PLACE MATTERS FOR HEALTH IN THE SAN JOAQUIN VALLEY:

Ensuring Opportunities for Good Health for All

A Report on Health Inequities in the San Joaquin Valley

PREPARED BY THE
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FOREWORD

In 2006 the Joint Center's Health Policy Institute (HPI), under the leadership of then HPI Director and Joint Center Vice President Dr. Gail Christopher, launched its Place Matters initiative. The initiative was based on the premise that where people live determines, to a significant degree, how long they are likely to live. It followed from findings by the Joint Center and others that neighborhood characteristics, often referred to as social determinants of health, are critically important in predicting health outcomes. Thus, when average income in a community is low, the quality of public schools is poor, access to quality health care and nutritious foods is limited, and levels of exposure to environmental hazards are high, the health outcomes of the community's residents are worse, and they are likely to live substantially shorter lives than residents of communities that don't suffer from these characteristics.

In 2010, with a generous grant from the National Institutes of Health (NIH), we began to dig deeper into the Place Matters premise under the new leadership of HPI Director and Joint Center Vice President Dr. Brian Smedley. The grant has enabled us to explore in substantially greater detail the relationship between life expectancy and social determinants of health and to engage local leaders in eight specific locations—Alameda County, CA; Baltimore County, MD; Bernalillo County, NM; Boston, MA; Cook County, IL; Orleans Parish, LA; San Joaquin Valley, CA; and South Delta, MS.

Special thanks are due to many who collaborated in the preparation of this report. The Place Matters Team of the San Joaquin Valley, led by Dr. John Capitman, provided local leadership and guidance, and it set the context for the research and developed key recommendations contained in the report. The Center on Human Needs (CHN) at Virginia Commonwealth University, led by Dr. Stephen Wolff and The Virginia Network for Geospatial Health Research, led by Steve Sedlock and their extremely capable staffs did the technical research and is responsible for the maps, charts and tables that appear throughout the report. Common Health Action, led by Natalie Burke, Dr. Vincent LaFronza, and their able associates, has consulted with the HPI and the San Joaquin Place Matters Team on the development and release of the report. And Dr. Smedley and his outstanding HPI team--Project Coordinator Felicia Eaves, Director of Operations and Outreach Carla Gullatt, and Joint Center Senior Fellow and HPI Editorial Consultant Michael Wenger-- have coordinated the entire effort, providing the inspiration, intellectual capacity, and common sense necessary to overcome numerous obstacles along the way.

We hope that this report will be a catalyst for action to significantly narrow the disparities in health outcomes and life expectancy that exist between the healthiest and least healthy communities in the San Joaquin Valley.

Ralph B. Everett
President and CEO
Joint Center for Political and Economic Studies

EXECUTIVE SUMMARY

Place matters for health in important ways. Differences in neighborhood conditions powerfully predict who is healthy, who is sick, and who lives longer. And because of patterns of residential segregation, these differences are the fundamental causes of health inequities among different racial, ethnic, and socioeconomic groups.

This study examines the relationships between place, race and ethnicity, and health in the San Joaquin Valley of California and attempts to address two specific questions raised by the San Joaquin Valley Place Matters Team:

- What is the relationship between social factors and premature mortality?
- What is the relationship between social factors and exposure to environmental hazards?

The overall pattern suggests that socioeconomic conditions in low-income and non-white neighborhoods make it more difficult for people in these neighborhoods to live healthy lives. The study finds that:

- The percentage of the population without a high school diploma in the San Joaquin Valley (30%) is more than double the percentage of people in the United States (14.7%) without a high school diploma. According to national statistics, adults (age 25 and older) without a high school diploma are three times more likely to die before the age of 65 than those with a college education.
- The rate of premature deaths in the lowest-income zip codes of the San Joaquin Valley is nearly twice that of those in the highest-income zip codes.
- Life expectancy varies by as much as 21 years in the San Joaquin Valley depending on zip code. In the zip codes with lowest life expectancy, people can expect to live to be only about 69 years or less, while people can expect to live to be 90 years or more in zip codes with the highest life expectancy. Zip codes with the lowest life expectancy tend to have a higher percentage of Hispanic and low-income residents.
- A recent study found that ozone levels above the federal standard in the San Joaquin Valley cause 460 premature deaths per year and that the total yearly economic cost of health complications and lost productivity due to unhealthy levels of ozone and particulate matter is more than $3 billion.
- Areas of the San Joaquin Valley with the highest levels of respiratory risk have the highest percentage of Hispanic residents (55%), while areas with the lowest level of respiratory risk have the lowest percentage of Hispanic residents (38%).
- One in six children in the San Joaquin Valley is diagnosed with asthma before the age of 18, an epidemic level.
- The health status of first-generation Hispanic immigrants is similar to the non-Hispanic white population, but on average health deteriorates for second and subsequent generations of Latinos, largely due to economic vulnerabilities, inadequate educational opportunities, and a lack of political power relative to whites.

Although researchers cannot say with certainty that these neighborhood conditions *caused* poor health, the overall pattern suggests that the clustering of social, economic, and environmental health risks in low-income and non-white neighborhoods constrains opportunities for people in these communities to live healthy lives.

Importantly, these patterns need not—and should not—continue as they are. Several ideas for strategies to address these inequities emerged from the *San Joaquin Valley Regional Equity Forum* staged in May 2011 by the Central Valley Health Policy Institute at California State University, Fresno (CVHPI). In October 2011 representatives of several of the largest regional social justice coalitions participating in the San Joaquin Valley Place Matters Team met to develop consensus recommendations to guide elected officials, policy makers, planners, philanthropic organizations, and other stakeholders. The broad conclusion was that focusing on creating the physical and institutional infrastructure for access to basic determinants of health and well-being while ensuring that communities have the political power to make certain that policies and practices respond to their interests offers a framework for shared action by the San Joaquin Valley Place Matters Team to:

- Re-orient the agricultural economy to promote both social and environmental sustainability.
- Increase understanding and application of the social determinants framework among elected policy makers and community leaders as well as health, social service, community/economic development, and education professionals through professional education and other tools.

- Monitor on an ongoing basis environmentally challenged and socioeconomically vulnerable communities and increase efforts by the public sector to engage with—and invest in—these communities.
- Focus increased attention on enforcing existing air quality standards and on helping individuals and communities understand and mitigate environmental risks.
- Focus attention on providing equitable expenditures throughout the school systems in the San Joaquin Valley and, in particular, on providing adequate resources for a quality education, including early childhood education, in those schools that serve poor and immigrant populations.
- Seek to create greater equity of resources and opportunities available in both urban and rural communities while alleviating socioeconomic, racial/ethnic, and gender discrimination.
- Adopt land use policies that reflect an emphasis on smart and equitable growth, facilitate access to affordable housing for poor and immigrant populations, and promote housing mobility to help reduce the clustering of immigrants in neighborhoods of concentrated poverty and in areas where exposure to environmental risks is highest.
- Ensure that all communities, including those that are unincorporated, have access to safe drinking water and have the institutional capacity to manage water systems, and create a process for cities and counties to consider the infrastructure needs—including clean drinking water access—of disadvantaged and unincorporated communities in urban planning efforts.
- Increase availability of data on environmental and social determinants of health and develop ways to better assess the health consequences of toxic water and other assaults on small rural communities.
- Increase the capacity of communities "... to hold decision makers accountable—not just the water service provider, but also local, regional, and state government officials"[104] through building the capacity of grassroots/community leaders and through encouraging support for collaborative decision making and advocacy to address regional challenges.
- Require public decision makers and program implementers to consider the impacts of proposed actions on racial and ethnic equity in life opportunities, health and well-being and to adjust action choices to maximize this goal. This equity in all policies approach should also be adopted by philanthropic and religious groups and other organizations serving the region.

While there is a strong moral imperative to enact policies to improve health for all, there also is a powerful economic incentive. A study released by the Joint Center for Political and Economic Studies in 2009 found that direct medical costs associated with health inequities among African Americans, Hispanic Americans, and Asian Americans approached $230 billion between 2003 and 2006. When indirect costs such as lowered productivity and lost tax revenue resulting from illness and premature death were included, the total cost of health inequities exceeded $1.24 trillion. Thus, for both moral and economic reasons, we must address health inequities and their root causes now.

INTRODUCTION

Place matters for health, and it may be more important than access to health care and health-related behaviors. This is the startling conclusion of a large and growing body of public health research, including this report. This research demonstrates that neighborhood conditions, often referred to as social determinants of health, have powerful direct and indirect influences on health, frequently operating in ways over which individuals have little control. The research further indicates that unhealthy neighborhood conditions tend to cluster adjacent to one another and most often in minority and low-income neighborhoods. According to many leading scholars, this is a root cause of health inequities between racial, ethnic, and socioeconomic groups.

The health of San Joaquin Valley residents is related to many factors.[1] Across the region, disease rates vary dramatically by age, gender, race, and ethnicity, as well as with the prevalence of risky health-related behaviors. This report will focus on characteristics of the San Joaquin Valley and its communities that may adversely impact health outcomes for residents, including access to care, exposure to environmental hazards, and socioeconomic disadvantage. Health outcomes that will be explored include premature mortality (years of potential life lost before the age of 65) and the impact of socioeconomic factors and environmental risks.

Regional averages may mask important differences that exist between different neighborhoods and communities within the San Joaquin Valley and that contribute to large differences in the health of residents. Disparities in health status within the San Joaquin Valley reflect, in part, historical geographic patterns that have resulted in vulnerable populations living in areas where conditions create greater health risks. In these areas, regardless of one's education, income, or motivation to make healthy choices, health risks are increased by the inaccessibility of nutritious food, poor quality of schools, a scarcity of good jobs, high levels of air and water pollution and crime, the absence of places to exercise, and stress related to these and other community challenges.[15, 18-26] The resultant poor health outcomes reinforce cycles of hardship that entrench patterns of socioeconomic disadvantage.[27-31]

This report investigates the relationship between social conditions, environmental factors, and health outcomes in the context of the unique demographic characteristics of the area. The San Joaquin Valley has a sizeable immigrant population with high poverty and low educational attainment. We will examine how this has impacted health outcomes in the San Joaquin Valley, and we will suggest longer term health implications for a community where social determinants of health remain at problematic levels.

Part I of this report provides background information about the San Joaquin Valley, including population data and community characteristics such as poverty, educational attainment, and health outcomes. Part II examines the relationship between poverty, educational attainment, race/ethnicity, and health outcomes. Part III presents data on air quality and respiratory health. Part IV presents conclusions about social determinants of premature mortality and environmental justice. Details about the data and methods that were used in preparing this report can be found at http://humanneeds.vcu.edu/.

I. Population and Community Characteristics in the San Joaquin Valley

Population

The San Joaquin Valley is located in the Central Valley of California. It is home to San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and Kern Counties and had a combined population of 3,951,814 as of 2009.[32, 33] The overall population density in the San Joaquin Valley is 248.8 people per square mile, but it ranges by county and zip code from 71.7 per square mile in Madera County to 487.4 in San Joaquin County. The Valley is home to several urban areas, including the cities of Stockton, Modesto, Fresno, and Bakersfield, which are surrounded by rural farming areas (see Map 1).

The San Joaquin Valley has a much larger concentration of Hispanics than the rest of the nation (48.5% and 15.8%, respectively), making the white population the minority[32, 33] (see Table 1 and Figure 1). In 2009, an estimated 21.4% of the population was foreign born, slightly lower than the percentage in California but much higher than the national average.

The extent to which an area is racially segregated may impact population health outcomes.[15, 34, 35] Although at the county level, racial and ethnic distributions between counties show few significant differences, smaller geographic areas reveal several instances of higher racial or ethnic segregation. For example, several census tracts in the western portions of Kern, Fresno, and Tulare counties are more than 90% Hispanic. The western portion of Madera and southern and western regions of Kern show a reverse pattern of ethnic segregation, with many over 80% non-Hispanic white. Notably, there are relatively small populations in the foothills, mountains, and high desert areas, and they are primarily white. The majority of the Asian population resides in San Joaquin County, where Asians

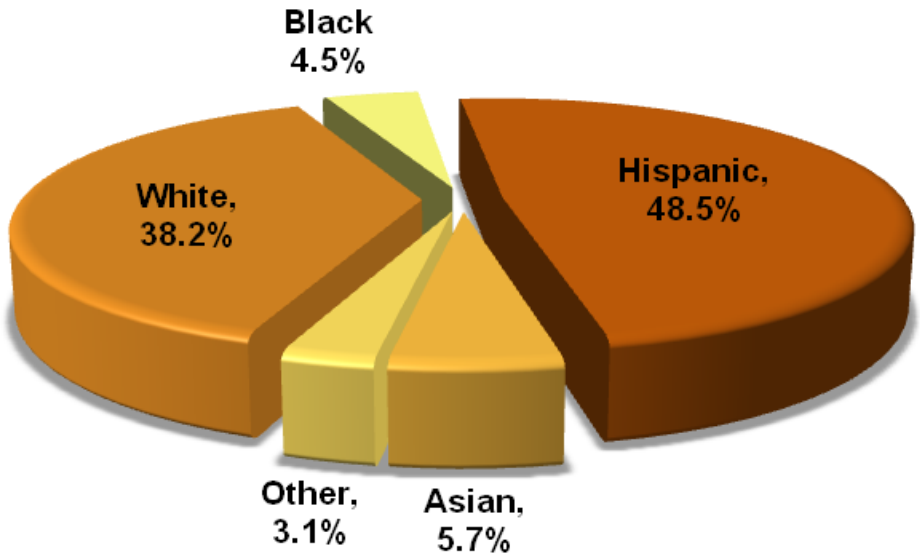
Table 1. Demographic Characteristics of San Joaquin Valley, California, and United States

	San Joaquin Valley	California	United States
Population (2009)[(a)]	3,880,304	36,961,664	307,006,556
Population Density (2009)[(b)]	248.8	239.5	86.7
Race/Ethnicity (2009)[(a)]			
White	38.2%	41.5%	64.9%
Black	4.5%	5.8%	12.1%
Hispanic	48.5%	37.0%	15.8%
Asian	5.7%	12.3%	4.4%
Other	3.1%	3.3%	0.7%
Foreign Born (2009)[(a)]	21.4%	26.9%	12.5%

(a) Source: U.S. Census Bureau, 2009 American Community Survey
(b) Source: 2009 Geolytics Projection

Note: "Other" includes American Indian and Alaskan Native, Native Hawaiian and Other Pacific Islander, and those who identified themselves as some other race or two or more races. Racial groups include the non-Hispanic population only; Hispanic can include any racial group.

Figure 1: Race/Ethnicity in San Joaquin Valley, CA



Source: U.S. Census Bureau, 2009 American Community Survey
Note: "Other" includes American Indian and Alaska Native, Native Hawaiian and Other Pacific Islander, and those who identified themselves as some other race or two or more races. Racial groups include Non-Hispanic population only; Hispanic can include any racial group.

Map 1: Population Density by Census Tract, San Joaquin Valley, 2009

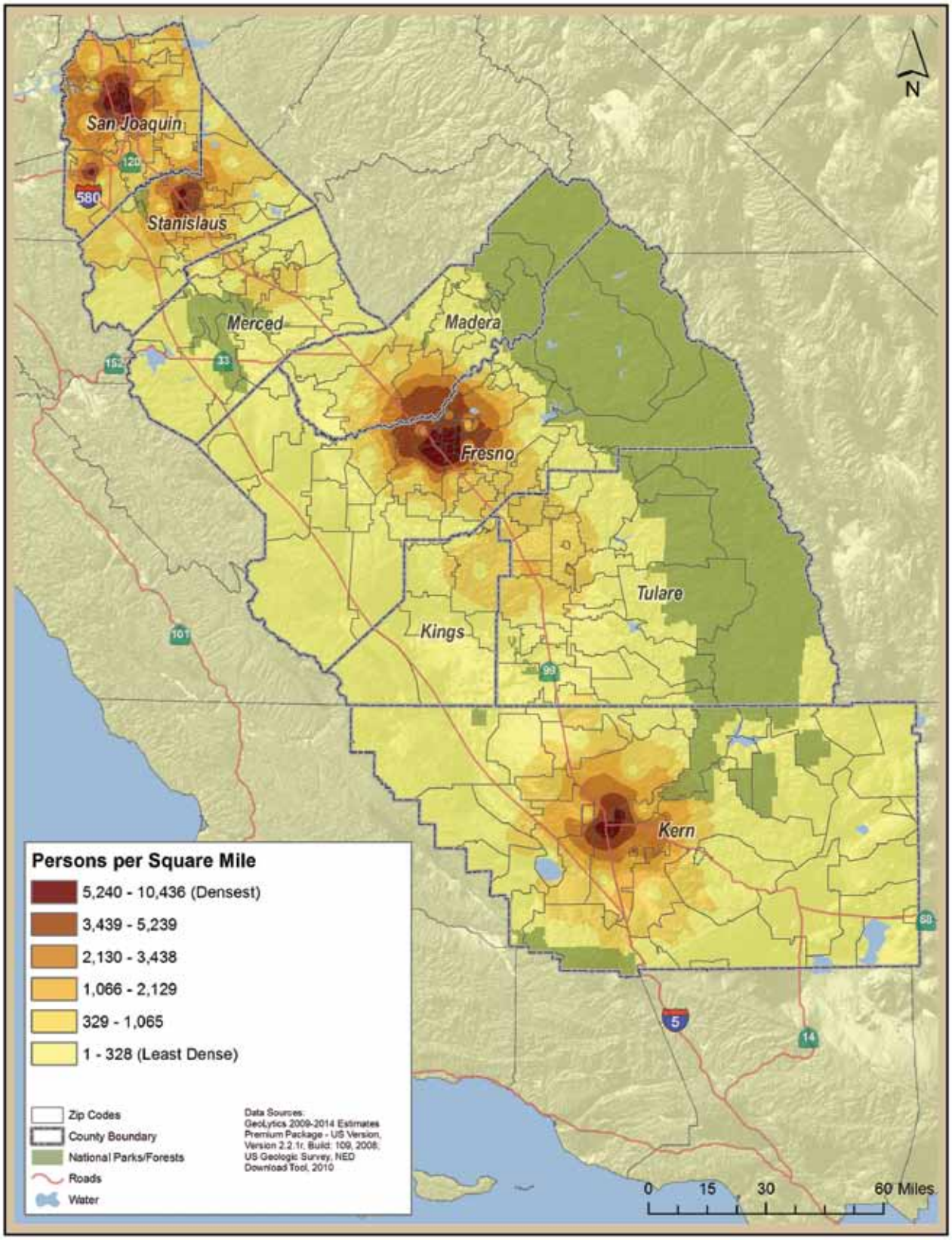
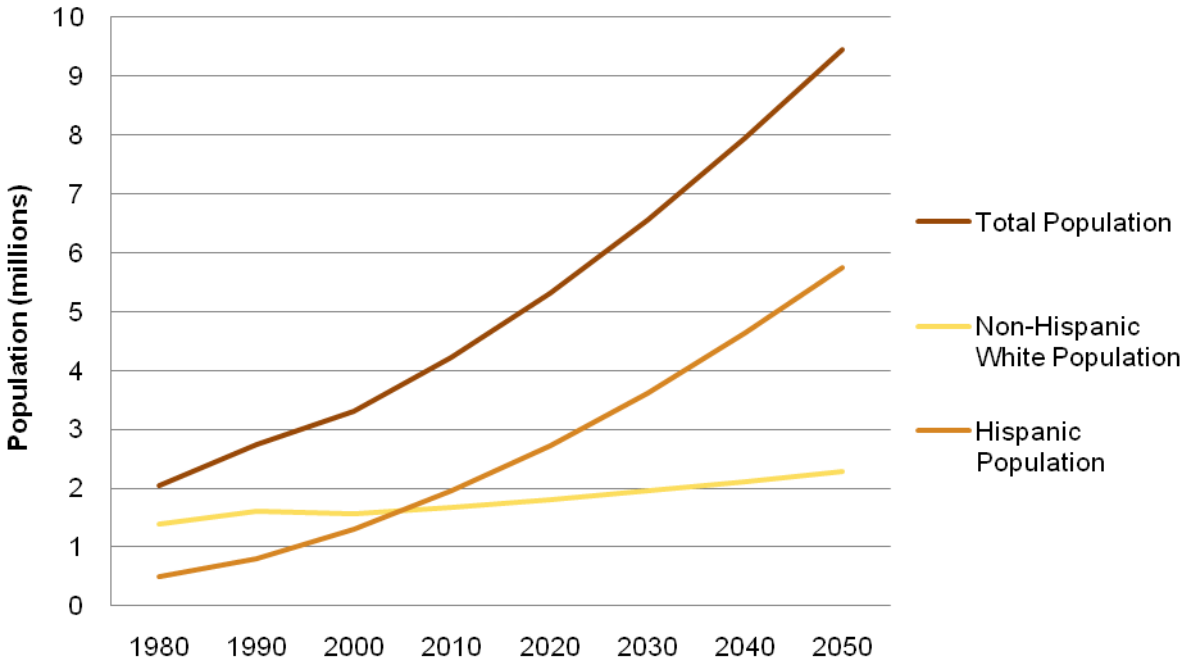


Figure 2: Historical and Projected Population Change in the San Joaquin Valley, 1980 - 2050



Source:(1980-2000): Geolytics Neighborhood Change Database (1970-2000)
(2010-2050): Population Projection by Race/Ethinicity for California and its Counties 2009-2010 California Department of Finance (2007)

account for 13.5% of the county population and more than one third of the population in a number of census tracts. The black population is concentrated in Fresno, Kern, and San Joaquin counties. In the urban areas of Stockton, Modesto, Bakersfield, and Fresno, Hispanic residents are concentrated in the south while the white populations occupy the northern parts of the cities. Map 2 displays the racial and ethnic distribution of San Joaquin Valley residents.

Migration trends and migrant characteristics also play an important role in the social context of the San Joaquin Valley. High rates of immigration, both from other areas of the state and the nation and from other countries, have had a notable influence on the area's population, which is expected to continue to grow rapidly over the next several decades (Figure 2).[37] Between 1980 and 2003 the population increased by 75% or 1.5 million people,[38] and five of the area's eight counties are projected to be among the top-10 fastest growing in California over the 2000-2050 period.[37] Many workers lacking formal education or career preparation are drawn by low-income and intermittent and seasonal agricultural employment opportunities in the Valley. While agriculture and food processing are the largest economic sector in the region—one of the most agriculturally productive areas in the world[38]—other industries such as logistics and distribution, petroleum production, waste management, and construction also depend on a lower-skilled, intermittent work force.

Though a natural increase in population still explains the bulk of the San Joaquin Valley's population growth, the increase due to migration is substantial and results in significant impacts. The majority of migrants come from other counties in California, and the net domestic migration rate has increased steadily since the mid-1990s to a peak of over 20 per 1,000 residents in 2000. The net migration rate from other countries has remained relatively stable since 1990 at about 6 per 1,000 residents. The majority of foreign-born residents immigrate from Latin America (56% in San Joaquin County and 88% in Madera County) and Asia (7% in San Joaquin County and 37% in Madera County), with 5% or fewer of immigrants from Europe, Africa, Oceana, or North America. Within the area, differences in migration trends exist as well; the southern part of the San Joaquin Valley tends to receive more international migrants, and both the international and domestic migrants to this area have

Map 2: Racial and Ethnic Distribution, San Joaquin Valley, 2005-2009

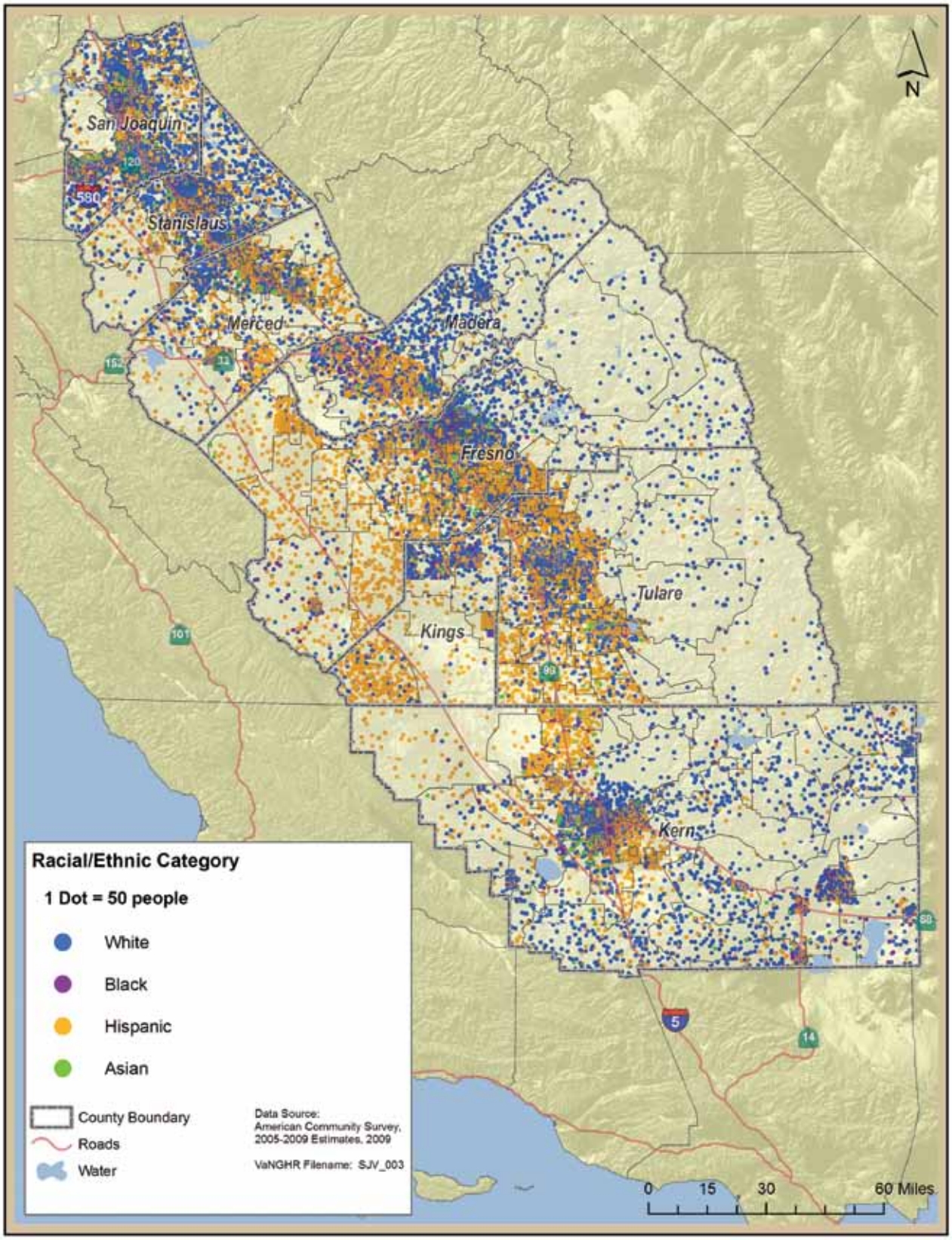
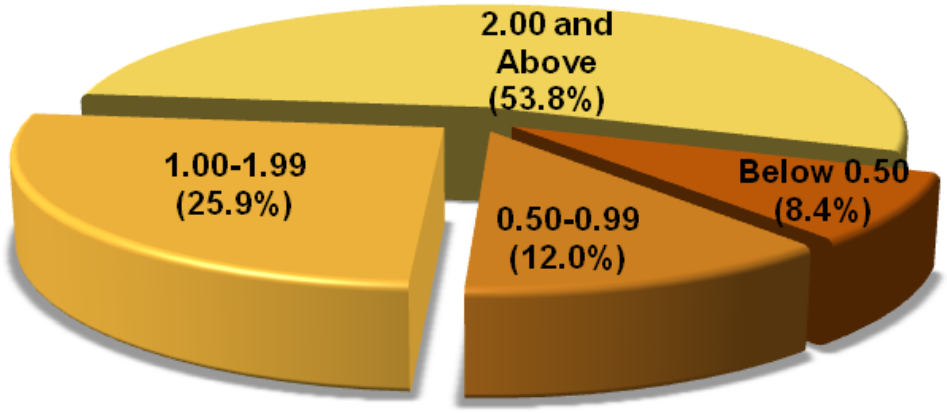


Figure 3: Income-to-Poverty Ratio, San Joaquin Valley



Source: U.S. Census Bureau, 2009 American Community Survey

higher rates of poverty and lower rates of education than do those in the northern Valley.[39] While it is beyond the scope of this report, it should be noted that the influx of undocumented workers to the San Joaquin Valley and their treatment and economic vulnerability raise significant issues related to poverty, education, and human services.

Socioeconomic Characteristics

Poverty

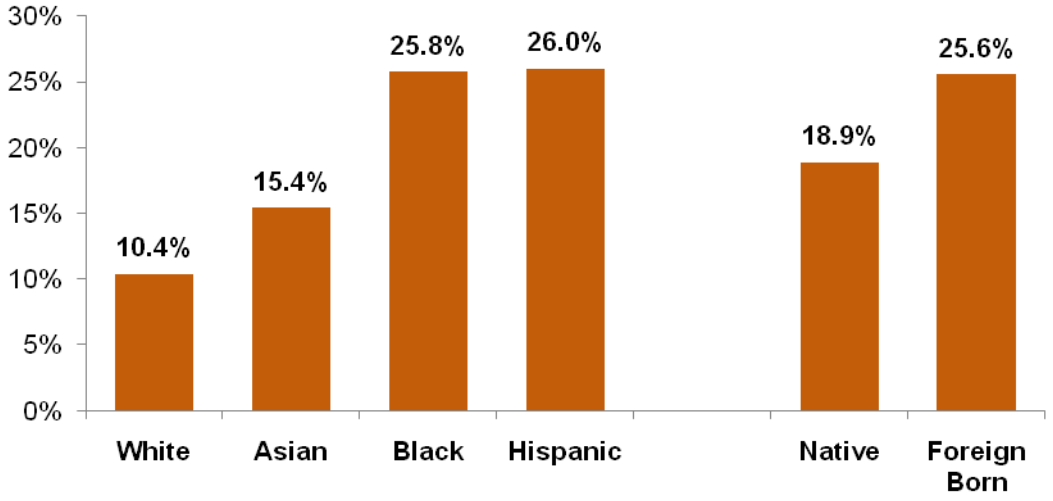
As is true elsewhere in the United States, socioeconomic conditions in the San Joaquin Valley exert an important, and often unrecognized, influence on health status. Nationally, families living below the federal poverty level are 3.6 times more likely to report fair or poor health than those with incomes of at least twice the poverty level.[40] Experiencing poverty during childhood negatively influences a child's cognitive, emotional, behavioral and physical development. Childhood poverty also decreases a child's likelihood of completing high school.[41, 42]

In 2009, more than one-fifth (20.4%) of households in the San Joaquin Valley had incomes below the federal poverty level, significantly more than the rate for both California and the nation (14.2% and 14.4%, respectively). Figure 3 shows that 8.4% of households in the San Joaquin Valley lived in severe poverty, with incomes less than half the federal poverty level, and almost half of households (46.2%) were either poor or near poor, with incomes less than twice the poverty threshold. For a family of four in 2009, an income less than twice the poverty level would equal an annual income below $43,908. As shown in Figure 4, over one quarter of all black, Hispanic, and foreign-born residents of San Joaquin Valley had incomes below the federal poverty level in 2009.

Nationwide in 2009, 22% of households had incomes below 150% of the federal poverty threshold.[33] In the San Joaquin Valley, 49% of zip codes (115) had the same or a greater percentage of households with incomes below 150% of the federal poverty threshold. The comparable number for the state of California was 31% of zip codes. Areas of concentrated poverty in the San Joaquin Valley, where at least 40% of the population in a zip code had an income below 150% of the federal poverty level, are in southeast Kings County, southwest Tulare county, northwest Kern County, and areas of Fresno County (see Map 3).

A persistent lack of economic resources during childhood may have consequences for cognitive, emotional, behavioral, and physical development.[41, 42] It may also diminish the likelihood of high school completion, thus perpetuating disadvantage and the multigenerational cycle of living in conditions that adversely affect health. *Persistent poverty*, where at least 20% of the population has been poor (incomes less than 100% of the federal poverty threshold) for at least two decades, has been a pervasive influence in urban areas of each county in the Valley. Persistent rural poverty is also a significant problem, experienced primarily in areas with many low-wage farm workers and their families. The darkly shaded census tracts on

Figure 4: Poverty by Race, Ethnicity and Nativity in San Joaquin Valley, 2009



Source: U.S Census Bureau, 2009 American Community Survey
Note: Racial groups include Non-Hispanic population only; Hispanic can include any racial group.

Map 4 identify areas of the San Joaquin Valley with persistent poverty for four or more decades.

Economic risks specific to the San Joaquin Valley exist due to the nature of its economy and the large migrant population. As a large agricultural area, the majority of jobs in the San Joaquin Valley are low-paying and seasonal. Outside of the agricultural sector there are few opportunities for low-skilled workers due to the lack of a diversified economy in heavily agricultural areas.[38] Although the area has high unemployment and low wages, the consistently large number of migrants over the past two decades is explained in part by low housing prices and year-round agricultural work.[39, 43]

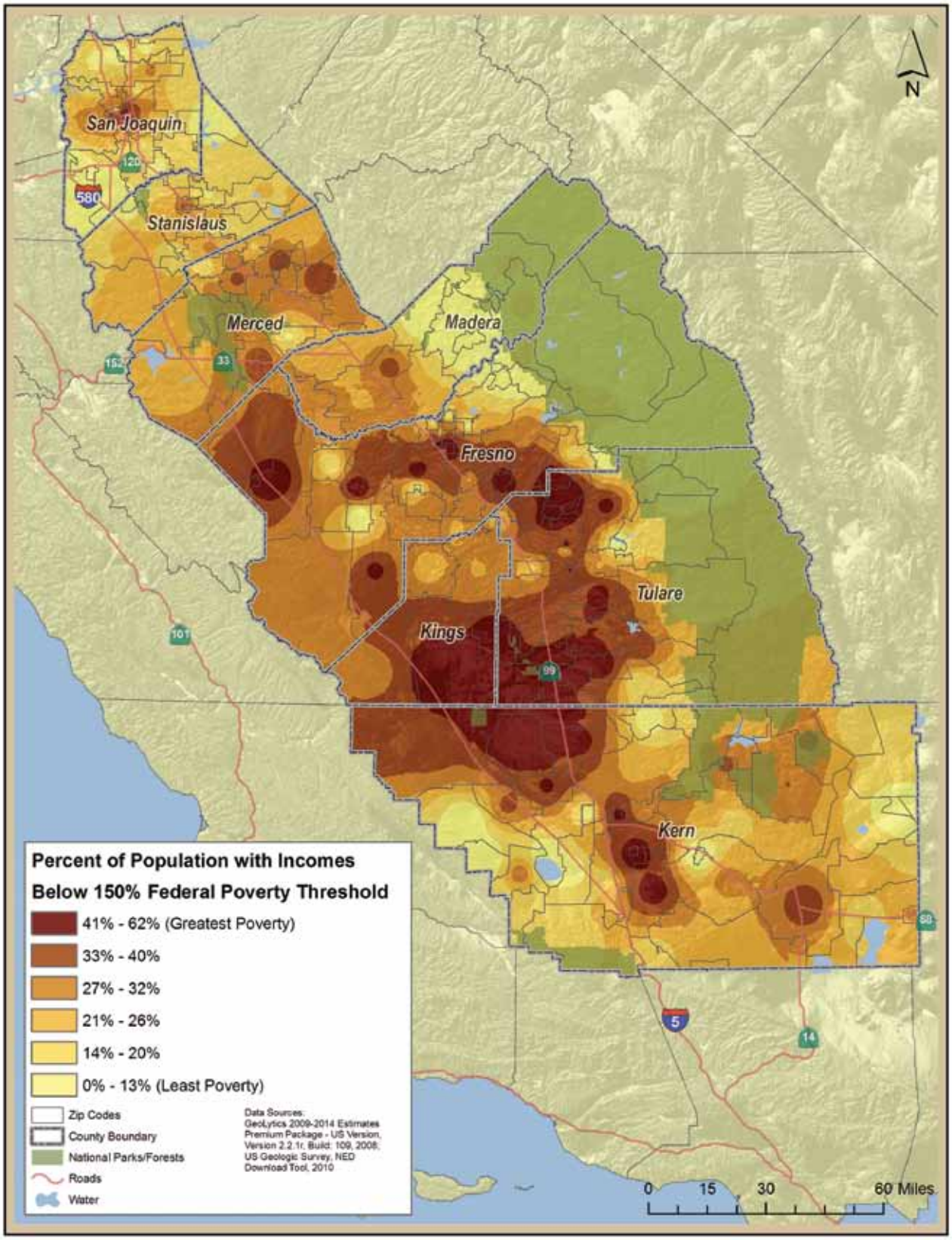
Since the 1990s there has been a steady and continuing increase in resident-based labor as opposed to migrant labor. This is largely due to the San Joaquin Valley's extended growing season, which allows farm workers to find work throughout the year and causes many migrants to become permanent residents. Some of these residents eventually move out of farm labor into other area industries, opening up jobs for the next wave of new migrants; however, low wages limit the economic growth of these farm worker communities and job alternatives are limited.[38] This lack of opportunity, as well as lower rates of education and lack of preparation for skilled labor among migrants, can lead to widespread and entrenched rural poverty, which affects both new and permanent resident communities. As discussed in this report, persistent poverty increases vulnerability to a wide range of health risks.

Education

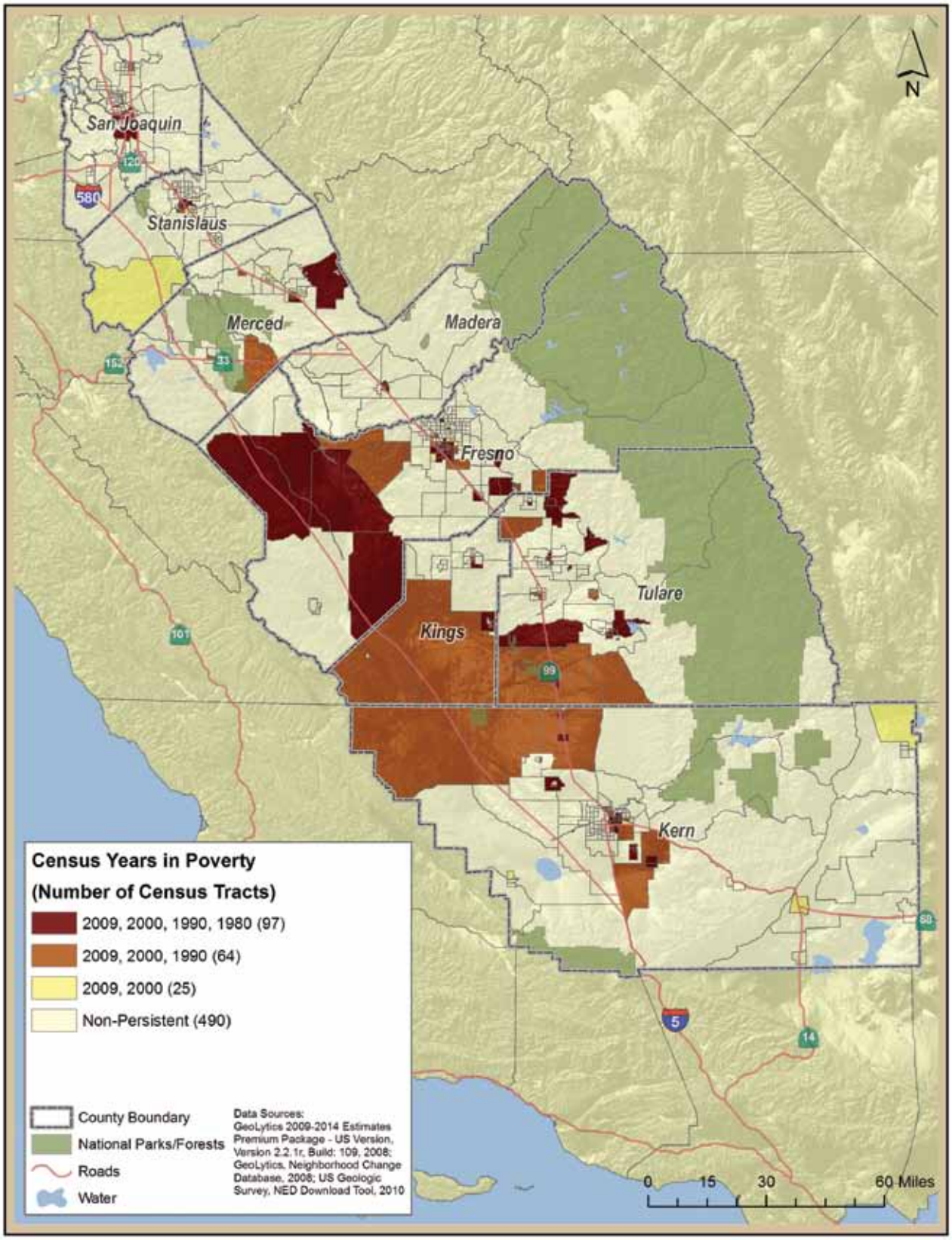
Education is a pathway to higher income and net worth, both of which have strong influences on health status and access to health care. National statistics indicate that adults (age 25 and older) who lack a high school education or equivalent are three times more likely to die before age 65 as those with a college education.[44] They are also more likely to engage in unhealthy behaviors such as cigarette smoking.[45]

At almost 30%, the San Joaquin Valley has a much higher percentage of the population without a high school diploma than does the state of California or the nation (19.4% and 14.7%, respectively) (see Table 2 and Figures 5 and 6).[36, 46] The percentage of adults in the San Joaquin Valley who lack a high school diploma varies greatly by location. Among the Valley's zip codes, the percentage of adults who have not completed high school ranges from less than 5% to more than 80%. As Map 5 shows, Kings County, southeast Tulare County, northwest Kern County, and areas of western Fresno County have the largest percentages of their populations who have not completed high school. Conversely, southwestern San Joaquin County and the eastern portions of Madera, Fresno, Tulare, and Kern counties have the lowest percentages of people with less than a high school education.

Map 3: Households below 150% of the Federal Poverty Threshold, by Zip Code, San Joaquin Valley, 2009



Map 4: Persistent Poverty by Census Tract, San Joaquin Valley, 1970-2009



Map 5: Adults with Less than a High School Education, San Joaquin Valley, 2009

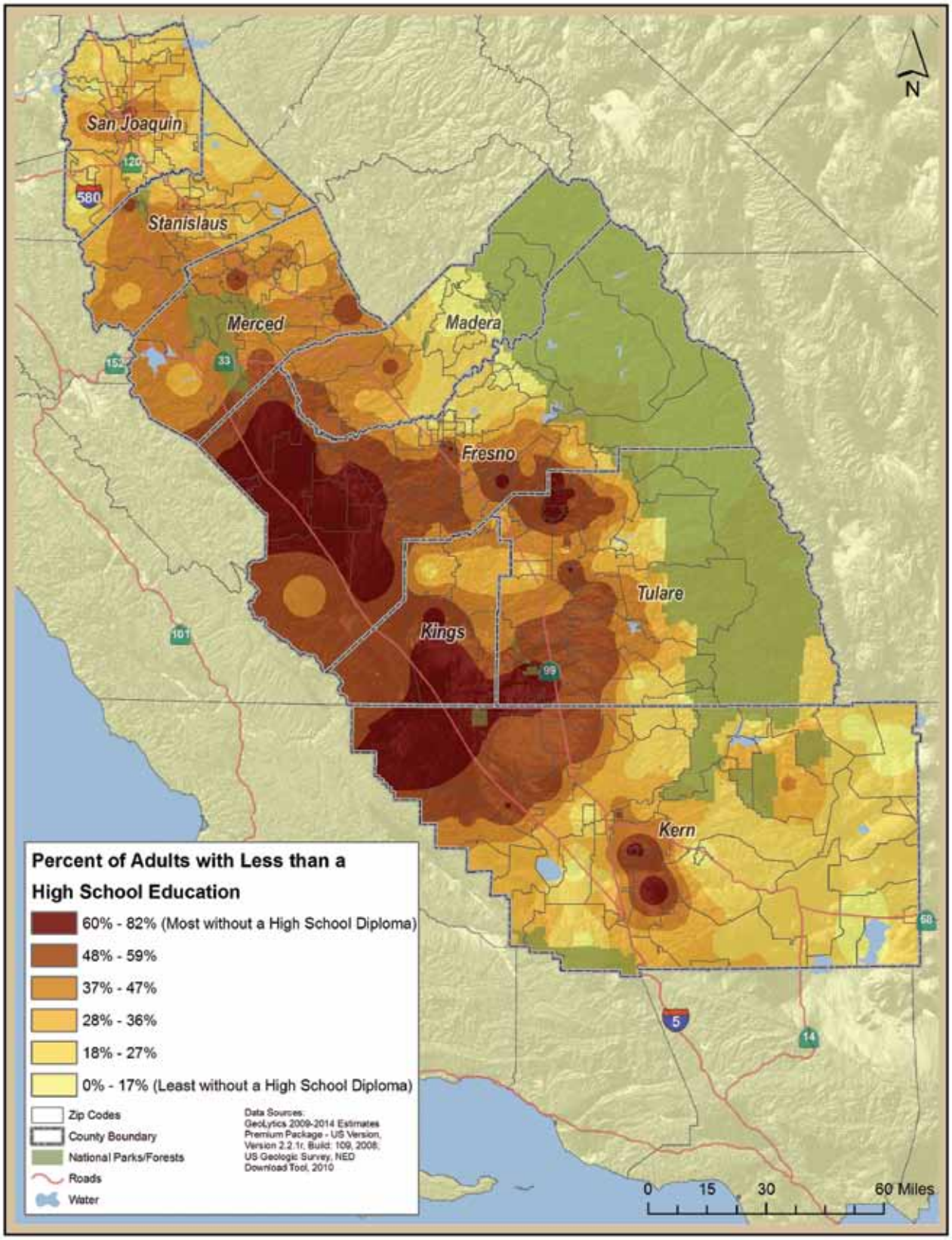
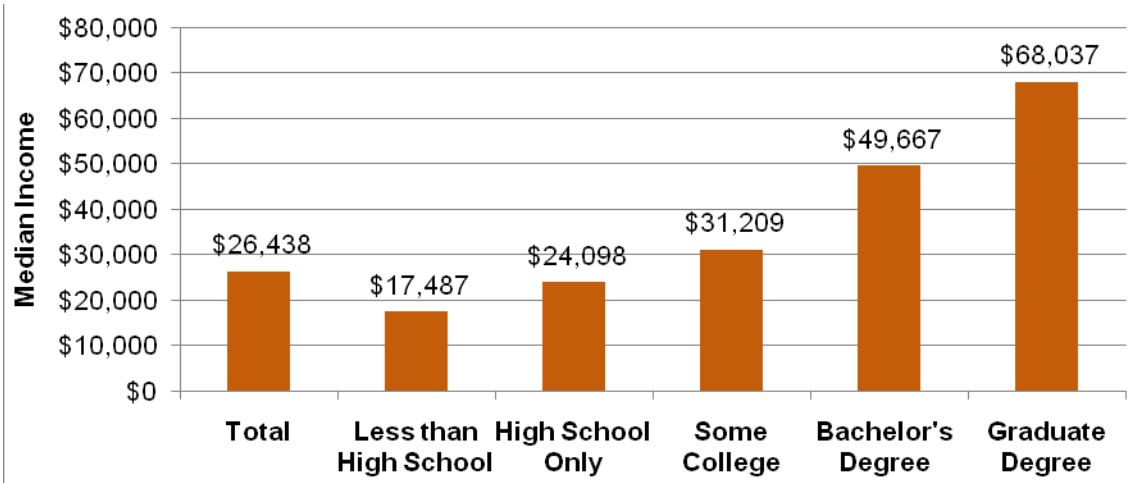
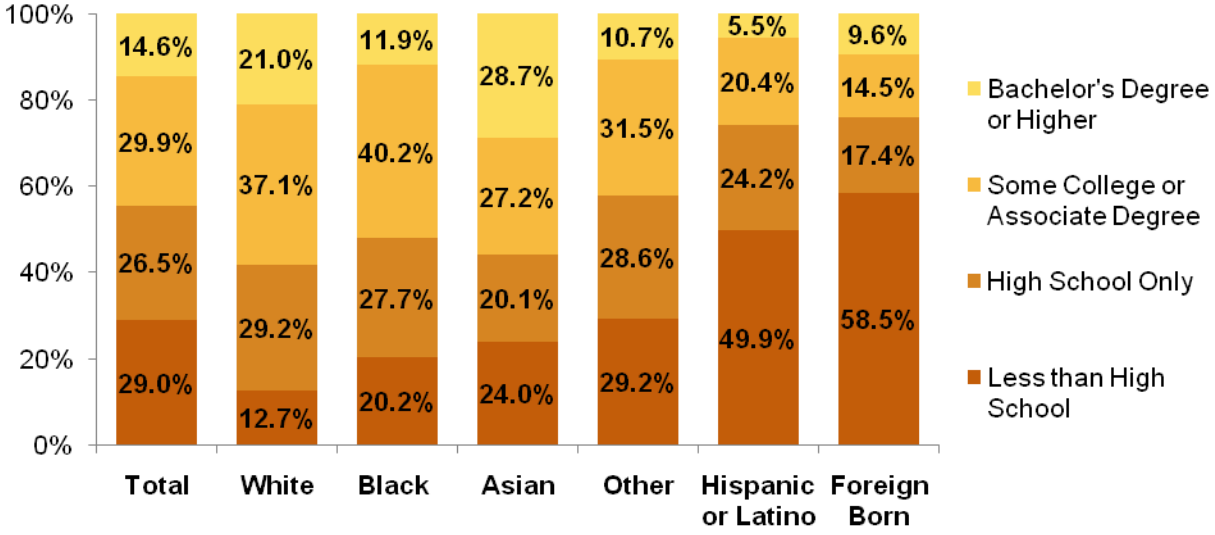


Figure 5: Median Income by Educational Attainment in San Joaquin Valley, 2009



Source: U.S. Census Bureau 2009, American Community Survey

Figure 6: Educational Attainment in San Joaquin Valley, 2009



Source: U.S. Census Bureau 2009, American Community Survey
Note: Other includes Two or More Races, American Indian and Alaska Native, Native Hawaiian and Other Pacific Islander, Some Other Race. Racial groups include Non-Hispanic population only; Hispanic can include any racial group.

Table 2. Socioeconomic Characteristics of San Joaquin Valley, State of California and United States

	San Joaquin Valley	California	United States
Educational Attainment[(a)]			
Less than High School	29.2%	19.4%	14.7%
High School Only	24.5%	20.9%	28.5%
Some College	24.1%	29.8%	28.9%
Bachelor's Degree or Higher	14.8%	29.9%	27.9%
Poverty Rate[(b)]			
Below 0.50 of Poverty Rate	8.4%	6.0%	6.3%
0.50-0.99 of Poverty Rate	12.0%	8.2%	8.1%
1.00-1.99 of Poverty Rate	25.9%	19.5%	18.4%
2.00 and Above of Poverty Rate	53.8%	66.3%	67.3%

(a) Source: U.S. Census Bureau, 2009 American Community Survey
(b) Source: 2009 Geolytics Projection

Table 3. Health Characteristics of the San Joaquin Valley, California, and United States

	San Joaquin Valley	California	United States
Life Expectancy	79.2[(a)]	80.0[(b)]	78.0[(b)]
All Cause Mortality Rate* (2007)[(c)]	732.9-871.7	675.0	759.5
Non-Hispanic	782.5-955.2	702.8	776.3
Hispanic	528.5-645.8	537.9	546.1
Asthma			
Childhood	10.6%-24.0%[(d)]	15.4%[(d)]	10.9%[(e)]
Adult	11.9%-21.9%[(d)]	13.0%[(d)]	13.1%[(e)]
Low Birth Weight Rate (2008)[(f)]	7.0%	6.8%	8.2%
Non-Hispanic	7.8%	7.5%	8.6%
Hispanic	6.5%	6.1%	7.0%

(a) Calculations performed by VCU Center on Human Needs from data provided by California Death Masterfile 1999-2007 and 2009 Geolytics Premium Estimates(b) Source: 2009 Geolytics Projection
(b) Calculations performed by American Human Development Index from data provided by the Centers for Disease Control and Prevention's National Vital Statistics Survey and the US Census Bureau
(c) Data from the Centers for Disease Control and Prevention, CDC Wonder, adjusted to the 2000 Census Population
(d) California Health Interview Survey, 2007
(e) National Health Interview Survey, 2007
(f) The Centers for Disease Control and Prevention National Vital Statistics System, 2008
* Mortality statistics are per 100,000 population

Table 4. Characteristics of Lowest and Highest Latino Premature Mortality Regions of the San Joaquin Valley

	Lowest Premature Mortality	Highest Premature Mortality
Premature Mortality (YPLL* per 1,000)	26.6	57.8
Median Household Income	60,729	36,806
Below 150% of the federal poverty level	18%	36%
Less than a high school diploma	24%	42%
Births to Immigrant Mothers	31%	37%
Hispanic	36%	49%

(*YPLL-Years of Potential Life Lost)

Compared to whites during the same time period (2009), Hispanic residents of the San Joaquin Valley age 25 and older were more than four times as likely to lack a high school diploma.[36] Migrant status is also strongly correlated with lower educational attainment. Between 1995 and 2000, well over half of all international migrants had less than a high school education. Additionally, because migrants into the San Joaquin Valley are far less likely to have a college education compared to migrants leaving the area, and because the area offers limited access to universities, the San Joaquin Valley experiences a large net loss of college-educated and college-bound individuals.[39] As discussed previously, this trend toward lower levels of education may have significant health-related repercussions. This is of particular concern given the low levels of education and income in the rapidly increasing immigrant population.

Health Outcomes

San Joaquin Valley health outcome statistics generally compare favorably with those for California and the United States (see Table 3). For the years 1999-2007, the average life expectancy of newborns in the San Joaquin Valley was 79.2 years, compared to 80.0 years in California and 78.0 years nationwide. Rates for all-cause mortality (number of deaths per 100,000 people) and low birth weight babies in the region tend to be lower among Hispanics than among non-Hispanics, mirroring state and national data.

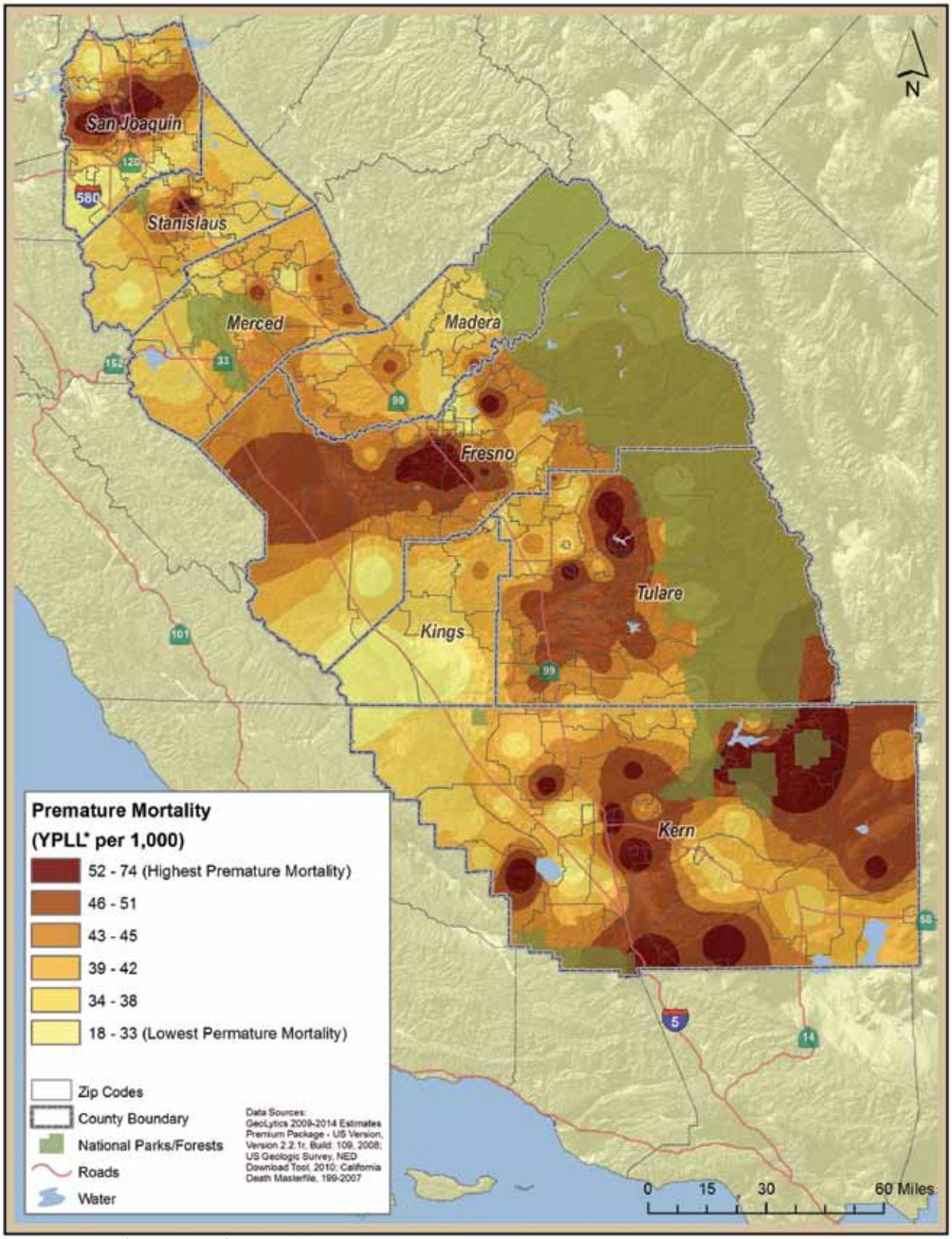
In summary, the San Joaquin Valley comprises a large geographic region with a number of urban centers surrounded by rural areas, farmland, and national parks. It is an area that has a much larger Hispanic population than elsewhere in the U.S., and many residents are immigrants or migrant laborers. More than one-fifth of households in the Valley have incomes below the federal poverty threshold. As a large agricultural area, the majority of jobs in the San Joaquin Valley are low-paying. About 30% of the region's adult population and almost 60% of foreign-born residents lack a high school education. These characteristics are important because of the geographic clustering of risk factors such as poverty and low educational attainment, and because of the relationship between socioeconomic and community risk factors and health outcomes. The next section will examine these relationships.

II. Poverty, Educational Attainment, Race/ Ethnicity, and Health Outcomes in the San Joaquin Valley

Premature mortality (years of potential life lost, or YPLL, before the age of 65) serves as an important group-level indicator of inequality. In the San Joaquin Valley, the communities with the highest levels of premature mortality are in San Joaquin County, central Stanislaus, western and central Fresno, north central Tulare, as well as central and eastern portions of Kern County (see Map 6).

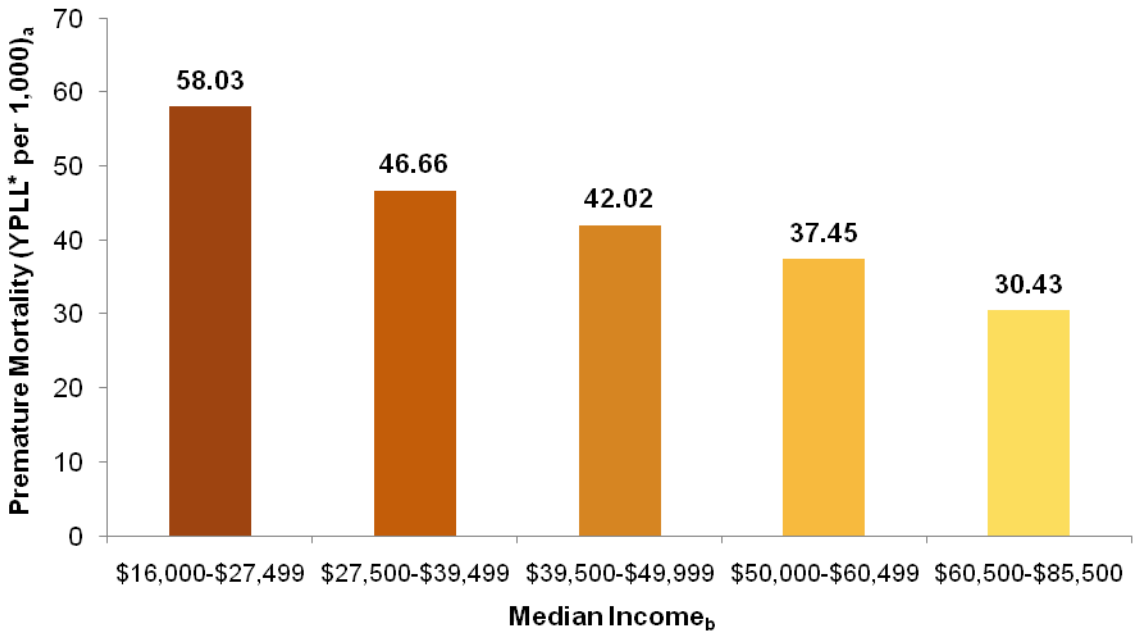
It is widely known that social factors which coexist in places with concentrations of disadvantaged populations are part of a complex web of interrelated factors that are only beginning to be understood. The health disparities associated with these economic, educational, and social factors are complex, multi-factorial relationships that cannot be reduced to a single etiology or mitigated by a single policy solution. In the San Joaquin Valley the highest rates of premature death are found in areas with significantly higher poverty, lower educational attainment, and a higher concentration of Latino residents and recent immigrants. These areas are also home to the lowest median incomes (see Table 4).

Map 6: Premature Mortality by Zip Code, San Joaquin Valley 1999-2007



(*YPLL-Years of Potential Life Lost)

Figure 7: Premature Mortality by Median Income in San Joaquin Valley



Source: aCalifornia Death Masterfile 1999-2007
Source: bGeolytics 2009
(*YPLL-Years of Potential Life Lost)

Life expectancy varies by as much as 21 years in the San Joaquin Valley depending on zip code (see Map 7). In the zip codes with lowest life expectancy, people can live to be only about 69 years or less, while people can live to be 90 years or more in zip codes with the highest life expectancy. Zip codes with the lowest life expectancy tend to have a higher percentage of Hispanic and low-income residents. For example, among the zip codes with highest life expectancy are the Woodward Park and Lincoln Village neighborhoods in Fresno and San Joaquin counties, respectively. Both have a white majority, high levels of education, and annual average annual household income well above the state average. Examples of the zip codes with the lowest life expectancy are multi-ethnic urban enclaves in southwest and southeast Fresno and central Stockton and primarily Latino rural neighborhoods such as Taft in Kern County or Lemon Cove in Tulare County. These diverse communities all share annual household incomes and education levels well below California averages.

Income and Premature Mortality

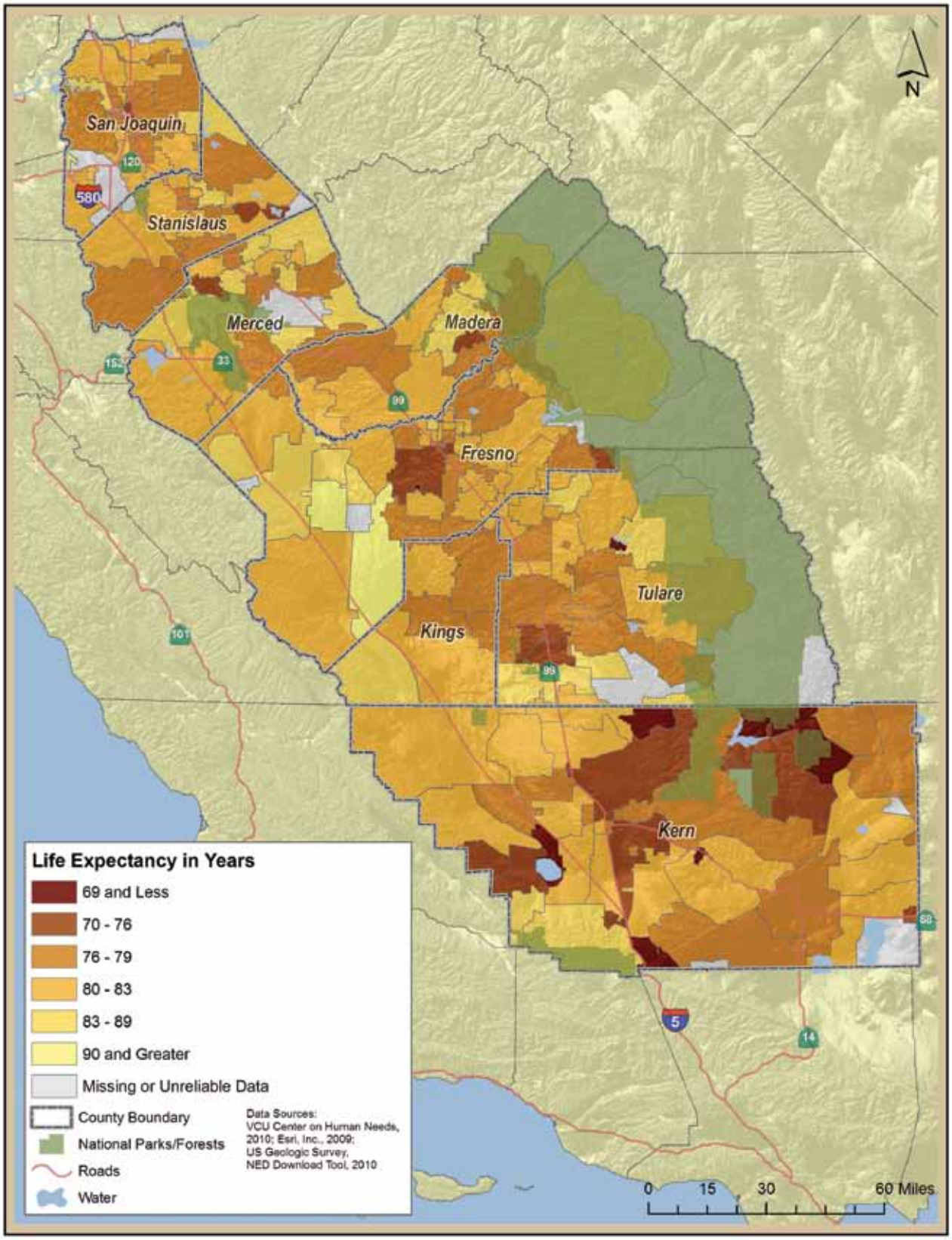
Though individual-level behavioral factors often have received the greatest attention as determinants of premature mortality, there is increasing awareness of and evidence for the important role of social factors that operate at a group level.[47-52] A review of the literature shows significant research documenting the relationship between premature mortality and factors such as income, race and ethnicity, and educational attainment.

For example, as shown in Figure 7, zip code areas in the San Joaquin Valley with lower median incomes suffer substantially more premature deaths than those with higher incomes; the rate for the lowest earning zip codes is nearly twice that of the highest income zip codes (58 per 10,000 deaths versus 30 per 10,000).

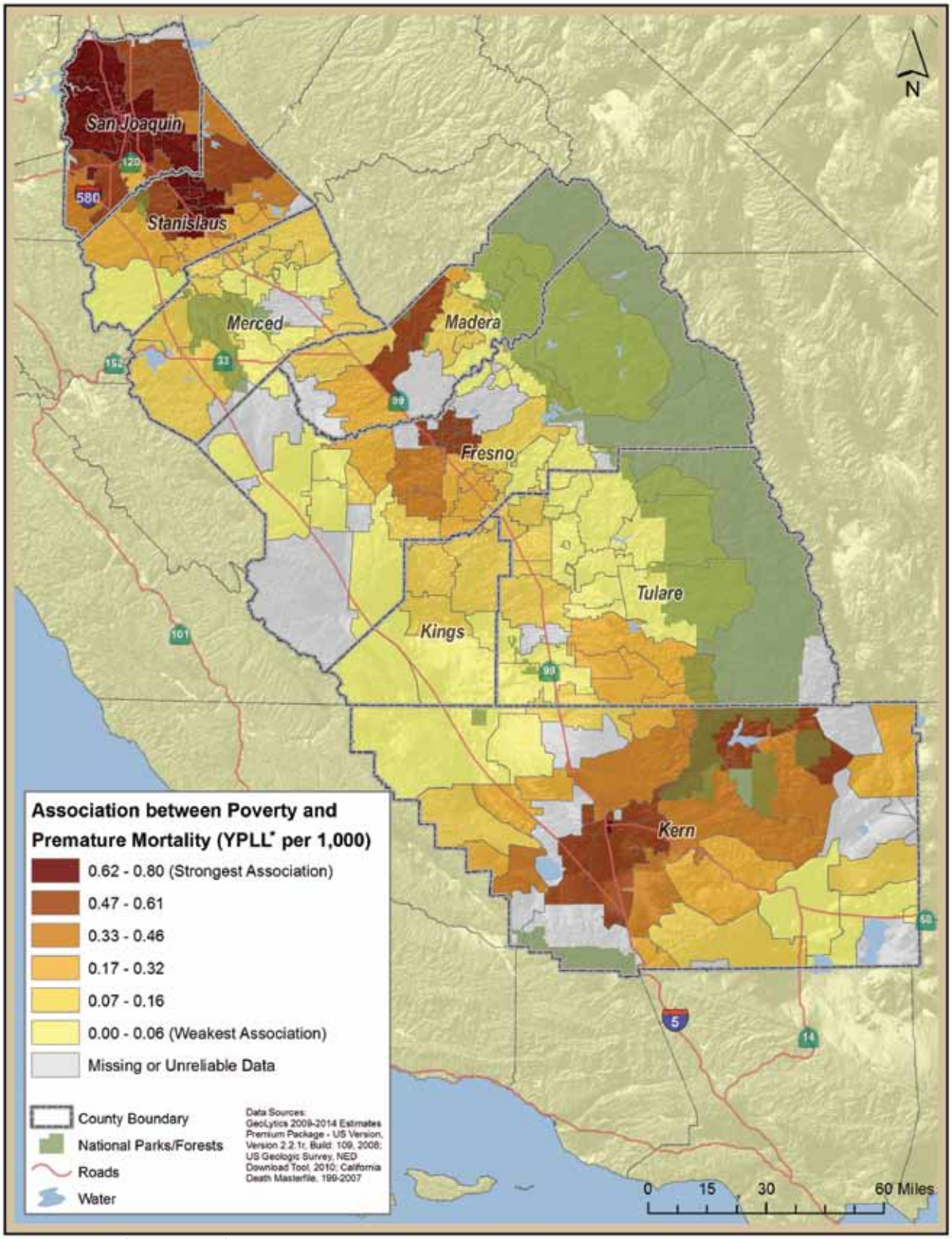
Poverty and Premature Mortality

Zip codes in which poverty is a strong predictor of premature mortality (shown in the darkest colors on Map 8) are in San Joaquin, central Stanislaus County, and regions of Madera, Fresno, and Kern counties.

Map 7: Life Expectancy by Zip Code, San Joaquin Valley, 2009

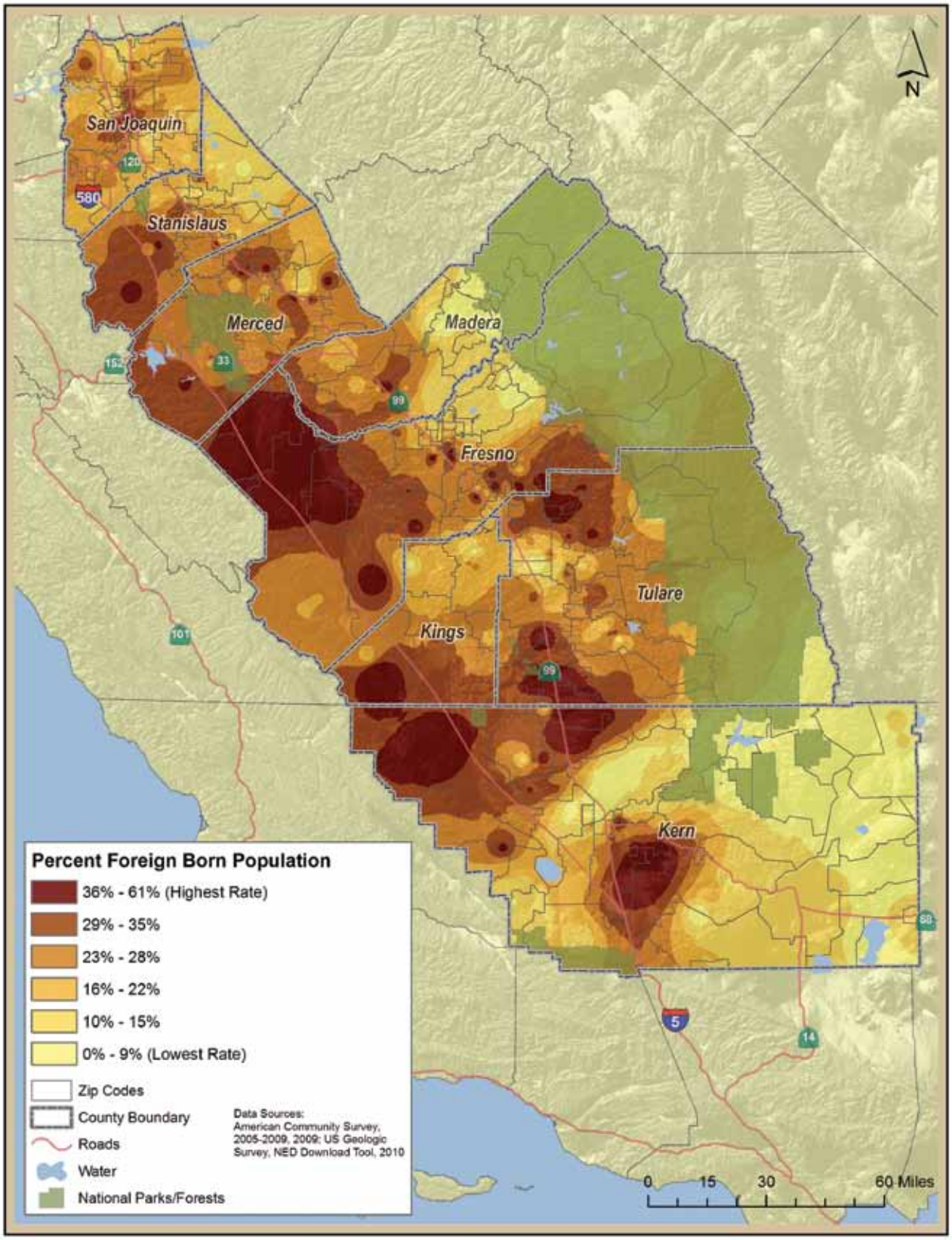


Map 8: Poverty (2009) as a Predictor for Years of Premature Mortality (1999-2007), San Joaquin Valley



(*YPLL-Years of Potential Life Lost)

Map 9: Percent Foreign Born Population by Census Tract, San Joaquin Valley, 2005-2009



Educational Attainment and Premature Mortality

Like income and poverty, educational attainment[50, 56-59] has been found to be significantly related to premature mortality. In the San Joaquin Valley, zip codes where a higher percentage of the population lack a high school diploma have higher rates of premature mortality. Map 5 shows concentrations of the population without a completed high school education. Communities with both low levels of educational attainment and high premature mortality rates include central San Joaquin, western and central Fresno, north central Tulare, and central Kern County. In these areas, the educational attainment of the population may influence the premature mortality rates of their residents. Areas of high premature mortality but high educational attainment, such as central Stanislaus County or eastern Kern County, may be influenced by other factors such as high number of retirees, or the rural nature of the area.

Ethnicity and Premature Mortality

While premature mortality is markedly higher in areas with high poverty and low educational attainment, the relationship between premature mortality and ethnicity in the San Joaquin Valley is inconsistent. As seen in Map 9, both Kings County and western Kern County have high percentages of foreign-born residents, ranging from 29% to 61% (in particular, at the western intersection of Kings and Kern counties) and have relatively low premature mortality rates (see Map 6 above).

It is well-documented that despite lower socioeconomic status and educational attainment levels, the general health and mortality outcomes of Hispanic populations in the United States, particularly Mexican-Americans, when they first come to the United States are similar to or better than those of non-Hispanic white populations.[64-67, 69, 70] However, second- and subsequent-generation Hispanic Americans tend to have poorer health and mortality outcomes compared to recent immigrants.[66, 71, 74, 75] Among the factors that may account for this trend are socioeconomic and educational disadvantages to which immigrant workers are subjected, their documentation status, environmental factors related to where they live, and their lack of political power to address these conditions. If this trend continues, it may portend increasingly significant health and mortality issues in the San Joaquin Valley.

Our research confirmed that poverty is the strongest determinant of premature mortality: poverty alone accounted for 33% of the variation in premature mortality across geographic areas in the San Joaquin Valley. In summary, premature mortality is geographically clustered in the region. It is higher in San Joaquin County, central Stanislaus, western and central Fresno, north central Tulare, and central and eastern portions of Kern County. Areas with lower median incomes and higher poverty rates had significantly higher risk of premature deaths. Poverty was a strong predictor of premature mortality in central Stanislaus County and regions of Fresno and Kern counties.

III. Air Quality and Respiratory Health in the San Joaquin Valley

Geographic Distribution of Respiratory Risk

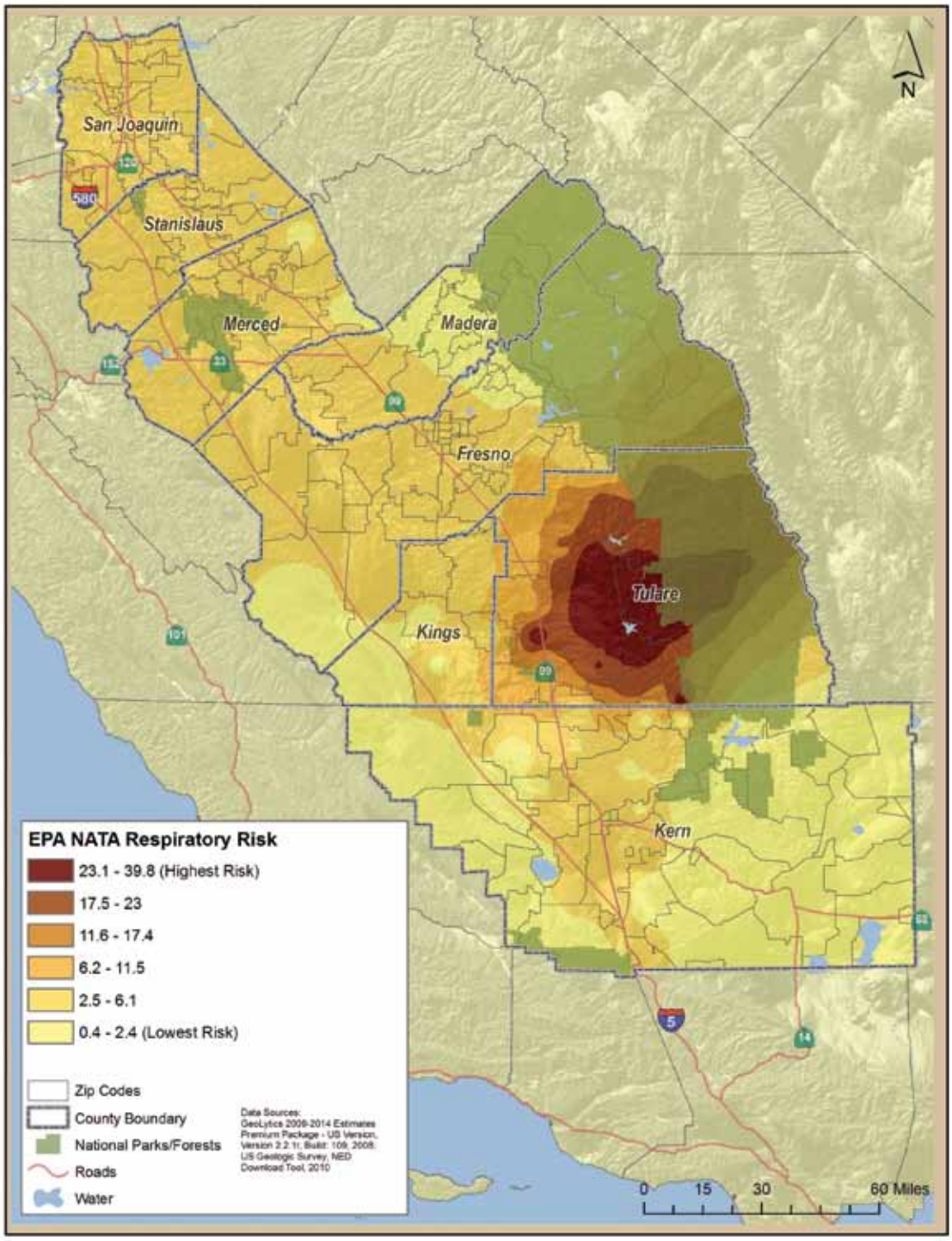
Environmental hazards are an important influence on community health. Within the San Joaquin Valley, air quality poses a particularly persistent hazard. The Valley's counties consistently rate in the top twenty-five most polluted locations in the United States,[76-81] and they frequently exceed the National Ambient Air Quality Standards for ozone and fine particulate levels by a significant amount.[82]

Poor air quality poses serious health risks and can lead to a variety of respiratory and cardiovascular conditions and symptoms. A recent study found that ozone levels above the federal standard in the San Joaquin Valley caused 460 premature deaths per year and that the total yearly economic cost of health complications and lost productivity due to unhealthful levels of ozone and particulate matter was more than $3 billion.[83] Although poor air quality poses potential risks throughout the Valley, respiratory risk is heavily concentrated in Tulare County (see Map 10).

Throughout the country, studies document proximity to hazardous sites and heightened exposure to pollution in neighborhoods with larger populations of people of color and the poor.[84-89] Some studies suggest that toxic facilities are deliberately sited in minority communities,[90] possibly because such neighborhoods are socially isolated and hold limited political power to resist undesirable land use decisions by governments and corporations.[91]

The same appears to be true in the San Joaquin Valley, where census tracts with the highest levels of respiratory risk are disproportionately populated by poor and Hispanic residents. Map 11 shows areas of the San Joaquin Valley with a high level of respiratory risk and a large proportion of Hispanic residents, particularly in Tulare County. Areas with the highest risk based on National Air Toxic Assessment (NATA) data have significantly fewer whites and a greater percentage of low-income residents (see Figure 8).

Map 10: National Air Toxic Assessment (NATA) Respiratory Risk, San Joaquin Valley, 2002



Note: Data in Map 10 refer to the non-cancer hazard index (HI), representing the sum of hazard quotients for substances that affect the same target organ system (respiratory). Aggregate exposures below an HI of 1.0 derived using target organ specific hazard quotients likely will not result in adverse non-cancer health effects over a lifetime of exposure and would ordinarily be considered acceptable. Results are presented for each source category (major, area, on-road mobile, non-road mobile, background), with total risk representing the sum of all substances that affect the same target organ system (respiratory) and individual pollutant contributions to total HI.

Map 11: Elevated Respiratory Risk (2002) and High Percentage Hispanic Population by Zip Code (2009), San Joaquin Valley

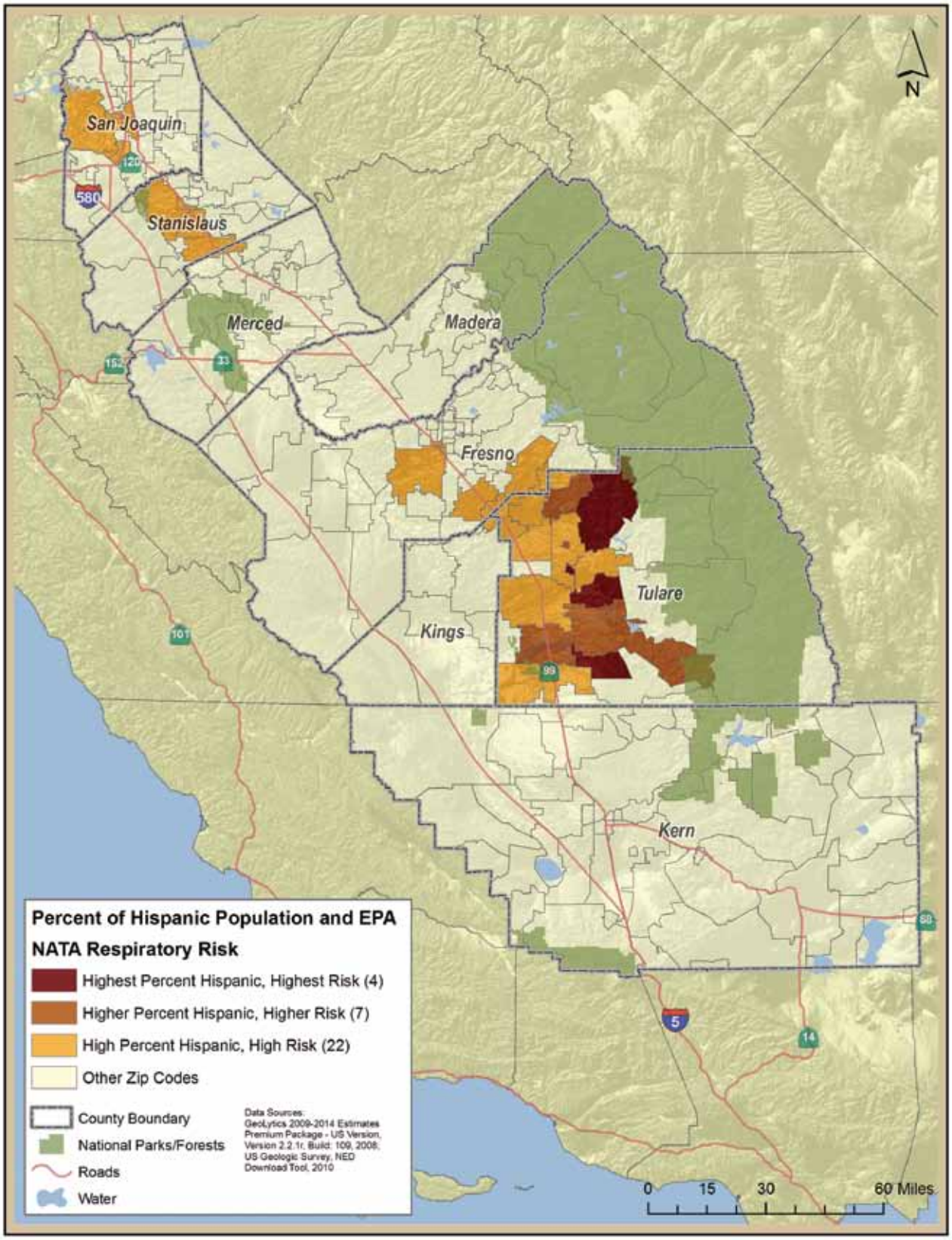
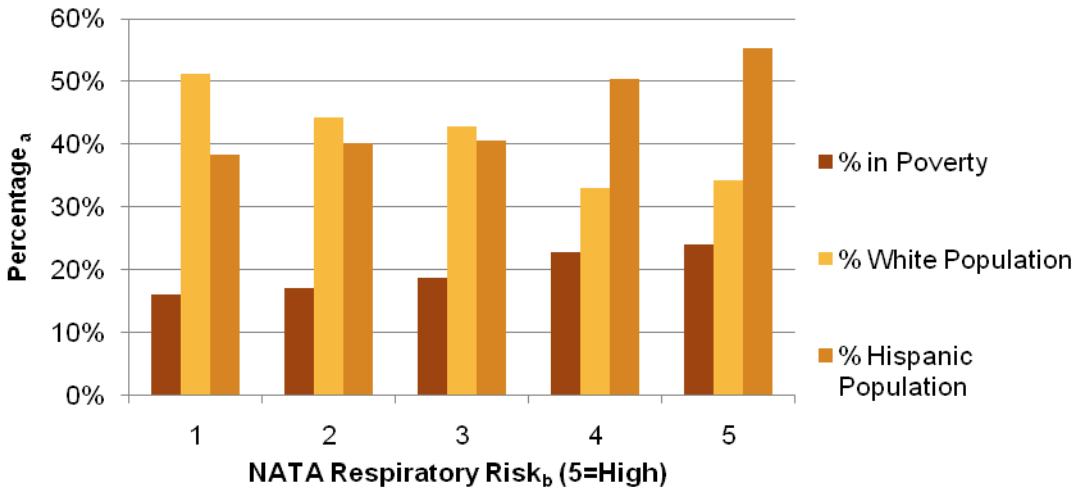


Figure 8: NATA Respiratory Risk by Race/Ethnicity and Poverty in San Joaquin Valley



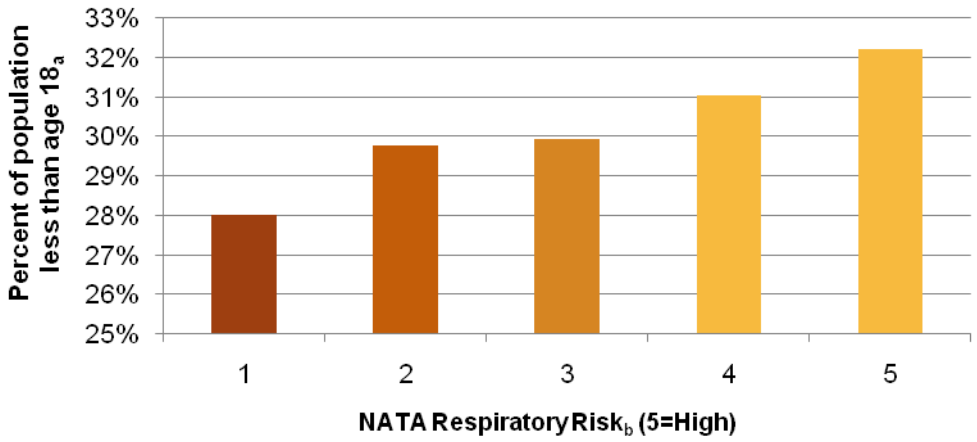
Source: [a]U.S. Census Bureau, American Community Survey 2005-2009
Source: [b]Environmental Protection Agency (EPA), National Air Toxic Assessment (NATA), 2002

Strong evidence in the medical literature links poor air quality with a higher incidence of asthma symptoms.[93-96] This is a critical problem throughout the San Joaquin Valley, where an association has been observed among both adults and children.[97] Recent research indicates that asthma-diagnosed individuals in locations with high ozone and particulate matter concentration experience more frequent asthma symptoms and are more likely to visit the emergency room or to be hospitalized. Children are particularly vulnerable to asthma, and in the San Joaquin Valley the prevalence of asthma has reached epidemic levels: one in six children are diagnosed with the condition before the age of 18.[98, 99] According to a recent impact study, reducing ozone and particulate matter levels in the Valley to the federal limit would avert 23,300 asthma attacks overall and 16,310 days of upper respiratory symptoms in asthmatic children every year,[83] resulting in huge savings financially and in terms of human suffering. In the San Joaquin Valley, the areas with the highest EPA respiratory risk have a higher percentage of the population under the age of 18 (see Figure 9).

Nearly half of the children diagnosed with asthma in the San Joaquin Valley are low-income, defined as a family income below 200% of the federal poverty limit.[100] Not only do those with low incomes have higher prevalence rates, they also experience more frequent symptoms and miss more days of school and work than wealthier people with asthma.

In summary, our findings concur with previously cited studies, which document that proximity to hazardous sites and heightened exposure to pollution disproportionately affect neighborhoods with larger populations of people of color and the poor. Previous studies have documented the high asthma prevalence rate in the San Joaquin Valley and the relationship between asthma and poor air quality. More recently, the co-location of environmental hazards, concentrated poverty and other demographic indicators of vulnerability, and reduced access to supportive services was demonstrated in a study by the U.C. Davis Center for Regional Change. Combining demographic and environmental exposure data with other indicators, London and his colleagues estimate that as much as one third of the San Joaquin Valley population live in "cumulative environmental action zones"—neighborhoods with persistent poverty, racial/ethnic and class isolation, and extraordinarily high levels of air pollution and toxic exposures. They recommend that regional and state policy makers and regulators focus resources for enforcement, investment, and additional assessment in these communities.

Figure 9: NATA Respiratory Risk by Population Under 18, San Joaquin Valley



Source: [a]U.S. Census Bureau, American Community Survey 2005-2009
Source: [b]Environmental Protection Agency (EPA), National Air Toxic Assessment (NATA), 2002

IV. Conclusions and Recommendations

Vulnerable Populations

We found that geographic areas with the highest levels of NATA respiratory risk were disproportionately populated with poor and Hispanic residents. In communities with the highest NATA environmental exposure, 55% of the population are Hispanic and 24% live below the poverty level. By comparison, in communities with the lowest risk, 38% of the population are Hispanic and 16% live below the poverty line. Additionally, areas with higher respiratory risk had a significantly higher percentage of the population under the age of 18—the population that is particularly vulnerable to respiratory illness. These findings are consistent with literature suggesting that vulnerable populations are disproportionately exposed to environmental hazards.

Premature Mortality

The analyses presented here have shown that social factors are strongly linked with premature mortality in the San Joaquin Valley. Both income and educational attainment are strongly correlated with premature mortality. As the income and educational attainment of an area decreases, premature mortality generally increases. Poverty is a particularly strong predictor of premature mortality at the zip code level. (Groups of zip codes with similar characteristics were used in this analysis for low population areas.)

Socioeconomic conditions of distress are distributed throughout the San Joaquin Valley. Poverty is particularly concentrated in the western and northwestern portions of the region, but it exists in every county. Similarly, low educational attainment is concentrated in western San Joaquin Valley but is prevalent across the region. Despite the relatively favorable mortality rates associated with recent Latino immigrants, the well-established relationship between poverty, education, and health combined with the limited economic and educational opportunities available to immigrants in the San Joaquin Valley likely will result in worsening health outcomes in succeeding generations.

Environmental Justice and Respiratory Risk

High poverty and low educational attainment rates make migrant workers and their families particularly vulnerable to asthma. Recent research indicates that those with asthma face significant barriers to care: they are more likely to lack a usual source of care, report a delay in medical care, and report no visit to the physician in the past year. They are also less likely to report asthma symptoms and emergency department visits, but this may reflect underutilization due to a variety of barriers such as cost, language, and fear of repercussions with immigration officials. Perhaps as a result of these barriers, migrant families are less likely to report that a child in their family has ever been diagnosed with asthma. For immigrant families with children, poverty and language barriers were both associated with greater limitations in ability to function and poorer perceived health.[101]

Recommendations[*]

As part of the Place Matters project, the Central Valley Health Policy Institute at California State University, Fresno (CVHPI) has facilitated regional and neighborhood health equity forums that have included representatives of over 75 organizations from across the region. Participants have learned about the broad range of challenges and policies addressed by their colleagues—from early childhood education to infrastructure and economic development, from health care delivery and advocacy to youth engagement. Yet despite this diversity of organizations and issues, they are finding a shared focus on improving the quality of life and the potential for health and well-being in the region's excluded and underserved communities. To ensure that recommendations in this Community Health Equity Report reflected this common ground, representatives of several of the largest regional social justice coalitions participating in the San Joaquin Valley Place Matters Team met in October 2011 to develop consensus recommendations.

This report underscores how some communities in the San Joaquin Valley, California's agricultural heartland, are characterized by both high rates of premature mortality and high rates of poverty, racial/ethnic segregation, and environmental risks. While this report focuses on the social determinants of health before the recession, the Joint Center for Political and Economic Studies September 2011 study, *A Lost Decade: Neighborhood Poverty and the Urban Crisis of the 2000s,* highlights the continued high levels of concentrated poverty in the San Joaquin Valley urban areas.[105] Rural communities may have suffered even greater losses in income and quality of life during the recent recession, and local leaders see the need for a re-orientation of the agricultural economy to promote both social and environmental sustainability.[106]

The San Joaquin Valley offers a remarkable context for studying the social determinants of health inequalities. The Valley's physical environment has been massively re-engineered for agra-business and urban development, and its neighborhoods and hamlets have been shaped by waves of immigration and strict patterns of class and racial segregation. The region has been the scene for the iconic literature of class conflict, and it has birthed national movements for human rights.[107] In this context, this study adds to a growing and consistent literature showing how the region's striking social class and racial/ethnic health inequalities are at least partly explained by historical forces and current policies that concentrate low-income people, people of color, and recent immigrants in urban neighborhoods and rural settlements that lack many of the most fundamental supports for health and well-being.

- A new report by the UC Davis Center for Regional Change estimates that about one third of Valley residents live in neighborhoods characterized by both multiple environmental hazards and highly socioeconomically vulnerable populations.[108] The report recommends ongoing monitoring of environmentally challenged and socioeconomically vulnerable communities and increased efforts by the public sector to engage with—and invest in— these communities.

- A California State University report shows that spikes in air pollution are associated with excess emergency room and hospital use for respiratory and cardiovascular conditions in the region's three largest cities.[109] The report calls for increased attention to enforcement of existing air quality standards and more attention to helping individuals and communities understand and mitigate environmental risks.

- The Fresno County Boys and Men of Color Data Chart Book outlines unique racial/ethnic health disparities experienced by Latino and African American males across socioeconomic, health, education, and safety domains.[110] Focus groups with urban and rural male youth revealed strong differences between communities in available resources and opportunities, as well as deep concern with alleviating socioeconomic, racial/ethnic, and gender discrimination.

- The United Nations Special Rapporteur on the Human Right to Safe Drinking Water and Sanitation cites the nitrate-ridden communities of Tulare County, including numerous unincorporated, majority Latino communities, that have been marginalized and excluded from this basic right.[111]

- Recent health services research studies show that hospitalizations for both ambulatory-care-sensitive conditions and elective surgeries are notably higher in the San Joaquin Valley than in California as a whole.[112, 113,**, ***]

[*] This section of the report was prepared by the San Joaquin Valley Place Matters Team and reflects its analysis of the data provided in this report.

> Francis and Firestone recently argued that addressing the international human right to potable drinking water in California requires a four component strategy: (1) creating new infrastructure, (2) protecting water sources, (3) building institutional capacity to manage water systems, and (4) building the political power of communities "... to hold decision makers accountable—not just the water service provider, but also local, regional, and state government officials."[104]

This strategy was instrumental in recent passage of several human-rights-to-water laws in California, including a requirement for cities and counties to consider the infrastructure needs—including clean drinking water access—of disadvantaged and unincorporated communities in urban planning efforts, including general plan updates. This strategy—to focus on creating the physical and institutional infrastructure for access to basic determinants of health and well-being while ensuring that communities have the political power to ensure that policies and practices respond to their interests—offers a framework for shared action for the San Joaquin Valley Place Matters Team.

This report adds to the growing consensus that the San Joaquin Valley is characterized by dramatic place-based health inequalities caused through multiple socioeconomic and environmental pathways. And the need to address these inequalities through multiple policy and program implementation strategies has been recognized in regional governmental efforts. The California Partnership for the San Joaquin Valley and the Department of Housing and Urban Development's Smart Valley Places each explore several policy initiatives around the infrastructure and urban form determinants of health inequalities. With support from The California Endowment, the region's eight county public health departments and other key stakeholders have developed a new consortium to increase their capacity to address health disparities and prevent chronic disease. This effort complements the 10-year Building Healthy Communities initiatives in three San Joaquin Valley areas to address social determinants of health. More recently, several Valley counties have received funding through the Centers for Disease Control's Community Transformation Grants to address a number of the social determinants of health inequalities through primary prevention strategies. In many cases, the strategies focus on building infrastructure, human development resources, and informal community capacity, while some strategies also involve finding revenues for new types of investments and restrictions on some activities. Successful implementation of the ideas and strategies being developed in these institutional initiatives will require both broad, meaningful engagement of communities and political leadership that prioritizes creating the conditions for equity in health and well-being in the region.

Recognizing that health inequalities occur through multiple socioeconomic and environmental pathways means that a unifying policy-making approach is needed. Some cities and counties around the nation have adopted **equity in all policies** initiatives. Through these initiatives public decision makers and program implementers are required to consider the impacts of proposed actions on equity in life opportunities, health, and well-being and to adjust action choices to maximize this goal. Such a frame can be applied to a broad spectrum of public functions from education, land use, and economic development to environmental regulation, infrastructure, and health and human services. The **equity in all policies** approach can also be adopted by philanthropic and religious groups serving the region. Even as the diverse organizations advocating around specific neighborhood and regional plans continue to focus on specific issues, all participating organizations may be able to support **equity in all policies** initiatives in their communities.

Other ways that the San Joaquin Valley Place Matters Team can support regional health equity efforts include:

- Increase understanding and application of the social determinants framework among elected policy makers and community leaders as well as health, social service, community/economic development, and education professionals through professional education and other tools.
- Increase the capacity of communities to shape policies and environments that influence health through building the capacity of grassroots/community leaders.
- Focus attention on providing equitable expenditures throughout the school systems in the
- San Joaquin Valley and, in particular, on providing adequate resources for a quality education, including early childhood education, in those schools that serve poor and immigrant populations.
- Increase availability of data on environmental and social determinants of health and develop ways to better assess the health consequences of toxic water and other assaults on small rural communities.
- Adopt land use policies that reflect an emphasis on smart and equitable growth, facilitate access to affordable housing for poor and immigrant populations, and promote housing mobility to help reduce the clustering of immigrants in neighborhoods

of concentrated poverty and in areas where exposure to environmental risks is highest.

- Encourage support for collaborative decision making and advocacy to address regional challenges.

In pursuing all of these recommendations, **racial and ethnic equity must be a conscious and intentional core principle of all efforts to address disparities in health outcomes**.

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