Safer Than You Think!  
Revising the Transit Safety Narrative  
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Abstract

Public transportation is overall a relatively safe (low crash risk) and secure (low crime risk) mode of transport. Transit travel has about a tenth the traffic casualty (death or injury) rate as automobile travel, and residents of transit-oriented communities have about a fifth the per capita crash casualty rate as in automobile-oriented communities. Transit also tends to have lower overall crime rates than automobile travel, and many transit service improvements can further increase security by improving surveillance and economic opportunities for at-risk populations. Despite its relative safety and security, many people consider public transit dangerous, and so are reluctant to use it or support service expansions in their communities. Various factors contribute to this excessive fear, including the nature of public transit travel, heavy media coverage of transit-related crashes and crimes, and conventional traffic safety messages which emphasize danger rather than safety. Transit agencies can help create a new safety narrative by better measuring and communicating transit's overall safety and security impacts, and providing better guidance concerning how users and communities can enhance transit safety and security.

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Introduction

Risk refers to exposure to undesirable events. It is the opposite of safety. Some risks, such as standing near a high ledge or facing an angry wild animal, are perceived directly and so invoke rational fear. Other risks are less tangible; they are measured statistically and communicated through mass media. People’s perception of such risks is significantly affected by the nature of this communication. Failure by experts to accurately communicate risks can cause individuals and communities to fear the wrong dangers and make irrational decisions.

This is certainly true of transportation safety (crash) and security (crime) risks. Many people have exaggerated fears of public transit risks, which can be a major obstacle to efforts to encourage transit travel, improve transit services, and implement transit-oriented development (more compact, mixed, walkable development around transit stations and routes), and therefore achieve strategic planning objectives such as reduced congestion, increased affordability, and improved accessibility for non-drivers. More accurate and positive information about transit’s safety benefits can help individuals choose safer and healthier communities, and create more efficient and equitable transportation systems.

This report discusses these issues. It evaluates various public transit risks including accidents, crimes and terrorism; compares these risks with other transport modes; examines evidence of excessive and irrational fear of transit; investigates how transit agencies currently communicate risks; and recommends better ways to communicate transit safety benefits and strategies. This analysis complements recent research on public transit health impacts (Lachapelle, et al. 2011; Litman 2011). This should be of interest to people involved in transport planning, transit promotion, and transportation safety and security analysis.
Evaluating Transportation Risks
Transportation risks can be challenging to evaluate because there are several types of risks and perspectives. Which risks are considered and how they are measured can significantly affect analysis results (Ketola and Chia 2000). For example, traffic accident statistics can measure based on collisions, casualties (somebody is injured or killed) or fatalities, and may include passengers, vehicle occupants (passengers plus employees), all crash victims (including other road users hit by a transit vehicle), plus non-collision injuries such as falls in transit stations, and employee workplace injuries. Whether or not suicides and falls (for example, if a passenger slips while walking up the stairs in a train station) are included can significantly affect casualty statistics, particularly for rail transit.

Similarly, crime statistics may include violent crimes, all crimes against passengers and employees, or all transit-related crimes, a major portion of which involve trespassing, transit property vandalism and fare evasion. Risks are considered *internal* if imposed on mode users, and *external* if imposed on other people. Table 1 summarizes these various risk categories.

<table>
<thead>
<tr>
<th>Perspectives</th>
<th>Accidents</th>
<th>Crime</th>
<th>Other Risks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Internal</strong></td>
<td>Crash damages to vehicle occupants.</td>
<td>Crime risk to vehicle occupants.</td>
<td>Pollution exposure to mode users.</td>
</tr>
<tr>
<td></td>
<td>Falls (e.g., in a train station).</td>
<td>Crime risk when accessing vehicles.</td>
<td>Sedentary living (inadequate exercise) by mode users.</td>
</tr>
<tr>
<td></td>
<td>Worker injuries.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>External</strong></td>
<td>Crash risk to other people.</td>
<td>Crime risk that users of a mode impose on other people (the travel mode used by criminals).</td>
<td>Air pollution a mode imposes on other people.</td>
</tr>
<tr>
<td>(impacts on non-users).</td>
<td></td>
<td></td>
<td>Self-harm (such as suicides)</td>
</tr>
</tbody>
</table>

*Transportation activities can affect various types of risks, including internal and external risks.*

Which perspective is used can also affect results. For example, driving a larger vehicle reduces internal but increases external crash risks (Anderson and Auffhammer 2014). Similarly, excluding poor households from a neighborhood may reduce local crime risks, but by concentrating poverty and reducing disadvantaged people’s economic opportunity, it may increase total regional crime risk.

Risk analysis is also complicated by various confounding factors. For example, transit service and ridership, vehicle crash rates, poverty and some types of crime tend to increase with city size and urban density, but such correlations do not necessarily indicate causation; they do not really mean that crashes and crime would increase with more transit travel.
Public Transit Risk Data Sources
This section summarizes research on public transit risks and how those compare with other modes.

Various sources provide data for transit risk analysis:

- The U.S. Bureau of Transportation Statistic’s annual National Transportation Statistics report contains data on crash fatalities, injuries, accidents and crime, by year, mode (air, highway, railroad, transit, waterborne and pipeline) and transit type (bus, rail, demand response). It compares crash rates (per 100 million vehicle- and passenger-miles) between agencies and modes.

- The U.S. Federal Transit Administration’s National Transit Database (NTD) contains accident and crime statistics from each U.S. transit agency. The Safety and Security Module contains data on safety- and security-related incidents, as defined in Table 2 (Yang 2004).

<table>
<thead>
<tr>
<th>Major Incident (require special reports)</th>
<th>Non-Major Incident (included in monthly reports)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety</td>
<td>Safety</td>
</tr>
<tr>
<td>Incidents causing injury (not qualifying as major incidents) requiring transport for immediate medical treatment</td>
<td>Incidents requiring transport for immediate medical treatment</td>
</tr>
<tr>
<td>Property damage exceeding $7,500</td>
<td>Property damage exceeding $25,000</td>
</tr>
<tr>
<td>All non-arson fires</td>
<td></td>
</tr>
<tr>
<td>Security</td>
<td>Security</td>
</tr>
<tr>
<td>Other threats (e.g. bomb, chemical, biological, cyber, etc.)</td>
<td>Other threats (e.g. bomb, chemical, biological, cyber, etc.)</td>
</tr>
<tr>
<td>Suicides</td>
<td>Suicides</td>
</tr>
</tbody>
</table>

The U.S. National Transit Database defines safety and security incidents that should be reported.

- The FTA Safety and Security Statistics website (http://transit-safety.volpe.dot.gov/Data/samis.aspx) provides some safety and security incident data by transit mode. Some transit agencies use these or similar statistics for performance evaluation to track trends and comparisons with peer agencies, but the information is unsuited for comparing risks with other modes (automobile travel).

- American Public Transportation Association (www.apta.com/research/stats) provides annual statistics on transit infrastructure, services, use and funding. The 2012 Transit Fact Book includes the following statement: “From 2003 to 2008 transit bus travel resulted in 0.05 deaths per 100 million passenger miles, compared to 1.42 deaths for motor vehicles. Amtrak and commuter rail also had low fatality rates of 0.03 and 0.06 per 100 million passenger miles, respectively.”

- The Canadian Urban Transit Association (www.cutaactu.ca) produces an annual Canadian Transit Fact Book, which includes various statistics for each transit agency, although none related to crash or crime risks.

- Some international data sets, such as the International Road Traffic and Accident Database (OECD 2012), and the Mobility In Cities Database (UITP 2005) include information on transit risks, but it is difficult to compare risk between travel modes, the relative safety of transit does not seem to be widely communicated.

- CrimeReports (www.publicengines.com/products/crimereports.php) uses police crime data to produce geocoded crime maps for many jurisdictions, and Neighborhood Scout (www.neighborhoodscout.com) uses this information to rate neighborhoods.

- Public Transport Victimisation (www.ucl.ac.uk/jdibrief/analysis/public-transport-victimisation) provides information on the risk exposure to various types of public transit users.
Measuring Transit Risk
This section discusses how various transit risks are measured.

Crash Risk
Crash risk refers to property damages, injuries and deaths caused by vehicle crashes.

Crash Risk Per Unit of Travel (Passenger-mile or –kilometer)
Public transit has relative low crash rates per unit of travel, as indicated in Table 3 and Figure 1.

<table>
<thead>
<tr>
<th>Travel Mode</th>
<th>Deaths Per Billion Passenger-Miles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Car or light truck driver or passenger</td>
<td>7.28</td>
</tr>
<tr>
<td>Commuter rail and Amtrak</td>
<td>0.43</td>
</tr>
<tr>
<td>Urban mass transit rail (subway or light rail)</td>
<td>0.24</td>
</tr>
<tr>
<td>Bus (transit, intercity, school, charter)</td>
<td>0.11</td>
</tr>
<tr>
<td>Commercial aviation</td>
<td>0.07</td>
</tr>
</tbody>
</table>

Table 3 Passenger Fatalities per Billion Passenger-Miles, 2000–2009 (Savage 2013)

Public transit passengers have far lower traffic casualty rates than automobile occupants.

Intercity and commuter passengers have about one-20\textsuperscript{th}, urban rail passengers about one-30\textsuperscript{th}, and bus passengers about one-60\textsuperscript{th} the traffic fatalities per 100 million passenger-miles as automobile travel. Of course, many factors affect an individual’s crash risk and there are many ways that motorists can increase their safety. For example, drivers can reduce their risks by staying sober and observing speed limits since about 31% of fatal traffic accidents involve an impaired driver and 30% involve speeding (NHTSA 2012), but there are still significant risks beyond individual drivers’ control, such as errors by other road users and mechanical failures, so even law-abiding motorists face greater crash risks than transit passengers.

Figure 2 Canadian Fatality Rate By Mode (CUTA 2010)

Public transit tends to have much lower traffic fatality rates than automobile travel.
Although transit vehicles are large and so impose risk on other road users, even considering these external risks transit travel has less than half the total death rate as automobile travel (Figure 2). Crash rates per passenger-mile or –kilometer are higher on transit systems with low load factors (fewer passengers per transit vehicle-mile or –km) but decline as load factors increase.

**Figure 1**  
Transport Fatalities (Litman and Fitzroy 2012, based on FHWA and APTA data)

*Transit tends to have lower crash rates than automobile travel, even taking into account risks to other road users.*

Most transit trips include active transport (walking and cycling) links, and transit users tend to walk and bike more in total than motorists (Lachapelle, et al. 2011). These modes have relatively high per-mile casualty rates, although this risk is largely offset by reduced risks to other travelers and improved public fitness and health (Jacobsen 2003; Litman 2011; Rojas-Rueda, et al. 2011).

**Community (Per Capita) Crash Risks**

As public transit travel increases in a community total (pedestrians, cyclists, motorists and transit passengers) per capita traffic casualty rates tend to decline (Karim, Wahba and Sayed 2012; Scheiner and Holz-Rau 2011). Various studies using diverse analysis methods and data sets indicate that relatively small transit ridership gains are associated with proportionately larger reductions in per capita crash rates (Duduta, et al. 2012). For example, using sophisticated statistical analysis, Ewing and Hamidi (2014) found that more compact communities had significantly higher transit ridership, slightly higher total crash rates, but much lower *fatal* crash rates than sprawled communities: each 10% increase in their compact community index is associated with an 11.5% increase in transit commute mode share, a 0.4% increase in total crashes, and a 13.8% reduction in traffic fatalities.

Analyzing 29 years of traffic data for 100 U.S. cities, Stimpson, et al. (2014) found that a 10% increase in the portion of passenger-miles made by transit is associated with a 1.5% reduction in total traffic deaths. Since only about 2% of total person-miles are currently by transit, this means that a 1% increase in transit mode share is associated with a 2.75% decrease in fatalities per 100,000 residents, which translates into a 5% decrease in total traffic fatalities in the 100 cities included in their study. Figures 3 (international data) and 4 (U.S. data) illustrate this relationship.

**Figure**  
Traffic Fatalities Vs. Transit Travel (Kenworthy and Laube 2000)
International data indicate that per capita crash rates decline with increased transit ridership.

The U.S. cities with more than 50 annual transit trips per capita include Boston, Chicago, Denver, Honolulu, Los Angeles, New York, Portland and Seattle. Some smaller cities with just 10-40 annual trips per capita also achieved low traffic fatality rates, including Baltimore, Buffalo, Eugene, Madison, Minneapolis, Pittsburgh, Providence, Rochester, Santa Rosa, Spokane and Springfield, Massachusetts (NHTSA 2012). Since Americans average about 1,350 annual person-trips, this represents an increase from about 1.5% to 4% transit mode share, but the transit-oriented cities have relatively low per capita vehicle mileage (5,540-9,618 average annual vehicle-miles traveled, compared with 10,036 overall) which helps explain their low crash rates. This indicates that transit-oriented development leverages additional vehicle travel reductions and traffic fatalities then just the individual trips shifted from automobile to transit.
Some of these high-transit-ridership, low-VMT cities are compact and transit-oriented because they developed prior to the Interstate Highway era, but some newer cities have achieved significant transit ridership and traffic safety gains by implementing transit improvements and support strategies. Figure 5 compares transit travel and traffic fatality trends for four cities with pro-transit policies (Denver, Los Angeles, Portland and Seattle) with four peer cities with more automobile-oriented policies (Cleveland, Dallas, Houston and Milwaukee). The pro-transit cities had more than double the transit ridership growth, and reduced average traffic fatality rates to nearly half those of the U.S. overall and of the automobile-oriented cities. This suggests that pro-transit policies can increase traffic safety in newer cities.
Several factors help explain the large crash reductions associated with modest transit ridership increases. Many of the transport system and built environment (urban design) features that tend to increase transit travel also reduce crashes, as summarized in Table 4. Communities that reflect these features are often called new urban, smart growth or transit-oriented development.

Table 4  Factors That Increase Transit Travel and Traffic Safety (Ewing and Dumbaugh 2009)  

<table>
<thead>
<tr>
<th>Transport System</th>
<th>Built Environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>• High quality transit (convenient, comfortable, affordable) service</td>
<td>• Development density and mix</td>
</tr>
<tr>
<td>• Good walking and cycling conditions</td>
<td>• Reduced parking supply</td>
</tr>
<tr>
<td>• Lower traffic speeds</td>
<td></td>
</tr>
<tr>
<td>• More connected roadway network</td>
<td></td>
</tr>
<tr>
<td>• Transportation demand management</td>
<td></td>
</tr>
<tr>
<td>• High fuel taxes, parking fees and road tolls</td>
<td></td>
</tr>
</tbody>
</table>

Several factors tend to encourage transit travel, reduce automobile travel and increase traffic safety.

These factors tend to reduce crash rates in several ways. Reducing traffic speeds reduces crash severity. Improving walking and cycling conditions (better sidewalks, crosswalks, bike paths, etc.) reduces pedestrian and cyclist risks, and drivers tend to be more cautious when they see more pedestrians and cyclists (Jacobson 2003). High quality transit and transit-oriented development allow some households to reduce their vehicle ownership, for example, giving up a second car, which leverages additional vehicle travel reductions; as a result, transit-oriented community residents own about half as many vehicles and generate 40-60% fewer vehicle trips as comparable residents of automobile-dependent communities (Arrington and Sloop 2010). More compact, mixed, connected community development tends to reduce traffic speeds and trip distances, and increases walking, cycling and public transit travel (Marshall and
Garrick 2011). Together these factors tend to reduce total vehicle travel, and appear to be particularly effective at reducing driving by higher-risk groups including youths, seniors and alcohol drinkers. Figure 6 illustrates how youth traffic death rates decline with increased transit ridership, which indicates that many young people will reduce their driving if given suitable alternatives.

### Figure 6  Youth and Total Traffic Fatality Rates (CDC 2012)

Youths (15-25 years old) tend to have about twice the traffic fatality rates as the total population average.

Both youth and total traffic fatality rates decline significantly with increased transit travel: cities where residents take more than 50 transit trips have about half the average traffic fatality rate as cities where residents average fewer than 20 annual transit trips. The statistical relationship between transit ridership and traffic safety is particularly strong for youths, suggesting that many young people are willing to reduce their higher-risk driving if given suitable alternatives.

Similarly, transit service improvements can reduce impaired driving. Residents often drive to parties, restaurants, and bars in automobile-oriented communities, but are more likely to walk, take transit or taxis in transit-oriented communities. Jackson and Owens (2009) and Broyles (2014) found that drunken driving rates declined after late-night transit service improvements between entertainment districts and homes. Public transit may also reduce distracted driving. Many passengers report that they choose transit in part because they can use telephones, computers and portable movie players while traveling (Thompson 2010). Many millennials (people born between 1982 and 2003) value having high quality transit available in part because it allows them to rest, read and use electronic devices while traveling (APTA 2014).

As a result, traffic safety policies and programs intended to reduce higher-risk driving, such as graduated licenses, senior driver testing, and drunk- or distracted-driving discouragement campaigns, are more effective if implemented with appropriate transit improvements. Since most casualty crashes involve multiple vehicles, even responsible drivers who always observe traffic laws and never use transit can benefit from transit improvements that reduce total vehicle traffic and higher-risk driving, and therefore their risk of being the victim of another drivers’ mistake.

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1 Ironically, bars have among the highest parking requirements of any land use types, indicating that conventional transport planning assumes that it is normal for drinkers to drive, and encourages this practice.
Figure 7 illustrates various ways that pro-transit strategies help increase traffic safety. A particular policy or planning decision may have multiple impacts. For example, a commuter-oriented transit improvement will directly reduce risk to the travelers who shift mode, and reduce risk indirectly if some households reduce their vehicle ownership which reduces their non-commuter vehicle travel. As a result, various pro-transit policies, including transit service improvements, TDM incentives, and support for transit-oriented development tend to have cumulative and synergistic effects: implemented together their impacts are greater than if implemented separately.

**Figure 7  How Transit Improvements, Incentives and Transit-Oriented Development Increase Overall Traffic Safety**

Public transit service improvements, transportation demand management (TDM) incentives, and transit-oriented development tend to increase safety in several ways. They reduce traffic speeds, reduce per capita vehicle travel, and are often particularly effective at reducing higher risk (youth, senior and impaired) driving. In addition to increasing safety, these vehicle travel reductions can provide significant co-benefits including reduced traffic and parking congestion, consumer savings, energy conservation and emission reductions, and improved mobility for non-drivers.
Crime Risk
Transit crimes include assaults and thefts against employees and passengers, plus theft, vandalism, trespassing and fare evasion against transit service providers (DfT 2010; Martin 2011).

Transit Crime
Table 5 summarizes crimes on transit properties (in vehicles, and at stations, stops and park-and-ride lots) reported to the FTA between 2000 and 2010. During this period violent transit crimes (murder, rape, robbery and assaults) declined, while ridership increased about 10%. Reported trespassing and fare evasion incidents are numerous and increased during this period, so including these categories in analysis gives an exaggerated sense of transit risks.

Table 5 | Transit Crime Reports (BTS 2013, Table 2-38)
<table>
<thead>
<tr>
<th>Transit trips (billions)</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Murder</td>
<td>12</td>
<td>16</td>
<td>0</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>9</td>
<td>9</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>Rape</td>
<td>37</td>
<td>37</td>
<td>65</td>
<td>25</td>
<td>24</td>
<td>23</td>
<td>5</td>
<td>1</td>
<td>4</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Robbery</td>
<td>3,480</td>
<td>3,308</td>
<td>1,641</td>
<td>1,408</td>
<td>1,561</td>
<td>1,656</td>
<td>2,222</td>
<td>2,634</td>
<td>2,799</td>
<td>2,849</td>
<td>2,077</td>
</tr>
<tr>
<td>Assaults</td>
<td>5,016</td>
<td>4,727</td>
<td>4,149</td>
<td>3,390</td>
<td>2,876</td>
<td>2,862</td>
<td>3,909</td>
<td>4,332</td>
<td>3,058</td>
<td>3,002</td>
<td>2,139</td>
</tr>
<tr>
<td>Theft</td>
<td>13,393</td>
<td>13,636</td>
<td>12,843</td>
<td>8,146</td>
<td>7,847</td>
<td>6,007</td>
<td>6,409</td>
<td>7,943</td>
<td>8,446</td>
<td>9,267</td>
<td>5,959</td>
</tr>
<tr>
<td>Vehicle theft</td>
<td>2,112</td>
<td>1,909</td>
<td>2,117</td>
<td>1,800</td>
<td>1,584</td>
<td>1,361</td>
<td>1,051</td>
<td>1,756</td>
<td>1,442</td>
<td>1,008</td>
<td>1,008</td>
</tr>
<tr>
<td>Vandalism</td>
<td>7,312</td>
<td>2,971</td>
<td>1,130</td>
<td>953</td>
<td>994</td>
<td>1,298</td>
<td>1,748</td>
<td>1,751</td>
<td>1,493</td>
<td>1,184</td>
<td>843</td>
</tr>
<tr>
<td>Trespassing</td>
<td>4,303</td>
<td>4,597</td>
<td>2,278</td>
<td>4,126</td>
<td>3,162</td>
<td>3,220</td>
<td>4,503</td>
<td>4,919</td>
<td>6,402</td>
<td>6,296</td>
<td>4,863</td>
</tr>
<tr>
<td>Fare evasion</td>
<td>53,863</td>
<td>47,258</td>
<td>74,385</td>
<td>69,950</td>
<td>103,156</td>
<td>129,590</td>
<td>126,092</td>
<td>135,602</td>
<td>197,819</td>
<td>249,004</td>
<td>167,746</td>
</tr>
</tbody>
</table>

Serious crimes (murder, rape, robbery and assault) on transit properties are small in number and declining.

Only a tiny portion of total violent crimes occur in transit vehicles and stations, as indicated in Table 6. Transit passengers also face crime risk when walking or cycling to and from stops and stations. Such trips usually occur on urban streets with natural surveillance (observers who would report threats). Only when walking or cycling in isolated areas are transit passengers likely to incur high crime risk.

Table 6 | Transit Versus Total National Crime, 2010 (FBI 2012, Table 1)
<table>
<thead>
<tr>
<th>Transit crime</th>
<th>Murder</th>
<th>Rape</th>
<th>Robbery</th>
<th>Assault</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>14</td>
<td>6</td>
<td>2,077</td>
<td>3,002</td>
</tr>
<tr>
<td>Total crime</td>
<td>14,722</td>
<td>85,593</td>
<td>369,089</td>
<td>781,844</td>
</tr>
<tr>
<td>Transit to Total Crime Ratios</td>
<td>1/1,051</td>
<td>1/14,265</td>
<td>1/178</td>
<td>1/260</td>
</tr>
</tbody>
</table>

A tiny portion of violent crimes (murders, rapes, robberies and aggregated assaults) occur on transit properties.

Residents sometimes oppose public transit services (such as new transit lines and stations) in their neighborhood based on fear that improving access by low-income non-drivers will increase crime rates. Before-and-after studies indicate that new transit services do not generally increase total crime rates (Blum 2012; Tay, et al. 2013). They may attract more people and business activity which may increase local crimes, but crimes per transit passenger, total regional crime, and risks to individuals do not usually increase (Billings, Leland and Swindell 2011).
Comparing Transit Versus Automobile Crime

Crime risk comparisons are challenging because different modes involve different types of risks (Table 7). For example, transit passengers face risks of assault and theft, while motorists face risks of road rage, vehicle assault, vehicle theft and vandalism, and both face assault and theft risks when walking to and from transit stations and stops, or parked automobiles (AAA 2009; FBI 2012). Most statistics only consider a subset of these risks, making comprehensive risk analysis difficult.

**Table 7** Transit And Automobile Crime Categories

<table>
<thead>
<tr>
<th>Transit</th>
<th>Automobile</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Passengers and employee assaults on transit properties</td>
<td>• Road rage and vehicular assault (intentional harm by drivers)</td>
</tr>
<tr>
<td>• Passengers assaults while accessing transit stations and stops</td>
<td>• Smash and grab assaults when vehicles are stopped</td>
</tr>
<tr>
<td>• Thefts against employees, passengers and agencies</td>
<td>• Assaults walking to or in parking lots</td>
</tr>
<tr>
<td>• Transit agency property vandalism</td>
<td>• Thefts of vehicles and from vehicles</td>
</tr>
<tr>
<td>• Fare evasion</td>
<td>• Vehicle, road and parking facility vandalism</td>
</tr>
</tbody>
</table>

Transit and automobile travel involve different types of crime risks.

Public transit travel has far lower property crime rates than automobile travel. In 2012 there were 5,959 thefts and 1,184 vandalism incidents reported on transit properties (BTS 2012, Table 2-38), compared with 2,332,604 motor vehicle-related thefts (638,964 vehicle thefts, 406,309 accessory thefts, and 1,287,331 non-accessory thefts from vehicles), plus numerous vehicle vandalism incidents (FBI 2012, Table 23). This indicates that property crimes are five hundred times more common for motorists than transit passengers, and accounting for exposure, public transit travel has significantly lower crime rates per passenger trip, mile and hour, as indicated in Table 8.

**Table 8** Automobles Versus Transit Travel Theft Rates, 2010 (FBI and NHTS Data)

<table>
<thead>
<tr>
<th>Mode</th>
<th>Thefts</th>
<th>Pass.-Trips</th>
<th>Rate</th>
<th>Pass.-Miles</th>
<th>Rate</th>
<th>Pass.-Hours</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Units</td>
<td>Millions</td>
<td>Per M trips</td>
<td>Millions</td>
<td>Per M Miles</td>
<td>Millions</td>
<td>Per M Pass-hrs</td>
<td></td>
</tr>
<tr>
<td>Transit</td>
<td>5,959</td>
<td>7,520</td>
<td>0.8</td>
<td>54,393</td>
<td>0.1</td>
<td>6,071</td>
<td>1.0</td>
</tr>
<tr>
<td>Household Vehicles</td>
<td>2,332,604</td>
<td>327,118</td>
<td>7.1</td>
<td>3,298,168</td>
<td>0.7</td>
<td>105,823</td>
<td>22.0</td>
</tr>
</tbody>
</table>

Transit travel has significantly lower crime rates per passenger-trip, -mile and -hour than driving.

In addition to being more frequent, automobile property crimes also tend to be more costly. A typical transit passenger theft involves a telephone, wallet or briefcase worth a few hundred dollars. Automobile thefts costs average $6,019, over six times the $987 average cost of non-automobile thefts (FBI 2012, Table 23). As a result, automobile crime costs are much higher per trip, mile or hour than transit travel.

Vehicle theft rates tend to decline with increased transit travel (Roberts and Block 2013), as illustrated in Figure 8 (San Francisco’s high vehicle crime rate is a notable exception) which provide significant financial savings. For example, the New York City Region averages 125 annual vehicle thefts per 100,000 residents, costing about $7.50 per capita (assuming $6,019 per theft), compared with 476 vehicle thefts per 100,000 residents in automobile-oriented San Bernardino County, costing about $29 per capita. Because automobiles are expensive and dangerous, automobile ownership and use tend to increase overall crime frequency and severity. For example, Stillman (2014) describes how lower-income people cited for minor crimes become caught in a cycle of debt and incarceration due to mounting court fees: in three of the four examples cited the initial crime was an unpaid traffic citation (the fourth involved stealing a can...
of beer) by a lower-income person, who, due to mounting court fees and inadequate mobility options, are forced to drive unlicensed and uninsured vehicles, exposing themselves to more severe crimes and punishments. Many of these crimes would not have occurred in more transit-oriented communities because lower-income residents are not forced to drive for transportation.

**Figure 8** Vehicle Thefts Versus Transit Mode Share In U.S. Cities (FBI and FTA Data)

Vehicle theft rates, and probably rates of other vehicle-related crimes, tend to decline as transit ridership increases in a community, due to lower per capita vehicle ownership. As a result, residents of transit oriented communities bear lower per capita crime costs.

**Crime Versus Traffic Casualties**

Transit travel violent crime risks are small compared with traffic accidents risk. For example, in 2010 in the U.S. there were 14,043 murders compared with (FBI and NHTSA data), compared with 32,788 traffic deaths, as illustrated in Figure i. Most murders (about 70%) resulted from conflicts among acquaintances (WSJ 2013); only a small portion reflect risks that could increase with transit ridership such as deaths during robberies, random assaults or inter-gang cross-fire. Only 14 murders occurred on transit properties.

**Figure 9** Traffic Versus Murder Deaths (BTS 2013, Table 2-38)

Murders, particularly stranger murders, are infrequent compared with traffic deaths.
**Terrorism Risks**

Terrorism has become a major transit security concern although the risk is actually small (Litman 2005; Rabkin, et al. 2005). Even including events such as the 2004 Madrid rail bombing which killed nearly two hundred people, and the 2005 London subway attack which killed about fifty people, traffic crashes kill hundreds of times as many people as terrorism. In 29 Organization for Economic Cooperation and Development (OECD) countries for which data were available, traffic deaths were approximately 390 times that of international terrorism (Wilson and Thomson 2005).

Because traffic accidents are a much greater risk than terrorism, total deaths can increase if terrorism fear causes travelers to shift from public transport to automobile. Such shifts do occur. In the three months after the 11 September 2001 terrorist attacks, shifts from air to automobile travel caused several hundred additional traffic fatalities (Gigerenzer 2004; Sivak and Flannagan 2004). Had these trends continued for more than a year, the additional traffic deaths would have exceeded the terrorist attack deaths. Similarly, there is evidence that the 7 September 2005 London subway terrorist attack caused mode shifts that increased total traffic deaths (Ayton, Murray and Hampton 2009).
Urban Crime Rates

People often assume that crime rates increase with city size and density, and therefore with transit travel and transit-oriented development. These assumptions are partly true and partly inaccurate. Simplistic analysis may lead to false conclusions concerning these factors. For example, crime mapping (Figure 10) and real estate guides such as Neighborhood Scout (www.neighborhoodscout.com) often indicate that crimes are much more common in denser, mixed city centers than lower-density suburbs, implying that urban environments tend to stimulate crime and increase risks to individuals (1000 Friends 1999), but this is not really what the data indicate. Dense, mixed urban areas have more of just about everything per area (acre, hectare, square-mile or -kilometer), good and bad: more people, businesses, wealth, poverty, social services, productivity, tragedy, generosity and crime, and some types of crime are associated with certain land use types, such as banks and bars. Contrary to the impressions made by this type of crime mapping, crime density does not really reflect the risk to individuals; the relatively high number of crimes reported in city centers does not really indicate that denser development causes responsible people to become criminals or increases the risk a typical person faces of becoming a crime victim (Walkscore 2014).

Figure 10  Crime Mapping (www.crimereports.com)

Crimes tend to concentrate near city centers due to the concentration of people, businesses, entertainment districts, motor vehicles, poverty and social services. This does not mean that increased development density increases total crime or that individuals face greater risk by living or visiting such areas.

Similarly, per capita crime rates tend to increase as a community grows in size from a village to a town, to a city, and all types of crime increased between 1955 and 1976, as indicated in Figure 11. Several factors can help explain these patterns. The positive association between community size and crime rates probably reflects community cohesion (the quality of relationships between community residents): smaller community residents are more likely to know and befriend their neighbors, or described differently, city residents tend to experience more anonymity and alienation.
Violent crime rates increased with city size and grew rapidly between 1955 and 1976, a period of what is often called “urbanization” (a growing portion of the population located in urban regions), although it is more accurately described as “suburbanization” since most urban growth occurred in suburbs, and many cities became automobile oriented, with urban freeways, expanded arterials and generous parking supply.

The growth in crime rates during this period where probably caused by a combination of increased mobility and urbanization (people traveled more and were less connected to their community), young Baby Boomers (young people tend to commit more crimes), urban poverty concentration (many non-poor families moved to suburbs), and possibly high blood lead levels from gasoline and paint (Reyes 2014).

However, these patterns reflect association, not causation; they do not indicate that total crimes or crime risk to individuals necessarily increase as more households located in cities. Most urban violence, particularly murders (about 70%), result from conflicts between acquaintances; the risk of random violence to transit passengers is low.

Because of the correlations between density, poverty and crime, individual households and neighborhoods often attempt to reduce their crime risk by distancing themselves from higher risk populations: households moved from cities to suburbs and neighborhoods discouraged affordable housing and public transit in order to exclude lower-income households. Such solutions may appear successful from an individual perspective but fail to address the root causes of crime such as poverty and alienation; on the contrary, they may increase total crime risk by concentrating poverty, increasing social isolation, reducing natural surveillance, and increasing police response times.

During the last two decades, U.S. crime rates declined significantly (Figure 12). Rates declined for virtually all types of crime in virtually all size communities, but the declines were particularly dramatic in the largest cities (more than a million residents), resulting in their rates being lower than in medium-size cities (250,000 to 1,000,000 residents).
Crime rates declined significantly during the last two decades, particularly in cities with more than a million residents. Crime rates are now lower in large cities than in medium-size cities (250,000 to one million).

As a result of these trends, the largest cities now have significantly lower crime rates (23% lower for violent crimes and 32% lower for property crimes) than medium-size cities, as illustrated in Figure 13.

Crime rates tend to increase as community population grows, peaks at 500,000-1,000,000 residents, and is significantly lower for cities with over a million population, which also have the highest transit ridership rates (AATPMPC = Average Annual Transit Passenger-Miles Per Capita).
The 1995-2006 decline in urban crime rates probably resulted from a combination of aging population (older people commit fewer crimes), declining drug abuse, improved policing methods, and lower blood lead levels, but these do not explain why crime rates are lower in large compared with medium-size cities, which experienced similar demographic trends. Large cities’ low crime rates can be explained by:

- Less concentrated poverty, as more middle- and higher-income residents move into inner neighborhoods. This can increase security and economic opportunity (better schools and local job opportunities) to low-income residents, which can help reduce poverty and crime rates.
- Large city neighborhoods tend to be dense, mixed and walkable, factors associated with reduced crime rates at the neighborhood scale due to more natural surveillance and community cohesion as more responsible (non-criminal) people live, work, walk and travel on city streets.
- Large cities tend to offer residents who are at-risk of criminal behavior more economic opportunities due to better access to education and employment.
- Larger cities and denser cities may have better policing and social services. They can afford to have more specialists and targeted programs, and increased density reduces emergency response times.
- Large cities tend to have higher average incomes and education levels, although they also tend to have greater income disparities, with large numbers of both high- and low-income households.
- Larger cities may have more affluence and corporate headquarters, and therefore more charity funds and other support for social programs.
- Reduced vehicle ownership tends to reduce vehicle-related crime, which is a major portion of total crime.

These factors are discussed in more detail below.

**Poverty Concentration**

Crime and related problems such as drug and alcohol abuse, and mental illness are strongly correlated to poverty. Crime and delinquency rates tend to be high and durable (they continue for multiple generations) in neighborhoods with concentrated poverty, because residents have fewer positive role models and social support, inferior schools, and fewer economic opportunities (Fraser, Oakley and Levy 2013). As a result, development policies that result in more mixed-income communities are likely to reduce the social and crime problems caused by concentrated poverty (Basolo 2013; Levy, McDale and Bertumen 2013). Transit oriented development can be a catalyst for such development (Reconnecting America 2009).

**Community Design (Surveillance and Control)**

Crime Prevention Through Environmental Design (CPTED) applies research concerning how community design factors such as density and walkability affect crime rates to identify crime reduction strategies. There is debate concerning which strategies are most effective. Some experts emphasize *defensible space*, which assumes that crime risk declines if residents gain more control of an area, which supports limiting public access, privatized spaces (fenced yards, shopping malls and gated communities), street closures, shops and homes set back from the street, single-use development (separating residential and commercial activities), and automobile travel. Others experts emphasize the importance of *natural surveillance* (also called *eyes on the street*, Jacobs 1961), which assumes that crime risk declines as more responsible (non-criminal) people live, work and walk in an area, which supports maximizing public access with well-connected streets and paths, mixed (commercial and residential) development, houses and shops close to sidewalks, and policies that encourage walking and cycling.
Until recently, most CPTED research consisted of before-and-after studies of interventions in high crime areas which indicated that defensible space strategies can reduce crime (Gardiner 1978), but this may simply reflect displacement of crime to other locations. Some recent studies use more comprehensive analysis of how various geographic and design factors affect crime rates (Browning, et al. 2010; Christens and Speer 2005; Stucky and Ottensmann 2009). The results indicate that all else being equal, crime rates are negatively associated with density and mix (Hillier and Sahbaz 2006; Li and Rainwater 2000). This research supports the conclusion that natural surveillance reduces crime risk.

**Affordable Accessibility**

Some research indicates that, all else being equal, communities with more diverse transport options tend to have lower per capita crime rates (Moreno Garcia 2005). More affordable transport options (good walking, cycling and public transport) can reduce poverty (Gao and Johnston 2009). High quality public transit increases labor participation (CTS 2010; Sanchez, Shen and Peng 2004), even in automobile-oriented cities (Yi 2006). International experience also indicates that transit service improvements can reduce crime risks. For example, crime rates declined after Bus Rapid Transit (BRT) service was established in Bogotá, Columbia (Garcia and José 2005; Hidalgo, et al. 2013).

**Summary**

This analysis suggests that most transit travel has low crime risk due to natural surveillance by employees, fellow passengers and by-passers, and public transit improvements and transit-oriented development can help reduce overall crime. The greatest risks occur when passengers walk, bicycle or wait in isolated areas (Kennedy 2008), although even these risks are usually no greater than those faced by motorists walking to and from parked vehicles. Transit agencies can reduce crime risks by implementing crime prevention programs and security systems (patrols, cameras and emergency alarms), and individuals can increase security by carrying a mobile telephone and avoiding risky situations, for example, by traveling by taxi rather than transit to isolated destinations (Loukaitou-Sideris 2009).

Table 9 summarizes possible ways that improving affordable transport options and transit-oriented development can increase security.

<table>
<thead>
<tr>
<th>Crime Risk Factor</th>
<th>Transit and Transit-Oriented Development Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poverty concentration</td>
<td>More mixed development can reduce poverty concentration and increase at-risk resident’s economic opportunities.</td>
</tr>
<tr>
<td>Natural surveillance and community cohesion</td>
<td>More businesses, residents and by-passers provide surveillance and help build local social networks (neighbors who know and care about each other).</td>
</tr>
<tr>
<td>Vulnerable population’s access to economic opportunity</td>
<td>Better access to education and employment for at-risk residents, many of whom cannot drive or do not own an automobile.</td>
</tr>
<tr>
<td>Policing efficiency and response times</td>
<td>Compact development allows more specialized policing and faster response times.</td>
</tr>
<tr>
<td>Transit security</td>
<td>Increased ridership makes transit policing more efficient (lower costs per passenger) and builds public support, leading to expanded programs.</td>
</tr>
<tr>
<td>Motor vehicle ownership</td>
<td>Reduced vehicle ownership reduces vehicle crimes (vehicle assaults, thefts and vandalism), which are more common and costly than transit crimes.</td>
</tr>
</tbody>
</table>

*Improving transportation options and transit-oriented development (TOD) can reduce crime risk in several ways. These tend to reduce total per capita crime rates rather than simply shifting where crimes occur.*
Improving transport options and transit-oriented development policies can help create a positive cycle of more responsible (non-criminal) urban residents, increased walking and transit travel (and therefore more natural surveillance), improved urban services, increased economic opportunity for at-risk residents, reduced crime rates, reduced fear, and reduced stigma of urban areas, as illustrated in Figure 14.

**Figure 14** The Positive Security Cycle

Communities tend to become safer as more non-criminals walk, bike and use public transit, and development is more compact and mixed, creating a positive feedback cycle.
Crash Costs Compared With Other Transportation Costs

Various studies have monetized (measure in monetary value) transport costs, including crash costs (Blincoe, et al, 2014; Litman 2009). Crashes are one of the largest categories of societal costs associated with motor vehicle use. Total annual U.S. vehicle crash costs are estimated to exceed $500 billion, about five times greater than traffic congestion or vehicle air pollution costs, as illustrated in Figure 14.²

Figure 14 Costs of Motor Vehicle Use in the U.S. (Litman 2009)

This figure illustrates the estimated magnitude of various transportation costs. Crash costs are one of the largest categories, greater than congestion or pollution costs.

This has important implications. It suggests that it is important to consider safety impacts when evaluating policy or planning options. For example, when comparing potential traffic congestion reduction strategies, a roadway expansion that reduces congestion costs by 10% but increases crash costs by 2%, due to higher traffic speeds or induced vehicle travel, is a poor investment; congestion cost savings are offset by increased crash costs. In contrast, a transit improvement that reduces congestion costs by 5% but also reduces crash costs by 2% is worth more overall when congestion and crash cost reductions are totaled. Current planning generally gives little consideration to overall safety impacts, which tends to undervalue transit improvements and transit-oriented development, and overvalues roadway expansions that increase vehicle traffic and sprawl.

This issue is not just a theoretical issue. People are willing to pay significant premiums to drive safer vehicles or live in safer communities. The analysis in this report indicates that transit travel and transit-oriented development tend to provide large safety and security benefits. Our challenge is to communicate these benefits to individuals and decision-makers.

² Some studies give lower total estimates of crash costs because they are based on a “human capital” methodology, which only considers people’s economic productivity, rather than a comprehensive analysis based on willingness-to-pay to reduce risks, including non-market values. Most experts agree that willingness-to-pay is the appropriate methodology for valuing safety programs that avoid damages. A human capital methodology may be more appropriate for damage compensation.
Risk Perception and Communication

Despite its overall safety and security, many people consider public transit dangerous, and so are reluctant to use it or support its expansion in their community (Ferrell, Mathur and Mendoza 2008; Kennedy 2008). Several factors may contribute to this exaggerated fear. Transit travel often requires passengers to be confined with strangers in sometimes crowded and uncomfortable vehicles and stations, and although most passengers are responsible, considerate and clean, a (usually small) portion is anti-social, rude and dirty (Ringerud 2014). These conditions can cause feelings of powerlessness, discomfort and insecurity.

Disproportionate media coverage can also stimulate transit fear. Because transit accidents and assaults are infrequent, they tend to receive significant media coverage (Martin 2011). A fatal train or bus crash, or transit terrorist attacks often produce intense national and international media coverage, while fatal automobile crashes are so common they are usually only reported locally.

Conventional traffic safety programs often emphasize the overall safety of automobile travel, since most crashes involve special risks such as impaired driving, young drivers and hazardous road conditions (ITE 2007). From this perspective, it is inefficient and unfair to increase safety by reducing total vehicle travel because that “punishes” all motorists for risks caused by a minority. Those safety programs seldom acknowledge the relative safety of transit travel or promote transit as a traffic safety strategy. A new traffic safety paradigm recognizes that all vehicle travel incurs risk, that high- and low-risk driving are complements (increasing total vehicle travel usually increases higher-risk driving), and that vehicle travel reduction strategies can increase safety (FHWA 2010; Litman and Fitzroy 2012).

Transit agency safety and security messages, such as those illustrated in Figure 15, tend to emphasize dangers, including dramatic but unlikely threats such as terrorism, without counterbalancing messages about transit’s overall safety.

Figure 15 Typical Transit Safety and Security Messages Emphasize Risks, Not Safety

Transit agency safety and security messages often emphasize unusual dangers without counterbalancing messages that emphasize the overall safety and security of public transit travel.
For this study I reviewed the safety and security messages of twenty representative transit agency websites, as summarized in Table 10. Most describe various risks and safety programs, and some offer safety advice. Although some websites include information about public transit economic and environmental benefits, only one (Utah) mentions the overall safety of transit travel, and none describe transit’s relatively low crime rates.

<table>
<thead>
<tr>
<th>Agency, City, Website</th>
<th>Safety and Security Messages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Champaign-Urbana Mass Transit District, Champaign-Urbana, IL (<a href="http://www.cumtd.com">www.cumtd.com</a>)</td>
<td>“Safety and Security” page describes what the agency is doing to maximize rider security and safety.</td>
</tr>
<tr>
<td>Chattanooga Area Regional Transportation Authority, Chattanooga, TN (<a href="http://www.carta-bus.org">www.carta-bus.org</a>)</td>
<td>No mention of safety or security.</td>
</tr>
<tr>
<td>Chicago Transit Authority, IL (<a href="http://www.transitchicago.com">www.transitchicago.com</a>)</td>
<td>Includes a “Safety and Security” page, and a “Security Tips” brochure.</td>
</tr>
<tr>
<td>Greater New Haven Transit District, New Haven, CT (<a href="http://www.gnhtd.org">www.gnhtd.org</a>)</td>
<td>Emphasizes that operators receive special safety training. No other discussion of safety or security.</td>
</tr>
<tr>
<td>Intercity Transit, Olympia, WA (<a href="http://www.intercitytransit.com">www.intercitytransit.com</a>)</td>
<td>Lists various benefits of public transit, but not traffic safety. Has no specific safety or security messages.</td>
</tr>
<tr>
<td>Long Beach Transit, CA (<a href="http://www.lbtransit.com">www.lbtransit.com</a>)</td>
<td>“Safety and Security” page describes the Agency’s security programs.</td>
</tr>
<tr>
<td>Massachusetts Bay Transportation Authority, Boston, MA (<a href="http://www.mbta.com">www.mbta.com</a>)</td>
<td>“Safety” page describes ways to increase user safety (mostly personal security). “Transit Police” page describes security programs and recent crimes.</td>
</tr>
<tr>
<td>Metro Transit, Minneapolis, MN (<a href="http://www.metrotransit.org">www.metrotransit.org</a>)</td>
<td>Includes a “Safety and Security” page which describes safety and policing programs and offers safety tips.</td>
</tr>
<tr>
<td>Metropolitan Atlanta Rapid Transit Authority, Atlanta, GA (<a href="http://www.itsmarta.com">www.itsmarta.com</a>)</td>
<td>“Safety on MARTA” page offers safety and security trip, and a “MARTA Police” page which describes the agency’s policing services.</td>
</tr>
<tr>
<td>Metropolitan Transit Authority of Harris County, Houston, TX (<a href="http://www.ridemetro.org">www.ridemetro.org</a>)</td>
<td>“Safety and Security” page describes ways to increase personal safety and security. States that “In today’s world, protecting one’s personal safety has never been more important.”</td>
</tr>
<tr>
<td>Suburban Mobility Authority for Regional Transportation, Detroit, MI (<a href="http://www.smartbus.org">www.smartbus.org</a>)</td>
<td>“Safety and Security” page provides basic safety advice. Emphasizes operators’ safety training and the system’s low accident rates.</td>
</tr>
<tr>
<td>Toronto Transit Commission, Toronto, ON (<a href="http://www.itsmartca.com">www.itsmartca.com</a>)</td>
<td>“Safety and Security” page offers information and guidance on public transit safety and security.</td>
</tr>
<tr>
<td>TransLink, Vancouver, BC (<a href="http://www.translink.ca">www.translink.ca</a>)</td>
<td>“Sustainability” page highlights environmental benefits but not safety. “Safety and Security” page describes the agency’s safety and security programs.</td>
</tr>
<tr>
<td>Utah Transit Authority, Salt Lake City, UT (<a href="http://www.rideuta.com">www.rideuta.com</a>)</td>
<td>“Transit Studies” page states, “You are 25 times less likely to die in a traffic accident when you ride public transit versus travel in a personal vehicle.” “Safety and Security” page offers safety tips.</td>
</tr>
</tbody>
</table>

Transit agencies websites seldom provide positive information about public transit safety benefits.
A New Safety Narrative
Transportation professionals and organizations can do more to convey the overall safety and security of public transit to current transit passengers, potential passengers, local residents and businesses, and public officials. This new safety narrative can be incorporated into all types of communication, including planning documents, community engagement, performance evaluations, newsletters, websites, media contacts, advertising and employee training.

The new safety narrative provides accurate and comprehensive information on various ways that public transit can affect safety and security. It should not understate risks or blame victims by implying that they should have been more cautious; safety and security should be recognized as a serious concern that can be reduced through cooperation between transit agencies, passengers and communities. It addresses common misperceptions about public transit risks, such as exaggerated fear of crime or terrorist attacks. It answers common questions such as:

- Is public transit dangerous?
- What are the greatest risks associated with transit?
- Does expanding transit service (such as a new line or station in a neighborhood) increase local crime risk?
- How can individuals and communities minimize transit risks?
- What are accurate and objective sources of information on transit crime risks?
- How can people and businesses report transit safety and security concerns?

Transit agencies should carefully assess their safety and security messages to ensure that they are overall positive and convey a sense of partnership. Although rational arguments alone may not change everybody’s feelings about public transit, appropriate safety and security information should be part of overall marketing programs that help reposition public transit as an efficient, attractive, enjoyable and prestigious form of travel that can enhance people’s lifestyle and community.

Below are examples of ways to apply the new transit safety narrative.

Policy and Planning Evaluation
Common transportation policy, planning and investment decisions can incorporate more comprehensive analysis of safety and security impacts. For example, when evaluating a new rail or bus line, a transit encouragement program, or transit-oriented developments, crash reductions should be included as benefits. At a minimum, these impacts should be described, and if possible, quantified. Models are available to help predict these impacts in a particular situation (Karim, Wahba and Sayed 2012; Lachapelle, et al. 2011). For example, a transit improvement, such as dedicated bus lanes, that shifts 5,000 daily commuters with 10-kilometer average trip distances from automobile to transit shifts 20 million total annual passenger-kilometers (5,000 commuters x 20 kms per day x 200 annual commutes = 20 million). Assuming buses average 1 death and 10 disabilities per billion passenger-kilometers, and automobiles average 11 deaths and 110 disabilities per billion passenger-kilometers, 20 million passenger-kilometers shifted from automobile to transit can be estimated to reduce 0.2 deaths and 2.0 disabilities annually, plus reductions in less severe crashes. Similarly, if transit-oriented development (TOD) residents average 5 traffic deaths and 50 disabilities annually per 100,000 residents, compared with 20 deaths and 200 disabilities per 100,000 residents elsewhere in the region, a policy that shifts 10,000 residents from auto-oriented to TOD housing can be estimated to reduce 1.0 death and 10 disabilities annually.
Public Communications
Virtually any communication involving public officials, transit passengers and the general public can incorporate information about transit safety and security. These messages should use appropriate perspectives and wording for various audiences.

- Transit passengers and potential passengers, neighborhood residents and businesses want realistic assessments of the risks they face and ways to reduce them. They want assurances that transit agencies are their partner and advocate for improving community safety, security and health. They want to know how to contact transit agencies and local officials if they have a concern or encounter a problem.

- Public officials want reliable evidence that public transit improvements and transit-oriented development can provide measurable safety, security and health benefits, or at least not exacerbate such problems.

- The general public wants accurate information on the overall safety and security of public transportation, and evidence that transportation agencies are responsive to users and residents’ concerns about these issues. This is particularly important when responding to high-profile transit crashes or crimes.

The following text box summarizes key messages which can be communicated frequently and illustrated with graphs and charts. This general information can be augmented with specific data from a particular agency or area. For example, transportation agencies can compare automobile and transit crash and crime rates and report trends in these impacts.

Ways That High Quality Public Transit Tends to Increase Safety, Security and Health

- *Shifts travel from automobile to transit.* Transit passengers have about a tenth the crash injury or death rate as automobile occupants.

- *Leverages reduced automobile travel.* High quality public transit and transit-oriented development tend to leverage overall reductions in per capita vehicle ownership and travel by creating communities where residents own fewer automobiles, travel shorter distances, and rely more on walking, bicycling and transit.

- *Increased economic opportunity.* Transit service improvements can reduce the causes of crime by improving disadvantaged people’s education and employment opportunities.

- *More passive surveillance.* As more non-criminals use public transit, and live, work and walk in transit-oriented neighborhoods, there is more chance that crime threats will be prevented and reported.

- *More community cohesion.* Transit oriented development and more walkable streets tend to increase positive interactions between neighbors, providing safety and security.

- *More safety programs.* High quality transit includes active safety and security programs (crime prevention through environmental design, police patrols, and security cameras) can reduce safety and security risks.

- *Increases public fitness and health.* Since most transit trips include walking and cycling links, transit tends to increase exercise.
Safer Than You Think! Revising the Transit Safety Narrative  
Victoria Transport Policy Institute

The new narrative presents easy to understand information, such as the graphs in Figure 16.

**Figure 16   Examples of Transit Safety Messages**

<table>
<thead>
<tr>
<th>Public Transit</th>
<th>Automobile</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>8</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Transit-Oriented Neighborhoods</th>
<th>Automobile-Oriented Neighborhoods</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>25</td>
</tr>
<tr>
<td>5</td>
<td>20</td>
</tr>
<tr>
<td>10</td>
<td>15</td>
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<td>15</td>
<td>10</td>
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<tr>
<td>20</td>
<td>5</td>
</tr>
</tbody>
</table>

**Integrated Safety, Security and Marketing Programs**

Many transit agencies have separated safety, security and marketing programs; the new safety narrative integrates these programs by highlighting safety and security benefits and incorporating safety and security messages into general marketing materials (schedules, maps, websites, etc.). For example, safety signs, brochures and webpages should begin with positive messages about the overall safety of transit travel before providing specific guidance on possible ways to reduce risks.

Transit agencies should develop crime prevention partnerships with users and local communities. They can provide practical guidance on how system users can prevent and respond to anti-social behaviors such as rude language (Loukaitou-Sideris, Liggett and Iseki 2010). Because mobile telephones can increase transit safety and security, as well as providing convenient transit schedule and navigation information, transit agencies can investigate ways to support mobile phone ownership by their passengers, for example, by bundling monthly transit passes with discounted telephone service.

**Incident Response**

Transit agencies should be prepared to respond publically to crash or crime incidents, if needed. They should acknowledge the tragedy and provide support to victims and the community, but put the incident into perspective relative to the overall safety and security of public transportation.

**Transit Safety and Security Program Valuation**

To the degree that transit safety and security programs increase transit travel by discretionary users (people who would otherwise drive), it can be considered a transportation demand management strategy that helps achieve strategic objectives such as reduced traffic and parking congestion, consumer savings and affordability, and pollution emission reductions. Targeted security improvements and information programs can be implemented in conjunction with other transit service improvements and incentives.
**Conclusions**

Public transit is a relatively safe (low crash rate) and secure (low crime rate) form of travel. Transit travel has about a tenth the crash casualty (death or injury) rate as automobile travel, and residents of transit-oriented developments have about a fifth the per capita traffic casualty rate as residents of automobile-oriented areas. Transit crimes tend to be less frequent and costly than motor vehicle crimes, and there is much that individuals and communities can do to increase transit safety and security. Transit becomes safer as more responsible (non-criminal) people use it and live in transit-oriented communities.

Many people have exaggerated transit fears. This results, in part, from excessive news coverage of transit crashes and crimes, and the nature of transit travel, which requires passengers to share sometimes crowded and uncomfortable spaces with strangers. It can also reflect outdated information on urban crime rates.

Current communications about transit safety and security tend to highlight risks. Transportation professionals can apply a new narrative which emphasizes safety and security. Table 11 summarizes key conclusions about actual and perceived transit risks, and how they can be addressed in this new narrative.

<table>
<thead>
<tr>
<th>Table 11: Actual Versus Perceived Transit Risks</th>
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</thead>
<tbody>
<tr>
<td><strong>Type of Risk</strong></td>
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<tr>
<td>Transit passenger crash risk</td>
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<tr>
<td>Crash risk while accessing transit</td>
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<tr>
<td>Crash risk to other road users</td>
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<tr>
<td>Overall community crash rates</td>
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<td>Transit passenger crime risk</td>
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<tr>
<td>Crime risk while accessing transit</td>
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<tr>
<td>Impacts on overall community crime rates</td>
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<tr>
<td>Terrorism risk</td>
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</tbody>
</table>

*Comprehensive analysis considers a variety of risk factors.*
Transportation risk analysis is complicated. Although statistics show positive correlations between transit travel, city size and crime, these reflect confounding factors such as poverty; they do not mean that transit travel is risky or that increased transit increases crime. On the contrary, overall traffic accident and crime rates tend to decline with improved transit service and more transit-oriented development. Although these safety and security benefits are often large and valuable, they are usually ignored in transportation planning and policy analysis. More comprehensive traffic safety and security analysis can help encourage transit ridership and increase public support for transit-oriented development, and therefore help achieve strategic planning objectives such as congestion reductions, facility cost savings, improved mobility for non-drivers, energy conservation, emission reductions, and improved public health.

The following are general recommendations for better communicating transit risks:

- Provide information that highlights the overall safety benefits of public transit to individuals and communities, and practical ways to increase safety. Communicate these messages in various ways, reflecting the diverse perspectives and concerns of different audiences.
- Collect and distribute accurate, timely and positive information on public transit risks and safety programs, including crash and crime data, and safety and security plans. Provide context when reporting risk data, for example, by comparing transit and automobile crash and crime rates, and comparing different transit services and communities.
- Provide practical guidance to transit passengers and communities on ways to increase safety and security.
- Develop better models for predicting how a policy or project will affect transit safety, security and health.
- Create multi-dimensional safety and security programs that integrate local planning, infrastructure design, neighborhood policing and user information. Apply crime prevention through environmental design (CPTED), and build partnerships with local communities and police to implement these strategies.
- Integrate the new safety narrative into transportation demand management and smart growth development programs. Reducing exaggerated fear of transit can help achieve strategic planning objectives.
- Incorporate these benefits into economic evaluation of transit improvement and encouragement programs, and transit-oriented developments.
- Integrate safety information into overall marketing activities that identify and overcome common barriers to transit travel, and repositions public transit as a prestigious and enjoyable mode.

This is not to deny that transit users may occasionally face risks, and so may choose to avoid waiting in isolated areas, just as motorists avoid parking in isolated areas or dog owners avoid walking their pets in isolated areas.

This subject deserves more research. It would be useful to perform more detailed statistical analysis of the relationships between transportation and land use conditions, and crash and crime rates, accounting for demographic factors such as age and income in order to identify how planning decisions, such as local walkability, transit service quality, street design, development density and mix, and building design affect these risks. It would be useful to explore in more detail the factors that contribute to transit dread and ways to overcome this excessive fear. It would also be useful to identify ways that individuals and communities can further increase public transit’s safety and security benefits.
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