M E M O R A N D U M

DATE: October 22, 2010

TO: SFMTA Board of Directors
Tom Nolan, Chairman
Jerry Lee, Vice-Chairman
Cameron Beach, Director
Cheryl Brinkman, Director
Malcolm Heinicke, Director
Bruce Oka, Director

THROUGH: Nathaniel P. Ford Sr.
Executive Director/CEO

FROM: Bond M. Yee, P.E.
Director of Sustainable Streets

SUBJECT: New York City Pedestrian Safety Study and San Francisco Data

Please find attached a report prepared by the Sustainable Streets Division on San Francisco pedestrian safety data.

In August of 2010, the New York City Department of Transportation (NYCDOT) released its *Pedestrian Safety Study and Action Plan*. According to NYCDOT, the study "examines over 7,000 records of crashes that have caused serious injuries or fatalities to pedestrians, and indentifies underlying causes." In response to interest the report generated here, San Francisco Municipal Transportation Agency (SFMTA) staff reviewed the study and compared New York City collision data in relation to data available for San Francisco.

This report is not intended to replicate the original New York City study for San Francisco. The goal is rather to inform on pedestrian collision statistics using the New York City study's analysis framework. While San Francisco and New York City share many commonalities in terms of pedestrian safety statistics, comparisons should be done with care due the different sizes of the city, collision reporting procedures, and institutional context.

Key San Francisco findings include:

- Fatal traffic collisions in San Francisco have decreased by two-thirds since the levels recorded in the 1960's.

- There were more than 800 collisions involving pedestrians in 2008.

- San Francisco has one of the lowest rates of pedestrian injury collisions per walk trip to work in California.

- Pedestrians typically account for half of the people killed in traffic collisions in San Francisco.

- More pedestrians are involved in collisions at intersections, on Fridays, during the month of December, and between the hours of 3:00 p.m. to 6:00 p.m.

- The leading cause of non-fatal pedestrian injury collisions is motorist failure to yield, which can have inattentive driving as a contributing factor.

- While males constitute a disproportionately higher share of drivers involved in injury and fatal collisions, males and females are more equally represented as pedestrians in collisions.

- Approximately 12 percent of pedestrians involved in traffic collisions are between the ages of 0-19. Approximately 19 percent are 60 or older.

The report also briefly highlights some pedestrian safety initiatives that the SFMTA has been undertaking. We hope that this report explains why we believe that reducing the number of pedestrian collisions remains a critical task for our City.

Attachment

cc: Mayor Gavin Newsom
Jason Elliott, Office of Mayor Gavin Newsom
ED Staff

New York City's Pedestrian Safety Study and San Francisco Data

SFMTA | Municipal Transportation Agency

October 21, 2010

City and County of San Francisco
San Francisco Municipal Transportation Agency
Sustainable Streets Division
1 South Van Ness Avenue, 7th Floor
San Francisco CA 94103

NEW YORK PEDESTRIAN SAFETY STUDY AND ACTION PLAN

In August of 2010 the New York City Department of Transportation (NYCDOT) released its *Pedestrian Safety Study and Action Plan*. According to the NYCDOT website, the study "examines over 7,000 records of crashes that have caused serious injuries or fatalities to pedestrians, and indentifies underlying causes."[1] The report was prepared by NYCDOT staff and the New York University Center for Transportation Policy and Management. In addition to the city project team, it included a cited team of about ten researches affiliated with regional universities.[2] The study is accompanied by a Technical Supplement with an extensive set of maps analyzing collision frequency by various factors. In response to interest the report generated here, San Francisco Municipal Transportation Agency (SFMTA) reviewed the study and compared New York City collision data in relation to data available for San Francisco.

This report is not intended to replicate the original New York City study for San Francisco. The goal is rather to inform on pedestrian collision statistics using the New York City study's analysis framework. While San Francisco and New York City share many commonalities in terms of pedestrian safety statistics, comparisons should be done with care due the different sizes of the city, collision reporting procedures, and institutional context.

Key San Francisco findings include:

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- Pedestrians typically account for half of the people killed in traffic collisions in San Francisco.
- More pedestrians are involved in collisions at intersections, on Fridays, during the month of December, and between the hours of 3:00 pm to 6:00 pm.
- The leading cause of non-fatal pedestrian injury collisions is motorist failure to yield, which can have inattentive driving as a contributing factor.
- While males constitute a disproportionately higher share of drivers involved in injury and fatal collisions, males and females are more equally represented as pedestrians in collisions.
- Approximately 12 percent of pedestrians involved in traffic collisions are between the ages of 0-19. Approximately 19 percent are 60 or older.

[1] For the report and other documents see http://www.nyc.gov/html/dot/html/about/pedsafetyreport.shtml
[2] *Pedestrian Safety Study and Action Plan*, Page 47.

DATA SOURCES

The creation of safety reports is not new to New York City or San Francisco. Studies reviewing collision trends and causes are typically considered a routine part of the transportation profession. In San Francisco annual collision reports have been prepared by staff highlighting different topics, with the latest 2008 Collision Report posted on the SFMTA website (www.sfmta.com). SFMTA staff also prepares specific reports, such on bicycle collision statistics, and conducts geographic analysis of area patterns to identify hot spots. Other city agencies such as the San Francisco Police Department, the San Francisco County Transportation Authority, and the Department of Public Health also review and analyze collision statistics.

The source of the San Francisco collision data used by SFMTA here and in other reports is the Statewide Integrated Traffic Records Systems (SWITRS) maintained by the California Highway Patrol (CHP). It only includes collisions reported by the SFPD. California Vehicle Code Section 20008 requires that local governments send their police collision reports to the State. SWITRS data is usually made official nine to ten months after a year closes. The data used in our reports excludes collisions that occurred on San Francisco freeways, in the Presidio, or on private property. It includes collisions on city streets that are classified as state highways (such as 19th and Van Ness avenues). The San Francisco Police Department also compiles data on its own collision tracking database. An additional source of collision information is Transit Safe, a database maintained by the SFMTA to track safety incidents involving Muni vehicles.

SFMTA REVIEW OF NEW YORK PEDESTRIAN SAFETY STUDY

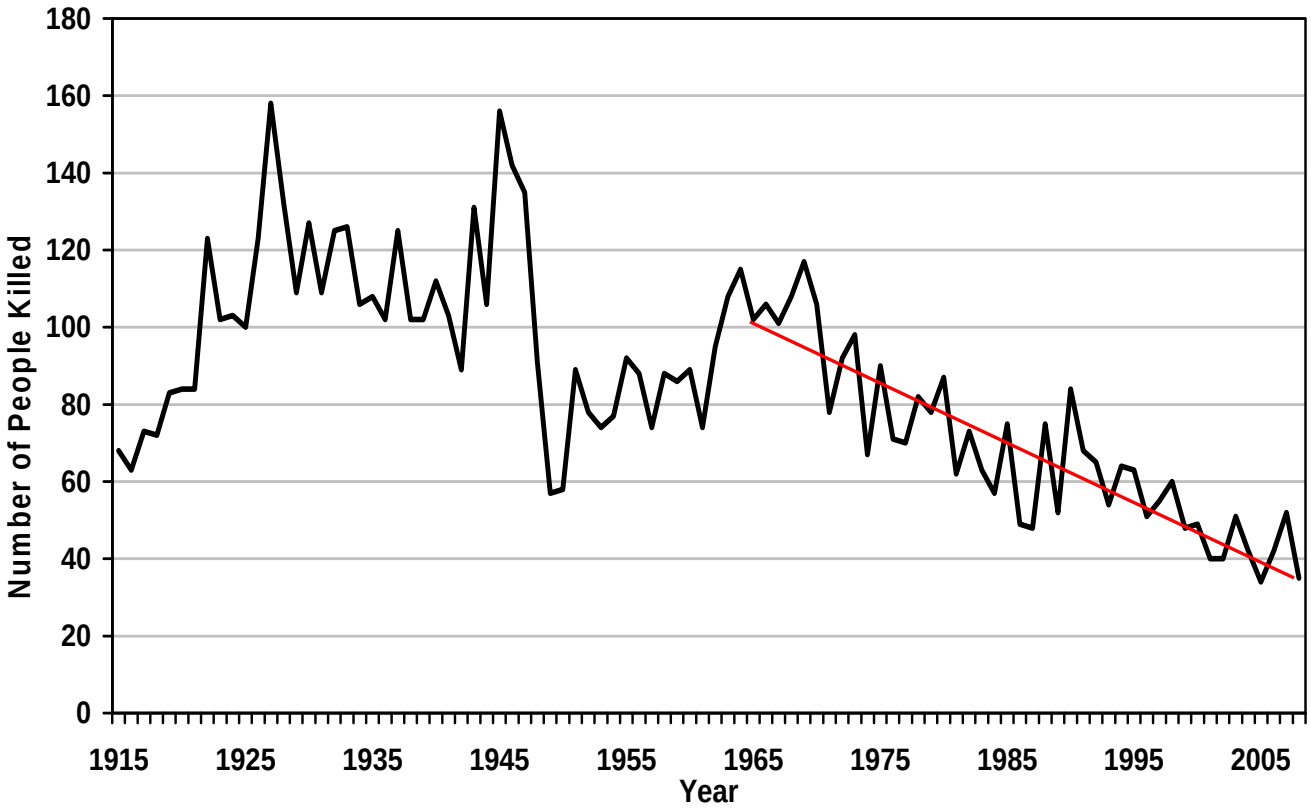
This report is divided into the following sections, generally following the organization of the original New York Pedestrian Safety Study and Action Plan. Additional San Francisco figures have been introduced where relevant.

Part 1: Fatal Trends and Rates
Part 2: Cost of Collisions
Part 3: Collisions by Vulnerable Road Users
Part 4: Existing Safety Programs
Part 5: Where Collisions Happen
Part 6: When Collisions Happen
Part 7: How Collisions Happen
Part 8: Characteristics of Parties Involved in Collisions
Part 9: New York City Action Plan
Part 10: Other Factors Influencing Collision Trends

1: FATAL TRENDS AND RATES

The first section of the New York City *Pedestrian Safety Study and Action Plan* discusses fatal collision trends. New York City and San Francisco have both seen a gradual reduction in fatal collision rates over time. While there may be more public attention paid on the up and down fluctuation of fatal collision statistics from year to year, long-term trends in San Francisco are positive.

Figure 1 - All Traffic Fatalities for San Francisco County, 1915 through 2008[3]



[3] Figure 1 includes freeway and street collisions, unlike data in rest of the report. Sources: The Street Traffic Control Problem of San Francisco," Miller McClintock, 1927, Table 10. "San Francisco City-Wide Traffic Survey," Miller McClintock, 1937, Table 156. California Highway Patrol (SWITRS)

Figure 1 - All Traffic Fatalities for San Francisco County, 1915 through 2008

Year	Total of Traffic Fatalities
1915	68
1916	77
1917	75
1918	82
1919	84
1920	84
1921	121
1922	121
1923	102
1924	102
1925	100
1926	135
1927	140
1928	122
1929	120
1930	125
1931	120
1932	123
1933	105
1934	103
1935	108
1936	117
1937	101
1938	101
1939	108
1940	110
1941	109
1942	110
1943	125
1944	143
1945	156
1946	138
1947	100
1948	61
1949	59
1950	99
1951	84
1952	79
1953	78
1954	90
1955	92
1956	80

Year	Total of Traffic Fatalities
1957	87
1958	85
1959	89
1960	80
1961	98
1962	105
1963	118
1964	105
1965	102
1966	101
1967	102
1968	119
1969	107
1970	79
1971	94
1972	97
1973	77
1974	85
1975	90
1976	75
1977	81
1978	79
1979	85
1980	66
1981	70
1982	62
1983	59
1984	78
1985	75
1986	48
1987	63
1988	64
1989	83
1990	76
1991	66
1992	62
1993	61
1994	61
1995	63
1996	57
1997	60
1998	50
1999	49
2000	40

Year	Total of Traffic Fatalities
2001	40
2002	55
2003	54
2004	39
2005	34
2006	55
2007	42
2008	35

Figure 1 shows fatal collisions for all collisions in the City and County of San Francisco from 1915. Since the 1960's fatal collisions have come down from the 100's to the mid 30's in recent years. A number of factors contribute to the positive trends, including improved vehicles, roadways, and driver behavior (such as the use of seat belts). This one chart includes freeway collisions, thus resulting in a higher number than reported in subsequent charts, which are based only on collisions reported in San Francisco.

In the past decade the percentage of fatal collisions that are pedestrian-related has remained in the 50 to 60 percent range (Figure 2).

FIGURE 2
San Francisco Fatal Collision Totals (1999-2008)

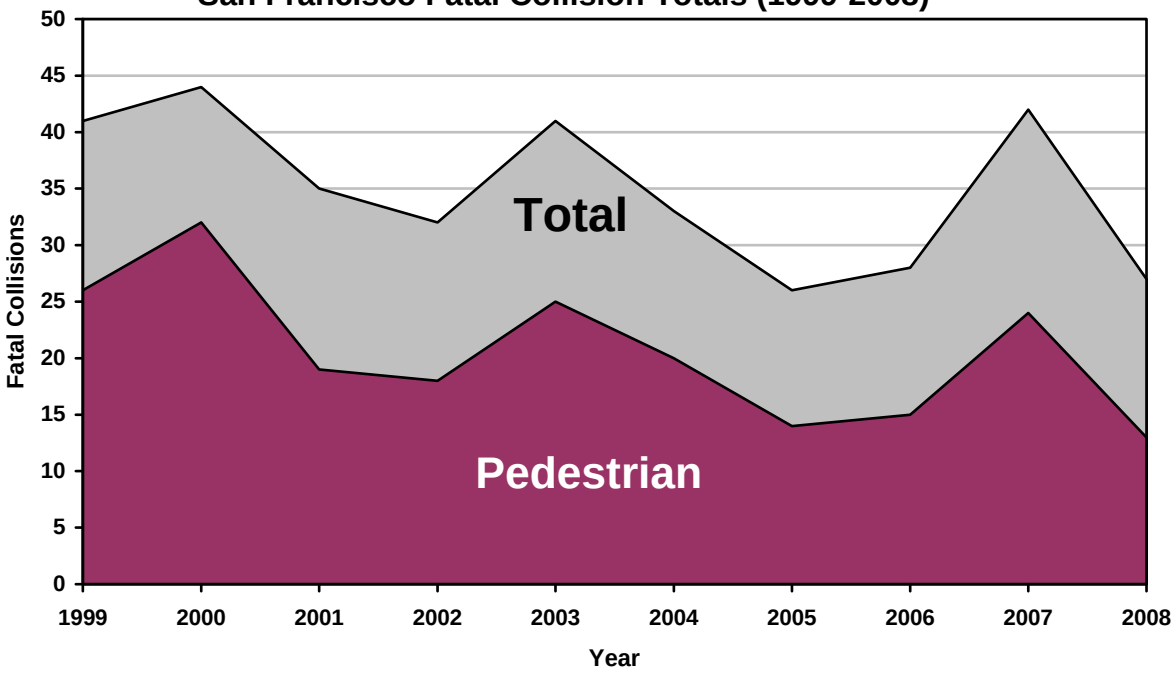


Figure 2: San Francisco Fatal Collisions (1999-2008)

Year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Total	41	44	35	32	41	33	26	28	42	27
Ped	26	32	19	18	25	20	14	15	24	13
% Ped	63	72	54	56	61	60	54	54	57	48

In San Francisco a higher percentage of fatal collisions are pedestrian-related compared with other major American cities, something that makes San Francisco more similar to New York City[4]. Most of the variability in the annual fatal total in the past decade has come from the pedestrian total, not from changes to the vehicular fatal collision total (which have been in the range of 13 to 16 annually). Bicycle fatal collisions had remained in the range of one to two a year until three fatal crashes were reported in 2008. After 2004 annual fatal collision totals below 30 have started being more common, a possible indication of an improving trend.

The New York City study has a table (here shown as Figure 4) that compares San Francisco's fatality rate with other international and U.S. "peer cities." Comparisons of this type can be problematic since not all metro areas are equivalent in terms of how their boundaries are drawn. San Francisco's jurisdictional boundary is relatively small, particularly when compared to larger cities in the list. Smaller city boundaries can exclude commuter areas where lower population density results in lower collision rates, skewing comparisons between urban areas. Central cities like San Francisco can be much more active during the day, so using population figures from the U.S. Census can underestimate actual levels of traffic and pedestrian activity. As can be seen in the previous figures, fatal totals can also vary from year to year by significant percentages.

The data in Figure 4 includes freeway collisions. In San Francisco, freeways such as I-280, I-80 and U.S. 101 are under the jurisdiction of the State Department of Transportation (Caltrans). SFMTA recalculated the San Francisco fatal rate per 100,000 residents excluding freeway data and obtained the Figure 3 totals.

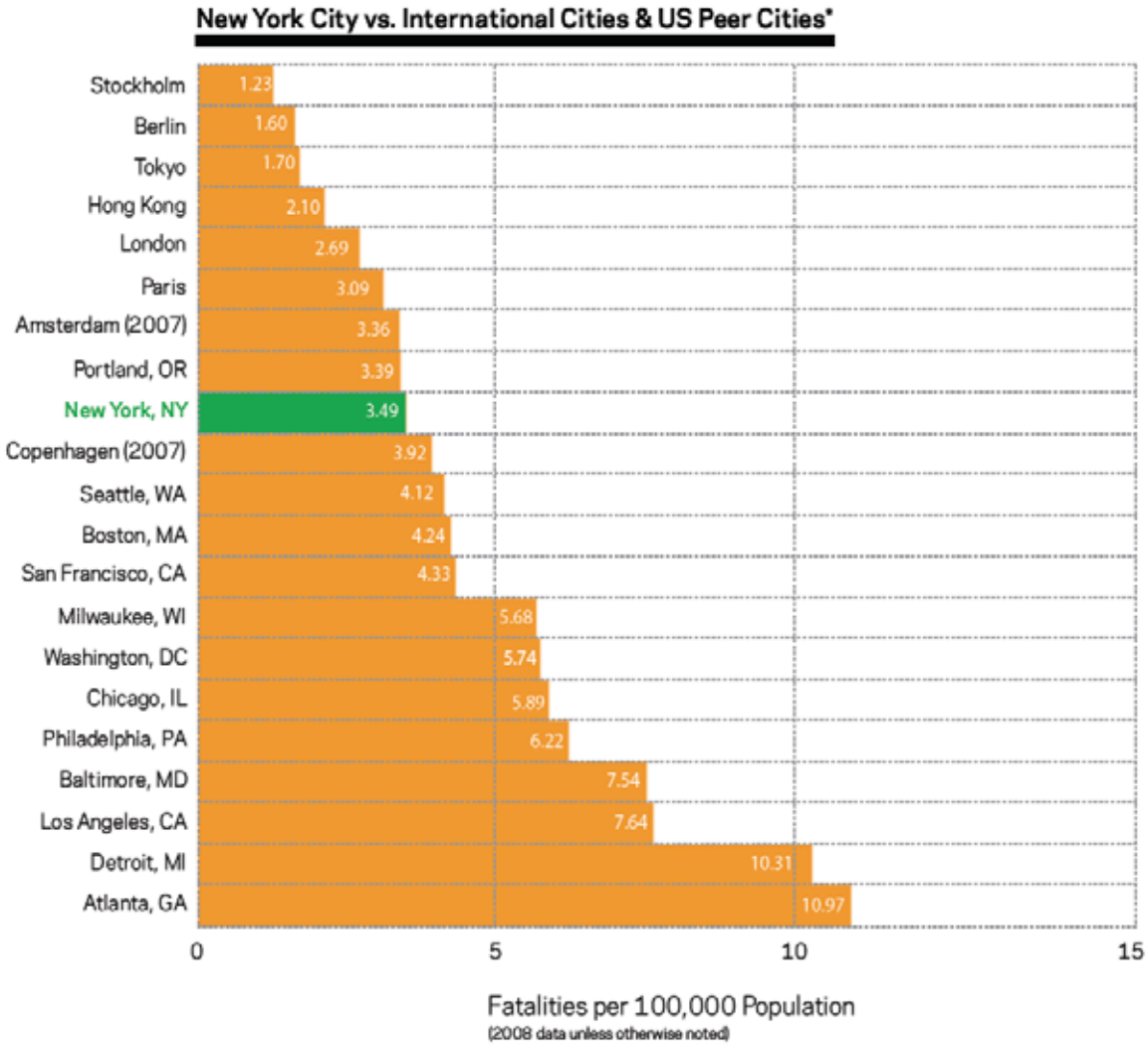
Figure 3 – San Francisco Fatal Collisions per 100,000 Residents

Jurisdiction	Fatal Collisions (2008)	Population	Fatal Collision Rate per 100,000
San Francisco Data in New York City Study	35 [5]	808,976	4.32
City and County of San Francisco (SFPD reported only)	27	808,976	3.34

[4] *Pedestrian Safety Study and Action Plan*, page 10. In 2008 New York City reported 151 pedestrian fatalities out of a total of 292, or 52 percent. See also Technical Appendix, page 72.
[5] Original data is from NHTSA, Fatal Accident Reporting System (FARS)

The 2008 SFMTA calculated rate of 3.34 for collisions that happen in San Francisco streets (excluding freeways) is comparatively low at 3.34 fatal collisions per 100,000 residents. Including freeway data, San Francisco's rate is higher than New York City's and more in the middle range of cities being compared like Boston, Seattle and Copenhagen (Figure 4).

Figure 4 – 2008 Per Capita Fatal Rates Shown New York City Study[6]



[6] *Pedestrian Safety Study and Action Plan,* page 7.

International Cities & US Peer Cities	Fatal Collision Rate per 100,000
Stockholm	1.23
Berlin	1.60
Tokyo	1.70
Hong Kong	2.10
London	2.69
Paris	3.09
Amsterdam (2007)	3.36
Portland, OR	3.39
New York, NY	3.49
Copenhagen (2007)	3.92
Seattle, WA	4.12
Boston, MA	4.24
San Francisco, CA	4.33
Milwaukee, WI	5.68
Washington, DC	5.74
Chicago, IL	5.89
Philadelphia, PA	6.22
Baltimore, MD	7.54
Los Angeles, CA	7.64
Detroit, MI	10.31
Atlanta, GA	10.97

Figure 5 is based on a San Francisco 2008 Collision Report study of California cities. Using an adjustment factor of walking trips to work resulted in San Francisco having a more moderate collision rate when compared to that using a simple per capita rate. Per capita rates have the disadvantage of not accounting for pedestrian activity. The New York City study did use those considerations to select its peer cities, but it did not adjust for actual walking rates among the selected cities. NYCDOT did note that New York City's low per capita pedestrian collision rate was notable given the higher percentage of trips made on foot when compared to some of the other cities in Figure 4.[7]

[7] *Pedestrian Safety Study and Action Plan*, page 8.

FIGURE 5
2007 Pedestrian Injury Collisions Per Walk Trips to Work
California Cities with more than 250,000 Population

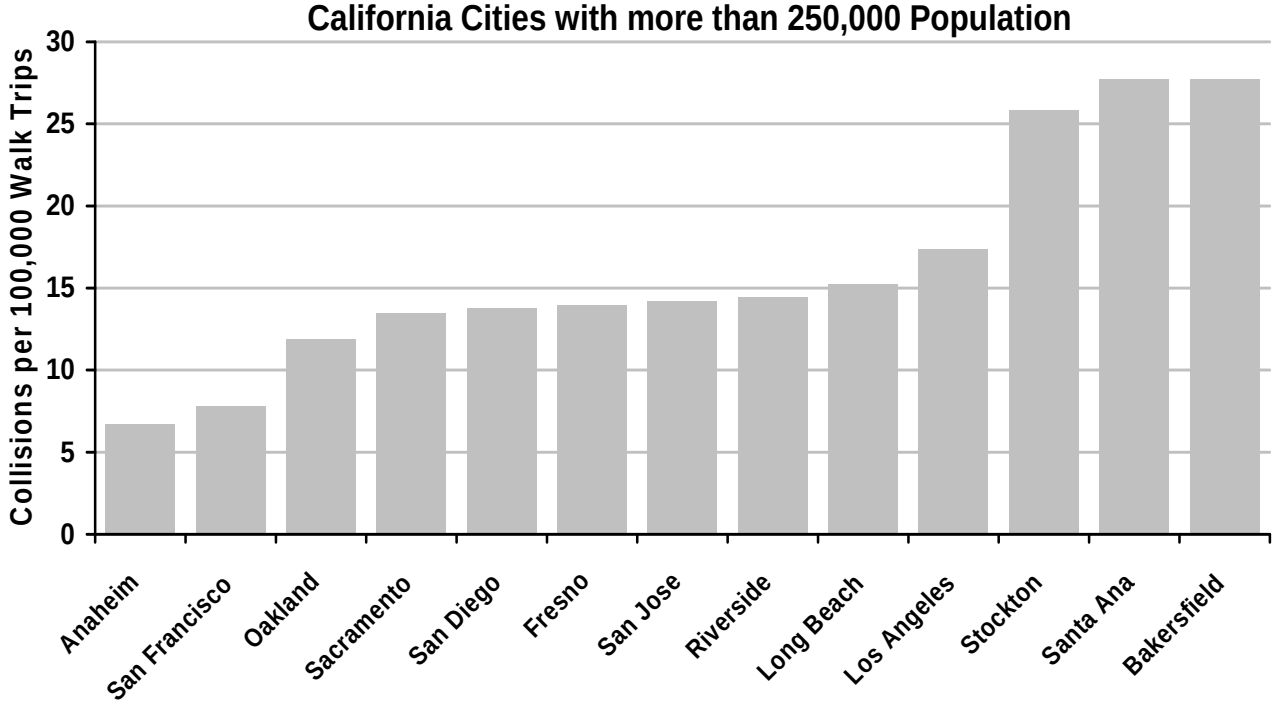


Figure 5: 2007 Pedestrian Injury Collisions per Walk Trips to Work
California Cities with more than 250,000 Population[8]

City	Walking work mode split	Estimated annual work walk trips	Pedestrian Injury Collisions per 100,000 work walking trips
Anaheim	2.56%	1,047,289	6.7
San Francisco	9.66%	10,491,404	7.8
Oakland	5.18%	2,184,525	11.9
Sacramento	3.43%	1,795,800	13.5
San Diego	2.65%	4,292,661	13.8
Fresno	2.03%	1,030,082	14.0
San Jose	1.96%	2,253,875	14.2
Riverside	1.72%	621,804	14.5
Long Beach	3.64%	1,947,014	15.3
Los Angeles	3.68%	16,720,650	17.4
Stockton	2.01%	588,693	25.8
Santa Ana	1.37%	537,593	27.7
Bakersfield	1.01%	349,879	27.7

[8] Sources: U.S. Census Bureau, 2007 American Community Survey; California Office of Traffic Safety, 2007 OTS Collision Rankings

Injury collisions are a more reliable indicator of collision trends because fatal collisions in San Francisco, being fewer in number compared to New York City, are subject to sharper percentage fluctuations from year to year. This is illustrated in the higher annual variance seen in San Francisco pedestrian fatalities (Figure 2) compared to pedestrian injures (Figure 6). The 2008 total of 799 injury collisions involving a pedestrian as a party is almost the same as the figure of 796 injury collisions reported in 2007 (Figure 17). In the first half of the decade pedestrian collisions steadily came down from the over 1,000 incidents recorded annually in the 1990's. Further declines have unfortunately not been reported in 2007 or 2008. Every day on average 2 or more pedestrians are injured on San Francisco's streets.

FIGURE 6
San Francisco Injury Collisions Involving Pedestrians
(1999-2008)

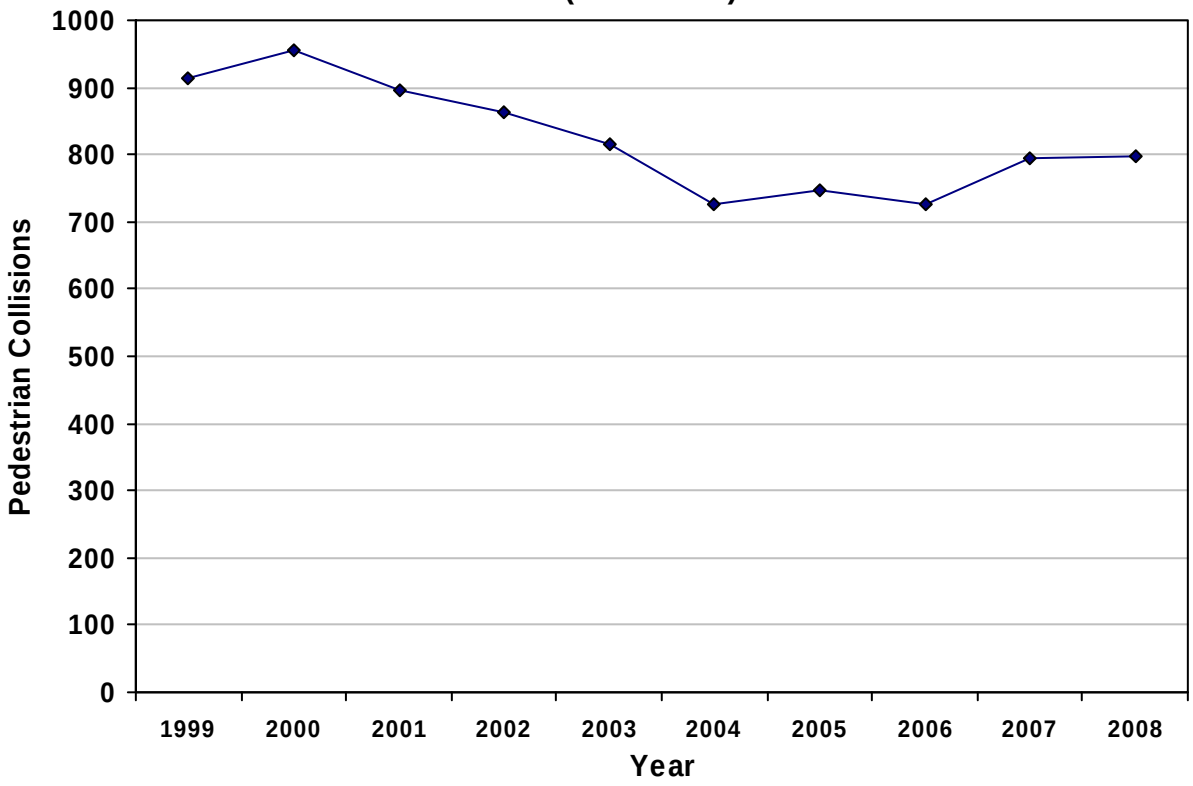


Figure 6: San Francisco Injury Collisions Involving Pedestrians (1999-2008)

Year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Total	915	955	895	862	815	727	747	726	796	799

2: COST OF COLLISIONS

Figure 7 lists the previous five-year injury collision totals for San Francisco according to the three non-fatal injury severity categories used by all police departments in California. The percentage of visible plus severe injuries has been increasing slightly over the past five years, going from 34 percent of the injury total in 2004 to 37 percent in 2008.

Figure 7 – San Francisco 2004-2008 Injury Collision Severity

Year	Complaint of Pain	Other Visible Injury	Severe Injury
2008	1,889 (63%)	941 (31%)	180 (6%)
2007	1,937 (64%)	896 (30%)	188 (6%)
2006	1,895 (66%)	807 (28%)	167 (6%)
2005	2,118 (66%)	936 (29%)	173 (5%)
2004	2,006 (66%)	882 (29%)	150 (5%)

The New York City study estimates that their collisions cost the city $4.29 billion annually. Estimating the social cost of crashes is challenging, since many times some factors, such as pain and loss of life, cannot be truly quantified. Property damages, loss of income, insurance data, and health costs can be analyzed to determine approximate societal cost of collisions. We do know that the costs of traffic collisions are significant. The California Highway Patrol has estimated that in 2008 alone the cost of reported collisions to the State was $23 billion.[9]

Figure 8 – 2008 Estimated Social Costs of San Francisco Collisions

Victim Severity	Totals	Cost for 1	Total Cost
Killed	27	$3,531,000	$95,337,000
Injured – Severe Injury	197	$244,000	$48,068,000
Injured – Other Visible	1,013	$49,000	$49,637,000
Injured – Complaint of Pain	2,652	$26,000	$68,952,000
Property Damage Only Collisions	6,000[10]	$3,000	$18,000,000
Total			$279,994,000

[9] Statewide Integrated Traffic Records System (SWITRS), 2008 Report, Table 7C

[10] Estimate only. This assumes a ratio of about two property damage only collisions for every reported injury collision. Due to limited Police Department resources, in San Francisco property damage only (non-injury) collisions are typically not reported. Injury and fatal collisions are reported more consistently from year to year.

Figure 8 estimates cost of collisions that occurred in San Francisco using the State's cost figures. These were originally calculated by the U.S. Department of Transportation.[11] The annual cost of collisions occurring on San Francisco's streets using this methodology is $280 million, or about $350 per San Francisco resident. Medical treatment costs for pedestrian collisions in San Francisco have been calculated at $75 million for 2004-2008 based on analysis of SF General Hospital records.[12]

The New York City *Pedestrian Safety Study and Action Plan* mentions other benefits of safer streets that are applicable in San Francisco as well, including:

- Encouraging the use of sustainable modes such as walking and bicycling
- Improving the quality of life for residents
- Reduced anxiety about unsafe conditions
- Reducing the impact on the City's health system and emergency services.

3: COLLISIONS BY VULNERABLE ROAD USERS

Vulnerable road users are those most likely to be injured or killed if involved in a collision with a vehicle. These include pedestrians, bicyclists, and motorcyclists.

Figure 9
2008 Non-Fatal Injury and Fatal "Motor Vehicle Involved With" Collisions

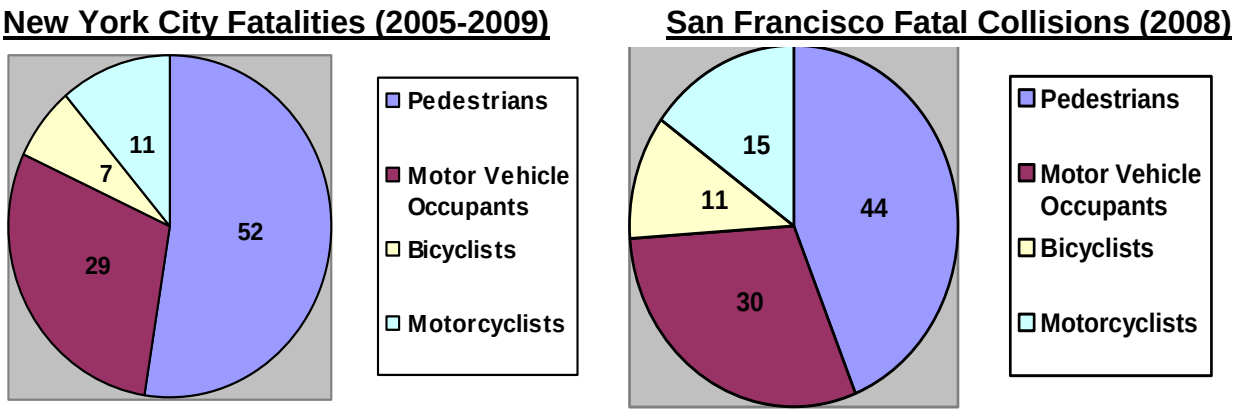
Motor Vehicle Involved With	Total Injury Collisions	Percent of Injury Collisions	Total Fatal Collisions	Percent of Fatal Collisions
Other Motor Vehicle	1,449	48%	4	15%
Pedestrian	755	25%	12	44%
Bicyclist	390	13%	3	11%
Fixed Object	132	5%	6	22%
Others	284	9%	2	7%

About a fourth of San Francisco's 3,010 injury collisions and half of the 27 fatal collisions involved pedestrians in 2008 (Figure 9). Bicycles were involved in 13 percent of injury collisions and 11 percent of citywide fatal collisions in that same year. Figure 9 shows collision totals using the State collision form field "Motor Vehicle Involved With."

[11] Federal Highway Administration, October 31, 1994, "Technical Advisory on Motor Vehicle Accident Costs," updated to 2008 dollars.
[12] Rochelle Dicker et al., San Francisco Injury Center (UCSF), "Cost of Auto-versus-Pedestrian Injuries, 2004-2008," March 2010. SF General receives "98 percent of all traumas that occur in the City."

Over half of fatal collisions in 2008 involved a motor vehicle involved with a pedestrian or bicycle. There were 21 bicycle-pedestrian injury collisions reported in 2008. (Different collision totals can result due to the various ways collisions can occur and be classified by the SFPD.) For San Francisco as a whole, including freeways, there were 8 motorcycle fatal collisions and 349 injuries reported by the State in 2008. Figure 10 offers a comparison of fatalities by mode for New York City[13] and San Francisco.

Figure 10 – Percentage of New York and San Francisco Fatals by Type



Type	Percentage of Fatalities for New York City from 2005-2009	Percentage of Fatalities for San Francisco in 2008
Pedestrians	52	44
Motor Vehicle Occupants	29	30
Bicyclists	7	11
Motorcyclists	11	15

In both cities motor vehicle occupant fatal collisions are less than a third of total fatal collisions. The New York City study speculates why it may have a higher percentage of vulnerable road user fatalities, a discussion that is relevant to San Francisco as well:

> New York's high proportion of vulnerable road user fatalities is primarily a function of low overall motor vehicle fatalities. Car usage in New York City is very low compared to the rest of the United States. 45% of NYC households own a car vs. 91% in the U.S., and fewer than one third of trips are taken in an automobile (vs. 90% in the U.S.). Since most automobile travel in New York City occurs on city streets rather than highways and suburban-style high speed arterials, average vehicle speeds are relatively low, limiting the deadliness of motor vehicle crashes to their occupants.[14]

[13] *Pedestrian Safety Study and Action Plan*, page 16
[14] *Pedestrian Safety Study and Action Plan*, page 16

The higher percentage of fatal and injury collisions that affect pedestrians and bicyclists in particular means that measures to reduce severe injuries in San Francisco should focus on these modes. Measures that reduce speeding and speeding violations are therefore important, as the likelihood of severe injuries for vulnerable road users goes up with the speed of impact by a vehicle.

4: EXISTING SAFETY PROGRAMS

Pages 17 and 18 of the *Pedestrian Safety Study and Action Plan* outline New York City programs aimed at improving traffic safety. There are a number of related initiatives that the SFMTA and other San Francisco departments have taken over time. Some SFMTA programs are included below.

Regular Collision Totals Review. Since the mid 1990's SFMTA staff has analyzed highest collision locations to determine possible mitigation measures and to prioritize capital investments. These efforts have paid off, with highest collision intersections in San Francisco generally reporting fewer collision totals in the past decade. These efforts have been aimed at both signalized and unsignalized intersections. Collision analysis software and electronic mapping systems are used to identify higher collision locations and review specific collision patterns.

New Signals and Signal Upgrades. In 1989 San Francisco voters approved a half-cent transportation sales tax[15] which included funding for signal improvements like overhead mast arm signals or new traffic signals at the highest collision intersections. South of Market streets like Bryant, Folsom, Harrison and Howard saw their collision totals drop by 40 to 60 percent in the late 1990's after new pedestrian and larger, more visible overhead signals were installed, helping remove many South of Market intersections from annual highest collision lists. Similar signal upgrades recently include 19th Avenue, Lombard Street, Mission Street, and Park Presidio Boulevard. General signal upgrades also benefit pedestrians by installing pedestrian signals at intersections where these devices are not present and by improving the visibility of signal indications to motorists

Pedestrian Countdown Signals. San Francisco was the first major city to replace all its existing pedestrian signals citywide with LED units that had a countdown display. The positive results from these deployment efforts in the past decade led the federal government to consider requiring these devices at all signals. The SFMTA continues to work on installing countdown units at older signals that lack them (about 30 percent).

[15] The transportation sales tax, administered by the San Francisco County Transportation Authority, was renewed by voters in 2003 (Proposition K) to continue until 2033.

Pedestrian Safety. At the citywide level, SFMTA has implemented a variety of measures to improve pedestrian safety, including installing new pedestrian signs, improved crosswalk markings, leading pedestrian signal intervals, pedestrian only signal phases, STOP signs, audible pedestrian signals, red zones to improve sight distances ("daylighting"), and traffic calming improvements such as sidewalk extensions. San Francisco was one of three cities selected by the federal government for experimentation of new pedestrian safety devices in the early 2000's. SFMTA works with local and citywide groups such as the Pedestrian Safety Advisory Committee, Walk San Francisco, and the Senior Action Network on identification of problems and possible improvements.

Educational and Enforcement Efforts. SFMTA works with the Department of Public Health and the San Francisco Police Department on a variety of coordinated safety and enforcement campaigns, like the recent "Let pedestrians go first" billboards pictured on the right.

Signal Timing Changes. SFMTA transportation engineers are continually updating signal timing settings. After State guidelines were revised in the mid 1990's, for example, yellow lights were lengthened at over 1,000 intersections. SFMTA has also revised its signals to provide additional time for pedestrians to cross streets and to provide additional all-red clearance phases, brief periods when signal approaches are red in all directions. In the 1990's San Francisco developed a 2.5 feet per second walking speed to determine the total signal time to cross a street that is more stringent than the recently-released federal guideline of 3.0 feet per second.

Traffic Calming Programs. The past two decades have seen the development of new and more robust traffic calming programs in San Francisco. Traffic calming is a community-driven process in which residents work with city staff to identify measures to increase safety for all road users by installing roadway features to reduce vehicle speeds and cut through traffic and increase pedestrian visibility. These programs have leveraged local, state, and federal funds to implement a variety of street improvement projects, from traffic calming projects on major arterials (such as road diets) to the installation of speed humps on lower volume residential streets.

School Safety Program and Crossing Guards. SFMTA has staff dedicated to work on school-related safety initiatives. These include the review of specific school-related safety and parking complaints, working with school staff on traffic safety concerns, and the proactive installation of fluorescent-yellow green school signs and yellow ladder-type crosswalks around all active school crossings. Safe Routes to School grants have funded major improvements near schools such as sidewalk extensions. On a typical school day over 140 SFMTA School Crossing Guards assist school children crossing major intersections.

Bicycle Program. San Francisco has completed a citywide Bicycle Plan and will now be able to implement major corridor improvements on key routes across the city. Bicycle projects can have beneficial effects to pedestrians when they reduce the number of motor vehicle lanes that pedestrians have to cross or when they provide an additional buffer between motor vehicles and sidewalks. Encouraging the use of alternatives to the automobile is also another effective way to improve conditions for pedestrians.

Red Light Running Reduction Program. San Francisco has had a number of educational, engineering and enforcement efforts around the issue of red light running. Figure 11 illustrates the trend in broadside (right-angle) injury collisions and injury collisions resulting from violation of California Vehicle Code Section 21453(A), failure by a motorist to obey red light signal indication. 2008 recorded one of the lowest broadside and red light violation injury collision totals of the past ten years. Signal hardware and timing improvements such as mast arms helped reduce these types of collisions at certain intersections. San Francisco was the first city in California to deploy red light photo enforcement starting in 1996.

FIGURE 11
San Francisco Injury Broadsides and Injury Red Light Violation Collisions (1999-2008)

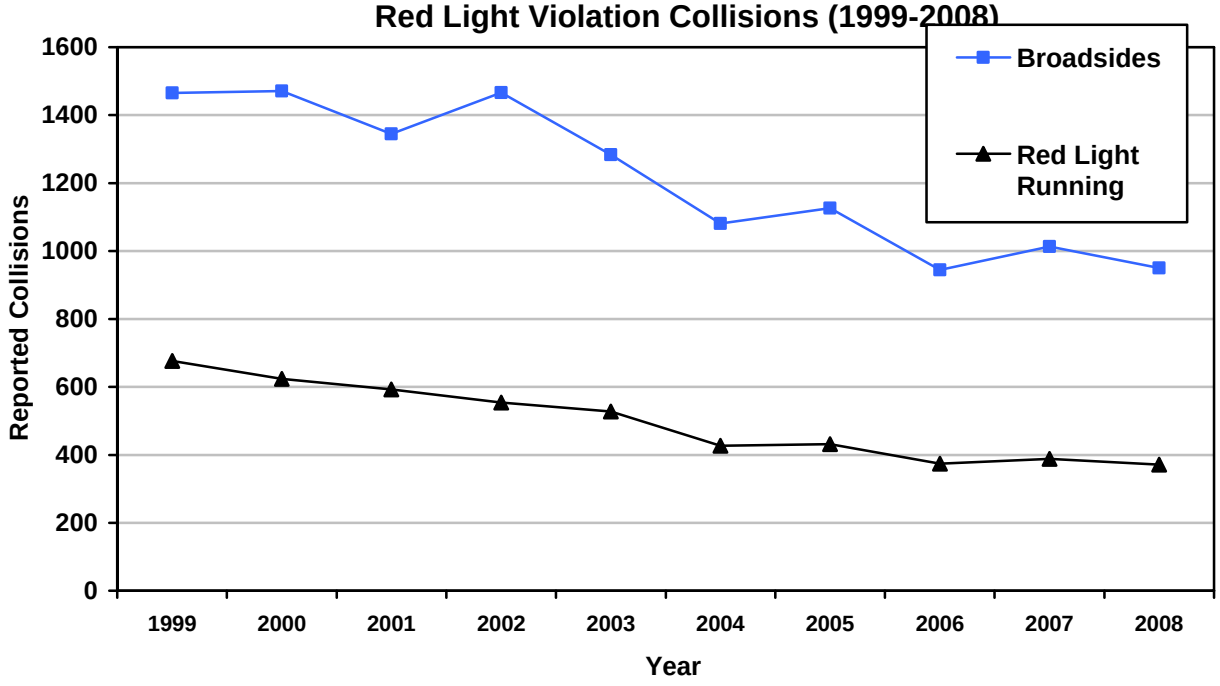


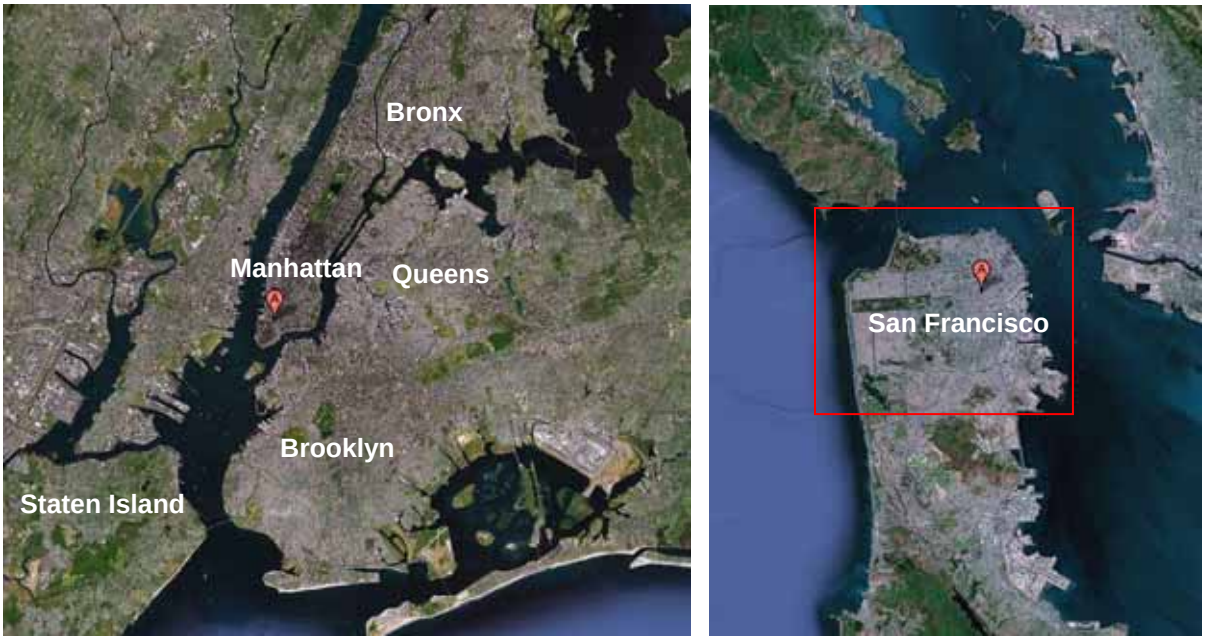
Figure 11: San Francisco Injury Broadsides and Injury Red Light Collisions (1999-2008)

Year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Total Broadsides	1465	1471	1345	1466	1283	1081	1126	944	1013	950
Total Red Light Running	677	624	593	554	528	427	432	374	388	371

5: WHERE COLLISIONS HAPPEN

The *Pedestrian Safety Study and Action Plan* has an impressive array of maps and charts in the Technical Supplement that detail in different ways where collisions happen in New York City. San Francisco naturally has a concentration of collisions in a more limited geographical area, one that over the years has been analyzed by city staff in various contexts using GIS mapping software. New York City covers approximately 305 square miles and has a population of over 8 million (for a population density of 26,000 inhabitants per square mile). San Francisco covers 47 square miles with a population near 760,000 (for a lower population density of 16,000 inhabitants per square mile). San Francisco is smaller in square feet than either the boroughs of Brooklyn or Staten Island. Figure 12 compares two Google maps satellite images at same scale showing the relative sizes of both areas.

Figure 12
Google Satellite Images at Same Scale: New York City and San Francisco



The New York City study discusses the relative frequency of collisions among the five boroughs. The highest densities of injuries occur in Manhattan, where more pedestrians are likely to be injured per mile of street. A similar effect occurs in San Francisco, where the downtown and adjacent dense residential neighborhoods like the Tenderloin have had historically the greatest concentration of pedestrian injuries.

SFMTA classifies any collision reported within 20 feet of an intersection as an "intersection collision," as well as any rear-end vehicular collisions that occur within 150 feet of an intersection. Using these definitions, 68 percent of total and pedestrian injury collisions occur at intersections and a similar number for bicycle collisions as well (Figures 14 through 16). The figures are somewhat less than in New York City, where the report notes 74 percent of collisions occur at intersections, with 47 percent being at signalized intersections.[16] Some of these discrepancies could be a matter of how collisions are measured in each State or by each police department. In any case, in both cities pedestrians are more likely to be injured crossing major intersections, in contrast with the rest of the United States, where pedestrians are more likely to be injured at non-intersection locations.

[16] *Pedestrian Safety Study and Action Plan*, page 22.

Figure 14 - Total Injury or Fatal Collisions by Intersection (2004-2008)

	Total	Percentage
Intersection Related	10,442	68 %
Non-Intersection	4,879	32 %

Figure 15 - Pedestrian Injury or Fatal Collisions by Intersection (2004-2008)

	Total	Percentage
Intersection Related	2,313	68 %
Non-Intersection	1,057	32 %

Figure 16 - Bicycle Injury or Fatal Collisions by Intersection (2004-2008)

	Total	Percentage
Intersection Related	1,027	64 %
Non-Intersection	586	36 %

Figure 13 is a GIS map with the location of pedestrian-involved injury collisions in 2008. The map confirms patterns that have been noted in previous spatial analyses of San Francisco pedestrian collisions: crashes are most frequent where pedestrian activity is highest, particularly along major commercial and transit corridors. Among some of these higher pedestrian collision areas are 6th Street, 19th Avenue, Market Street, Mission Street, and the Tenderloin. Many of these areas have had infrastructure improvements implemented recently, for example the installation of pedestrian signals along 19th Avenue in 2009 (including 19th Avenue and Taraval Street, which had four pedestrian collisions in 2008).

Figure 13
Map of 2008 "Motor Vehicle Involved with Pedestrian" Injury Collisions

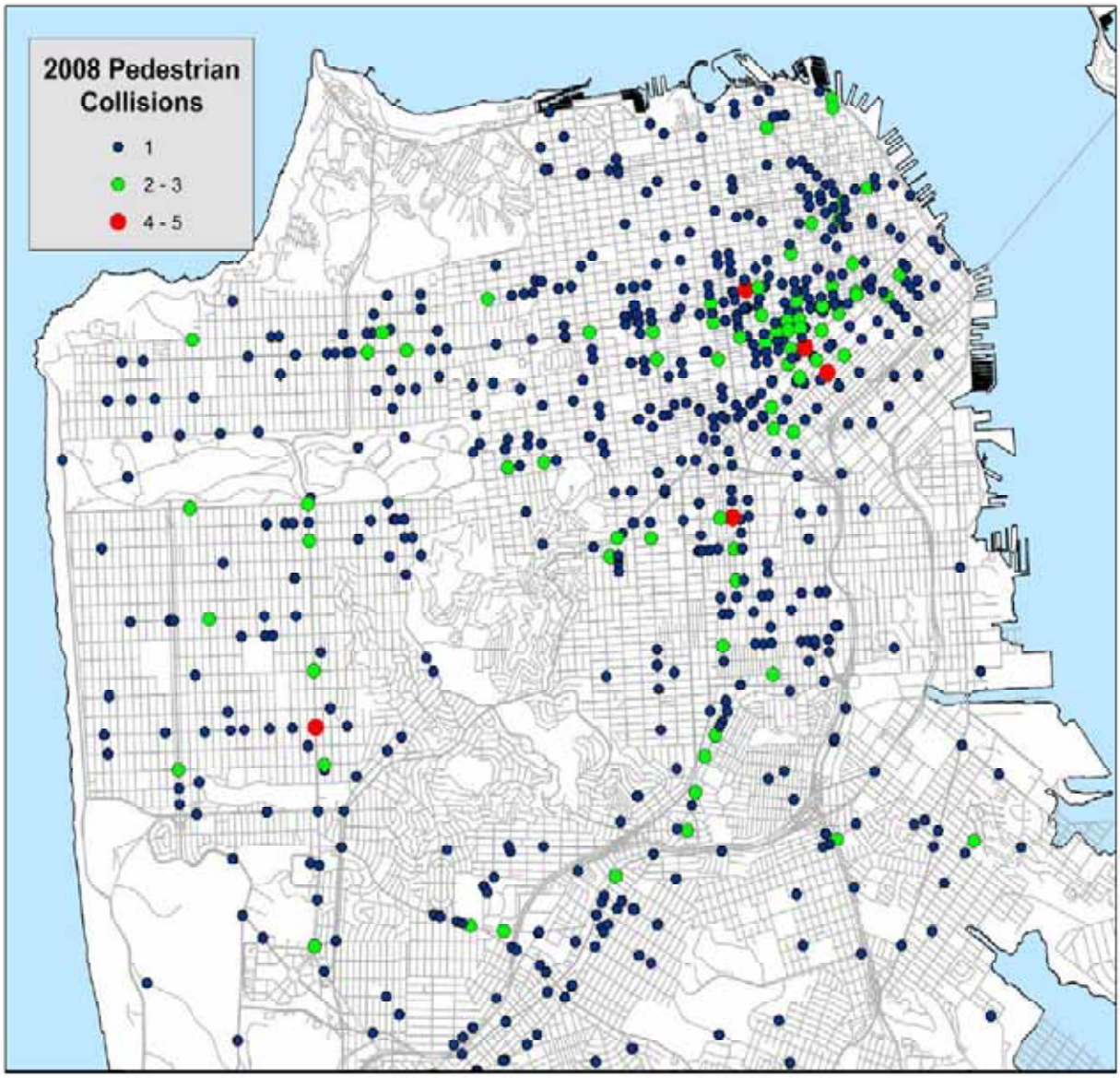


Figure 13 – Map of 2008 "Motor Vehicle Involved with Pedestrian" Injury Collisions

Intersection	Total of Pedestrian Collisions
Howard Street at 6th Street	5
Mission Street at 16th Street	5
Sutter Street at Larkin Street	4
Taraval Street at 19th Avenue	4

Intersection	Total of Pedestrian Collisions
Taylor Street at Golden Gate Avenue	4
Jones Street at Eddy Street	3
Jones Street at Ellis Street	3
Mission Street at 6th Street	3
Powell Street at Ofarrell Street	3
Sutter Street at Hyde Street	3
Caledonia Street at 16th Street	2
Clement Street at 33rd Avenue	2
Clement Street at 9th Avenue	2
Collingwood Street at 18th Street	2
Folsom Street at 26th Street	2
Folsom Street at 9th Street	2
Francisco Street at Columbus Avenue	2
Geary Boulevard at Divisadero Street	2
Geary Boulevard at 11th Avenue	2
Geary Boulevard at 6th Avenue	2
Golden Gate Avenue at Franklin Street	2
Haight Street at Cole Street	2
Holloway Avenue at 19th Avenue	2
Howard Street at 10th Street	2
Howard Street at 5th Street	2
Jones Street at Golden Gate Avenue	2
Judah Street at 19th Avenue	2
Kearny Street at Bay Street	2
Kearny Street at 3rd Street	2
Kearny Street at Geary Street	2
Kearny Street at Bush Street	2
Leavenworth Street at Eddy Street	2
Leese Street at Highland Avenue	2
Lincoln Way at Crossover Drive	2
Lincoln Way at 34th Avenue	2
Market Street at Cyril Magnin Street	2
Market Street at Charles J Brenham Place	2
Market Street at 17th Street	2
Masonic Avenue at Haight Street	2
Minna Street at 2nd Street	2
Mission Street at Cortland Avenue	2
Mission Street at 1st Street	2

Intersection	Total of Pedestrian Collisions
Mission Street at 9th Street	2
Mission Street at 18th Street	2
Mission Street at 20th Street	2
Mission Street at 7th Street	2
Murray Street at Genebern Way	2
Newcomb Avenue at Keith Street	2
Noriega Street at 32nd Avenue	2
Ocean Avenue at Howth Street	2
Ocean Avenue at Lee Avenue	2
Ofarrell Street at Hyde Street	2
Pacific Avenue at Columbus Avenue	2
Peter Yorke Way at Post Street	2
Polk Street at Eddy Street	2
Quintara Street at 19th Avenue	2
Sanchez Street at 17th Street	2
Sansome Street at Broadway	2
Silver Avenue at Bay Shore Boulevard	2
Spruce Street at California Street	2
Starr King Way at Ofarrell Street	2
Stockton Street at Ellis Street	2
Stockton Street at Post Street	2
Taylor Street at Ellis Street	2
Taylor Street at California Street	2
Taylor Street at Geary Street	2
Taylor Street at Eddy Street	2
The Embarcadero at North Point Street	2
Theresa Street at Alemany Boulevard	2
Turk Street at Hyde Street	2
Valencia Street at 24th Street	2
Vicente Street at Sunset Boulevard	2
Vicente Street at 18th Avenue	2
Virginia Avenue at Mission Street	2
Washington Street at Powell Street	2
Webster Street at Ofarrell Street	2
Webster Street at Turk Street	2
Wentworth Place at Washington Street	2
11th Street at Bryant Street	1
Anza Street at 22nd Avenue	1

Intersection	Total of Pedestrian Collisions
Anza Street at 8th Avenue	1
Balboa Street at 38th Avenue	1
Balboa Street at 7th Avenue	1
Balboa Street at 33rd Avenue	1
Balboa Street at 5th Avenue	1
Balboa Street at 44th Avenue	1
Balboa Street at 10th Avenue	1
Balboa Street at 41st Avenue	1
Bartlett Street at 22nd Street	1
Bay Street at Baker Street	1
Brannan Street at 5th Street	1
Brannan Street at 2nd Street	1
Broadway at Battery Street	1
Brotherhood Way at Arch Street	1
Bryant Street at 24th Street	1
Bryant Street at 16th Street	1
Buckingham Way at 19th Avenue	1
Cabrillo Street at 8th Avenue	1
California Street at 10th Avenue	1
California Street at Baker Street	1
California Street at 4th Avenue	1
California Street at Broderick Street	1
Capp Street at 18th Street	1
Capp Street at 20th Street	1
Capp Street at 17th Street	1
Castro Street at 18th Street	1
Castro Street at 14th Street	1
Castro Street at 19th Street	1
Church Street at 14th Street	1
Claremont Boulevard at Allston Way	1
Clement Street at 14th Avenue	1
Clement Street at 23rd Avenue	1
Clement Street at 22nd Avenue	1
Clement Street at 11th Avenue	1
Clement Street at 2nd Avenue	1
Clementina Street at 1st Street	1
Clipper Street at Church Street	1
Columbus Avenue at Broadway	1

Intersection	Total of Pedestrian Collisions
Davis Street at Broadway	1
Davis Street at California Street	1
De Haro Street at 16th Street	1
Divisadero Street at Clay Street	1
Dolores Street at 16th Street	1
Dwight Street at Bowdoin Street	1
Eddy Street at Divisadero Street	1
Egbert Avenue at Bacon Street	1
Ellis Street at Divisadero Street	1
Evans Avenue at 3rd Street	1
Fell Street at Ashbury Street	1
Fillmore Street at Duboce Avenue	1
Fillmore Street at Chestnut Street	1
Fillmore Street at Broadway	1
Florida Street at 24th Street	1
Folsom Street at 19th Street	1
Folsom Street at 23rd Street	1
Folsom Street at 2nd Street	1
Folsom Street at 21st Street	1
Folsom Street at 24th Street	1
Folsom Street at 8th Street	1
Folsom Street at Beale Street	1
Folsom Street at 6th Street	1
Folsom Street at 3rd Street	1
Franklin Street at Bush Street	1
Fulton Street at Baker Street	1
Fulton Street at 35th Avenue	1
Fulton Street at 25th Avenue	1
Geary Boulevard at 42nd Avenue	1
Geary Boulevard at 15th Avenue	1
Geary Boulevard at Arguello Boulevard	1
Geary Boulevard at 3rd Avenue	1
Geary Boulevard at 26th Avenue	1
Geary Boulevard at 20th Avenue	1
Geary Boulevard at Funston Avenue	1
Geary Boulevard at Franklin Street	1
Geary Boulevard at Cook Street	1
Geary Boulevard at 16th Avenue	1

Intersection	Total of Pedestrian Collisions
Geary Boulevard at Fillmore Street	1
Geneva Avenue at Esquina Drive	1
Geneva Avenue at Cayuga Avenue	1
Gilbert Street at Bryant Street	1
Golden Gate Avenue at Broderick Street	1
Golden Gate Avenue at Fillmore Street	1
Grove Street at Franklin Street	1
Grove Street at Divisadero Street	1
Guerrero Street at 17th Street	1
Guerrero Street at 15th Street	1
Guerrero Street at 18th Street	1
Haight Street at Central Avenue	1
Haight Street at Clayton Street	1
Haight Street at Divisadero Street	1
Hamilton Street at Burrows Street	1
Hampshire Street at Cesar Chavez On Ramp	1
Hampshire Street at 21st Street	1
Harrington Street at Alemany Boulevard	1
Harrison Street at 10th Street	1
Hayes Street at Buchanan Street	1
Hayes Street at Franklin Street	1
Hayes Street at Divisadero Street	1
Hayes Street at Fillmore Street	1
Hermann Street at Buchanan Street	1
Howard Street at Fremont Street	1
Howard Street at 9th Street	1
Howard Street at 2nd Street	1
Howard Street at 1st Street	1
Howard Street at 3rd Street	1
Hyde Street at Beach Street	1
Hyde Street at Eddy Street	1
Hyde Street at Golden Gate Avenue	1
I-280 North Off Ramp at I-280 North On Ramp	1
I-280 Southbound at 6th Street	1
I-80 East Off Ramp at 4th Street	1
Irving Street at 7th Avenue	1
Irving Street at 22nd Avenue	1
Irving Street at 8th Avenue	1

Intersection	Total of Pedestrian Collisions
Irving Street at 19th Avenue	1
Irving Street at 21st Avenue	1
Jennings Street at Carroll Avenue	1
John F Kennedy Drive at Chain Of Lakes Drive	1
Jones Street at Filbert Street	1
Jones Street at Geary Street	1
Jones Street at Beach Street	1
Judah Street at 6th Avenue	1
Judah Street at 7th Avenue	1
Junipero Serra Boulevard at Holloway Avenue	1
Kearny Street at Jackson Street	1
Kearny Street at Clay Street	1
Kirkham Street at 30th Avenue	1
Kirkham Street at 9th Avenue	1
Kirkham Street at 5th Avenue	1
Laguna Street at Guerrero Street	1
Laguna Street at Geary Boulevard	1
Laguna Street at Jackson Street	1
Laguna Street at Hayes Street	1
Laguna Street at Filbert Street	1
Lake Merced Boulevard at Font Boulevard	1
Lake Merced Hill at Lake Merced Boulevard	1
Lake Street at 4th Avenue	1
Larkin Street at Bush Street	1
Larkin Street at Green Street	1
Laurel Street at California Street	1
Lawton Street at 21st Avenue	1
Leavenworth Street at Bush Street	1
Leavenworth Street at Golden Gate Avenue	1
Leavenworth Street at Ellis Street	1
Leavenworth Street at Jackson Street	1
Lombard Street at Fillmore Street	1
Market Street at 2nd Street	1
Market Street at Hyde Street	1
Market Street at Eureka Street	1
Market Street at Grant Avenue	1
Market Street at 11th Street	1

Intersection	Total of Pedestrian Collisions
Mason Street at Geary Street	1
Mason Street at Bay Street	1
Masonic Avenue at Geary Boulevard	1
Mcallister Street at Larkin Street	1
Mcallister Street at Jones Street	1
Mcallister Street at Laguna Street	1
Mcallister Street at Hyde Street	1
Mccoppin Street at Gough Street	1
Middlefield Drive at Lake Merced Boulevard	1
Minna Street at 8th Street	1
Mission Street at Fair Avenue	1
Mission Street at 15th Street	1
Mission Street at Fremont Street	1
Mission Street at 4th Street	1
Mission Street at Excelsior Avenue	1
Mission Street at Farragut Avenue	1
Mission Street at 11th Street	1
Mission Street at 2nd Street	1
Mission Street at Geneva Avenue	1
Mission Street at Capp Street	1
Mission Street at 29th Street	1
Mission Street at 10th Street	1
Mission Street at Foote Avenue	1
Mission Street at 21st Street	1
Montgomery Street at Bush Street	1
Montgomery Street at Broadway	1
Moulton Street at Fillmore Street	1
Murray Street at Bosworth Street	1
Naglee Avenue at Mission Street	1
Naples Street at Excelsior Avenue	1
New Montgomery Street at Montgomery Street	1
Niagara Avenue at Alemany Boulevard	1
Noe Street at 14th Street	1
Noriega Street at 37th Avenue	1
Noriega Street at 42nd Avenue	1
Noriega Street at 21st Avenue	1
North Point Street at Hyde Street	1
Oak Street at Fillmore Street	1

Intersection	Total of Pedestrian Collisions
Oak Street at Broderick Street	1
Oak Street at Gough Street	1
Oak Street at Masonic Avenue	1
Oak Street at Cole Street	1
Oakdale Avenue at Bay Shore Boulevard Southbound	1
Ocean Avenue at Miramar Avenue	1
Ocean Avenue at Brighton Avenue	1
Ocean Avenue at Eucalyptus Drive	1
Ocean Avenue at Mission Street	1
Octavia Street at Fell Street	1
Octavia Street at Haight Street	1
Octavia Street at Bush Street	1
Octavia Street at Bay Street	1
Ofarrell Street at Fillmore Street	1
Ofarrell Street at Mason Street	1
Onondaga Avenue at Cayuga Avenue	1
Ortega Street at 25th Avenue	1
Ortega Street at 24th Avenue	1
Ortega Street at 28th Avenue	1
Pacheco Street at 18th Avenue	1
Pacific Avenue at Hyde Street	1
Pacific Avenue at Kearny Street	1
Pacific Avenue at Larkin Street	1
Page Street at Gough Street	1
Palou Avenue at Mendell Street	1
Palou Avenue at Newhall Street	1
Paris Street at Excelsior Avenue	1
Park Presidio Boulevard at Geary Boulevard	1
Parnassus Avenue at Clayton Street	1
Paul Avenue at 3rd Street	1
Persia Avenue at Naples Street	1
Persia Avenue at Athens Street	1
Persia Avenue at Mission Street	1
Pine Street at Fillmore Street	1
Pine Street at Hyde Street	1
Plymouth Avenue at Monterey Boulevard	1
Polk Street at O'farrell Street	1

Intersection	Total of Pedestrian Collisions
Polk Street at Pine Street	1
Polk Street at California Street	1
Polk Street at Beach Street	1
Polk Street at Fell Street	1
Post Street at Baker Street	1
Post Street at Polk Street	1
Post Street at Fillmore Street	1
Potrero Avenue at 21st Street	1
Potrero Avenue at 24th Street	1
Potrero Avenue at 25th Street	1
Powell Street at Geary Street	1
Powell Street at Pacific Avenue	1
Powell Street at Bush Street	1
Powell Street at Broadway	1
Prague Street at Drake Street	1
Prentiss Street at Cortland Avenue	1
Quintara Street at 34th Avenue	1
Randall Street at Church Street	1
Randolph Street at Bright Street	1
Revere Avenue at Bay View Road	1
Richardson Avenue at Chestnut Street	1
Richland Avenue at Mission Street	1
Ritch Street at Brannan Street	1
Rousseau Street at Alemany Boulevard	1
Sacramento Street at Octavia Street	1
Sacramento Street at Polk Street	1
Sacramento Street at Front Street	1
Sacramento Street at Buchanan Street	1
Saint Joseph's Avenue at Baker Street	1
Salinas Avenue at Mansell Street	1
San Jose Avenue at Goethe Street	1
San Jose Avenue at Guerrero Street	1
San Jose Avenue at Broad Street	1
San Jose Avenue at Ocean Avenue	1
San Jose Avenue at Lakeview Avenue	1
San Juan Avenue at Alemany Boulevard	1
Sanchez Street at 25th Street	1
Sanchez Street at Cesar Chavez Street	1

Intersection	Total of Pedestrian Collisions
Sanchez Street at 16th Street	1
Sanchez Street at 29th Street	1
Sansome Street at Clay Street	1
Sansome Street at Merchant Street	1
Santa Rosa Avenue at Alemany Boulevard	1
Santiago Street at 30th Avenue	1
Santiago Street at 17th Avenue	1
Scott Street at Lombard Street	1
Selby Street at Oakdale Avenue	1
Seneca Avenue at Mission Street	1
Shipley Street at 5th Street	1
Sickles Avenue at Plymouth Avenue	1
Sickles Avenue at Mission Street	1
Sickles Avenue at Alemany Boulevard	1
Silver Avenue at Girard Street	1
Silver Avenue at Edinburg Street	1
Silver Avenue at San Bruno Avenue	1
Sloat Boulevard at 26th Avenue	1
Sloat Boulevard at 19th Avenue	1
South Hill Boulevard at Rolph Street	1
South Van Ness Avenue at 15th Street	1
South Van Ness Avenue at 24th Street	1
South Van Ness Avenue at 16th Street	1
South Van Ness Avenue at Van Ness Avenue	1
South Van Ness Avenue at 22nd Street	1
Stanyan Street at Fulton Street	1
Stanyan Street at Fell Street	1
Starr King Way at Peter Yorke Way	1
Steiner Street at Pine Street	1
Steiner Street at Fell Street	1
Steiner Street at Post Street	1
Steiner Street at Geary Boulevard	1
Steuart Street at Mission Street	1
Stevenson Street at New Montgomery Street	1
Stockton Street at Broadway	1
Stockton Street at Ofarrell Street	1
Stockton Street at Sacramento Street	1
Stockton Street at Geary Street	1

Intersection	Total of Pedestrian Collisions
Sunnydale Avenue at Delta Street	1
Sunset Boulevard at Noriega Street	1
Sutter Street at Franklin Street	1
Sutter Street at Jones Street	1
Sutter Street at Stockton Street	1
Sutter Street at Grant Avenue	1
Sutter Street at Mason Street	1
Sweeny Street at San Bruno Avenue	1
Tara Street at I-280 South Off Ramp	1
Taraval Street at 28th Avenue	1
Taraval Street at 38th Avenue	1
Taraval Street at 15th Avenue	1
Taylor Street at Sutter Street	1
Taylor Street at Sacramento Street	1
Taylor Street at Post Street	1
Taylor Street at Bay Street	1
Tehama Street at 2nd Street	1
The Embarcadero at Folsom Street	1
Turk Boulevard at Temescal Terrace	1
Turk Street at Gough Street	1
Turk Street at Leavenworth Street	1
Turk Street at Fillmore Street	1
Turk Street at Larkin Street	1
Turk Street at Taylor Street	1
Turk Street at Steiner Street	1
Ulloa Street at 20th Avenue	1
Underwood Avenue at Keith Street	1
Union Street at Columbus Avenue	1
Union Street at Larkin Street	1
Union Street at Buchanan Street	1
Union Street at Franklin Street	1
Uranus Terrace at Roosevelt Way	1
Utah Street at 23rd Street	1
Valencia Street at Tiffany Avenue	1
Valencia Street at 25th Street	1
Valencia Street at 21st Street	1
Valencia Street at Duboce Avenue	1
Vallejo Street at Grant Avenue	1

Intersection	Total of Pedestrian Collisions
Vallejo Street at Battery Street	1
Vallejo Street at Columbus Avenue	1
Van Ness Avenue at Francisco Street	1
Van Ness Avenue at Sacramento Street	1
Van Ness Avenue at Ofarrell Street	1
Van Ness Avenue at Fell Street	1
Van Ness Avenue at California Street	1
Vermont Street at Division Street	1
Victoria Street at Sargent Street	1
Walnut Street at California Street	1
Warren Drive at Lawton Street	1
Washington Street at Scott Street	1
Washington Street at Walter U Lum Place	1
Waverly Place at Clay Street	1
Wawona Street at Sunset Boulevard	1
Wawona Street at Crestlake Drive	1
Webster Street at Geary Boulevard	1
Webster Street at Fell Street	1
Webster Street at Pine Street	1
Webster Street at Post Street	1
West Portal Avenue at Ulloa Street	1
West Portal Avenue at Sloat Boulevard	1
Wilder Street at Diamond Street	1
Yorba Street at Sunset Boulevard	1
York Street at 24th Street	1
Grand Total	**540**

SFMTA staff has not conducted research on whether pedestrian collisions are more likely on one-way or two-way streets. The New York City study states that major two-way streets accounted for 57 percent of pedestrian fatalities but only 12 percent of the road network.[17] There has also been no local research conducted on whether streets with bicycle lanes by themselves result in fewer injuries. The New York City report states that pedestrian severe or fatal crashes were less likely on streets with

[17] Page 21. In San Francisco there is a related debate about whether one-way streets (seen as faster streets) are less safe than two-way streets for pedestrians. Two-way streets appear to have more turning conflicts at intersections, where as noted in Figure 13 most collisions tend to occur.

bicycle lanes.[18] It has been San Francisco's experience that bicycle lane projects can result in safety gains for all modes. These projects can be accompanied by changes such as left turn lanes or pedestrian medians that can reduce certain crash frequencies.

Figure 17 has the four highest injury vehicle-pedestrian collision locations for the three-year period 2006-2008. All four intersections are located in a four block stretch along the 6th Street and Golden Gate Avenue corridors adjacent to Market Street. Despite having made various engineering changes to these four intersections, including engineering and traffic regulation upgrades, they had higher pedestrian collision totals in the past three years compared to the previous three-year period 2003-2005.

FIGURE 17
Three Year Highest Injury Vehicle-Pedestrian Collision Intersections
Intersections with 7 or more collisions resulting in injury, 2006-2008

Street A	Street B	2006-2008 Injury Collisions	2003-2005 Injury Collisions	Three-year change
6th St. / Market St.	Golden Gate/ Taylor	11	4	+7
6th Street	Howard Street	9	3	+6
Jones Street	Golden Gate Avenue	7	4	+3
6th Street	Mission Street	7	6	+1

6: WHEN COLLISIONS HAPPEN

Pedestrian crashes are most likely on Fridays and during the month of December or January (Figures 18 and 19). These statistics are the same as those in New York City. About a third of collisions occur when conditions are dark (Figure 20). Shorter daylight hours could be a factor in the rise of pedestrian collisions during winter months. The New York City study, which also had higher collision totals in November and December, cited possibly "increased evening shopping activity, higher pedestrian and vehicular volumes, increased holiday alcohol use and poor winter road conditions"[19] as a reason for the seasonal fluctuation. San Francisco has higher January and February crash frequencies than New York City, the harsher winters there potentially being a factor in lowering street activity compared to San Francisco. In New York City January and February were the lowest crash months of the year.[20]

[18] *Pedestrian Safety Study and Action Plan*, page 23.
[19] *Pedestrian Safety Study and Action Plan: Technical Supplement*, Page 10.
[20] *Pedestrian Safety Study and Action Plan,* page 24.

Figure 18 - Vehicle-Pedestrian Injury Collisions by Day (2004-2008)

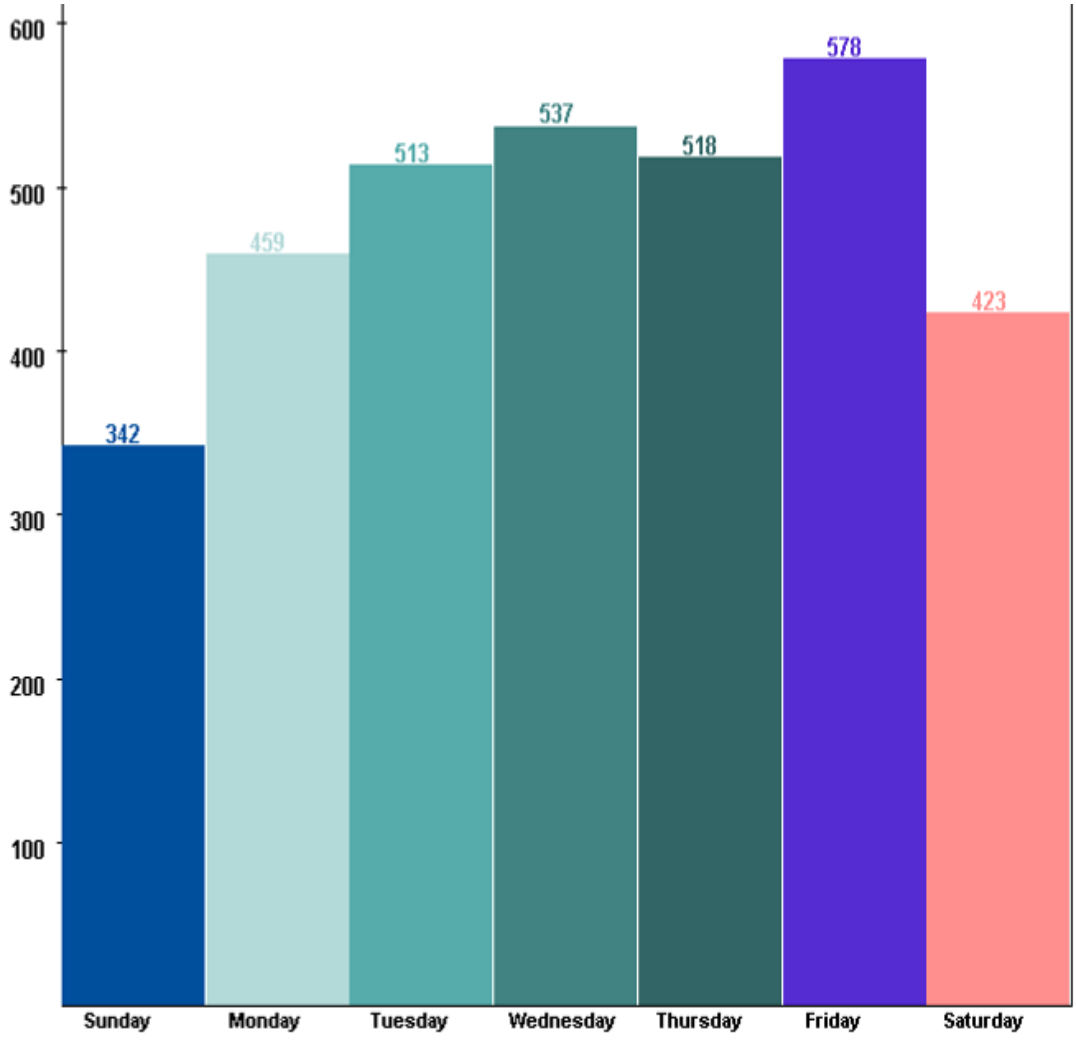


Figure 18 – Vehicle-Pedestrian Injury Collisions by Day (2004-2008)

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
342	459	513	537	518	578	423

Figure 19
Vehicle-Pedestrian Injury Collisions by Month (2004-2008)

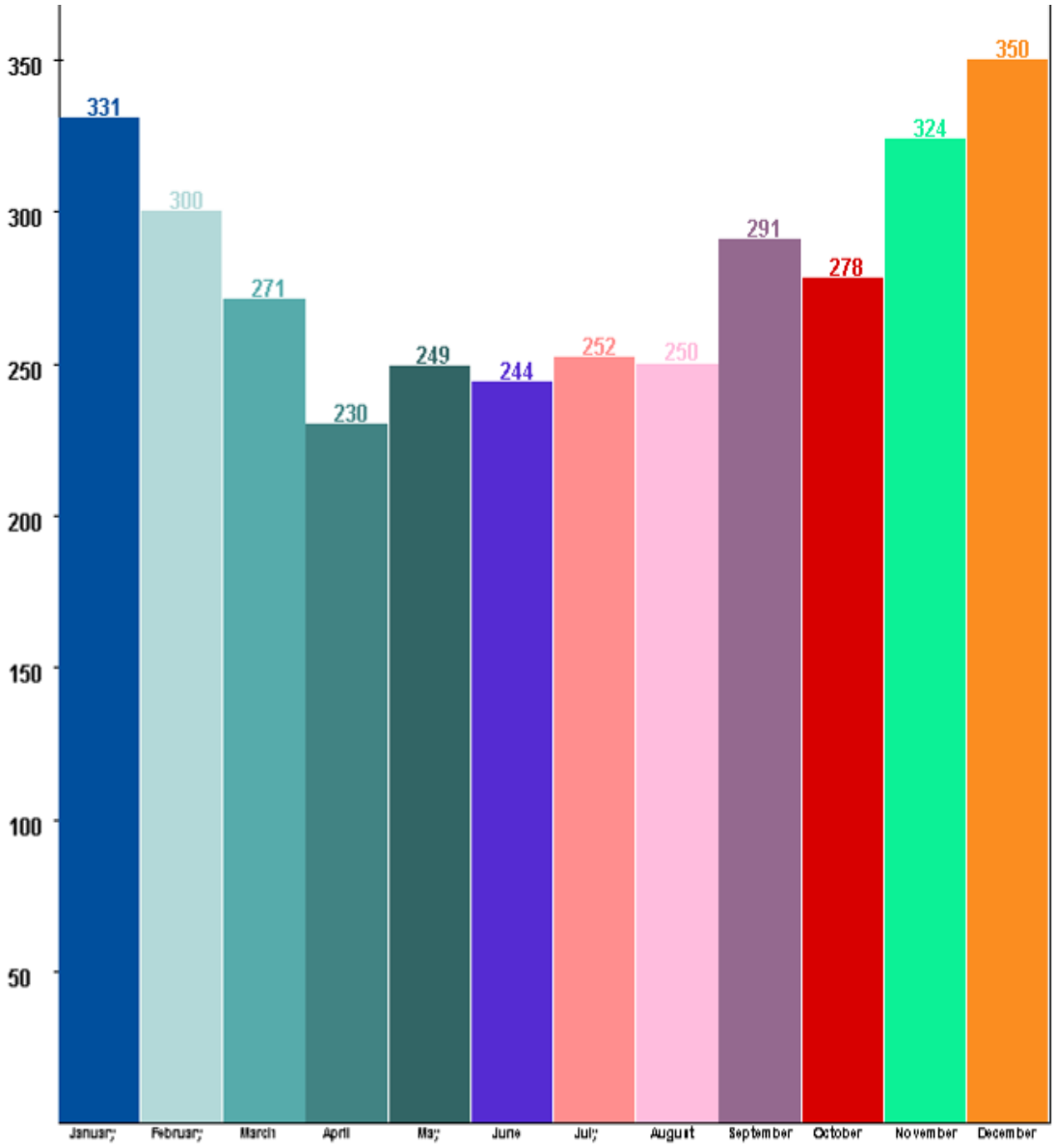


Figure 19 – Vehicle-Pedestrian Injury Collisions by Month (2004-2008)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
331	300	271	230	249	244	252	250	291	278	324	350

The pie charts below (Figure 20) show how pedestrian injury collisions are segmented by weather and lighting conditions.

Figure 20 – Vehicle-Pedestrian Injury Collisions by Weather and Lighting

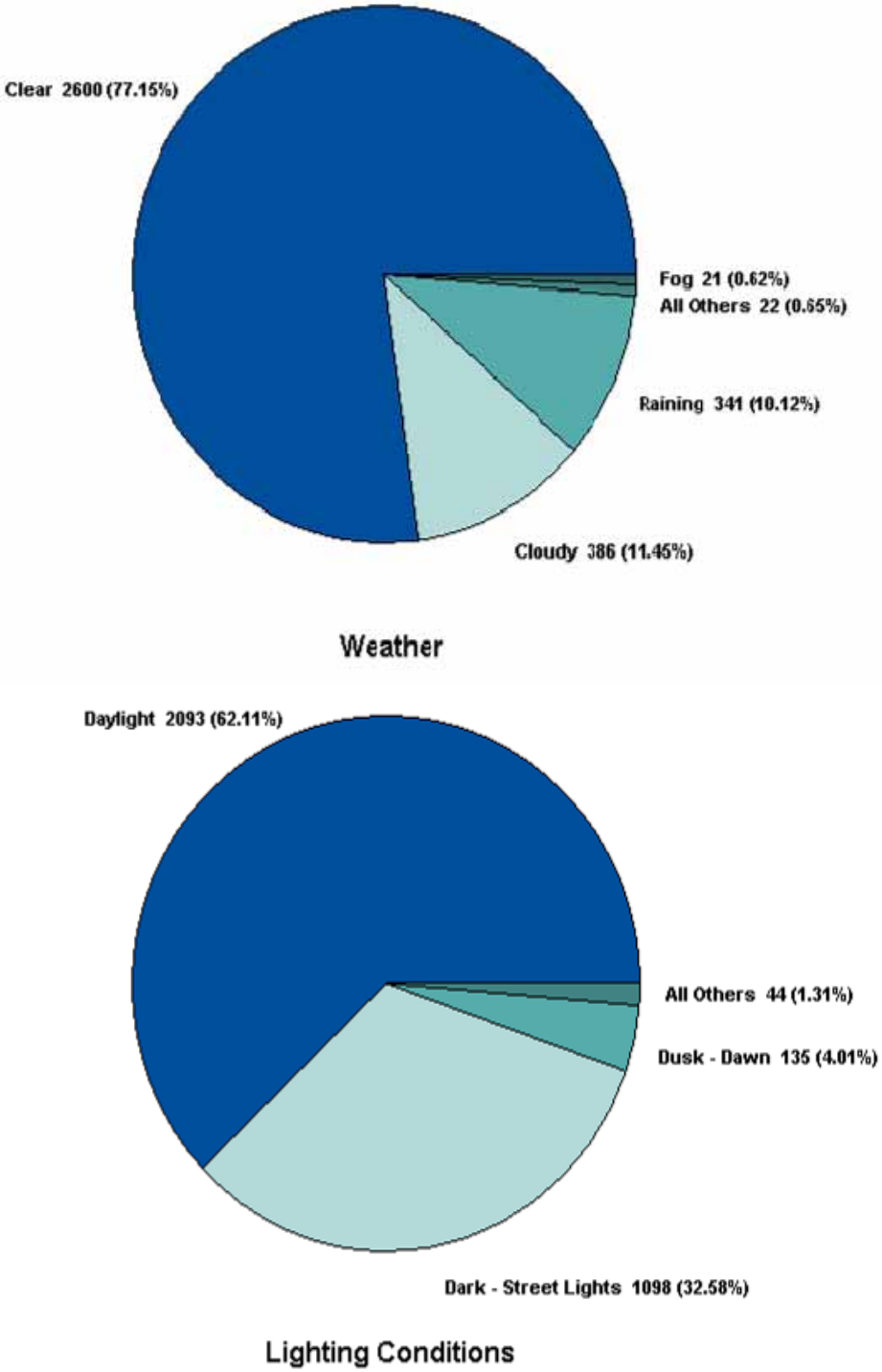


Figure 20 – Vehicle-Pedestrian Injury Collisions by Weather and Lightning

	Number of Injury Collisions	Percentage
Weather Conditions		
Clear	2600	77.15%
Fog	21	0.62%
Raining	341	10.12%
Cloudy	386	11.45%
All Others	22	0.65%
Lightning Conditions		
Daylight	2093	62.11%
Dusk – Dawn	135	4.01%
Dark – Street Lights	1098	32.58%
All Others	44	1.31%

In terms of all reported collisions during the five-year period 2004 to 2008, the highest collision totals occurred during the weekday hours of 8 AM to 9 AM and 5 PM to 6 PM, followed closely by the hour of 2 AM to 3 AM on Saturday. These correspond respectively to the peak commute hours and the closing time of bars in San Francisco.

Figure 21: All Reported Collisions by Day of Week and Hour of Day (2004 to 2008)

Time Period	Total	Weekday	Weekend	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Unknown	33	26	7	5	2	7	5	7	5	2
00:00-00:59	687	387	300	142	66	52	88	87	94	158
01:00-01:59	659	350	309	166	66	50	68	70	96	143
02:00-02:59	855	403	452	219	70	63	92	82	96	233
03:00-03:59	370	188	182	90	29	30	37	45	47	92
04:00-04:59	246	122	124	58	34	13	23	28	24	66
05:00-05:59	271	191	80	47	36	39	40	42	34	33
06:00-06:59	417	334	83	43	63	60	77	80	54	40
07:00-07:59	836	705	131	66	139	156	140	144	126	65
08:00-08:59	1129	1006	123	53	165	213	220	204	204	70
09:00-09:59	1098	913	185	82	166	208	197	166	176	103
10:00-10:59	1053	829	224	102	148	180	174	146	181	122
11:00-11:59	1093	816	277	135	155	171	174	160	156	142
12:00-12:59	1192	929	263	142	172	171	202	190	194	121
13:00-13:59	1195	896	299	142	183	187	185	163	178	157
14:00-14:59	1215	909	306	148	161	193	207	148	200	158
15:00-15:59	1281	1001	280	128	192	201	198	192	218	152
16:00-16:59	1357	1035	322	155	190	220	227	227	171	167
17:00-17:59	1506	1164	342	162	232	246	243	229	214	180
18:00-18:59	1355	1044	311	162	199	182	199	212	252	149
19:00-19:59	1015	751	264	144	139	158	148	138	168	120
20:00-20:59	852	644	208	89	138	117	115	120	154	119
21:00-21:59	825	578	247	120	87	125	111	123	132	127
22:00-22:59	862	610	252	108	109	113	116	121	151	144
23:00-23:59	786	541	245	95	90	83	92	120	156	150
Total	22188	16372	5816	2803	3031	3238	3378	3244	3481	2013

Looking more specifically at pedestrian injury collisions by time of day, San Francisco (Figure 23) has a similar daytime pattern than that of New York City (Figure 22). There are a greater percentage of collisions occurring in the peak commute hours of 3 PM to 6 PM, over 20 percent in both cases. Unlike New York City, San Francisco has fewer collisions in the early morning hours of 3 AM to 6 AM as well between 6 PM and 9 PM. Both likely are due to the differences in late night activity (pedestrian and motor vehicle). This is compensated in San Francisco with a higher percentage of collisions occurring between noon and 3 PM (18 percent).

Figure 22 – NY City Pedestrian Injury Collisions by Time of Day (2002-2006)[21]

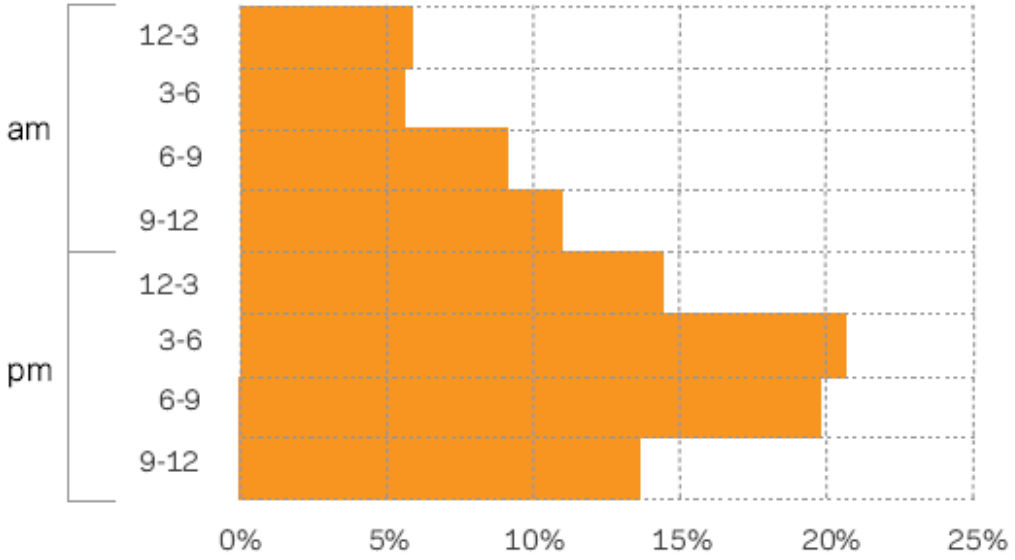


Figure 22 – NY City Pedestrian Injury Collisions by Time of Day (2002-2006)

Collisions by Time of Day (2002-2006)	Percentage
12 a.m. to 3 a.m.	7%
3 a.m. to 6 a.m.	6%
6 a.m. to 9 a.m.	9%
9 a.m. to 12 noon	11%
12 p.m. to 3 p.m.	14%
3 p.m. to 6 p.m.	21%
6 p.m. to 9 p.m.	20%
9 p.m to 12 a.m.	14%

[21] *Pedestrian Safety Study and Action Plan*, Page 24.

Figure 23 – San Francisco Pedestrian Injury Collisions by Time of Day (2008)

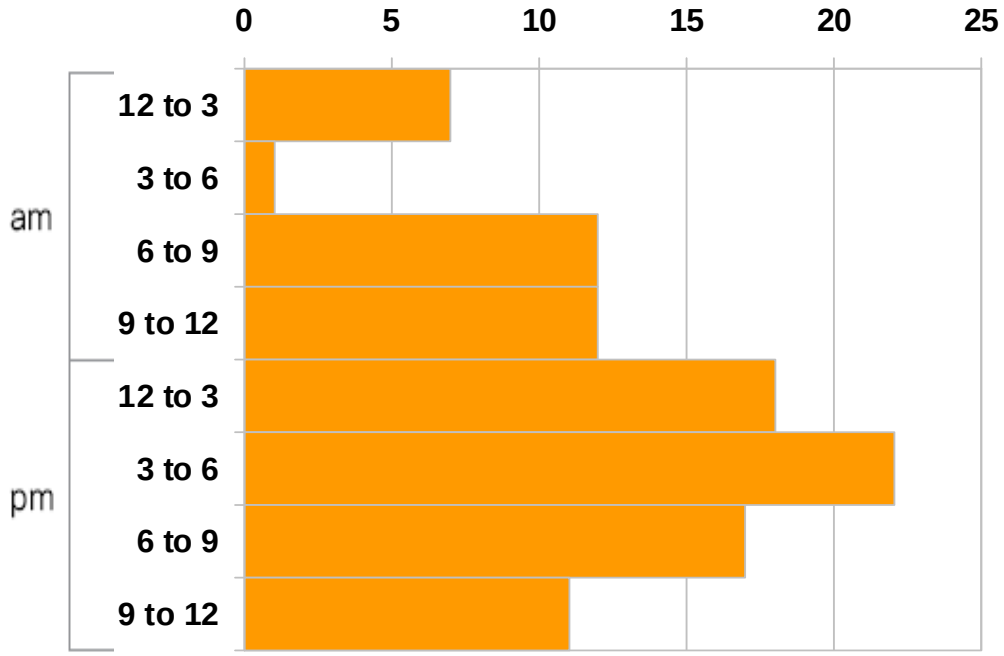


Figure 23 – San Francisco Pedestrian Injury Collisions by Time of Day (2008)

Collisions by Time of Day (2008)	Percentage
12 a.m. to 3 a.m.	7%
3 a.m. to 6 a.m.	1%
6 a.m. to 9 a.m.	12%
9 a.m. to 12 noon	12%
12 p.m. to 3 p.m.	18%
3 p.m. to 6 p.m.	22%
6 p.m. to 9 p.m.	17%
9 p.m to 12 a.m.	11%

7: HOW COLLISIONS HAPPEN

San Francisco injury collision totals by primary collision type and cause are shown in Figures 24 and 25. The two most common types of collisions, broadsides and vehicle-pedestrian, together comprise 55 percent of injury collisions. The top primary collision cause is generally determined to be speeding.

Figure 24 - 2008 Non-Fatal Injury Collisions by Primary Collision Type

Type	Collisions	Percent
Broadside (Right-Angle)	941	32
Vehicle-Pedestrian	703	23
Rear-End	500	16
Sideswipe	350	12
Head-On	142	5
Other	374	12

Figure 25 - 2008 Non-Fatal Injury Collisions by Primary Collision Cause

Cause	Collisions	Percent
Unsafe Speed	571	19
Violation of Traffic Signals and Signs	452	15
Vehicle Right-of-Way Violations	349	12
Driver Violations of Pedestrian Right-of-Way	318	11
Violations by the Pedestrian	244	8
Improper Turning	241	8
Other	835	28

Figure 26 notes the collision causes per the SFPD officer at the scene for collisions in which a motorist hit a pedestrian. The plurality of collisions (41 percent) was caused by a violation of the pedestrian right-of-way on the part of the motorist. This most frequently happens when a motorist does not yield to a pedestrian at a crosswalk or when a motorist makes a turn at a signalized intersection without yielding.

Figure 26
2008 Non-Fatal Pedestrian Injury Collisions by Primary Collision Cause

Cause	Collisions	Percent
Motorist Violation of Pedestrian Right-of-Way	310	41%
Pedestrian Violation	237	31%
Violation of Traffic Signals and Signs	39	5%
Other	169	22%

New York City collision reporting forms are not the same as those of California, and fields that officers have to check may be different. Driver inattention, cited as the most common factor in New York City pedestrian injury collisions[22], does not specifically show up as a primary collision cause in our reports. Many collisions involving driver inattention are probably being coded in San Francisco as a motorist violation of pedestrian right-of-way. In New York City violation of right-of-way was listed as accounting for only 27 percent of pedestrian crashes compared to 41 percent in San Francisco. Equivalent comparisons between states are more difficult in this category.

Figure 27 shows which specific California Vehicle Code sections are most likely to be determined as being the primary cause of a pedestrian collision. The most common violation cause (39 percent) was CVC 22950(A), the section that makes it illegal for motorists not to yield to a pedestrian crossing at a crosswalk. In Figure 27, 58% of collisions are the fault of the motorist, 31% of collisions are the fault of the pedestrian, and 11% are undetermined. Many collisions can be the result of more than one violation factor, some not readily apparent, but typically the officer at the scene will determine through witness and party statements the most likely cause of the collision. In the case of pedestrian collisions, inattention combined with unsafe speeds can result in a violation of CVC 21950(A).

[22] *Pedestrian Safety Study and Action Plan*, Page 25. Driver inattention was a factor in 36 percent of their pedestrian crashes.

Figure 27 – 2004-2008 Most Common Vehicle-Pedestrian Injury Collision Factors by California Vehicle Code Violation Section

CVC Section	General Description of CVC Violation	
21950(A)	Motorist failure to yield to pedestrian at a crosswalk	1328
21954(A)	Pedestrian failure to yield right-of-way outside crosswalk	331
21955	Pedestrian crossing between signalized intersections	279
21950(B)	Pedestrian failure to watch for cross traffic at crosswalk	215
22350	Motorist driving at unsafe speed given conditions of roadway	157
22106	Motorist unsafe maneuver or backing after being parked	156
21453(D)	Pedestrian violation of signal red light	131
21453(A)	Motorist violation of signal red light	93
21456(B)	Pedestrian disobedience of pedestrian signal indications	78
22450	Motorist failure to stop at a STOP sign limit line	35
21451(A)	Motorist failure to yield to pedestrians on green signal light	27
21956	Pedestrian walking on roadway	26
23152/23153	Under the influence of drugs or alcohol (DUI)	26
21951	Motorist overtaking a vehicle that is yielding to a pedestrian	23
21954(B)	Motorist not exercising due care for pedestrian outside crosswalk	21
21756(A)	Motorist failure to yield to pedestrians exiting a streetcar or bus	21
21804/21952	Motorist failure to yield from driveway or alleyway	18
22107	Motorist changing lanes or turning without signaling	17
21453(B)	Motorist failure to yield to pedestrians when turning with red light	16
21663	Motorist driving on sidewalk	14
21950(C)	Motorist not exercising due care for pedestrian at crosswalk	14
Blank		219
Other Code		125
TOTAL		3370

Figure 28 shows that 14 percent of injury pedestrian collisions result in a hit and run, or failure on the part of one of the parties to remain at the scene of the collision. In New York City they found that 21 percent of motorists left the scene of a fatal pedestrian collision.[23] The figure in San Francisco is similarly high at 23 percent. Figure 29 shows results for vehicle-pedestrian collisions that involve a DUI on the part of any party.

Figure 28 - Hit and Run Injury Vehicle-Pedestrian Collisions (2008)

	Total Injury	Percentage	Fatal Only	Percentage
Hit and Run =Yes	100	14 %	3	23 %
Hit and Run = No	616	86 %	10	77 %

[23] *Pedestrian Safety Study and Action Plan: Technical Supplement,* Page 19.

Figure 29 - DUI and Injury Pedestrian Injury Collisions (2008)

	Total	Percentage	Fatal Only	Percentage
Had Been Drinking (any party)	68	10 %	2	15 %
Had Not Been Drinking	634	90 %	11	85 %

Figure 30 summarizes the percentage of San Francisco pedestrian collisions that involve vehicles making turns in general for 1999-2003, part of a study the SFMTA conducted in 2005 analyzing turning collisions and pedestrians.[24] It provides the total number of pedestrian injury collisions, then the number of these collisions that have the movement preceding the collision as a left or right turn. In San Francisco right turn collisions constitute an average of 15 percent of intersection collisions, while left turn collisions are an average of 31 percent of the reported total. Taken together, almost half of San Francisco intersection pedestrian injury collisions involve turns. In New York City left turning collisions outnumbered right turns by 3 to 1, more than the 2 to 1 ratio recorded in San Francisco.

The greater number of left turn collisions is likely due to three factors present on typical two-way roadway configurations. First, a left turning vehicle is likely to be going at a higher rate of speed over a crosswalk while completing the turn than a right turning vehicle. Second, a left turning motorist has to evaluate gaps between oncoming vehicular traffic and conflicting pedestrian movements, a more challenging maneuver compared to a right turning motorist who only has to watch for nearside pedestrian traffic. Lastly, pedestrians may be located at a greater distance from a left turning vehicle and thus may be relatively less visible. The New York City study also mentioned that "When turning left, the driver's visibility is partially blocked by the A-pillar (the support between the windshield and the side window), making it harder to see pedestrians in the left crosswalk."[25]

[24] "Multiple Turn Lane Report," Internal SFMTA paper, June 15, 2005, page 5.
[25] *Pedestrian Safety Study and Action Plan*, Page 26.

Figure 30
San Francisco Pedestrian Injury Collisions Total and Intersection Turns
Five Year Totals 1999 to 2003

PEDESTRIAN-RELATED

Pedestrian Injury Intersection Total	Involved Vehicle Right Turn at Intersection	Involved Vehicle Left Turn at Intersection
2692	403 (15 %)	835 (31 %)

8: PARTIES INVOLVED IN COLLISIONS

The gender break down of collisions in general in San Francisco for 2008 is given in Figure 31. For reference purposes, the U.S. Census lists the female population of San Francisco at 49.2 percent, though this may not reflect the actual gender make-up of pedestrians and drivers on San Francisco streets. There is a greater likelihood that a driver in a fatal or injury collision is male. Whether this is due to males driving more in San Francisco or differences in the propensity to be cause a collision is not clear. In California 51 percent of licensed drivers are male[26] but this does not indicate how much driving each licensed individual engages in. New York City found that 80 percent of their pedestrian injury crashes "involved male drivers, while only 57 percent of vehicles are registered to men,"[27] suggesting gender was a factor.

Figure 31 – Gender of Drivers in Fatal and Injury Collisions (2008)

	Fatal	Injury
Male	74%	67%
Female	26%	33%

Injury collisions involving male pedestrians were 52 percent of the total for the five-year period 2004-2008. 54 percent of fatal pedestrian collisions involved a male pedestrian.

The New York City *Pedestrian Safety Study and Action Study* also looked at specific factors that would not be easily or directly obtained from current California collision databases, such as whether the party was foreign-born, did not have a driver's license, did not have a high school diploma, or was not a resident of the city. The UCSF San Francisco Injury Center has extensively looked at detailed crash patient records for 2004-2008 and made the following findings concerning injured pedestrians treated at San Francisco General Hospital[28]:

[26] FHWA, Highway Statistics 2008, Table DL-1C.
[27] *Pedestrian Safety Study and Action Plan*, Page 29.
[28] Rochelle Dicker et al., San Francisco Injury Center (UCSF), "Cost of Auto-versus-Pedestrian Injuries, 2004-2008," March 2010.

- 74 percent lived in San Francisco and 98 percent in California
- 74 percent were released within 24 hours (non-admitted)
- Caucasians comprised 33 percent and Asians 25 percent of the treated total

The following two graphs look at collisions by age, with special emphasis on school-age children and seniors. Figure 32 shows the overall trend of injury collisions reported for ages 5 to 17, broken down by whether the party was a driver, pedestrian or bicyclist. Overall recent trends are positive. Since 1999 injury collisions involving drivers younger than 18 years old have dropped by more than 50 percent, pedestrian collisions have dropped by 36 percent, and bicycle collisions have declined by 68 percent.

FIGURE 32
San Francisco Injury Collisions Involving Parties Ages 5 to 17 (1999-2008)

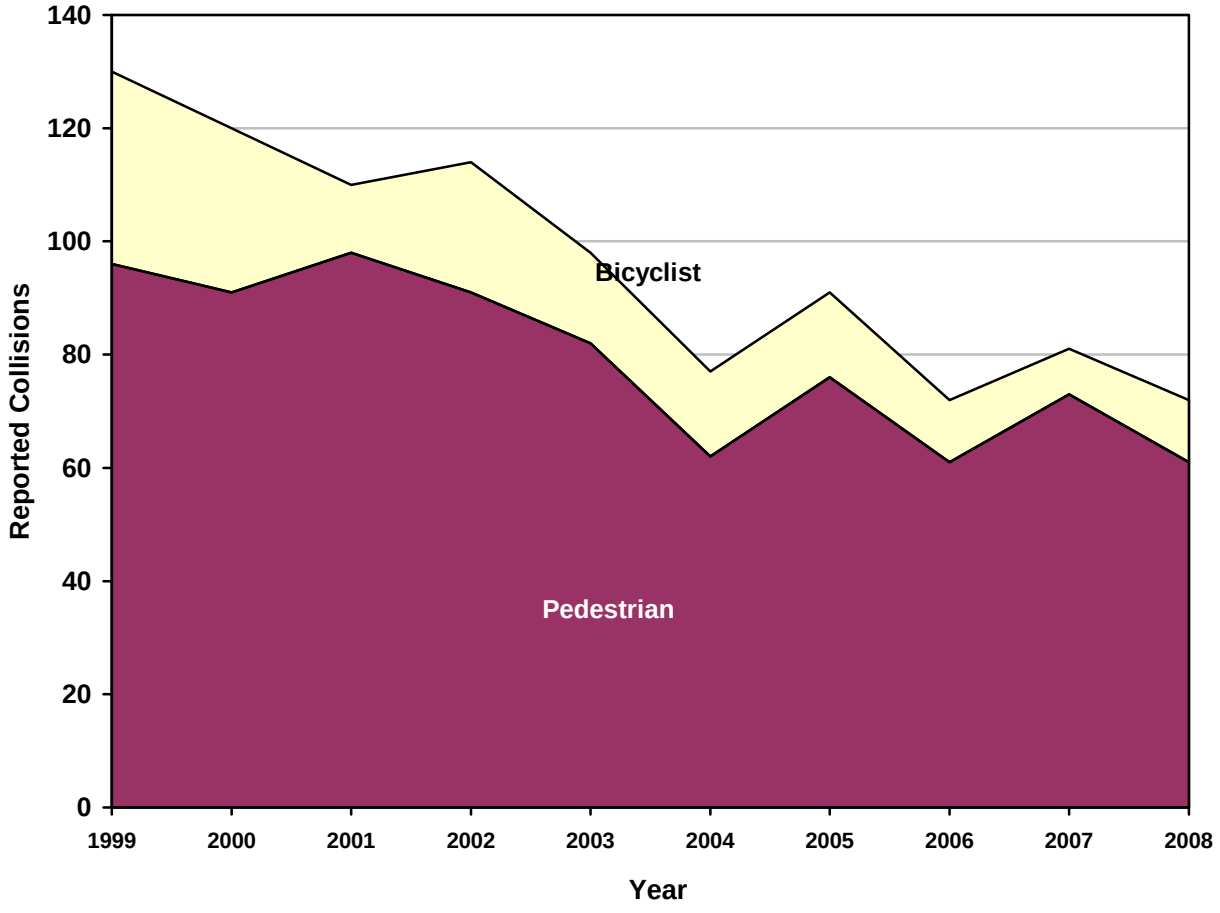


Figure 32: San Francisco Injury Collisions Involving Parties Ages 5 to 17 (1999-2008)

Year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Pedestrian	96	91	98	91	82	62	76	61	73	61
Bicyclist	34	29	12	23	16	15	15	11	8	11

Figure 33 shows the same injury information for parties ages 65 and older, also including drivers. Trends were positive until 2006, after which there was an increase in collisions involving senior drivers and senior pedestrians. During this period individuals 65 and older were generally three times as likely to be involved in a collision as a driver than as a pedestrian.

Figure 33
San Francisco Injury Collisions, Parties Ages 65 and Older
(1999-2008)

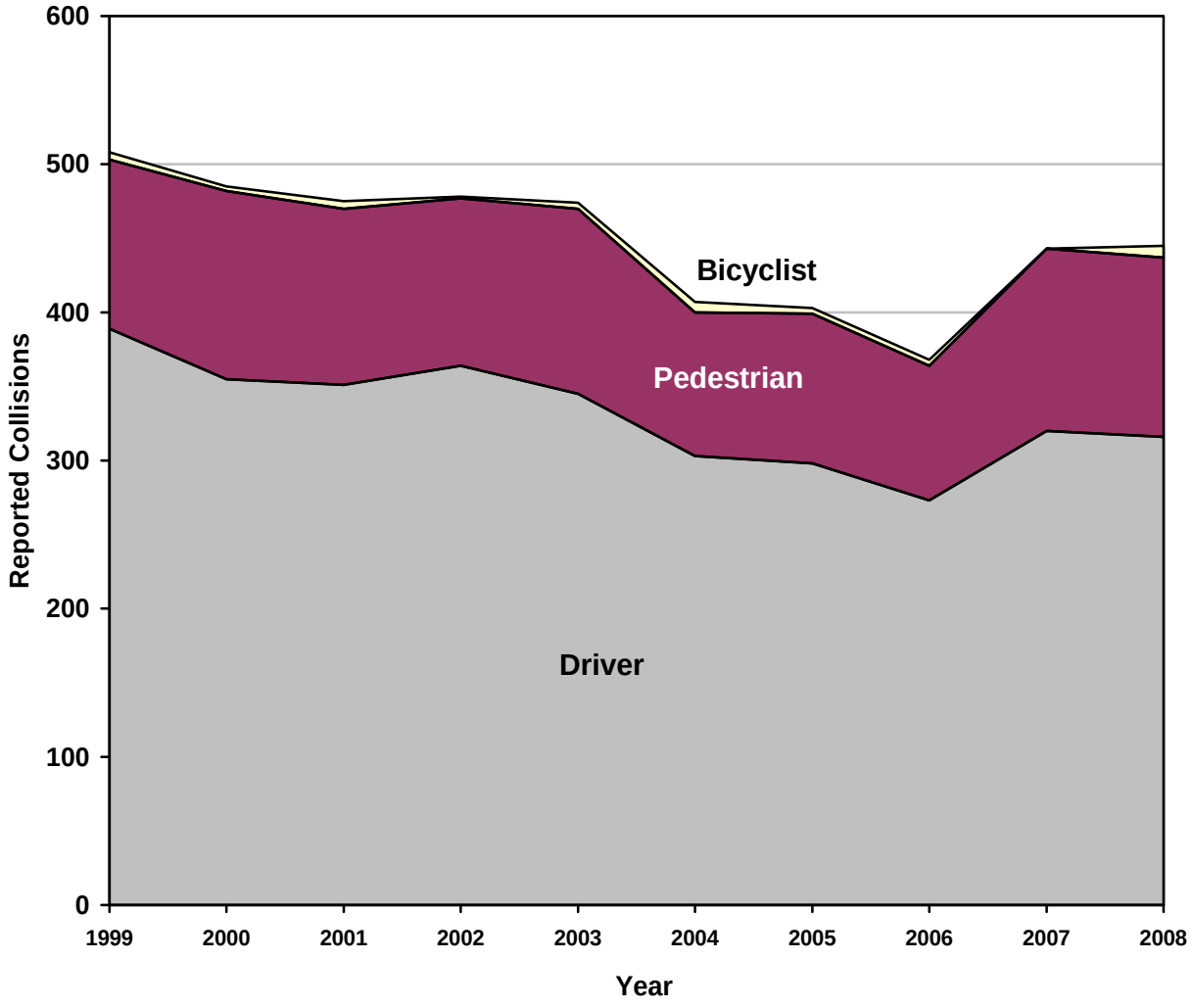


Figure 33: San Francisco Injury Collisions, Parties Ages 65 and Older (1999-2008)

Year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Driver	389	355	351	364	345	303	298	273	320	316
Pedestrian	114	127	119	113	125	97	101	91	123	121
Bicyclist	5	3	5	1	4	7	4	4	0	8

Figures 34 and 35 describe three-year injury totals by age of pedestrian or bicyclist involved in the collision. Census data provided in Figure 35 does not necessarily reflect the demographic characteristics of pedestrians or bicyclists on San Francisco's streets. Pedestrian collisions do nevertheless somewhat follow the age distribution of the city as a whole. Bicycle collisions tend to be more frequent among young adults, however, with 70 percent of collisions involving parties between the ages of 20 to 39.

Figure 34
Pedestrian and Bicycle Injury Collisions by Party Age (2006-2008)

Pedestrian or Bicyclist Age	Pedestrian Injury Collisions	Percent of Pedestrian Collisions	Bicycle Injury Collisions	Percent of Bicycle Collisions
0 to 9 years old	59	3%	11	1%
10 to 19 years old	225	10%	61	5%
20 to 29 years old	415	18%	538	43%
30 to 39 years old	357	15%	330	26%
40 to 49 years old	387	17%	179	14
50 to 59 years old	418	18%	90	7%
60 to 69 years old	200	9%	31	2%
70 to 79 years old	152	7%	5	0%
80 to 89 years old	83	4%	1	0%
Over 90 years old	14	1%	0	0%
Total	2310		1246	

Figure 35
Pedestrian and Bicycle Collisions by Major Age Groupings (2006-2008)

Pedestrian or Bicyclist Age	Percent of Pedestrian Collisions	Percent of Bicycle Collisions	Population % San Francisco 2000 Census
0 to 19 years old	12%	6%	16%
20 to 59 years old	68%	91%	66%
Over 60 years old	19%	3%	18%

9: NEW YORK CITY ACTION PLAN

The New York City report concludes with an action plan outlining various engineering, enforcement, and educational efforts that the city is undertaking. Highlights include:

- Continued analysis of higher collision corridors, areas, and intersections
- Pedestrian countdown signal installations

- Redesign of streets to slower speeds (20 MPH)
- Removal of parking at corners along Manhattan Avenue for left turn visibility
- Continuation of Safe Routes to School programs
- Continuation of traffic calming programs
- Enforcement coordination with the New York City Police Department
- Educational efforts at schools
- Safety marketing and public relations campaigns
- Legislation to expand red light cameras and introduce speed cameras

In many areas San Francisco has initiatives similar to those of New York City, though of course varying in scope given all the differences between both cities. Some SFMTA pedestrian safety action items include:

- Continued analysis of higher collision corridors, areas, and intersections
- Continued installation of pedestrian countdown signals
- Continued expansion of audible pedestrian signal locations
- Continued installation of traffic calming measures to slow vehicle speeds
- Continued removal parking at corners to improve pedestrian sight distances
- Continued expansion of the use of “continental” or “ladder” type crosswalk markings at high-traffic uncontrolled crosswalks (pictured below)

- Increased use of yield lines and "yield here to pedestrians" signage at multiple lane approaches to uncontrolled crosswalks using new national design standards
- Installation of new symbolic TURNING VEHICLES YIELD TO PEDESTRIAN signs, first installed in New York City and now a new national standard (pictured to the right)
- Continued school safety evaluations, school safety education, and Safe Route to School grant efforts.
- Continued coordination with the San Francisco Police Department and Public Health Department on pedestrian safety enforcement, data sharing, and educational campaigns.
- Improved collection of pedestrian counts to estimate collision exposure levels and pedestrian activity changes.

Of the new safety initiatives listed by New York City, the one that was most noted by the New York City press was the introduction of pedestrian countdown signal devices. These pedestrian signal indications give the time remaining before a yellow is shown and cross street traffic receives a green. This was highlighted by the press release itself, which used this as an opportunity to announce an ambitious rollout of this technology:

> "In addition to releasing the report, the Mayor, Speaker and Commissioner announced the conclusion of the City's pedestrian countdown signal pilot program. Based on the data collected, which clearly demonstrates the types of intersections where countdown signals have a positive safety impact, pedestrian countdown signals will be installed at 1,500 initial intersections across the city, with installation beginning this month."[29]

As previously noted, San Francisco was one of the early adopters of this technology on a citywide scale, and positive results here[30] and elsewhere they have been tried in the past decade resulted in the Federal Highway Administration recommending their use for

[29] "Mayor Bloomberg, Speaker Quinn And Transportation Commissioner Sadik-Khan Release City's Most Comprehensive Pedestrian Safety Study To Date And Announce Installation Of 1,500 Pedestrian Countdown Signals Across The City," August 16, 2010, www.nyc.gov.
[30] *Pedsafe: Pedestrian Safety Guide and Countermeasures Selection System*, FHWA, September 2004, pages 262-264.

new pedestrian signals as part of their 2009 revision to the Manual on Uniform Traffic Control Devices (MUCTD). San Francisco was able to leverage funds available in the early 2000's to replace its incandescent pedestrian signals to LED countdown units, resulting in a simultaneous improvement in safety and a reduction in energy consumption. The SFMTA goal now is to install pedestrian signals where they are missing (less than a third of our approximately 1,200 signals). Local sales tax and state grants have been used to fund these pedestrian safety improvements, with highest priority given to school crosswalks and high collision locations.

Another idea that has received attention in San Francisco in particular has been New York City's proposal to do more 20 MPH zoned streets. New York City "is developing a pilot neighborhood 20 mph zone program that would slow traffic on an area-wide, rather than individual street, basis."[31] New York City staff recently clarified to SFMTA that under this plan streets would design through traffic calming to a slower 20 MPH speed, such as with the addition of speed humps. There was a misunderstanding when the study came out that New York City would be posting 20 MPH speed limit signs, but they will not. San Francisco similarly has a traffic calming program where streets are evaluated for redesigns that can lower speeds below those posted, such as a design speed of 15 to 17 MPH depending on the design of speed humps.

The regulations on how San Francisco can set speed limits are set by the California Vehicle Code. In New York City the basic speed limit (the law that applies on most residential streets) is 30 MPH. In California that figure is 25 MPH, a lower limit that in general can be seen as a plus for pedestrian safety. The California Vehicle Code does allow jurisdictions to post speed limits below 25 MPH for certain types of roadways, such as those that are very narrow or steep, but it does not have provisions to have entire residential areas posted with 20 MPH speed limits. If any city were to post such speed limits their legality could be challenged. In general, measures that encourage or enforce appropriate and safe speeds on the part of motorists are more effective than simply changing a speed limit sign on a street. Driving at speeds unsafe for conditions is the primary cause of collisions in San Francisco, and for pedestrians it is the key factor in determining likelihood of severe injury once hit.[32]

One of the challenges New York City and San Francisco face now is addressing all the streets that were not designed in the past with all of these pedestrian safety factors in mind. Significantly redesigning roadways will require coordination among a number of city agencies. In San Francisco, the Department of Public Works is leading a multi-agency collaboration to redesign key street segments, the Great Streets Program. Of the nine total Great Streets projects, six are complete at Leland Avenue, Valencia Street, Divisadero Boulevard, San Bruno Avenue, Lower Polk Street, and Van Ness

[31] *Pedestrian Safety Study and Action Plan*, Page 34.
[32] Erick Rosen and Ulrich Sander, "Pedestrian fatality risk as a function of car impact speed." Accident Analysis and Prevention, Vol. 41, 2009.

Avenue. Three are in design and planning phase at Balboa Street, Cesar Chavez and 19th Avenue.[33] These redesign efforts typically include major pedestrian enhancements like crosswalk bulbs, decorative sidewalk treatments, and pedestrian scale lighting. When combined together, such as the changes pictured below on Leland Avenue at Peabody Street, the end results can be a much improved walking environment.

Further facilitating these interdepartmental efforts will be the adoption of the City's Better Streets Plan, which will "create a unified set of standards, guidelines, and implementation strategies to govern how the City designs, builds, and maintains its pedestrian environment."[34] The Plan will help guide decision-making by both city agencies and private parties to improve the quality of the pedestrian realm.

10: OTHER FACTORS INFLUENCING COLLISION TRENDS

NYCDOT has a stated goal of reducing fatal collisions by 50 percent by 2030 from the totals recorded in 2007, from 274 to 137.[35] Using the same goal in San Francisco would require fatal collisions to drop from 42 fatal collisions in 2007 to 21 in 2030, something attainable well before 2040 given that the 2008 fatal collision total had

[33] Great Streets Program website: http://sfdpw.org/index.aspx?page=88
[34] Better Streets Plan website: http://www.sf-planning.org/ftp/BetterStreets/index.htm.
[35] *Pedestrian Safety Study and Action Plan*, Page 9.

already dropped to 27. As discussed, San Francisco has a lower collision total that tends to fluctuate more in any one year. While NYCDOT and SFMTA have an important role to play in improving pedestrian conditions, specific collision trends can be also influenced by demographic, cultural, and economic changes that affect the amount and type of traveling people engage in. For these reasons the SFMTA has in the past not set an exact percentage goal for the reduction of fatal collisions in future decades, though of course it remains our mission to improve roadway safety as rapidly as possible. It is the general goal of the SFMTA both to see reductions in pedestrian injuries every year and to increase the number of pedestrian trips in the City.

At the state level, changes can be made to laws and fines that can over time change driver behavior. For example, the State of California approved the creation of a double fine zone on Van Ness and 19th Avenues last year (both conventional state highways and important pedestrian streets), which went into effect at the start of 2009. Recent legislation in Sacramento has sought to reduce incidences of distracted driving caused by cell phones. Distracted driving is difficult to ascertain after a crash and is thus not consistently reported, but efforts to increase driver attention should be helpful to reduce pedestrian collisions, as was noted by the New York City study.

All levels of government can also play a role disseminating information about the toll that traffic collisions can have on society. Local and national educational efforts can over time result in diminished acceptance of unsafe behavior. Coordinated campaigns against drunk driving or promoting the use of seat-belts, for example, have been linked to decreases in the number of injuries from collisions. New York City provides a role model of how government can increase public awareness of a problem like pedestrian safety through visible action and publicity campaigns.

Economic factors can influence the number and mode of transportation trips, which in turn can affect a region's safety statistics. The National Highway Traffic Safety Administration reported fatal collisions for the United States were down almost 10 percent from the total reported in 2007, reaching their lowest level since 1961.[36] Higher gas prices, increases in unemployment, and drops in economic activity are all part of the complex mix of factors that affect a region's transportation activity and the collisions that result from such activity.

Although it is difficult to predict how much San Francisco's collision totals will decrease in the coming years, what is certain is that continued education, engineering and enforcement efforts are required to make San Francisco's streets safer for everyone.

[36] "2008 Traffic Safety Annual Assessment – Highlights," NHTSA, June 2009.