

SOCIAL AND ENVIRONMENTAL DETERMINANTS OF POPULATION HEALTH IN THE SAN JOAQUIN VALLEY

The Central Valley Health Policy Institute (CVHPI) and the San Joaquin Valley Public Health Consortium (SJVPHC), with the support of The California Endowment, have been conducting data analyses and policy reviews regarding key indicators of population health across the life span. The analyses have focused on childhood morbidity, reproductive health, and longevity for elders. In addition to an overview paper on each topic, county briefs highlight findings on these topics for Kern, Kings, Fresno, Madera, Merced, San Joaquin, Stanislaus, and Tulare Valley counties. Included here are an overview of the project and summaries of each of the region-wide papers.

Key Findings:

- San Joaquin Valley (SJV) counties have some of the highest rates of teen birth in California, but they have seen dramatic reductions in teen birthing in recent years.
- The SJV faces higher levels of adverse birth outcomes than other parts of California. During the study period, the proportion of preterm births was greater within the SJV region, 9.4%, than the state, 8.8%.
- Rates of both teen birthing and adverse birth outcomes were higher for low income women of color living in neighborhoods with fewer economic opportunities and higher pollution.
- Children in the SJV have higher rates of preventable hospitalizations than other California children do, and there are broad disparities in these events by individual- and neighborhood-level factors.
- If children of color in the SJV had similar preventable hospitalization rates as their white peers in affluent neighborhoods, there would be a 62% reduction in these events, a possible costs savings of \$19,113,621.
- SJV residents are more likely to die before age 65 and lose more years of life after age 65 than other Californians.
- Elders in the SJV have higher use of avoidable hospitalizations and lower use of planned elective surgeries than do their peers in the rest of California.
- SJV elders who lived in more walkable neighborhoods lost fewer years after age 65 compared to others.
- SJV county Public Health Departments continue individual-oriented health promotion/disease prevention initiatives. Increasingly, SJV county Public Health Departments serve as catalysts, organizers and thought leaders in multi-sectoral initiatives to eliminate inequalities in the social determinants of health.

Project Overview

One of the key functions of the eight public health departments, among other organizations, that form the San Joaquin Valley Public Health Consortium (SJVPHC) is telling the story of population health and the regional factors that shape these outcomes. Understanding the social determinants of health is an important starting place for assessment of public health and health care policies and programs. The scientific consensus understanding of population health highlights socio-economic and environmental conditions experienced by residents and their health behavior, physiological, and social responses to these conditions as the underlying determinants and root causes of population health. From this perspective, developing a shared understanding of how the places in our region shape population health can contribute to program planning and policy making across a broad range of county and local concerns from community and economic development to education, human services and environmental protection.

Prior Findings on Population Health in the San Joaquin Valley

The San Joaquin Valley offers a remarkable context for studying population health. In the process of becoming a world powerhouse in agricultural production, the Valley's physical environment has been massively re-engineered; its neighborhoods and hamlets have been shaped by waves of immigration and group conflict; and strict patterns of class and racial segregation of housing and community resources have created diverse neighborhood conditions.¹ In the 1940s, Walter Goldschmidt described the health and social consequences of the alternative agricultural labor models emerging at that time.² Recent studies have described the historical policies and practices that created rural (and urban-edge) low-income communities, primarily composed of Latinos, that are cut-off from housing and supportive services.^{3,4} Recent economic studies have shown that in our region, that the same labor practices that have created our highly vaunted agro-business wealth and rapid community development have also promoted poverty.⁵ Studies by the Urban Institute have consistently identified two Valley metro areas as having the highest rate of concentrated poverty, and a new report documents how concentrated wealth in the region is associated with low gross domestic product per capita.^{6,7} In this context, it is not surprising that more than a decade of research has documented striking population health challenges in the San Joaquin Valley.⁸⁻¹⁴ These reports paint a picture of comparatively poor population health. Recent and ongoing studies have demonstrated how air pollution exacerbates birth outcomes, asthma, and cardiovascular conditions.¹⁵⁻¹⁸ Compared to the rest of California, the region's nearly 4 million residents are more likely to experience behavioral and environmental risk factors (obesity, inactivity etc.), face shorter lives, more frequent episodes of illness and hospitalizations and elevated rates of both chronic (asthma, diabetes) and infectious (STDs, Hep-C) disease.

Just as the economic and political history of the San Joaquin Valley created neighborhood differences in access to resources and the accumulation of environmental hazards, contemporary epidemiological studies have found inequalities across neighborhoods in living conditions and health outcomes. Communities less than 10 miles apart face differences in life expectancy as large as 20 years¹⁹(Joint

Center, 2012). Neighborhoods with longer life expectancy tend to be more homogenously white, more affluent, and experience better housing, transportation, air/water quality and schools, as well as better access to other amenities for healthy living such as parks and quality grocers. Similarly, UC Davis researchers have identified a number of San Joaquin Valley communities as “cumulative environmental vulnerability areas,” where multiple sources of pollution, social challenges, such as poverty, and lack of health resources, and overall poor health outcomes co-occur.^{20,21} This same conclusion was drawn by the Office of Environmental Health Hazard Assessment (OEHHA), on behalf of the California Environmental Protection Agency (CalEPA), when developing the *CalEnviroScreen*. The measure combines zip code or census tract measures exposure to 11 types of pollution with measures of poverty and social conditions/outcomes to identify the communities facing the greatest environmental health burden. The largest set of overburdened communities are located within the San Joaquin Valley and there is a considerable overlap between the communities highlighted for greater premature mortality.²²

Framing Our Story: Key Concepts and Questions

The Social and Environmental Determinants of Population Health series features three papers that address different population groups, health conditions, and place-based determinants. Figure 1 offers a broad conceptual model that guides the series and Table 1 outlines the principle groups, outcomes and potential causes considered in each of the papers. Four key elements shaped our approach to telling the story of population health in the San Joaquin Valley.

Figure 1. Social Determinants of Health Conceptual Model

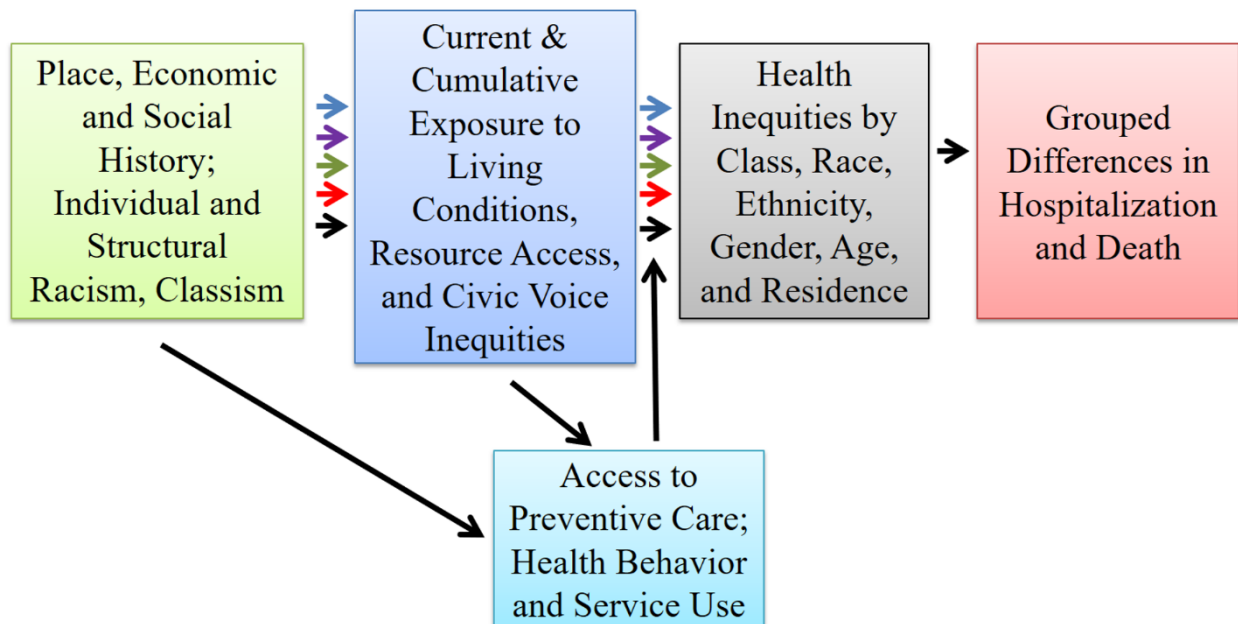


Table 1. Populations, Outcomes, and Potential Causes that were Significantly Associated, San Joaquin Valley, 2009-2013		
Populations	Outcomes	Potential Causes
Children ages 0 - 14	ED visits and hospitalizations for ambulatory care-sensitive conditions, cost estimates, ED visits and hospitalizations for non-preventable conditions, infant mortality (0 – 1 years); and childhood mortality (1-14 years)	Poverty, primary care-shortage areas, racial segregation, pollution, sex, age, race/ethnicity, and health insurance type
Women and adolescent youth ages 15 - 35	Teen births, low-birth weight, prenatal care, infant mortality, and premature birth	Economic opportunity, particulate matter 2.5, housing, civic life opportunity, education, smoking, hypertension, WIC services (protective), previous preterm birth, short interpregnancy period, race/ethnicity, health insurance type, and obesity
Older adults ages 65 and greater	ED visits and hospitalizations for chronic conditions, ED visits and hospitalizations for ambulatory care-sensitive conditions, elective surgeries, major causes of mortality, life expectancy, average age of death, and years of life lost	Poverty, walkability, primary care-shortage areas, racial/ethnic segregation, marital status, sex, education, and nativity

- Focus on Hospitalization and Death:** For this series of reports, the focus has been on explaining patterns of hospitalizations (emergency department and inpatient) and death. These data are drawn from Death Statistical Master Files from the California Department of Public Health

(CDPH), while emergency department (ED) visits and patient discharge data (hospitalizations) were gathered from the Office of Statewide Health Planning and Development (OSHPD). Additional data were drawn from Birth Statistical Master Files maintained by the CDPH. This focus reflects the clear mission of public health to promote length and quality of life while limiting potentially unnecessary health care costs. Depending on the population group, the focus is sometimes further narrowed to specific key causes of death because of their notable prevalence in the Valley or their relevance to other health and life outcomes. While hospitalization and death represent the most intense (and expensive) expressions of poor health and disease, they are in effect the tip of the health iceberg and thus give an admittedly incomplete perspective on population disease burden. Because public health policies seek a balance between promoting equity in population health and minimizing intrusions on individual liberty, it is most relevant to focus on communities and groups that experience the most difficult health burdens. Unfortunately, this approach does not allow for a clear examination of how individual-level health behaviors are shaped by living conditions and social characteristics, or how these behaviors influence health outcomes. When available data permits, the potential roles of individual-level health and social characteristics that may further elucidate population health outcomes are described.

- **A Life Course Perspective:** The reports build on the emerging consensus that health and well-being at each stage of life are shaped by developmental factors (aging), current exposures to risks and resources, and the impacts of cumulative exposures to risks and resources at prior developmental stages. The health and well-being experienced by babies and small children can shape their outcomes across the life course, while for elders, in particular, accumulated socio-economic and physical exposures throughout childhood and adult years shape longevity and other outcomes. From this perspective, it is important to focus on different measures of population health at each stage of life. In these reports we examine preventable hospital use for children, sexual experiences and birth outcomes for young adults, and length of life for elders since each of these measures best speaks to developmentally central outcomes. Further, the expectation is that broad measures of social position (gender, race/ethnicity, social class and residence) become even stronger predictors of population health for elders, while current exposures may be more influential earlier in the life course.
- **Place-Based Approach to Social and Environmental Determinants:** Perhaps the most influential new idea in public health over the last decades has been the recognition that individual and population health are shaped by a broad set of social determinants of health, including economics, education, housing, transportation, food systems, neighborhood design, etc. (See Figure 2). This has led to a broad new focus in California, and nationally, on a health in all policies approach that seeks to integrate health and quality of life into all realms of public policy.²³

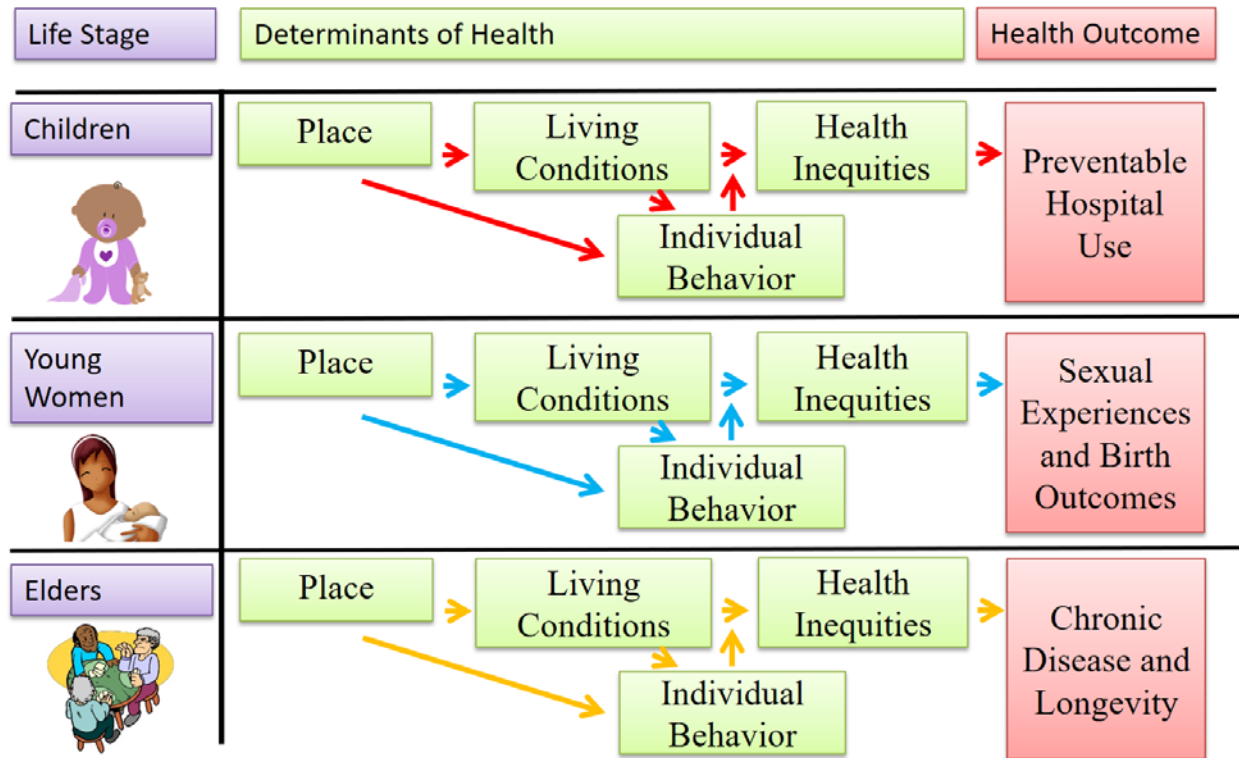
Figure 2. Social Determinants of Health Framework



Building on this perspective, groups such as the National Collaborative for Health Equity (<http://www.nationalcollaborative.org/>) and the Health Equity and Leadership Exchange Network (<http://healthequitynetwork.org/>), as well as California and national foundations, have noted that racial/ethnic and social class health inequalities are the product of unequal exposure to experience accumulated physical and social stressors (social determinants of health). Residents of communities of color and low-income communities have access to fewer resources to support health and well-being and greater exposure to threats to health, such as pollution and violence. In these reports, we implement emerging social determinants of health inequality perspectives by considering variations in population health that are based on residential location. We develop neighborhood (zip code or census tract) measures of factors such as population estimates of age groups, race/ethnicity, individuals living below 125% of the Federal Poverty Line (FPL), education, home ownership, employment (US Census Bureau's American Community Survey American Community Survey (2010)), access to health services, such as distance to a facility and professional shortage areas (<https://datawarehouse.hrsa.gov/tools/analyzers/hpsafind.aspx>), neighborhood design as indicated by relative walkability (<https://www.walkscore.com/>), a broad range of environmental measures from the CalEnviroScreen, and a number of economic and educational measures developed for the UC Davis regional opportunity index (<http://interact.regionalchange.ucdavis.edu/roi/>).

By combining the place-based health inequalities and life course perspectives, these papers explore the extent to which social determinants of health associated with residential location explain group differences in outcomes. In each case, we examined many different potential neighborhood determinants of health outcomes. Notably, our findings indicate that the significant neighborhood factors differ by the outcome considered. Rather than the social determinants of health, neighborhood living conditions, presenting a single, undifferentiated risk factor for all outcomes, specific aspects of neighborhood life seem to be associated with different outcomes. As shown in Figure 3, a life-course social determinant of health inequality perspective suggests that segregation, poverty, walkability, job opportunities, air quality, professional shortages, and other factors may each effect some but not all life-stage specific health and well-being indicators.

Figure 3. Life Course and Social Determinants of Health Perspective



- Focus of What Public Health Can Lead vs Inform/Support:** Because of our understanding of the social determinants of health and population health inequalities and new evidence on the most effective ways to promote health and well-being, public health initiatives have undergone important changes in recent years. While traditional public health interventions around risk education and behavior change have continued, albeit with less funding, attention has focused to implementing the health in all policies approach. In this context, public health initiatives often take the form of engaging multiple institutional and community actors in improving neighborhood access to resources and opportunities and reducing neighborhood exposures to physical and social risks. Reflecting this approach, the review of public health programming and potential new directions to improve health also considered not only direct services being offered to at risk individuals but also the numerous efforts to improve living conditions for at risk communities.

Data Limitations

Central Valley Health Policy Institute

California State University, Fresno
 1625 East Shaw Avenue, Suite 146 M/S OF126 • Fresno, California 93710-8106

P 559.228.2150 F 559.228.2168 www.FresnoState.edu/chhs/cvhip/

There are three important limitations on the data and analyses reported here:

- 1) Population Health before the Affordable Care Act: Although all three papers consider three or more years of health outcome data, in all cases the analyses were confined to the years 2009-2013. While the Affordable Care Act (ACA) was passed in 2010 and planning/early implementation efforts for California's Medi-Cal expansion and Covered California were underway, the study period does not reflect the impacts of the ACA on utilization and outcomes.
- 2) Limited Individual Data: The availability of individual risk and prevention service use data varied, with more elements included in the birth data than in other sets. This means that there are likely to be a broad range of individual physiological and behavioral risk factors, important drivers for each of the study outcomes, not reflected here. At the same time, although our population health indicators reflect overall burden of disease, they do not include self-perceived care experiences, health assessment or quality of life.
- 3) Limited Neighborhood Data: Similarly, the range of neighborhood level indicators available was also limited. For example, although the neighborhood Walkability scores reflect local access to amenities, services, and opportunities for physical activity, they do not reflect other aspects of neighborhood design or resource access that may be crucial to population health.

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