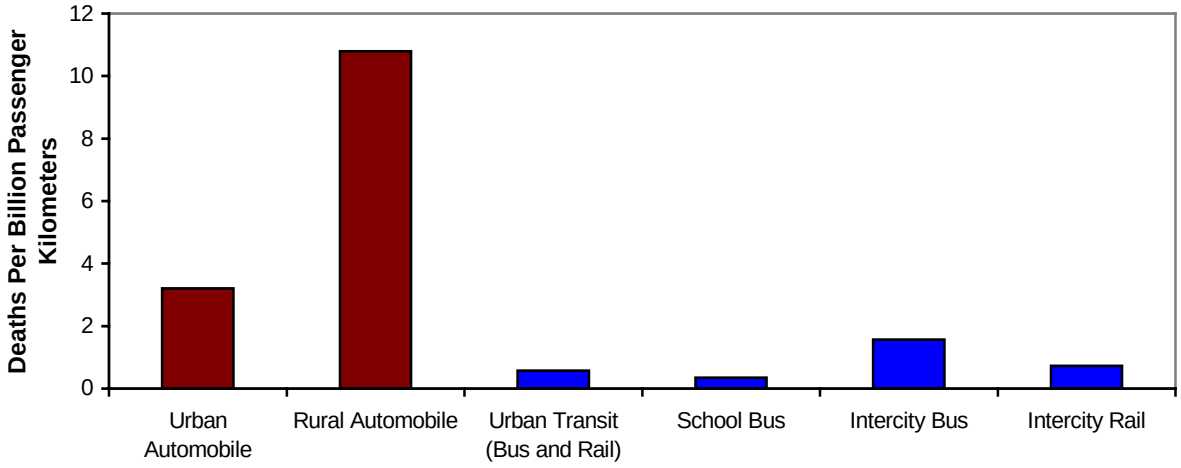
Despite such events, public transit is still an extremely safe form of travel. The traffic fatality rate per passenger-kilometer is less than one-tenth that of automobile travel, as indicated in figures 1 to 3.[1] Even including terrorist attacks and other crimes against transit passengers, transit is far safer than private vehicle travel.

Figure 2 **US Death Rate By Mode** (BTS, Tables 2-1 and 2-4; APTA, 2003)



U.S. Transit passengers have about one-tenth the traffic fatality rate as automobile occupants.

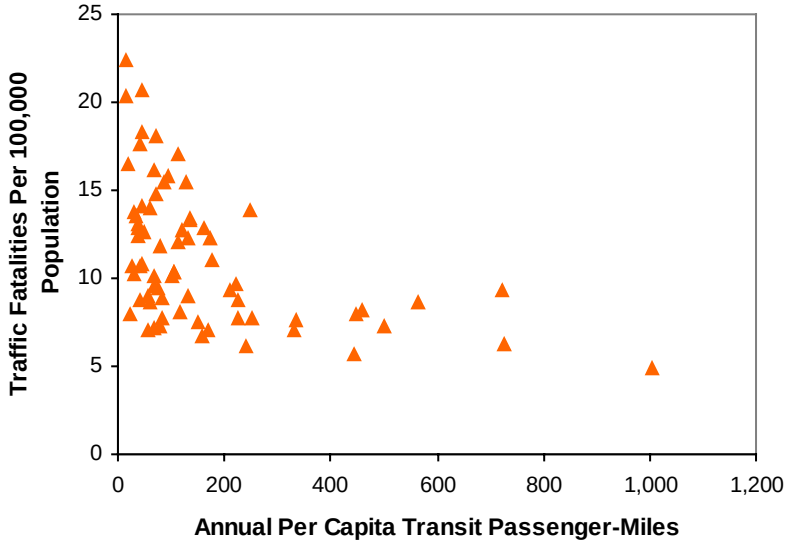
Figure 3 **Canadian Death Rate By Mode** (CUTA, 2000)



Canadian transit passengers have about one-tenth the traffic fatality rate as automobile occupants.

Shifting travel from automobile to transit, and creating more transit-oriented communities, increases safety for transit passengers and other road users. Total per capita traffic fatality rates (including automobile, transit and pedestrian deaths), tend to decline as transit ridership increases in a community, as indicated in Figure 4.[2]

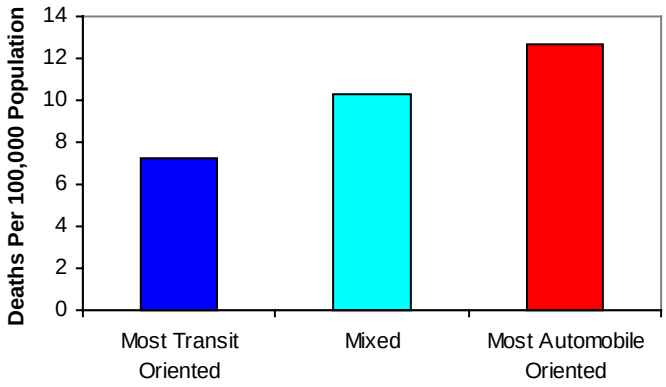
Figure 4 **Traffic Deaths and Transit Mileage, U.S. Cities** (based on FTA data)[3]



Per capita traffic fatalities (including automobile occupants, transit occupants and pedestrians) tends to decline with increased transit ridership.

Residents of more transit-oriented urban regions experience far lower per capita traffic fatality rates than in automobile-oriented regions, as illustrated in Figure 5. Overall, transit passengers are much safer than motorists, and residents of transit-oriented communities are safer than residents of automobile-oriented communities, even taking into account risks from murder and terrorism (Lucy, 2002).

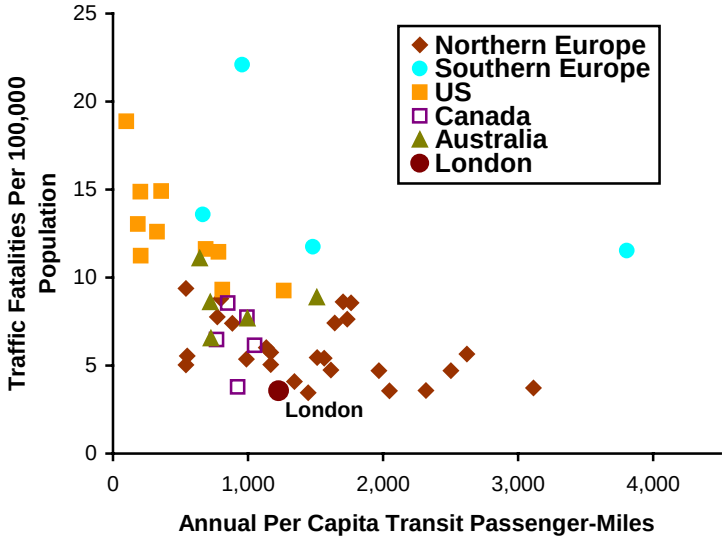
Figure 5 **Annual Per Capita Traffic Deaths** (Litman, 2004)[4]



Transit-oriented urban regions have significantly lower per capita traffic fatality rates than more automobile-oriented cities.

International data also indicate that per capita traffic fatalities decline with increased transit ridership, as indicated in Figure 6.

Figure 6 **International Traffic Deaths** (Kenworthy and Laube, 2000)



International data indicate that traffic fatality rates decline with increased transit ridership. London has one of the lowest fatality rates of all cities listed.

Annual road and rail traffic deaths total 286 in the London region, about 3,500 in the U.K. and more than 43,000 in the U.S., of which only a small portion involve public transit passengers, as summarized in Table 1.

Table 1 **Traffic Fatality Data Summary** (TfL, 2004; DfT, 2004; BTS, 2004)

	London	UK	U.S.
Automobile/Motorcycle Passenger Deaths	143 (50.0%)	2,574 (73.6%)	37,192 (87.2%)
Bus Transit Passenger Deaths	7 (2.4%)	11 (0.3%)	64 (0.1%)
Rail Transit Passenger Deaths	9 (3.1%)	12 (0.3%)	45 (0.1%)
Rail Passenger Deaths	- (0.0%)	20 (0.6%)	3 (0.0%)
Nonmotorized Deaths	127 (44.4%)	882 (25.2%)	5,371 (12.6%)
Total Deaths	*286 (100%)*	*3,499 (100%)*	*42,675 (100%)*

This table summarizes traffic fatality data by mode for London, the U.K. and the U.S. Transit accidents cause only a small portion of total traffic fatalities.

Of the 286 transportation fatalities in London, only 5.6% involved public transport passengers, although public transport provides 24.2% of total passenger trips and 20.1% of passenger-kilometers, as indicated in Table 2.

Table 2 **London Area 2003 Travel and Fatalities By Mode** (TfL, 2004)

	Million Trips	Million Kms	User Deaths
Bus	1,430 (14.3%)	5,128 (8.1%)	7 (2.4%)
Underground	953 (9.5%)	7,451 (11.7%)	9 (3.1%)
Docklands (DLR)	41 (0.4%)	207 (0.3%)	0 (0.0%)
Car/Motorcycle	4,015 (40.0%)	46,976 (73.8%)	143 (50%)
Taxi	99 (1.0%)	503 (0.8%)	0 (0.0%)
Walk	3,366 (33.5%)	2,693 (4.2%)	107 (37.4%)
Bicycle	131 (1.3%)	693 (1.1%)	20 (7.0%)
Total Transit (Bus, Underground, DLR)	*2,424 (24.2%)*	*12,785 (20.1%)*	*16 (5.6%)*
Total Automobile (Car, Motorcycle, Taxi)	*4,114 (41.0%)*	*47,478 (74.6%)*	*143 (50.0%)*
Total Nonmotorized Modes (Walk, Bicycle)	*3,497 (34.8%)*	*3,385 (5.3%)*	*127 (44.4%)*
Totals	**10,034 (100%)**	**63,649 (100%)**	**286 (100%)**

In London public transit provides 24% of passenger trips and 20.1% of passenger-miles, but causes only 5.6% of traffic fatalities. London has a low overall per capita traffic fatality rate compared with more automobile-oriented cities.

If public transit had the same fatality rate per passenger-mile as automobile travel there would have been 104 more deaths in London, 300 in the U.K., and 148 in the U.S. in 2003.[5] These are lower-bound estimates because they assume that each transit passenger-mile replaces just one automobile passenger-mile. However, when people shift from driving to transit they tend to reduce their annual mileage, because transit users often choose closer destinations and avoid unnecessary trips. As public transit ridership increases in a community, per capita vehicle ownership tends to decline and land use patterns become more accessible and walkable, further reducing vehicle mileage.[6] As a result, each transit passenger-mile often replaces several automobile vehicle-miles (Litman, 2004). This is one of the reasons that increased per capita transit ridership

provides such large reduction in per capita traffic fatality rates, as indicated earlier. If residents of the "Transit Oriented" regions described earlier in Figure 5 had the same traffic fatality rate as the "Automobile-Oriented," there would be about 2,500 additional traffic fatalities in the U.S.[7]

These safety benefits of transit are much larger than deaths and injuries caused by recent terrorist attacks. In addition, public transit provides other health benefits, by reducing air pollution and increasing physical exercise, since most transit trips involve walking or cycling links. Although these health benefits are difficult to quantify, they are probably large, indicating far greater total health benefits from transit, and therefore much larger disbenefits when people shift from transit to driving (Litman, 2003). Travelers would increase their total risk if they shift from transit to driving in response to terrorist threats.

Transit risks tend to receive more attention than automobile risks. Because they are rare, incidents that kill or injure a few transit passengers often receive national or international media attention, while automobile crashes that kill a few people are so common they are considered local news, and injury accidents often receive no media coverage at all.[8]

Traffic accidents actually represents a much greater risk than terrorism (Adams, 2005):

- On an average day nine people die and over 800 are injured in British road accidents. The 7 July London terrorist deaths represent about six days of normal traffic fatalities.
- The 191 people killed 11th March 2004 by Madrid bombers were equivalent to about 12 or 13 days of normal traffic deaths in Spain.
- During the 25 worst years of sectarian violence in Northern Ireland, twice as many people died there in road accidents as were killed by terrorists.
- In Israel, the annual road traffic death toll has been two or three times higher than civilian deaths by Palestinian terrorists during the violent years of 2000 through 2003.
- The 11 September 2001 terrorist attacks killed about the same number of people as a typical month of U.S. traffic accidents. According to official reports, terrorists killed 25 Americans worldwide in 2002, 23 in 2003, and none in 2004, while about 42,000 Americans died in traffic accidents each of these years.
- A study by Wilson and Thomson (2005) calculated that in 29 OECD countries for which suitable data were available, the annual average death rate from road injuries was approximately 390 times that from international terrorism. The ratio road to terrorism deaths averaged over 10 years was lowest for the United States at 142 times. In 2001, U.S. road deaths were equal to those from a September 11 attack every 26 days.

There are several reasons that people react particularly strongly to terrorist attacks (Adams, 2005). Such attacks are designed to be highly visible, producing intense media coverage. The fact that the harm they cause is intentional rather than accidental makes them particularly tragic and frustrating. And they raise fears that such attacks may become more frequent or severe, so risks may increase in the future. For these reasons, it is unsurprising that transit terrorism tends to instill more fear than other risks that are actually much greater overall. That is exactly what terrorists intend.

This is not to suggest that transit terrorism risks are insignificant and should be ignored. On the contrary, transit terrorism is a serious threat that harms people both directly, through injury and property damage, and indirectly by creating fear and confusion. Strong action is justified to protect transit users' safety and sense of security.

Society should work aggressively to prevent terrorist attacks, respond to incidents, and bring terrorists to justice. Transportation professionals, transit operators and users should be cautious and vigilant.[9] Many transport organizations are currently working to increase transit security (APTA, 2005; FTA, 2005; MTI, 2005; Loukaitou-Sideris, 2005). Much more can be done. The federal government spent $22 billion, more than $9 per passenger, on air transportation security after than September 11, 2001 attacks, but less than 1¢ per passenger to increase railway and subway security (Howitt and Makler, 2005).

But it is important for individuals and public officials to take *all* risks into account and avoid overreacting to transit terrorism risks in ways that increase overall danger. Transit terrorism would cause greater total casualties and harm to society if individual travelers respond to exaggerated fears by shifting from public transit to less safe modes, or if decision makers respond by reducing support for public transit.

Such shifts have occurred. Analysis by Gigerenzer (2004) and Sivak and Flannagan (2004) indicate that in the three months after the 11 September 2001 terrorist attacks, shifts from air to automobile travel caused several hundred additional roadway traffic fatalities. Since air travel is safer per mile than driving, particularly on rural roads, total travel deaths increased. Had these trends continued for more than a year, the additional deaths would have exceeded the September 11 terrorist deaths. Because of actions by governments and the airline industry to increase air travel security, these travel shifts have been reduced, reducing excess traffic deaths.

After a high-profile transit accident or attack news reporters sometimes stick a microphone in front of transit riders and ask, "How can you possibly continue using transit after what just happened?" with the implication that riding transit is dangerous and foolish. This reflects the myopic tendency of news media to consider just one issue at a time. But people and policy makers must balance many factors, including *overall* safety, efficiency and affordability. It would be foolish for travelers to reduce their transit travel in response to a terrorist attack, despite the fact that transit is an extremely safe mode of travel and provides other benefits to users and society.

When terrorist attacks occur, responsible leaders rightfully recommend that people return to their normal habits, including public transit travel. Cities repair their public transit systems and people use them, both for practical reasons and to show they are not intimidated by terrorism. As expressed by London Mayor Ken Livingstone in a statement to terrorists written soon after the July 7 bombing,

> I know you fear that you [terrorists] may fail in your long-term objective to destroy our free society and I can show you why you will fail. In the days that follow look at our airports, look at our sea ports and look at our railway stations and, even after your cowardly attack, you will see that people from the rest of Britain, people from around the world will arrive in London to become Londoners and to fulfill their dreams and achieve their potential.

Mass Transit Systems Educate Riders on Safety After London Bombs

Transit employees are working to educate passengers about emergency procedures and remind riders to remain vigilant.

Janet Nester, *InfoZine*, Scripps Howard Foundation Wire (www.infozine.com), 20 July 2005.

Washington, D.C. -- In the immediate aftermath of the London bombings, police presence increased but no major security changes have been made. Metro workers are on increased alert, with more announcements in stations about suspicious packages. Employees with fluorescent vests are available, making it easy for customers to spot workers in an emergency, said Steven Taubenkibel, public affairs specialist for the Washington Metropolitan Area Transit Authority.

Passengers have also been more vigilant, said Lt. Ron Bodmer, emergency management coordinator for the Metro Transit Police Department at a news briefing Monday. “The number of reports of suspicious packages has probably quadrupled,” Bodmer said. “We tell people, if they see it, say it.”

Some passengers say they appreciate the increased vigilance and friendliness among fellow riders and still feel safe riding Metro. “People are more alert,” said Betty Patterson, 63, of Oxon Hill, Md. “I have no fear. Tragedy can happen anyplace - on a train, plane or bus.” Patterson, a clothing store worker, said Metro does a good job of making people feel secure, as system officials always alert riders about delays and other problems.

Boston’s Massachusetts Bay Transportation Authority has a campaign, “See Something, Say Something,” that encourages riders to report suspicious activities, said Joe Pesaturo, press secretary for the system. A spike in the number of reported suspicious packages after the London bombings has since leveled off.

Random passenger bag checks is one security measure in preliminary discussions by Washington Metro officials, although the legal ramifications are unclear, Taubenkibel said. Metro has the capability to shut off passengers’ cell phones to deter their use as triggers for bombs, but is not planning to do so, Taubenkibel said.

At the news briefing, Metro employees demonstrated safety features. Each rail car is equipped with an intercom, which directs calls to the system’s control center, and a fire extinguisher. Everything from the wheels to the seat upholstery is made of flame retardant material, which would slow the burn time of a car, Bodmer said.

In an emergency, officials said it is best for passengers to remain on the train and follow the operator’s instructions. Riders should not call 911, they said, as the control center and operator should already be aware of the problem. Passenger making calls might also miss important announcements from the operator, Taubenkibel said. Evacuating passengers from a train is only a “last resort,” Bodmer said.

Metro’s office of safety in Washington is aiming to educate its 667,000 daily passengers about what to do in an emergency. At least once a month, Metro employees hand out fliers at station entrances that have information about emergency features on trains, said Paul Mayfield, Metro’s manager for accident prevention and emergency management. Signs at stations and on trains contain the same information. Signs alerting passengers about safety and emergency procedures are also posted on trains, on buses and at stations in Boston’s MBTA system, Pesaturo said.

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Much analysis in this paper is in the "Transit Risk" spreadsheet, available from the Victoria Transport Policy Institute website at www.vtpi.org/transitrisk.xls.

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Endnotes

[1] Figures 1 through 3 only show risks to transit passengers. Transit accidents also impose "external" risks on other road users (motorists, pedestrians and cyclists), but the marginal external risk of an additional transit passenger-kilometer is small, since most transit systems have excess capacity (only if additional ridership requires additional transit vehicles would external risk increase) and automobile travel imposes comparable external risks. For more discussion of marginal transit risk see Litman, 2005a and 2005b.

[2] The decline in traffic fatalities associated with increased transit use probably results from a combination of reduced per capita annual vehicle mileage, lower average traffic speeds in higher-density areas, and reduced driving by higher-risk motorists, such as teenagers and habitual drunk drivers, due to better alternatives to automobile travel. Transit is a significant contributor to each of these factors.

[3] The analysis for this graph is in the *Transit Risk* spreadsheet, available from the Victoria Transport Policy Institute website at www.vtpi.org/transitrisk.xls.

[4] "Most Transit Oriented" are the ten U.S. cities with the highest per capita annual transit mileage (333 to 1,004 annual transit passenger miles). "Mixed" are the next twenty cities ranked by transit mileage (118 to 254 annual transit passenger miles). "Most Automobile Oriented" are the rest (15 to 114 annual transit passenger-miles).

[5] Calculations in www.vtpi.org/transitrisk.xls.

[6] Described differently, as a community becomes more automobile-oriented, destinations tend to disperse, due in part to the need to dedicate more land to roads and parking facilities, causing people to travel more in order to maintain a given level of accessibility.

[7] Calculations in www.vtpi.org/transitrisk.xls.

[8] For example, in 1995 the death of three passengers in a Toronto subway crash was widely reported here in British Columbia. The same week the death of four teenagers in a car crash here was a local news story without media coverage in Toronto. This suggests that a transit passenger death receives about one hundred times as much media coverage as an automobile passenger death.

[9] For more discussion of strategies for increasing transit security see the "Address Security Concerns" chapter of the VTPI *Online TDM Encyclopedia* at www.vtpi.org/tdm/tdm37.htm.