



Health Equity for All

SAN JOAQUIN VALLEY
PUBLIC HEALTH CONSORTIUM

FRESNO STATE
Central Valley Health Policy Institute

LONGEVITY FOR SAN JOAQUIN VALLEY ELDERS



Individual and Neighborhood Characteristics



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LONGEVITY FOR SAN JOAQUIN VALLEY ELDERS

Individual and Neighborhood Factors

ABSTRACT

This report examines the determinants of longevity for San Joaquin Valley (SJV) persons aged 65 and older in relation to individual, health care, and neighborhood factors. Although examining patterns of survival and death for elders does not provide a complete picture of the overall health of older adults in the region, understanding longevity determinants can help identify priorities for public health. Findings indicate that San Joaquin Valley residents are more likely to die before age 65 and lose more years of life after age 65 than do other Californians. There were notable gender and race/ethnicity differences, with women and whites experiencing greater longevity than do men, Latinos, and African Americans. Elders in the San Joaquin Valley have higher use of avoidable hospitalizations and lower use of planned elective surgeries than their peers in the rest of California. Even after accounting for individual differences, elder San Joaquin Valley residents who lived in more walkable neighborhoods with more frequent planned surgeries had more years of life after 65, while those who lived in neighborhoods with increased higher poverty rates and higher rates of unplanned ER visits lost more years after age 65.

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Introduction

The United States and other industrialized counties have experienced notable improvements in the length of life, and about 81% of US residents are expected to live past age 65.¹ Public health initiatives, such as improvements in sanitation, control of infectious disease and improved nutrition have been key factors. Since the 1930's improvements in life expectancy are more often attributed to access to health care^{2,3} and modifying lifestyle behaviors (such as substance use, physical inactivity, and obesity).⁴ Despite overall increases in the length and quality of life for older people, broad differences across gender^{5,6}, racial/ethnic⁷, social class⁸, neighborhood design⁹ and rural-urban residence have been found.¹⁰ Findings on the influence of diverse potentially modifiable factors on elder health outcomes indicate the potential for continued improvements. As a result, a major goal for public health policy in the USA is to broaden improvements in elder health by addressing individual behavioral, social and physical environment, and health-services related determinants.¹¹ This report examines the determinants of longevity for San Joaquin Valley (SJV) persons aged 65 and older in relation to individual, health care, and neighborhood factors. Although examining patterns of survival and death for elders does not provide a complete picture of the overall health of older adults in the region, understanding longevity determinants can help identify priorities for public health strategies and other policy areas.



Older Adult Longevity: Multiple Determinants

The number of years a person is likely to live (life expectancy) has been examined from multiple perspectives. Although there is consensus that genetic factors are determinants of longevity, specific pathways have not been identified^{12,13}. Further, there is increasing evidence for epigenetic (interactions of genes with environment or behavior factors) determination of longevity and thus the continuing attention to other potential causes.¹⁴ Four groups of determinants have been highlighted in prior studies: individual demographics; health related behaviors; health services use and neighborhood environment.

Individual Demographics

For older adults in this country, individual factors such as gender, race/ethnicity, education and wealth have been linked to longevity, functional status, and quality of life. Populations with greater economic security live longer and report greater health and well-being including Asian Americans, older whites, women and those with more education.¹⁵ There has been evidence for a Latino paradox in deaths before age 65, with Latinos experiencing generally better health outcomes than other groups despite lower average socio-economic status. However, among elders, Mexican Americans and other Latinos appear at greater risk of premature death.¹⁶ There are substantial differences in life-expectancy associated with these factors, for example, in 2012 additional years of life expectancy at age 65 was 17.9 and 20.5 for males and females, respectively¹⁷ and for men, there was a 3 year advantage for white men compared to African American men. Notably, consideration of other factors, such as individual health behaviors or health care use, tends to reinforce the influence of demographic differences. For elders, demographic categories serve as proxy measures of a life-time of differential exposure to living condition, health events and interventions, social supports, and other sources of stress and resilience, all closely associated with different demographic positions in the society.¹⁸ The apparent impacts of cumulative exposures and behaviors before age 65 has prompted elder health promotion and disease prevention experts to focus renewed attention on promoting lifestyle modifications and use of clinical preventive services beginning in early adulthood (1).

Health Related Behaviors

Current and lifetime health risk behaviors, such as smoking, diet, exercise, substance use, and social support have been consistently linked to health outcomes.¹⁹ The influence of these factors appears smaller for elders than for younger persons, perhaps reflecting the selective survival into old age of only the most resilient individuals²⁰. These health risk behaviors are increasingly recognized as at least partially a response to stress because they are closely correlated with individual factors such as gender, race/ethnicity and income, as well as neighborhood factors such as sprawl, pollution, and segregation. Health risk behaviors can change even in old age, and there is convincing evidence that smoking cessation, weight management and physical activity interventions can improve health and survival^{21,22}. As a result, increasing access to and participation of adults age 50 and above in evidence-based programming to improve physical activity, social engagement and other factors are key Healthy People 2020 objectives.

Health Services Use

For older adults, the accessibility and quality of medical care has been associated with longevity and quality of life. Older adults who receive higher frequency and quality of primary medical care experience

lower mortality^{23,24}. Further, older persons with greater access to primary care are less likely to have avoidable hospitalizations.^{25,26} There is extensive literature on the positive impacts of clinical preventive services (such as cancer screening and immunizations) as well as several high technology surgical and medical interventions for older people, such as angioplasty and open heart surgeries for heart disease, surgical treatment of colorectal, breast and other cancer, and surgical care. Having these tests and treatments on a timely, planned basis is often associated with lower mortality and better outcomes.^{27,28,29} Nonetheless, there is evidence that market area variations in surgical rates, especially for elective procedures may be more indicative of style of medical practice, patient-doctor relationships, and health system organization than with underlying need^{30,31,32}.



Neighborhood Environments

Because individual demographic and health risk behaviors in elders reflect both cumulative life experiences and current exposures, they have been found to be the most powerful predictors of longevity among elders. Researchers, nonetheless, have consistently found impacts of multiple neighborhood features on longevity. Neighborhood socio-economic status has been found to be an independent predictor of heart disease mortality³³ and all-cause mortality³⁴.

Table 1. Selected SJV Public Health Initiatives to Improve Elder Health

County	Examples of Current Initiatives
Kings	<ul style="list-style-type: none"> • Kings County Diabesity Coalition: providing ongoing education and resource services for health promotion, obesity, and diabetes prevention for families and the communities of Kings County • Targeted case management, immunizations, communicable disease investigation, coast 2 coast Rx prescription discount cards, tobacco control, environmental health services, and Kings County Asthma Coalition • Tobacco free living, prevent drug abuse and excessive alcohol use, healthy eating, active living, injury and violence free living, and mental and emotional well-being
Fresno	<ul style="list-style-type: none"> • Voluntary smoke-free policies in multi-unit housing complexes • Ordinances to reduce tobacco, alcohol, and sugary drink advertising at convenience stores • Increased community opportunities for no to low-cost physical activity • Training for seniors to engage in community-driven health initiatives
Madera	<ul style="list-style-type: none"> • Building capacity of seniors through outreach and engagement in emergency preparedness at Senior Centers and retirement communities • Nutrition education/physical activity/food demonstration presentations at senior centers with "Get Fresh" • Labs at reduced rates, seasonal flu shots, blood pressure and body mass index check, sexually transmitted disease clinic, and tuberculosis clinic
Merced	<ul style="list-style-type: none"> • Multipurpose Senior Service Program (MSSP) provides social and health care management for elderly who wish to remain in the community • Older Adult System of Care Program (OASOC) provides services to seniors that may be unserved, underserved, homeless, or at risk of homelessness, institutionalization, or hospitalization • Building capacity of seniors through outreach and engagement in emergency preparedness at Senior Centers and retirement communities • Nutrition education/physical activity/food presentations at senior centers with "Get Fresh" • Chronic Disease Self-Management Program (CDSMP) classes focus on helping individuals manage their chronic health conditions
San Joaquin	<ul style="list-style-type: none"> • "Get Fresh" is a Senior Nutrition Education Program that provides classes at local community centers to teach seniors about healthy eating options as well as physical activity • Lifetime of Wellness is a project that focuses on 15 intersecting strategies to prevent diabetes, heart disease, and stroke • Partnerships have been formed with senior advocacy and service organizations to educate and encourage county and city public works and planning departments to address senior concerns with the built environment
Stanislaus	<ul style="list-style-type: none"> • Promote wellness and healthy lifestyles, • Prevent illness and injury, • Provide quality care and treatment, and • Preserve access to healthcare for the underserved
Tulare	<ul style="list-style-type: none"> • Multipurpose Senior Service Program (MSSP) provides social and health care management for elderly who wish to remain in the community • Tulare County Aging Services and the Kings/Tulare Area Agency on Aging help provide nutritious tasty meals to seniors and provides services to isolated seniors • Health Insurance Counseling and Advocacy Program (HICAP) conducts community presentations and conferences as well as individual counseling sessions

Methods

This report utilizes data from a variety of statewide governmental agencies. Death Statistical Master Files for the years 2009-2013 were obtained from the California Department of Public Health (CDPH). Emergency department (ED) visits and patient discharge data (hospitalizations) were gathered from the Office of Statewide Health Planning and Development (OSHPD), 2009-2011. The Walk Score® generated by walkscore.com was used to analyze walkability (see Appendix A). Approval from the California Department of Public Health Vital Statistics Advisory Committee (VSAC) and the California Health and Human Services Agency's Committee for the Protection of Human Subjects (CPHS) was obtained. All data files mentioned above provided information on place of residence (county and zip code), age, gender, and other non-identifiable demographics. All rates and population estimates were based on 2010 Census files. Self-reported data is reported from UCLA's California Health Interview Survey (CHIS).



Indicators

In an attempt to describe premature mortality in the SJV we developed several indicators of age of death. We use age at death to illustrate the distribution of premature death by race/ethnicity (Figure 1). We used years of life lost as a measure of premature mortality from gender-specific life expectancy for eight five-year categories starting at age 65. This method allows for the adjustment of gender and age differences in life expectancy. In order to address morbidity, several indicators were developed including hospitalization and emergency department rates for ambulatory care-sensitive conditions (ACSC) and scheduled elective procedures. ACSCs include upper respiratory infection, asthma acute exacerbation, febrile convulsions, dehydration, and pneumonia. For a complete list of ACSCs please see the Agency for Healthcare Research and Quality's Prevention Quality Indicators. Scheduled elective procedures reflect hospital events in which an arrangement was made at least 24 hours prior to admission and includes colectomy, gallbladder removal, coronary artery bypass graft, endarterectomy, and heart valve replacement. For a complete list of procedures included see OSHPD common surgery.

Analysis

This report describes mortality and factors that influence longevity within the SJV, and whenever possible, compares the health status of the SJV to California as whole. First, we investigate premature mortality of all ages within the SJV by race/ethnicity and compare these rates to the state. Second, the geographic distribution of years of life lost is examined in adults aged 65 and older. The remainder of this report focuses exclusively on this older adult population. Third, rates of ED Ambulatory Care-Sensitive Conditions (ACSC) and scheduled elective procedures are examined within the SJV in order to understand where potentially avoidable healthcare utilization can be decreased and increased, respectively. Fourth, rates of modifiable health indicators are examined by region to determine how the SJV compares to the state. Finally, potentially modifiable social determinants of health are examined to determine the extent to which neighborhood characteristics are associated with longevity.

Findings

Figure 1. Cumulative Percentage of Age of Death by Race/Ethnicity in the SJV, 2009-2013

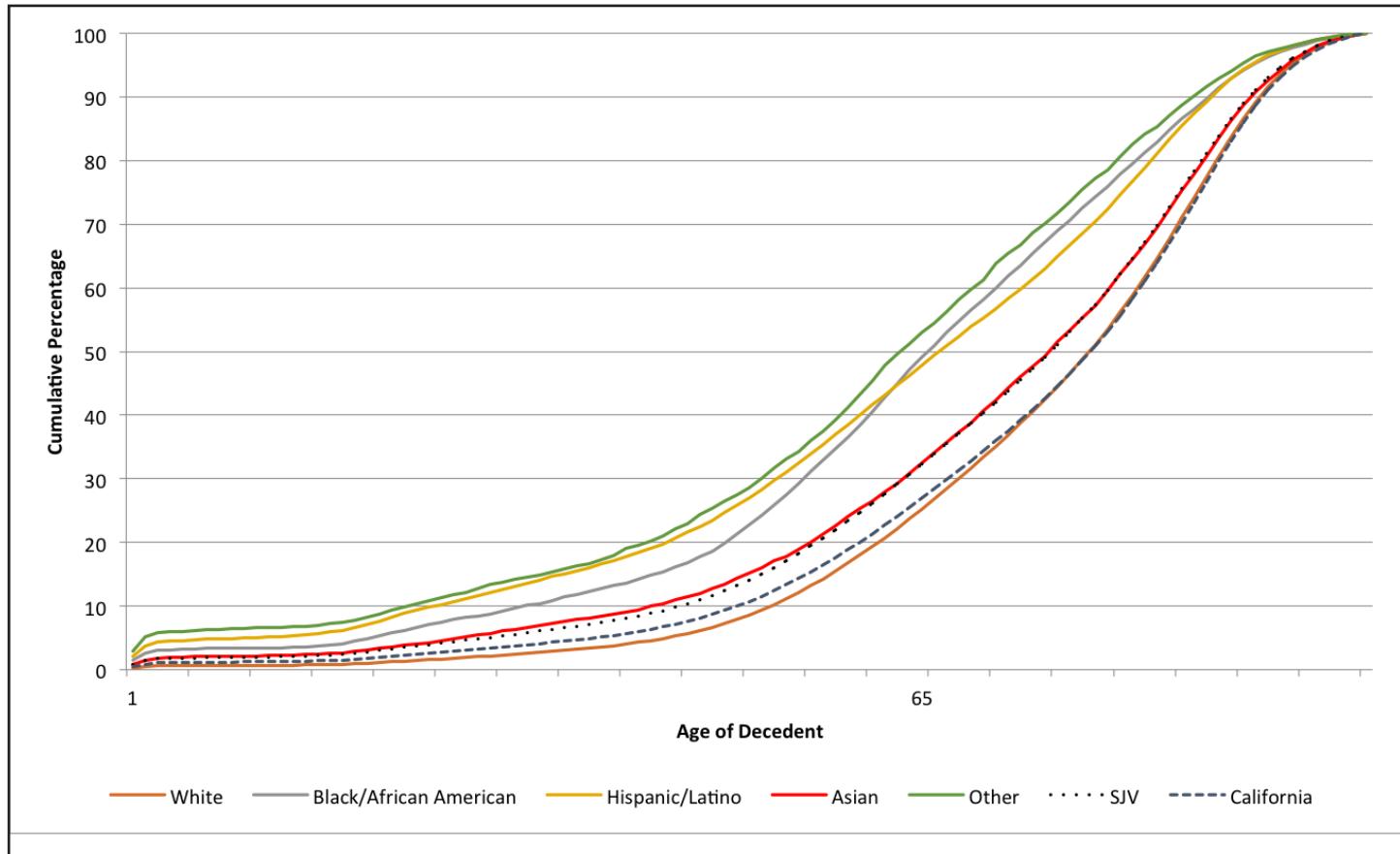


Figure 1 illustrates the cumulative percentage of death by age and race/ethnicity between the years 2009 and 2013. This figure illustrates that individuals living in the SJV suffer from premature death at a greater proportion than those living in other regions of the state. Within every age group, the SJV has a greater proportion of accumulated deaths compared to the rest of California, as evidenced by the higher SJV broken-line in Figure 1. The race subgroups represent deaths only in the SJV. Most notably, 40% of all deaths in African Americans, Latinos, and “other” race categories occur to individuals younger than 60 years of age. In contrast, less than 20% of white deaths are of individuals less than 60 years of age. These regional and racial/ethnic differences in premature mortality shape the context for examining longevity in the SJV and highlight the need to focus on the determinants of premature mortality in the region.



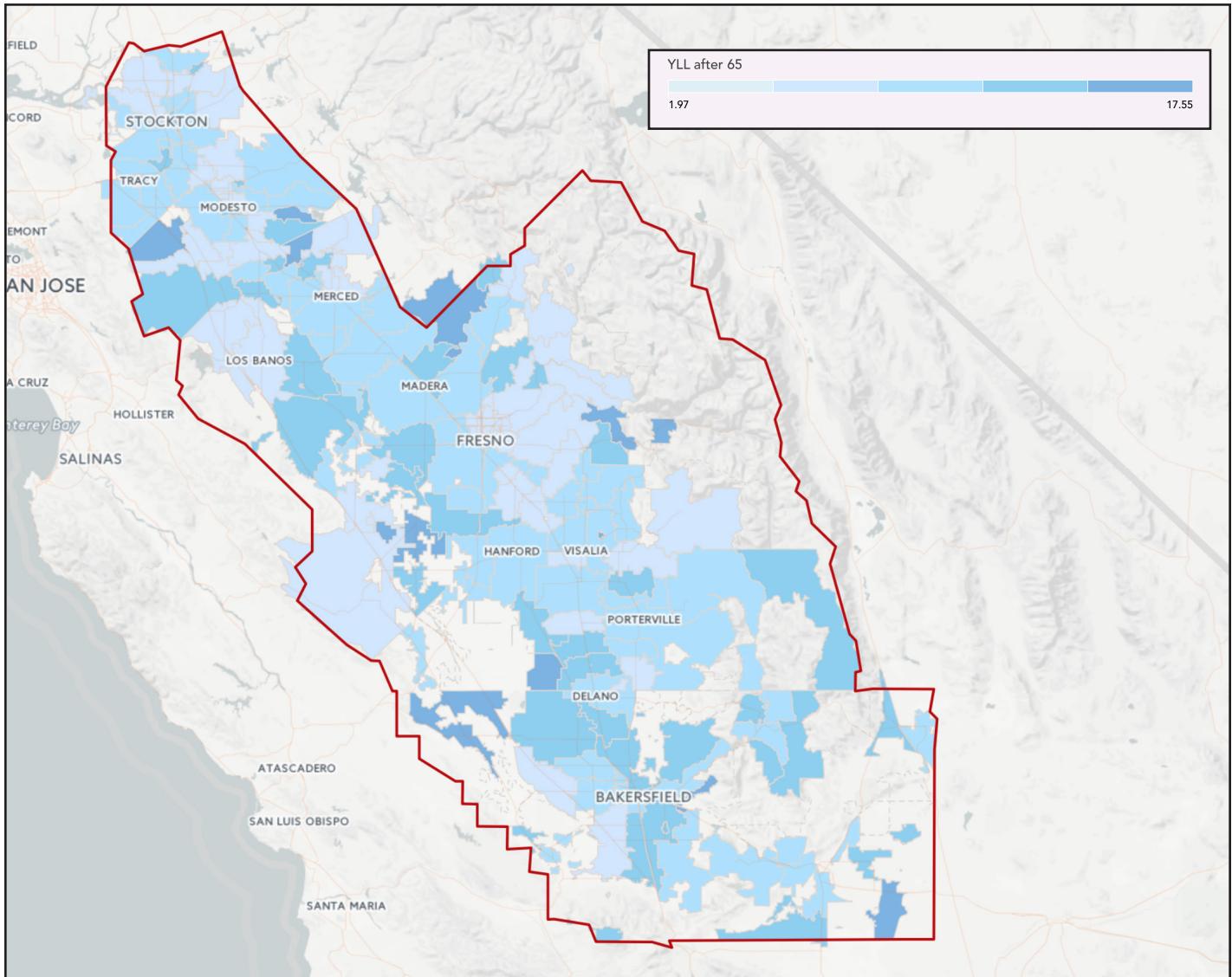
Figure 2. Years of Life Lost Age 65 and Older by Zip Code in the SJV, 2009-2013

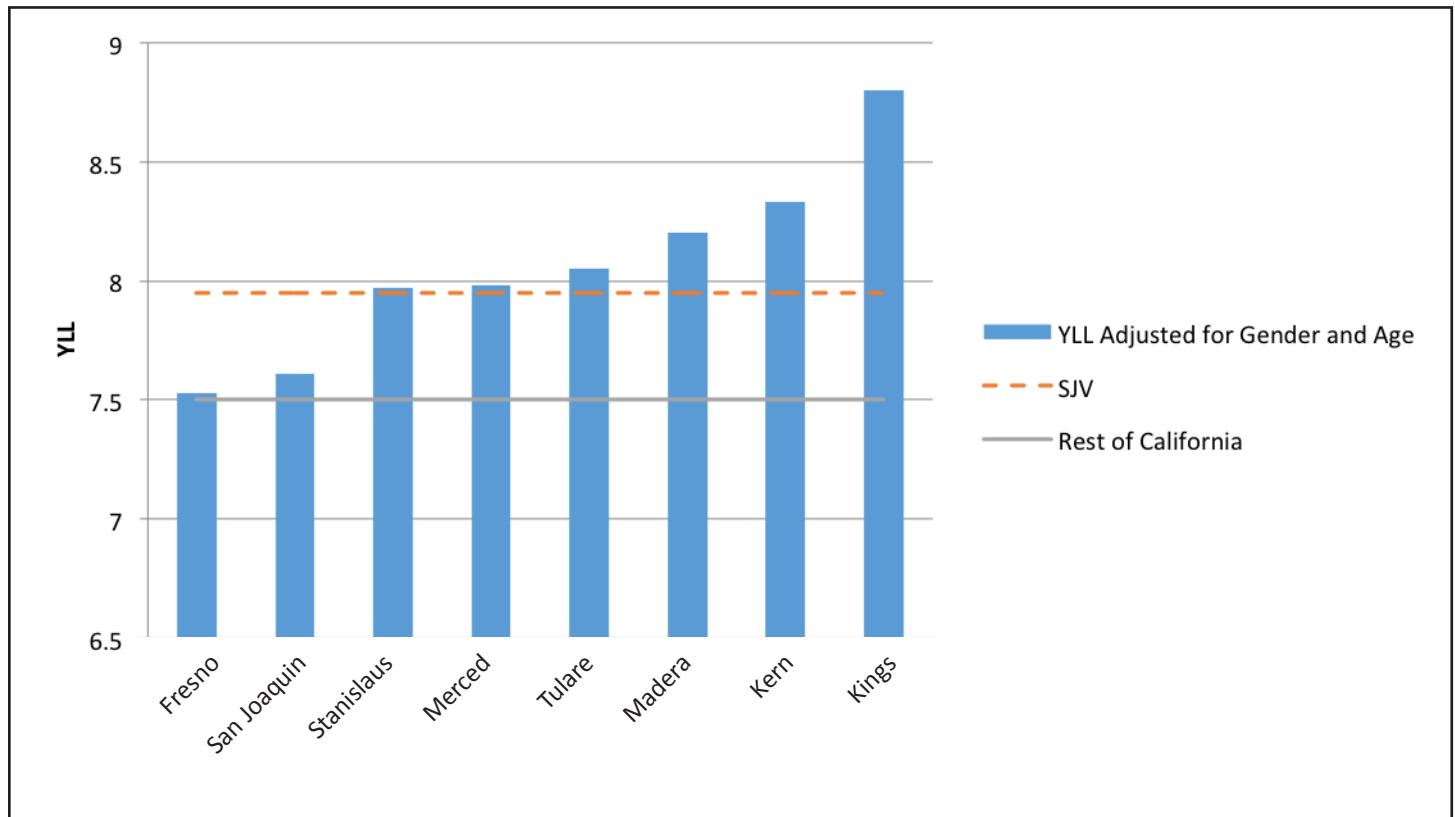
Figure 2 displays the geographic distribution of years of life lost (YLL) in the SJV for individuals deceased at age 65 or older. In this map, YLL was computed as the difference between the age of an individual at death and the life expectancy of the individual's zip code. The SJV's average YLL is 8.5, which is greater than the rest of California at 6.3. In Figure 2, the darkest shade represents areas where older adults lose more than nine years of life (one standard deviation above the state's average). These rural communities tend to have the largest rates of poverty and are generally not walkable due to lack of sidewalks and local amenities. The three leading causes of death in the SJV are: disease of

the circulatory system; neoplasms; and disease of the respiratory system. With regard to these three leading causes of death, older adults in the SJV are at similar risk as older adults living in other regions of California. However, there are several different measures for comparing premature mortality across regions including life expectancy, average age of death, and years of life lost. A table is included in Appendix B which illustrates that inequities exist by geographic region, gender, and race/ethnicity across several measures of premature mortality. For further details on rates of mortality in older adults see Appendix B.

It is well documented that men are at higher risk for mortality than women, and that age is positively correlated with mortality. In light of this, we have adjusted YLL by the life expectancies of each gender and eight five-year age categories beginning at age 65. Potentially, gender and age are major risk factors that are non-modifiable through health interventions.



Figure 3. Years of Life Lost Age 65 and Older Adjusted for Gender and Age by County in the SJV, 2009-2013



After statistically adjusting for gender and age, the regional difference between the SJV and the rest of California in YLL is largely reduced. Figure 3 highlights the regional and county differences that remain after such adjustment. Unfortunately, each individual county, and

the SJV region as a whole, have greater YLL than the rest of California. These differences in YLL are, are at the very least, attributable to factors beyond the influence of an individual's gender and age.

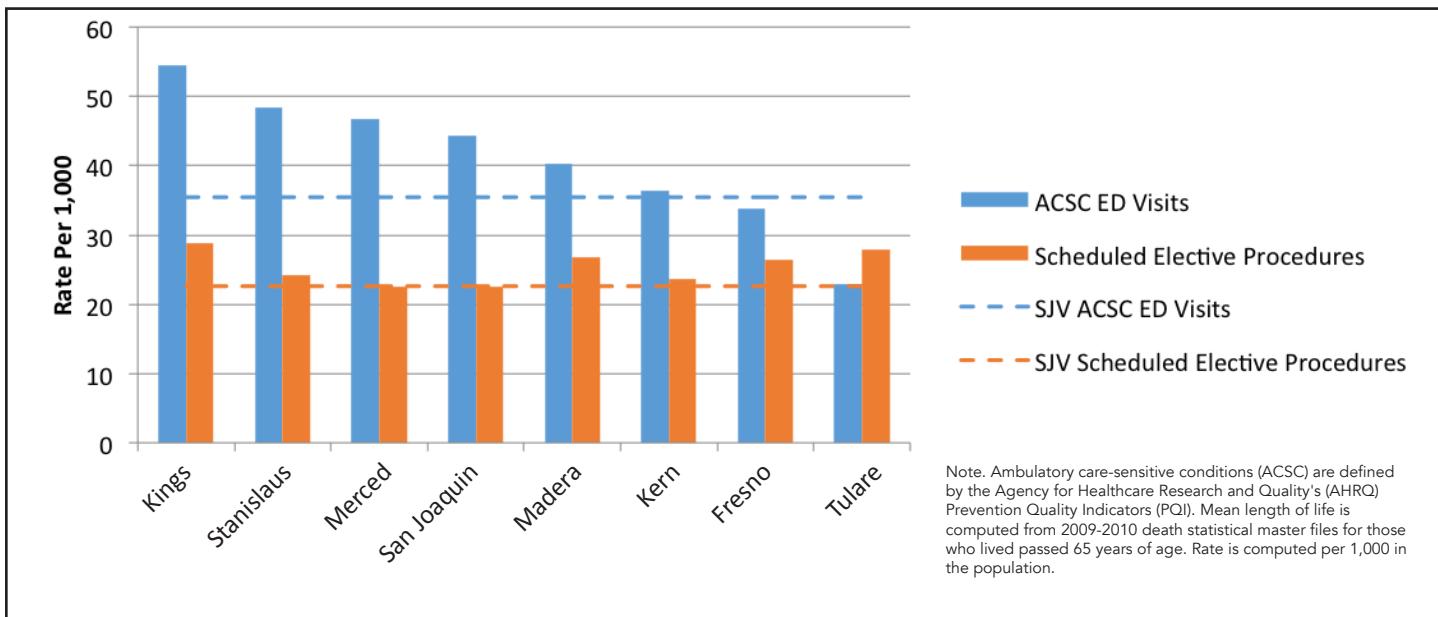
Figure 4. Rates of ACSC ED Visits and Scheduled Elective Procedures by County in the SJV, 2009-2011

Figure 4 illustrates the rate of ED visits for ACSCs and scheduled elective procedures in individuals age 65 and older. We could not compute statewide rates directly from the existing data set for ACSC ED visits or scheduled elective procedures to use as a comparison. However, according to the Healthcare Cost and Utilization Project (HCUP) produced by the Agency for Healthcare Research and Quality (AHRQ), the National rate of ACSC ED visits in older adults is 48 per 1,000 indicating that nearly all counties in the

SJV have a lower rate of ACSC ED utilization than the Nation. This suggests that a preventive infrastructure in the SJV is positively impacting the health and quality of life in older adults regarding these potentially avoidable conditions. Using the HCUP resources we were able to compute the state rate of scheduled elective procedures, 36.1 per 1,000. In Figure 4, the eight SJV counties have a lower rate of scheduled elective procedures than the state.

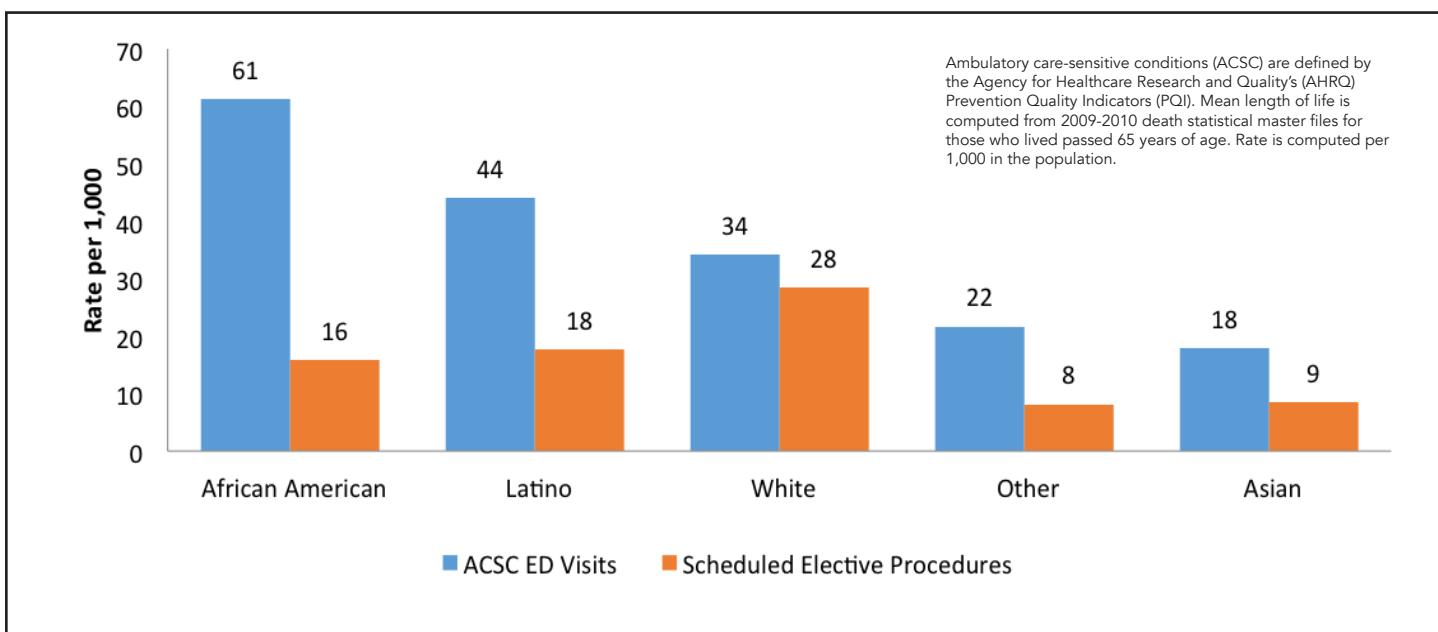
Figure 5. Rate of ACSC ED Visits and Scheduled Elective Procedures by Race/Ethnicity, 2009-2011, SJV

Figure 5 displays rates of ACSC ED visits and scheduled elective procedures by race/ethnicity within the SJV. Although the SJV as a whole has a lower rate of ACSC ED visits than the Nation, as shown in Figure 4, disparities within the region exist among racial/ethnic subgroups. African Americans and Latinos have the

highest rates of potentially avoidable utilization, with at least double the utilization rate than Asians and Others. Whites have the highest rate (28 per 1,000) of scheduled elective procedures in the SJV with a 55% increased rate compared to Latinos (18 per 1,000) who have the second highest utilization.

Figure 6. Self-Reported Health Indicators Older Adults, 2009 - 2012, SJV

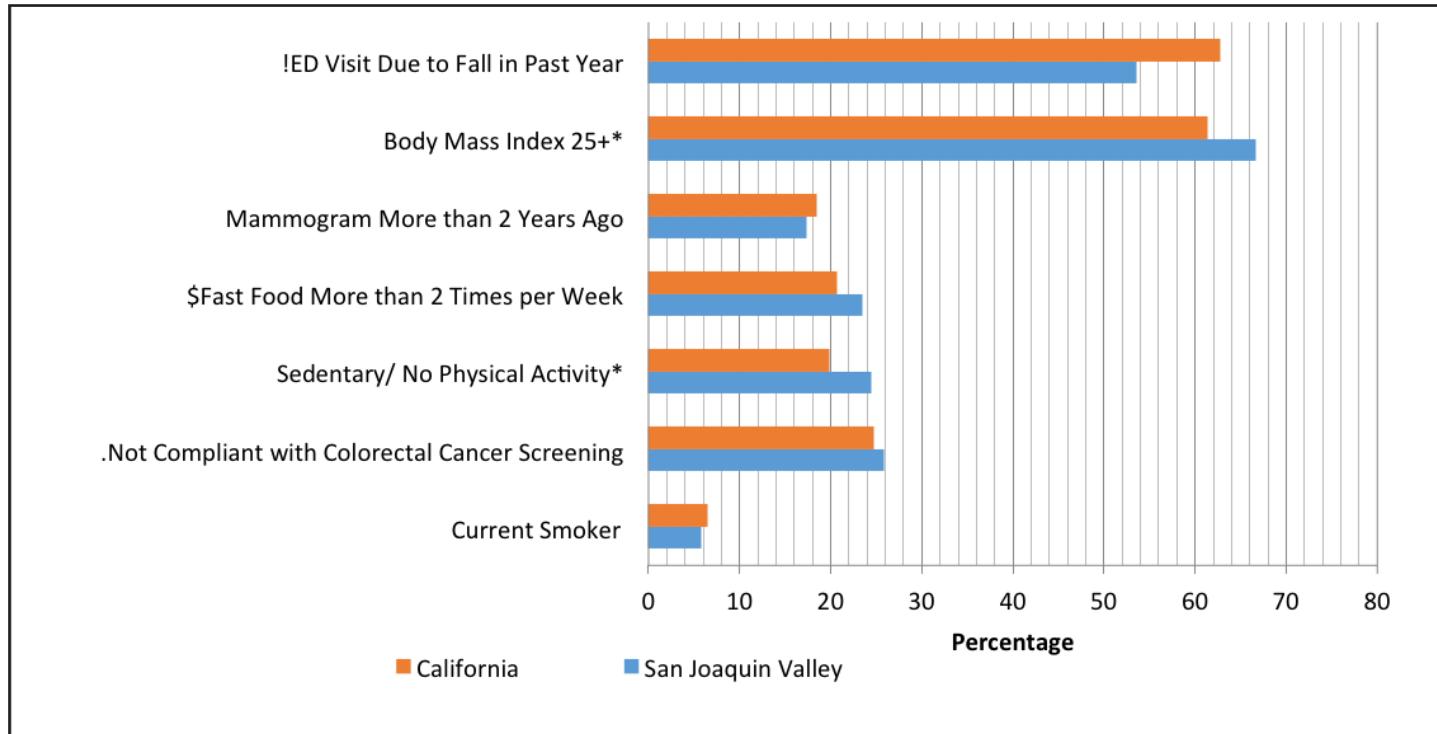


Figure 6 compares the SJV to the state on seven modifiable health indicators. The SJV is very similar to California on self-reported rates of ED visits due to falls, mammogram and colorectal screenings, fast food consumption, and smoking status. The two modifiable health indicators where we do see a regional difference include: body mass index and physical activity. Despite these two indicators, which are closely related, Figure 6 suggests that older adults living in the SJV report comparable health outcomes to the rest of California. When investigating these seven modifiable health indicators within the SJV by race/ethnicity, we were unable to produce stable estimates due to the small sample sizes. Please see Appendix C for an in-depth illustration of the racial/ethnic disparities observed across California amongst these seven health indicators.

Social Determinants of Health

In order to better understand social determinants of YLL, a multivariate (hierarchical linear model) analysis examined individual and neighborhood level factors. Four zip code-level measures were examined in this analysis including: walkability; poverty; rate of ACSC ED utilization; and rate of scheduled elective procedures. Individual-level measures included gender, race/ethnicity, education, and marital status. For greater details on methods and results please see Appendix D Table D1.

The analysis suggests that neighborhood walkability, poverty, rate of ACSC ED utilization, and the rate of scheduled elective procedures are significantly and independently associated with YLL beyond individual demographics. Poverty and the rate of ACSC ED visits are both associated with higher levels of YLL compared to areas of affluence and low ACSC ED rates,

respectively. The walkability of a neighborhood and the rate of scheduled elective procedures proved to be protective factors associated with YLL. In other words, individuals living in neighborhoods with sidewalks, parks, and other amenities tend to live longer than those who do not, and a similar—positive relationship is observed in communities with increased rates of schedules elective procedures. Alone, the Walk Score® had the strongest association with YLL compared to the other three factors investigated in this analysis. It can be concluded that all four zip code-level factors previously mentioned are associated with YLL beyond the individual-level effects of gender, age, race/ethnicity, and education. See Appendix D Figure D1 and D2 for greater discussion of other social determinants of health that are geographically distributed throughout the SJV similarly to poverty and Walk Score®.



Discussion and Recommendations

Overall, this study found that Valley residents are more likely to die before age 65 and loose more years of life after age 65 than do other Californians. There were notable gender and race/ethnicity differences, with women and whites experiencing greater longevity than do men, Latinos, and African Americans. At the same time, the findings indicate that elders in the San Joaquin Valley have higher use of avoidable (ambulatory care sensitive) hospitalizations and lower use of planned elective surgeries than their peers in the rest of California. There were also racial/ethnic differences in access to care: whites had a higher use of planned elective surgeries and fewer avoidable hospitalizations than Latinos and other persons of color. Latino elders had notably lower rates of planned elective treatments. Perhaps most noteworthy was that even after accounting for individual differences in race/ethnicity, gender, and education, that elder San Joaquin Valley residents who lived in more walkable neighborhoods with more frequent planned surgeries had more years of life after 65, while those who lived in neighborhoods with increased higher poverty rates and higher rates of unplanned ER visits lost more years after age 65. Although findings from the California Health Interview Survey indicate a number of racial/ethnic group differences in elder health behaviors, they do not suggest that individual high risk health behaviors are higher than in the Valley. Together, these findings suggest that improving elder outcomes requires attention to both increasing appropriate use of health care services, most notably for Latinos, and greater attention to building communities that promote healthy life styles and a culture of prevention and wellness.

Although the local public health departments that make-up the San Joaquin Public Health Consortium do not receive specific funding for eldercare preventive and care management programming, many have sought to engage elders in chronic disease self-management, health care and medications access initiatives, nutrition, and other preventive care initiatives. They have also sought elder involvement in a range of initiatives that address the social determinants of health by improving neighborhood conditions and strengthening networks of support for treatment and disease management. While this two-pronged approach seems responsive to the data, the notable variability across racial/ethnic groups and neighborhoods in elder outcomes, also suggests the need for more concentrated attention to elders' engagement in health care and prevention in the least well-served neighborhoods, using culturally tailored strategies for engaging elders in prevention and treatment.

APPENDIX A

Walk Score Categories

90 to 100 **Walker's Paradise**

Daily errands do not require a car

70 to 89 **Very Walkable**

Most errands can be accomplished on foot

50 to 69 **Somewhat Walkable**

Some errands can be accomplished on foot

25 to 49 **Car-Dependent**

Most errands require a car

0 to 24 **Car-Dependent**

Almost all errands require a car

This scoring scale was created by walkscore.com
and is used to facilitate interpretation of walk scores.

APPENDIX B

Table B-1. Rate¹ of Death in Older Adults by Cause and Race/Ethnicity, 2009-2013, SJV

Major Diagnostic Category ²	San Joaquin Valley						Rest of California
	White	Black/African American	Hispanic/Latino	Asian	Other	SJV	
Disease of the circulatory system	2005.4	1832.2	1132.7	1211.6	308.7	1621.3	1546.8
Neoplasms	1067.6	1073.3	629.5	611.7	173.4	870.8	978.9
Disease of the respiratory system	667.4	428.3	300.2	339.9	107.3	511.5	468.9
Disease of nervous system	452.8	313.2	183.3	163.8	48.9	336.9	358.8
Endocrine, metabolic, and nutritional disorders	194.6	318.5	235.2	204.3	54.6	198.6	168.2
Mental and behavioral	174.7	140.5	78.7	63.3	26.0	133.0	189.6
Disease of the digestive system	153.6	141.9	162.3	114.9	31.8	143.6	121.2
External causes of mortality	122.8	73.6	69.4	91.5	23.5	99.4	97.6
Disease of genitourinary system	102.5	144.5	91.6	83.3	22.9	94.4	86.4
Infections and parasitic diseases	97.9	127.1	90.4	107.3	21.6	92.3	63.0
Muscoskeletal system and connective tissue	24.6	13.4	17.9	15.1	4.4	20.6	20.8
Symptoms and signs, mot elsewhere classified	15.8	17.4	7.2	12.4	3.8	12.9	20.8
Blood forming organs and immune disorders	15.5	20.1	13.8	10.3	6.4	14.2	10.1
Disease of the skin and subcutaneous	7.4	12.0	6.8	6.9	1.3	7.0	4.1
Congenital malformations	2.6	4.0	2.5	2.1	0.0	2.4	2.9
Diseases of eye and adnexa	0.2	0.0	0.0	0.0	0.0	0.1	0.1
¹ Rate per 100,000							
² ICD-10-CM Categories							

Table B-2. Measures of Longevity for Adults Aged 65 and Older by Gender and Race/Ethnicity

Measure	Female		Male	
	White	Mexican American	White	Mexican American
Life Expectancy at Age 65				
Nation-Wide ^a	20.3	22	17.6	19.4
California	21.9	22.2	20.7	21.1
San Joaquin Valley	20.9	21.8	18.6	20.6
Mean (SD) Years				
Age at Death	83.3 (8.7)	80.9* (8.4)	80.4 (8.6)	79.1* (8.4)
Years of life lost ^b	-0.21 (5.0)	1.01* (5.0)	-0.15 (4.5)	0.53* (4.6)

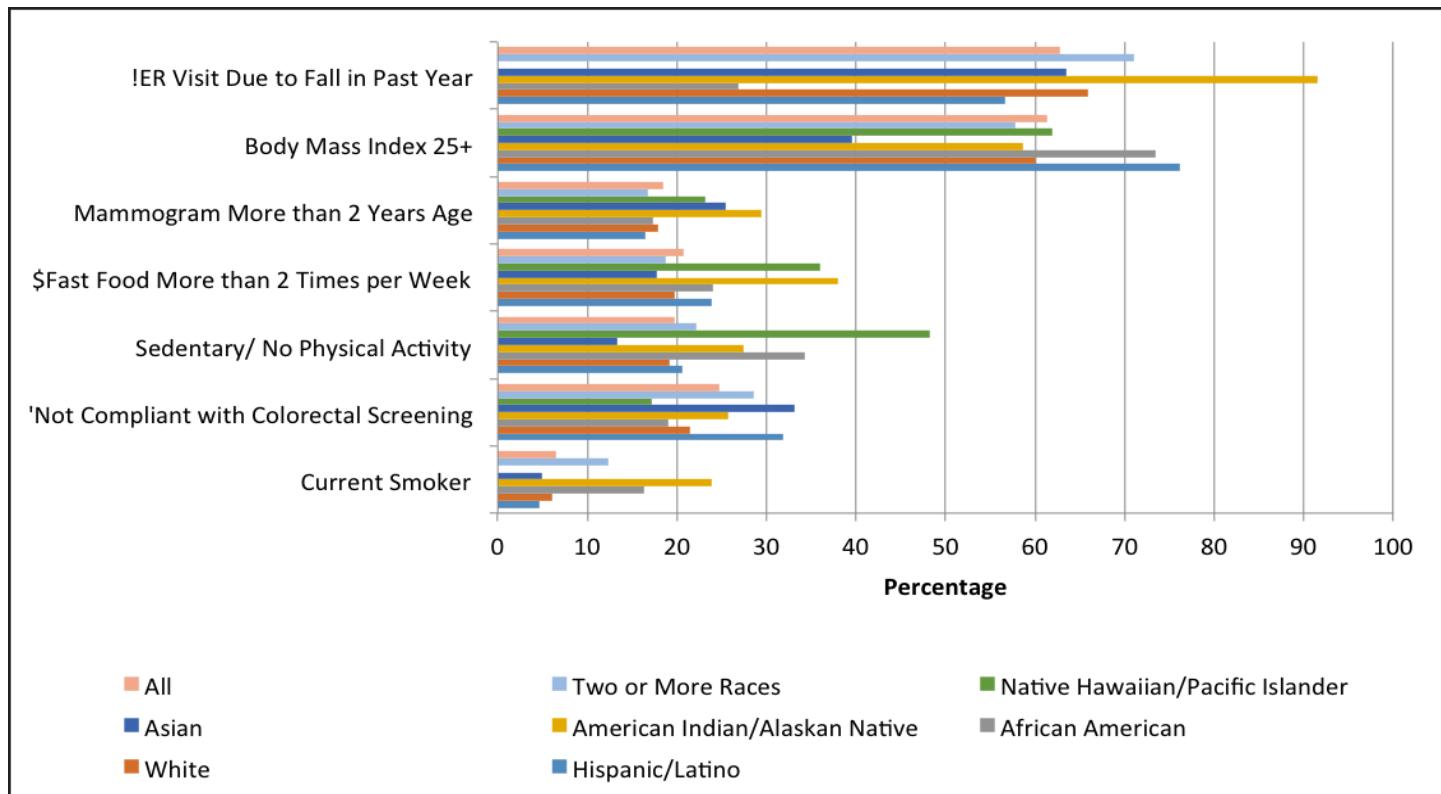
* p < .01.

^a Hispanic estimate by the Centers for Disease Control and Prevention, 2010

^b negative values exceed life expectancy

APPENDIX C

Self-Reported Health Indicators by Race/Ethnicity, 2009-2012, California



¹UCLA AskCHIS database.

APPENDIX D

Walk Score® was used to indicate the walkability of a zip code and data from the US Census was collected to estimate the proportion of individuals living below 125% of the Federal Poverty Level. Data from the Office of Statewide Health Planning and Development (OSHPD) were used to compute rates of Ambulatory Care-Sensitive Conditions (ACSC) in the emergency department (ED) and scheduled elective procedures from patient discharge data. All individual level demographics were collected from Death Statistical Master Files (2009-2010) from the California Department of Public Health. The outcome measured was YLL for any cause of mortality for age 65 and older. YLL was calculated by obtaining the estimated life expectancy for 8 five-year categories for each gender, starting at age 65 and ending at age 100 plus.

Table D1. Years of Life Lost Modeled by Neighborhood and Individual Level Factors, 2009-2013, SJV¹

Fixed Factor	Coefficient	Standard Error
<i>Neighborhood</i>		
Walk Score	-0.021**	0.004
Poverty	0.018**	0.004
Rate of Scheduled Elective Procedures	-0.009*	0.003
Rate of ACSC ED Visits	0.007*	0.002
<i>Individual</i>		
Male	-0.096*	0.039
Married	2.007*	0.050
No High School Diploma	-1.039**	0.055
African American	1.830**	0.148
Hispanic/Latino	1.303**	0.074
Asian	0.371**	0.121
Other Race	2.002**	0.145
Random Factor	Standard Deviation	Variance Component ²
Intercept, u_0	0.518	0.268**
level-1, r	4.798	23.025

** p < .001. * p < .01.

¹ Hierarchical Linear Modeling was used with individuals at level 1 and zip codes at level 2.

² Variability in years of life lost between zip codes.

In California, 23.39% of individuals in each zip code on average are living below 125% of the Federal Poverty Line. Figure D1 highlights the communities within the SJV which are above the state average, and one standard deviation above (with more than 35.4% living in poverty). As previously discussed, impoverished communities have a strong association with YLL. The table below Figure D1 lists neighborhood indicators that are significantly associated with poverty and years of life lost. Communities with high proportions of foreign-born immigrants and renters are positively associated with poverty and years of life lost; while communities with high proportions of high

school graduates and income are negatively associated with poverty and years of life lost.

Figure D2 demonstrates walkability throughout the SJV by zip code. According to Walk Score®, 98.5% of all zip codes in the SJV are car-dependent, the lowest two categories on the walk score scale (See Appendix A). Of these zip codes, 56.1% require a car for almost all errands and 42.4% require a car for most errands. Four zip codes, 1.5%, in the SJV have walk scores greater than 50, three of which are somewhat walkable and one is very walkable, and all are at the core centers of the largest cities in the region. Five indicators are shown below Figure D2 which are significantly correlated with both walkability and years of life lost. Population density is most highly correlated with walkability and is negatively associated with years of life lost. The proportion of renters in a community and racial diversity (Simpson index) were both positively associated with Walk Score®, although, they each had opposing associations with years of life lost.

Figure D1: Proportion Living Below 125% of the Federal Poverty Level by Zip Code, SJV, 2010

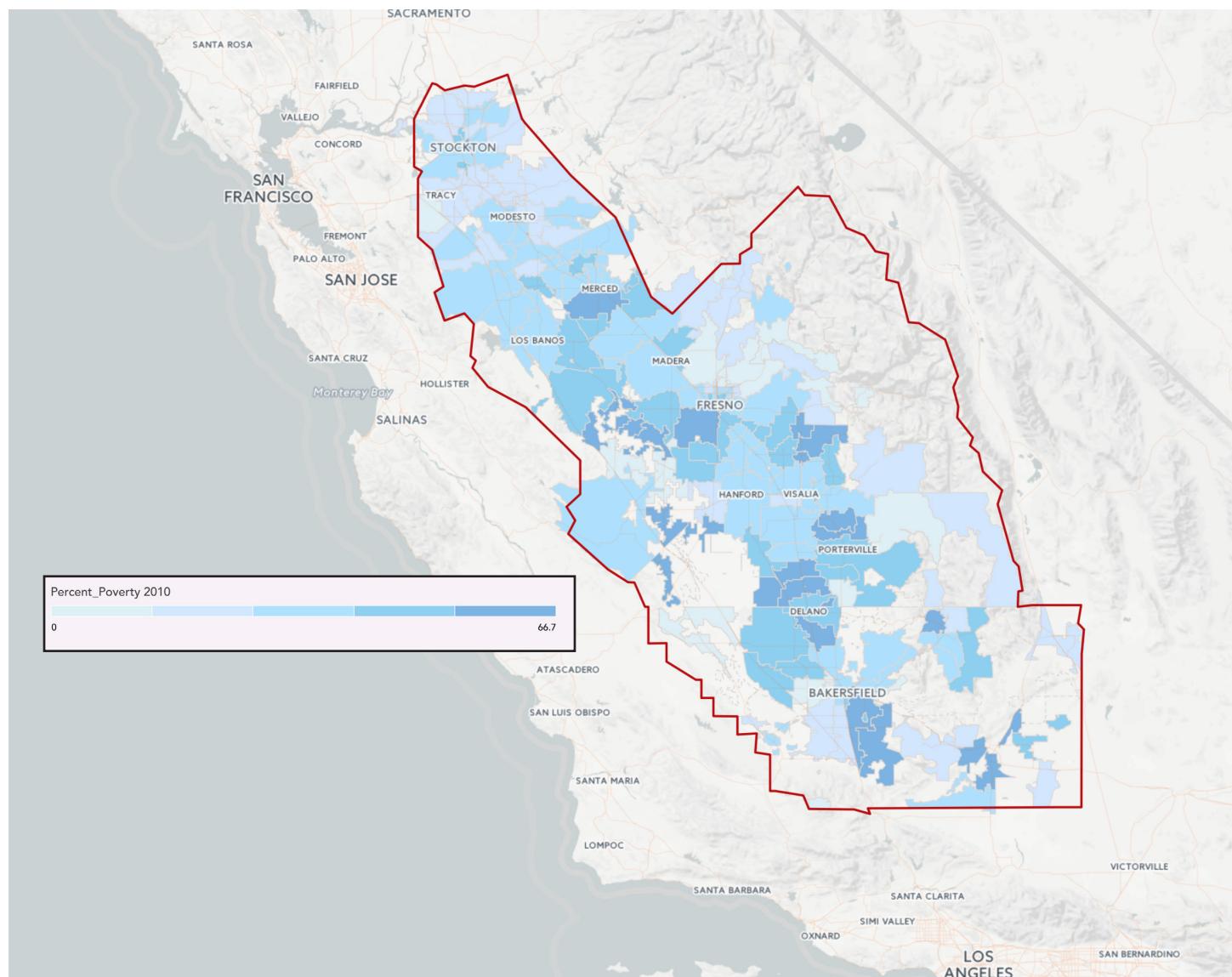
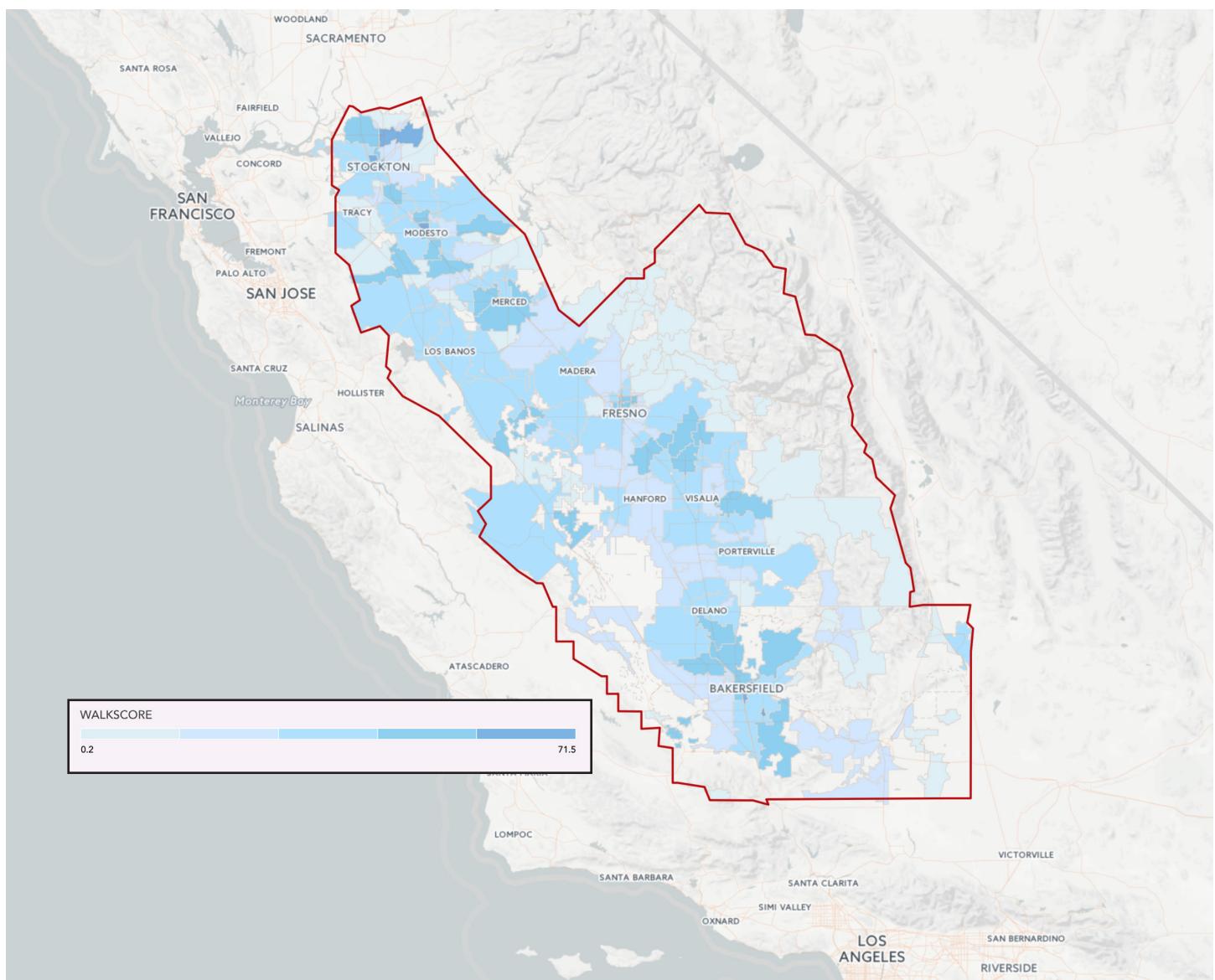


Figure D2: Walk Score by Zip Code, San Joaquin Valley, 2014

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