



2017

# Walking for a Healthier SANTA CLARA COUNTY

A pedestrian transportation, health, and data report



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## Acknowledgements

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## Introduction

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Pedestrian safety is a major public health issue. In 2013, 6,100 pedestrians were killed and approximately 160,000 were injured in traffic collisions in the U.S.<sup>1</sup> According to the National Safety Council, the economic costs of these fatalities and injuries were estimated to be nearly \$26 billion.<sup>2</sup> Although certain groups, such as children, older adults, and transit users, are more dependent on walking as a form of transportation, nearly everyone is a pedestrian at some point.

Walking can be a means of transportation or recreation and social connection and an easily accessible and affordable source of routine physical activity. According to a California travel survey, 16.2% of all household trips were made on foot.<sup>3</sup> Walking can help to reduce traffic congestion and emissions and contribute to the life of a community. More walkable neighborhoods have been shown to benefit the local economy by increasing business activity and employment.<sup>4,5</sup> In addition, since disadvantaged populations are likely to rely more heavily on active forms of transportation, improving walking environments can result in greater social equity.

Studies have shown that active transportation such as bicycling and walking can provide population-level health benefits.<sup>6,7,8</sup> Half of U.S. adults suffer from a chronic disease such as cancer, heart disease, or type 2 diabetes.<sup>9</sup> Physical activity can reduce the risk of premature death and a number of chronic diseases, support emotional well-being, and promote positive mental health and healthy aging.<sup>10</sup> Increasing physical activity can also produce economic benefits. According to a 2009 study, physical inactivity in Santa Clara County resulted in \$1.1 billion in health care costs and lost productivity.<sup>11</sup>

Walking for a Healthier Santa Clara County will provide a picture of the pedestrian environment in Santa Clara County and the connection between walking and health. The report includes data on pedestrian demographics, injuries, and fatalities; walking as a commute mode; pedestrian collisions and their primary causes; and maps of pedestrian crashes by County jurisdictions. The report provides recommendations for policy makers, advocates, public safety personnel, public health practitioners, and transportation planners to improve pedestrian safety and rates of walking through urban design, education, encouragement, and policy change. Data limitations and technical notes are also incorporated in the report.

The report is timely as it complements international, national, state, and local efforts to reduce pedestrian injuries and increase physical activity by creating complete streets and walkable, livable neighborhoods where people can be physically active. Some of these initiatives include the Safe Routes to School program; Surgeon General's Step It Up! Call to Action to Promote Walking and Walkable Communities; Toward Zero Deaths National Strategy on Highway Safety; U.S. Department of Transportation's Safer People, Safer Streets: Pedestrian and Bicycle Safety Initiative; California Complete Streets Act; World Health Organization's Age Friendly Cities Initiative; and Vision Zero San Jose.

## Key Findings

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The following are select key findings and are further described in the report.

- Communities that support active living, such as walking, experience a variety of benefits ranging from economic, environmental sustainability, increased safety, and improved health.
- The percentage of workers ages 16 and older who commute to work by walking was stable in Santa Clara County from 2010 to 2014. In 2014, the percentage was 1.9%.
- Among adults ages 18 to 64, the percentage who walked for reasons other than their regular job duties increased with age. The percentage was highest among ages 55 to 64 (61%) and the percentage declined slightly among ages 65 and older.
- The age-adjusted rate of pedestrian-involved collisions decreased slightly from 2004 to 2013 in Santa Clara County. In 2013, the age-adjusted rate was 27.9 per 100,000 people.
- In 2013, 7% of all the motor vehicle related collisions involved a pedestrian. One in five (20%) of these collisions involving a pedestrian resulted in a fatal or severe injury.
- In nearly half (48%) of the pedestrian-involved collisions, the pedestrian was crossing in the crosswalk; the majority of these pedestrians were crossing at an intersection.
- In 2011-2013, the top three primary collision factor violations in pedestrian-involved collisions are: vehicle failure to yield to pedestrian right-of-way (36%), pedestrian violation (31%), and unsafe speed (10%).
- In 2013, the rate of pedestrian-involved collisions is highest among ages 15 to 24 (46.0 per 100,000 people), followed by ages 65 to 74 (41.2) and ages 75+ (35.5). The percentage of pedestrian-involved collisions is similar by gender.
- In 2013, the percentage of pedestrian-involved collisions is higher among Latinos (37%) and Whites (34%) than Asians and African Americans (16% and 7%, respectively). Pedestrian-involved collisions are overrepresented by Latinos and African Americans relative to the proportion of these groups in the county population.
- The number and age-adjusted rate of emergency department visits for pedestrian injuries has increased from 2007 to 2014 in Santa Clara County; the rate is highest among African Americans (123.7 per 100,000 people) than all other race/ethnicity groups.
- The rate of emergency department visits for pedestrian injuries is highest among ages 15 to 24 (63.9 per 100,000 people), 25 to 34 (44.8) and 45 to 54 (40.6).
- The rate of pedestrian-involved deaths increases with age and is highest among ages 85 and older (8.6 per 100,000 people).
- The traffic safety needs of aging adults as well as distracted pedestrian and drivers will have implications for planning, policies, and resources.
- Improving walkability and safety are linked to the E's of traffic safety: equity, engineering, encouragement, evaluation, education, enforcement, and engagement.

## Commuting by Foot

Walking as a mode of transportation has significant personal benefits. In the U.S., 29 percent of people who use public transit obtain 30 minutes or more of daily physical activity from walking to and from transit stops.<sup>12</sup> Time spent walking can contribute to the amount of aerobic activity recommended by the Centers for Disease Control and Prevention (CDC) to improve health and prevent adverse health outcomes.

Choosing to walk is good for the environment and saves money too. Automobiles, the fastest growing source of greenhouse gas emissions, are responsible for about 20 percent of the carbon dioxide (CO<sub>2</sub>) emissions in the U.S.<sup>13</sup> With a car-centric transportation system, polluted air leads to higher levels of asthma, lung cancer, heart disease, and respiratory illness.<sup>14</sup> The most harmful pollutants are emitted within minutes of starting a car, meaning that short trips pollute more per mile and have a bigger impact on overall health than longer trips.<sup>13</sup> As many as 69% of short trips are taken in private motorized vehicles.<sup>15</sup> Each gallon of gas burned produces 19.4 pounds of CO<sub>2</sub>, nearly a pound per mile driven on average. Walking one day a week for a year can save a typical commuter about 1,200 miles on a vehicle and reduce CO<sub>2</sub> emissions by over half a ton per year.<sup>16</sup>

**Walking one day a week for a year can save the average commuter 1,200 miles on a vehicle and reduce CO<sub>2</sub> emissions by over half a ton per year.**

Despite the multitude of benefits from walking, driving is the primary mode of transportation for most people. Overall, the percentage of workers ages 16 and older who commute to work by walking was stable in Santa Clara County from 2010 to 2014 (Table 1). In 2014, the overall percentage was 1.9%. Palo Alto had the highest percentage (5.4%), followed by Santa Clara (3.5%), and Los Altos (2.9%). Among reportable cities, Los Gatos, Gilroy, and Milpitas had the most notable decreases from 2010 to 2014 with percent change decreases of -48%, -30%, and -27%, respectively. Campbell experienced the highest percent change increase of 43% during the same time period.

**Table 1 – Percentage of workers ages 16 and older who commute to work by walking overall and by city in Santa Clara County, 2010-2014**

	2010	2011	2012	2013	2014
Santa Clara County	2.2	2.3	2.1	2	1.9
Campbell	1.4	1.5*	1.4	1.7	2
Cupertino	1.9	1.7	1.7	1.2	1.4
Gilroy	2	1.9	1.6	1.4	1.4
Los Altos	1*	1.4	1.6	2.2	2.9
Los Altos Hills	2.3*	1.1*	0.7*	0*	0.1*
Los Gatos	2.5	2.8	2	1.8	1.3
Milpitas	1.1	0.9	0.7	0.8	0.8
Monte Sereno	0*	0*	0*	0.3*	0.4*

	2010	2011	2012	2013	2014
Morgan Hill	3*	3.3*	2.8*	1.7*	1.6
Mountain View	2.6	2.6	2.5	2.7	2.5
Palo Alto	5.3	5.3	5.2	5.8	5.4
San Jose	1.9	2	1.8	1.7	1.6
Santa Clara	2.9	3.2	3	3.3	3.5
Saratoga	0.8*	1*	1*	0.3*	0.4*
Sunnyvale	1.6	1.5	1.2	1.3	1.3

Note: \* indicates estimate is statistically unstable due to a relative standard error of greater than 30%. These estimates should be viewed with caution and may not be appropriate to use for planning or policy purposes.

Source: U.S. Census Bureau; American Community Survey, 2006-2014 American Community Survey 5-Year Estimates, Table B08301; generated by Pamela Amparo; using American FactFinder; <<http://factfinder2.census.gov>>; (15 March 2016)

## Zero-Vehicle Households

Zero-vehicle households are households that do not own or have regular access to an automobile. Vehicle availability affects the mode used to make trips such as to work, school, shopping, and medical care. Households with zero-vehicle accessibility make a much larger proportion of their trips using transit or walking than do households with one or more vehicles. A study by the U.S. Department of Transportation found income is a major determinant of the number of vehicles in a household and that 78% of households with no vehicles have the lowest incomes.<sup>17</sup>

According to the American Community Survey (2006-2010), approximately five percent of Santa Clara County households do not own a vehicle, but there are areas in the County where more than 25% of households do not have access to a vehicle. Some of these areas correspond to low-income neighborhoods where it is likely that households cannot afford a vehicle. While other areas, such as near Stanford and San Jose State Universities, concentrations of zero-vehicle households may be due to large numbers of students who live on or near campus, and thus may not need a vehicle.<sup>18</sup>

Table 2 highlights the percentage of workers ages 16 years and older in households with zero vehicles by County and city jurisdictions from 2010-2014. Overall, the percentage of households with zero vehicles among workers ages 16 years and older was stable from 2010 to 2014. In 2014, the percentage was 2.2% in Santa Clara County. The percentage was highest in Mountain View (2.5%), Milpitas (2.3%), San Jose (2.3%), and Sunnyvale (2.3%). Among reportable cities, Gilroy, Mountain View and Santa Clara had the most notable decreases from 2010 to 2014 with percent change decreases of -48%, -36%, and -13, respectively. Milpitas had the highest percent change increase at 77% from 2010 to 2014.

**Table 2 – Percentage of workers ages 16 years and older in households with zero vehicles overall and by city in Santa Clara County, 2010-2014**

	2010	2011	2012	2013	2014
Santa Clara County	2.1	2	2.2	2.1	2.2
Campbell	2	2	2.2	1.9	2.2
Cupertino	0.8*	0.7	0.7	0.6*	0.5
Gilroy	3.1	2.1	1.7	1.7	1.6
Los Altos	0.4*	0.8*	0.7*	0.5*	0.6
Los Altos Hills	0*	0*	1.9*	1.1*	1.1*
Los Gatos	1*	1*	1.2*	1.1*	0.9
Milpitas	1.3	1	1.4	1.8	2.3
Monte Sereno	1.5*	1.1*	1.5*	3.2*	2.3*
Morgan Hill	0.8*	0.6*	0.9*	1*	1.3
Mountain View	3.9	3.7	3.3	3	2.5
Palo Alto	1.9	1.9	2.4	2.2	2
San Jose	2.1	2	2.3	2.2	2.3
Santa Clara	2.3	2.2	2.1	1.7	2
Saratoga	0.6*	0.6*	0.3*	0.4*	0.8*
Sunnyvale	2.6	2.3	2.6	2.8	2.3

Note: \* indicates estimate is statistically unstable due to a relative standard error of greater than 30%. These estimates should be viewed with caution and may not be appropriate to use for planning or policy purposes. Percent change shows a change in a variable during a specific time frame (i.e., 1 year, 5 years, etc). It represents the relative change between the old value and the new one.

Source: U.S. Census Bureau; American Community Survey, 2009-2014 American Community Survey 5-Year Estimates, Table B08301; generated by Pamela Amparo; using American FactFinder; <<http://factfinder2.census.gov>>; (15 March 2016)

## Walking for Physical Activity, Recreation, and Health

Walking is one the easiest and affordable ways get exercise and improve health. Physical activity can decrease one's risk of chronic disease, type 2 diabetes, heart attack, stroke, several forms of cancer; help maintain weight; reduce high blood pressure, arthritis pain, symptoms of depression and anxiety; and lessen the risk of osteoporosis and falls.<sup>19</sup>

Furthermore, regular physical exercise can help manage chronic conditions and support healthy aging by improving balance, stamina, flexibility, joint mobility, agility, walking, and overall coordination.<sup>20</sup>

In 2013-2014, half (50%) of adults in Santa Clara County walked in the past month for reasons other than their job. Pedestrian trips outside of work may include walking as a mode of

commute, exercise, or for incidental trips such as shopping. The percentage of adults who walked in the past month outside of work was higher among females than males (56% vs. 44%) and Whites (53%) than other race/ethnicity groups. Among adults ages 18 to 64, the percentage who walked other than their regular job increased with age. The percentage was highest among ages 55 to 64 (61%) and the percentage declined slightly among ages 65 and older (Table 3).

**Table 3 – Percent of adults who walked in the past month other than their regular job in Santa Clara County, 2013-14**

		%
Santa Clara County		50
Gender	Male	44
	Female	56
Age	18-24	28
	25-34	41
	35-44	49
	45-54	53
	55-64	61
	65+	57
Race/ethnicity	African American	44
	Asian/PI	50
	Latino	44
	White	53

Source: Santa Clara County Public Health Department, 2013-14 Behavioral Risk Factor Survey

Having access to places to play and be active is important for young children and adults alike. Santa Clara County is home to miles of walking trails through the County Parks and Recreation as well as through city parks and intentional planning efforts. Among all urbanized census blocks in the County, the average walking distance to the nearest park is just under a quarter of a mile. With few exceptions, most of Santa Clara County is within a half-mile of a park. Proximity to parks is associated with increased park usage, physical activity, and better overall health.<sup>18</sup>

To gain substantial health benefits from physical activity, the 2008 Physical Activity Guidelines for Americans by the Centers for Disease Control and Prevention (CDC) recommend adults obtain at least 150 minutes a week of moderate-intensity aerobic activity, or 75 minutes a week of vigorous-intensity aerobic activity, or an equivalent combination of moderate and vigorous intensity aerobic activity. When older adults cannot do 150 minutes of moderate-intensity aerobic activity a week, they should be as physically active as their abilities and conditions allow.<sup>21</sup>

The 2013-2014 Behavioral Risk Factor Survey reported fifty-eight percent (58%) of adults in Santa Clara County get enough aerobic physical activity to meet CDC recommendations in the past month. The percentage of adults meeting the recommendations is similar for males and

females (59% vs. 58%); however, it is lower for Asian/Pacific Islanders (54%) and Latinos (50%) than African Americans (61%) and Whites (65%). The percentage increases with age (highest among adults ages 65+, 69%), educational attainment, and household income (Table 4).

**Table 4 – Adults meeting the CDC recommendations for aerobic physical activity in past month in Santa Clara County, 2013-2014**

		Meet CDC recommendations for aerobic physical activity in past month, %
Adults		%
Santa Clara County		58
Gender	Male	59
	Female	58
Race/ethnicity	African American	61
	Asian/Pacific Islander	54
	Latino	50
	White	65
	Two or more races	74
Age group	18-24	56
	25-34	53
	35-44	53
	45-54	59
	55-64	63
	65+	69
Education	Less than high school	44
	High school or GED	56
	Some college	59
	College graduate or more	63
Household income	Less than \$15,000	49
	\$15,000-\$24,999	54
	\$25,000-\$34,999	50
	\$35,000-\$49,999	59
	\$50,000-\$74,999	57
	\$75,000+	63

Notes: \* + indicates estimate is statistically unstable due to a relative standard error (\*) of greater than 30% or less than 50 respondents in the denominator (+). These estimates should be viewed with caution and may not be appropriate to use for planning or policy purposes. The Centers for Disease Control and Prevention (CDC) suggests that adults ages 18 and older get at least 2 hours and 30 minutes (150 minutes) of moderate intensity aerobic activity (i.e., brisk walking) every week for good health; 1 hour and 15 minutes (75 minutes) of vigorous intensity aerobic activity (i.e., jogging or running); or an equivalent mix of moderate and vigorous intensity activity.

Source: Santa Clara County Public Health Department, 2013-14 Behavioral Risk Factor Survey

Table 5 shows by County jurisdiction the percentage of adults by city who walk as their primary mode of transportation to work, meet the CDC guidelines for aerobic exercise in the last month, and are diagnosed with health conditions that may be associated with exercise and environmental factors. Although the percentages are presented by city, rates of overweight, obesity, and physical inactivity are greater among certain groups of adults in the County. Seventy-two percent of Latinos and 65% of adults with lower incomes (\$25,000 to \$34,999) are overweight or obese compared to 54% of the general adult population.<sup>22</sup> Fifty-eight percent of Santa Clara County adults met the CDC’s recommendations for physical activity, while only 54% of Asian-Pacific Islanders and 50% of Latinos met the recommendations.<sup>23</sup>

**Table 5 - Public health indicators related to physical activity by city**

Jurisdiction	% of workers ages 16 and older who commute to work by walking	% adults who met CDC for aerobic physical activity in the last month	% adults who are obese	% adults ever diagnosed with diabetes	% adults who were ever diagnosed with high blood pressure	% adults who were ever diagnosed with asthma
Santa Clara County	1.9	58	20	8	27	14
Campbell	2	66	23	6*	33	13*
Cupertino	1.4	63	13	5*	19	12
Gilroy	1.4	68*	31	8*	28	17
Los Altos	2.9	73	10	2*	15	20
Los Gatos	1.3	64	16*	6*	26	19*
Milpitas	0.8	58	13	13*	17	8*
Morgan Hill	1.6	63	36	7*	38	27
Mountain View	2.5	61	17	6*	23	9
Palo Alto	5.4	75	11	5*	36	10
San Jose	1.6	53	22	7	28	14
Santa Clara	3.5	64	19	14	25	13
Saratoga	0.4*	68	15*	6*	32	23*
Sunnyvale	1.3	57	20	10	27	14

Notes: \*indicates estimate is statically unstable due to a relative standard error of greater than 30% or less than 50 respondents in the denominator. These estimates should be viewed with caution and may not be appropriate to use for planning or policy purposes. Data for Monte Sereno, Los Altos Hills and the unincorporated areas are excluded.

Sources: U.S. Census Bureau; American Community Survey, 2006-2014 American Community Survey 5-Year Estimates, Table B08301; generated by Pamela Amparo; using American FactFinder; <<http://factfinder2.census.gov>>; (15 March 2016)

## Physical Activity and Youth

Participating in regular physical activity is tied to many positive outcomes among children and adolescents including: short- and long- term health benefits, improved performance at school, and a decreased likelihood of engaging in risky behaviors.<sup>24</sup> The Centers for Disease Control and Prevention (CDC) recommends that children ages 6-17 spend a minimum of 60 minutes each day engaged in moderate to vigorous physical activity.<sup>19</sup>

More than one-quarter (27%) of Santa Clara County children ages 5 to 11 were physically active for at least 60 minutes each day in the past 7 days. Seventeen percent (17%) of middle and high school students were physically active for at least 60 minutes each day in the past 7 days. The percentage was lower for females than males across all age groups (26% vs. 29% for ages 5 to 11; 13% vs. 22% for middle and high school students).<sup>24</sup>

Results from the 2013-2014 Behavioral Risk Factor Survey show one third (36%) of children ages 5 to 11 walked, biked, or skateboarded home from school at least once in the past week/in a typical week. Percentages are lower for females than males and for Asian/Pacific Islanders and Whites than Latinos. Table 6 compares the percentage of children 5-11 years of age who indicated that they walked, biked, or skateboarded home from school at least once versus five days in a typical week.

**Table 6 - Percentage of children that walked, biked, or skateboarded home from school at least once in the past week/typical week and five days in the past week/typical week, 2013-2014**

		Walked, biked, or skateboarded home from school at least once in past week/a typical week	Walked, biked, or skateboarded home from school 5 days in past week/a typical week
Children (ages 5-11)		%	%
Santa Clara County		36	24
Gender	Male	38	27
	Female	33	21
Race/ethnicity	Asian/Pacific Islander	30	20
	Latino	46	34
	White	32	19
	Two or more races	32+*	19+*
Age group	5	16+*	10+*
	6-11	41	28

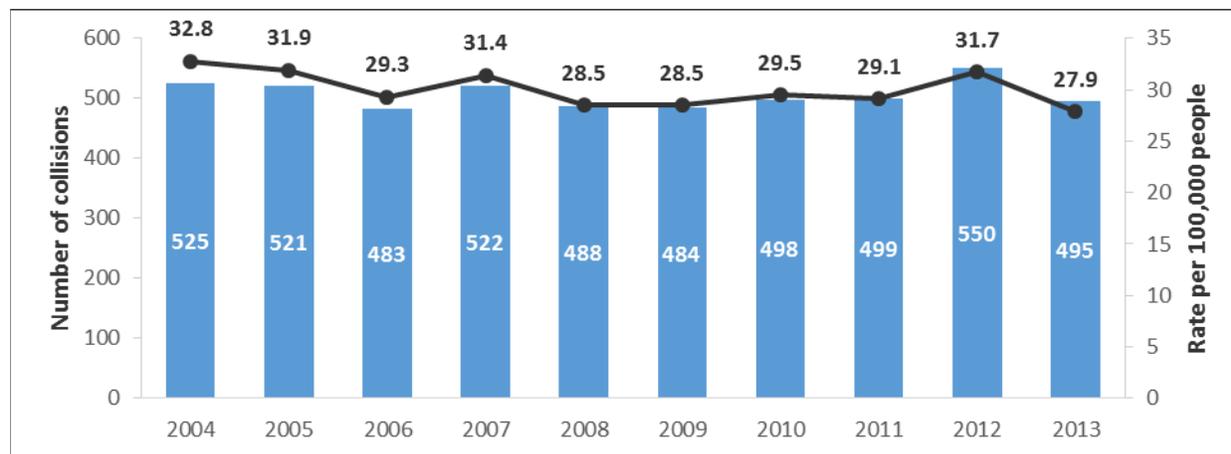
Notes: \* + indicates estimate is statistically unstable due to a relative standard error (\*) of greater than 30% or less than 50 respondents in the denominator (+). These estimates should be viewed with caution and may not be appropriate to use for planning or policy purposes Data were not available for African American children due to a small sample size.

Source: Santa Clara County Public Health Department, 2013-14 Behavioral Risk Factor Survey

## Pedestrian Collisions

Santa Clara County experienced a total of 6,669 injury and fatal motor vehicle collisions in 2013; crashes involving pedestrians comprised 7% of all motor vehicle crashes.<sup>25</sup> Overall, the age-adjusted rate of pedestrian collisions decreased slightly from 2004 to 2013. There were 525 pedestrian collisions and the age-adjusted rate was 32.8 per 100,000 people in 2004 compared to 495 crashes and an age-adjusted rate of 27.9 in 2013 (Figure 1).

**Figure 1 - Number and age-adjusted rate of pedestrian collisions in Santa Clara County, 2004-2013**

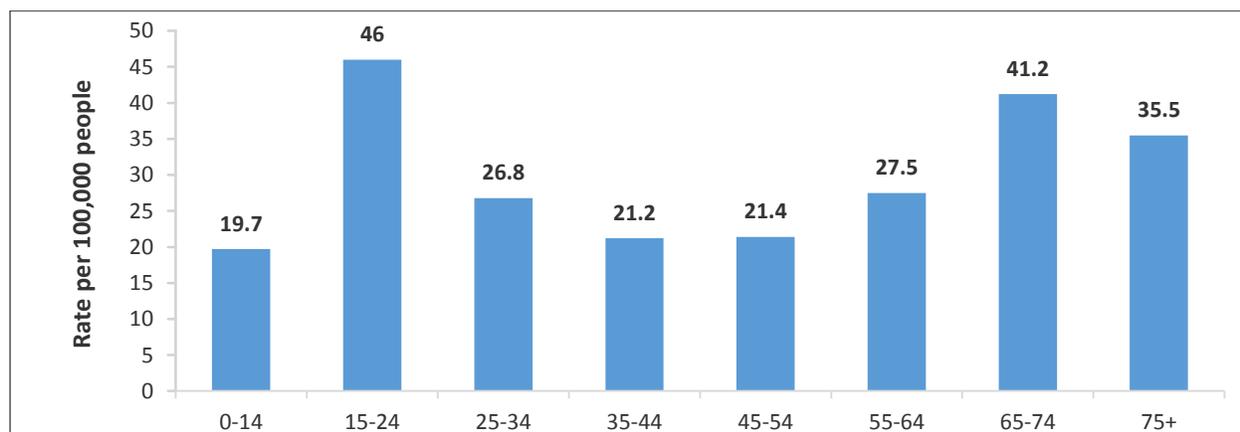


Note: The colored bars represent the number and the black line represents the age-adjusted rate per 100,000 people.

Sources: California Highway Patrol, Statewide Integrated Traffic Records Systems (SWITRS), 2004-2013

In 2013, the rate of pedestrian-involved collisions was highest among ages 15 to 24 (46.0 per 100,000 people), followed by ages 65 to 74 (41.2) and ages 75+ (35.5) (Figure 2).

**Figure 2 – Age-specific rates of pedestrian collisions in Santa Clara County, 2013**



Sources: California Highway Patrol, Statewide Integrated Traffic Records Systems (SWITRS), 2013; State of California, Department of Finance, State and County Population Projections by Race/Ethnicity and Age (5-year groups), 2010-2060, Sacramento, California, December 15, 2014

The percentage of pedestrian-involved collisions is similar by gender, and is higher among Latinos (37%) and Whites (34%) than Asians and African Americans (16% and 7%, respectively). Latinos and African Americans are overrepresented relative to the proportion of these groups in the county population. In 2013, 27% of residents were Latino and 3% were African Americans; both percentages were lower than race/ethnicity distribution of collisions among pedestrians (Table 7).

**Table 7 – Percentage of pedestrians involved in collisions by gender and race/ethnicity in Santa Clara County**

Select demographic characteristics		%
Gender	Male	49
	Female	51
Race/ethnicity	African American	7
	Asian	16
	Latino	37
	White	34
	Other	6

Note: 15% of race/ethnicity data is missing.

Source: California Highway Patrol, Statewide Integrated Traffic Records Systems (SWITRS), 2013

Table 8 delineates by city the annual average pedestrian collision count and rate from 2009-2013. Cities' age-adjusted pedestrian collision rates range from 17.1 per 100,000 in Sunnyvale to 46.0 in Palo Alto. The second and third highest rates are Campbell (34.4) and San Jose (34.1), respectively. It is worth noting Palo Alto has the highest percentage of workers 16 and older who commute to work by walking. Therefore, pedestrians' exposure to a collision may be greater than other cities.

**Table 8 – Average annual count and age-adjusted rate of pedestrian-involved collisions by city in Santa Clara County, 2009-2013**

	Average annual count	Rate per 100,000 people
Campbell	13	34.4
Cupertino	16	29.8
Gilroy	16	32.6
Los Altos	5	20.9
Los Altos Hills	<1	2.6*
Los Gatos	8	29.7
Milpitas	17	26.1
Monte Sereno	0	--
Morgan Hill	7	17.2
Mountain View	21	28.2
Palo Alto	31	46.3

	Average annual count	Rate per 100,000 people
San Jose	329	34.1
Santa Clara	36	31.2
Saratoga	3	11.1*
Sunnyvale	22	17.1
Unincorporated	14	14.4

Note: \* indicates estimate is statistically unstable. This estimate should be viewed with caution and may not be appropriate to use for planning or policy purposes. (--) indicates that rate is not available.

Sources: California Highway Patrol, Statewide Integrated Traffic Records Systems (SWITRS), 2009-2013; U.S. Census Bureau, 2010 Summary File, Table QT-P2 Single Years of Age and Sex: 2010

## Pedestrian Injuries and Fatalities

Traffic collision reports provide critical data regarding a crash (e.g., date, time, weather, location; information on the parties involved; and injury severity). However, a separate injury surveillance tracking system is required to know if an injured pedestrian receives medical treatment, is admitted to a hospital, or has complications resulting from his/her injuries. Monitoring crash data provides a better understanding of crash and post-crash circumstances as well as the consequences and costs of injuries incurred. Furthermore, injury surveillance data can aid in the development of effective countermeasure, injury prevention education, and policy changes.

The information presented in this section represents fatal and non-fatal pedestrian injuries treated in Santa Clara County emergency departments and trauma centers. The data was gathered through various surveillance mechanisms including Office of Statewide Health Planning and Development and the Santa Clara County Emergency Medical Service Trauma Registry.

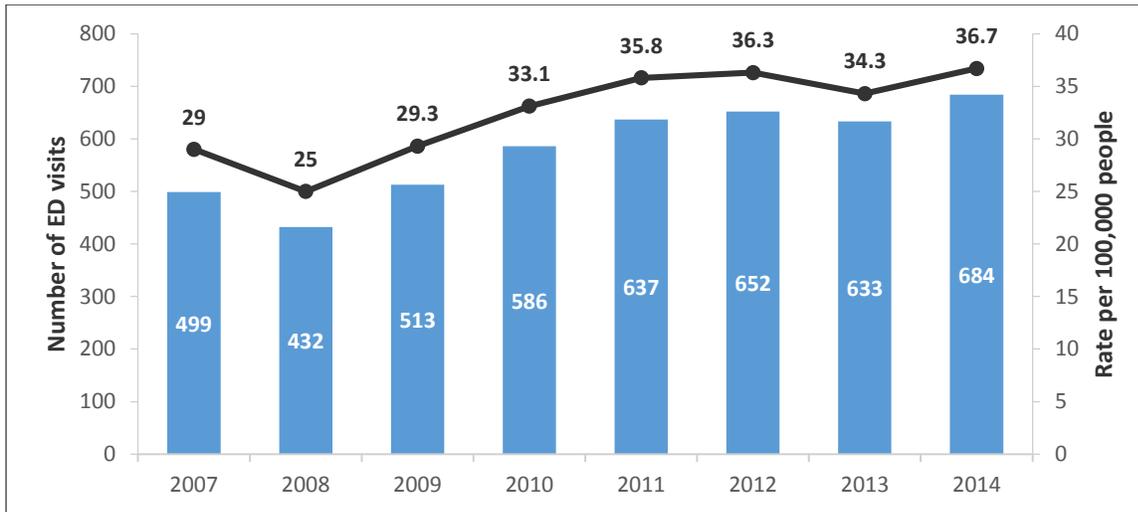
Pedestrian injury and death data include unintentional motor-vehicle-traffic injuries involving automobiles, vans, trucks, motorcycles, and other motorized cycles known or assumed to be traveling on public roads or highways. The data also includes a small number of unintentional non-motor-vehicle traffic injuries and deaths such as pedestrians hit by a train and motor-vehicle injuries that did not occur in traffic.

**Data surveillance provides a better understanding of motor vehicle collision trends and injury outcomes, and the data can contribute to developing effective countermeasures and policy changes.**

### Injuries

The number and age-adjusted rate of emergency department visits for pedestrian injuries has increased from 2007 to 2014 in the County (Figure 4). In 2014, there were 684 emergency department visits for non-fatal pedestrian injuries; the age-adjusted rate is 36.7 visits per 100,000 people, compared to 499 visits and an age-adjusted rate of 29 in 2007.

**Figure 4 – Number and age-adjusted rate of emergency department (ED) visits for non-fatal pedestrian injuries in Santa Clara County, 2007-2014**

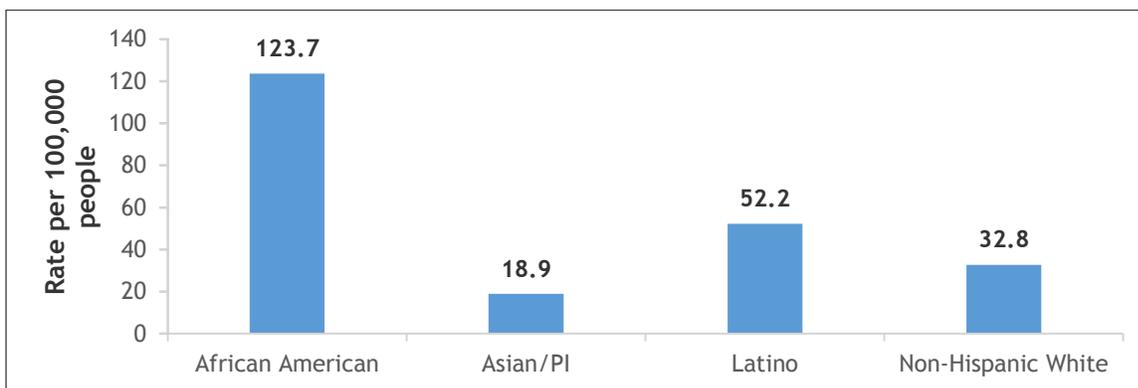


Note: The colored bars represent the number and the black line represents the age-adjusted rate per 100,000 people.

Sources: Office of Statewide Health Planning and Development, 2007-2014 Emergency Department Data; State of California, Department of Finance, Race/Ethnic Population with Age and Sex Detail, 2000-2010. Sacramento, California, September 2012; State of California, Department of Finance, State and County Population Projection, 2010-2060. Sacramento, California, December 15, 2014

Figures 5, 6, and 7 depict rates of emergency department visits for non-fatal pedestrian injuries in the County by race/ethnicity, age, and gender, respectively. The age-adjusted rate of emergency department visits for pedestrian injuries is highest among African Americans (123.7 per 100,000 people) than all other race/ethnicity groups.

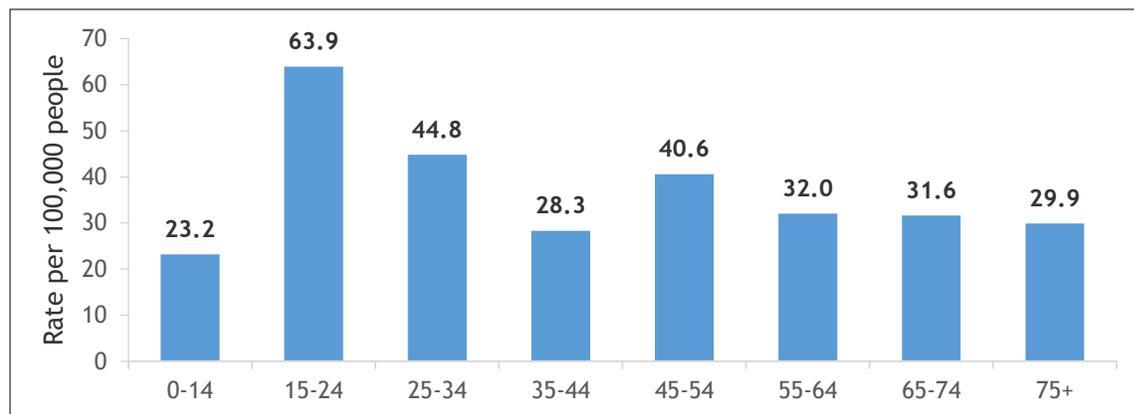
**Figure 5 – Age-adjusted rate of emergency department (ED) visits for non-fatal pedestrian injuries by race/ethnicity in Santa Clara County, 2014**



Sources: Office of Statewide Health Planning and Development, 2014 Emergency Department Data; State of California, Department of Finance, State and County Population Projection, 2010-2060. Sacramento, California, December 15, 2014

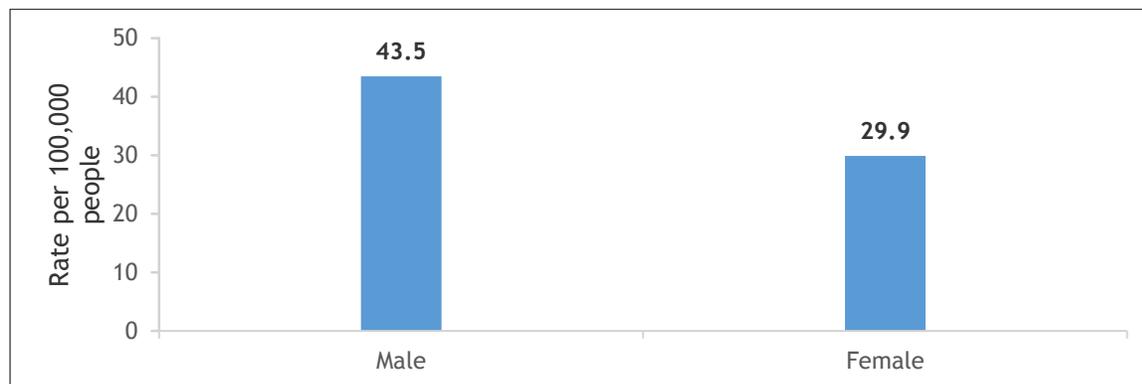
The rate of emergency department visits for pedestrian injuries is highest among ages 15 to 24 (63.9 per 100,000 people), 25 to 34 (44.8) and 45 to 64 (40.6) (Figure 6). Figure 7 shows the age-adjusted rate of emergency department visits for pedestrian injuries is higher among males than females (43.5 vs 29.9 per 100,000 people).

**Figure 6 – Age-specific rate of emergency department (ED) visits for non-fatal pedestrian injuries in Santa Clara County, 2014**



Sources: Office of Statewide Health Planning and Development, 2014 Emergency Department Data; State of California, Department of Finance, State and County Population Projection, 2010-2060. Sacramento, California, December 15, 2014

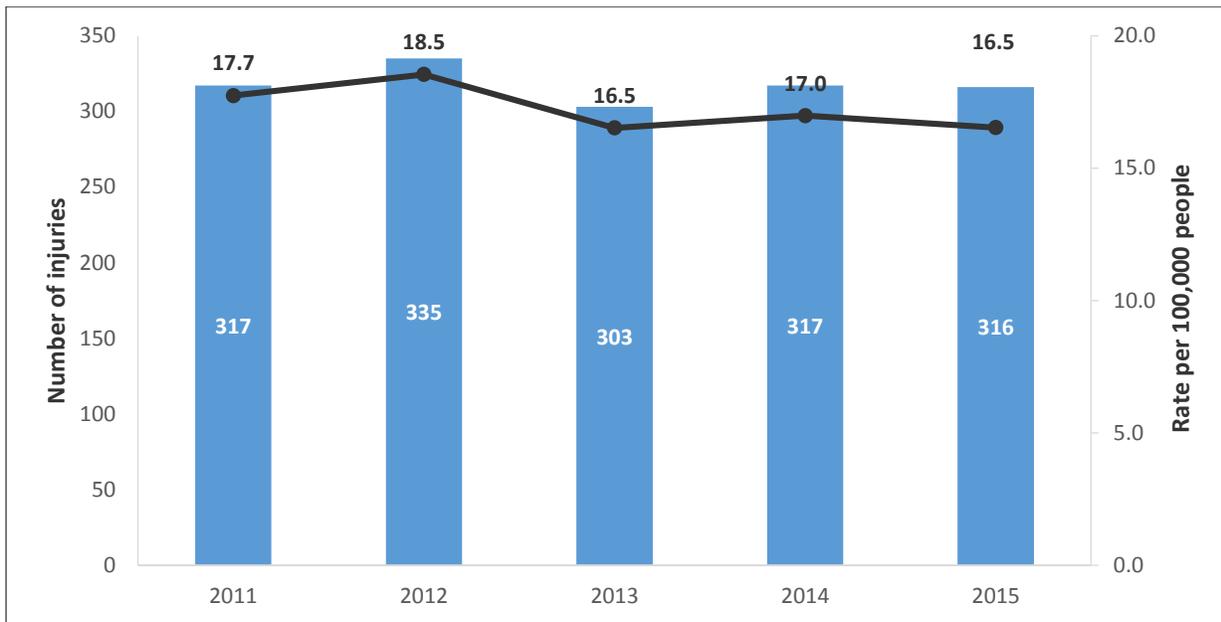
**Figure 7 – Age-adjusted rate of emergency department (ED) visits for non-fatal pedestrian injuries by gender in Santa Clara County, 2014**



Sources: Office of Statewide Health Planning and Development, 2014 Emergency Department Data; State of California, Department of Finance, State and County Population Projection, 2010-2060. Sacramento, California, December 15, 2014

Figures 8 and 9 highlight the number and age-adjusted rate of pedestrian-involved injuries treated at local trauma centers plus the age-specific rates of persons treated. Overall, the age-adjusted rate of pedestrian-involved injuries treated at trauma centers has remained fairly stable from 2011 to 2015. In 2015, the age-adjusted rate was 16.5 per 100,000 people. The rate of pedestrian-involved injuries treated at trauma centers is highest among ages 18 to 24 (23.5 per 100,000 people).

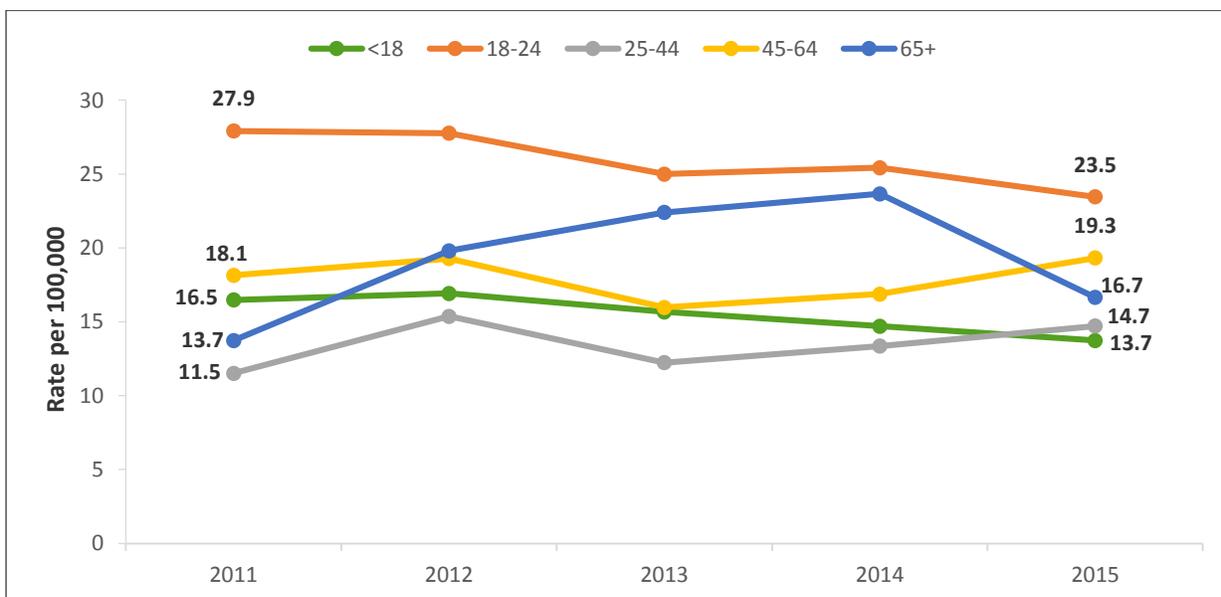
**Figure 8 – Number and age-adjusted rate of pedestrian-involved injuries treated at trauma centers in Santa Clara County, 2011-2015**



Note: The colored bars represent the number and the black line represents the age-adjusted rate per 100,000 people.

Source: Santa Clara County, Emergency Medical Services Agency, 2011-2015 Trauma registry; State of California, Department of Finance, State and County Population Projection, 2010-2060. Sacramento, California, December 15, 2014

**Figure 9 – Age-specific rate of pedestrian-involved injuries treated at trauma centers in Santa Clara County, 2011-2015**

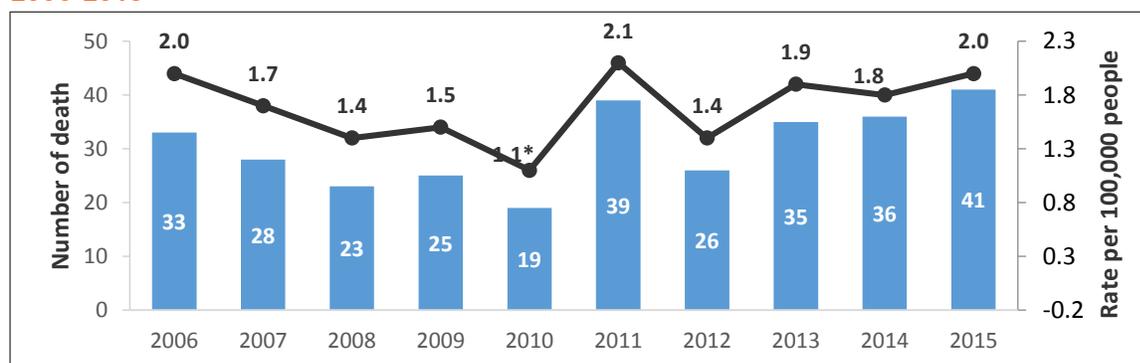


Source: Santa Clara County, Emergency Medical Services Agency, 2011-2015 Trauma registry; State of California, Department of Finance, State and County Population Projection, 2010-2060. Sacramento, California, December 15, 2014

## Fatalities

In 2013, pedestrian fatalities accounted for 23.4 percent of California’s total motor vehicle crash deaths<sup>26</sup> and 38 percent of the County’s crash deaths. The number of pedestrian-involved deaths in Santa Clara County has fluctuated over the past ten years between 19 and 41 deaths per year; the age-adjusted rate ranged from 1.4 and 2.1 per 100,000 people per year (Figure 10). The Healthy People 2020 target for pedestrian fatalities is 1.4 deaths per 100,000 population.<sup>27</sup>

**Figure 10 – Number and age-adjusted rate of pedestrian-involved deaths in Santa Clara County, 2006-2015**



Note: \* indicates estimate is statistically unstable. This estimate should be viewed with caution and may not be appropriate to use for planning or policy purposes. The colored bars represent the number and the black line represents the age-adjusted rate per 100,000 people.

Source: California Department of Public Health, 2006-2015 VRBIS, downloaded 5/05/2016

The rate of pedestrian-involved deaths is higher among males than females (2.6 vs 1.2 per 100,000 people) and higher among African Americans than all other race/ethnicities (Table 10).

**Table 10 – Average annual count, percentage, and age-adjusted rate of pedestrian-involved deaths in Santa Clara County, 2011-2015**

	Average annual count	%	Rate per 100,000 people
Santa Clara County	35	--	1.9
<b>Gender</b>			
Female	11	31	1.2
Male	24	69	2.6
<b>Race/ethnicity</b>			
African American	2	6	4.3*
Asian/PI	9	25	1.7
Latino	12	33	3
White	11	31	1.3
Other	2	6	--

Note: \* indicates estimate is statistically unstable. This estimate should be viewed with caution and may not be appropriate to use for planning or policy purposes.

Source: California Department of Public Health, 2006-2015 VRBIS, downloaded 5/05/2016

As illustrated in Table 11, the Santa Clara County rate of pedestrian-involved deaths increases with age and is highest among ages 85 and older. The findings are consistent with those of the Centers for Disease Control and Prevention which found that the risk of pedestrian death increases slowly through the life span and peaks with people over age 75.<sup>28</sup>

**Table 11 – Age-specific rates of pedestrian-involved deaths in Santa Clara County, 2011-2015**

Age	Rate per 100,000 people
0-14	0.3
15-24	1.1
25-34	1.3
35-44	1.3
45-54	2.2
55-64	2.6
65-74	4
75-84	7.6
85+	8.6

Note: There is variability over years due to small counts.

Source: California Department of Public Health, 2006-2015 VRBIS, downloaded 5/05/2016

The five-year count (2011-2015) of pedestrian deaths and their percentage of total motor vehicle collision deaths are listed by jurisdiction of occurrence. (Table 12). It is worth noting that the City of San Jose is the third largest city in California and tenth largest city in the nation with a population of over 1 million people. Despite its large size and population, San Jose continues to be one of the safest large cities in the nation for transportation operations, with an injury crash rate about half the national average.

**Table 12 - Number of pedestrian deaths and the percentage of motor vehicle traffic (MVT) deaths that are pedestrian deaths by city of occurrence in Santa Clara County, 2011-2015**

	Total pedestrian deaths	% of total MVT deaths that are pedestrians
Santa Clara County	177	33
Campbell	6	46
Cupertino	2	20
Gilroy	5	10
Los Altos	2	20
Los Gatos	1	6
Milpitas	11	44
Monte Sereno	0	0
Morgan Hill	4	19
Mountain View	9	36

	Total pedestrian deaths	% of total MVT deaths that are pedestrians
Palo Alto	6	40
San Jose	110	38
Santa Clara	7	26
Saratoga	1	17
Sunnyvale	13	50
Unincorporated	0	0

Source: California Department of Public Health, 2011-2015 VRBIS, downloaded 5/05/2016

## Collision Factors

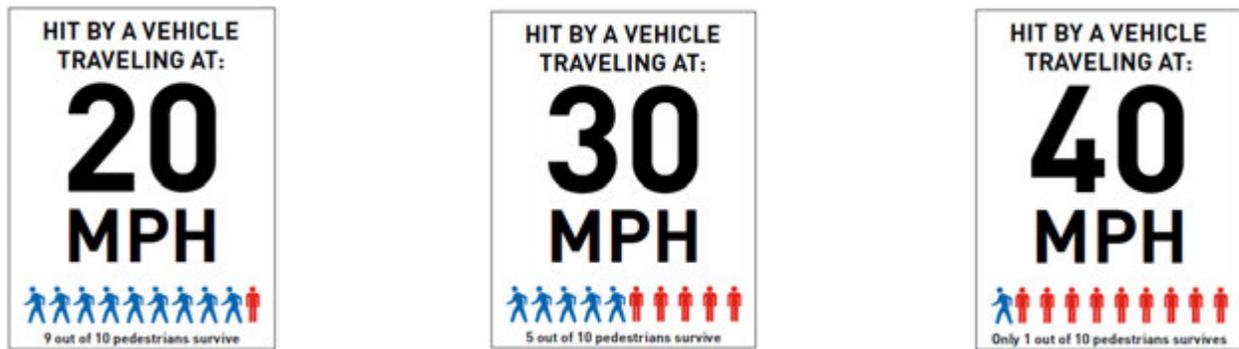
Pedestrian-related collisions can be caused by driver or pedestrian behavior, vehicle issues, physical environment, and many other conditions. An analysis of 2013 Statewide Integrated Traffic Records System (SWITRS) collision data for Santa Clara County shows in nearly half (48%) of the pedestrian-involved crashes, the pedestrian was crossing in a crosswalk, and the majority of these pedestrians were crossing at an intersection. Among the pedestrian-involved collisions at an intersection, 40% involved a vehicle proceeding straight, 30% involved a vehicle making a left turn, and 21% involved a vehicle making a right turn.

Primary collision factors are considered the primary or main causes of a collision based on the incident investigation. From 2011 to 2013, the top three primary collision factor violations in pedestrian-involved collisions in the county were pedestrian right-of-way (36%), pedestrian violation (31%), and unsafe speed (10%). Pedestrian right-of-way violations occur when a driver or bicyclist fails to yield to a pedestrian’s right-of-way. Among all of the collisions cited for pedestrian right-of-way, nearly all (98%) of the violation codes were for driver failure to yield. Among pedestrian violations, half of the violation codes (51%) were for the pedestrian being outside of the crosswalk.

Although unsafe speed was the primary collision factor in ten percent of pedestrian-vehicle collisions in the County,<sup>29</sup> it is a leading factor in pedestrian injuries and fatalities. It is well established that the risk that a pedestrian struck by a vehicle will be injured or killed is related to the impact speed. Figure 11 illustrates a pedestrian’s likelihood of surviving a crash when hit by a vehicle at 20 miles per hour versus 30 and 40 miles per hour.<sup>30</sup>

By collecting and analyzing collision data such as driver and pedestrian behaviors, factors which contribute to the greatest number of crashes and injuries can be identified and targeted for intervention. Countermeasures may warrant enforcement, education, policy recommendations, and/or infrastructure changes.

Figure 11 - Pedestrian Crash Survivability at 20 mph, 30, mph, and 40 mph.



## Pedestrian Collision Maps by Jurisdiction

From 2009-2013, there were a total of 2,698 pedestrian-related collisions in the County. Table 13 provides the number of crashes by jurisdiction and unincorporated areas of the county for the five-year period.

Table 13 - Number of pedestrian-involved collisions by jurisdiction, 2009-2013

	Count
Campbell	67
Cupertino	79
Gilroy	82
Los Altos	26
Los Altos Hills	1
Los Gatos	42
Milpitas	84
Morgan Hill	34
Mountain View	105
Palo Alto	156
San Jose	1,645
Santa Clara	180
Saratoga	17
Sunnyvale	112
Unincorporated	68

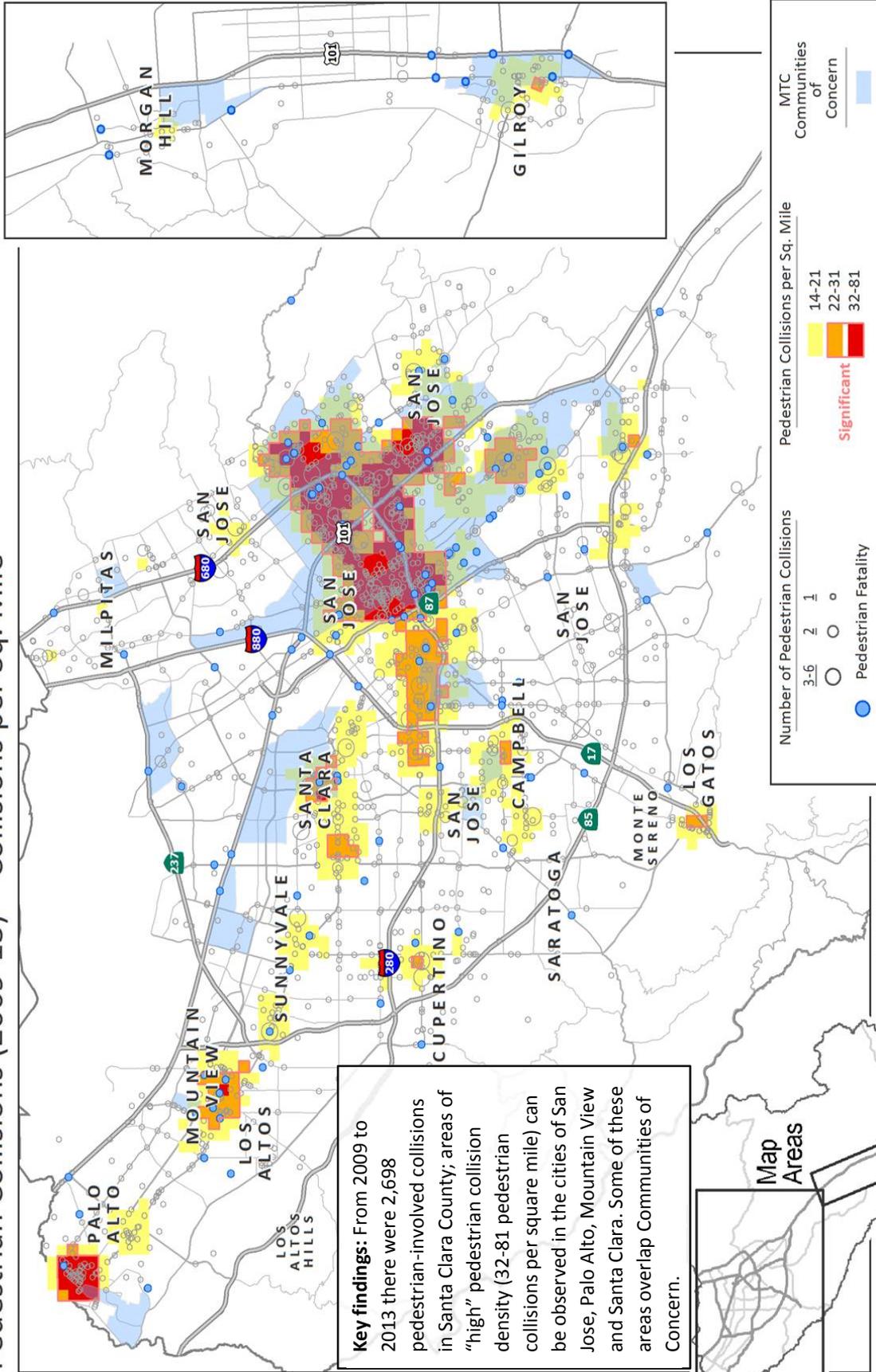
Source: California Highway Patrol, Statewide Integrated Traffic Records Systems (SWITRS), 2009-2013

The following maps plot pedestrian-involved collisions and fatalities by city and unincorporated areas between 2009 and 2013. Of the collisions identified in Table 13, only 81% are mapped due to limitations in mapping coordinates. The numbers of collisions occurring in the same proximity are indicated on the maps by small, medium, and large

circles and represent 1, 2, and 3-6 collisions per location, respectively. A blue dot represents a pedestrian fatality. Areas in yellow, orange, and red signify pedestrian collision density within a square mile. Yellow indicates locations that experienced 14-21 crashes and is considered a “low” collision density area, orange includes 22-31 crashes and is considered a “medium” density collision area, and red represents 32-81 crashes and is a “high” collision density location. Although areas in yellow are significant, orange and red areas are of particular concern due to the large number of collisions occurring within the geographic area. Some caution is warranted when reviewing the maps as the data are retrospective, and it is possible that improvements in infrastructure have been made since the data were reported.

Crash sites are overlaid by “Communities of Concern” as identified by the Metropolitan Transportation Commission (MTC) and are shaded blue. Communities of Concern are intended to represent populations and communities that could be considered disadvantaged or vulnerable in terms of both current conditions and potential impacts of future growth. The Metropolitan Transportation Committee’s Communities of Concern are defined as census tracts that have a select combination of demographic and socioeconomic characteristics. The variables include: minority population, low-income population, limited English proficiency population, zero-vehicle households, population ages 75 and over, population with a disability, single-parent households, and overburdened renters (share of all housing units occupied by renters paying more than 50% of income on rent). By exploring Communities of Concern that are disproportionately affected by pedestrian crashes, injuries, and fatalities, a more equitable distribution of resources can be deployed to improve walkability and safety. For more information on the mapping methodology see Technical Notes.

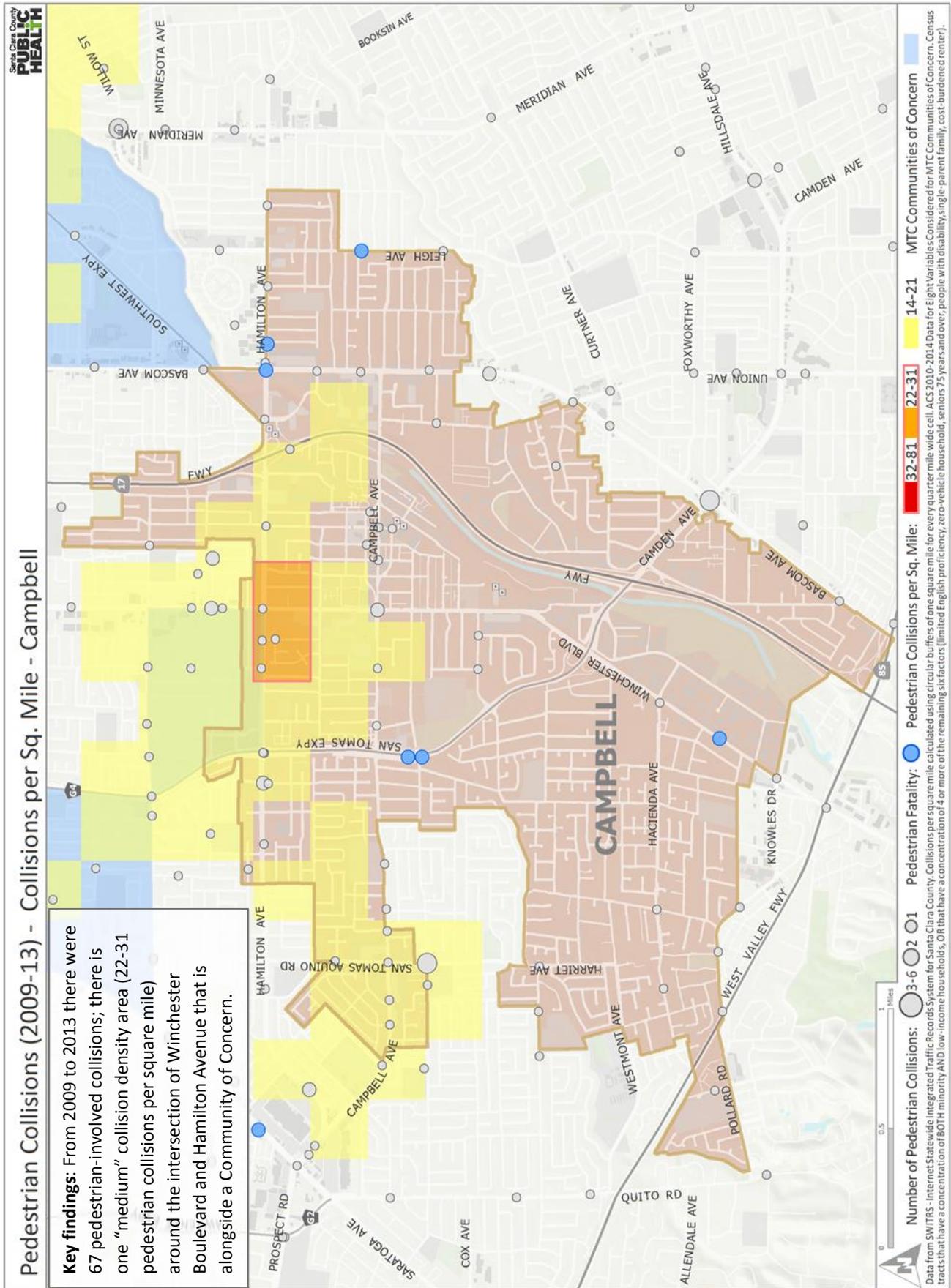
# Pedestrian Collisions (2009-13) - Collisions per Sq. Mile

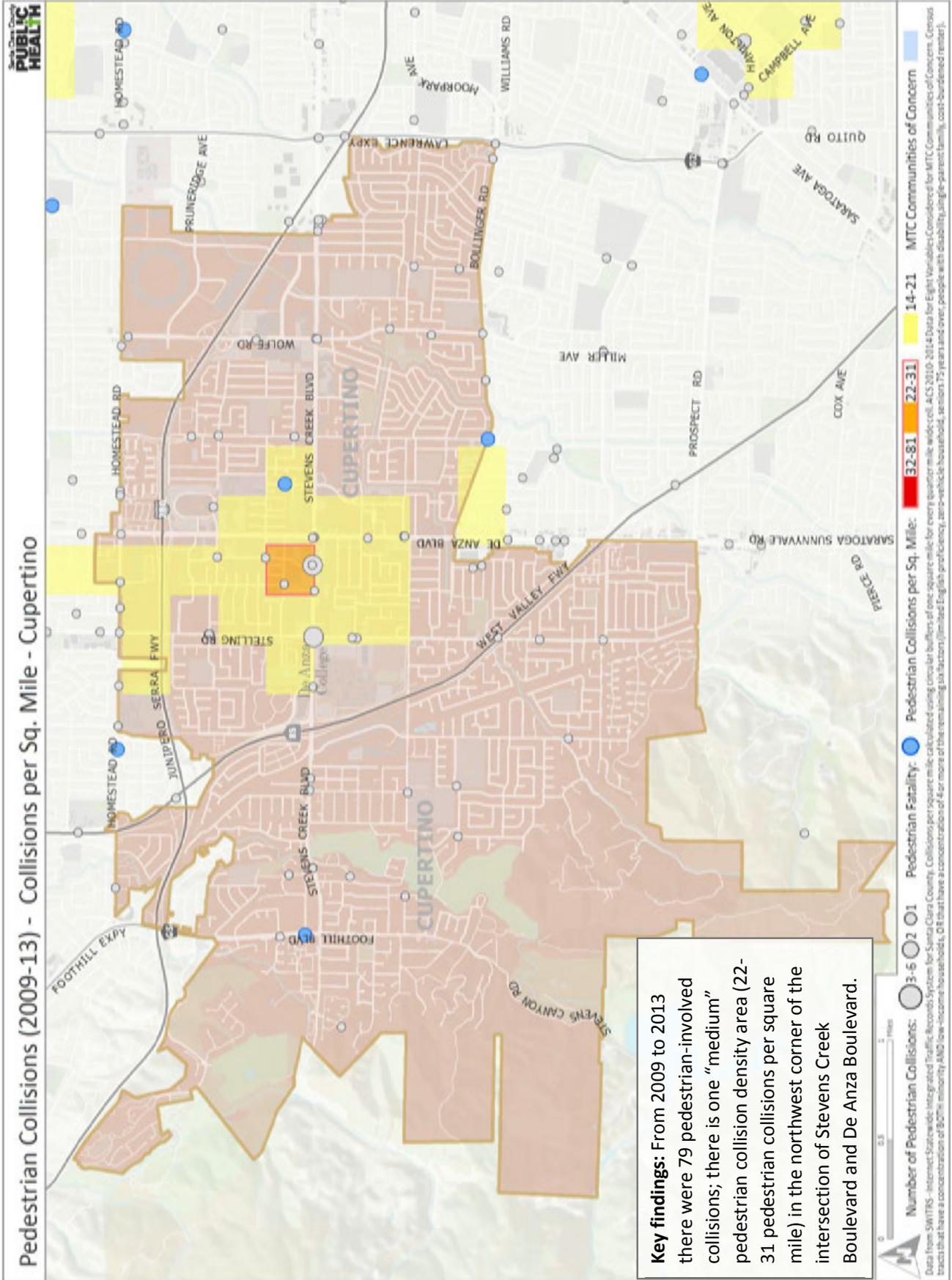


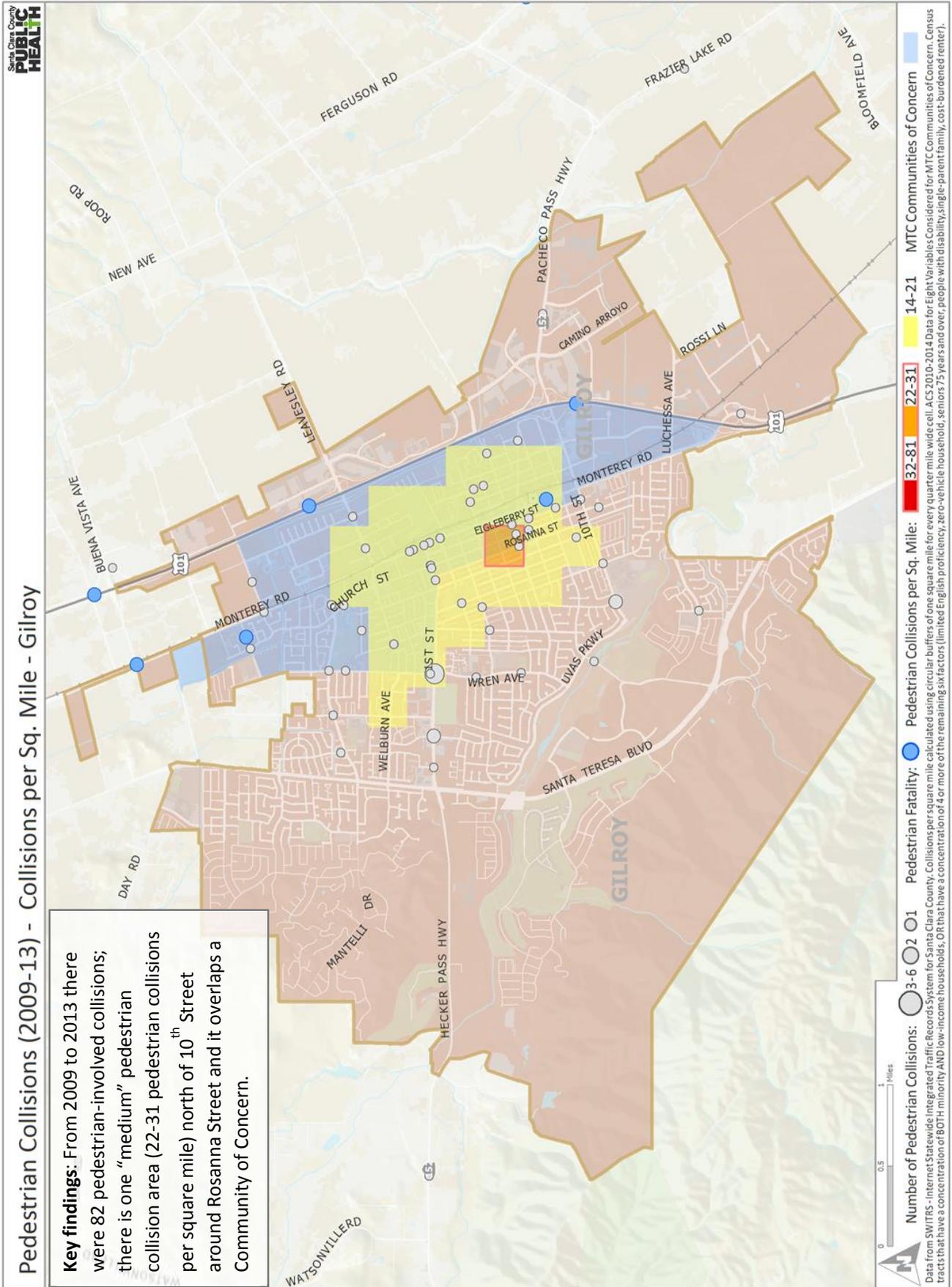
**Key findings:** From 2009 to 2013 there were 2,698 pedestrian-involved collisions in Santa Clara County; areas of “high” pedestrian collision density (32-81 pedestrian collisions per square mile) can be observed in the cities of San Jose, Palo Alto, Mountain View and Santa Clara. Some of these areas overlap Communities of Concern.

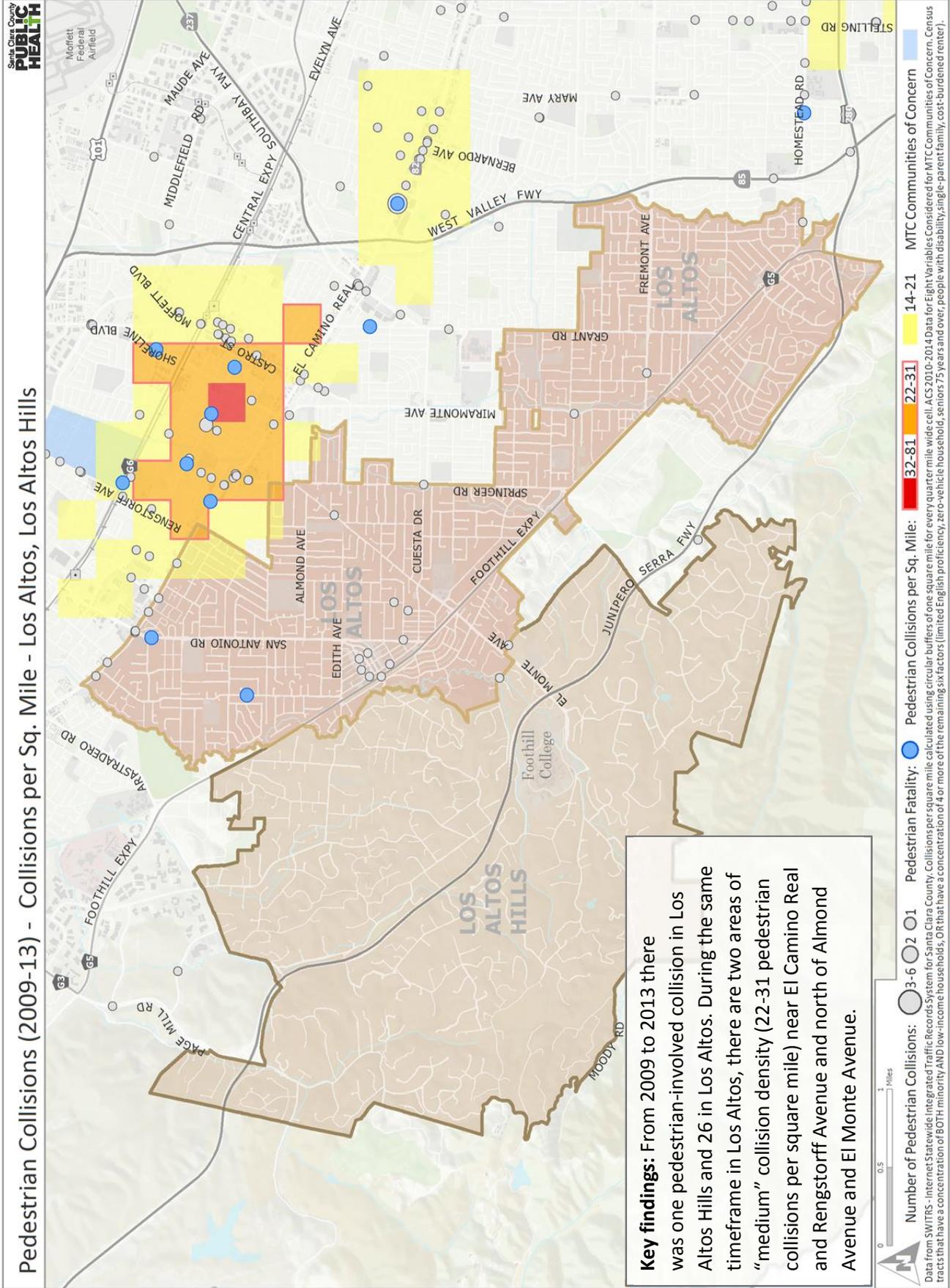
Data from SWITRS - Internet Statewide Integrated Traffic Records System for Santa Clara County. Collisions per square mile calculated using circular buffers of one square mile for every quarter mile cell. ACS 2010-2014 Data for Eight Variables Considered for MTC Communities of Concern. Census tracts that have a concentration of BOTH minority AND low-income households, OR that have a concentration of 4 or more of the remaining six factors (limited English proficiency, zero-vehicle household, seniors 75 years and over, people with disability, single-parent family, cost-burdened renter).

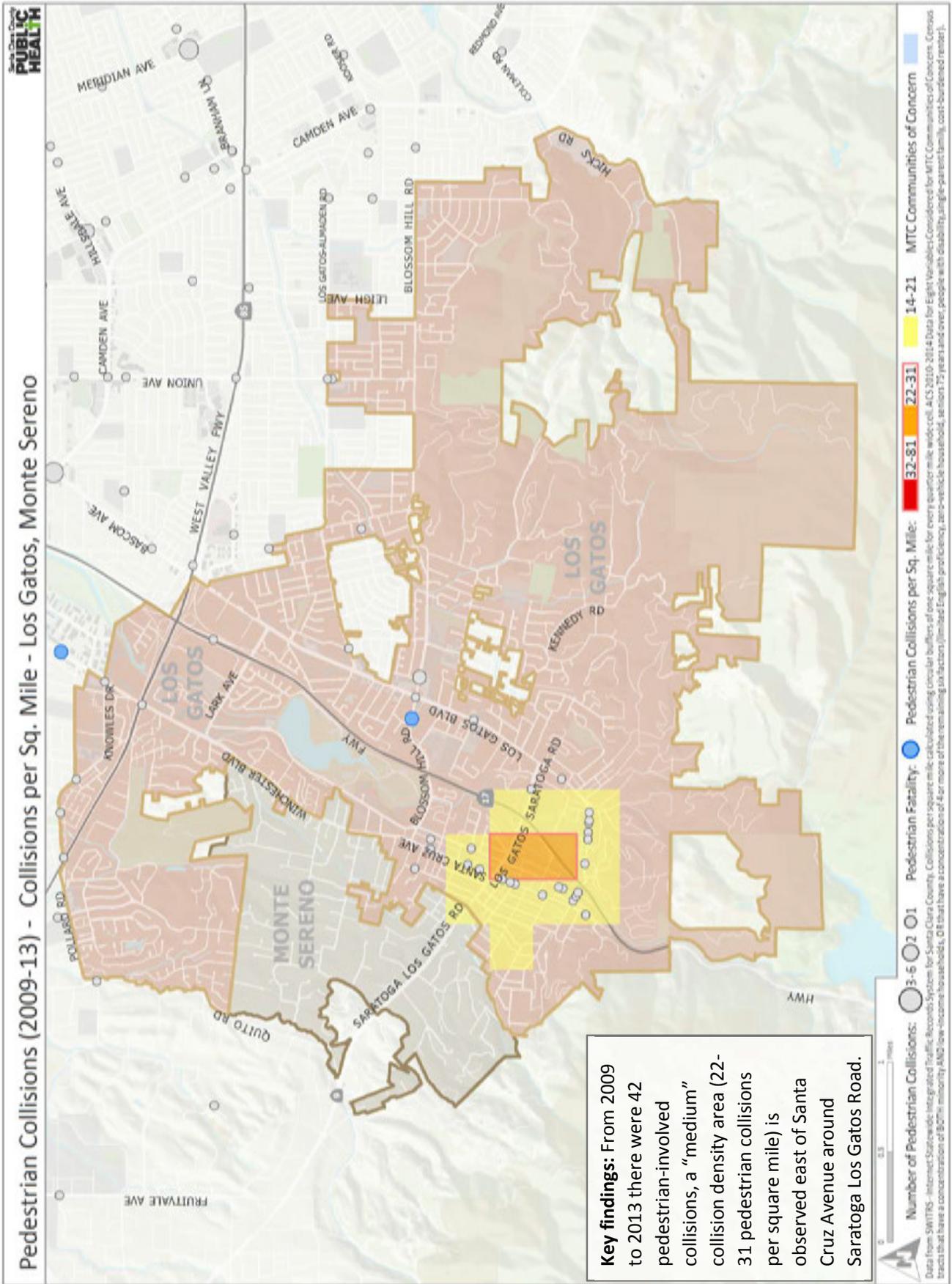


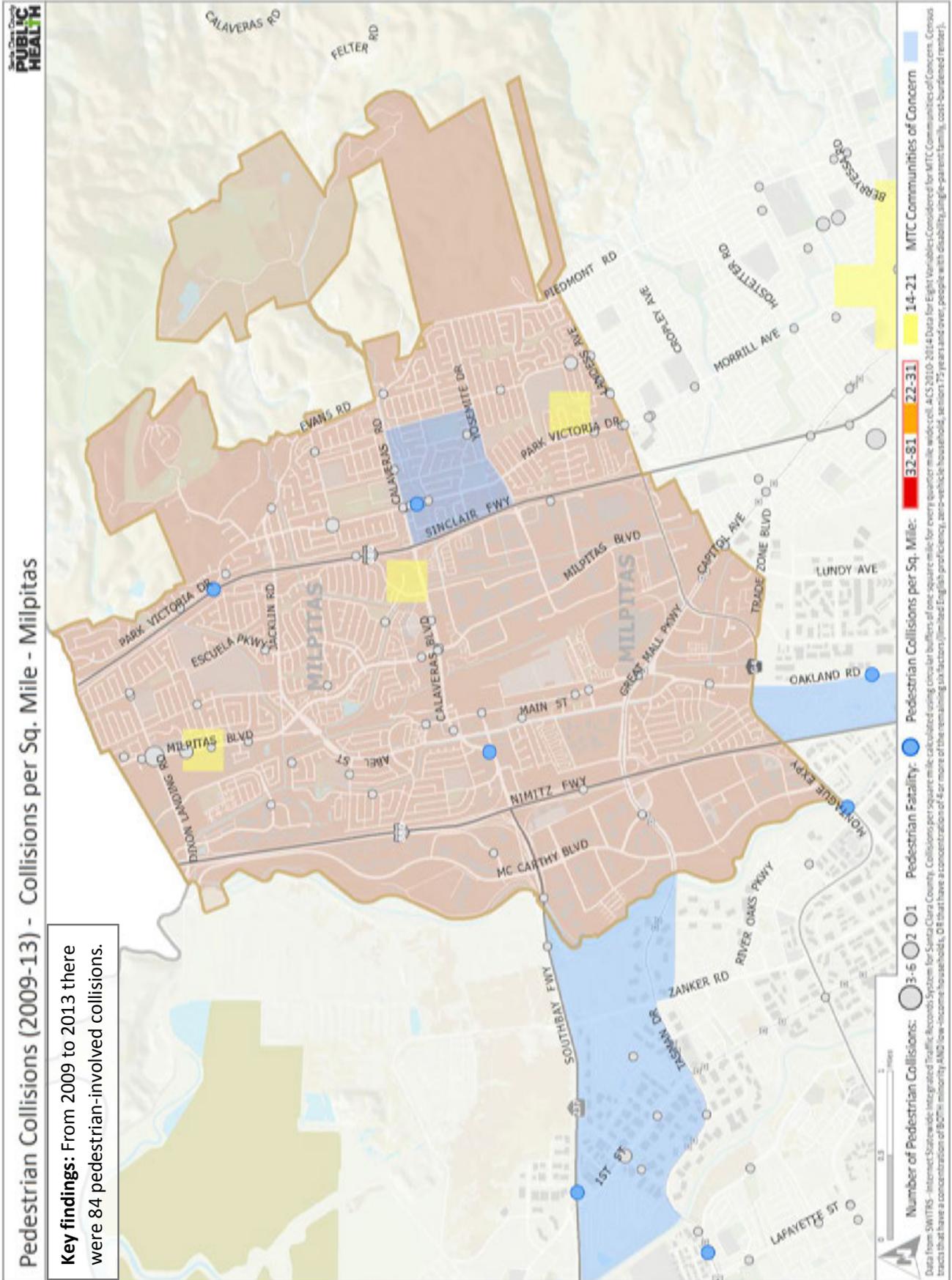


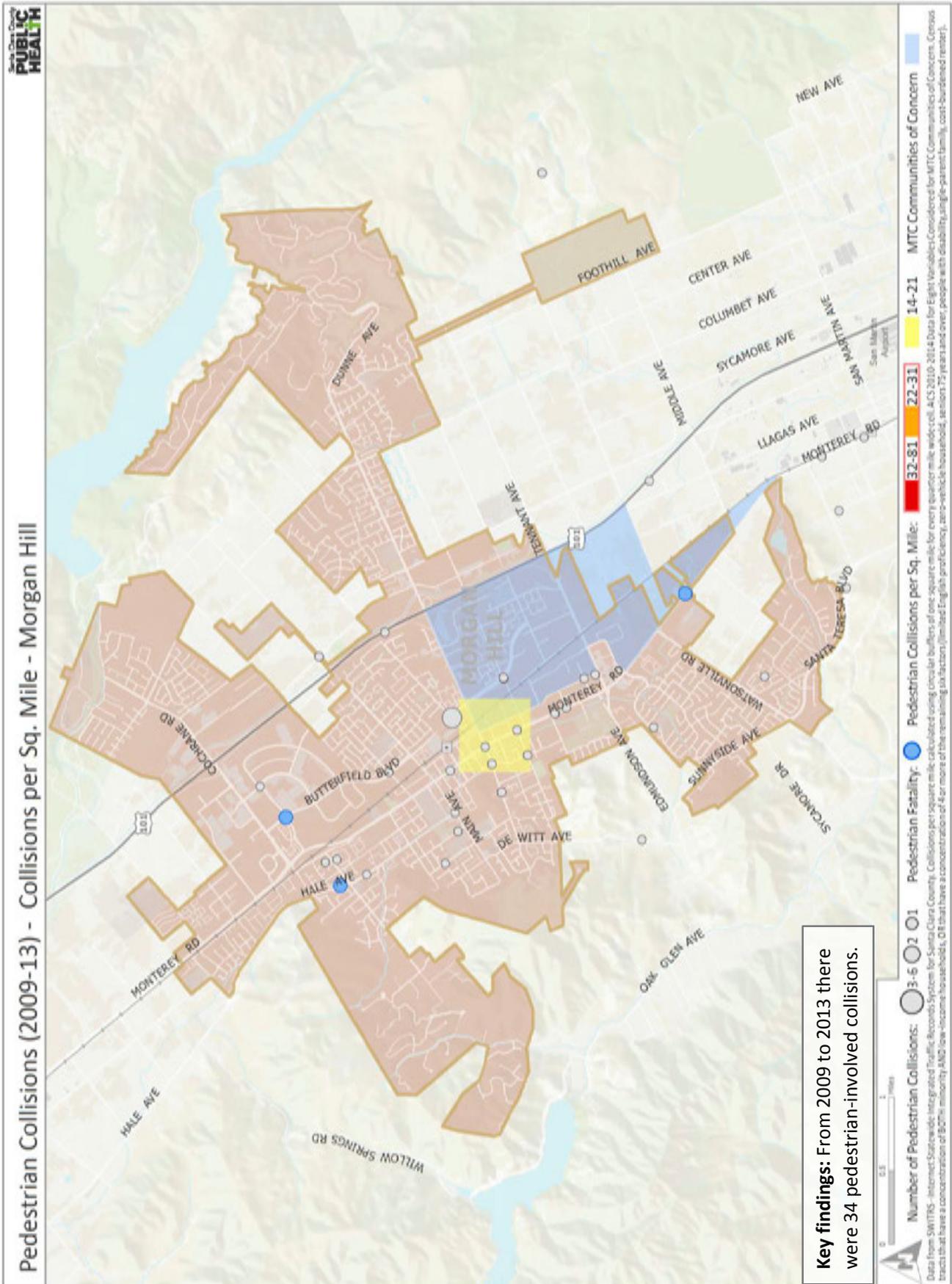


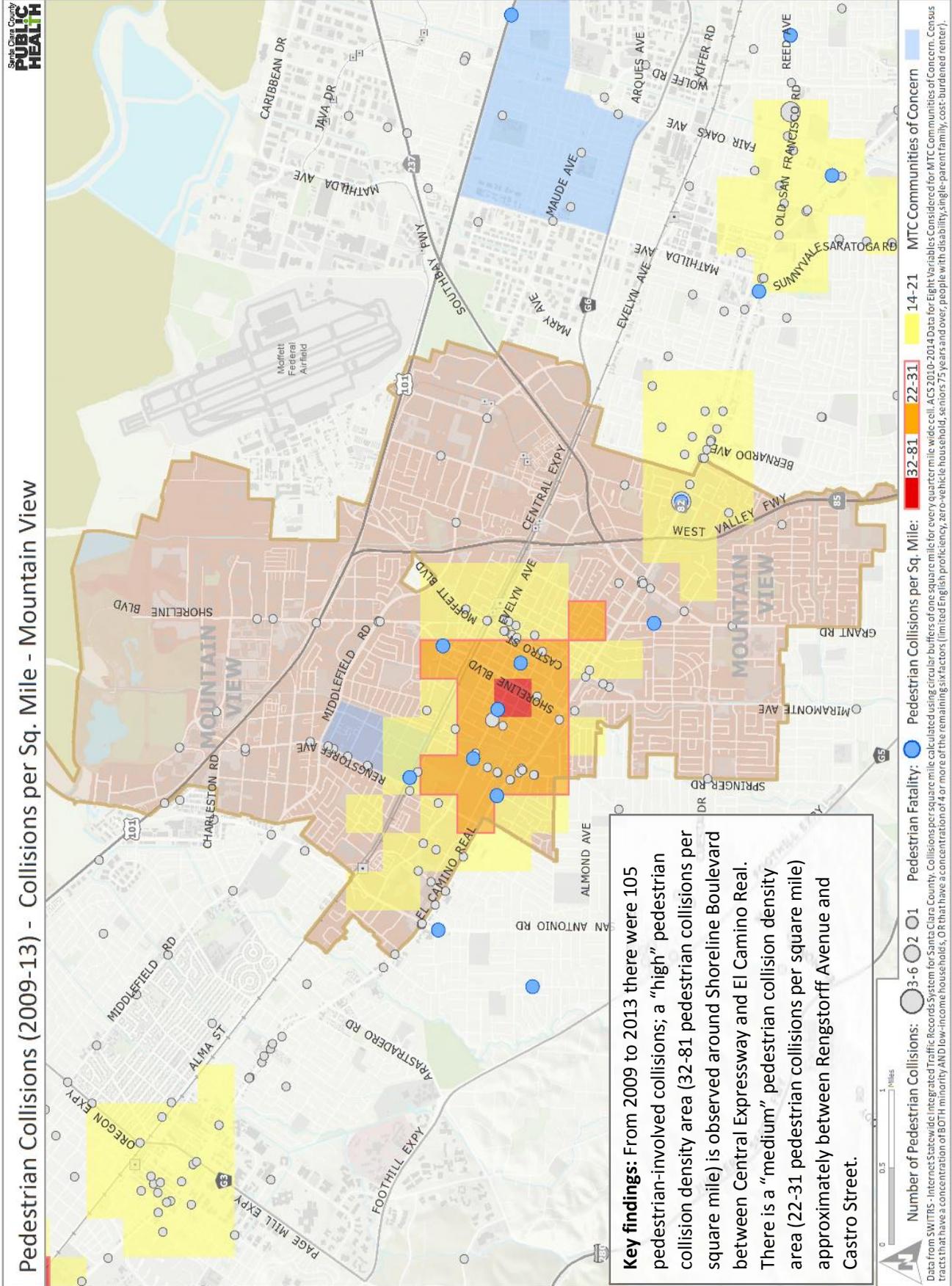


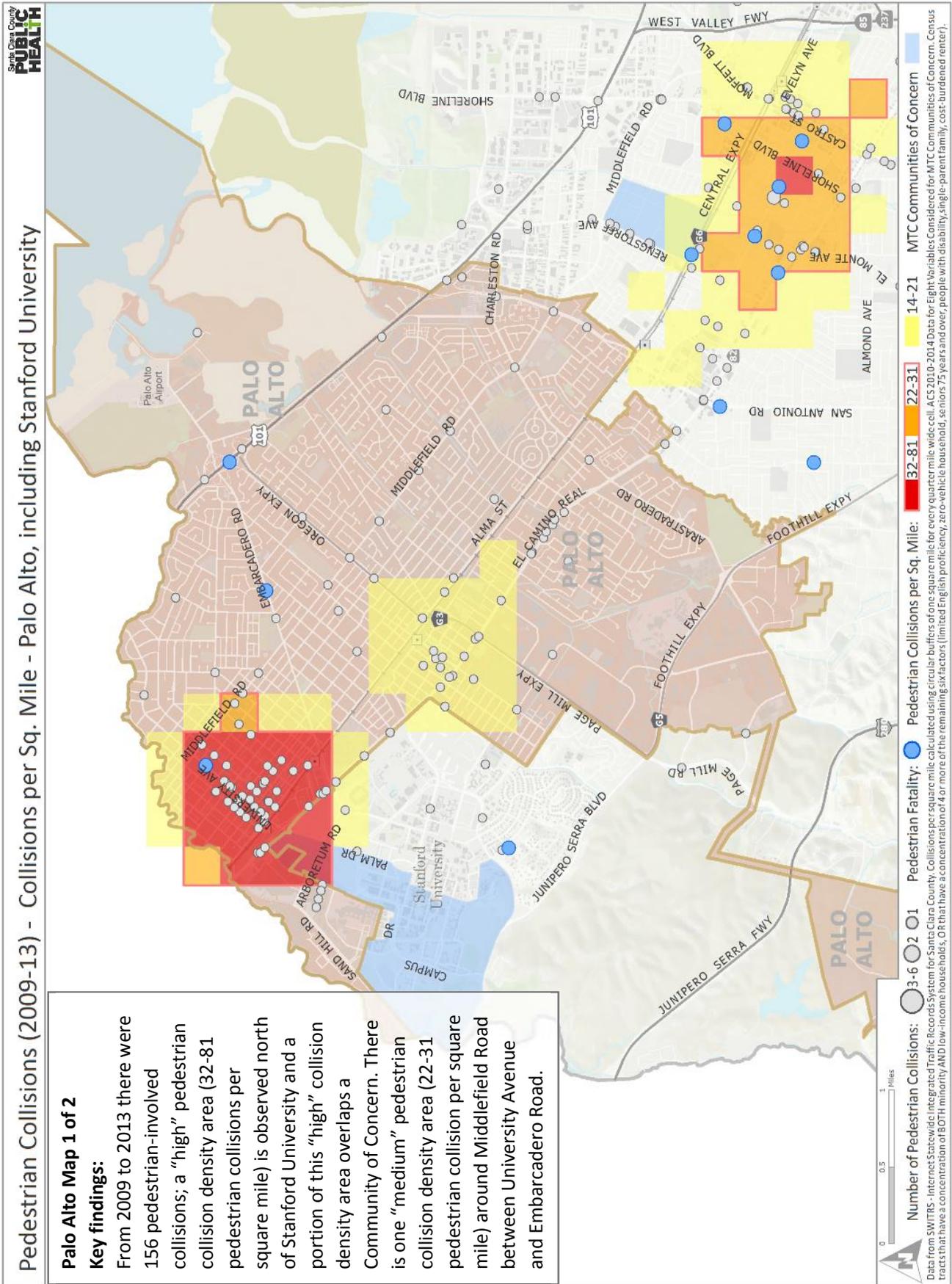


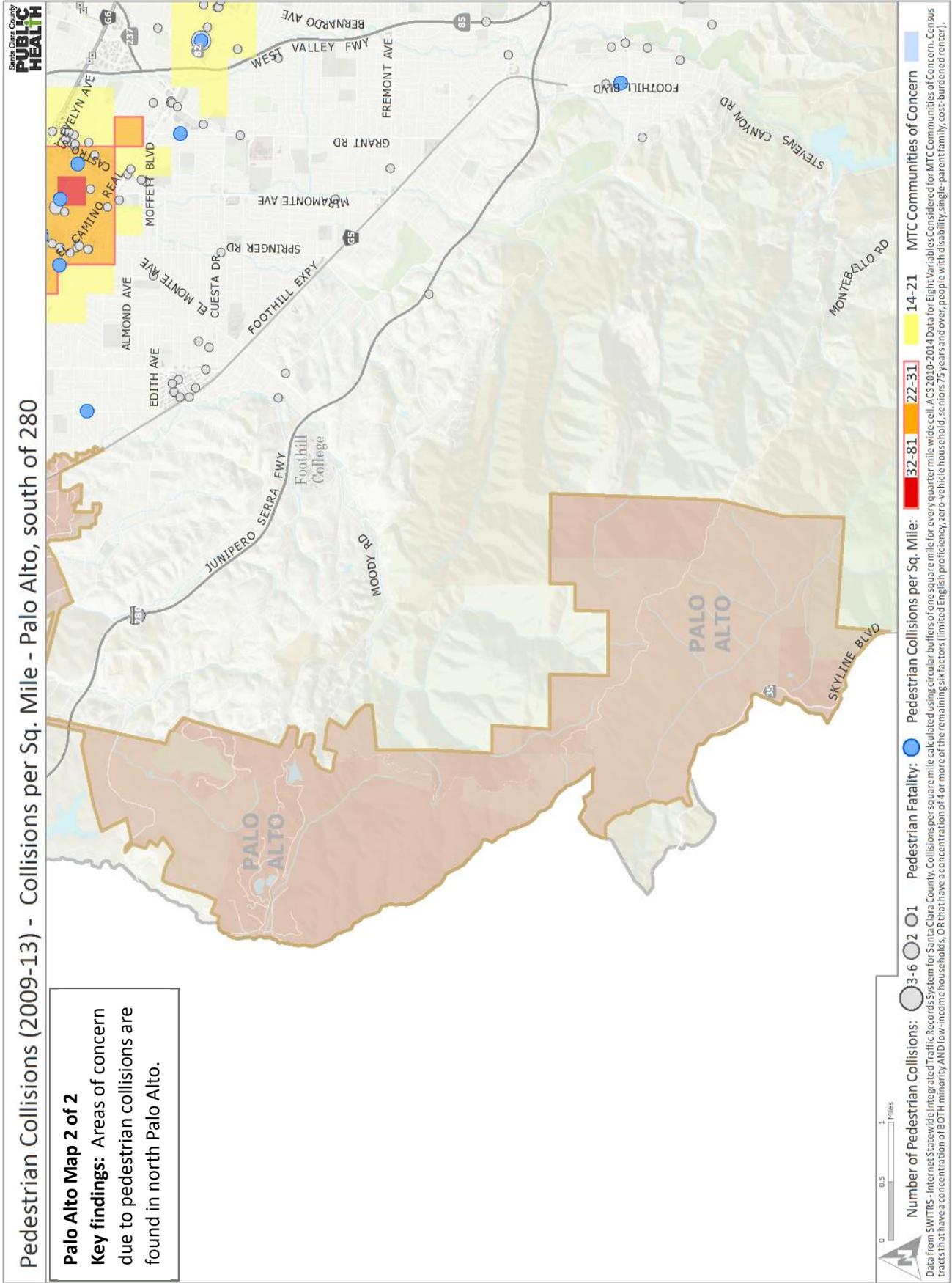


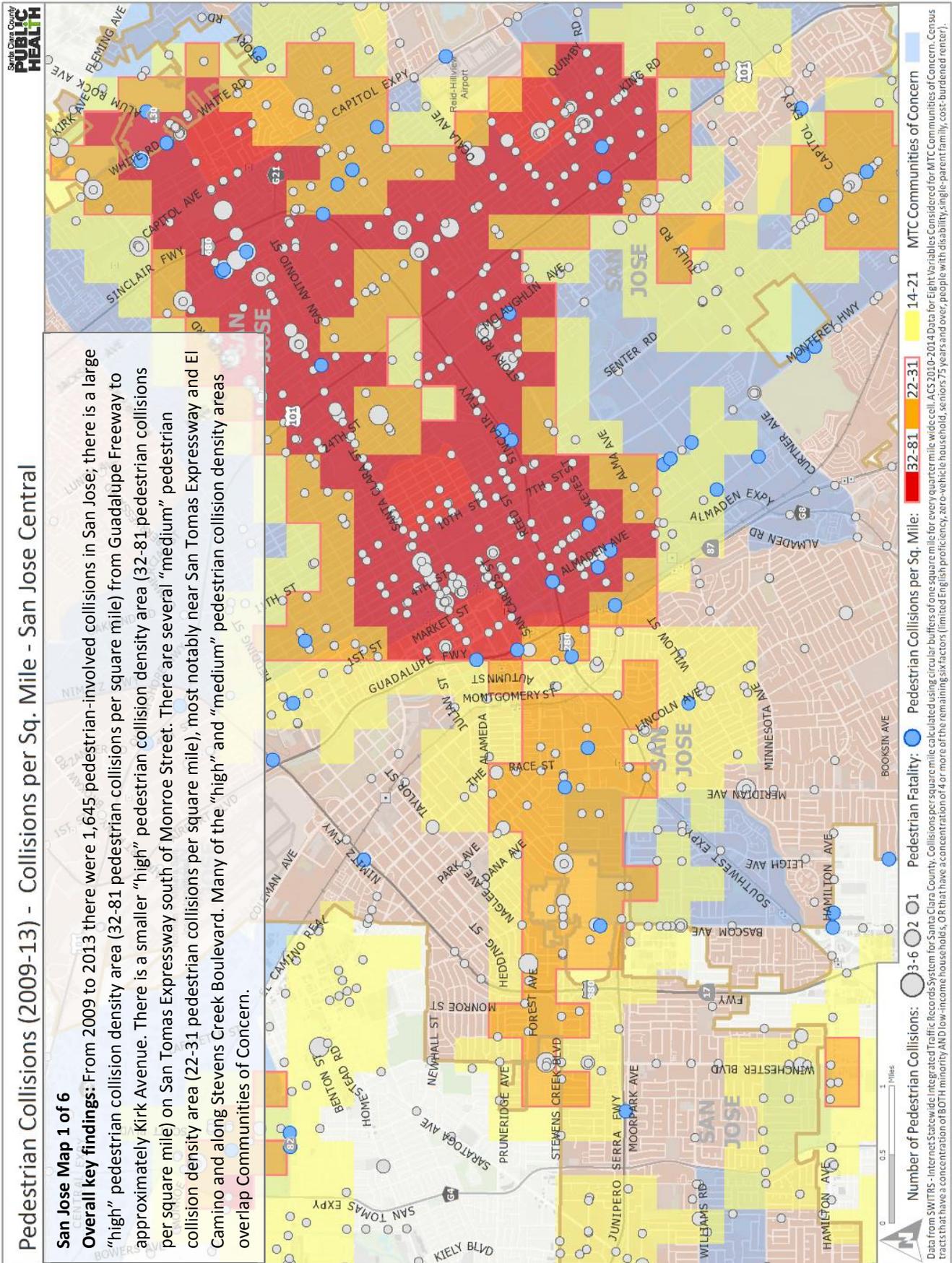


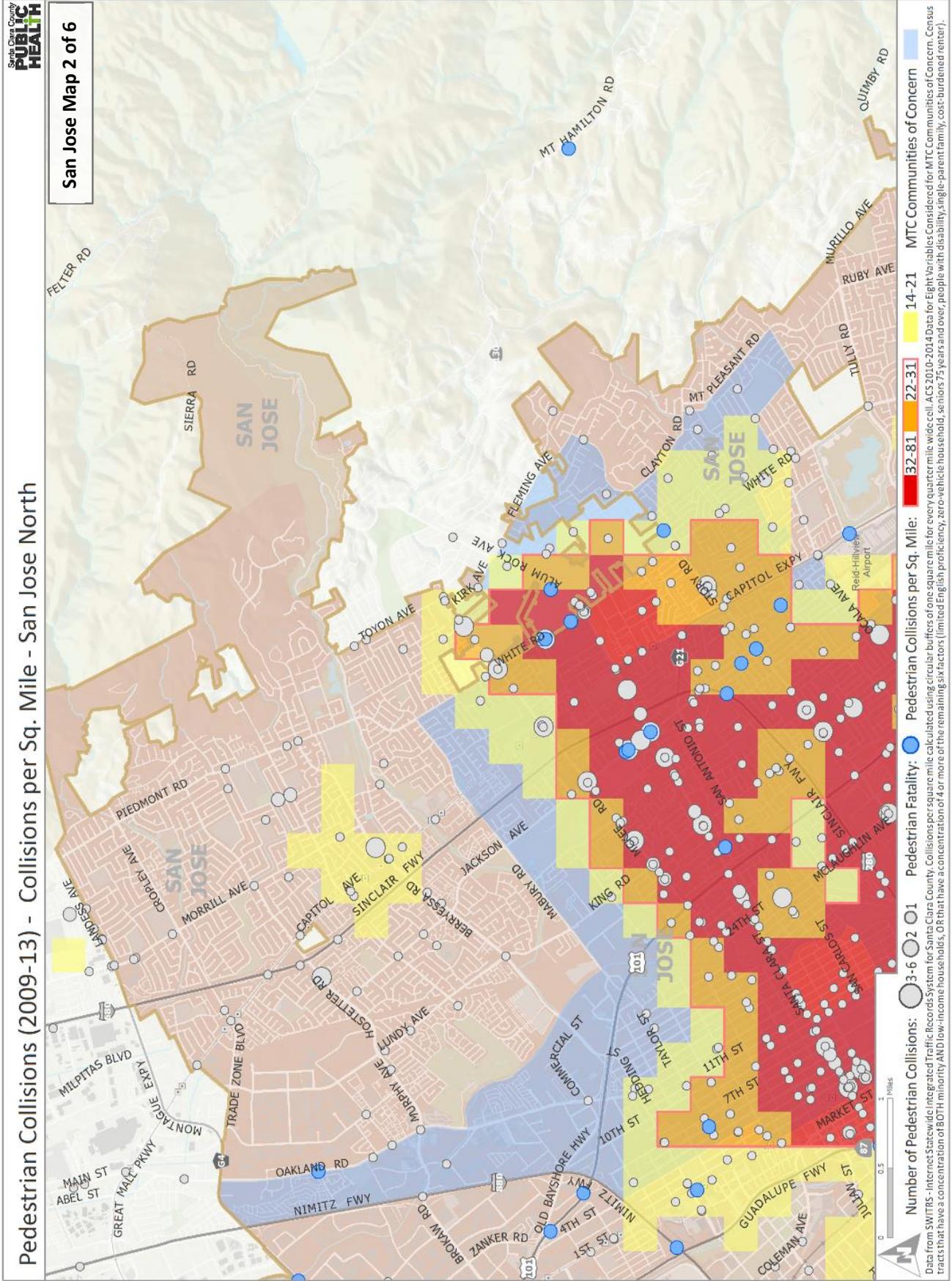


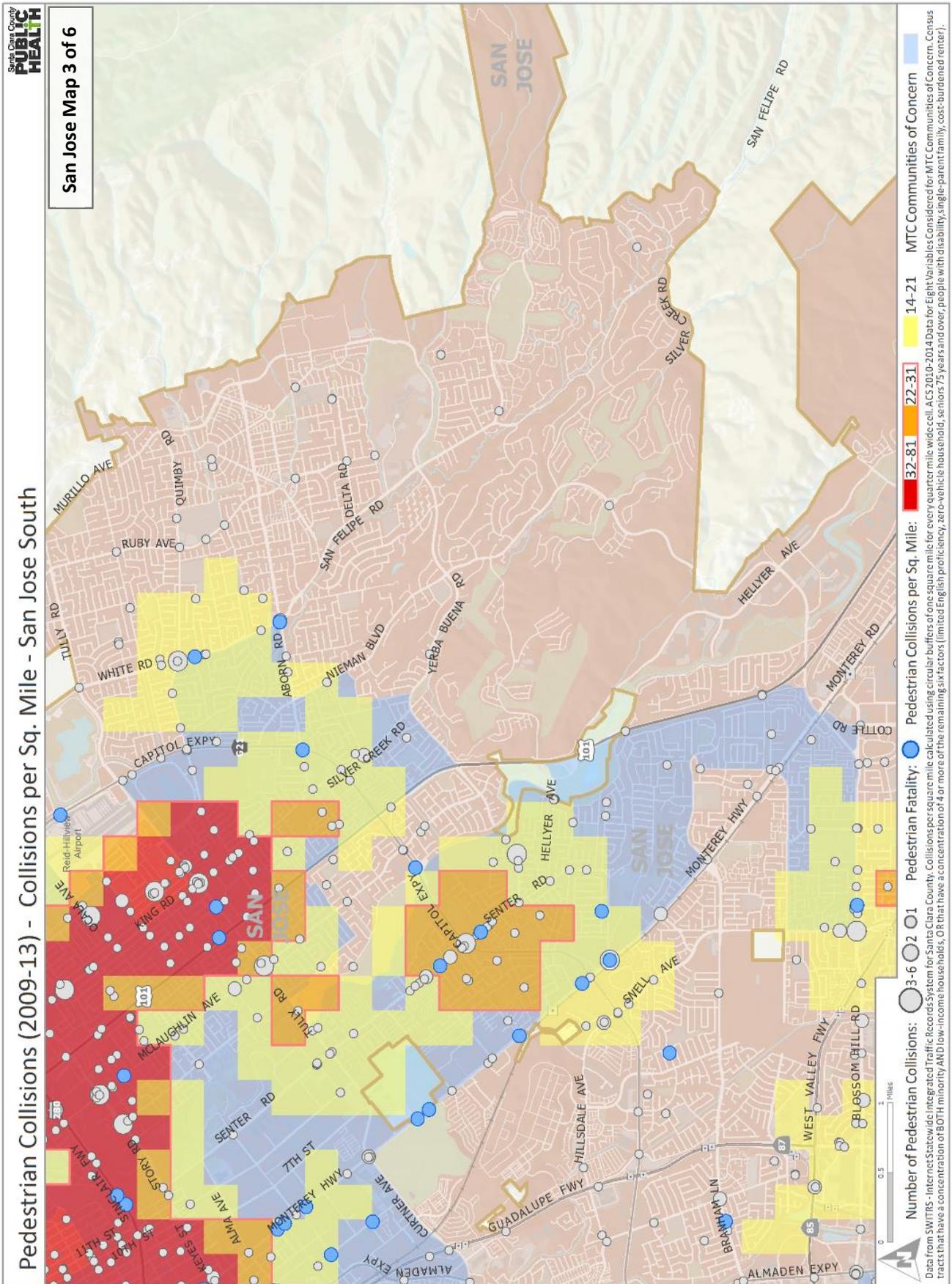


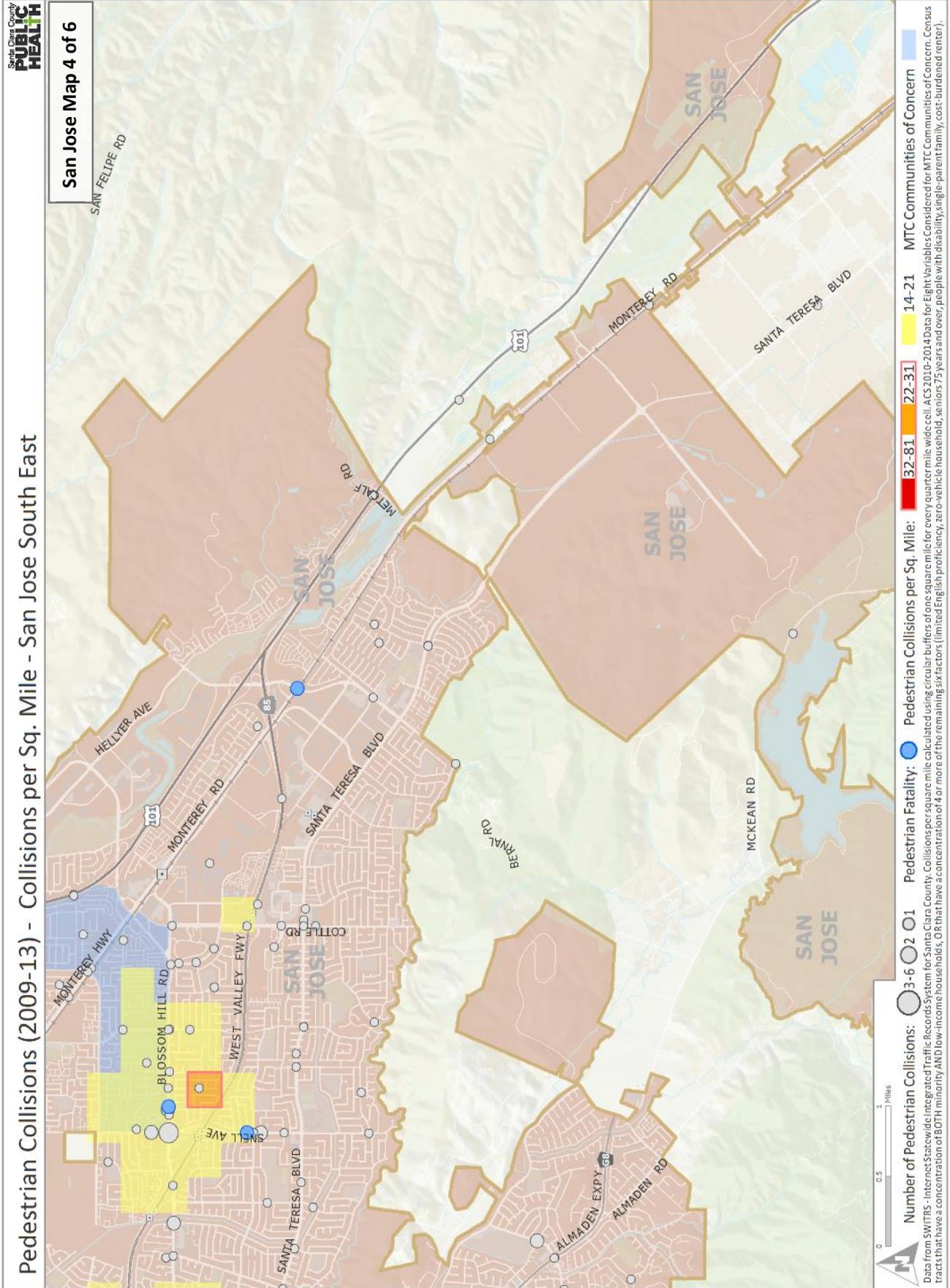


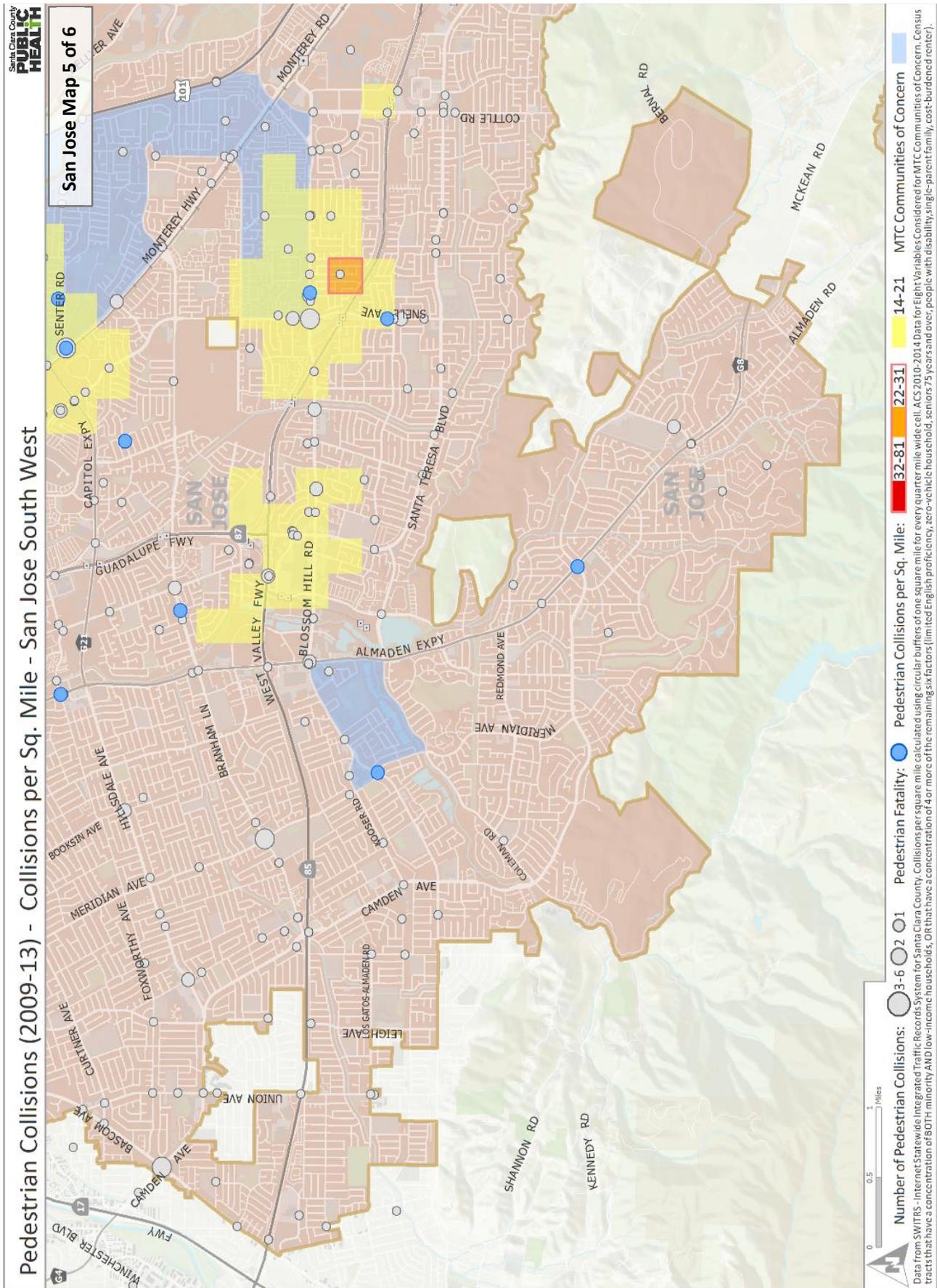




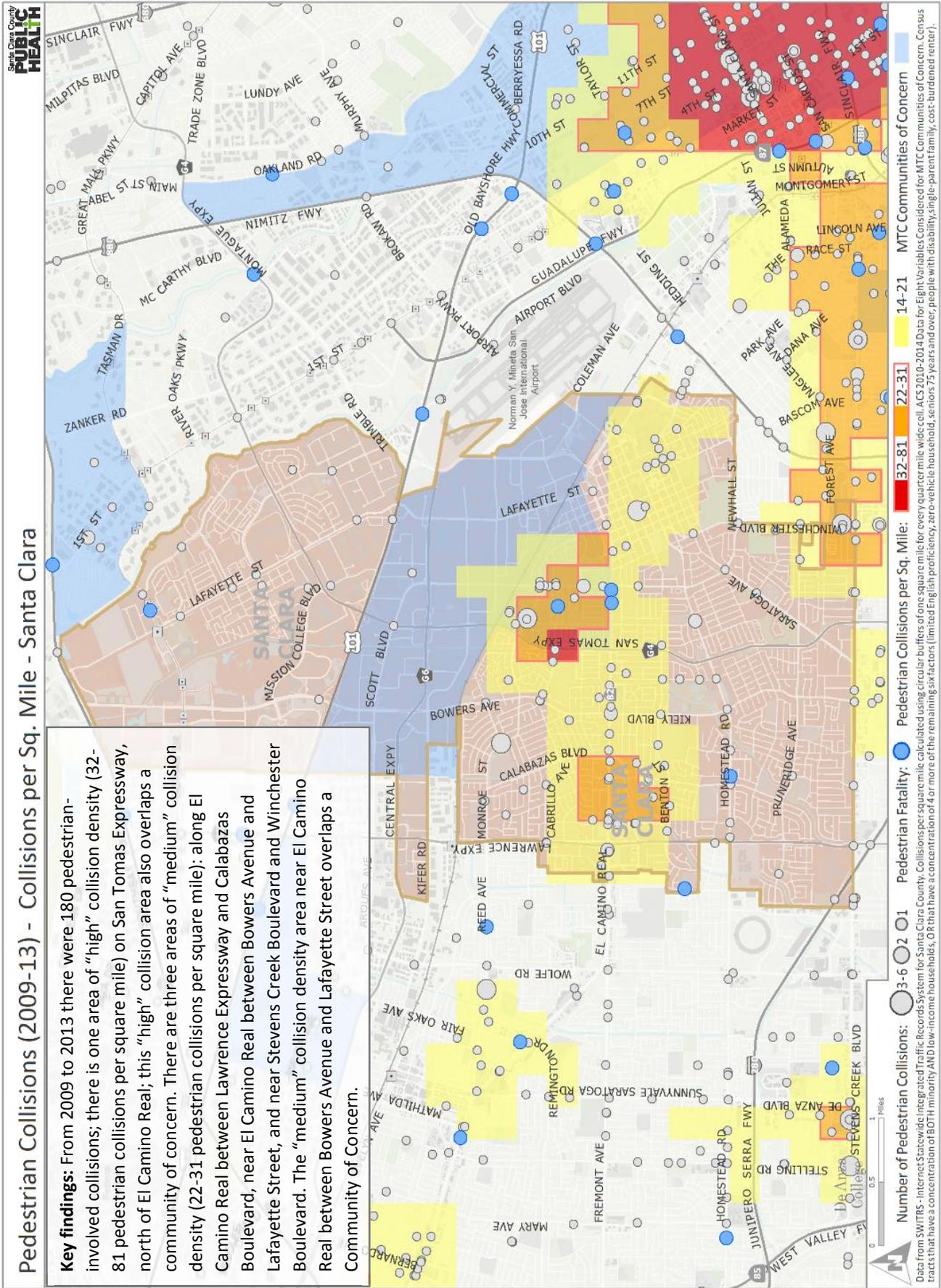


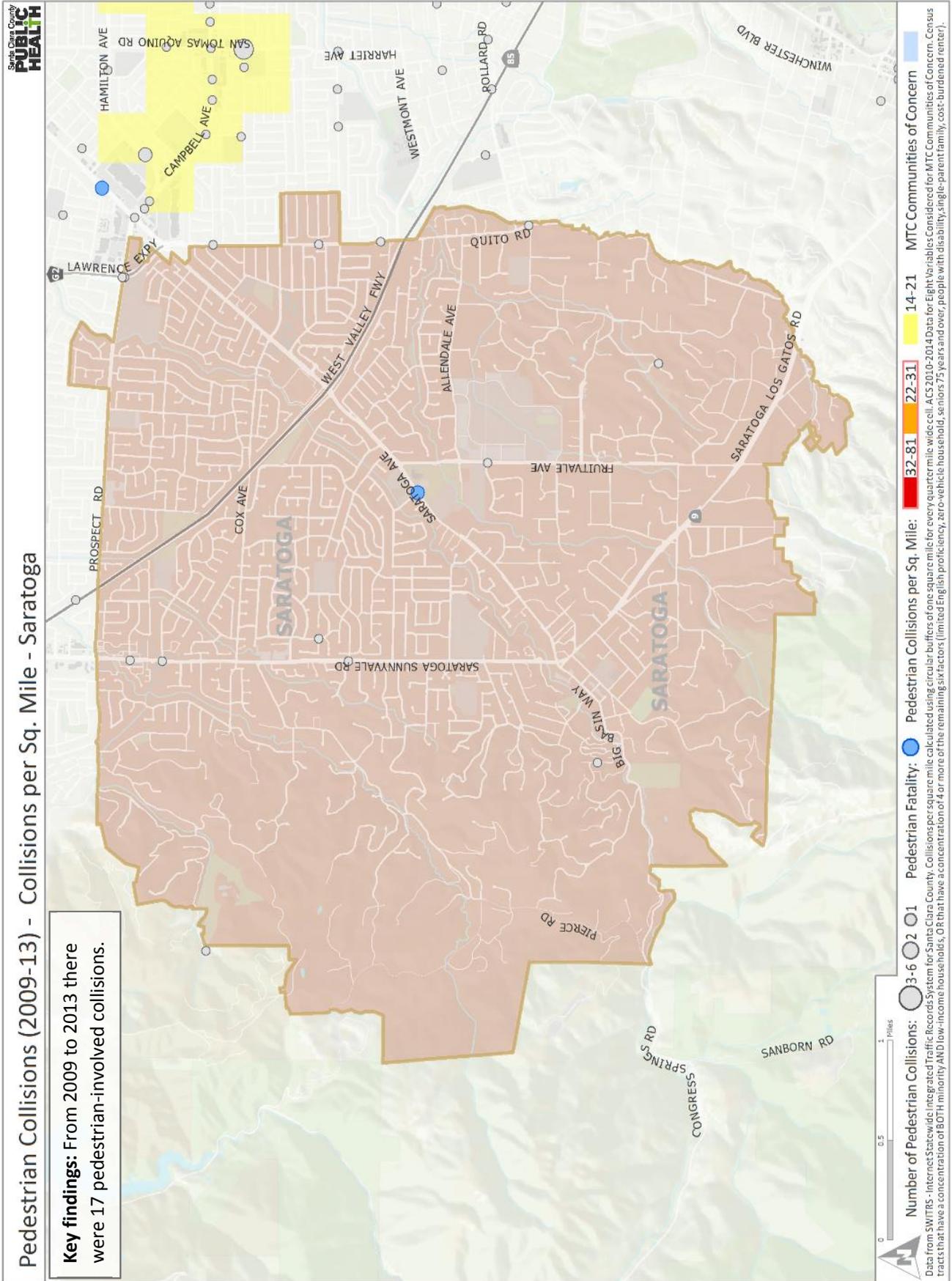


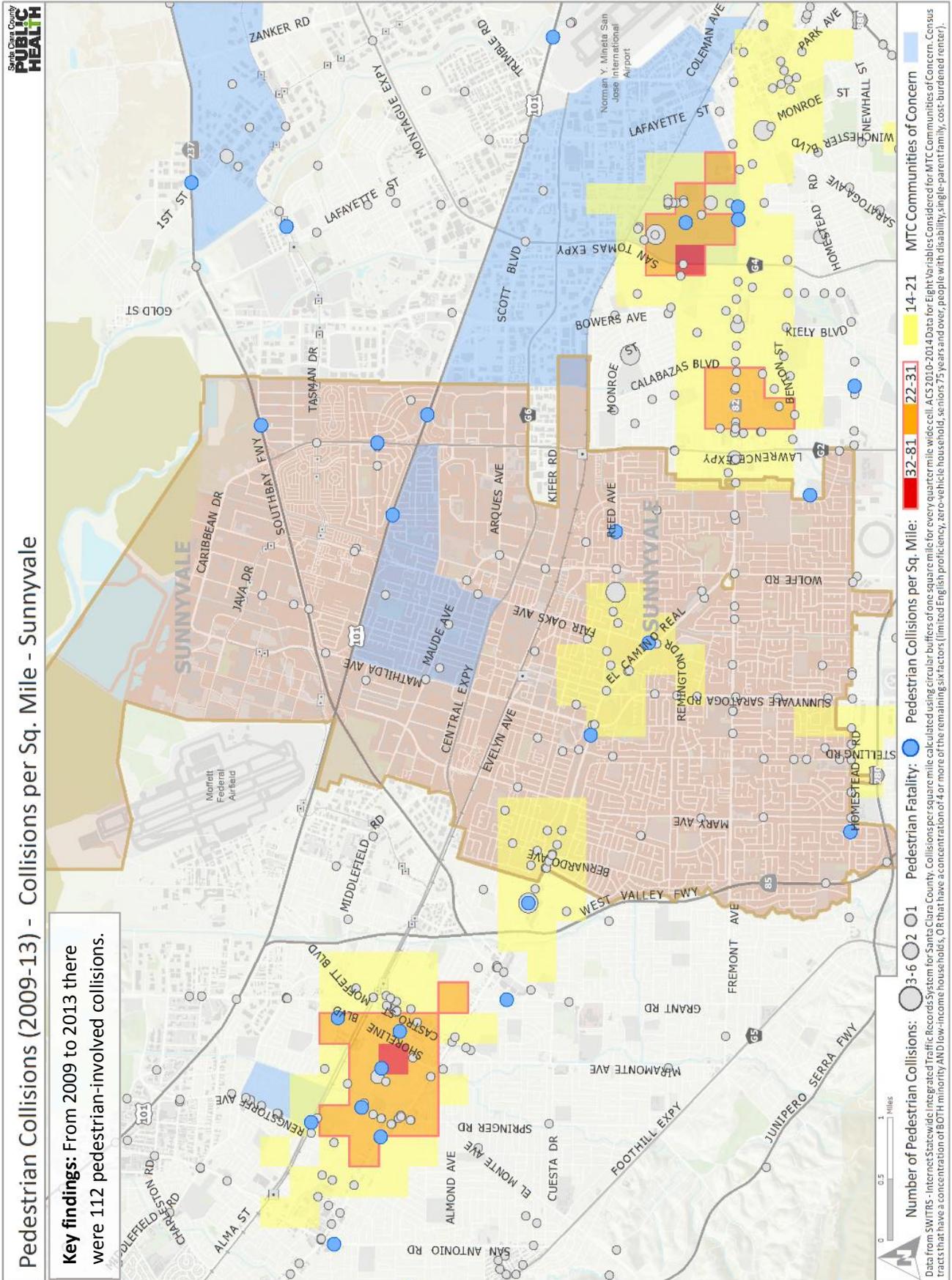
















## Emerging Pedestrian Issues

In addition to the common collision factors, there are issues that pose threats to pedestrian safety both short- and long-term. The effects of aging and how they impact a growing segment of older adults plus new and evolving technology that contribute to pedestrian distractions will present challenges for traffic safety stakeholders and have implications for planning, policies, and resources.

### The Aging Population and Traffic Safety

Results from the 2010 Census indicate that seniors (people 60 years of age or older) comprise 15.7% of the County population. By 2030, one in four (27.6%) Santa Clara County residents will be over the age 60; the fastest growing segment of this population is 85 and older.<sup>31</sup> Pedestrian collision rates of those aged 65-74 and 75 and over are already among the highest collision rates in the County, and seniors 75 and over have the highest fatality rate compared to all other age groups.

To meet the needs of this population, professionals will need to consider the impact of aging on pedestrian safety. For example, the physical effects of aging can include a shorter stride and slower gait which impact walking speed and the need for additional time for crossing roadways. Declines in physical strength, agility, balance, depth perception, and coordination can contribute to difficulty negotiating curbs and changes in surfaces leading to an increased risk for falls.

Resources for building communities that are supportive of older adults are available from Federal Highway Administration, AARP, and the World Health Organization (WHO). The *Handbook for Designing Roadways for the Aging Population* by the Federal Highway Administration provides guidance for how engineers and planners can address the challenges facing older adult pedestrians so that they can safely walk in their communities. The WHO's *Global Age-Friendly Cities: A Guide* highlights key areas that cities and communities can address to promote active aging and enhance quality of life.<sup>32</sup> AARP's Livable Communities program offers 11 different fact sheets in English and Spanish to aid in the development of safe, accessible, and vibrant environments.<sup>33</sup>

**The aging adult population and distractions from current and new technology present short- and long-term challenges to pedestrian safety.**

### Distractions and Safety

Distractions pose risks for all roadway users. According to Distraction.Gov, in 2014, 3,179 people were killed, and 431,000 were injured in motor vehicle crashes involving distracted drivers in the United States.<sup>34</sup> Although there are many causes of driver distraction, cell phone use is one of the most dangerous because it takes one's eyes, hands, and mind away from the task of driving. The 2015 National Occupant Protection Use Survey found 3.8 percent of drivers holding cell phones to their ears while driving. This means that 542,000 vehicles were driven by people using hand-held cell phones at a typical daylight moment which puts themselves and others at risk for a crash.<sup>35</sup> This number is likely under reported as there are

several obstacles to accurately determining if a cell phone was a contributing factor in a crash such as whether a driver admits to cell phone use and inconsistencies in police reporting of cell phone involvement in crashes.

Pedestrians are not immune to the distractions caused by technology. The growing trend of walking while using a cell phone has resulted in the term “*petextrian*,” as one who texts while walking, usually unaware of their surroundings.<sup>36</sup> Researchers have found that between 2004 and 2010 the number of pedestrians killed while using a cell phone increased from less than 1 percent to 3.6 percent.<sup>37</sup> The National Safety Council states that distracted walking injuries involving cellphones accounted for an estimated 11,101 injuries between 2000 and 2011, making it a significant safety threat. Its research found 68 percent of those injured are women, 54 percent are people ages 40 or younger, and twenty-one percent of those injured are 71 and older.<sup>38</sup> This number is likely underreported as cell phone use is not consistently captured in police reports.

Multiple studies cited in *Everyone Walks. Understanding & Addressing Pedestrian Safety* found pedestrians who were distracted took one to two seconds longer to cross the street and were more likely to engage in unsafe crossing behaviors such as ignoring a traffic light or not looking both ways. Teens in particular are engaging in distracted walking. According to Safe Kids Worldwide, 40 percent of U.S. teens 13 to 18 years of age have been hit or nearly hit by a car, bike or motorcycle while walking. Teens who have been hit or had a close call are two times more likely than their peers who have not reported being distracted while crossing the street to cross the street unsafely (i.e., midblock, darting across the street). These same teens also believe it is okay to cross the street while texting or talking on the phone.<sup>39</sup> As technology evolves, so will the distractions encountered by pedestrians and drivers, leading to potentially dangerous encounters on roadways.

## Recommendations—The 7 E’s

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Cities and organizations strive to build communities that create environments that make walking accessible, desirable, and safe. To that end, pedestrian related projects require the involvement of stakeholders who are committed to creating safer streets using a holistic approach such as the 7 E’s of traffic safety—equity, engineering, encouragement, evaluation, education, enforcement, and engagement. The E’s are not mutually exclusive, but are intended to complement each other and contribute to a comprehensive plan. The following recommendations for increasing walking and improving pedestrian safety in Santa Clara County align with recommendations in the Vision Zero initiative that seeks to eliminate all traffic fatalities and severe injuries to ensure safe, healthy, and equitable mobility for all.

### Equity

Equity in transportation safety relates to the impacts that a transportation system has on the most vulnerable members of communities, including low-income residents, seniors, youth, women, people with disabilities, people of color, immigrants, and non-English speaking

residents. Equity should be integrated in all of the E's to effectively improve pedestrian safety while at the same time addressing imbalances in transportation funding, policy, and projects. The following are examples of how to improve equity among traffic safety programming:

- Preserve and expand active transportation funding programs to match current mode-share and to increase mobility and access to meet or exceed future mode-share goals.
- Engage historically marginalized communities—including seniors, youth, women, people with disabilities, low-income communities, people of color, immigrants, and communities with non-English speaking population—and seek feedback on culturally appropriate messaging, strategies, and proposed safety improvements.
- Ensure engagement is inclusive-vary times/days of community outreach, provide outreach resources in multiple languages and across traditional and social media; plan meetings at transit accessible locations; and provide interpretation services, childcare, and refreshments.
- Use collision data in concert with demographic and public health data to obtain a more complete picture of inequities, service gaps, and community needs to aid in the prioritization of planning and improvements.
- Prioritize improvements using data, including but not limited to: collision data; injury and fatality data; speed data; transit use and accessibility; street lighting; ADA accessible curb ramps; sidewalk/network gaps; and marked and improved crosswalks.
- Encourage collaboration between community members and law enforcement to promote inclusion of immigrants and immigrant communities (nearly 40% of the county population is born outside of the U.S. and more than 51% of the population speaks a language other than English at home<sup>40,41</sup>), people of color, and other traditionally marginalized communities in the development of enforcement plans and policies designed with assurances against demographic profiling and targeting.
- Establish educational diversion programs for minor infractions to increase the reach of educational programming while at the same time lessening the economic impacts of traditional enforcement fines on low-income populations.

## Evaluation

Evaluation of traffic safety programming is an on-going process, and there are many different types of data available that can be collected and analyzed to guide planning and improvement efforts. Examples include police reports/collision data, pedestrian volume, survey data, traffic counts/volume, hospital records, and collision maps. Baseline data is initially gathered to determine intervention or planning needs, and process and outcome evaluation data is required to measure if the interventions are having the short- and long-term results desired. The following are ways in which data can be used for evaluation purposes.

- Utilize mapping tools such as UC Berkeley Safe Transportation Research and Education Center (SafeTREC) Transportation Injury Mapping System (TIMS) to aid in identifying corridors, hotspots or overlay multiple data sources to identify correlations.
- Prioritize geographic locations by number of incidents to target funding for improvements and/or programs.
- Collect pedestrian volumes to use with data to calculate pedestrian rates.
- Establish a collision/incident database to track trends over time.
- Obtain data from police departments, Statewide Integrated Traffic Records System (SWITRS), and TIMS to evaluate crashes and vehicle/pedestrian injuries; non-collision pedestrian injuries may need to be obtained from other sources (e.g., hospital data) to understand the complete picture of injured pedestrians.

The continuous collection, consolidation, and analysis of crash and response data can provide critical information to local and state transportation departments, law enforcement agencies, state highway safety offices, emergency responders, hospitals, and trauma centers. Data analytics enable government agencies to make critical decisions about possible changes to policies and procedures that will optimize each of the important E's of traffic safety.<sup>42</sup>

## Engineering

Engineering related to walkability and safety focuses primarily on physical changes to the roadways to help reduce vehicle speeds, minimize conflicts with vehicles, create a safer and more attractive environment for people to walk, and provide accessible and safe pedestrian facilities that link important destinations. Below are several suggestions on engineering strategies to meet these goals.

- Design infrastructure that is comfortable for all ages and abilities, including people who do not currently choose to walk.
- Consider Leading Pedestrian Intervals (LPI) to allow pedestrians a head start in crossing the intersection to minimize conflicts with turning vehicles.
- Shorten pedestrian crossing distance by implementing hardscape elements such as curb extensions and median refuge islands, and reduce crossing times.
- Improve visibility for pedestrians by providing adequate street lighting and removing on-street parking in vicinity of crosswalks.
- Enhance all crosswalks with high visibility design (ladder, piano) and pedestrian flashing beacons on higher speed and wider roadways to increase motorists' awareness and make pedestrians feel welcome.

- Implement pavement markings and post signs that provide warning and regulatory messages informing motorists the presence of pedestrians and bicyclists.
- Where appropriate and recommended by traffic engineering evaluation, use proven safety countermeasures such as road diets to reduce the number of travel lanes, and narrow travel lanes on wider roadways to help lower vehicle speeds, accommodate bike lanes, and allow shorter crossing distance which reduces vehicle-pedestrian, -bicycle, and -vehicle conflicts.
- Design new roadways or retrofit existing roadways with Complete Streets principles in mind.
- Maintain safety by ensuring good visibility and properly maintaining sidewalks.

## Enforcement

Law enforcement agencies play a critical role in contributing to safe streets for pedestrians as well as all users. A strategy for increasing safety that has proven effective is pedestrian safety enforcement operations. They have shown to significantly increase driver yielding while improving pedestrian behavior. The National Highway Traffic Safety Administration recommends law enforcement agencies include these steps to deliver successful pedestrian enforcement operations:<sup>43</sup>

- Collaborate with partners in business, civic organizations, and government agencies to expand resource and establish community buy-in.
- Coordinate with the judiciary to alert officials to planned operations and to verify that operation operations comply with local laws.
- Coordinate with engineering representatives to ensure locations are suitable for operations.
- Establish and nurture relationships with the media to increase the likelihood that positive messages will reach the public.

Law enforcement agencies are encouraged to analyze existing data to guide operations and target high-risk locations and violations that cause the greatest number of collisions and injuries. Following data analysis, policies can be established to ensure that enforcement efforts target areas and behaviors that will yield the greatest reductions. A periodic review of the collision and injury data will determine the effectiveness of an agency's efforts.

Enforcement is not exclusively for police officers. The community can also play an important role in enhancing traffic safety. For example, slow-down yard sign campaigns have proven to be effective at reducing vehicle speed when the signs are posted. Additional tools include speed feedback signs that can be posted in a neighborhood or moveable trailers that can be placed in troublesome areas as identified by the community.<sup>44</sup> In addition, enforcement

through the use of red light cameras at intersections is effective at reducing red light violations and crashes.<sup>45</sup>

## Engagement

The success of creating a safer, healthier, and more accessible pedestrian friendly Santa Clara County relies on creating opportunities for meaningful engagement with diverse stakeholders in the planning and design process. Community stakeholders may include pedestrians from low-income or under-served areas, vulnerable users such as youth, elderly, and people with disabilities or mobility impairments. Pedestrian safety stakeholders can also represent city transportation, public works, or engineering departments; education; law enforcement; elected officials; pedestrian advocates; public health; and community based organizations.

Examples of community engagement activities are conducting walking audits, holding public meetings, and allowing stakeholders to provide input through traditional and non-traditional means (e.g., providing feedback via online tools). A brief description of the benefits of each are described below.

- Walking audits include diverse community members in conducting assessments of an environment to collect quantitative and qualitative data to identify opportunities for improving walkability.
- Community meetings are beneficial when they elicit feedback from individual or groups on the pedestrian issues that will most impact them.
- Using online resources to gather input from stakeholders can complement traditional methods by providing a mechanism for feedback for those who might not be able to attend meetings or are reluctant to voice their opinions in a live venue.

## Education

Education is a critical element to traffic safety as it creates a common set of expectations and behaviors for all roadway users. Data analysis and review of best-practices can help drive educational messaging and activities. For example, if local data shows that mid-block crossing is the behavior that causes the greatest number of injuries near a school, messages can be tailored the desired audience to encourage the desired behavior. In this case it could be promoting the use of crosswalks or crossing at corners near a school facility.

Effective traffic safety education programs should combine the following fundamental elements:<sup>46</sup>

- Development of behaviors, attitudes, and decision-making skills to manage an environment in a responsible and safe way.
- Knowledge and understanding of the road traffic, transportation environment, and law.
- Understanding of physical skills needed to manage an environment safely.

Road safety education is encouraged to begin at preschool and continue throughout the school years utilizing age appropriate curriculum that is consistently administered.<sup>47</sup> Safe Routes to School is an example of a program that supports safe walking (and bicycling) through education in elementary, middle, and high schools. Elementary school education includes classroom curriculum and school assemblies that are tailored to specific grade levels while middle and high school activities incorporate leadership skills and peer developed messaging.

Models of pedestrian safety educational campaigns include the California Department of Public Health's (CDPH) It's Up to All of Us and WalkSmart. It's Up to All of Us features a call to action with targeted messages for drivers, pedestrians, and the community while the WalkSmart campaign aims to improve pedestrian safety by focusing educational messages on speeding, distracted driving, and crosswalk safety. In addition, the California State Senate declared September as "California Pedestrian Safety Month" to create public awareness about pedestrian injuries and fatalities. The month will highlight educational messages for drivers and pedestrians. Although the messages are created at the state level, they can be adopted by local agencies and will reinforce a statewide effort.

## Encouragement

Encouragement activities promote, motivate, and support walking. A wide array of strategies can appeal to and inspire people of all ages and abilities to walk. For instance, open streets events temporarily close roads to motor vehicle traffic so people can walk, bike, or otherwise be active in a comfortable non-threatening environment. The use of route maps or posting wayfinding signage that highlights walking distances and minutes to parks, trails, and key community assets are other ways of encouraging walking and highlight community assets. Strategies can target segments of the community such as youth, older adults, and employees. The following are a few activities that can encourage members of these groups to walk.

- Implement Safe Routes to School Programs in elementary, middle, and high schools.
- Engage students in National Walk to School Day, establishing a walking school bus or promoting a themed day (e.g., Two Feet Tuesdays).
- Offer senior walking programs or mall walking options
- Invite older adults to participate in walk audits to identify areas of concern in their community and advocate for change.
- Promote walking by establishing worksite programs and supporting walking meetings.
- Offer incentives for employees to incorporate walking into their commute to or from work.

## The E's in Action - Safe Routes to School

Safe Routes to Schools (SRTS) is a nationwide program that encourages students to be active on the way to school which can lead to a lifetime of activity. In Santa Clara County, the Public Health Department's "Walk & Roll" program aims to create safe, convenient, and fun opportunities for K-12 students and their families to walk and bicycle to and from school. The program succeeds by including the whole community and encompassing the E's of traffic safety—education, encouragement, engineering, enforcement, and evaluation. The program engages local school and community stakeholders into Safe Routes activities to ensure the program is equitably administered in communities so that every student has the opportunity to walk and bike to school safely. Examples of how the E's are incorporated into SRTS include:

- **Education** activities teach students and parents/guardians about pedestrian, bicycle, and traffic safety through in-class curriculum, on the bike skills training, and after school family fun bike events.
- **Encouragement** strategies generate excitement and interest in walking and bicycling for families by creating events and activities such as daily/weekly/monthly Walk and Roll to School Days, Walking School Buses and Bike Trains that allow students to walk and bicycle together along with adult volunteers, and by organizing free community bike repairs.
- **Enforcement** tactics deter unsafe behaviors of drivers, pedestrians and bicyclists in the vicinity of schools as well as encourage all road users to obey traffic laws and share the road safely.
- **Engineering** efforts include planning and implementing physical improvements surrounding schools that make it safer and more attractive for students and their families to walk and bicycle to school.
- **Evaluation** includes a combination of quantitative information, such as counts of how many children are walking and bicycling to school, and qualitative information, like parents'/guardians' knowledge and attitudes towards walking and biking. Together, they can identify underlying barriers as well as meet the traffic safety needs of the school community.

## Pedestrian Policies/Plans/Initiatives

Well-designed, walkable communities begin with transportation plans and policies. Complete Streets laws, intended to create safe, convenient streets for all users, including pedestrians, were passed by the State of California in 2008 (AB1358) and by Congress in 2011 (HR 1780). The California Complete Streets Act required that all cities and counties modify their circulation elements upon revision of their general plans to meet Complete Streets requirements. In addition, the Metropolitan Transportation Commission (MTC) passed a resolution in 2012 requiring that cities and counties either pass a Complete Streets Resolution or amend their circulation elements as a requirement for receiving One Bay Area Grant (OBAG) funding. All cities in Santa Clara County are now compliant with MTC's OBAG Complete Street requirements (Table 14).

Pedestrian plans provide a comprehensive framework to identify pedestrian needs, potential improvements, and priorities for implementation. Sometimes they are combined with bicycle or trails plans. The State of California has just announced its Transportation Plan 2040 and will be releasing a Statewide Bicycle and Pedestrian Plan in the coming year. The Metropolitan Transportation Commission issues a Regional Transportation Plan (Plan Bay Area) every five years, which comprehensively addresses transportation and land use and is currently in the process of creating Plan Bay Area 2040. In addition, every five years, the cities work with the Santa Clara Valley Transportation Authority (VTA) to create a Valley Transportation Plan. VTA is also currently in the process of creating a new Pedestrian Access to Transit Plan, recognizing that the average transit user walks to transit. According to VTA, approximately 70% of riders access their first transit stop on foot.<sup>48</sup>

In recent years, U.S. cities have begun to adopt Vision Zero Initiatives with the goal of reducing serious traffic injuries and deaths. The Vision Zero Act of 2015, which has been introduced in Congress, would provide funding for those cities that have adopted Vision Zero plans. Locally, the City of San Jose adopted Vision Zero in April 2015, City of Sunnyvale included Vision Zero in its study issues for 2016, and Morgan Hill recently passed a Vision Zero Policy.

Transportation is an important element that the World Health Organization (WHO) has identified as a characteristic of an age-friendly city. Cities qualify as part of the WHO's Global Network of Age-Friendly Cities and Communities if they commit to becoming age-friendly. The Seniors' Agenda of Santa Clara County Department of Aging and Adult Services provides technical assistance to cities wishing to apply for an Age-Friendly designation. Los Altos and Los Altos Hills were the first local jurisdictions to be considered Age-Friendly.

Over the last several years, cities in Santa Clara County have begun to adopt Safe Routes to School policies and to build SRTS policy language into circulation elements of their general plans. The first step for some communities has been to adopt SRTS resolutions or consensus statements. To acknowledge the positive steps that have already been taken to develop safe, walkable communities, a comprehensive list of jurisdictions within Santa Clara County that have committed to SRTS and other local and state policies, plans, and initiatives is provided (Table 14).

**Table 14 - Policies, plans, and initiatives that support walkable communities by jurisdiction and agency**

Jurisdictions and Agencies	Complete Streets		Pedestrian and Trails Plans or Combined Bike/ Pedestrian Plans	Vision Zero Initiative	Age-Friendly Cities	Safe Routes to School Resolution or Consensus Statement
	Resolution/ Ordinance	Circulation Element Amendment Update				
<b>Jurisdictions</b>						
State of California			California Statewide Bicycle and Pedestrian Plan (coming 2017)			
County of Santa Clara	x		Countywide Trails Master Plan			
Campbell	x	x				x
Cupertino		x	Pedestrian Transportation Guidelines			x
Gilroy	x		Bicycle Pedestrian Transportation Plan, Trails Master Plan			x
Los Altos	x		Pedestrian Master Plan Administrative Draft		x	
Los Altos Hills	x	x			x	
Los Gatos		x	Bicycle & Pedestrian Plan (in progress)			x
Milpitas		x	Trails Master Plan			
Monte Sereno	x					
Morgan Hill		x	Master Plan Update for Parks, Recreation, Trails and Bikeways	x	x	

Jurisdictions and Agencies	Complete Streets		Pedestrian and Trails Plans or Combined Bike/ Pedestrian Plans	Vision Zero Initiative	Age-Friendly Cities	Safe Routes to School Resolution or Consensus Statement
	Resolution/ Ordinance	Circulation Element Amendment Update				
Mountain View		x	Pedestrian Master Plan			x
Palo Alto	x		Bicycle and Pedestrian Plan; Parks, Trails, Open Space & Recreation Plan (under development)			x
San Jose		x	Pedestrian Master Plan Administrative Draft 2008	x	x	
Santa Clara		x				
Saratoga	x	x			x	
Sunnyvale		x		2016 Study Issue		
<b>Agencies</b>						
Open Space Authority Santa Clara Valley			Santa Clara Valley Greenprint			
Valley Transportation Agency (VTA)			Valley Transportation Plan 2040; Pedestrian Access to Transit Plan			

Note: There may be policies, plans, and initiatives that have been completed or passed since this report's publication.

## Technical Notes

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### Counts and Rates

Injury data are presented in the report as counts, age-specific rates per 100,000 people, and age-adjusted rates per 100,000 people. Counts are the total number of events that occur in a defined period of time, such as the total number of collisions in a single year. Rates are often used instead of or in addition to counts when comparing data between two or more populations or over a period of time to account for differences in the size of populations. A rate is the count divided by the population at risk, and multiplied by a standard number (e.g., 100,000) to show the number affected per 100,000 people in a given population. Age-specific rates are the count in a given age group, such as the number of collisions for individuals ages 15 to 24, divided by the number of people in the population ages 15 to 24, multiplied by a standard number, e.g., 100,000.

Age-adjusted rates are commonly used to compare data across subgroups (like race/ethnicity), time periods, and geographic areas like cities to account for differences in the age profile of different populations or the same population over time (i.e., the fact that there is a higher percentage of older adults in the White population than in other racial/ethnic groups in Santa Clara County). Age adjustment involves applying the age distribution of a “standard” population, in this case the 2000 U.S. population, to the rates. It is important to note that once an age adjustment is applied, results no longer represent the actual rates in a given population and so should be used only for the purposes of comparison. For more information on age adjustment, see <http://www.cdc.gov/nchs/data/statnt/statnt20.pdf>.

### Volume

Pedestrian volume is important in understanding if collisions are going up/down as a result of increasing/decreasing volume or if it is in fact a true increase in crashes. Relative to other modes of travel, there is often limited information available regarding changes in pedestrian travel patterns and exposure (such as number, length, and nature of walking trips, where these trips are taking place, and amount of time spent walking). This lack of data tends to limit understanding of the seriousness of pedestrian crash risks where problems exist. For example, two intersections may have the same number of pedestrian crashes in a given year, but one site may have double or triple the number of pedestrians crossing, making it potentially a safer site. Without knowing the details of the pedestrian volumes at each site, an agency could wrongly conclude that both sites warranted the same amount of attention.

### Data Resources and Limitations

The findings presented in this document were secondary (pre-existing) quantitative data collected from a variety of sources, including, but not limited to: U.S. Census Bureau; California Department of Public Health; Office of Statewide Health Planning and Development; Vital Records Business Intelligence System; Statewide Integrated Traffic Records System; California Healthy Kids Survey; and other local, state, and national surveys,

databases, and registries. The key data sources used in the report, the timeframe of the data presented, and the limitations of each are noted below.

Data Type	Source	Years	Potential Limitations
Death	Vital Records Business Intelligence System (VRBIS), California Comprehensive Death File (CCDF). Data are also available through the online data query systems from the California Department of Public Health, EpiCenter, California Injury Data Online, but these data may differ.	2004-2015	Data on circumstances around the time of injury are not available in the death database. The data analysis is conducted based on the International Classification of Diseases (ICD), version 10. The ICD codes included in the analysis are: V02-V04 (.1, .9) V09.2, V01, V02-V04 (.0), V05, V06, V09 (.0,.1,.3,.9).
Emergency department (ED) visits	California Office of Statewide Health Planning and Development	2007-2013	There is no information on location of incident and the factors contributing to the collision. The data analysis is conducted based on the International Classification of Diseases (ICD), version 9. The ICD codes included in the analysis are: E810-E819 (.7), E800-807(.2), E820-E825 (.7), E826-E829(.0).
Hospital (PDD) discharges	California Office of Statewide Health Planning and Development	2007-2013	There is no information on location of incident and the factors contributing to the collision. The data analysis is conducted based on the International Classification of Diseases (ICD), version 9. The ICD codes included in the analysis are: E810-E819 (.7), E800-807(.2), E820-E825 (.7), E826-E829(.0).
Collisions (based on the location of the incident, also referred to as data presented by occurrence)	Transportation Injury Mapping System (TIMS), Statewide Integrated Traffic Records System (SWITRS)	2004-2013	Only the collisions reported to the California Highway Patrol (CHP) are included in the database. Collisions in which only property damage occurred (no injury) are not included in the database.
Trauma registry	Santa Clara County EMS	2010-2015	The exclusion of deaths prior to arrival at a trauma center and patients who are treated at non-trauma centers means that the injuries included in the trauma registry are not demonstrative of all pedestrian injuries in the

Data Type	Source	Years	Potential Limitations
			County. The extensive amount of data included in the registry indicates that operations and upkeep are labor intensive, which may be a challenge regarding data quality or completeness.
American Community Survey (ACS)	U.S. Census Bureau, American FactFinder	2009-2014	This survey only captures the collective behavior for the primary mode of transportation used by people for commuting to work. It does not capture walking as a form of leisure or utility nor does it capture multimodal work commutes where walking comprised the lesser distance. Five year ACS survey data is used for this report (i.e., the data presented reflects a five year average). Hence the year-to-year changes in the mode of transportation during the 5 year period might not be reflected in the data. Data are available at county, city, zip code and census tract level.
Santa Clara County Public Health Department, Behavioral Risk Factor Survey	Limited data available on <a href="https://www.sccgov.org">https://www.sccgov.org</a> under Health Status Quick Facts	2013-2014	This survey is conducted every 3-4 years and it is possible that the same questions might not be included in the survey questionnaire during the next survey administration. It is a random digit dial telephone survey of adults residing in the Santa Clara County and does not represent the population segment that does not have a landline or cell phone. Adults who did not speak any of the languages that the survey was conducted in could not participate.

## Mapping Methodology

Pedestrian collision density was generated by creating a grid of  $\frac{1}{4}$  mile square cells in the study area, identifying the center of each square cell and creating a one square mile circular buffer for each of these centers. The number of incidents which occurred in each of these buffers were counted and assigned to the center cell. Each count value was classified based upon standard deviations of the population dataset: 0.5-1.5 (14-21 collisions per square mile), 1.5-2.5 (22-31 collisions per square mile) and more than 2.5 (32-81 collisions per square mile). The standard deviation classes that exceed 1.5 standard deviations were considered significant areas within the study area. The resulting value represents the number of collisions within in one square mile of the center of each grid as represented on the map.

## References

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- <sup>1</sup> National Safety Council. (2015). *Injury Facts*. Retrieved from [http://www.nsc.org/Membership%20Site%20Document%20Library/2015%20Injury%20Facts/NSC\\_InjuryFacts2015Ed.pdf](http://www.nsc.org/Membership%20Site%20Document%20Library/2015%20Injury%20Facts/NSC_InjuryFacts2015Ed.pdf).
- <sup>2</sup> Pedestrian and Bicycle Information Center. (n.d.). *What is the economic cost of crashes involving bicyclists and pedestrians?* Retrieved from [http://www.pedbikeinfo.org/data/faq\\_details.cfm?id=42](http://www.pedbikeinfo.org/data/faq_details.cfm?id=42).
- <sup>3</sup> California Department of Transportation. (June 2013). *2010-2012 California household travel survey final report*. Retrieved from [http://www.dot.ca.gov/hq/tpp/offices/omsp/statewide\\_travel\\_analysis/files/CHTS\\_Final\\_Report\\_June\\_2013.pdf](http://www.dot.ca.gov/hq/tpp/offices/omsp/statewide_travel_analysis/files/CHTS_Final_Report_June_2013.pdf).
- <sup>4</sup> Smart Growth America. (n.d.) *Benefits of Complete Streets: Complete Streets stimulate the local economy*. Retrieved from <http://www.smartgrowthamerica.org/documents/cs/factsheets/cs-economic.pdf>.
- <sup>5</sup> Litman, T. (2014). *Economic value of walkability*. Retrieved from <http://www.vtpi.org/walkability.pdf>.
- <sup>6</sup> Pucher, J., Buehler, R., Bassett, D., & Dannenberg, A. (October 2010). Walking and cycling to health: A comparative analysis of city, state, and international data. *American Journal of Public Health*, 100 (10). Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/20724675>.
- <sup>7</sup> Cohen, J.M., Boniface, S., & Watkins, S. (March 2014). Health implications of transport planning, development, and operations. *Journal of Transport and Health*. Retrieved from <http://www.sciencedirect.com/science/article/pii/S2214140513000169>.
- <sup>8</sup> Kelly, P., Kahlmeir, S., Gotshi, T., Orsini, N., Richards, J., Roberts, N., Scarborough, P., & Foster, C. (2014, October). Systemic review and meta-analysis of reduction in all-cause mortality from walking and cycling and shape of dose response relationship. *International Journal of Behavioral Nutrition and Physical Activity*, 11; 132. Retrieved from <https://ijbnpa.biomedcentral.com/articles/10.1186/s12966-014-0132-x>.
- <sup>9</sup> Ward B., Schiller J., & Goodman R. (2014). *Multiple chronic conditions among US adults: A 2012 update*. Retrieved from the Centers for Disease Control and Prevention <http://dx.doi.org/10.5888/pcd11.130389>.
- <sup>10</sup> U.S. Department of Health and Human Services. (2008). *2008 physical activity guidelines for Americans*. Retrieved from <http://health.gov/PAGuidelines/pdf/paguide.pdf>.
- <sup>11</sup> California Center for Public Health Advocacy. (2009). *The economic costs of overweight, obesity, and physical inactivity among California Adults 2006*. Retrieved from <https://www.cdph.ca.gov/HealthInfo/healthyliving/nutrition/Documents/CostofObesityToplineReport.pdf>.
- <sup>12</sup> Active Living Research. (2016). *Moving toward active transportation: How policies can encourage walking and bicycling*. Retrieved from [http://activelivingresearch.org/sites/default/files/ALR\\_Review\\_ActiveTransport\\_January2016.pdf](http://activelivingresearch.org/sites/default/files/ALR_Review_ActiveTransport_January2016.pdf).
- <sup>13</sup> Federal Highway Administration. (2012). *Report to the U.S. Congress on the outcomes of the nonmotorized transportation pilot program: SAFETEA-LU Section 1807*. April 2012. Retrieved from [http://www.fhwa.dot.gov/environment/bicycle\\_pedestrian/ntpp/2012\\_report/](http://www.fhwa.dot.gov/environment/bicycle_pedestrian/ntpp/2012_report/).
- <sup>14</sup> Policylink, Prevention Institute, & Convergence Partnership. (n.d.). *Healthy equitable transportation policy recommendations and research*. Retrieved from <https://www.preventioninstitute.org/sites/>

default/files/publications/Healthy%20Equitable%20Transportation%20Policy%20Recommendations%20and%20Research.pdf.

- <sup>15</sup> U.S. Department of Transportation, Federal Highway Administration. (2011). *Summary of travel trends: 2009 National Household Travel Survey*. Retrieved from <http://nhts.ornl.gov/2009/pub/stt.pdf>.
- <sup>16</sup> U.S. Department of Transportation Federal Highway Administration. (April 2009). *10 simple steps to reducing climate change*. Retrieved August 12, 2016, from [http://www.fhwa.dot.gov/environment/climate\\_change/mitigation/publications/ten\\_steps/index.cfm](http://www.fhwa.dot.gov/environment/climate_change/mitigation/publications/ten_steps/index.cfm).
- <sup>17</sup> U.S. Department of Transportation Research and Innovative Technology Administration (October 2007). *Trends in personal income and passenger vehicle miles*. Retrieved from [http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/special\\_reports\\_and\\_issue\\_briefs/special\\_report/2007\\_10\\_03/html/entire.html](http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/special_reports_and_issue_briefs/special_report/2007_10_03/html/entire.html).
- <sup>18</sup> Raimi & Associates. (2013). *Community health existing conditions report, 2013*. Retrieved from [https://www.sccgov.org/sites/dpd/DocsForms/Documents/HealthElement\\_Existing\\_Health\\_Conditions\\_FINAL\\_May\\_2013.pdf](https://www.sccgov.org/sites/dpd/DocsForms/Documents/HealthElement_Existing_Health_Conditions_FINAL_May_2013.pdf).
- <sup>19</sup> Centers for Disease Control and Prevention. (n.d.). *Physical activity for a healthy weight*. Retrieved June 7, 2016, from [http://www.cdc.gov/healthyweight/physical\\_activity/index.html](http://www.cdc.gov/healthyweight/physical_activity/index.html).
- <sup>20</sup> U.S. Department of Health and Human Services. (2015). *Step it up! The Surgeon General's call to action to promote walking and walkable communities*. Retrieved from <http://www.surgeongeneral.gov/library/calls/walking-and-walkable-communities/>.
- <sup>21</sup> Office of Disease Prevention and Health Promotion. (2008). *2008 physical activity guidelines for Americans*. Retrieved June 7, 2016, from <http://health.gov/paguidelines/guidelines/summary.aspx>.
- <sup>22</sup> Santa Clara County Public Health Department (n.d.). Obesity: overweight or obese. Retrieved October 6, 2016, from <https://www.sccgov.org/sites/sccphd/en-us/Partners/Data/Pages/Obesity.aspx>.
- <sup>23</sup> Santa Clara County Public Health Department (n.d.). Physical activity: met CDC recommendations for aerobic physical activity in past month. Retrieved October 6, 2016, from <https://www.sccgov.org/sites/sccphd/en-us/Partners/Data/Pages/Physical-Activity.aspx>.
- <sup>24</sup> Santa Clara County Public Health Department. (2016). *Status of children's health: Santa Clara County 2016*. Retrieved from <https://www.sccgov.org/sites/sccphd/en-us/Partners/Data/reports/child-health/Documents/exec-summary.pdf>.
- <sup>25</sup> California Highway Patrol. Statewide Integrated Traffic Records System, 2013 Report. Retrieved October 6, 2016, from <https://www.chp.ca.gov/programs-services/services-information/switrs-internet-statewide-integrated-traffic-records-system/switrs-2013-report>.
- <sup>26</sup> National Highway Transportation Safety Administration. (2015). Traffic safety facts, pedestrians. Retrieved from <https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812124>.
- <sup>27</sup> Office of Disease Prevention and Health Promotion. (n.d.). *Healthy People 2020*. Retrieved June 29, 2016, from <https://www.healthypeople.gov/2020/topics-objectives/objective/ivp-18>.
- <sup>28</sup> National Public Radio. (2013). *Walking while old: Seniors face greatest death risk*. Retrieved July 1, 2016, from <http://www.npr.org/sections/health-shots/2013/04/18/177783314/walking-while-old-elderly-pedestrians-face-greatest-death-risk>.

- <sup>29</sup> Transportation Injury Mapping System. (2016). Pedestrian collision summary (2013 Santa Clara County SWITRS data - pedestrian collisions). Retrieved October 14, 2016, from <https://tims.berkeley.edu/tools/query/summary.php>.
- <sup>30</sup> City of Seattle. (2015). *Vision Zero: Seattle's plan to end traffic deaths and serious injuries by 2030*. Retrieved from <http://www.seattle.gov/Documents/Departments/beSuperSafe/VisionZeroPlan.pdf>.
- <sup>31</sup> Santa Clara County Social Services Agency Department of Aging and Adult Services. *Seniors' agenda 2015 annual report*. Retrieved from [https://www.sccgov.org/sites/ssa/daas/Documents/SA%20annual%20report\\_2015\\_v13.pdf](https://www.sccgov.org/sites/ssa/daas/Documents/SA%20annual%20report_2015_v13.pdf).
- <sup>32</sup> World Health Organization. (2007). *Global age-friendly cities: a guide*. Retrieved from [http://www.who.int/ageing/publications/Global\\_age\\_friendly\\_cities\\_Guide\\_English.pdf](http://www.who.int/ageing/publications/Global_age_friendly_cities_Guide_English.pdf).
- <sup>33</sup> AARP. (n.d.) Livable communities: about us. Retrieved November 10, 2016, from <http://www.aarp.org/livable-communities/about/>.
- <sup>34</sup> Distraction.gov. *Facts and statistics*. Retrieved June 20, 2016, from <http://www.distraction.gov/stats-research-laws/facts-and-statistics.html>.
- <sup>35</sup> Pickrell, T. M., Li, R., & KC, S. (2016, September). *Driver electronic device use in 2015* (Traffic Safety Facts Research Note. Report No. DOT HS 812 326). Washington, DC: National Highway Traffic Safety Administration National Highway Traffic Safety Administration. Retrieved from <https://crashstats.nhtsa.dot.gov/>.
- <sup>36</sup> Urban Dictionary. (n.d.). Retrieved June 20, 2016, from <http://www.urbandictionary.com/define.php?term=petextrian>.
- <sup>37</sup> Governors Highway Safety Administration. (2015). *Everyone walks. Understanding and addressing pedestrian safety*. Retrieved October 6, 2016, from <http://www.ghsa.org/resources/everyone-walks-understanding-and-addressing-pedestrian-safety>.
- <sup>38</sup> National Safety Council. (2015). Distracted walking injuries on the rise. Retrieved August 23, 2016, from <http://www.nsc.org/Connect/NSCNewsReleases/Lists/Posts/Post.aspx?ID=15>.
- <sup>39</sup> Governors Highway Safety Association. (2015). *Everyone walks. Understanding and addressing pedestrian safety*. Retrieved January 24, 2017, from <http://www.ghsa.org/resources/everyone-walks-understanding-and-addressing-pedestrian-safety>.
- <sup>40</sup> Santa Clara County Public Health Department. (n.d.). *Partners for health Santa Clara County 2015-2020: community health assessment, community health improvement plan*. Retrieved from <https://www.sccgov.org/sites/sccphd/en-us/Partners/chip/Documents/cha-chip/cha-chip.pdf>.
- <sup>41</sup> San Jose Mercury News and Yarbrough, B. (2015, November 4). Language besides English spoken by 44 percent in California, more than half in Santa Clara County. Retrieved October 6, from <http://www.mercurynews.com/2015/11/04/language-besides-english-spoken-by-44-percent-in-california-more-than-half-in-santa-clara-county/>.
- <sup>42</sup> Savage, M. (2012). *Crash analytics: How data can help eliminate highway deaths, 2012*. Retrieved June 30, 2016, from GCN website <https://gcn.com/Articles/2012/04/20/Data-analytics-traffic-safety-toward-zero-deaths.aspx?Page=1>.
- <sup>43</sup> National Highway Traffic Safety Administration. (n.d.). *Pedestrian enforcement operations: a how-to-guide*. Retrieved from <http://www.nhtsa.gov/Driving-Safety/Pedestrians/Pedestrian-Safety-Enforcement-Operations:-A-How%E2%80%9393To-Guide>.
- <sup>44</sup> Pedestrian and Bicycle Information Center. (n.d.). What communities can do to enforce laws. Retrieved October 11, 2016, from [http://www.pedbikeinfo.org/programs/enforcement\\_communityenforce.cfm](http://www.pedbikeinfo.org/programs/enforcement_communityenforce.cfm).

<sup>45</sup> Bochner, B. and Walden, T. (2010). *Effectiveness of red light cameras*. Retrieved from <http://tti.tamu.edu/group/stsc/files/2011/03/Red-light-camera-effectiveness-070610-w-Garland-correction1.pdf>.

<sup>46</sup> Victoria State Government. (2007). Rationale for traffic safety education. Retrieved June 30, 2016, from <https://www.eduweb.vic.gov.au/edulibrary/public/teachlearn/student/tserationale.pdf>.

<sup>47</sup> *Victoria's road safety education action plan 2014-2016*. (n.d.) Retrieved from <https://www.vicroads.vic.gov.au/searchresultpage?q=safety%20education%20action%20plan&TabPF=1>.

<sup>48</sup> Valley Transportation Authority. (2014). *Draft pedestrian access to transit plan: existing conditions report*. Retrieved from Valley Transportation Authority website <http://www.vta.org/sfc/servlet.shepherd/document/download/069A0000001eAwWIAU>.